# ACOPOSinverter P66

User's manual
1.60 DRAFT (February 2024)
MAACPIP66-ENG

Translation of the original documentation

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# 1 Safety information

Read through these instructions carefully and familiarize yourself with the device before installing, operating or servicing it. The warning notices listed below are included in all documentation and on the device itself and indicate potential risks and hazards or specific information that illustrates or simplifies a procedure.

**Notes**

## Danger!

**DANGER indicates a direct hazard that will result in death or serious injury if not avoided.**

## Warning!

**WARNING indicates a potential hazard that can result in death, serious injury and/or material damage if not avoided.**

## Caution!

**CAUTION indicates a potential hazard that can result in personal injury and/or material damage if not avoided.**

## Note:

**NOTE without the use of the danger symbol indicates a possible hazard that can result in material damage if not avoided.**

The term "inverter" in the context of this manual refers to the control unit of the frequency inverter as defined by the NEC.
Only qualified personnel are permitted to install, operate, service and repair electrical devices. B&R assumes no responsibility for possible consequences resulting from the use of this product.

**PLEASE NOTE**

Only qualified personnel are permitted to install, operate, control and service electrical devices. B&R is not liable for any damage resulting from the use of this material.
Qualified personnel are employees who have skills and knowledge regarding the design and operation of this electrical equipment and installations and who have completed training to recognize and avoid potential hazards.

### Personnel qualifications

Work on and with this product is only permitted to be carried out by appropriately trained and authorized personnel who are familiar with the contents of this manual and all associated product documentation. In addition, such personnel must have participated in safety training to recognize and avoid the hazards associated with the use of this product. Personnel must have sufficient technical training, know-how and experience and be able to foresee and identify potential hazards that may arise from the use of the product, the changing of settings and the mechanical, electrical and electronic equipment of the entire system. All personnel working on and with the product must be familiar with all applicable standards, guidelines and accident prevention regulations.

### Intended use

This product is an inverter for three-phase synchronous and induction motors and designed for industrial use according to the specifications and instructions in this manual. When using the product, all relevant safety regulations and guidelines as well as the specified requirements and technical data must be observed. The product must be installed outside the ATEX zone. Before use, a risk assessment must be carried out with regard to the intended application. Based on the results of this analysis, appropriate safety

measures must be implemented. Since the product is used as a component of a complete system, personal safety must be ensured by appropriate design of the complete system (for example, appropriate machine design). Any use other than that expressly permitted is prohibited and may present hazards. Only qualified personnel are permitted to install, operate, control and service electrical devices.

**Product-related information**

## Danger!

**RISK OF ELECTRIC SHOCK OR ARC AND RISK OF EXPLOSION**

- **Work on and with this drive system is only permitted to be carried out by appropriately trained and authorized personnel who are familiar with the contents of this manual and all associated product documentation and who have completed safety training to recognize and avoid the hazards involved. Installation, adjustment, repair and servicing must be carried out by qualified personnel.**
- **The system integrator is responsible for compliance with all relevant local and national electrical engineering requirements and any other applicable regulations regarding the protective grounding of all equipment.**
- **Many components of the product, including the printed circuits, are supplied by the mains voltage.**
- **Only use electrically insulated tools and measuring instruments with the correct rated voltage.**
- **Do not touch any unshielded components or terminals when voltage is applied.**
- **Motors can generate voltage when the shaft is rotated. Before performing any work on the drive system, secure the motor shaft against being driven by an external source.**
- **With AC voltage, voltage can be coupled out to unused conductors in the motor cable. Insulate unused conductors in the motor cable at both ends.**
- **Do not short-circuit the DC bus terminals, the DC bus capacitors or the braking resistor terminals.**
- **Before performing any work on the drive system:**
  - **Disconnect all power supplies, including any external voltage to the control unit. Note that the circuit breaker or main power disconnect switch does not de-energize all circuits.**
  - **Affix a DO NOT SWITCH ON sign to all circuit breakers connected to the inverter system.**
  - **Lock all circuit breakers in the open position.**
  - **Wait 15 minutes to allow the DC bus capacitors to discharge.**
  - **Follow the instructions included in section "Checking for the absence of voltage" in the product installation instructions.**
- **Before switching on the power supply to the inverter system:**
  - **Ensure that work is completed and that there are no hazards resulting from installation.**
  - **If the mains input terminals and motor output terminals are grounded and shorted, remove the grounding and shorts circuits from the main input terminals and motor output terminals.**
  - **Ensure that all devices are properly grounded.**
  - **Ensure that all protective equipment such as covers, doors and screens are installed or closed.**
- **Install and close all covers before switching on the power supply.**

**Failure to follow these instructions will result in death or life-threatening injury.**

Inverter systems can cause unexpected movements due to incorrect wiring, incorrect settings, incorrect data other errors.

## Warning!

**UNINTENDED OPERATION OF THE EQUIPMENT**

- **All EMC requirements must be strictly observed during wiring.**
- **Operating the product using unknown or unsuitable settings or data is not permitted.**
- **Perform a comprehensive commissioning test.**

**Failure to follow these instructions can result in serious bodily injury and even death or damage to the material.**

Damaged products and accessories may cause electric shock or unexpected operation of the equipment.

## Danger!

**ELECTRIC SHOCK OR UNEXPECTED OPERATION OF THE EQUIPMENT**

**The use of damaged products or accessory products is not permitted.**

**Failure to follow these instructions will result in death or life-threatening injury.**

In the event of damage, contact your local B&R sales representative.

## Warning!

**LOSS OF CONTROL**

- **When developing a control plan, it is necessary to take into account possible error states of the control paths and provide means for certain critical control functions through which a safe state can be achieved after path failure. Examples of critical control functions include emergency switch-off, overrun stop, power failure and restart.**
- **Separate or redundant control paths must be provided for critical control functions.**
- **System control paths can include communication connections. The effects of unforeseen transfer delays or connection disruptions must be taken into account.**
- **All accident prevention regulations and local safety codes[1)] must be followed.**
- **Each implementation of the product must be individually and carefully tested for proper operation before being put into service.**

**Failure to follow these instructions can result in serious bodily injury and even death or damage to the material.**

## Note:

**IRREPARABLE DAMAGE DUE TO INCORRECT MAINS VOLTAGE**

- **Before switching on and configuring the product, it must be ensured that it is approved for the existing mains voltage.**

**Failure to follow these instructions can result in bodily injury or damage to devices.**

During operating, the products described in these instructions can reach temperatures above 80°C.

[1)] For the USA: For additional information, see NEMA ICS 1.1 (latest edition), "Safety guidelines for the application, installation and maintenance of solid-state control" and NEMA ICS 7.1 (latest edition), "Safety standards for construction and guide for selection, installation and operation of adjustable-speed drive systems".

## Warning!

**HOT SURFACES**

- **Avoid all contact with hot surfaces.**
- **Keep flammable or heat-sensitive parts away from the immediate vicinity of hot surfaces.**
- **Before handling the product, ensure that it has cooled down sufficiently.**
- **Ensure that there is sufficient heat dissipation by performing a test run at maximum load.**

**Failure to follow these instructions can result in serious bodily injury and even death or damage to the material.**

The product is approved for use outside danger zones (explosive atmospheres). Install the device only in areas free of hazardous atmospheres.

## Danger!

**RISK OF EXPLOSION**

**Install and use this device only outside danger zones.**

**Failure to follow these instructions will result in death or serious injury.**

Machines, controllers and associated devices are usually integrated into the network. Unauthorized persons and malware can gain access to the machine or other devices on the machine's network/fieldbus and connected networks via insufficiently secured access to software and networks.

## Warning!

**UNAUTHORIZED ACCESS TO THE MACHINE VIA SOFTWARE AND NETWORK**

**In your hazard and risk analysis, take into account all dangers that may arise by accessing and operating the network/fieldbus and develop a suitable cybersecurity concept.**

**Ensure that the hardware and software infrastructure into which the machine will be integrated, as well as the organizational policies and guidelines, cover access to this infrastructure by taking into account the results of the hazard and risk analysis, that they are implemented according to best practices and standards and that they address IT and cybersecurity concerns (e.g. ISO/IEC 27000 for common criteria for assessing the security of information technology systems, ISO/IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - "Standard of good practice for information security").**

**Ensure the effectiveness of your IT and cybersecurity system by using appropriate, proven methods.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

## Warning!

**LOSS OF CONTROL**

**Perform a comprehensive commissioning test to ensure that the communication monitoring system properly detects communication interruptions.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

## 1.1 Intended use

In all cases, applicable national and international standards, regulations and safety measures must be taken into account and observed!

The B&R products described in this manual are intended for use in industry and industrial applications. Intended use includes controlling, operating, monitoring, driving and visualizing as part of automation processes in machines and systems.

The use of B&R products is only permitted in their original condition. Modifications and extensions are only permitted if they are described in this manual.

B&R Industrial Automation GmbH assumes no any liability for damages of any kind arising from the use of B&R products outside of their intended use.

B&R products were not designed, developed and manufactured for any use involving serious risks or hazards that could result in death, injury, serious physical impairment or loss of any kind without the implementation of exceptionally stringent safety precautions.

B&R products are explicitly not intended for use in the following applications:

- Monitoring and controlling thermonuclear processes
- Controlling weapon systems
- Flight and traffic management systems for passenger and freight transportation
- Health monitoring and life support systems

The B&R products described in this manual are designed as "open equipment" (EN 61131-2) and "open type equipment" (UL) and are therefore designated for installation in an enclosed control cabinet.

Servo drives, inverter modules and frequency inverters from B&R Industrial Automation GmbH are not dual-use goods per Annex I | 3A225 of Regulation (EU) 2021/821 of the European Parliament and European Council. The electrical output frequency of these modules is monitored; if the limit frequency is exceeded, the current movement is aborted and an error is reported.
Servo drives, inverter modules and frequency inverters from with the dual-use option are dual-use goods per Annex I | 3A225 of Regulation (EU) 2021/821 of the European Parliament and European Council. The electrical output frequency of these modules is not monitored. Modules with the dual-use option are subject to various export restrictions.

# 2 General information

The products in the ACOPOSinverter family add a cost-optimized drive solution for motors to the B&R portfolio. The drives have been especially designed for use with asynchronous motors in efficiency classes IE2 and IE3, but they can also be used with synchronous motors.

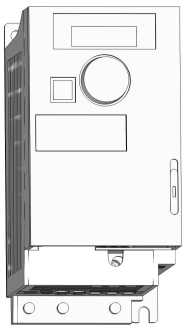
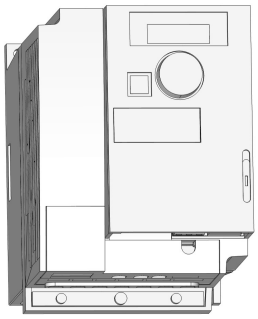
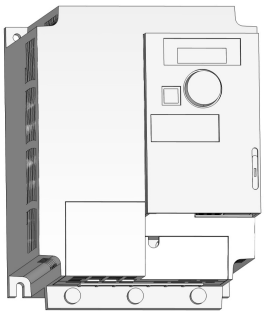
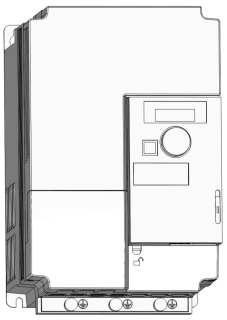
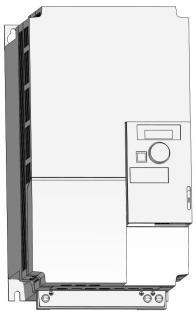
The product family differentiates between mains voltages and motor cable classes. The ACOPOSinverter is supplied with up to 240 V, 500 V or 600 V and can control motors in the power classes 0.18 kW to 15 kW (IEC) or 0.25 HP to 20 HP (NEMA).

A communication card is required to operate an ACOPOSinverter on a controller. Communication cards of type POWERLINK and X2X have been fully integrated, i.e. special configuration and user interfaces for Automation Studio have been designed to make it easier to commission the drive and to integrate it into B&R in-house development environments mapp Motion and mapp Cockpit. Depending on the requirement specifications, it is possible to choose between two function models. Smaller applications can be implemented with the license-free "Direct control" function model; demanding applications (e.g. with several drives) can be implemented with mapp Motion.

## 2.1 Device overview

Depending on the model, the ACOPOSinverter P66 product family includes up to five inverter sizes (1, 2, 3, 4 and 5) and is ideally suited for integrating compact, high-performance inverter solutions.

### IP20 protection

<table>
<tr><td>Size 1<br>8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000, 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000</td><td>Size 2<br>8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000, 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000, 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000, 8I66T400150.00-000, 8I66T600075.00-000, 8I66T600150.00-000</td></tr>
<tr><td>• 240 V 1-phase from 0.18 to 0.75 kW (0.25 to 1 PS)<br>• 240 V 3-phase from 0.18 to 0.75 kW (0.25 to 1 PS)<br>  </td><td>• 240 V 1-phase from 1.1 to 2.2 kW (1.5 to 3 PS)<br>• 240 V 3-phase from 1.1 to 2.2 kW (1.5 to 3 PS)<br>• 500 V 3-phase from 0.37 to 1.5 kW (0.5 to 2 PS)<br>• 600 V 3-phase from 0.75 to 1.5 kW (1 to 2 PS)<br>  </td></tr>
<tr><td>Size 3<br>8I66T200300.00-000, 8I66T200400.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000, 8I66T600220.00-000, 8I66T600400.00-000</td><td>Size 4<br>8I66T200550.00-000, 8I66T200750.00-000, 8I66T400550.00-000, 8I66T400750.00-000, 8I66T600550.00-000, 8I66T600750.00-000,</td></tr>
<tr><td>• 240 V 3-phase from 3 to 4 kW (3 to 5 HP)<br>• 500 V 3-phase from 2.2 to 4 kW (up to 5 HP)<br>• 600 V 3-phase from 2.2 to 4 kW (up to 5 PS)<br>  </td><td>• 240 V 3-phase from 5.5 to 7.5 kW (7.5 to 10 HP)<br>• 500 V 3-phase from 5.5 to 7.5 kW (7.5 to 10 PS)<br>• 600 V 3-phase from 5.5 to 7.5 kW (7.5 to 10 PS)<br>  </td></tr>
<tr><td>Size 5<br>8I66T201100.00-000, 8I66T201500.00-000, 8I66T401100.00-000, 8I66T401500.00-000, 8I66T601100.00-000, 8I66T601500.00-000,</td><td></td></tr>
<tr><td>• 240 V 3-phase from 11 to 15 kW (15 to 20 PS)<br>• 500 V 3-phase from 11 to 15 kW (15 to 20 PS)<br>• 600 V 3-phase from 11 to 15 kW (15 to 20 PS)<br>  </td><td></td></tr>
</table>

## IP65 protection

| Size 1<br>8I66S200018.00-065, 8I66S200037.00-065, 8I66S200055.00-065, 8I66S200075.00-065 | Size 2<br>8I66T400037.00-065, 8I66T400055.00-065, 8I66T400075.00-065, 8I66T400110.00-065, 8I66T400150.00-065 |
|---|---|
| • 240 V 1-phase from 0.18 to 0.75 kW (0.25 to 1 HP)<br> | • 500 V 3-phase from 0.37 to 1.5 kW (0.5 to 2 HP)<br> |
| **Size 3**<br>8I66S200110.00-065, 8I66S200150.00-065, 8I66S200220.00-065, 8I66T400220.00-065, 8I66T400300.00-065, 8I66T400400.00-065 | **Size 4**<br>8I66T400550.00-065, 8I66T400750.00-065 |
| • 240 V 1-phase from 1.1 to 2.2 kW (1.5 to 3 HP)<br>• 500 V 3-phase from 2.2 to 4 kW (up to 5 HP)<br> | • 500 V 3-phase from 5.5 to 7.5 kW (7.5 to 10 HP)<br> |

## IP66 protection

| Size 1<br>8I66S200018.00-066, 8I66S200037.00-066, 8I66S200055.00-066, 8I66S200075.00-066 | Size 2<br>8I66T400037.00-066, 8I66T400055.00-066, 8I66T400075.00-066, 8I66T400110.00-066, 8I66T400150.00-066 |
|---|---|
| • 240 V 1-phase from 0.18 to 0.75 kW (0.25 to 1 HP)<br> | • 500 V 3-phase from 0.37 to 1.5 kW (0.5 to 2 HP)<br> |
| **Size 3**<br>8I66S200110.00-066, 8I66S200150.00-066, 8I66S200220.00-066, 8I66T400220.00-066, 8I66T400300.00-066, 8I66T400400.00-066 | **Size 4**<br>8I66T400550.00-066, 8I66T400750.00-066 |
| • 240 V 1-phase from 1.1 to 2.2 kW (1.5 to 3 HP)<br>• 500 V 3-phase from 2.2 to 4 kW (up to 5 HP)<br> | • 500 V 3-phase from 5.5 to 7.5 kW (7.5 to 10 HP)<br> |

## 2.2 Model number key

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Product area | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | Motion group |
| | Product family | | | | | | | | | | | | | |
| | I | | | | | | | | | | | | | ACOPOSinverter |
| | | Model | | | | | | | | | | | | |
| | | 66 | | | | | | | | | | | | ACOPOSinverter P66 |
| | | | Number of phases | | | | | | | | | | | |
| | | | S | | | | | | | | | | | 1-phase |
| | | | T | | | | | | | | | | | 3-phase |
| | | | | Voltage range | | | | | | | | | | |
| | | | | 2 | | | | | | | | | | 200 to 240 V |
| | | | | 4 | | | | | | | | | | 380 to 500 V |
| | | | | 6 | | | | | | | | | | 525 to 600 V |
| | | | | | Nominal power | | | | | | | | | |
| | | | | | 0-9 | | | | | | | | | W x $10^5$ |
| | | | | | | 0-9 | | | | | | | | W x $10^4$ |
| | | | | | | | 0-9 | | | | | | | W x $10^3$ |
| | | | | | | | | 0-9 | | | | | | W x $10^2$ |
| | | | | | | | | | 0-9 | | | | | W x 10 |
| | | | | | | | | | | Interface | | | | |
| | | | | | | | | | | . | 00 | | | Version |
| | | | | | | | | | | . | 0C | | | CAN |
| | | | | | | | | | | . | 0P | | | POWERLINK |
| | | | | | | | | | | . | 0X | | | X2X |
| | | | | | | | | | | | | Version | | |
| | | | | | | | | | | | | - | 000 | Version control |
| | | | | | | | | | | | | - | 065 | IP65 protection |
| | | | | | | | | | | | | - | 066 | IP66 protection |

| Examples | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | I | 66 | S | 2 | 0 | 0 | 0 | 1 | 8 | . | 00 | - | 000 | ACOPOSinverter P66, 1 x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery |
| 8 | I | 66 | S | 2 | 0 | 0 | 0 | 1 | 8 | . | 0P | - | 000 | ACOPOSinverter P66, 1 x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface |
| 8 | I | 66 | S | 2 | 0 | 0 | 0 | 1 | 8 | . | 0P | - | 065 | ACOPOSinverter P66, IP65, 1 x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface |
| 8 | I | 66 | T | 2 | 0 | 0 | 1 | 5 | 0 | . | 00 | - | 000 | ACOPOSinverter P66, 3 x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper |
| 8 | I | 66 | T | 2 | 0 | 0 | 1 | 5 | 0 | . | 0P | - | 000 | ACOPOSinverter P66, 3 x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper, POWERLINK interface |
| 8 | I | 66 | T | 2 | 0 | 0 | 1 | 5 | 0 | . | 0P | - | 066 | ACOPOSinverter P66, IP66, 3 x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper, POWERLINK interface |
| 8 | I | 66 | T | 4 | 0 | 0 | 3 | 0 | 0 | . | 00 | - | 000 | ACOPOSinverter P66, 3 x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery |
| 8 | I | 66 | T | 4 | 0 | 0 | 3 | 0 | 0 | . | 0P | - | 000 | ACOPOSinverter P66, 3 x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery, POWERLINK interface |
| 8 | I | 66 | T | 6 | 0 | 1 | 1 | 0 | 0 | . | 00 | - | 000 | ACOPOSinverter P66, 3 x 525 to 600 V, 11 kW, integrated EMC filter and brake chopper |
| 8 | I | 66 | T | 6 | 0 | 1 | 1 | 0 | 0 | . | 0P | - | 000 | ACOPOSinverter P66, 3 x 525 to 600 V, 11 kW, integrated EMC filter and brake chopper, POWERLINK interface |

# 3 Technical data

## 3.1 IP20 protection

### 3.1.1 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000

#### 3.1.1.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 1-phase 200 to 240 V** | |
| 8I66S200018.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 0.18 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66S200037.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66S200055.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66S200075.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| | **Included in delivery** | |
| | **Optional EMC kit** | |
| 8I0XE066.401-1 | ACPi P66 EMC kit for size A 1ph. 200…240 VAC: Power output class: 0.18 - 0.75 kW 3ph. 200…240 VAC: Power output class: 0.18 - 0.75 kW | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FS009.200-2 | 9 A EMC filter for ACOPOSinverter P76 and P74new (1-phase 200-240 V, 0.18-0.75 kW). | |
| | **Optional braking resistors** | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CS004.000-1 | Mains choke 1-phase 4 A Can be used for ACOPOSinverter P66, P74new, P76 1x 200 to 240 VAC: 0.18 to 0.37 kW | |
| 8I0CS007.000-1 | Mains choke 1-phase 7 A Can be used for ACOPOSinverter P66, P74new, P76 1x 200 to 240 VAC: 0.55 to 0.75 kW | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |

Table 1: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Order data

## Technical data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 1: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Order data

### 3.1.1.2 Technical data

| Order number | 8I66S200018.00-000 | 8I66S200037.00-000 | 8I66S200055.00-000 | 8I66S200075.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| **Motor power** | | | | |
| Specified on nameplate | 0.18 kW (0.25 HP) | 0.37 kW (0.5 HP) | 0.55 kW (0.75 HP) | 0.75 kW (1 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 1x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 0.6 kVA | 1 kVA | 1.4 kVA | 1.8 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 1 kA [1] | | | |
| Inrush current | Max. 9.6 A [2] | | | |
| Mains current | | | | |
| At 200 VAC | 3.1 A [3] | 5.2 A [3] | 6.8 A [3] | 8.8 A [3] |
| At 240 VAC | 2.6 A [3] | 4.3 A [3] | 5.7 A [3] | 7.4 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 22 W | 32 W | 42 W | 48 W |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| With add-on filter | 8I0FS009.200-2 | | | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 20 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 50 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 100 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 1.5 A [5] | 3.3 A [5] | 3.7 A [5] | 4.8 A [5] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 2.3 A | 5 A | 5.6 A | 7.2 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |

Table 2: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Technical data

## Technical data

| Order number | 8I66S200018.00-000 | 8I66S200037.00-000 | 8I66S200055.00-000 | 8I66S200075.00-000 |
|---|---|---|---|---|
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 40 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |

Table 2: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Technical data

| Order number | 8I66S200018.00-000 | 8I66S200037.00-000 | 8I66S200055.00-000 | 8I66S200075.00-000 |
|---|---|---|---|---|
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10; 25): 2.1% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (50; 25): 2.1% (1x 200 VAC); 1.8% (1x 240 VAC)<br>IE2 (10; 50): 2.3% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (50; 50): 2.1% (1x 200 VAC); 1.8% (1x 240 VAC)<br>IE2 (90; 50): 2.3% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (10; 100): 2.7% (1x 200 VAC); 2.4% (1x 240 VAC)<br>IE2 (50; 100): 2.7% (1x 200 VAC); 2.2% (1x 240 VAC)<br>IE2 (90; 100): 3.1% (1x 200 VAC); 2.6% (1x 240 VAC) | IE2 (10; 25): 1.8% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (50; 25): 1.6% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (10; 50): 1.8% (1x 200 VAC); 1.4% (1x 240 VAC)<br>IE2 (50; 50): 1.7% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (90; 50): 1.8% (1x 200 VAC); 1.4% (1x 240 VAC)<br>IE2 (10; 100): 2.4% (1x 200 VAC); 2% (1x 240 VAC)<br>IE2 (50; 100): 2.2% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (90; 100): 2.5% (1x 200 VAC); 2% (1x 240 VAC) | IE2 (10; 25): 1.6% (1x 200 VAC); 1.1% (1x 240 VAC)<br>IE2 (50; 25): 1.5% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (10; 50): 1.7% (1x 200 VAC); 1.4% (1x 240 VAC)<br>IE2 (50; 50): 1.6% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (90; 50): 1.8% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (10; 100): 2.3% (1x 200 VAC); 2% (1x 240 VAC)<br>IE2 (50; 100): 2.2% (1x 200 VAC); 1.8% (1x 240 VAC)<br>IE2 (90; 100): 2.5% (1x 200 VAC); 2% (1x 240 VAC) | IE2 (10; 25): 1.2% (1x 200 VAC); 1.1% (1x 240 VAC)<br>IE2 (50; 25): 1.1% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (10; 50): 1.5% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (50; 50): 1.4% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (90; 50): 1.6% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (10; 100): 2.3% (1x 200 VAC); 2% (1x 240 VAC)<br>IE2 (50; 100): 2.2% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (90; 100): 2.6% (1x 200 VAC); 2.1% (1x 240 VAC) |
| Nominal losses in standby mode | 6 W | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 2: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Technical data

## Technical data

| Order number | 8I66S200018.00-000 | 8I66S200037.00-000 | 8I66S200055.00-000 | 8I66S200075.00-000 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 72 mm | | | |
| Height | 188 mm | | | |
| Height without shield plate | 143 mm | | | |
| Depth | 109 mm | 128 mm | 143 mm | |
| Weight | 0.8 kg | 1 kg | 1.1 kg | |

Table 2: 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.2 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000

### 3.1.2.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 1-phase 200 to 240 V** | |
| 8I66S200110.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66S200150.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66S200220.00-000 | Base device for ACOPOSinverter P66 and P64new, 1x 200 to 240 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| | **Included in delivery** | |
| | **Optional EMC kit** | |
| 8I0XE066.402-1 | ACPi P66 EMC kit for size B 1ph. 200…240 VAC: Power output class: 1.1 -2.2 kW 3ph. 200…240 VAC: Power output class: 1.1 - 2.2 kW 3ph. 380…500 VAC: Power output class: 0.37 - 1.5 kW 3ph. 525…600 VAC: Power output class: 0.75 - 1.5 kW | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.021-1 | ACPi P66 Lüfter 1ph. 200…240 VAC: Leistungsklasse: 1,1 - 2,2 kW 3ph. 380…500 VAC: Leistungsklasse: 0,37 - 1,5 kW 3ph. 525…600 VAC: Leistungsklasse: 0,75 - 1,5 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FS016.200-1 | 16 A EMC filter for ACOPOSinverter P76 and P74new (1-phase 200-240 V, 1.1-1.5 kW). | |
| 8I0FS016.200-3 | ACPi additional EMC input filter 3-phase 47 A supply voltage 1-phase: 200...240 V 50/60 Hz | |
| 8I0FS022.200-1 | 22 A EMC filter for ACOPOSinverter P76 and P74new (1-phase 200-240 V, 2.2 kW). | |
| 8I0FS022.200-2 | ACPi additional EMC input filter 1-phase 22 A supply voltage 1-phase: 200...240 V 50/60 Hz | |
| | **Optional braking resistors** | |
| 8I0BR060.000-1 | Braking resistor ohmic value: 60 Ω continuous braking power: 0.10 kW degree of protection (IP): IP20 | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CS018.000-1 | Mains choke 1-phase 18 A Can be used for ACOPOSinverter P66, P74new, P76 1x 200 to 240 VAC: 1.1 to 2.2 kW | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |

Table 3: 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 - Order data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 3: 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 - Order data

### 3.1.2.2 Technical data

| Order number | 8I66S200110.00-000 | 8I66S200150.00-000 | 8I66S200220.00-000 |
|---|---|---|---|
| **General information** | | | |
| Certifications | | | |
| CE | | Yes | |
| UKCA | | Yes | |
| UL | | cULus E225616<br>Power conversion equipment | |
| **Motor power** | | | |
| Specified on nameplate | 1.1 kW (1.5 HP) | 1.5 kW (2 HP) | 2.2 kW (3 HP) |
| **Mains connection** | | | |
| Mains input voltage | | 1x 200 VAC -15% to 240 VAC +10% | |
| Frequency | | 50 to 60 Hz ±5% | |
| Apparent power (at 240 VAC) | 2.5 kVA | 3.2 kVA | 4.4 kVA |
| Max. assumed short-circuit current (Isc) (short-circuit current at connection point) | | 1 kA [1] | |
| Inrush current | | Max. 19.1 A [2] | |
| Mains current | | | |
| At 200 VAC | 12.2 A [3] | 16 A [3] | 22.1 A [3] |
| At 240 VAC | 10.3 A [3] | 13.4 A [3] | 18.5 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 66 W | 82 W | 110 W |
| Integrated EMC filter | | Yes [4] | |
| **Line-conducted and radiated emissions** | | | |
| With integrated filter | | | |
| Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power network) | | 10 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system) | | 10 m | |
| With add-on filter | 8I0FS016.200-1 | | 8I0FS022.200-1 |
| With add-on filter | | | |
| Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power network) | | 20 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power network) | | 50 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system) | | 100 m | |
| **Motor connection** | | | |
| Nominal output current | 6.9 A [5] | 8 A [5] | 11 A [5] |
| Derating of continuous output current depending on ambient temperature | | | |
| At nominal clock frequency (4 kHz) | | No derating (up to 50°C) | |
| Other clock frequencies | | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | |
| Derating of continuous output current depending on installation elevation | | | |
| Starting at 1000 m above sea level | | 1%, per 100 m | |
| Max. transient current for 60 s [6] | 10.4 A | 12 A | 16.5 A |
| Output frequency range | | 0.1 to 599 Hz | |
| Nominal clock frequency | | 4 kHz | |
| Clock frequency | | | |
| Min. | | 2 kHz | |
| Max. | | 16 kHz | |
| Braking torque | | | |
| With braking resistor | | Up to 170% of the rated motor torque | |
| Max. motor cable length | | | |
| Shielded cable | | 50 m | |
| Non-shielded cable | | 100 m | |
| Motor control profiles | | | |
| Induction motor | | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | |
| Synchronous motor | | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | |

Table 4: 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 - Technical data

## Technical data

| Order number | 8I66S200110.00-000 | 8I66S200150.00-000 | 8I66S200220.00-000 |
|---|---|---|---|
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | |
| **Brake chopper** | | | |
| Integrated dynamic brake transistors | Yes | | |
| Min. resistance value (external) | 27 Ω | | 25 Ω |
| **24 VDC power supply** | | | |
| Input voltage | 24 VDC (-15%/+20%) | | |
| Current | Max. 1.1 A | | |
| **Available internal power supplies** | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | |
| Output voltage 24 VDC | | | |
| Max. output current at 24 VDC | 100 mA | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | |
| Output voltage 10 VDC | | | |
| Max. output current at 10 VDC | 10 mA | | |
| **Interfaces** | | | |
| POWERLINK | | | |
| Type | Type 3 [7)] | | |
| **Digital inputs** | | | |
| Quantity | 6 [8)] | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | |
| Input circuit | Source or sink | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | |
| Electrical isolation | | | |
| Input - ACOPOSinverter | Yes | | |
| Input - Input | No | | |
| Sampling time | 8 ms ±0.7 ms | | |
| Digital input 5 | | | |
| Max. input frequency | 20 kHz | | |
| **Safe input - STO (Safe Torque Off)** | | | |
| Quantity | 1 | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | |
| Input impedance | 1.5 kΩ | | |
| Input impedance | | | |
| Current consumption | 16 mA | | |
| Electrical isolation | | | |
| Input - ACOPOSinverter | Yes | | |
| Input - Input | No | | |
| **Analog inputs** | | | |
| Quantity | 3 | | |
| Electrical isolation | | | |
| Input - Input | No | | |
| Input - ACOPOSinverter | Yes | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | |
| Input | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | |
| Resolution | 10-bit | | |
| Sampling time | 2 ms | | |
| Input impedance | | | |
| Voltage | 30 kΩ | | |
| Current | 250 Ω | | |
| **Digital outputs** | | | |
| Quantity | 1 | | |
| Nominal voltage | 24 VDC -15%/+20% | | |
| Max. voltage | 30 VDC | | |
| Output circuit | Source or sink | | |
| Sampling time | 2 ms | | |
| Max. current | 100 mA | | |
| **Relay outputs** | | | |
| Quantity | 2 | | |
| Nominal voltage | 30 VDC / 250 VAC | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | |

Table 4: 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 - Technical data

| Order number | 8I66S200110.00-000 | 8I66S200150.00-000 | 8I66S200220.00-000 |
|---|---|---|---|
| Variant | | | |
| Relay 1 | | 1 changeover contact | |
| Relay 2 | | 1 normally open contact | |
| Electrical isolation | | | |
| Output - ACOPOSinverter | | Yes | |
| Output - Output | | No | |
| Response time (max.) | | 2 ms | |
| **Analog outputs** | | | |
| Quantity | | 1 | |
| Output | | 0 to 10 V or 0 to 20 mA | |
| Nonlinearity | | ±0.3% | |
| Basic accuracy | | At 25°C: ±1%<br>At -10 to 60°C: ±2% | |
| Electrical isolation | | | |
| Output - ACOPOSinverter | | Yes | |
| Output - Output | | No | |
| Max. load impedance | | | |
| Voltage | | 470 Ω | |
| Current | | 800 Ω | |
| Update time | | 2 ms | |
| Resolution | | 10-bit | |
| **Electrical properties** | | | |
| Energy efficiency (IE classification) | | | |
| Power dissipation relative to continuous apparent power | IE2 (10; 25): 1.2% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (50; 25): 1.1% (1x 200 VAC); 0.9% (1x 240 VAC)<br>IE2 (10; 50): 1.5% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (50; 50): 1.4% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (90; 50): 1.5% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (10; 100): 2.2% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (50; 100): 2.1% (1x 200 VAC); 1.8% (1x 240 VAC)<br>IE2 (90; 100): 2.4% (1x 200 VAC); 2% (1x 240 VAC) | IE2 (10; 25): 1.2% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (50; 25): 1.1% (1x 200 VAC); 0.9% (1x 240 VAC)<br>IE2 (10; 50): 1.5% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (50; 50): 1.4% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (90; 50): 1.6% (1x 200 VAC); 1.3% (1x 240 VAC)<br>IE2 (10; 100): 2.2% (1x 200 VAC); 1.9% (1x 240 VAC)<br>IE2 (50; 100): 2.2% (1x 200 VAC); 1.8% (1x 240 VAC)<br>IE2 (90; 100): 2.6% (1x 200 VAC); 2.1% (1x 240 VAC) | IE2 (10; 25): 1% (1x 200 VAC); 0.9% (1x 240 VAC)<br>IE2 (50; 25): 0.9% (1x 200 VAC); 0.8% (1x 240 VAC)<br>IE2 (10; 50): 1.3% (1x 200 VAC); 1.1% (1x 240 VAC)<br>IE2 (50; 50): 1.2% (1x 200 VAC); 1% (1x 240 VAC)<br>IE2 (90; 50): 1.4% (1x 200 VAC); 1.2% (1x 240 VAC)<br>IE2 (10; 100): 2% (1x 200 VAC); 1.7% (1x 240 VAC)<br>IE2 (50; 100): 2% (1x 200 VAC); 1.6% (1x 240 VAC)<br>IE2 (90; 100): 2.4% (1x 200 VAC); 1.9% (1x 240 VAC) |
| Nominal losses in standby mode | | 6 W | |
| **Operating conditions** | | | |
| Degree of protection per EN 61800-5-1 | | IP20 | |
| Relative humidity per IEC 60068-2-3 | | 5 to 95%, non-condensing<br>No dripping water | |
| Maximum installation elevation | | ≤1000 m without derating<br>1000 to 3000 m with Derating [9] | |
| Max. pollution degree per IEC/EN 61800-5-1 | | 2 (non-conductive pollution) | |
| Ambient conditions per IEC 60721-3-3 | | Class 3C3 and 3S2 | |
| Operating position | | Vertical mounting orientation ±10° | |
| **Ambient conditions** | | | |
| Temperature | | | |
| Operation | | -10 to 50°C without derating<br>50 to 60°C with derating | |
| Storage | | -25 to 70°C | |
| Max. vibration resistance | | $1\ g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | |
| **Mechanical properties** | | | |
| Dimensions | | | |
| Width | | 105 mm | |
| Height | | 189 mm | |
| Height without shield plate | | 143 mm | |
| Depth | | 158 mm | |
| Weight | | 1.6 kg | |

Table 4: 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.3 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000

### 3.1.3.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 200 to 240 V** | |
| 8I66T200018.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 0.18 kW, integrated brake chopper | |
| 8I66T200037.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 0.37 kW, integrated brake chopper | |
| 8I66T200055.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 0.55 kW, integrated brake chopper | |
| 8I66T200075.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 0.75 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT007.200-1 | 7 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 0.18-0.75 kW). | |
| | **Optional EMC kit** | |
| 8I0XE066.401-1 | ACPi P66 EMC kit for size A 1ph. 200…240 VAC: Power output class: 0.18 - 0.75 kW 3ph. 200…240 VAC: Power output class: 0.18 - 0.75 kW | |
| | **Optional braking resistors** | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT004.000-1 | Mains choke 3-phase, 4 A, 50/60 for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 5: 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 - Order data

### 3.1.3.2 Technical data

| Order number | 8I66T200018.00-000 | 8I66T200037.00-000 | 8I66T200055.00-000 | 8I66T200075.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | - | | UL E225616<br>Power conversion equipment | - |
| UL | cULus E225616<br>Power conversion equipment | | - | cULus E225616<br>Power conversion equipment |
| CSA | - | | CSA E272421<br>Industrial control equipment | - |
| **Motor power** | | | | |
| Specified on nameplate | 0.18 kW (0.25 HP) | 0.37 kW (0.5 HP) | 0.55 kW (0.75 HP) | 0.75 kW (1 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 0.6 kVA | 1.1 kVA | 1.5 kVA | 2 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 9.6 A [2] | | | |
| Mains current | | | | |
| At 200 VAC | 1.8 A [3] | 3.1 A [3] | 4.3 A [3] | 5.6 A [3] |
| At 240 VAC | 1.5 A [3] | 2.6 A [3] | 3.6 A [3] | 4.7 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 21 W | 34 W | 40 W | 49 W |
| Integrated EMC filter | No | | | |
| **Line-conducted and radiated emissions** | | | | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 1 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 5 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 5 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 1.5 A [4] | 3.3 A [4] | 3.7 A [4] | 4.8 A [4] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [5] | 2.3 A | 5 A | 5.6 A | 7.2 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | Up to 170% of the rated motor torque | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |

Table 6: 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 - Technical data

## Technical data

| Order number | 8I66T200018.00-000 | 8I66T200037.00-000 | 8I66T200055.00-000 | 8I66T200075.00-000 |
|---|---|---|---|---|
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 40 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [6)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [7)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |

Table 6: 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 - Technical data

| Order number | 8I66T200018.00-000 | 8I66T200037.00-000 | 8I66T200055.00-000 | 8I66T200075.00-000 |
|---|---|---|---|---|
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 2.1% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 25): 1.9% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (10, 50): 2.3% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 50): 2.1% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (90, 50): 2.3% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (10, 100): 2.7% (3x 200 VAC), 2.4% (3x 240 VAC)<br>IE2 (50, 100): 2.5% (3x 200 VAC), 2.2% (3x 240 VAC)<br>IE2 (90, 100): 2.9% (3x 200 VAC), 2.4% (3x 240 VAC) | IE2 (10, 25): 1.7% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (50, 25): 1.6% (3x 200 VAC), 1.0% (3x 240 VAC)<br>IE2 (10, 50): 1.8% (3x 200 VAC), 1.4% (3x 240 VAC)<br>IE2 (50, 50): 1.7% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (90, 50): 1.7% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (10, 100): 2.4% (3x 200 VAC), 2.0% (3x 240 VAC)<br>IE2 (50, 100): 2.2% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (90, 100): 2.4% (3x 200 VAC), 2.0% (3x 240 VAC) | IE2 (10, 25): 1.6% (3x 200 VAC), 1.1% (3x 240 VAC)<br>IE2 (50, 25): 1.5% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 50): 1.7% (3x 200 VAC), 1.4% (3x 240 VAC)<br>IE2 (50, 50): 1.6% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (90, 50): 1.7% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (10, 100): 2.3% (3x 200 VAC), 2% (3x 240 VAC)<br>IE2 (50, 100): 2.1% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (90, 100): 2.3% (3x 200 VAC), 2% (3x 240 VAC) | IE2 (10, 25): 1.2% (3x 200 VAC), 1.1% (3x 240 VAC)<br>IE2 (50, 25): 1.1% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 50): 1.5% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (50, 50): 1.4% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (90, 50): 1.5% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (10, 100): 2.3% (3x 200 VAC), 2% (3x 240 VAC)<br>IE2 (50, 100): 2.2% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (90, 100): 2.5% (3x 200 VAC), 2% (3x 240 VAC) |
| Nominal losses in standby mode | 6 W | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 6: 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 - Technical data

## Technical data

| Order number | 8I66T200018.00-000 | 8I66T200037.00-000 | 8I66T200055.00-000 | 8I66T200075.00-000 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 72 mm | | | |
| Height | 188 mm | | | |
| Height without shield plate | 143 mm | | | |
| Depth | 109 mm | 128 mm | 138 mm | |
| Weight | 0.8 kg | 0.9 kg | 1 kg | |

Table 6: 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.4 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000

### 3.1.4.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 200 to 240 V** | |
| 8I66T200110.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 1.1 kW, integrated brake chopper | |
| 8I66T200150.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 1.5 kW, integrated brake chopper | |
| 8I66T200220.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 2.2 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.022-1 | ACPi P66 Lüfter 3ph. 200…240 VAC: Leistungsklasse: 1,1 - 4 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT015.200-2 | ACPi additional EMC input filter 3-phase 15 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| | **Optional EMC kit** | |
| 8I0XE066.402-1 | ACPi P66 EMC kit for size B 1ph. 200…240 VAC: Power output class: 1.1 -2.2 kW 3ph. 200…240 VAC: Power output class: 1.1 - 2.2 kW 3ph. 380…500 VAC: Power output class: 0.37 - 1.5 kW 3ph. 525…600 VAC: Power output class: 0.75 - 1.5 kW | |
| | **Optional braking resistors** | |
| 8I0BR060.000-1 | Braking resistor ohmic value: 60 Ω continuous braking power: 0.10 kW degree of protection (IP): IP20 | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT010.000-1 | Mains choke 3-phase, 10 A, 50/60 Hz for ACOPOSinverter | |
| 8I0CT016.000-1 | Mains choke 3-phase, 17 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 7: 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000 - Order data

## 3.1.4.2 Technical data

| Order number | 8I66T200110.00-000 | 8I66T200150.00-000 | 8I66T200220.00-000 |
|---|---|---|---|
| **General information** | | | |
| Certifications | | | |
| CE | | Yes | |
| UKCA | | Yes | |
| UL | | cULus E225616<br>Power conversion equipment | |
| **Motor power** | | | |
| Specified on nameplate | 1.1 kW (1.5 HP) | 1.5 kW (2 HP) | 2.2 kW (3 HP) |
| **Mains connection** | | | |
| Mains input voltage | | 3x 200 VAC -15% to 240 VAC +10% | |
| Frequency | | 50 to 60 Hz ±5% | |
| Apparent power (at 240 VAC) | 2.7 kVA | 3.5 kVA | 4.7 kVA |
| Max. assumed short-circuit current (Isc) (short-circuit current at connection point) | | 5 kA [1] | |
| Inrush current | | Max. 9.6 A [2] | |
| Mains current | | | |
| At 200 VAC | 7.6 A [3] | 10 A [3] | 13.7 A [3] |
| At 240 VAC | 6.4 A [3] | 8.4 A [3] | 11.4 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 66 W | 69 W | 92 W |
| Integrated EMC filter | | No | |
| **Line-conducted and radiated emissions** | | | |
| With add-on filter | | | |
| Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power network) | | 1 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power network) | | 5 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system) | | 5 m | |
| **Motor connection** | | | |
| Nominal output current | 6.9 A [4] | 8 A [4] | 11 A [4] |
| Derating of continuous output current depending on ambient temperature | | | |
| At nominal clock frequency (4 kHz) | | No derating (up to 50°C) | |
| Other clock frequencies | | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | |
| Derating of continuous output current depending on installation elevation | | | |
| Starting at 1000 m above sea level | | 1%, per 100 m | |
| Max. transient current for 60 s [5] | 10.4 A | 12 A | 16.5 A |
| Output frequency range | | 0.1 to 599 Hz | |
| Nominal clock frequency | | 4 kHz | |
| Clock frequency | | | |
| Min. | | 2 kHz | |
| Max. | | 16 kHz | |
| Braking torque | | | |
| With braking resistor | | Up to 170% of the rated motor torque | |
| Max. motor cable length | | | |
| Shielded cable | | 50 m | |
| Non-shielded cable | | 100 m | |
| Motor control profiles | | | |
| Induction motor | | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | |
| Synchronous motor | | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | |
| Main protective functions of inverter | | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | |
| **Brake chopper** | | | |
| Integrated dynamic brake transistors | | Yes | |
| Min. resistance value (external) | 27 Ω | | 25 Ω |
| **24 VDC power supply** | | | |
| Input voltage | | 24 VDC (-15%/+20%) | |
| Current | | Max. 1.1 A | |

Table 8: 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000 - Technical data

| Order number | 8I66T200110.00-000 | 8I66T200150.00-000 | 8I66T200220.00-000 |
|---|---|---|---|
| **Available internal power supplies** | | | |
| Output voltage 24 VDC | | 24 VDC (-15%/+20%) | |
| Output voltage 24 VDC | | | |
| Max. output current at 24 VDC | | 100 mA | |
| Output voltage 10 VDC | | 10 VDC (-0%/+10%) | |
| Output voltage 10 VDC | | | |
| Max. output current at 10 VDC | | 10 mA | |
| **Interfaces** | | | |
| POWERLINK | | | |
| Type | | Type 3 [6] | |
| **Digital inputs** | | | |
| Quantity | | 6 [7] | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | |
| Input circuit | | Source or sink | |
| Switching threshold | | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | |
| Electrical isolation | | | |
| Input - ACOPOSinverter | | Yes | |
| Input - Input | | No | |
| Sampling time | | 8 ms ±0.7 ms | |
| Digital input 5 | | | |
| Max. input frequency | | 20 kHz | |
| **Safe input - STO (Safe Torque Off)** | | | |
| Quantity | | 1 | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | |
| Input impedance | | 1.5 kΩ | |
| Input impedance | | | |
| Current consumption | | 16 mA | |
| Electrical isolation | | | |
| Input - ACOPOSinverter | | Yes | |
| Input - Input | | No | |
| **Analog inputs** | | | |
| Quantity | | 3 | |
| Electrical isolation | | | |
| Input - Input | | No | |
| Input - ACOPOSinverter | | Yes | |
| Nonlinearity | | ±0.2%, max. ±0.5% | |
| Basic accuracy | | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | |
| Input | | | |
| Voltage | | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | |
| Current | | 0 to 20 mA (or 4 to 20 mA) | |
| Resolution | | 10-bit | |
| Sampling time | | 2 ms | |
| Input impedance | | | |
| Voltage | | 30 kΩ | |
| Current | | 250 Ω | |
| **Digital outputs** | | | |
| Quantity | | 1 | |
| Nominal voltage | | 24 VDC -15%/+20% | |
| Max. voltage | | 30 VDC | |
| Output circuit | | Source or sink | |
| Sampling time | | 2 ms | |
| Max. current | | 100 mA | |
| **Relay outputs** | | | |
| Quantity | | 2 | |
| Nominal voltage | | 30 VDC / 250 VAC | |
| Switching current range | | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | |
| Variant | | | |
| Relay 1 | | 1 changeover contact | |
| Relay 2 | | 1 normally open contact | |
| Electrical isolation | | | |
| Output - ACOPOSinverter | | Yes | |
| Output - Output | | No | |
| Response time (max.) | | 2 ms | |
| **Analog outputs** | | | |
| Quantity | | 1 | |
| Output | | 0 to 10 V or 0 to 20 mA | |
| Nonlinearity | | ±0.3% | |

Table 8: 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000 - Technical data

## Technical data

| Order number | 8I66T200110.00-000 | 8I66T200150.00-000 | 8I66T200220.00-000 |
|---|---|---|---|
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | |
| Electrical isolation | | | |
| Output - ACOPOSinverter | Yes | | |
| Output - Output | No | | |
| Max. load impedance | | | |
| Voltage | 470 Ω | | |
| Current | 800 Ω | | |
| Update time | 2 ms | | |
| Resolution | 10-bit | | |
| **Electrical properties** | | | |
| Energy efficiency (IE classification) | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 25): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (10, 50): 1.5% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (50, 50): 1.4% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (90, 50): 1.5% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (10, 100): 2.2% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 100): 2.1% (3x 200 VAC), 1.7% (3x 240 VAC)<br>IE2 (90, 100): 2.3% (3x 200 VAC), 1.9% (3x 240 VAC) | IE2 (10, 25): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 25): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (10, 50): 1.5% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (50, 50): 1.4% (3x 200 VAC), 1.2% (3x 240 VAC)<br>IE2 (90, 50): 1.5% (3x 200 VAC), 1.3% (3x 240 VAC)<br>IE2 (10, 100): 2.2% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 100): 2.1% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (90, 100): 2.5% (3x 200 VAC), 2% (3x 240 VAC) | IE2 (10, 25): 1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (50, 25): 0.9% (3x 200 VAC), 0.8% (3x 240 VAC)<br>IE2 (10, 50): 1.3% (3x 200 VAC), 1.1% (3x 240 VAC)<br>IE2 (50, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (90, 50): 1.4% (3x 200 VAC), 1.1% (3x 240 VAC)<br>IE2 (10, 100): 1.9% (3x 200 VAC), 1.7% (3x 240 VAC)<br>IE2 (50, 100): 1.9% (3x 200 VAC), 1.6% (3x 240 VAC)<br>IE2 (90, 100): 2.3% (3x 200 VAC), 1.8% (3x 240 VAC) |
| Nominal losses in standby mode | 6 W | | |
| **Operating conditions** | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | |
| Operating position | Vertical mounting orientation ±10° | | |
| **Ambient conditions** | | | |
| Temperature | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | |
| Storage | -25 to 70°C | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | |
| **Mechanical properties** | | | |
| Dimensions | | | |
| Width | 105 mm | | |
| Height | 189 mm | | |
| Height without shield plate | 143 mm | | |
| Depth | 138 mm | | |
| Weight | 1.4 kg | | |

Table 8: 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.5 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000

### 3.1.5.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 200 to 240 V** | |
| 8I66T200300.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 3 kW, integrated brake chopper | |
| 8I66T200400.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 4 kW, integrated brake chopper | |
| 8I66T200550.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 5.5 kW, integrated brake chopper | |
| 8I66T200750.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 7.5 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.022-1 | ACPi P66 Lüfter 3ph. 200…240 VAC: Leistungsklasse: 1,1 - 4 kW | |
| 8I0XF074.030-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT025.400-1 | 25 A EMC filter for ACOPOSinverter (3-phase 200-240 V, 3-4 kW and 380-500 V, 2.2-4 kW). | |
| 8I0FT047.201-1 | ACPi additional EMC input filter 3-phase 47 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| | **Optional EMC kit** | |
| 8I0XE066.403-1 | ACPi P66 EMC kit for size C 3ph. 200…240 VAC: Power output class: 3 - 4 kW 3ph. 380…500 VAC: Power output class: 2.2 - 4 kW 3ph. 525…600 VAC: Power output class: 2.2 - 4 kW | |
| 8I0XE066.404-1 | ACPi P66 EMC kit for size D 3ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW | |
| | **Optional braking resistors** | |
| 8I0BR015.000-1 | Braking resistor ohmic value: 15 Ω continuous braking power: 1.00 kW degree of protection (IP): IP20 | |
| 8I0BR028.000-1 | Braking resistor ohmic value: 28 Ω continuous braking power: 0.20 kW degree of protection (IP): IP20 | |
| 8I0BR060.000-1 | Braking resistor ohmic value: 60 Ω continuous braking power: 0.10 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT016.000-1 | Mains choke 3-phase, 17 A, 50/60 Hz for ACOPOSinverter | |
| 8I0CT030.000-1 | Mains choke 3-phase, 30 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |

Table 9: 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000 - Order data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 9: 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000 - Order data

### 3.1.5.2 Technical data

| Order number | 8I66T200300.00-000 | 8I66T200400.00-000 | 8I66T200550.00-000 | 8I66T200750.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| **Motor power** | | | | |
| Specified on nameplate | 3 kW (4 HP) | 4 kW (5 HP) | 5.5 kW (7.5 HP) | 7.5 kW (10 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 6.1 kVA | 7.8 kVA | 11.8 kVA | 15.3 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | 22 kA [1] | |
| Inrush current | 28.7 A [2] | | 35.2 A [2] | |
| Mains current | | | | |
| At 200 VAC | 17.4 A [3] | 22.4 A [3] | 33.7 A [3] | 43.8 A [3] |
| At 240 VAC | 14.6 A [3] | 18.8 A [3] | 28.4 A [3] | 36.9 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 109 W | 141 W | 261 W | 324 W |
| Integrated EMC filter | No | | | |
| **Line-conducted and radiated emissions** | | | | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 1 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 5 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 5 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 13.7 A [4] | 17.5 A [4] | 27.5 A [4] | 33 A [4] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [5] | 20.6 A | 23.6 A | 41.3 A | 49.5 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |

Table 10: 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000 - Technical data

## Technical data

| Order number | 8I66T200300.00-000 | 8I66T200400.00-000 | 8I66T200550.00-000 | 8I66T200750.00-000 |
|---|---|---|---|---|
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 16 Ω | | 8 Ω | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [6)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [7)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |

Table 10: 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000 - Technical data

| Order number | 8I66T200300.00-000 | 8I66T200400.00-000 | 8I66T200550.00-000 | 8I66T200750.00-000 |
|---|---|---|---|---|
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.9% (3x 200 VAC), 0.8% (3x 240 VAC)<br>IE2 (50, 25): 0.8% (3x 200 VAC), 0.7% (3x 240 VAC)<br>IE2 (10, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (90, 50): 1.3% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 100): 1.8% (3x 200 VAC), 1.5% (3x 240 VAC)<br>IE2 (50, 100): 1.8% (3x 200 VAC), 1.5% (3x 240 VAC)<br>IE2 (90, 100): 2.1% (3x 200 VAC), 1.7% (3x 240 VAC) | IE2 (10, 25): 0.9% (3x 200 VAC), 0.8% (3x 240 VAC)<br>IE2 (50, 25): 0.8% (3x 200 VAC), 0.7% (3x 240 VAC)<br>IE2 (10, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (90, 50): 1.3% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 100): 1.8% (3x 200 VAC), 1.6% (3x 240 VAC)<br>IE2 (50, 100): 1.8% (3x 200 VAC), 1.5% (3x 240 VAC)<br>IE2 (90, 100): 2.2% (3x 200 VAC), 1.8% (3x 240 VAC) | IE2 (10, 25): 0.8% (3x 200 VAC), 0.7% (3x 240 VAC)<br>IE2 (50, 25): 0.7% (3x 200 VAC), 0.6% (3x 240 VAC)<br>IE2 (10, 50): 1.1% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (90, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 100): 2.1% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 100): 2% (3x 200 VAC), 1.7% (3x 240 VAC)<br>IE2 (90, 100): 2.4% (3x 200 VAC), 2% (3x 240 VAC) | IE2 (10, 25): 0.7% (3x 200 VAC), 0.7% (3x 240 VAC)<br>IE2 (50, 25): 0.7% (3x 200 VAC), 0.6% (3x 240 VAC)<br>IE2 (10, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (50, 50): 1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (90, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 100): 2% (3x 200 VAC), 1.8% (3x 240 VAC)<br>IE2 (50, 100): 2% (3x 200 VAC), 1.7% (3x 240 VAC)<br>IE2 (90, 100): 2.4% (3x 200 VAC), 2% (3x 240 VAC) |
| Nominal losses in standby mode | 6 W (3x 200 VAC), 7 W (3x 240 VAC) | | 7 W | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 140 mm | | 150 mm | |
| Height | 228 mm | | 308 mm | |
| Height without shield plate | 184 mm | | 232 mm | |
| Depth | 158 mm | | 178 mm | |
| Weight | 2.2 kg | | 3.5 kg | 3.6 kg |

Table 10: 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.

5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.6 8I66T201100.00-000, 8I66T201500.00-000

### 3.1.6.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 200 to 240 V** | |
| 8I66T201100.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 11 kW, integrated brake chopper | |
| 8I66T201500.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 200 to 240 V, 15 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF074.040-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 11 - 15 kW 3-ph. 380…500 VAC: Power output class: 11 - 15 kW 3-ph. 525…600 VAC: Power output class: 11 - 15 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 11 - 15 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT083.200-1 | 83 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 11-15 kW). | |
| | **Optional EMC kit** | |
| 8I0XE066.405-1 | ACPi P66 EMC kit for size E 3ph. 200…240 VAC: Power output class: 11 - 15 kW 3ph. 380…500 VAC: Power output class: 11 - 15 kW 3ph. 525…600 VAC: Power output class: 11 - 15 kW | |
| | **Optional braking resistors** | |
| 8I0BR010.000-1 | Braking resistor ohmic value: 10 Ω continuous braking power: 1.00 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT060.000-1 | Mains choke 3-phase, 60 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 11: 8I66T201100.00-000, 8I66T201500.00-000 - Order data

## 3.1.6.2 Technical data

| Order number | 8I66T201100.00-000 | 8I66T201500.00-000 |
|---|---|---|
| **General information** | | |
| Certifications | | |
| CE | Yes | |
| UKCA | Yes | |
| UL | cULus E225616<br>Power conversion equipment | |
| **Motor power** | | |
| Specified on nameplate | 11 kW (15 HP) | 15 kW (20 HP) |
| **Mains connection** | | |
| Mains input voltage | 3x 200 VAC -15% to 240 VAC +10% | |
| Frequency | 50 to 60 Hz ±5% | |
| Apparent power (at 240 VAC) | 21.1 kVA | 27.9 kVA |
| Max. assumed short-circuit current (Isc) (short-circuit current at connection point) | 22 kA [1] | |
| Inrush current | 66.7 A [2] | |
| Mains current | | |
| At 200 VAC | 60.1 A [3] | 79.6 A [3] |
| At 240 VAC | 50.7 A [3] | 67 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 528 W | 545 W |
| Integrated EMC filter | No | |
| **Line-conducted and radiated emissions** | | |
| With add-on filter | | |
| Motor cable length per IEC/EN 61800-3 Cat. C1 environment 1 (public power network) | 1 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power network) | 5 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system) | 5 m | |
| **Motor connection** | | |
| Nominal output current | 54 A [4] | 66 A [4] |
| Derating of continuous output current depending on ambient temperature | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | |
| Derating of continuous output current depending on installation elevation | | |
| Starting at 1000 m above sea level | 1%, per 100 m | |
| Max. transient current for 60 s [5] | 81 A | 99 A |
| Output frequency range | 0.1 to 599 Hz | |
| Nominal clock frequency | 4 kHz | |
| Clock frequency | | |
| Min. | 2 kHz | |
| Max. | 16 kHz | |
| Braking torque | | |
| With braking resistor | Up to 170% of the rated motor torque | |
| Max. motor cable length | | |
| Shielded cable | 50 m | |
| Non-shielded cable | 100 m | |
| Motor control profiles | | |
| Induction motor | <u>Sensorless vector control:</u><br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br><u>Sensorless slip control:</u><br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | |
| Synchronous motor | <u>Sensorless vector control:</u><br>1. Voltage controlled with constant torque → standard mode | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | |
| **Brake chopper** | | |
| Integrated dynamic brake transistors | Yes | |
| Min. resistance value (external) | 5 Ω | |
| **24 VDC power supply** | | |
| Input voltage | 24 VDC (-15%/+20%) | |
| Current | Max. 1.1 A | |

Table 12: 8I66T201100.00-000, 8I66T201500.00-000 - Technical data

| Order number | 8I66T201100.00-000 | 8I66T201500.00-000 |
|---|---|---|
| **Available internal power supplies** | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | |
| Output voltage 24 VDC | | |
| Max. output current at 24 VDC | 100 mA | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | |
| Output voltage 10 VDC | | |
| Max. output current at 10 VDC | 10 mA | |
| **Interfaces** | | |
| POWERLINK | | |
| Type | Type 3 [6] | |
| **Digital inputs** | | |
| Quantity | 6 [7] | |
| Nominal voltage | 24 VDC (max. 30 VDC) | |
| Input circuit | Source or sink | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | |
| Electrical isolation | | |
| Input - ACOPOSinverter | Yes | |
| Input - Input | No | |
| Sampling time | 8 ms ±0.7 ms | |
| Digital input 5 | | |
| Max. input frequency | 20 kHz | |
| **Safe input - STO (Safe Torque Off)** | | |
| Quantity | 1 | |
| Nominal voltage | 24 VDC (max. 30 VDC) | |
| Input impedance | 1.5 kΩ | |
| Input impedance | | |
| Current consumption | 16 mA | |
| Electrical isolation | | |
| Input - ACOPOSinverter | Yes | |
| Input - Input | No | |
| **Analog inputs** | | |
| Quantity | 3 | |
| Electrical isolation | | |
| Input - Input | No | |
| Input - ACOPOSinverter | Yes | |
| Nonlinearity | ±0.2%, max. ±0.5% | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | |
| Input | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | |
| Current | 0 to 20 mA (or 4 to 20 mA) | |
| Resolution | 10-bit | |
| Sampling time | 2 ms | |
| Input impedance | | |
| Voltage | 30 kΩ | |
| Current | 250 Ω | |
| **Digital outputs** | | |
| Quantity | 1 | |
| Nominal voltage | 24 VDC -15%/+20% | |
| Max. voltage | 30 VDC | |
| Output circuit | Source or sink | |
| Sampling time | 2 ms | |
| Max. current | 100 mA | |
| **Relay outputs** | | |
| Quantity | 2 | |
| Nominal voltage | 30 VDC / 250 VAC | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | |
| Variant | | |
| Relay 1 | 1 changeover contact | |
| Relay 2 | 1 normally open contact | |
| Electrical isolation | | |
| Output - ACOPOSinverter | Yes | |
| Output - Output | No | |
| Response time (max.) | 2 ms | |
| **Analog outputs** | | |
| Quantity | 1 | |
| Output | 0 to 10 V or 0 to 20 mA | |
| Nonlinearity | ±0.3% | |

Table 12: 8I66T201100.00-000, 8I66T201500.00-000 - Technical data

## Technical data

| Order number | 8I66T201100.00-000 | 8I66T201500.00-000 |
|---|---|---|
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | |
| Electrical isolation | | |
| Output - ACOPOSinverter | Yes | |
| Output - Output | No | |
| Max. load impedance | | |
| Voltage | 470 Ω | |
| Current | 800 Ω | |
| Update time | 2 ms | |
| Resolution | 10-bit | |
| **Electrical properties** | | |
| Energy efficiency (IE classification) | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.8% (3x 200 VAC), 0.7% (3x 240 VAC)<br>IE2 (50, 25): 0.7% (3x 200 VAC), 0.6% (3x 240 VAC)<br>IE2 (10, 50): 1.1% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (50, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (90, 50): 1.2% (3x 200 VAC), 1% (3x 240 VAC)<br>IE2 (10, 100): 2.1% (3x 200 VAC), 1.9% (3x 240 VAC)<br>IE2 (50, 100): 2% (3x 200 VAC), 1.7% (3x 240 VAC)<br>IE2 (90, 100): 2.4% (3x 200 VAC), 2% (3x 240 VAC) | IE2 (10, 25): 0.7% (3x 200 VAC), 0.6% (3x 240 VAC)<br>IE2 (50, 25): 0.6% (3x 200 VAC), 0.5% (3x 240 VAC)<br>IE2 (10, 50): 1% (3x 200 VAC), 0.8% (3x 240 VAC)<br>IE2 (50, 50): 1% (3x 200 VAC), 0.8% (3x 240 VAC)<br>IE2 (90, 50): 1.1% (3x 200 VAC), 0.9% (3x 240 VAC)<br>IE2 (10, 100): 1.8% (3x 200 VAC), 1.6% (3x 240 VAC)<br>IE2 (50, 100): 1.9% (3x 200 VAC), 1.5% (3x 240 VAC)<br>IE2 (90, 100): 2.3% (3x 200 VAC), 1.8% (3x 240 VAC) |
| Nominal losses in standby mode | 9 W (3x 200 VAC), 11 W (3x 240 VAC) | |
| **Operating conditions** | | |
| Degree of protection per EN 61800-5-1 | IP20 | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | |
| Operating position | Vertical mounting orientation ±10° | |
| **Ambient conditions** | | |
| Temperature | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | |
| Storage | -25 to 70°C | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | |
| **Mechanical properties** | | |
| Dimensions | | |
| Width | 180 mm | |
| Height | 404 mm | |
| Height without shield plate | 330 mm | |
| Depth | 198 mm | |
| Weight | 6.8 kg | 6.9 kg |

Table 12: 8I66T201100.00-000, 8I66T201500.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.7 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000

### 3.1.7.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 380 to 500 V** | |
| 8I66T400037.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 0.37 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400055.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 0.55 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400075.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 0.75 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400110.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 1.1 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| | **Included in delivery** | |
| | **Optional EMC kit** | |
| 8I0XE066.402-1 | ACPi P66 EMC kit for size B 1ph. 200…240 VAC: Power output class: 1.1 -2.2 kW 3ph. 200…240 VAC: Power output class: 1.1 - 2.2 kW 3ph. 380…500 VAC: Power output class: 0.37 - 1.5 kW 3ph. 525…600 VAC: Power output class: 0.75 - 1.5 kW | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.021-1 | ACPi P66 Lüfter 1ph. 200…240 VAC: Leistungsklasse: 1,1 - 2,2 kW 3ph. 380…500 VAC: Leistungsklasse: 0,37 - 1,5 kW 3ph. 525…600 VAC: Leistungsklasse: 0,75 - 1,5 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT015.200-2 | ACPi additional EMC input filter 3-phase 15 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| | **Optional braking resistors** | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT004.000-1 | Mains choke 3-phase, 4 A, 50/60 for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 13: 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000 - Order data

## 3.1.7.2 Technical data

| Order number | 8I66T400037.00-000 | 8I66T400055.00-000 | 8I66T400075.00-000 | 8I66T400110.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| KC | Yes | | | |
| **Motor power** | | | | |
| Specified on nameplate | 0.37 kW (0.5 HP) | 0.55 kW (0.75 HP) | 0.75 kW (1 HP) | 1.1 kW (1.5 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 1.2 kVA | 1.6 kVA | 2.1 kVA | 2.9 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 1.8 A [3] | 2.4 A [3] | 3.2 A [3] | 4.4 A [3] |
| At 500 VAC | 1.4 A [3] | 1.9 A [3] | 2.4 A [3] | 3.4 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 28 W | 33 W | 39 W | 47 W |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| With add-on filter | 8I0FT015.200-1 | | | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 20 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 50 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 150 m | 100 m | 150 m | |
| **Motor connection** | | | | |
| Nominal output current | 1.5 A [5] | 1.9 A [5] | 2.3 A [5] | 3 A [5] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 2.3 A | 2.9 A | 3.5 A | 4.5 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |

Table 14: 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000 - Technical data

| Order number | 8I66T400037.00-000 | 8I66T400055.00-000 | 8I66T400075.00-000 | 8I66T400110.00-000 |
|---|---|---|---|---|
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increas-ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 80 Ω | | | 54 Ω |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |

Table 14: 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000 - Technical data

## Technical data

| Order number | 8I66T400037.00-000 | 8I66T400055.00-000 | 8I66T400075.00-000 | 8I66T400110.00-000 |
|---|---|---|---|---|
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.8% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 25): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (10, 50): 1.9% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (50, 50): 1.7% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (90, 50): 1.8% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (10, 100): 2.2% (3x 380 VAC), 2% (3x 500 VAC)<br>IE2 (50, 100): 2.1% (3x 380 VAC), 1.9% (3x 500 VAC)<br>IE2 (90, 100): 2.3% (3x 380 VAC), 1.9% (3x 500 VAC) | IE2 (10, 25): 1.6% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (50, 25): 1.5% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (10, 50): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 50): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 50): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (10, 100): 2% (3x 380 VAC), 1.8% (3x 500 VAC)<br>IE2 (50, 100): 1.9% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (90, 100): 2.1% (3x 380 VAC), 1.8% (3x 500 VAC) | IE2 (10, 25): 1.2% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (50, 25): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (10, 50): 1.4% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 50): 1.3% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 50): 1.4% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (10, 100): 1.9% (3x 380 VAC), 1.7% (3x 500 VAC)<br>IE2 (50, 100): 1.8% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (90, 100): 2.1% (3x 380 VAC), 1.7% (3x 500 VAC) | IE2 (10, 25): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 25): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 50): 1.3% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (50, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (90, 50): 1.3% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (10, 100): 1.8% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (50, 100): 1.7% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.6% (3x 500 VAC) |
| Nominal losses in standby mode | 7 W (3x 380 VAC), 9 W (3x 500 VAC) | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 14: 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000 - Technical data

| Order number | 8I66T400037.00-000 | 8I66T400055.00-000 | 8I66T400075.00-000 | 8I66T400110.00-000 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 105 mm | | | |
| Height | 189 mm | | | |
| Height without shield plate | 143 mm | | | |
| Depth | 158 mm | | | |
| Weight | 1.2 kg | | | 1.3 kg |

Table 14: 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.8 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000

### 3.1.8.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 380 to 500 V** | |
| 8I66T400150.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 1.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400220.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 2.2 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400300.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 3 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400400.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 4 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| | **Included in delivery** | |
| | **Optional EMC kit** | |
| 8I0XE066.402-1 | ACPi P66 EMC kit for size B 1ph. 200…240 VAC: Power output class: 1.1 -2.2 kW 3ph. 200…240 VAC: Power output class: 1.1 - 2.2 kW 3ph. 380…500 VAC: Power output class: 0.37 - 1.5 kW 3ph. 525…600 VAC: Power output class: 0.75 - 1.5 kW | |
| 8I0XE066.403-1 | ACPi P66 EMC kit for size C 3ph. 200…240 VAC: Power output class: 3 - 4 kW 3ph. 380…500 VAC: Power output class: 2.2 - 4 kW 3ph. 525…600 VAC: Power output class: 2.2 - 4 kW | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.021-1 | ACPi P66 Lüfter 1ph. 200…240 VAC: Leistungsklasse: 1,1 - 2,2 kW 3ph. 380…500 VAC: Leistungsklasse: 0,37 - 1,5 kW 3ph. 525…600 VAC: Leistungsklasse: 0,75 - 1,5 kW | |
| 8I0XF066.030-1 | ACPi P66 Lüfter 3ph. 380…500 VAC: Leistungsklasse: 2,2 - 4 kW 3ph. 525…600 VAC: Leistungsklasse: 2,2 - 4 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT015.200-2 | ACPi additional EMC input filter 3-phase 15 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| 8I0FT025.400-1 | 25 A EMC filter for ACOPOSinverter (3-phase 200-240 V, 3-4 kW and 380-500 V, 2.2-4 kW). | |
| | **Optional braking resistors** | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT004.000-1 | Mains choke 3-phase, 4 A, 50/60 for ACOPOSinverter | |
| 8I0CT010.000-1 | Mains choke 3-phase, 10 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |

Table 15: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Order data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 15: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Order data

## 3.1.8.2 Technical data

| Order number | 8I66T400150.00-000 | 8I66T400220.00-000 | 8I66T400300.00-000 | 8I66T400400.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| KC | Yes | | | |
| **Motor power** | | | | |
| Specified on nameplate | 1.5 kW (2 HP) | 2.2 kW (3 HP) | 3 kW (4 HP) | 4 kW (5 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 3.8 kVA | 5.3 kVA | 6.8 kVA | 8.6 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 5.8 A [3] | 8 A [3] | 10.3 A [3] | 12.9 A [3] |
| At 500 VAC | 4.4 A [3] | 6.1 A [3] | 7.8 A [3] | 9.9 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 61 W | 76 W | 94 W | 112 W |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | 20 m | | |
| With add-on filter | 8I0FT015.200-1 | 8I0FT025.200-1 | | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 20 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 50 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 150 m | 100 m | | |
| **Motor connection** | | | | |
| Nominal output current | 4.1 A [5] | 5.5 A [5] | 7.1 A [5] | 9.5 A [5] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 6.2 A | 8.3 A | 10.7 A | 14.3 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |

Table 16: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Technical data

| Order number | 8I66T400150.00-000 | 8I66T400220.00-000 | 8I66T400300.00-000 | 8I66T400400.00-000 |
|---|---|---|---|---|
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increas-ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 54 Ω | | | 36 Ω |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |

Table 16: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Technical data

## Technical data

| Order number | 8I66T400150.00-000 | 8I66T400220.00-000 | 8I66T400300.00-000 | 8I66T400400.00-000 |
|---|---|---|---|---|
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (50, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (10, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 50): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (90, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (10, 100): 1.7% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (50, 100): 1.7% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.5% (3x 500 VAC) | IE2 (10, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 25): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 50): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (90, 50): 1.2% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.5% (3x 500 VAC) | IE2 (10, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 25): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (50, 50): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (90, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) | IE2 (10, 25): 0.8% (3x 380 VAC), 0.6% (3x 500 VAC)<br>IE2 (50, 25): 0.7% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 1% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 1% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.4% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC) |
| Nominal losses in standby mode | 7 W (3x 380 VAC),<br>9 W (3x 500 VAC) | 8 W (3x 380 VAC), 10 W (3x 500 VAC) | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 16: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Technical data

| Order number | 8I66T400150.00-000 | 8I66T400220.00-000 | 8I66T400300.00-000 | 8I66T400400.00-000 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 105 mm | 140 mm | | |
| Height | 189 mm | 228 mm | | |
| Height without shield plate | 143 mm | 184 mm | | |
| Depth | 158 mm | | | |
| Weight | 1.3 kg | 2.1 kg | | 2.2 kg |

Table 16: 8I66T400150.00-000, 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.9 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000

### 3.1.9.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 380 to 500 V** | |
| 8I66T400550.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 5.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T400750.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 7.5 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T401100.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 11 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| 8I66T401500.00-000 | Base device for ACOPOSinverter P66 and P64new, 3x 380 to 500 V, 15 kW, integrated EMC filter and brake chopper, shield plate included in delivery | |
| | **Included in delivery** | |
| | **Optional EMC kit** | |
| 8I0XE066.404-1 | ACPi P66 EMC kit for size D 3ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW | |
| 8I0XE066.405-1 | ACPi P66 EMC kit for size E 3ph. 200…240 VAC: Power output class: 11 - 15 kW 3ph. 380…500 VAC: Power output class: 11 - 15 kW 3ph. 525…600 VAC: Power output class: 11 - 15 kW | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF074.030-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW | |
| 8I0XF074.040-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 11 - 15 kW 3-ph. 380…500 VAC: Power output class: 11 - 15 kW 3-ph. 525…600 VAC: Power output class: 11 - 15 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 11 - 15 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC filters** | |
| 8I0FT047.200-1 | 47 A EMC filter for ACOPOSinverter P76 and P74new (3-phase 380-500 V, 5.5-7.5 kW). | |
| 8I0FT049.200-1 | 49 A EMC filter for ACOPOSinverter P76 and P74new (3-phase 380-500 V, 11-15 kW). | |
| | **Optional braking resistors** | |
| 8I0BR028.000-1 | Braking resistor ohmic value: 28 Ω continuous braking power: 0.20 kW degree of protection (IP): IP20 | |
| 8I0BR060.000-1 | Braking resistor ohmic value: 60 Ω continuous braking power: 0.10 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT016.000-1 | Mains choke 3-phase, 17 A, 50/60 Hz for ACOPOSinverter | |
| 8I0CT030.000-1 | Mains choke 3-phase, 30 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |

Table 17: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Order data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 17: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Order data

## 3.1.9.2 Technical data

| Order number | 8I66T400550.00-000 | 8I66T400750.00-000 | 8I66T401100.00-000 | 8I66T401500.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| KC | Yes | | | |
| **Motor power** | | | | |
| Specified on nameplate | 5.5 kW (7.5 HP) | 7.5 kW (10 HP) | 11 kW (15 HP) | 15 kW (20 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 13.2 kVA | 17 kVA | 23.6 kVA | 30.7 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 22 kA [1] | | | |
| Inrush current | 27.6 A [2] | | 36.7 A [2] | |
| Mains current | | | | |
| At 380 VAC | 19.8 A [3] | 25.5 A [3] | 35.4 A [3] | 46.5 A [3] |
| At 500 VAC | 15.2 A [3] | 19.6 A [3] | 27.2 A [3] | 35.5 A [3] |
| Power dissipation at nominal load and nominal clock frequency | 232 W | 262 W | 398 W | 475 W |
| Integrated EMC filter | No | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 2 m | | - | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 20 m | | 30 m | |
| With add-on filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C1 environment 1 (public power network) | 20 m | | 5 m | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 100 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 150 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 14.3 A [4] | 17 A [4] | 27.7 A [4] | 33 A [4] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [5] | 21.5 A | 25.5 A | 41.6 A | 49.5 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |

Table 18: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Technical data

| Order number | 8I66T400550.00-000 | 8I66T400750.00-000 | 8I66T401100.00-000 | 8I66T401500.00-000 |
|---|---|---|---|---|
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increas-ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 27 Ω | | 16 Ω | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [6] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [7] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |

Table 18: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Technical data

## Technical data

| Order number | 8I66T400550.00-000 | 8I66T400750.00-000 | 8I66T401100.00-000 | 8I66T401500.00-000 |
|---|---|---|---|---|
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.7% (3x 380 VAC), 0.6% (3x 500 VAC)<br>IE2 (50, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 1% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.5% (3x 500 VAC) | IE2 (10, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (50, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) | IE2 (10, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (50, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) | IE2 (10, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (50, 25): 0.5% (3x 380 VAC), 0.4% (3x 500 VAC)<br>IE2 (10, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.8% (3x 380 VAC), 0.6% (3x 500 VAC)<br>IE2 (90, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) |
| Nominal losses in standby mode | 8 W (3x 380 VAC), 10 W (3x 500 VAC) | | 10 W (3x 380 VAC), 11 W (3x 500 VAC) | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 18: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Technical data

| Order number | 8I66T400550.00-000 | 8I66T400750.00-000 | 8I66T401100.00-000 | 8I66T401500.00-000 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 150 mm | | 180 mm | |
| Height | 308 mm | | 404 mm | |
| Height without shield plate | 232 mm | | 330 mm | |
| Depth | 178 mm | | 198 mm | |
| Weight | 3.5 kg | 3.6 kg | 6.8 kg | 6.9 kg |

Table 18: 8I66T400550.00-000, 8I66T400750.00-000, 8I66T401100.00-000, 8I66T401500.00-000 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.10 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000

### 3.1.10.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 525 to 600 V** | |
| 8I66T600075.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 0.75 kW, integrated brake chopper | |
| 8I66T600150.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 1.5 kW, integrated brake chopper | |
| 8I66T600220.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 2.2 kW, integrated brake chopper | |
| 8I66T600400.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 4 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF066.021-1 | ACPi P66 Lüfter 1ph. 200…240 VAC: Leistungsklasse: 1,1 - 2,2 kW 3ph. 380…500 VAC: Leistungsklasse: 0,37 - 1,5 kW 3ph. 525…600 VAC: Leistungsklasse: 0,75 - 1,5 kW | |
| 8I0XF066.030-1 | ACPi P66 Lüfter 3ph. 380…500 VAC: Leistungsklasse: 2,2 - 4 kW 3ph. 525…600 VAC: Leistungsklasse: 2,2 - 4 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC kit** | |
| 8I0XE066.402-1 | ACPi P66 EMC kit for size B 1ph. 200…240 VAC: Power output class: 1.1 -2.2 kW 3ph. 200…240 VAC: Power output class: 1.1 - 2.2 kW 3ph. 380…500 VAC: Power output class: 0.37 - 1.5 kW 3ph. 525…600 VAC: Power output class: 0.75 - 1.5 kW | |
| 8I0XE066.403-1 | ACPi P66 EMC kit for size C 3ph. 200…240 VAC: Power output class: 3 - 4 kW 3ph. 380…500 VAC: Power output class: 2.2 - 4 kW 3ph. 525…600 VAC: Power output class: 2.2 - 4 kW | |
| | **Optional braking resistors** | |
| 8I0BR100.000-1 | Braking resistor ohmic value: 100 Ω continuous braking power: 0.05 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT004.000-1 | Mains choke 3-phase, 4 A, 50/60 for ACOPOSinverter | |
| 8I0CT010.000-1 | Mains choke 3-phase, 10 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 19: 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000 - Order data

## 3.1.10.2 Technical data

| Order number | 8I66T600075.00-000 | 8I66T600150.00-000 | 8I66T600220.00-000 | 8I66T600400.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| **Motor power** | | | | |
| Specified on nameplate | 0.75 kW (1 HP) | 1.5 kW (2 HP) | 2.2 kW (3 HP) | 4 kW (5 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 525 VAC -15% to 600 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 600 VAC) | 1.2 kVA | 2.2 kVA | 3 kVA | 5.7 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 22 kA | | | |
| Inrush current | Max. 12 A [1] | | | |
| Mains current | | | | |
| At 525 VAC | 1.4 A [2] | 2.4 A [2] | 3.3 A [2] | 6 A [2] |
| At 600 VAC | 1.2 A [2] | 2.1 A [2] | 2.9 A [2] | 5.5 A [2] |
| Power dissipation at nominal load and nominal clock frequency | 31 W | 40 W | 50 W | 72 W |
| Integrated EMC filter | No | | | |
| **Motor connection** | | | | |
| Nominal output current | 1.7 A [3] | 2.7 A [3] | 3.9 A [3] | 6.1 A [3] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [4] | 2.6 A | 4.1 A | 5.9 A | 9.2 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 96 Ω | 64 Ω | | 44 Ω |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |

Table 20: 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000 - Technical data

| Order number | 8I66T600075.00-000 | 8I66T600150.00-000 | 8I66T600220.00-000 | 8I66T600400.00-000 |
|---|---|---|---|---|
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | | 100 mA | | |
| Output voltage 10 VDC | | 10 VDC (-0%/+10%) | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | | 10 mA | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | | Type 3 [5] | | |
| **Digital inputs** | | | | |
| Quantity | | 6 [6] | | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | | |
| Input circuit | | Source or sink | | |
| Switching threshold | | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | | Yes | | |
| Input - Input | | No | | |
| Sampling time | | 8 ms ±0.7 ms | | |
| Digital input 5 | | | | |
| Max. input frequency | | 20 kHz | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | | 1 | | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | | |
| Input impedance | | 1.5 kΩ | | |
| Input impedance | | | | |
| Current consumption | | 16 mA | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | | Yes | | |
| Input - Input | | No | | |
| **Analog inputs** | | | | |
| Quantity | | 3 | | |
| Electrical isolation | | | | |
| Input - Input | | No | | |
| Input - ACOPOSinverter | | Yes | | |
| Nonlinearity | | ±0.2%, max. ±0.5% | | |
| Basic accuracy | | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | |
| Input | | | | |
| Voltage | | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | |
| Current | | 0 to 20 mA (or 4 to 20 mA) | | |
| Resolution | | 10-bit | | |
| Sampling time | | 2 ms | | |
| Input impedance | | | | |
| Voltage | | 30 kΩ | | |
| Current | | 250 Ω | | |
| **Digital outputs** | | | | |
| Quantity | | 1 | | |
| Nominal voltage | | 24 VDC -15%/+20% | | |
| Max. voltage | | 30 VDC | | |
| Output circuit | | Source or sink | | |
| Sampling time | | 2 ms | | |
| Max. current | | 100 mA | | |
| **Relay outputs** | | | | |
| Quantity | | 2 | | |
| Nominal voltage | | 30 VDC / 250 VAC | | |
| Switching current range | | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | |
| Variant | | | | |
| Relay 1 | | 1 changeover contact | | |
| Relay 2 | | 1 normally open contact | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | | Yes | | |
| Output - Output | | No | | |
| Response time (max.) | | 2 ms | | |
| **Analog outputs** | | | | |
| Quantity | | 1 | | |
| Output | | 0 to 10 V or 0 to 20 mA | | |
| Nonlinearity | | ±0.3% | | |
| Basic accuracy | | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | |

Table 20: 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000 - Technical data

| Order number | 8I66T600075.00-000 | 8I66T600150.00-000 | 8I66T600220.00-000 | 8I66T600400.00-000 |
|---|---|---|---|---|
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.1% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (50, 25): 1% (3x 525 VAC), 1% (3x 600 VAC)<br>IE2 (10, 50): 1.3% (3x 525 VAC), 1.3% (3x 600 VAC)<br>IE2 (50, 50): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (90, 50): 1.4% (3x 525 VAC), 1.3% (3x 600 VAC)<br>IE2 (10, 100): 1.7% (3x 525 VAC), 1.6% (3x 600 VAC)<br>IE2 (50, 100): 1.7% (3x 525 VAC), 1.6% (3x 600 VAC)<br>IE2 (90, 100): 2.1% (3x 525 VAC), 1.9% (3x 600 VAC) | IE2 (10, 25): 0.9% (3x 525 VAC), 0.8% (3x 600 VAC)<br>IE2 (50, 25): 0.8% (3x 525 VAC), 0.8% (3x 600 VAC)<br>IE2 (10, 50): 1.1% (3x 525 VAC), 1% (3x 600 VAC)<br>IE2 (50, 50): 1% (3x 525 VAC), 1% (3x 600 VAC)<br>IE2 (90, 50): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (10, 100): 1.4% (3x 525 VAC), 1.4% (3x 600 VAC)<br>IE2 (50, 100): 1.5% (3x 525 VAC), 1.4% (3x 600 VAC)<br>IE2 (90, 100): 2% (3x 525 VAC), 1.8% (3x 600 VAC) | IE2 (10, 25): 0.8% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (50, 25): 0.7% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (10, 50): 1% (3x 525 VAC), 0.9% (3x 600 VAC)<br>IE2 (50, 50): 0.9% (3x 525 VAC), 0.9% (3x 600 VAC)<br>IE2 (90, 50): 1.1% (3x 525 VAC), 1% (3x 600 VAC)<br>IE2 (10, 100): 1.3% (3x 525 VAC), 1.3% (3x 600 VAC)<br>IE2 (50, 100): 1.4% (3x 525 VAC), 1.3% (3x 600 VAC)<br>IE2 (90, 100): 2% (3x 525 VAC), 1.8% (3x 600 VAC) | IE2 (10, 25): 0.7% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (50, 25): 0.6% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (10, 50): 0.8% (3x 525 VAC), 0.8% (3x 600 VAC)<br>IE2 (50, 50): 0.8% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (90, 50): 0.9% (3x 525 VAC), 0.8% (3x 600 VAC)<br>IE2 (10, 100): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (50, 100): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (90, 100): 1.6% (3x 525 VAC), 1.4% (3x 600 VAC) |
| Nominal losses in standby mode | 8 W (3x 525 VAC), 9 W (3x 600 VAC) | | 9 W | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 2000 m with Derating [7] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 105 mm | | 140 mm | |
| Height | 189 mm | | 228 mm | |
| Height without shield plate | 143 mm | | 184 mm | |
| Depth | 158 mm | | | |
| Weight | 1.3 kg | | 2 kg | 2.5 kg |

Table 20: 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000 - Technical data

1) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
2) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
3) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
4) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
5) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
6) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
7) Over 1000 m, load reduced by 1% per 100 m.

## 3.1.11 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000

### 3.1.11.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **ACOPOSinverter P66 - 3-phase 525 to 600 V** | |
| 8I66T600550.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 5.5 kW, integrated brake chopper | |
| 8I66T600750.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 7.5 kW, integrated brake chopper | |
| 8I66T601100.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 11 kW, integrated brake chopper | |
| 8I66T601500.00-000 | ACOPOSinverter P66, 3x 525 to 600 V, 15 kW, integrated brake chopper | |
| | **Optional accessories** | |
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for remote use of the display for the ACOPOSinverter. | |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for remote use of the display for the ACOPOSinverter. | |
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |
| | **Fans (spare part)** | |
| 8I0XF074.030-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3-ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW | |
| 8I0XF074.040-1 | ACPi P66 fan 3-ph. 200…240 VAC: Power output class: 11 - 15 kW 3-ph. 380…500 VAC: Power output class: 11 - 15 kW 3-ph. 525…600 VAC: Power output class: 11 - 15 kW ACPi P76, P74/P74new fan 3-ph. 380…500 VAC: Power output class: 11 - 15 kW | |
| | **Graphic display** | |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. | |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. | |
| | **Optional EMC kit** | |
| 8I0XE066.404-1 | ACPi P66 EMC kit for size D 3ph. 200…240 VAC: Power output class: 5.5 - 7.5 kW 3ph. 380…500 VAC: Power output class: 5.5 - 7.5 kW 3ph. 525…600 VAC: Power output class: 5.5 - 7.5 kW | |
| 8I0XE066.405-1 | ACPi P66 EMC kit for size E 3ph. 200…240 VAC: Power output class: 11 - 15 kW 3ph. 380…500 VAC: Power output class: 11 - 15 kW 3ph. 525…600 VAC: Power output class: 11 - 15 kW | |
| | **Optional braking resistors** | |
| 8I0BR028.000-1 | Braking resistor ohmic value: 28 Ω continuous braking power: 0.20 kW degree of protection (IP): IP20 | |
| 8I0BR060.000-1 | Braking resistor ohmic value: 60 Ω continuous braking power: 0.10 kW degree of protection (IP): IP20 | |
| | **Optional line chokes** | |
| 8I0CT016.000-1 | Mains choke 3-phase, 17 A, 50/60 Hz for ACOPOSinverter | |
| 8I0CT030.000-1 | Mains choke 3-phase, 30 A, 50/60 Hz for ACOPOSinverter | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |

Table 21: 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 - Order data

| Order number | Short description | Figure |
|---|---|---|
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 21: 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 - Order data

## 3.1.11.2 Technical data

| Order number | 8I66T600550.00-000 | 8I66T600750.00-000 | 8I66T601100.00-000 | 8I66T601500.00-000 |
|---|---|---|---|---|
| **General information** | | | | |
| Certifications | | | | |
| CE | Yes | | | |
| UKCA | Yes | | | |
| UL | cULus E225616<br>Power conversion equipment | | | |
| **Motor power** | | | | |
| Specified on nameplate | 5.5 kW (7.5 HP) | 7.5 kW (10 HP) | 11 kW (15 HP) | 15 kW (20 HP) |
| **Mains connection** | | | | |
| Mains input voltage | 3x 525 VAC -15% to 600 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 600 VAC) | 7.4 kVA | 10.6 kVA | 14.5 kVA | 20.8 kVA |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 22 kA | | | |
| Inrush current | Max. 33.1 A [1] | | Max. 44 A [1] | |
| Mains current | | | | |
| At 525 VAC | 8 A [2] | 11.2 A [2] | 15.7 A [2] | 22.1 A [2] |
| At 600 VAC | 7.1 A [2] | 10.2 A [2] | 14 A [2] | 20 A [2] |
| Power dissipation at nominal load and nominal clock frequency | 114 W | 136 W | 197 W | 228 W |
| Integrated EMC filter | No | | | |
| **Motor connection** | | | | |
| Nominal output current | 9 A [3] | 11 A [3] | 17 A [3] | 22 A [3] |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from the website (www.br-automation.com). | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [4] | 13.5 A | 16.5 A | 25.5 A | 33 A |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the rated motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode<br>2. Voltage controlled with variable torque → energy saving mode e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → standard mode<br>2. With V/f characteristic curve for constant torque (up to 6 f-ranges) → Custom mode for special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 34 Ω | 23 Ω | 24 Ω | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |

Table 22: 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 - Technical data

| Order number | 8I66T600550.00-000 | 8I66T600750.00-000 | 8I66T601100.00-000 | 8I66T601500.00-000 |
|---|---|---|---|---|
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | | 100 mA | | |
| Output voltage 10 VDC | | 10 VDC (-0%/+10%) | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | | 10 mA | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | | Type 3 [5] | | |
| **Digital inputs** | | | | |
| Quantity | | 6 [6] | | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | | |
| Input circuit | | Source or sink | | |
| Switching threshold | | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | | Yes | | |
| Input - Input | | No | | |
| Sampling time | | 8 ms ±0.7 ms | | |
| Digital input 5 | | | | |
| Max. input frequency | | 20 kHz | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | | 1 | | |
| Nominal voltage | | 24 VDC (max. 30 VDC) | | |
| Input impedance | | 1.5 kΩ | | |
| Input impedance | | | | |
| Current consumption | | 16 mA | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | | Yes | | |
| Input - Input | | No | | |
| **Analog inputs** | | | | |
| Quantity | | 3 | | |
| Electrical isolation | | | | |
| Input - Input | | No | | |
| Input - ACOPOSinverter | | Yes | | |
| Nonlinearity | | ±0.2%, max. ±0.5% | | |
| Basic accuracy | | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | |
| Input | | | | |
| Voltage | | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | |
| Current | | 0 to 20 mA (or 4 to 20 mA) | | |
| Resolution | | 10-bit | | |
| Sampling time | | 2 ms | | |
| Input impedance | | | | |
| Voltage | | 30 kΩ | | |
| Current | | 250 Ω | | |
| **Digital outputs** | | | | |
| Quantity | | 1 | | |
| Nominal voltage | | 24 VDC -15%/+20% | | |
| Max. voltage | | 30 VDC | | |
| Output circuit | | Source or sink | | |
| Sampling time | | 2 ms | | |
| Max. current | | 100 mA | | |
| **Relay outputs** | | | | |
| Quantity | | 2 | | |
| Nominal voltage | | 30 VDC / 250 VAC | | |
| Switching current range | | Min. switching current: 5 mA at 24 VDC<br>Max. switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | |
| Variant | | | | |
| Relay 1 | | 1 changeover contact | | |
| Relay 2 | | 1 normally open contact | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | | Yes | | |
| Output - Output | | No | | |
| Response time (max.) | | 2 ms | | |
| **Analog outputs** | | | | |
| Quantity | | 1 | | |
| Output | | 0 to 10 V or 0 to 20 mA | | |
| Nonlinearity | | ±0.3% | | |
| Basic accuracy | | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | |

Table 22: 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 - Technical data

## Technical data

| Order number | 8I66T600550.00-000 | 8I66T600750.00-000 | 8I66T601100.00-000 | 8I66T601500.00-000 |
|---|---|---|---|---|
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.6% (3x 525 VAC), 0.5% (3x 600 VAC)<br>IE2 (50, 25): 0.5% (3x 525 VAC), 0.5% (3x 600 VAC)<br>IE2 (10, 50): 0.7% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (50, 50): 0.7% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (90, 50): 0.8% (3x 525 VAC), 0.8% (3x 600 VAC)<br>IE2 (10, 100): 1.3% (3x 525 VAC), 1.2% (3x 600 VAC)<br>IE2 (50, 100): 1.3% (3x 525 VAC), 1.2% (3x 600 VAC)<br>IE2 (90, 100): 1.7% (3x 525 VAC), 1.5% (3x 600 VAC) | IE2 (10, 25): 0.5% (3x 525 VAC), 0.5% (3x 600 VAC)<br>IE2 (50, 25): 0.5% (3x 525 VAC), 0.4% (3x 600 VAC)<br>IE2 (10, 50): 0.7% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (50, 50): 0.7% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (90, 50): 0.8% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (10, 100): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (50, 100): 1.2% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (90, 100): 1.6% (3x 525 VAC), 1.4% (3x 600 VAC) | | IE2 (10, 25): 0.5% (3x 525 VAC), 0.4% (3x 600 VAC)<br>IE2 (50, 25): 0.4% (3x 525 VAC), 0.4% (3x 600 VAC)<br>IE2 (10, 50): 0.6% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (50, 50): 0.6% (3x 525 VAC), 0.6% (3x 600 VAC)<br>IE2 (90, 50): 0.7% (3x 525 VAC), 0.7% (3x 600 VAC)<br>IE2 (10, 100): 1.1% (3x 525 VAC), 1.1% (3x 600 VAC)<br>IE2 (50, 100): 1.1% (3x 525 VAC), 1% (3x 600 VAC)<br>IE2 (90, 100): 1.5% (3x 525 VAC), 1.3% (3x 600 VAC) |
| Nominal losses in standby mode | 10 W (3x 525 VAC), 12 W (3x 600 VAC) | | 11 W (3x 525 VAC), 13 W (3x 600 VAC) | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP20 | | | |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 2000 m with Derating [7)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 50°C without derating<br>50 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 150 mm | | 180 mm | |
| Height | 308 mm | | 404 mm | |
| Height without shield plate | 232 mm | | 330 mm | |
| Depth | 178 mm | | 198 mm | |
| Weight | 3.5 kg | | 6.5 kg | |

Table 22: 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 - Technical data

1) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
2) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
3) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
4) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
5) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
6) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
7) Over 1000 m, load reduced by 1% per 100 m.

# 3.2 IP65/IP66 protection

## 3.2.1 8I66S200018.00-065, 8I66S200018.00-066, 8I66S200037.00-065, 8I66S200037.00-066

### 3.2.1.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 23: , , , - Order data

### 3.2.1.2 Technical data

| Order number | 8I66S200018.00-065 | 8I66S200018.00-066 | 8I66S200037.00-065 | 8I66S200037.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 0.18 kW (0.25 HP) | | 0.37 kW (0.5 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 1x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 0.6 kVA | | 1 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 1 kA [1] | | | |
| Inrush current | Max. 9.6 A [2] | | | |
| Mains current | | | | |
| At 200 VAC | 3.1 A [3] | | 5.2 A [3] | |
| At 240 VAC | 2.6 A [3] | | 4.3 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 22 W | | 32 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 1.5 A [5] | | 3.3 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |

Table 24: 8I66S200018.00-065, 8I66S200018.00-066, 8I66S200037.00-065, 8I66S200037.00-066 - Technical data

| Order number | 8I66S200018.00-065 | 8I66S200018.00-066 | 8I66S200037.00-065 | 8I66S200037.00-066 |
|---|---|---|---|---|
| Max. transient current for 60 s [6] | 2.3 A | | 5 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increasing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 40 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |

Table 24: 8I66S200018.00-065, 8I66S200018.00-066, 8I66S200037.00-065, 8I66S200037.00-066 - Technical data

| Order number | 8I66S200018.00-065 | 8I66S200018.00-066 | 8I66S200037.00-065 | 8I66S200037.00-066 |
|---|---|---|---|---|
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 2.1% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (50, 25): 2.1% (1x 200 VAC), 1.8% (1x 240 VAC)<br>IE2 (10, 50): 2.3% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (50, 50): 2.1% (1x 200 VAC), 1.8% (1x 240 VAC)<br>IE2 (90, 50): 2.3% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (10, 100): 2.7% (1x 200 VAC), 2.4% (1x 240 VAC)<br>IE2 (50, 100): 2.7% (1x 200 VAC), 2.2% (1x 240 VAC)<br>IE2 (90, 100): 3.1% (1x 200 VAC), 2.6% (1x 240 VAC) | | IE2 (10, 25): 1.8% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (50, 25): 1.6% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (10, 50): 1.8% (1x 200 VAC), 1.4% (1x 240 VAC)<br>IE2 (50, 50): 1.7% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (90, 50): 1.8% (1x 200 VAC), 1.4% (1x 240 VAC)<br>IE2 (10, 100): 2.4% (1x 200 VAC), 2% (1x 240 VAC)<br>IE2 (50, 100): 2.2% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (90, 100): 2.5% (1x 200 VAC), 2% (1x 240 VAC) | |
| Nominal losses in standby mode | 6 W | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | -10 to 40°C without derating<br>50 to 40°C with derating |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 24: 8I66S200018.00-065, 8I66S200018.00-066, 8I66S200037.00-065, 8I66S200037.00-066 - Technical data

## Technical data

| Order number | 8I66S200018.00-065 | 8I66S200018.00-066 | 8I66S200037.00-065 | 8I66S200037.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 182 mm | | | |
| Weight | 5.4 kg | 5 kg | 5.5 kg | 5.1 kg |

Table 24: 8I66S200018.00-065, 8I66S200018.00-066, 8I66S200037.00-065, 8I66S200037.00-066 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.2 8I66S200055.00-065, 8I66S200055.00-066, 8I66S200075.00-065, 8I66S200075.00-066

### 3.2.2.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 25: , , , - Order data

### 3.2.2.2 Technical data

| Order number | 8I66S200055.00-065 | 8I66S200055.00-066 | 8I66S200075.00-065 | 8I66S200075.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 0.55 kW (0.75 HP) | | 0.75 kW (1 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 1x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 1.4 kVA | | 1.8 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 1 kA [1] | | | |
| Inrush current | Max. 9.6 A [2] | | | |
| Mains current | | | | |
| At 200 VAC | 6.8 A [3] | | 8.8 A [3] | |
| At 240 VAC | 5.7 A [3] | | 7.4 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 42 W | | 48 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 3.7 A [5] | | 4.8 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 5.6 A | | 7.2 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 26: 8I66S200055.00-065, 8I66S200055.00-066, 8I66S200075.00-065, 8I66S200075.00-066 - Technical data

| Order number | 8I66S200055.00-065 | 8I66S200055.00-066 | 8I66S200075.00-065 | 8I66S200075.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 40 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 26: 8I66S200055.00-065, 8I66S200055.00-066, 8I66S200075.00-065, 8I66S200075.00-066 - Technical data

| Order number | 8I66S200055.00-065 | 8I66S200055.00-066 | 8I66S200075.00-065 | 8I66S200075.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.6% (1x 200 VAC), 1.1% (1x 240 VAC)<br>IE2 (50, 25): 1.5% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (10, 50): 1.7% (1x 200 VAC), 1.4% (1x 240 VAC)<br>IE2 (50, 50): 1.6% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (90, 50): 1.8% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (10, 100): 2.3% (1x 200 VAC), 2% (1x 240 VAC)<br>IE2 (50, 100): 2.2% (1x 200 VAC), 1.8% (1x 240 VAC)<br>IE2 (90, 100): 2.5% (1x 200 VAC), 2% (1x 240 VAC) | | IE2 (10, 25): 1.2% (1x 200 VAC), 1.1% (1x 240 VAC)<br>IE2 (50, 25): 1.1% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (10, 50): 1.5% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (50, 50): 1.4% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (90, 50): 1.6% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (10, 100): 2.3% (1x 200 VAC), 2% (1x 240 VAC)<br>IE2 (50, 100): 2.2% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (90, 100): 2.6% (1x 200 VAC), 2.1% (1x 240 VAC) | |
| Nominal losses in standby mode | 6 W | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | -10 to 50°C without derating<br>50 to 60°C with derating | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 26: 8I66S200055.00-065, 8I66S200055.00-066, 8I66S200075.00-065, 8I66S200075.00-066 - Technical data

## Technical data

| Order number | 8I66S200055.00-065 | 8I66S200055.00-066 | 8I66S200075.00-065 | 8I66S200075.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 182 mm | | | |
| Weight | 5.5 kg | 5.1 kg | 5.5 kg | 5.1 kg |

Table 26: 8I66S200055.00-065, 8I66S200055.00-066, 8I66S200075.00-065, 8I66S200075.00-066 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.3 8I66S200110.00-065, 8I66S200110.00-066, 8I66S200150.00-065, 8I66S200150.00-066

### 3.2.3.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 27: , , , - Order data

### 3.2.3.2 Technical data

| Order number | 8I66S200110.00-065 | 8I66S200110.00-066 | 8I66S200150.00-065 | 8I66S200150.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 1.1 kW (1.5 HP) | | 1.5 kW (2 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 1x 200 VAC -15% to 240 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 240 VAC) | 2.5 kVA | | 3.2 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 1 kA [1] | | | |
| Inrush current | Max. 19.1 A [2] | | | |
| Mains current | | | | |
| At 200 VAC | 12.2 A [3] | | 16 A [3] | |
| At 240 VAC | 10.3 A [3] | | 13.4 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 66 W | | 82 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 6.9 A [5] | | 8 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 10.4 A | | 12 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 28: 8I66S200110.00-065, 8I66S200110.00-066, 8I66S200150.00-065, 8I66S200150.00-066 - Technical data

| Order number | 8I66S200110.00-065 | 8I66S200110.00-066 | 8I66S200150.00-065 | 8I66S200150.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 27 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 28: 8I66S200110.00-065, 8I66S200110.00-066, 8I66S200150.00-065, 8I66S200150.00-066 - Technical data

| Order number | 8I66S200110.00-065 | 8I66S200110.00-066 | 8I66S200150.00-065 | 8I66S200150.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.2% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (50, 25): 1.1% (1x 200 VAC), 0.9% (1x 240 VAC)<br>IE2 (10, 50): 1.5% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (50, 50): 1.4% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (90, 50): 1.5% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (10, 100): 2.2% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (50, 100): 2.1% (1x 200 VAC), 1.8% (1x 240 VAC)<br>IE2 (90, 100): 2.4% (1x 200 VAC), 2% (1x 240 VAC) | | IE2 (10, 25): 1.2% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (50, 25): 1.1% (1x 200 VAC), 0.9% (1x 240 VAC)<br>IE2 (10, 50): 1.5% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (50, 50): 1.4% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (90, 50): 1.6% (1x 200 VAC), 1.3% (1x 240 VAC)<br>IE2 (10, 100): 2.2% (1x 200 VAC), 1.9% (1x 240 VAC)<br>IE2 (50, 100): 2.2% (1x 200 VAC), 1.8% (1x 240 VAC)<br>IE2 (90, 100): 2.6% (1x 200 VAC), 2.1% (1x 240 VAC) | |
| Nominal losses in standby mode | 6 W | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 28: 8I66S200110.00-065, 8I66S200110.00-066, 8I66S200150.00-065, 8I66S200150.00-066 - Technical data

## Technical data

| Order number | 8I66S200110.00-065 | 8I66S200110.00-066 | 8I66S200150.00-065 | 8I66S200150.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 235 mm | | | |
| Weight | 7.8 kg | 7.4 kg | 7.8 kg | 7.4 kg |

Table 28: 8I66S200110.00-065, 8I66S200110.00-066, 8I66S200150.00-065, 8I66S200150.00-066 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.4 8I66S200220.00-065, 8I66S200220.00-066

### 3.2.4.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |

Table 29: , - Order data

### 3.2.4.2 Technical data

| Order number | 8I66S200220.00-065 | 8I66S200220.00-066 |
|---|---|---|
| **Motor power** | | |
| Specified on nameplate | 2.2 kW (3 HP) | |
| **Mains connection** | | |
| Mains input voltage | 1x 200 VAC -15% to 240 VAC +10% | |
| Frequency | 50 to 60 Hz ±5% | |
| Apparent power (at 240 VAC) | 4.4 kVA | |
| Max. assumed short-circuit current (Isc) (short-circuit current at connection point) | 1 kA [1] | |
| Inrush current | Max. 19.1 A [2] | |
| Mains current | | |
| At 200 VAC | 22.1 A [3] | |
| At 240 VAC | 18.5 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 110 W | |
| Integrated EMC filter | Yes [4] | |
| **Line-conducted and radiated emissions** | | |
| With integrated filter | | |
| Motor cable length per IEC/EN 61800-3 Cat. C2 environment 1 (public power network) | 10 m | |
| Motor cable length per IEC/EN 61800-3 Cat. C3 environment 2 (industrial power system) | 10 m | |
| **Motor connection** | | |
| Nominal output current | 11 A [5] | |
| Derating of continuous output current depending on ambient temperature | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | |
| Derating of continuous output current depending on installation elevation | | |
| Starting at 1000 m above sea level | 1%, per 100 m | |
| Max. transient current for 60 s [6] | 16.5 A | |
| Output frequency range | 0.1 to 599 Hz | |
| Nominal clock frequency | 4 kHz | |
| Clock frequency | | |
| Min. | 2 kHz | |
| Max. | 16 kHz | |
| Braking torque | | |
| With braking resistor | Up to 170% of the nominal motor torque | |
| Max. motor cable length | | |
| Shielded cable | 50 m | |
| Non-shielded cable | 100 m | |

Table 30: 8I66S200220.00-065, 8I66S200220.00-066 - Technical data

## Technical data

| Order number | 8I66S200220.00-065 | 8I66S200220.00-066 |
|---|---|---|
| Motor control profiles | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-<br>ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between out-<br>put phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | |
| **Brake chopper** | | |
| Integrated dynamic brake transistors | Yes | |
| Min. resistance value (external) | 25 Ω | |
| **24 VDC power supply** | | |
| Input voltage | 24 VDC (-15%/+20%) | |
| Current | Max. 1.1 A | |
| **Available internal power supplies** | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | |
| Output voltage 24 VDC | | |
| Max. output current at 24 VDC | 100 mA | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | |
| Output voltage 10 VDC | | |
| Max. output current at 10 VDC | 10 mA | |
| **Interfaces** | | |
| POWERLINK | | |
| Type | Type 3 [7)] | |
| **Digital inputs** | | |
| Quantity | 6 [8)] | |
| Nominal voltage | 24 VDC (max. 30 VDC) | |
| Input circuit | Source or sink | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | |
| Electrical isolation | | |
| Input - ACOPOSinverter | Yes | |
| Input - Input | No | |
| Sampling time | 8 ms ±0.7 ms | |
| Digital input 5 | | |
| Max. input frequency | 20 kHz | |
| **Safe input - STO (Safe Torque Off)** | | |
| Quantity | 1 | |
| Nominal voltage | 24 VDC (max. 30 VDC) | |
| Input impedance | 1.5 kΩ | |
| Input impedance | | |
| Current consumption | 16 mA | |
| Electrical isolation | | |
| Input - ACOPOSinverter | Yes | |
| Input - Input | No | |
| **Analog inputs** | | |
| Quantity | 3 | |
| Electrical isolation | | |
| Input - Input | No | |
| Input - ACOPOSinverter | Yes | |
| Nonlinearity | ±0.2%, max. ±0.5% | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | |
| Input | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | |
| Current | 0 to 20 mA (or 4 to 20 mA) | |
| Resolution | 10-bit | |
| Sampling time | 2 ms | |
| Input impedance | | |
| Voltage | 30 kΩ | |
| Current | 250 Ω | |
| **Digital outputs** | | |
| Quantity | 1 | |
| Nominal voltage | 24 VDC -15%/+20% | |
| Max. voltage | 30 VDC | |

Table 30: 8I66S200220.00-065, 8I66S200220.00-066 - Technical data

| Order number | 8I66S200220.00-065 | 8I66S200220.00-066 |
|---|---|---|
| Output circuit | Source or sink | |
| Sampling time | 2 ms | |
| Max. current | 100 mA | |
| **Relay outputs** | | |
| Quantity | 2 | |
| Nominal voltage | 30 VDC / 250 VAC | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | |
| Variant | | |
| Relay 1 | 1 changeover contact | |
| Relay 2 | 1 normally open contact | |
| Electrical isolation | | |
| Output - ACOPOSinverter | Yes | |
| Output - Output | No | |
| Response time (max.) | 2 ms | |
| **Analog outputs** | | |
| Quantity | 1 | |
| Output | 0 to 10 V or 0 to 20 mA | |
| Nonlinearity | ±0.3% | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | |
| Electrical isolation | | |
| Output - ACOPOSinverter | Yes | |
| Output - Output | No | |
| Max. load impedance | | |
| Voltage | 470 Ω | |
| Current | 800 Ω | |
| Update time | 2 ms | |
| Resolution | 10-bit | |
| **Electrical properties** | | |
| Energy efficiency (IE classification) | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1% (1x 200 VAC), 0.9% (1x 240 VAC)<br>IE2 (50, 25): 0.9% (1x 200 VAC), 0.8% (1x 240 VAC)<br>IE2 (10, 50): 1.3% (1x 200 VAC), 1.1% (1x 240 VAC)<br>IE2 (50, 50): 1.2% (1x 200 VAC), 1% (1x 240 VAC)<br>IE2 (90, 50): 1.4% (1x 200 VAC), 1.2% (1x 240 VAC)<br>IE2 (10, 100): 2% (1x 200 VAC), 1.7% (1x 240 VAC)<br>IE2 (50, 100): 2% (1x 200 VAC), 1.6% (1x 240 VAC)<br>IE2 (90, 100): 2.4% (1x 200 VAC), 1.9% (1x 240 VAC) | |
| Nominal losses in standby mode | 6 W | |
| **Operating conditions** | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | |
| Operating position | Vertical mounting orientation ±10° | |
| **Ambient conditions** | | |
| Temperature | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | |
| Storage | -25 to 70°C | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | |
| **Mechanical properties** | | |
| Dimensions | | |
| Width | 250 mm | |
| Height | 340 mm | |
| Depth | 235 mm | |
| Weight | 7.8 kg | 7.4 kg |

Table 30: 8I66S200220.00-065, 8I66S200220.00-066 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.

8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.5 8I66T400037.00-065, 8I66T400037.00-066, 8I66T400055.00-000, 8I66T400055.00-066

### 3.2.5.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 31: , , , - Order data

### 3.2.5.2 Technical data

| Order number | 8I66T400037.00-065 | 8I66T400037.00-066 | 8I66T400055.00-065 | 8I66T400055.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 0.37 kW (0.5 HP) | | 0.55 kW (0.75 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 1.2 kVA | | 1.6 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 1.8 A [3] | | 2.4 A [3] | |
| At 500 VAC | 1.4 A [3] | | 1.9 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 28 W | | 33 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 1.5 A [5] | | 1.9 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 2.3 A | | 2.9 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 32: 8I66T400037.00-065, 8I66T400037.00-066, 8I66T400055.00-065, 8I66T400055.00-066 - Technical data

| Order number | 8I66T400037.00-065 | 8I66T400037.00-066 | 8I66T400055.00-065 | 8I66T400055.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 80 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 32: 8I66T400037.00-065, 8I66T400037.00-066, 8I66T400055.00-065, 8I66T400055.00-066 - Technical data

| Order number | 8I66T400037.00-065 | 8I66T400037.00-066 | 8I66T400055.00-065 | 8I66T400055.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.8% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 25): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (10, 50): 1.9% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (50, 50): 1.7% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (90, 50): 1.8% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (10, 100): 2.2% (3x 380 VAC), 2% (3x 500 VAC)<br>IE2 (50, 100): 2.1% (3x 380 VAC), 1.9% (3x 500 VAC)<br>IE2 (90, 100): 2.3% (3x 380 VAC), 1.9% (3x 500 VAC) | | IE2 (10, 25): 1.6% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (50, 25): 1.5% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (10, 50): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 50): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 50): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (10, 100): 2% (3x 380 VAC), 1.8% (3x 500 VAC)<br>IE2 (50, 100): 1.9% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (90, 100): 2.1% (3x 380 VAC), 1.8% (3x 500 VAC) | |
| Nominal losses in standby mode | 7 W (3x 380 VAC), 9 W (3x 500 VAC) | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 32: 8I66T400037.00-065, 8I66T400037.00-066, 8I66T400055.00-065, 8I66T400055.00-066 - Technical data

## Technical data

| Order number | 8I66T400037.00-065 | 8I66T400037.00-066 | 8I66T400055.00-065 | 8I66T400055.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 200 mm | | | |
| Weight | 6.3 kg | 5.9 kg | 6.3 kg | 5.9 kg |

Table 32: 8I66T400037.00-065, 8I66T400037.00-066, 8I66T400055.00-065, 8I66T400055.00-066 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.6 8I66T400075.00-065, 8I66T400075.00-066, 8I66T400110.00-000, 8I66T400110.00-066

### 3.2.6.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 33: , , , - Order data

### 3.2.6.2 Technical data

| Order number | 8I66T400075.00-065 | 8I66T400075.00-066 | 8I66T400110.00-065 | 8I66T400110.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 0.75 kW (1 HP) | | 1.1 kW (1.5 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 2.1 kVA | | 2.9 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 3.2 A [3] | | 4.4 A [3] | |
| At 500 VAC | 2.4 A [3] | | 3.4 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 39 W | | 47 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 2.3 A [5] | | 3 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 3.5 A | | 4.5 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 34: 8I66T400075.00-065, 8I66T400075.00-066, 8I66T400110.00-065, 8I66T400110.00-066 - Technical data

| Order number | 8I66T400075.00-065 | 8I66T400075.00-066 | 8I66T400110.00-065 | 8I66T400110.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 80 Ω | | 54 Ω | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 34: 8I66T400075.00-065, 8I66T400075.00-066, 8I66T400110.00-065, 8I66T400110.00-066 - Technical data

| Order number | 8I66T400075.00-065 | 8I66T400075.00-066 | 8I66T400110.00-065 | 8I66T400110.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1.2% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (50, 25): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (10, 50): 1.4% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 50): 1.3% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 50): 1.4% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (10, 100): 1.9% (3x 380 VAC), 1.7% (3x 500 VAC)<br>IE2 (50, 100): 1.8% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (90, 100): 2.1% (3x 380 VAC), 1.7% (3x 500 VAC) | | IE2 (10, 25): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 25): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 50): 1.3% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (50, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (90, 50): 1.3% (3x 380 VAC), 1.1% (3x 500 VAC)<br>IE2 (10, 100): 1.8% (3x 380 VAC), 1.6% (3x 500 VAC)<br>IE2 (50, 100): 1.7% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.6% (3x 500 VAC) | |
| Nominal losses in standby mode | 7 W (3x 380 VAC), 9 W (3x 500 VAC) | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | -10 to 40°C without derating<br>50 to 40°C with derating | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 34: 8I66T400075.00-065, 8I66T400075.00-066, 8I66T400110.00-065, 8I66T400110.00-066 - Technical data

## Technical data

| Order number | 8I66T400075.00-065 | 8I66T400075.00-066 | 8I66T400110.00-065 | 8I66T400110.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 200 mm | | | |
| Weight | 6.3 kg | 5.9 kg | 6.4 kg | 6 kg |

Table 34: 8I66T400075.00-065, 8I66T400075.00-066, 8I66T400110.00-065, 8I66T400110.00-066 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.7 8I66T400150.00-065, 8I66T400150.00-066, 8I66T400220.00-000, 8I66T400220.00-066

### 3.2.7.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 35: , , , - Order data

### 3.2.7.2 Technical data

| Order number | 8I66T400150.00-065 | 8I66T400150.00-066 | 8I66T400220.00-065 | 8I66T400220.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 1.5 kW (2 HP) | | 2.2 kW (3 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 3.8 kVA | | 5.3 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 5.8 A [3] | | 8 A [3] | |
| At 500 VAC | 4.4 A [3] | | 6.1 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 61 W | | 76 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 10 m | | 20 m | |
| **Motor connection** | | | | |
| Nominal output current | 4.1 A [5] | | 5.5 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 6.2 A | | 8.3 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 36: 8I66T400150.00-065, 8I66T400150.00-066, 8I66T400220.00-065, 8I66T400220.00-066 - Technical data

| Order number | 8I66T400150.00-065 | 8I66T400150.00-066 | 8I66T400220.00-065 | 8I66T400220.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 54 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 36: 8I66T400150.00-065, 8I66T400150.00-066, 8I66T400220.00-065, 8I66T400220.00-066 - Technical data

| Order number | 8I66T400150.00-065 | 8I66T400150.00-066 | 8I66T400220.00-065 | 8I66T400220.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (50, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (10, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 50): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (90, 50): 1.2% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (10, 100): 1.7% (3x 380 VAC), 1.5% (3x 500 VAC)<br>IE2 (50, 100): 1.7% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.5% (3x 500 VAC) | | IE2 (10, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 25): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 50): 1.1% (3x 380 VAC), 1% (3x 500 VAC)<br>IE2 (50, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (90, 50): 1.2% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.5% (3x 500 VAC) | |
| Nominal losses in standby mode | 7 W (3x 380 VAC), 9 W (3x 500 VAC) | | 8 W (3x 380 VAC), 10 W (3x 500 VAC) | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 36: 8I66T400150.00-065, 8I66T400150.00-066, 8I66T400220.00-065, 8I66T400220.00-066 - Technical data

## Technical data

| Order number | 8I66T400150.00-065 | 8I66T400150.00-066 | 8I66T400220.00-065 | 8I66T400220.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 200 mm | | 235 mm | |
| Weight | 6.4 kg | 6 kg | 8.1 kg | 7.7 kg |

Table 36: 8I66T400150.00-065, 8I66T400150.00-066, 8I66T400220.00-065, 8I66T400220.00-066 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.8 8I66T400300.00-065, 8I66T400300.00-066, 8I66T400400.00-000, 8I66T400400.00-066

### 3.2.8.1 Order data

| Order number | Short description |
|---|---|
| | |
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| | |
| | |
| | |

Table 37: , , , - Order data

### 3.2.8.2 Technical data

| Order number | 8I66T400300.00-065 | 8I66T400300.00-066 | 8I66T400400.00-065 | 8I66T400400.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 3 kW (4 HP) | | 4 kW (5 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 6.8 kVA | | 8.6 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 5 kA [1] | | | |
| Inrush current | Max. 10 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 10.3 A [3] | | 12.9 A [3] | |
| At 500 VAC | 7.8 A [3] | | 9.9 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 94 W | | 112 W | |
| Integrated EMC filter | Yes [4] | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 10 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 20 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 7.1 A [5] | | 9.5 A [5] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [6] | 10.7 A | | 14.3 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 38: 8I66T400300.00-065, 8I66T400300.00-066, 8I66T400400.00-065, 8I66T400400.00-066 - Technical data

| Order number | 8I66T400300.00-065 | 8I66T400300.00-066 | 8I66T400400.00-065 | 8I66T400400.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 54 Ω | | 36 Ω | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [7)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [8)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 38: 8I66T400300.00-065, 8I66T400300.00-066, 8I66T400400.00-065, 8I66T400400.00-066 - Technical data

| Order number | 8I66T400300.00-065 | 8I66T400300.00-066 | 8I66T400400.00-065 | 8I66T400400.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 25): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (50, 50): 1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (90, 50): 1.1% (3x 380 VAC), 0.9% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) | | IE2 (10, 25): 0.8% (3x 380 VAC), 0.6% (3x 500 VAC)<br>IE2 (50, 25): 0.7% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 1% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 1% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.4% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.7% (3x 380 VAC), 1.3% (3x 500 VAC) | |
| Nominal losses in standby mode | 8 W (3x 380 VAC), 10 W (3x 500 VAC) | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [9)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 38: 8I66T400300.00-065, 8I66T400300.00-066, 8I66T400400.00-065, 8I66T400400.00-066 - Technical data

| Order number | 8I66T400300.00-065 | 8I66T400300.00-066 | 8I66T400400.00-065 | 8I66T400400.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 250 mm | | | |
| Height | 340 mm | | | |
| Depth | 235 mm | | | |
| Weight | 8.1 kg | 7.7 kg | 8.2 kg | 7.7 kg |

Table 38: 8I66T400300.00-065, 8I66T400300.00-066, 8I66T400400.00-065, 8I66T400400.00-066 - Technical data

1) With mains choke max. Isc 65 kA for 380/500 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) Inverter is provided with an integrated Category C2 EMC filter. This filter can be switched off.
5) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
6) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
7) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
8) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
9) Over 1000 m, load reduced by 1% per 100 m.

## 3.2.9 8I66T400550.00-065, 8I66T400550.00-066, 8I66T400750.00-000, 8I66T400750.00-066

### 3.2.9.1 Order data

| Order number | Short description |
|---|---|
| | |
| | |
| | |
| | |
| | |

Table 39: , , , - Order data

### 3.2.9.2 Technical data

| Order number | 8I66T400550.00-065 | 8I66T400550.00-066 | 8I66T400750.00-065 | 8I66T400750.00-066 |
|---|---|---|---|---|
| **Motor power** | | | | |
| Specified on nameplate | 5.5 kW (7.5 HP) | | 7.5 kW (10 HP) | |
| **Mains connection** | | | | |
| Mains input voltage | 3x 380 VAC -15% to 500 VAC +10% | | | |
| Frequency | 50 to 60 Hz ±5% | | | |
| Apparent power (at 500 VAC) | 13.2 kVA | | 17 kVA | |
| Max. assumed short-circuit current (Isc)<br>(short-circuit current at connection point) | 22 kA [1] | | | |
| Inrush current | 27.6 A [2] | | | |
| Mains current | | | | |
| At 380 VAC | 19.8 A [3] | | 25.5 A [3] | |
| At 500 VAC | 15.2 A [3] | | 19.6 A [3] | |
| Power dissipation at nominal load and nominal clock frequency | 232 W | | 262 W | |
| Integrated EMC filter | No | | | |
| **Line-conducted and radiated emissions** | | | | |
| With integrated filter | | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C2 environment 1 (public power network) | 2 m | | | |
| Motor cable length per IEC/EN 61800-3<br>Cat. C3 environment 2 (industrial power system) | 20 m | | | |
| **Motor connection** | | | | |
| Nominal output current | 14.3 A [4] | | 17 A [4] | |
| Derating of continuous output current depending on ambient temperature | | | | |
| At nominal clock frequency (4 kHz) | No derating (up to 50°C) | | | |
| Other clock frequencies | The derating curves are included in the installation instructions, which can be downloaded from www.br-automation.com. | | | |
| Derating of continuous output current depending on installation elevation | | | | |
| Starting at 1000 m above sea level | 1%, per 100 m | | | |
| Max. transient current for 60 s [5] | 21.5 A | | 25.5 A | |
| Output frequency range | 0.1 to 599 Hz | | | |
| Nominal clock frequency | 4 kHz | | | |

Table 40: 8I66T400550.00-065, 8I66T400550.00-066, 8I66T400750.00-065, 8I66T400750.00-066 - Technical data

| Order number | 8I66T400550.00-065 | 8I66T400550.00-066 | 8I66T400750.00-065 | 8I66T400750.00-066 |
|---|---|---|---|---|
| Clock frequency | | | | |
| Min. | 2 kHz | | | |
| Max. | 16 kHz | | | |
| Braking torque | | | | |
| With braking resistor | Up to 170% of the nominal motor torque | | | |
| Max. motor cable length | | | | |
| Shielded cable | 50 m | | | |
| Non-shielded cable | 100 m | | | |
| Motor control profiles | | | | |
| Induction motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode<br>2. Voltage controlled with variable torque → Energy-saving mode, e.g. for fans and pumps<br>Sensorless slip control:<br>1. With V/f characteristic curve for constant torque → Standard mode<br>2. With V/f characteristic curve for constant torque (6 f-ranges) → Mode for individual special applications<br>3. With V/f characteristic curve for quadratically increas-<br>ing torque → Energy-saving mode, e.g. for fans and pumps | | | |
| Synchronous motor | Sensorless vector control:<br>1. Voltage controlled with constant torque → Standard mode | | | |
| Main protective functions of inverter | Thermal protection against power stage overheating<br>Protection against short circuits between motor phases, overcurrent between output phases and ground, overvoltages on the DC bus, exceeding the speed limit.<br>Safety function for: Overvoltage and undervoltage of the<br>mains supply, mains phase failure with 3-phase power supply | | | |
| **Brake chopper** | | | | |
| Integrated dynamic brake transistors | Yes | | | |
| Min. resistance value (external) | 27 Ω | | | |
| **24 VDC power supply** | | | | |
| Input voltage | 24 VDC (-15%/+20%) | | | |
| Current | Max. 1.1 A | | | |
| **Available internal power supplies** | | | | |
| Output voltage 24 VDC | 24 VDC (-15%/+20%) | | | |
| Output voltage 24 VDC | | | | |
| Max. output current at 24 VDC | 100 mA | | | |
| Output voltage 10 VDC | 10 VDC (-0%/+10%) | | | |
| Output voltage 10 VDC | | | | |
| Max. output current at 10 VDC | 10 mA | | | |
| **Interfaces** | | | | |
| POWERLINK | | | | |
| Type | Type 3 [6)] | | | |
| **Digital inputs** | | | | |
| Quantity | 6 [7)] | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input circuit | Source or sink | | | |
| Switching threshold | Sink: >19 V (position 0), <13 V (position 1)<br>Source: <5 V (position 0), >11 V (position 1) | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| Sampling time | 8 ms ±0.7 ms | | | |
| Digital input 5 | | | | |
| Max. input frequency | 20 kHz | | | |
| **Safe input - STO (Safe Torque Off)** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC (max. 30 VDC) | | | |
| Input impedance | 1.5 kΩ | | | |
| Input impedance | | | | |
| Current consumption | 16 mA | | | |
| Electrical isolation | | | | |
| Input - ACOPOSinverter | Yes | | | |
| Input - Input | No | | | |
| **Analog inputs** | | | | |
| Quantity | 3 | | | |
| Electrical isolation | | | | |
| Input - Input | No | | | |
| Input - ACOPOSinverter | Yes | | | |
| Nonlinearity | ±0.2%, max. ±0.5% | | | |
| Basic accuracy | At 25°C: ±0.5%<br>At -10 to 60°C: ±0.7% | | | |
| Input | | | | |
| Voltage | AI1: 0 to 10 VDC<br>AI2: 0 ±10 VDC, max. 30 VDC | | | |
| Current | 0 to 20 mA (or 4 to 20 mA) | | | |
| Resolution | 10-bit | | | |

Table 40: 8I66T400550.00-065, 8I66T400550.00-066, 8I66T400750.00-065, 8I66T400750.00-066 - Technical data

| Order number | 8I66T400550.00-065 | 8I66T400550.00-066 | 8I66T400750.00-065 | 8I66T400750.00-066 |
|---|---|---|---|---|
| Sampling time | 2 ms | | | |
| Input impedance | | | | |
| Voltage | 30 kΩ | | | |
| Current | 250 Ω | | | |
| **Digital outputs** | | | | |
| Quantity | 1 | | | |
| Nominal voltage | 24 VDC -15%/+20% | | | |
| Max. voltage | 30 VDC | | | |
| Output circuit | Source or sink | | | |
| Sampling time | 2 ms | | | |
| Max. current | 100 mA | | | |
| **Relay outputs** | | | | |
| Quantity | 2 | | | |
| Nominal voltage | 30 VDC / 250 VAC | | | |
| Switching current range | Min. switching current: 5 mA at 24 VDC<br>Max. Switching current:<br>R1 at cos φ = 1: 3 A at 250 VAC / 4 A at 30 VDC<br>R2 at cos φ = 1: 5 A<br>R1 and R2 at cos φ = 0.4: 2 A | | | |
| Variant | | | | |
| Relay 1 | 1 changeover contact | | | |
| Relay 2 | 1 normally open contact | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Response time (max.) | 2 ms | | | |
| **Analog outputs** | | | | |
| Quantity | 1 | | | |
| Output | 0 to 10 V or 0 to 20 mA | | | |
| Nonlinearity | ±0.3% | | | |
| Basic accuracy | At 25°C: ±1%<br>At -10 to 60°C: ±2% | | | |
| Electrical isolation | | | | |
| Output - ACOPOSinverter | Yes | | | |
| Output - Output | No | | | |
| Max. load impedance | | | | |
| Voltage | 470 Ω | | | |
| Current | 800 Ω | | | |
| Update time | 2 ms | | | |
| Resolution | 10-bit | | | |
| **Electrical properties** | | | | |
| Energy efficiency (IE classification) | | | | |
| Power dissipation relative to continuous apparent power | IE2 (10, 25): 0.7% (3x 380 VAC), 0.6% (3x 500 VAC)<br>IE2 (50, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 0.9% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (50, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 1% (3x 380 VAC), 0.8% (3x 500 VAC)<br>IE2 (10, 100): 1.6% (3x 380 VAC), 1.4% (3x 500 VAC)<br>IE2 (50, 100): 1.6% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (90, 100): 2% (3x 380 VAC), 1.5% (3x 500 VAC) | | IE2 (10, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (50, 25): 0.6% (3x 380 VAC), 0.5% (3x 500 VAC)<br>IE2 (10, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (50, 50): 0.8% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (90, 50): 0.9% (3x 380 VAC), 0.7% (3x 500 VAC)<br>IE2 (10, 100): 1.5% (3x 380 VAC), 1.3% (3x 500 VAC)<br>IE2 (50, 100): 1.5% (3x 380 VAC), 1.2% (3x 500 VAC)<br>IE2 (90, 100): 1.9% (3x 380 VAC), 1.4% (3x 500 VAC) | |
| Nominal losses in standby mode | 8 W (3x 380 VAC), 10 W (3x 500 VAC) | | | |
| **Operating conditions** | | | | |
| Degree of protection per EN 61800-5-1 | IP65 | IP66 | IP65 | IP66 |
| Relative humidity per IEC 60068-2-3 | 5 to 95%, non-condensing<br>No dripping water | | | |
| Maximum installation elevation | ≤1000 m without derating<br>1000 to 3000 m with Derating [8)] | | | |
| Max. pollution degree per IEC/EN 61800-5-1 | 2 (non-conductive pollution) | | | |
| Ambient conditions per IEC 60721-3-3 | Class 3C3 and 3S2 | | | |
| Operating position | Vertical mounting orientation ±10° | | | |
| **Ambient conditions** | | | | |
| Temperature | | | | |
| Operation | -10 to 40°C without derating<br>40 to 60°C with derating | | | |
| Storage | -25 to 70°C | | | |
| Max. vibration resistance | 1 $g_n$ 13 to 200 Hz EN/IEC 60068-2-6<br>1.5 mm peak to peak 2 to 13 Hz EN/IEC 60068-2-6 | | | |

Table 40: 8I66T400550.00-065, 8I66T400550.00-066, 8I66T400750.00-065, 8I66T400750.00-066 - Technical data

| Order number | 8I66T400550.00-065 | 8I66T400550.00-066 | 8I66T400750.00-065 | 8I66T400750.00-066 |
|---|---|---|---|---|
| **Mechanical properties** | | | | |
| Dimensions | | | | |
| Width | 320 mm | | | |
| Height | 521 mm | | | |
| Depth | 335 mm | 300 mm | 335 mm | 300 mm |
| Weight | 22.7 kg | 22 kg | 22.7 kg | 22 kg |

Table 40: 8I66T400550.00-065, 8I66T400550.00-066, 8I66T400750.00-065, 8I66T400750.00-066 - Technical data

1) With mains choke max. Isc 22 kA for 200/240 V.
2) Peak current when switching on for maximum voltage (240 V +10% or 500 V +10% or 600 V +10%)
3) Typical value for 4-pin motor and a max. clock frequency of 4 kHz, without mains choke for the max. assumed short circuit current (Isc).
4) These values apply at a nominal clock frequency of 4 kHz during continuous operation. The clock frequency can be set from 2 to 16 kHz. Above 4 kHz, reduce the nominal drive current. The nominal motor current is not permitted to exceed this value.
5) The inverter is designed to operate for a maximum of 60 seconds at 150% nominal current.
6) For additional information, see section "Communication / POWERLINK / General information / Hardware - CN" in Automation Help.
7) 1 logic input can be programmed as a 20 kbps pulse input. 1 logic input is configurable as an input for a PTC sensor using a switch (SW2). Trigger resistance 3 kΩ, reset value 1.8 kΩ, short-circuit proof <50 Ω
8) Over 1000 m, load reduced by 1% per 100 m.

# 4 Installation

## 4.1 Testing for absence of voltage

The voltage level of the DC bus is calculated by measuring the voltage between DC bus terminals PA/+ and PC/-. The mounting orientation of the DC bus terminals is determined by the inverter model. Use the nameplate to determine your inverter's specific model. Then see section "Wiring the power unit" on page 146.

### Danger!

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

- **Only suitably trained and authorized personnel who are familiar with the content of this manual as well as the overall product documentation are permitted to work with or near this drive system. Such personnel must also have successfully completed safety training on how to identify and prevent the various hazards involved. Installation, setup, repair and servicing must be performed by qualified personnel.**
- **The system integrator is responsible for ensuring compliance with all relevant local and national electrical engineering requirements as well as with any other applicable regulations relating to the protective grounding of all devices.**
- **Many product components, including the printed circuits, are powered via the mains voltage. Do not touch!**
- **Only use electrically insulated tools and ensure that measuring instruments are used with the correct rated voltage.**
- **Once powered on, do not touch any unshielded components or terminals.**
- **Motors can generate voltage when the shaft rotates. Before working on the drive system, make sure that the motor shaft is not driven by an external source.**
- **If there is a change in voltage, the voltage applied to unused conductors in the motor cable may become disconnected. Any motor cable conductors that are not used must be insulated at either end.**
- **Do not short-circuit the DC bus terminals, the DC bus capacitors or the braking resistor terminals.**
- **Before performing any work on the drive system, proceed as follows:**
  - **Disconnect all power supplies, including the external power supply to the control unit, if applicable.**
  - **Affix a "DO NOT SWITCH ON" sign to all circuit breakers connected to the inverter system.**
  - **Lock all circuit breakers in the open position.**
  - **Wait 15 minutes to allow the DC bus capacitors to discharge.**
  - **Follow the instructions under "Testing for absence of voltage".**
- **Before switching on the power supply to the inverter system, proceed as follows:**
  - **Make sure that all work is complete and that no hazards have been created as a result of the installation.**
  - **If the mains input terminals and motor output terminals are grounded and short-circuited, remove the grounding and short circuits from the main input terminals and motor output terminals.**
  - **Make sure that the entire device is grounded correctly.**
  - **Make sure that all protective equipment such as covers, doors and grids are installed and closed.**

**Failure to follow these instructions will result in death or serious injury.**

### Procedure

To test for the absence of voltage, proceed as follows:

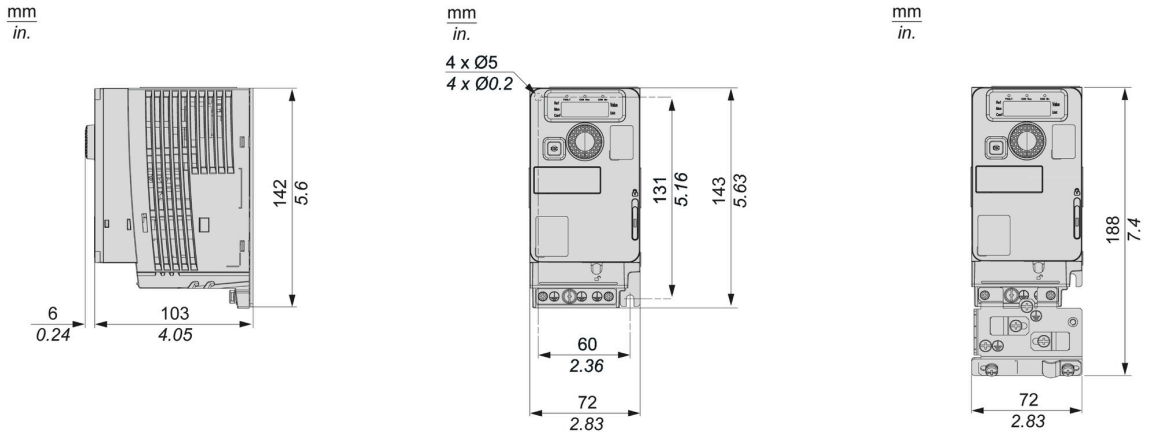
1) Measure the voltage on the DC bus between the DC bus terminals (PA/+, PC/-) to ensure that the voltage is less than 42 VDC. You can do this using a voltmeter with the correct rated voltage.
2) If the DC bus capacitors do not discharge correctly, contact your local B&R representative.
   In this case, it is not permitted to repair or start up the product.
3) Make sure that there is no other voltage present in the inverter system.

## 4.2 Mechanical data

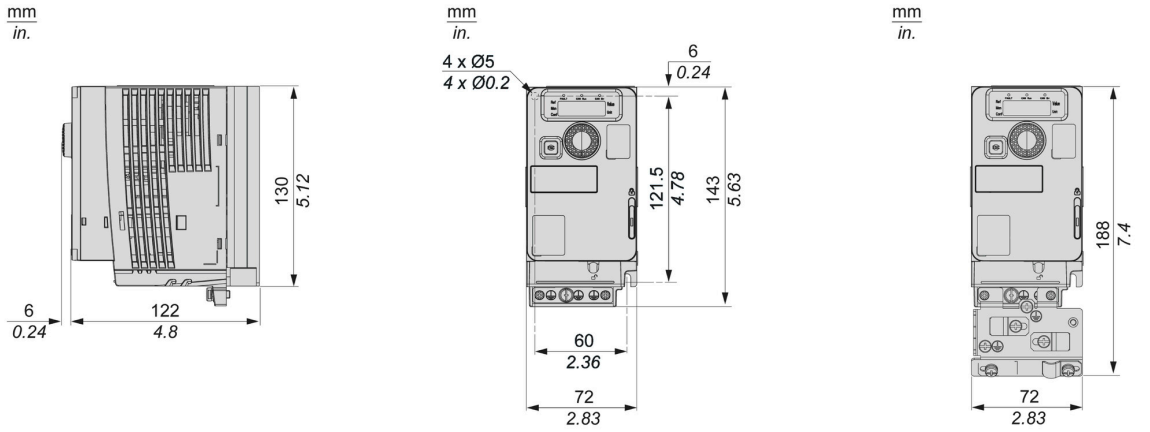
### 4.2.1 IP20 protection

#### Size 1 - Dimensions and weights

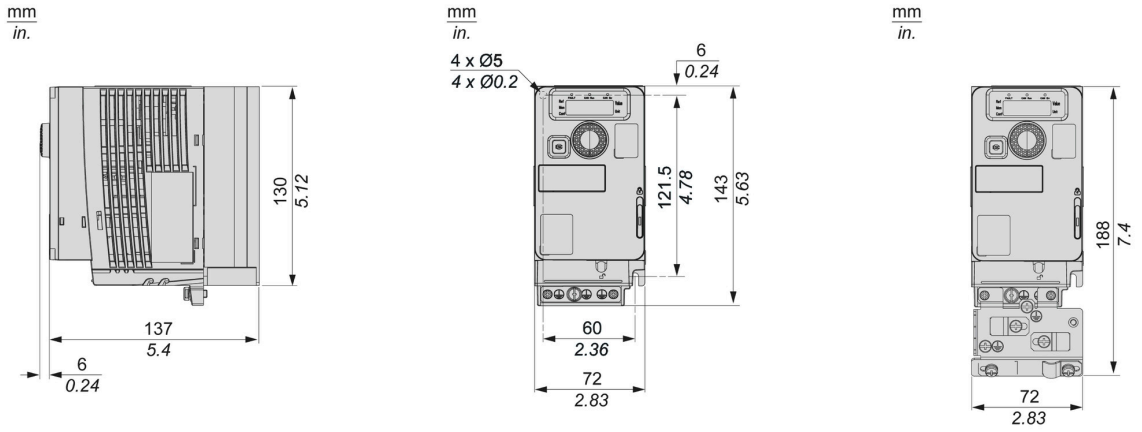
8I66S200018.00-000, 8I66T200018.00-000



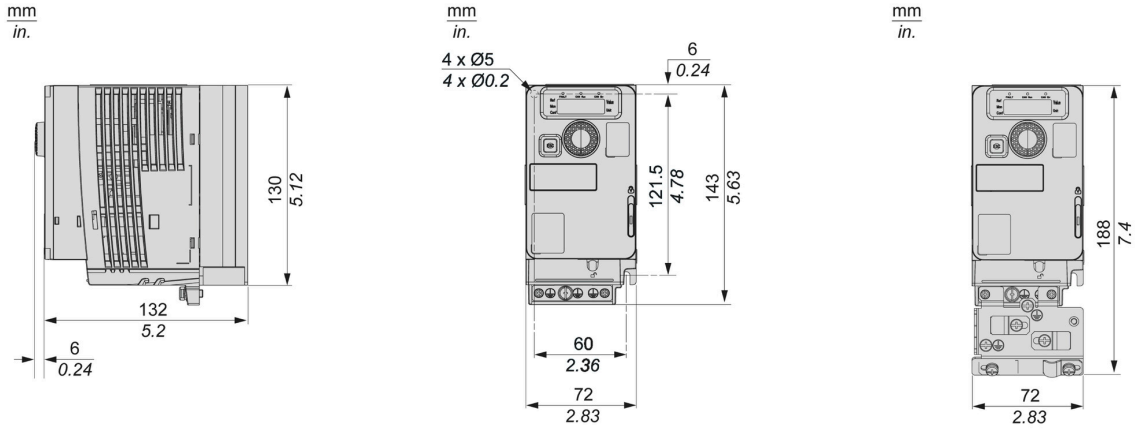

8I66S200037.00-000, 8I66T200037.00-000




8I66S200055.00-000, 8I66S200075.00-000



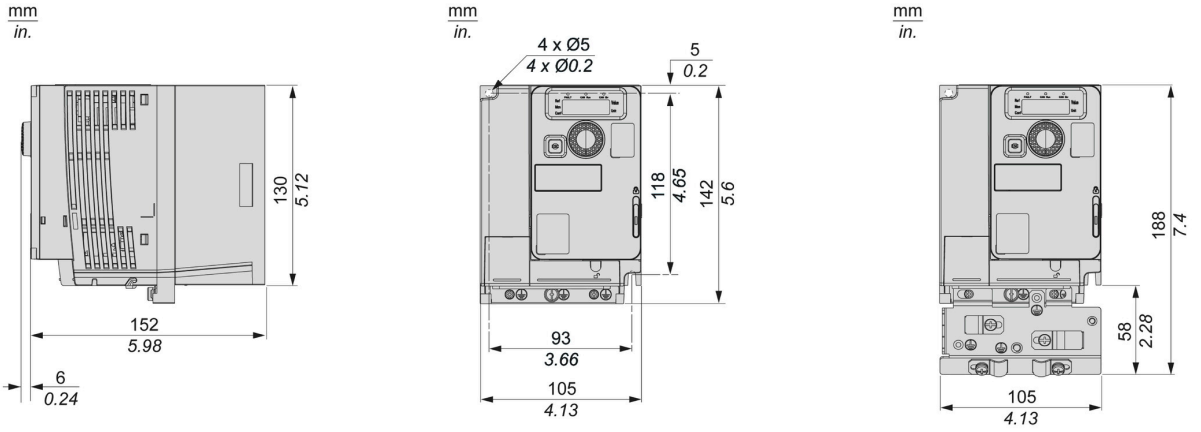

8I66T200055.00-000, 8I66T200075.00-000



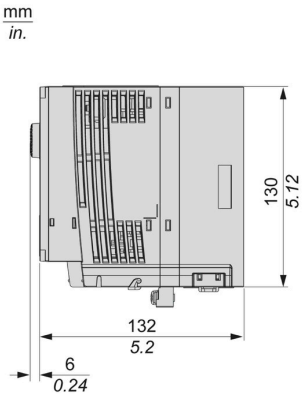

| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66S200018.00-000, 8I66T200018.00-000 | 0.8 | 1.76 |
| 8I66T200037.00-000 | 0.9 | 1.98 |
| 8I66S200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000 | 1 | 2.2 |
| 8I66S200055.00-000, 8I66S200075.00-000 | 1.1 | 2.42 |

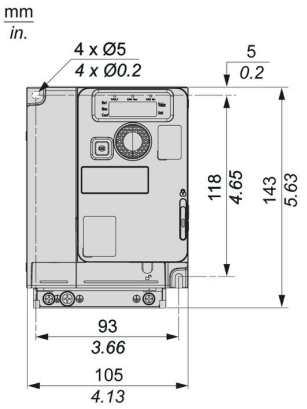
### Size 2 - Dimensions and weights

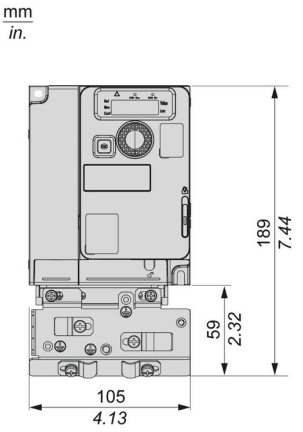
8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000, 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000, 8I66T400150.00-000, 8I66T600075.00-000, 8I66T600150.00-000




8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000

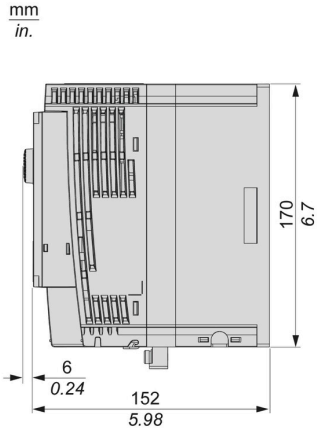


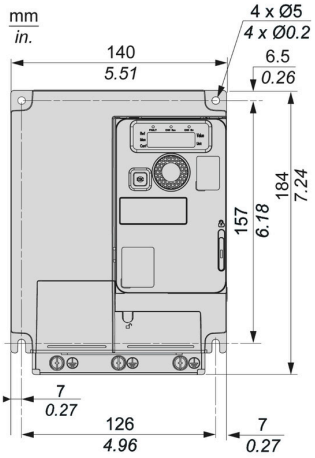



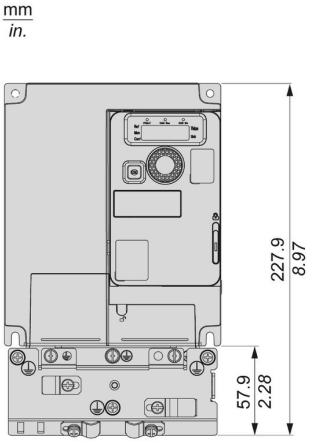




| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000 | 1.60 | 3.53 |
| 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000 | 1.40 | 3.08 |
| 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000 | 1.20 | 2.65 |
| 8I66T400110.00-000, 8I66T400150.00-000, 8I66T600075.00-000, 8I66T600150.00-000 | 1.30 | 2.87 |

## Size 3 - Dimensions and weights

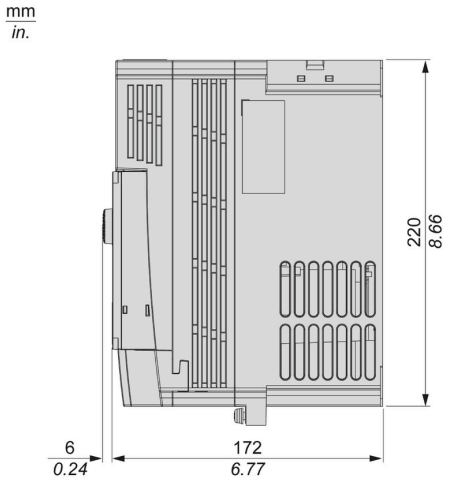


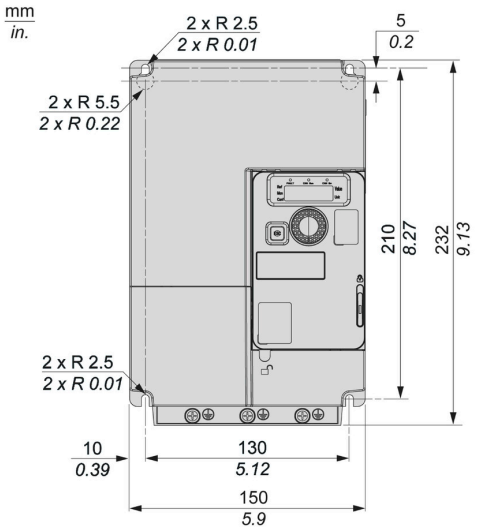



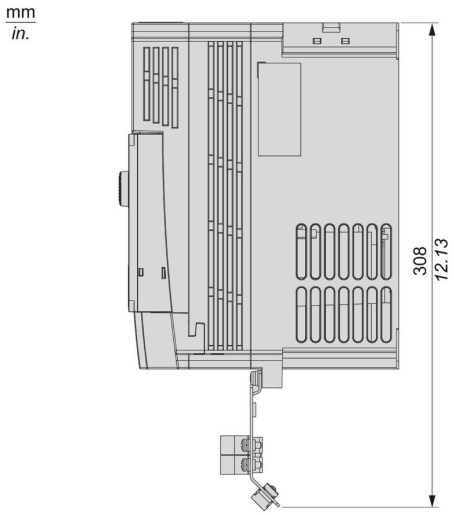



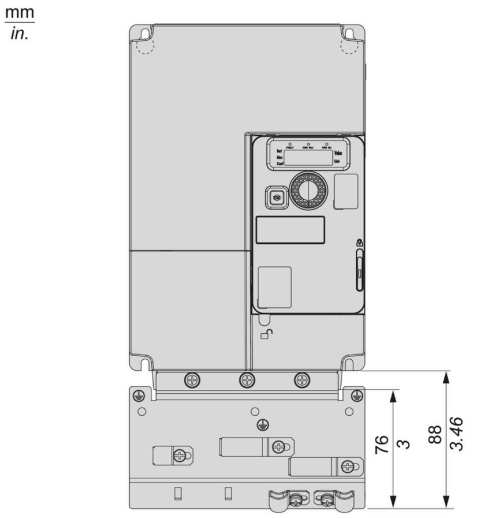

| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66T200300.00-000, 8I66T200400.00-000, 8I66T400400.00-000 | 2.20 | 4.85 |
| 8I66T400220.00-000, 8I66T400300.00-000 | 2.10 | 4.63 |
| 8I66T600220.00-000 | 2 | 4.41 |
| 8I66T600400.00-000 | 2.50 | 5.5 |

## Size 4 - Dimensions and weights



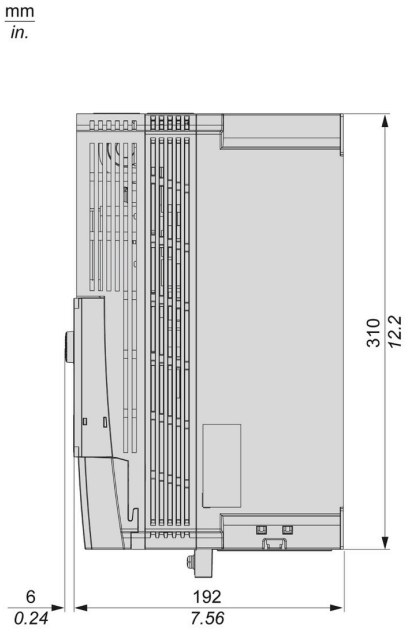



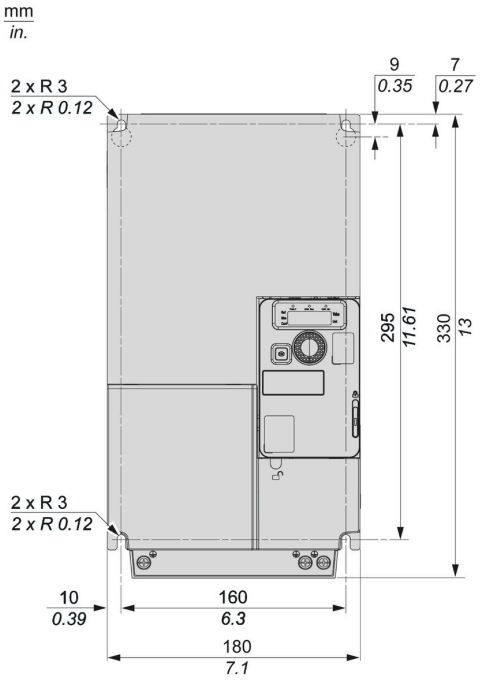



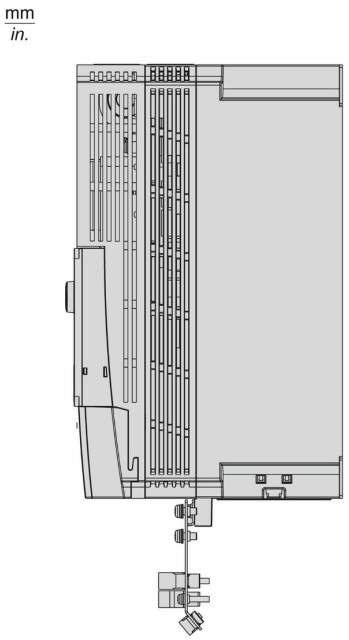



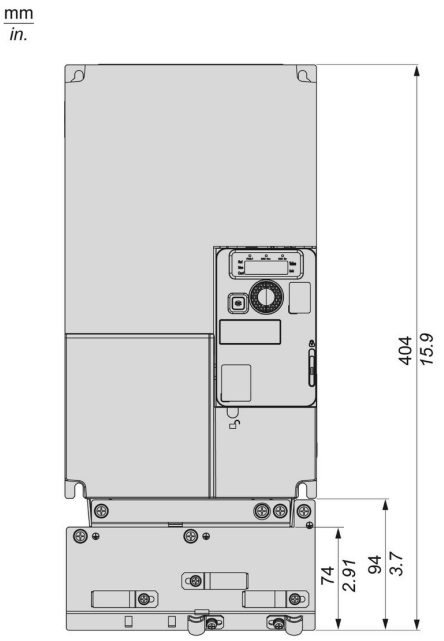

| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66T200550.00-000, 8I66T400550.00-000, 8I66T600550.00-000, 8I66T600750.00-000 | 3.5 | 7.72 |
| 8I66T200750.00-000, 8I66T400750.00-000 | 3.6 | 7.92 |

## Size 5 - Dimensions and weights



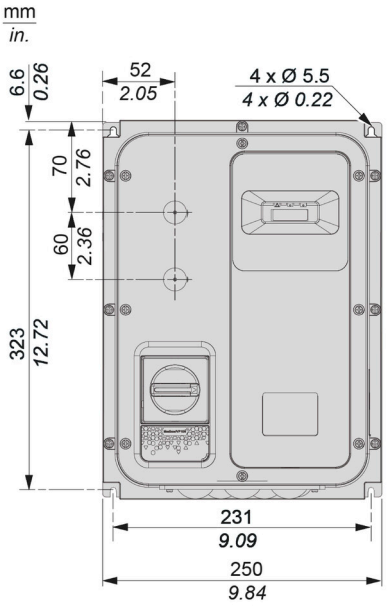



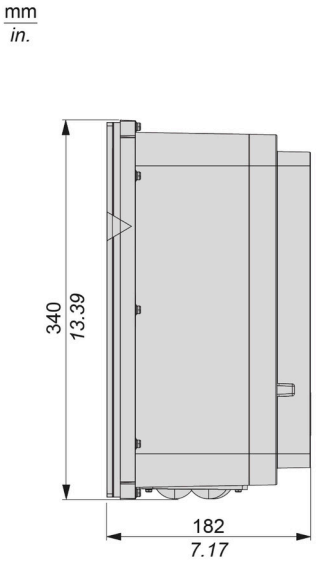




| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66T201100.00-000, 8I66T401100.00-000 | 6.8 | 15 |
| 8I66T201500.00-000, 8I66T401500.00-000 | 6.9 | 15.2 |
| 8I66T601100.00-000, 8I66T601500.00-000 | 6.5 | 14.3 |

## 4.2.2 IP65/IP66 protection

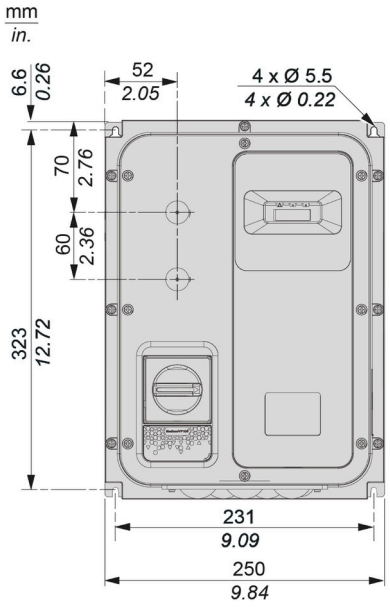
### Size 1 - Dimensions and weights

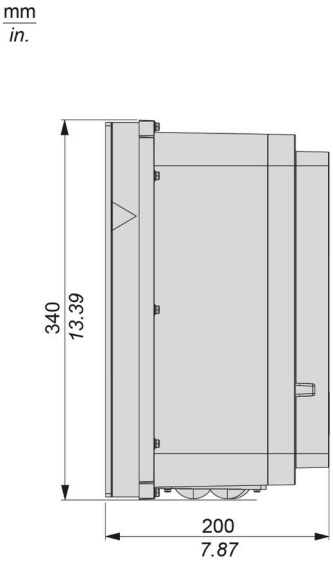



| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66S200018.00-065 | 5.4 | 11.9 |
| 8I66S200037.00-065, 8I66S200055.00-065, 8I66S200075.00-065 | 5.5 | 12.1 |
| 8I66S200018.00-066 | 5 | 11 |
| 8I66S200037.00-066, 8I66S200055.00-066, 8I66S200075.00-066 | 5.1 | 11.2 |

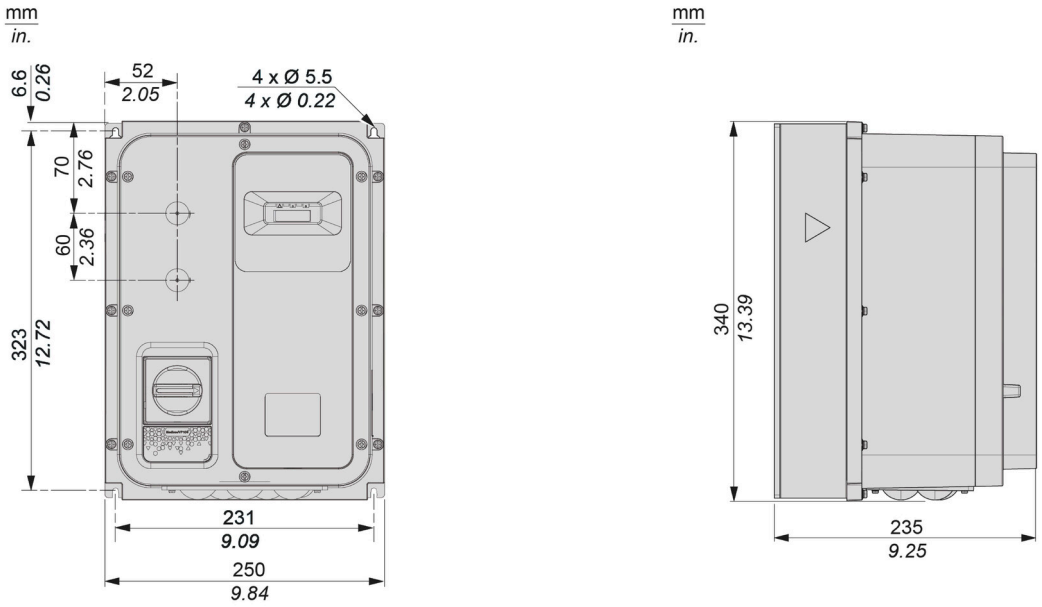
### Size 2 - Dimensions and weights




| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66T400037.00-065, 8I66T400055.00-065, 8I66T400075.00-065 | 6.3 | 13.9 |
| 8I66T400110.00-065, 8I66T400150.00-065 | 6.4 | 14.1 |
| 8I66T400037.00-066, 8I66T400055.00-066, 8I66T400075.00-066 | 5.9 | 13 |
| 8I66T400110.00-066, 8I66T400150.00-066 | 6 | 13.2 |

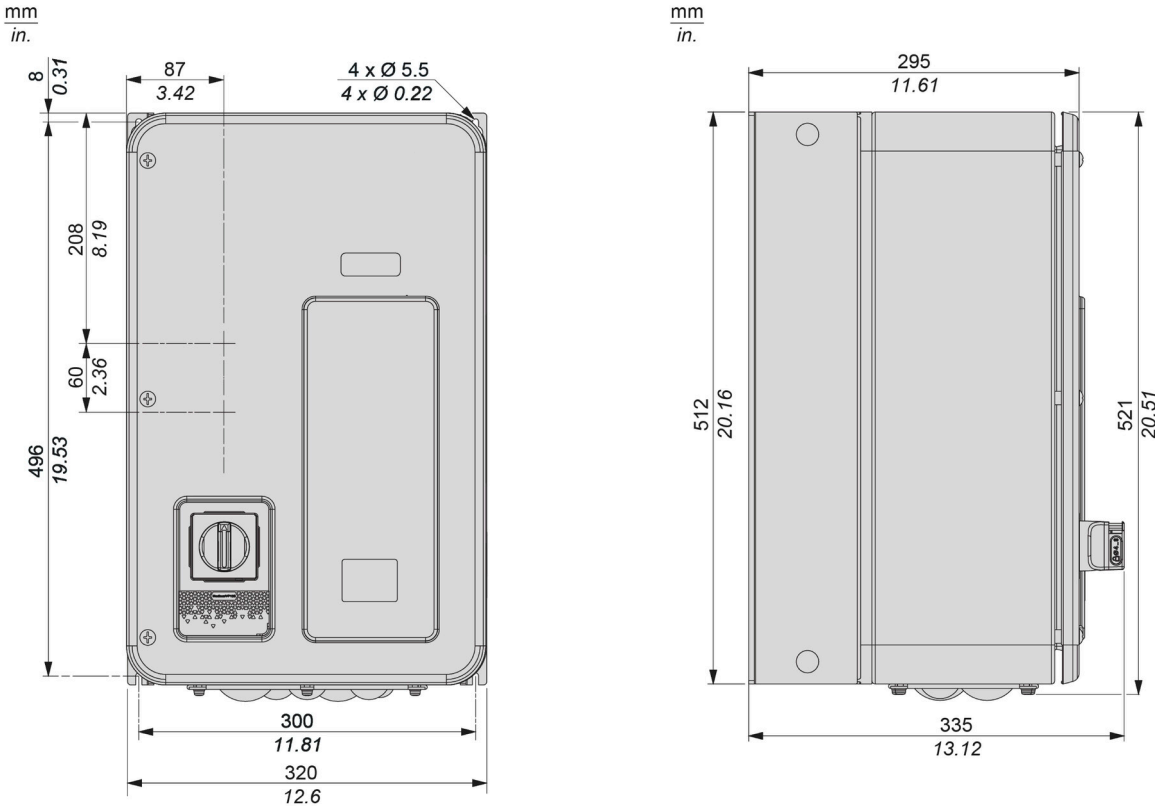
## Size 3 - Dimensions and weights



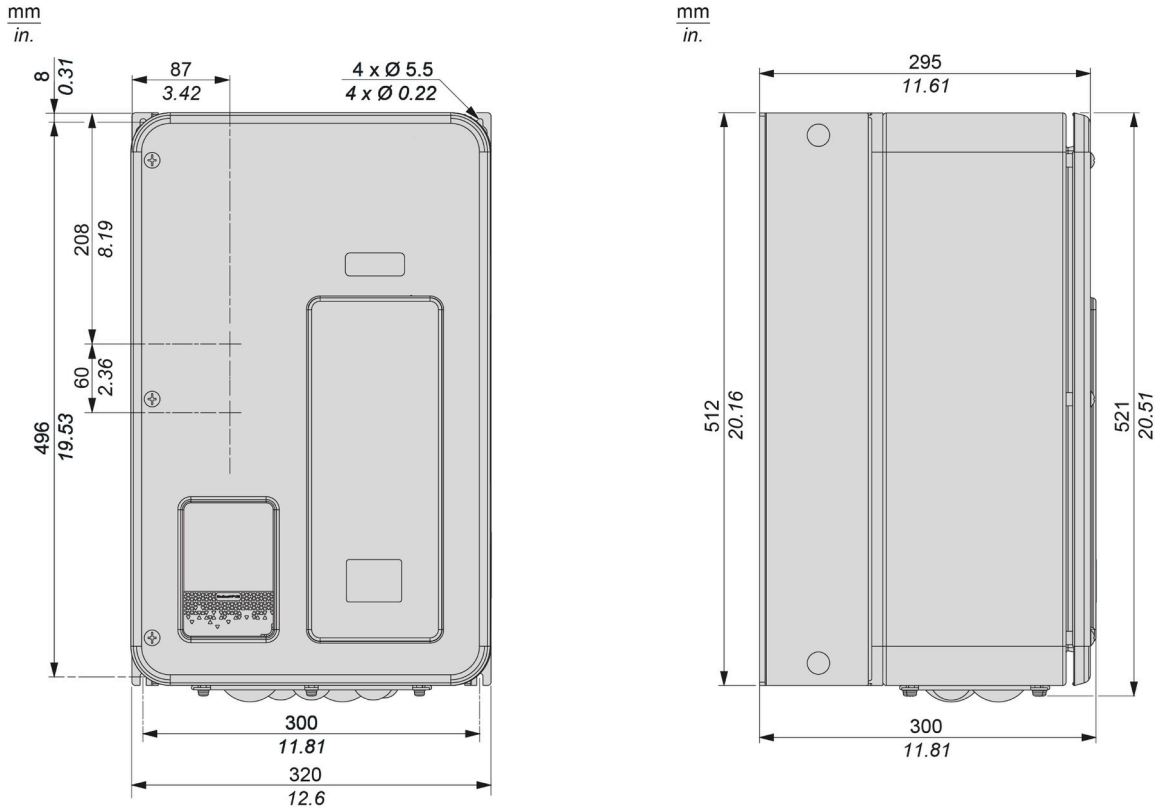

| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66S200110.00-065, 8I66S200150.00-065, 8I66S200220.00-065 | 7.8 | 17.2 |
| 8I66T400220.00-065, 8I66T400300.00-065 | 8.1 | 17.9 |
| 8I66T400400.00-065 | 8.2 | 18.1 |
| 8I66S200110.00-066, 8I66S200150.00-066, 8I66S200220.00-066 | 7.4 | 16.3 |
| 8I66T400220.00-066, 8I66T400300.00-066, 8I66T400400.00-066 | 7.7 | 17 |

## Size 4 - Dimensions and weights

8I66T400550.00-065, 8I66T400750.00-065



## 8I66T400550.00-066, 8I66T400750.00-066




| Order number | Weight in kg | Weight in lb |
|---|---|---|
| 8I66T400550.00-065, 8I66T400750.00-065 | 22.7 | 50 |
| 8I66T400550.00-066, 8I66T400750.00-066 | 22 | 48.5 |

# 4.3 Installing the frequency inverter

## 4.3.1 Procedure for commissioning the inverter

**Procedure**

1) Take delivery of the inverter and perform an inspection:
   - Make sure that the catalog number indicated on the label matches the model number.
   - Remove the inverter from the packaging and inspect it for damage.
2) Check the mains power supply:
   - Make sure that the mains power supply is compatible with the supply voltage for the inverter power unit.
3) Install the inverter:
   - Install the inverter in accordance with the instructions provided in this document.
   - Mount the inverter(s), and if applicable, all internal and external options.
4) Wire the inverter.
   - Connect the motor and make sure that the connections match the voltage.
   - Make sure that the voltage is switched off, and then connect to the mains power supply.
   - Connect the controller.
5) Programming

Steps 1 to 4 must be carried out with the voltage switched off.

### 4.3.2 Getting started

#### Transport and storage

**Warning!**

**IMPROPER TRANSPORT**

- **Lifting and handling must be carried out by qualified personnel in accordance with the requirements of the site and in compliance with all relevant regulations.**
- **Ensure that there are no persons or obstacles in the operating area of the lifting and transport equipment.**
- **Use lifting and transportation equipment suitable for the load and take all necessary measures to avoid swinging, tilting, tipping and other potentially hazardous conditions.**
- **Follow all transportation instructions in this manual and in all associated product documentation.**
- **Take all measures to prevent damage to the product or other hazards during transport or when opening the packaging.**
- **Store and transport the product in its original packaging.**
- **Do not store or transport the device if the packaging is damaged or appears to be damaged.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

To protect the device, make sure that it is transported and stored in its own packaging before installation. Make sure that environmental conditions are suitable.

#### Inspecting the inverter after delivery

Damaged products and accessories can cause electric shocks or the equipment to operate in unexpected ways.

**Danger!**

**ELECTRIC SHOCK OR UNEXPECTED OPERATION OF THE EQUIPMENT**

**Use of damaged products or accessories is not permitted.**

**Failure to follow these instructions will result in death or serious injury.**

In the event of damage, contact your local B&R sales representative.

1) Remove the inverter from the packaging and inspect it for damage.
2) Make sure that the catalog number on the nameplate matches the model number.

### 4.3.3 Forming DC bus capacitors

Electrolytic capacitors are installed in B&R servo drives, inverter modules, stepper motor modules and power supplies. In these cases, the oxide layer that acts as a dielectric can become weakened by electrochemical processes when stored for a lengthy period with the power is switched off. In the worst case, this can cause a short circuit and subsequent destruction of the capacitor and irreparable damage to B&R modules.

When stored for periods over 1 year, the electrolytic capacitors may be destroyed during commissioning if not preconditioned. If preconditioning takes place using a forming process defined for B&R modules, then proper operation can be guaranteed. Forming is performed by applying a defined voltage over a defined period of time. This reforms the oxide layer to ensure the functionality of the electrolytic capacitors.

#### 4.3.3.1 Forming specifications for DC bus capacitors

| Storage period | Forming required? | Forming measures |
|---|---|---|
| <1 year | No | No measures required |
| 1 to <2 years | Yes | Supply the B&R module with nominal voltage for 1 hour before initial commissioning. |
| 2 to <3 years | Yes | Supply the B&R module with an adjustable DC power supply with current limiting and gradually increase the voltage.<br>Observe the following sequence:<br>1. Completely disconnect the B&R module from the mains.<br>2. Check the B&R module for absence of voltage (ensure by measurement).<br>3. Connect the adjustable DC power supply with current limiting to the B&R module according to section Module-specific values.<br>4. Set the current limit of the adjustable DC power supply to a value that is between 30 and 50 mA higher than the expected forming current (see section Module-specific values).<br>5. Switch on the adjustable DC power supply and gradually increase the voltage according to the following scheme:<br>a) Supply with 25% of the forming voltage for 30 minutes.<br>b) Supply with 50% of the forming voltage for 30 minutes.<br>c) Supply with 75% of the forming voltage for 30 minutes.<br>d) Supply with 100% of the forming voltage for 30 minutes.<br>✓ The electrical properties of the DC bus capacitors are restored when the forming current (leakage current) for the capacitors is within the range as specified in the data sheets (see section Module-specific values). The current can be monitored via the DC power supply or via an ammeter.<br>6. Switch off the adjustable DC power supply.<br>7. Wait until the DC bus capacitors in the B&R module are voltage-free (about 5-10 minutes). Check for absence of voltage using a multimeter to avoid the risk of electric shock.<br>8. Disconnect the adjustable DC power supply from the B&R module.<br>✓ The B&R module is now ready for operation. |
| >3 years | Yes | Supply the B&R module with an adjustable DC power supply with current limiting and gradually increase the voltage.<br>Observe the following sequence:<br>1. Completely disconnect the B&R module from the mains.<br>2. Check the B&R module for absence of voltage (ensure by measurement).<br>3. Connect the adjustable DC power supply with current limiting to the B&R module according to section Module-specific values.<br>4. Set the current limit of the adjustable DC power supply to a value that is between 30 and 50 mA higher than the expected forming current (see section Module-specific values).<br>5. Switch on the adjustable DC power supply and gradually increase the voltage according to the following scheme:<br>a) Supply with 25% of the forming voltage for 2 hours.<br>b) Supply with 50% of the forming voltage for 2 hours.<br>c) Supply with 75% of the forming voltage for 2 hours.<br>d) Supply with 100% of the forming voltage for 2 hours.<br>✓ The electrical properties of the DC bus capacitors are restored when the forming current (leakage current) for the capacitors is within the range as specified in the data sheets (see section Module-specific values). The current can be monitored via the DC power supply or via an ammeter.<br>6. Switch off the adjustable DC power supply. |

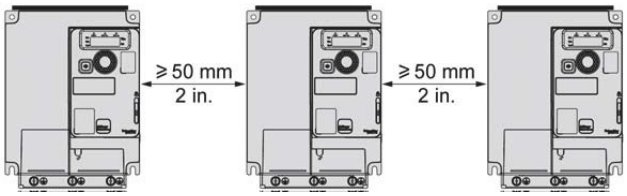
| Storage period | Forming required? | Forming measures |
|---|---|---|
| | | 7. Wait until the DC bus capacitors in the B&R module are voltage-free (about 5-10 minutes). Check for absence of voltage using a multimeter to avoid the risk of electric shock.<br>8. Disconnect the adjustable DC power supply from the B&R module.<br>✓ The B&R module is now ready for operation. |

**Information:**

**For B&R modules stored for a long period of time, forming is recommended once a year for 1 hour at nominal voltage.**

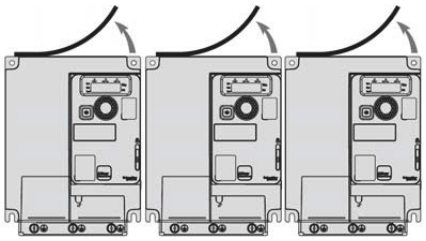
### 4.3.4 Mounting conditions

**Mounting type A**



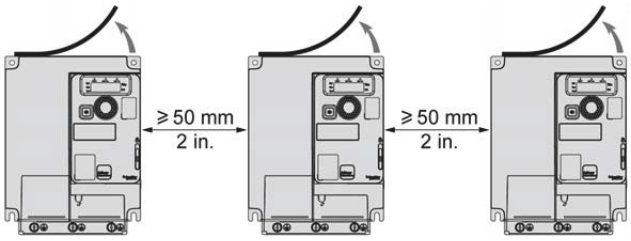

Clearance ≥50 mm (2 in.) on each side with mounted ventilation cover. Mounting type A allows the inverter to operate at ambient temperatures up to 50°C (122°F).

**Mounting type B**



Inverters mounted side by side. The protective cover should be removed. The degree of protection changes to IP20.

**Mounting type C**




Clearance ≥50 mm (2 in.) on each side. When operating at ambient temperatures above 50°C (122°C), the protective cover should be removed. The degree of protection changes to IP20.

## Spacing and mounting position

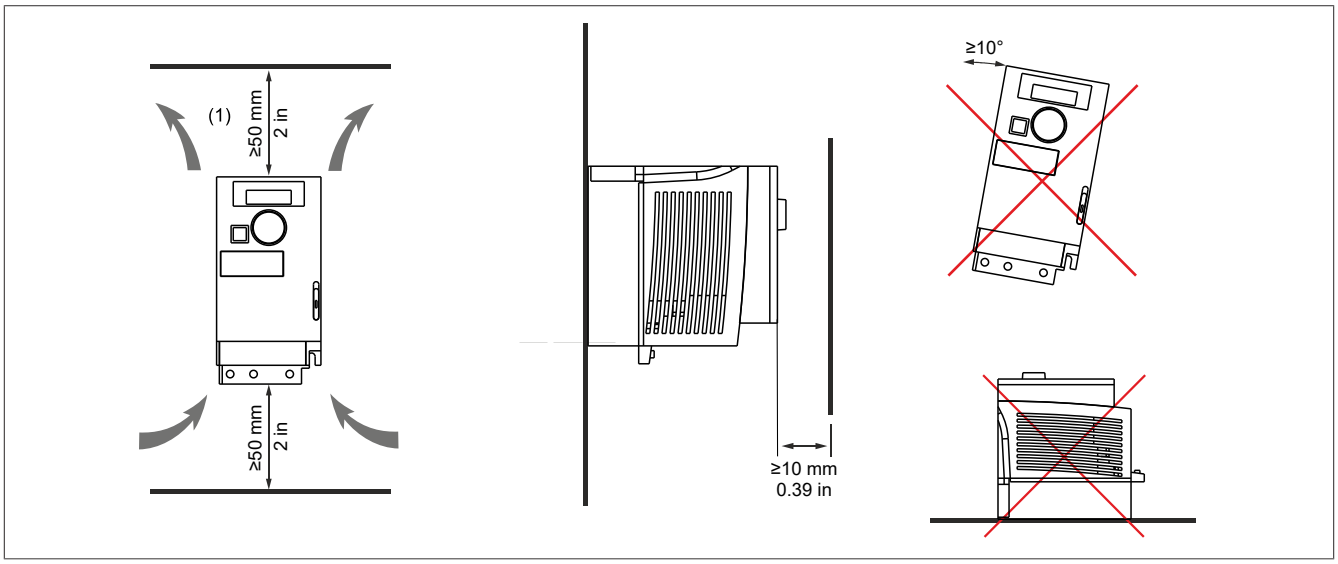



Figure 1: IP20 protection

(1) Minimum value according to the thermal conditions.

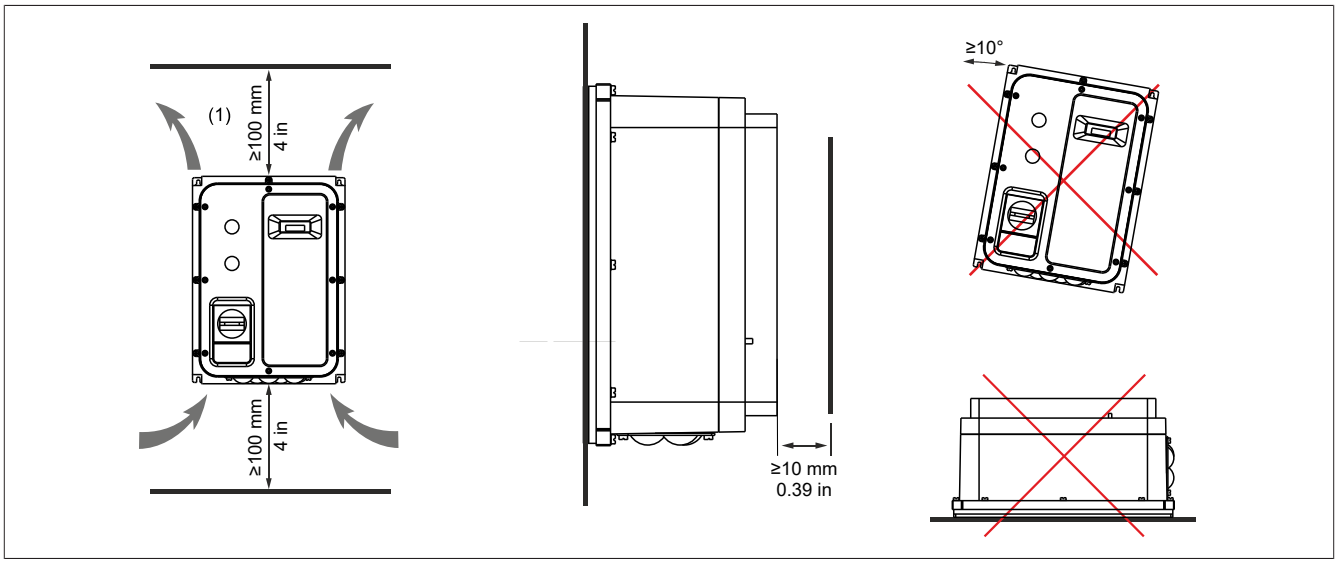



Figure 2: IP65/IP66 protection

(1) Minimum value according to the thermal conditions.

## General mounting instructions

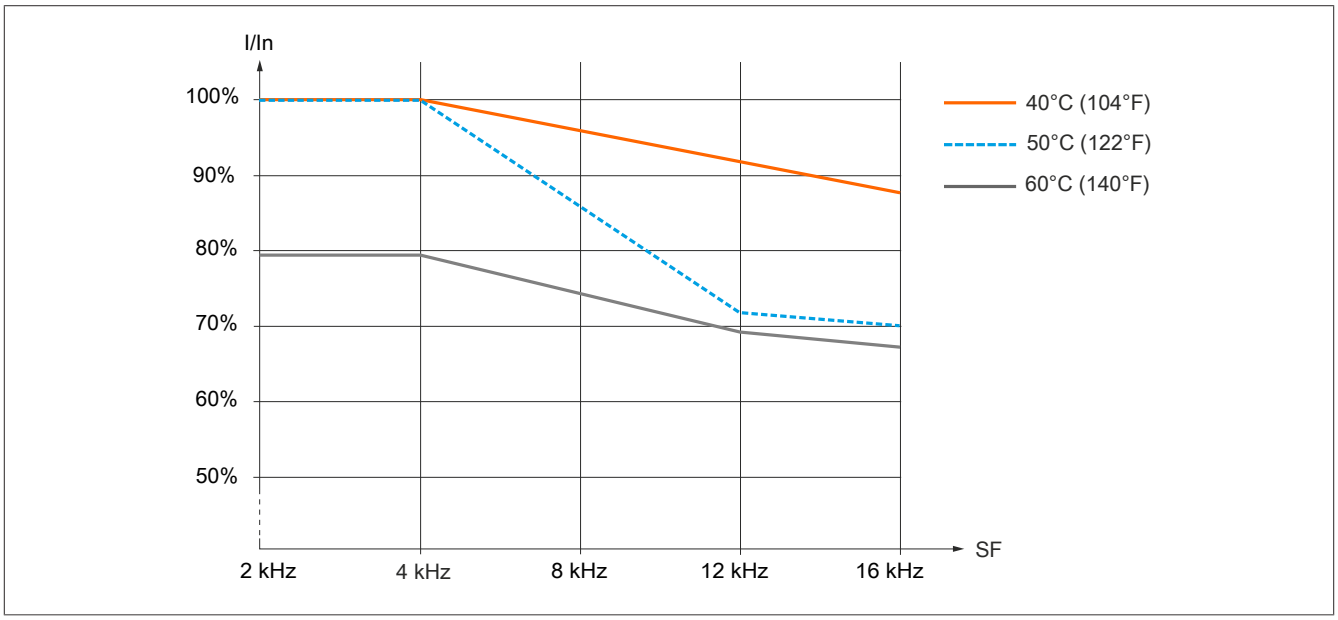
- Mount the device in a vertical position of ±10°. This is necessary to facilitate cooling of the device.
- In accordance with the relevant standards, mount the device onto the mounting surface using four screws, as described in the table in section 4.3.6 "Mounting type" on page 131.
- Washers should be used for all mounting screws.
- Tighten the mounting screws.
- Do not install the device near heat sources.
- Avoid environmental influences such as high temperatures and high humidity as well as dust, dirt and aggressive gases.
- Comply with the minimum spacing prescribed for the installation to ensure the required cooling.
- Do not install the device on flammable equipment.
- Install the inverter on a solid, vibration-free floor.
- 8I66...-000: It is possible for sizes 1 and 2 to be installed horizontally without derating (except if installed directly side by side), provided that the following requirements are met:
  - The air inlets are located on the top of the device.
  - The spacing around the inverter is the same as if installed vertically.

### 4.3.5 Derating characteristic curves

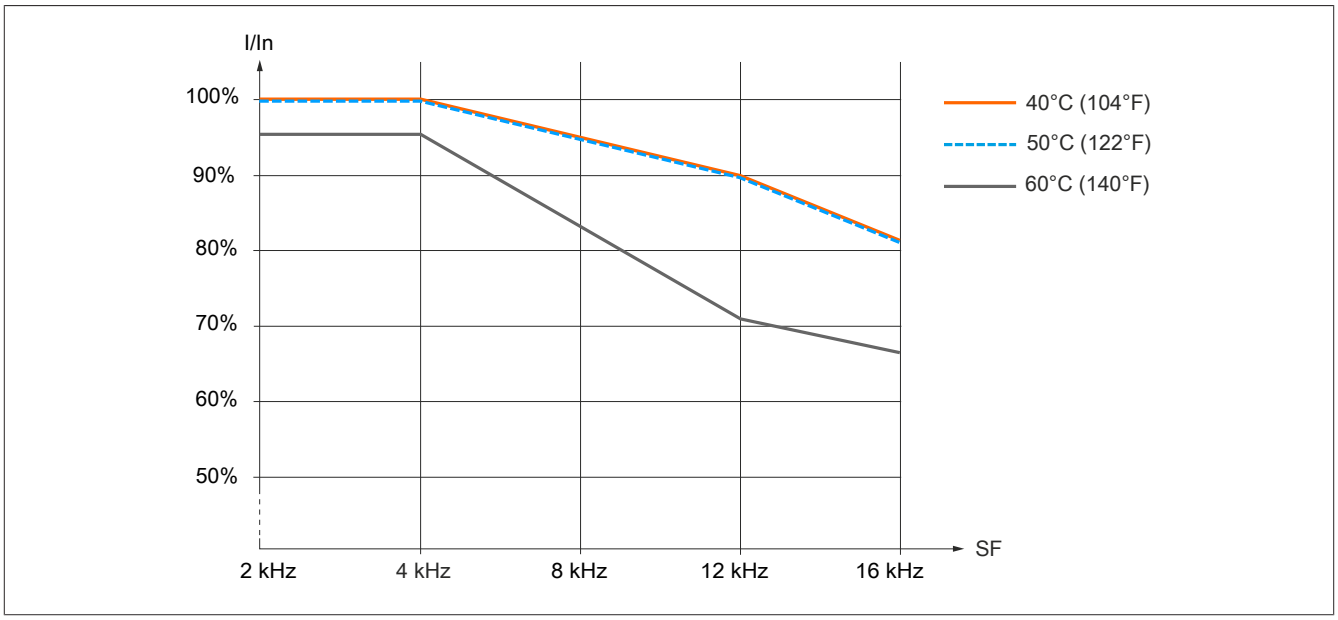
Derating curves for the nominal current of the inverter (In) as a function of the temperature and switching frequency.

#### 4.3.5.1 IP20 protection

**8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000**



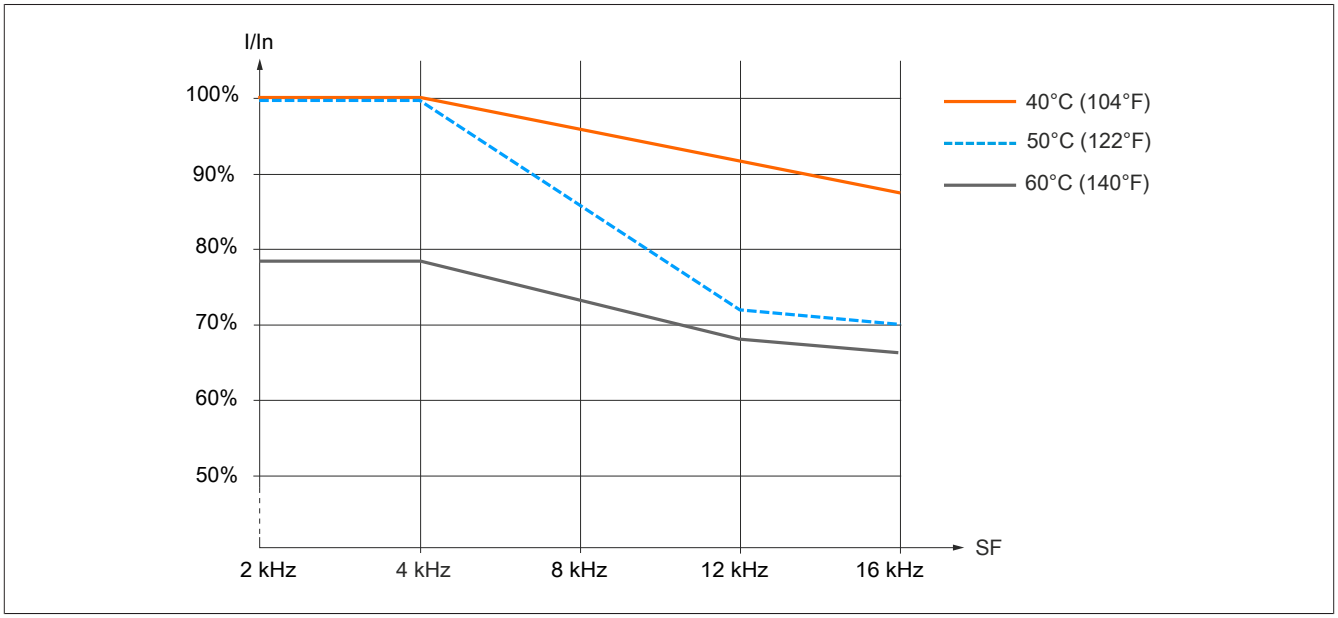

**8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000**



### 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000

Mounting types A and B: 40°C

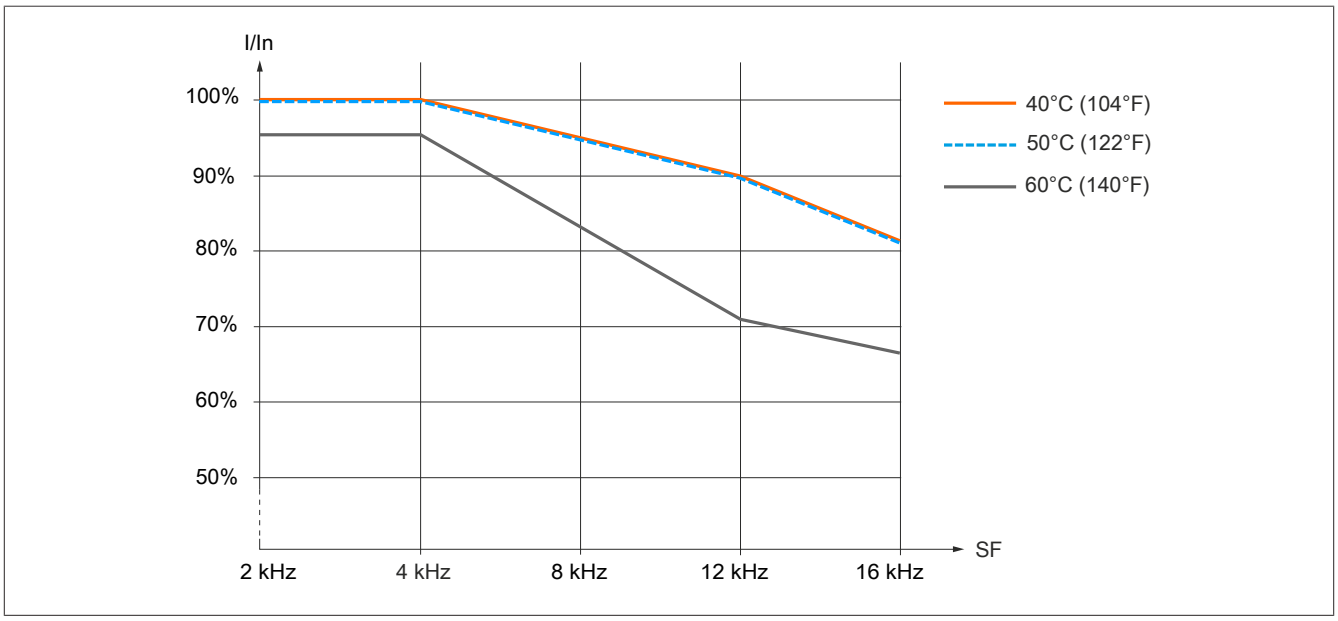
Mounting type C: 40°C, 50°C, 60°C




### 8I66T200110.00-000, 8I66T200150.00-000, 8I66T200220.00-000

Mounting types A and B: 40°C

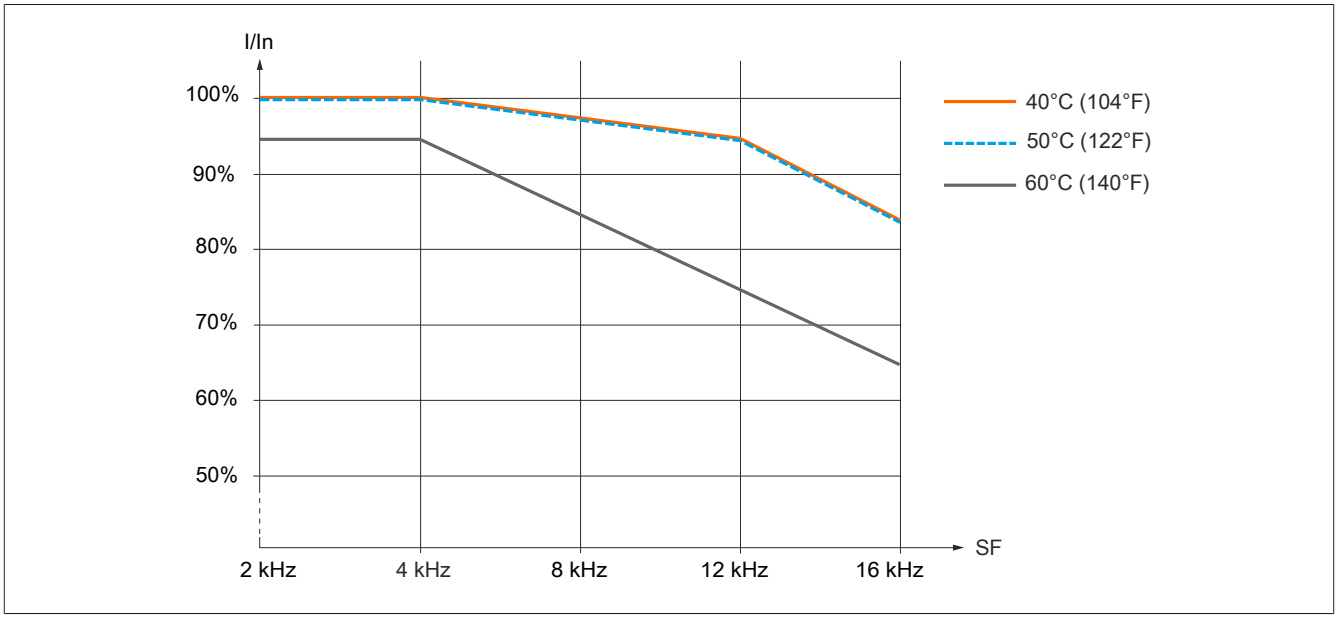
Mounting type C: 40°C, 50°C, 60°C



### 8I66T200300.00-000, 8I66T200400.00-000

Mounting types A and B: 40°C

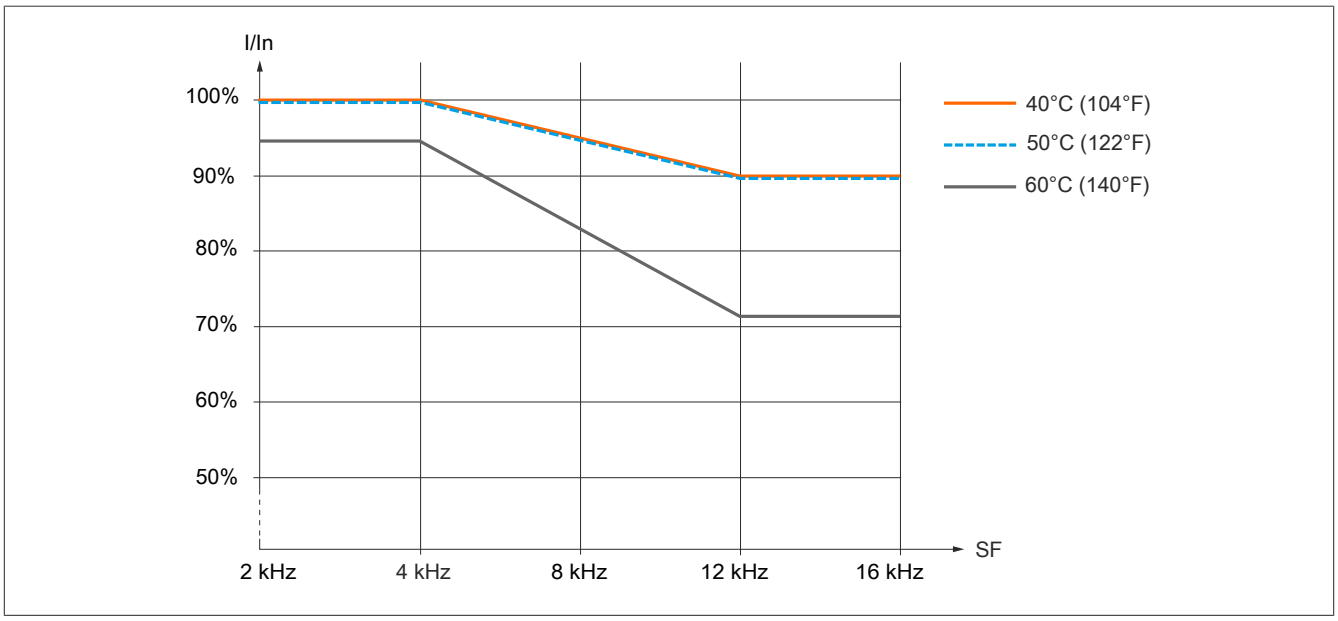
Mounting type C: 40°C, 50°C, 60°C




### 8I66T200550.00-000, 8I66T200750.00-000

Mounting types A and B: 40°C

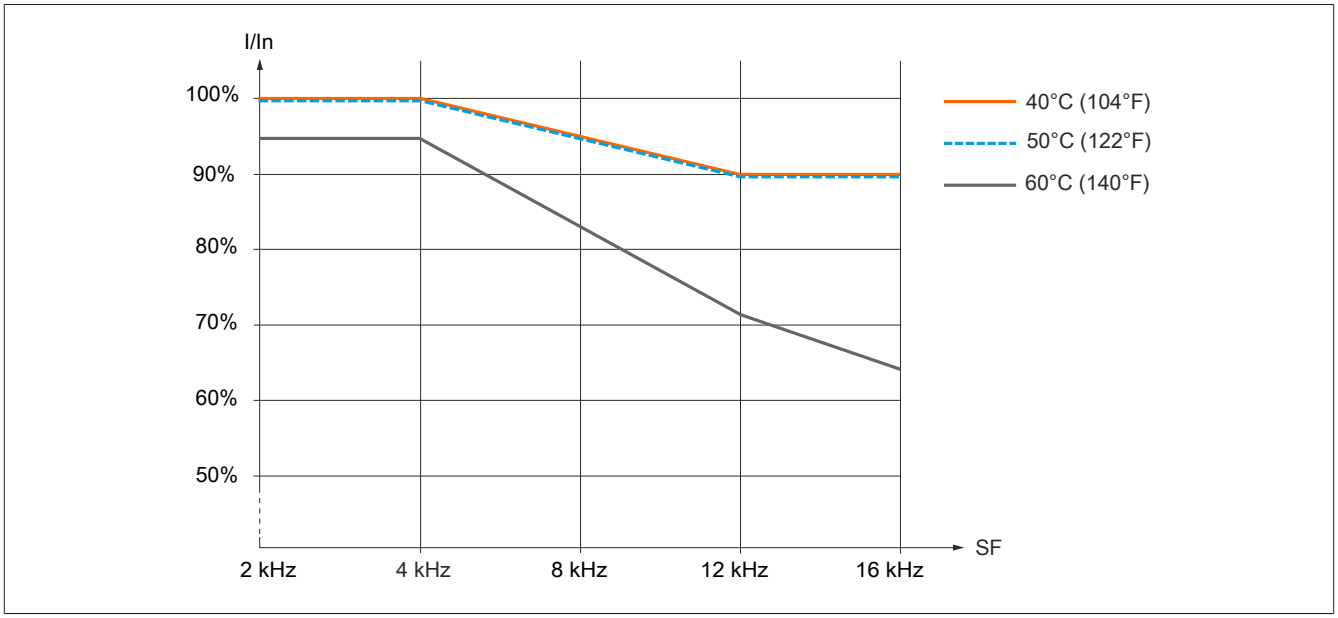
Mounting type C: 40°C, 50°C, 60°C



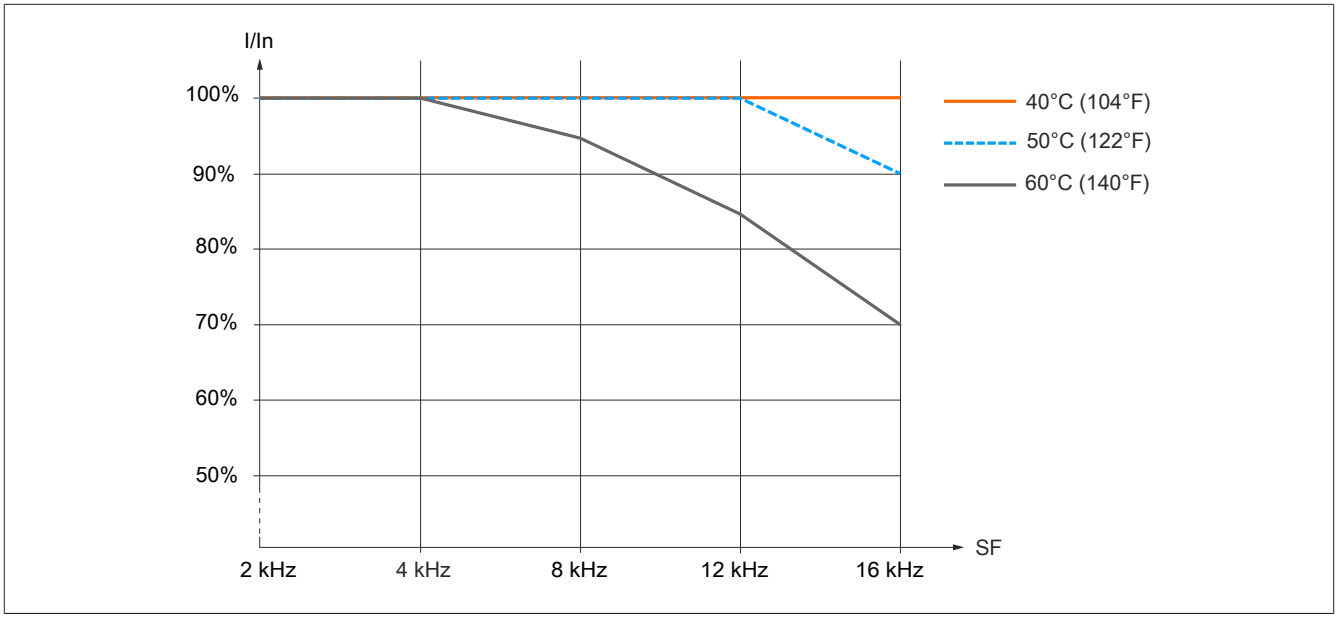
### 8I66T201100.00-000, 8I66T201500.00-000

Mounting types A and B: 40°C

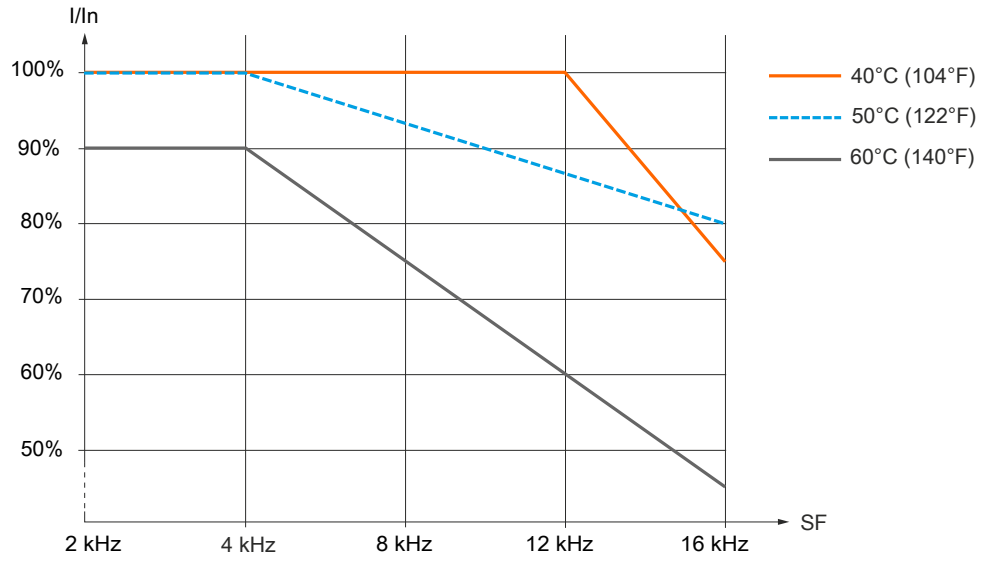
Mounting type C: 40°C, 50°C, 60°C




### 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000, 8I66T400150.00-000

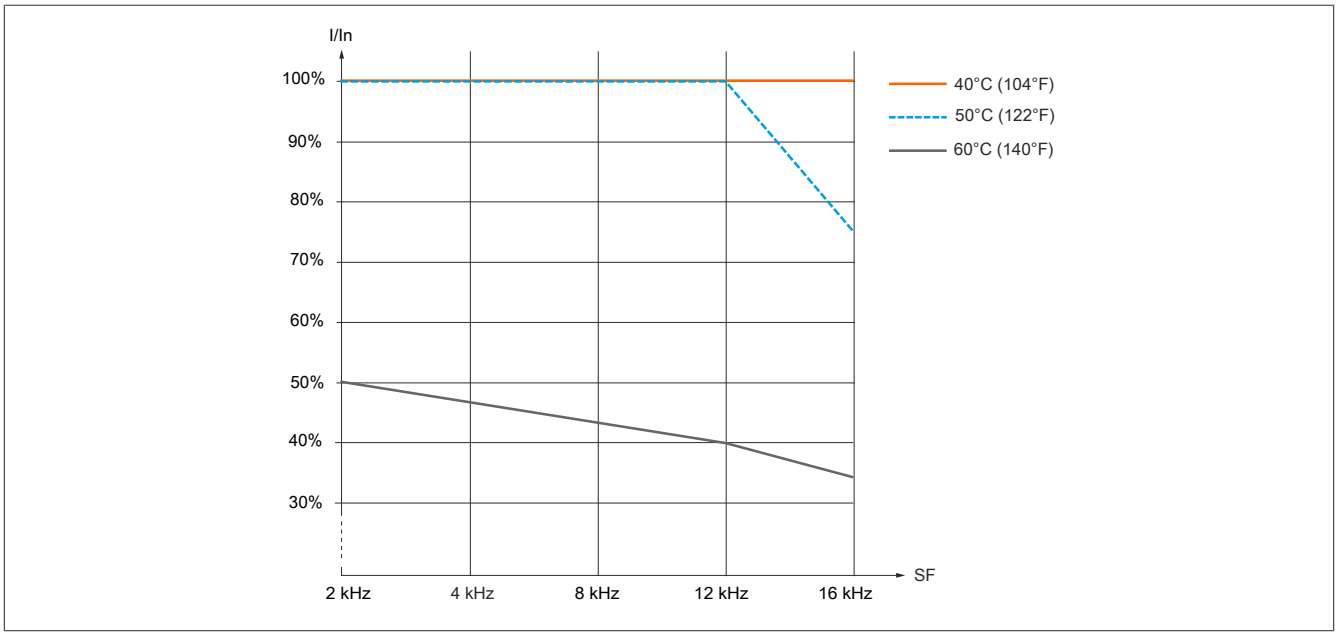


### 8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000

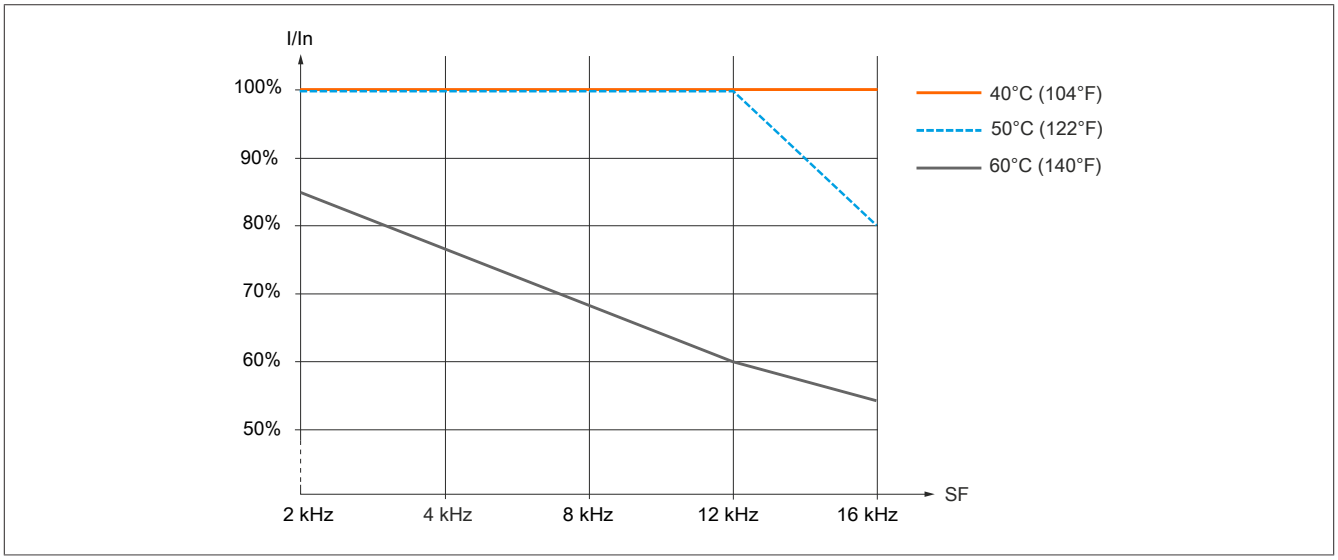


## 8I66T400550.00-000, 8I66T400750.00-000

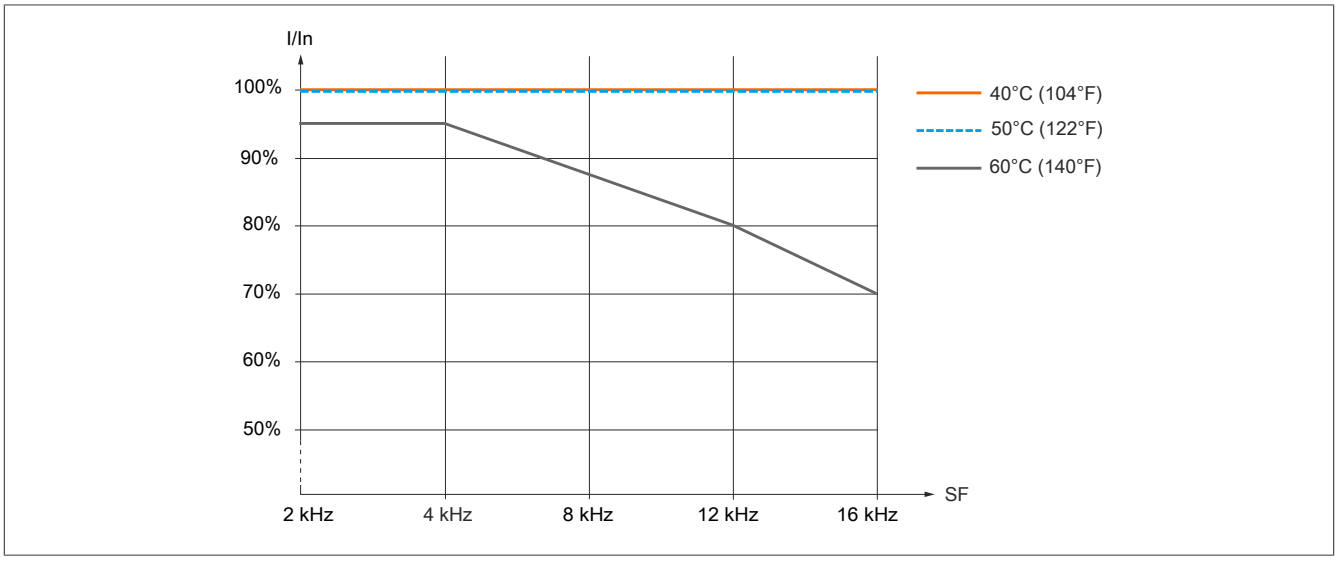
Mounting type A:




Mounting type B:

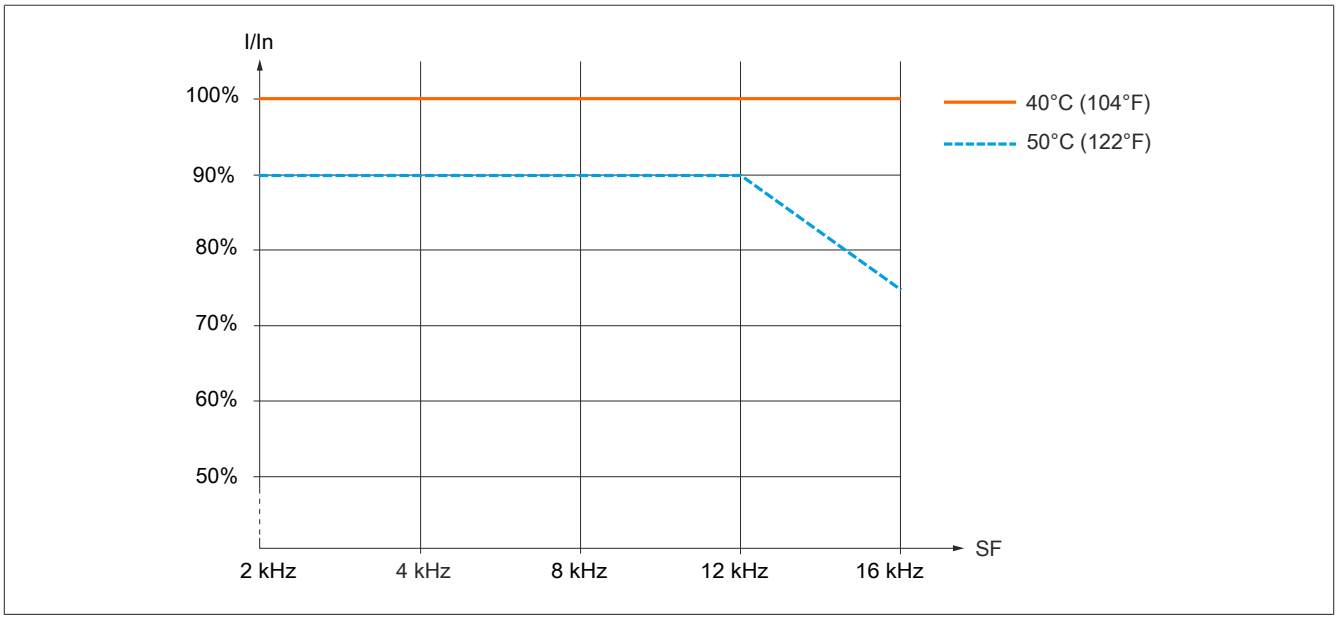



Mounting type C:

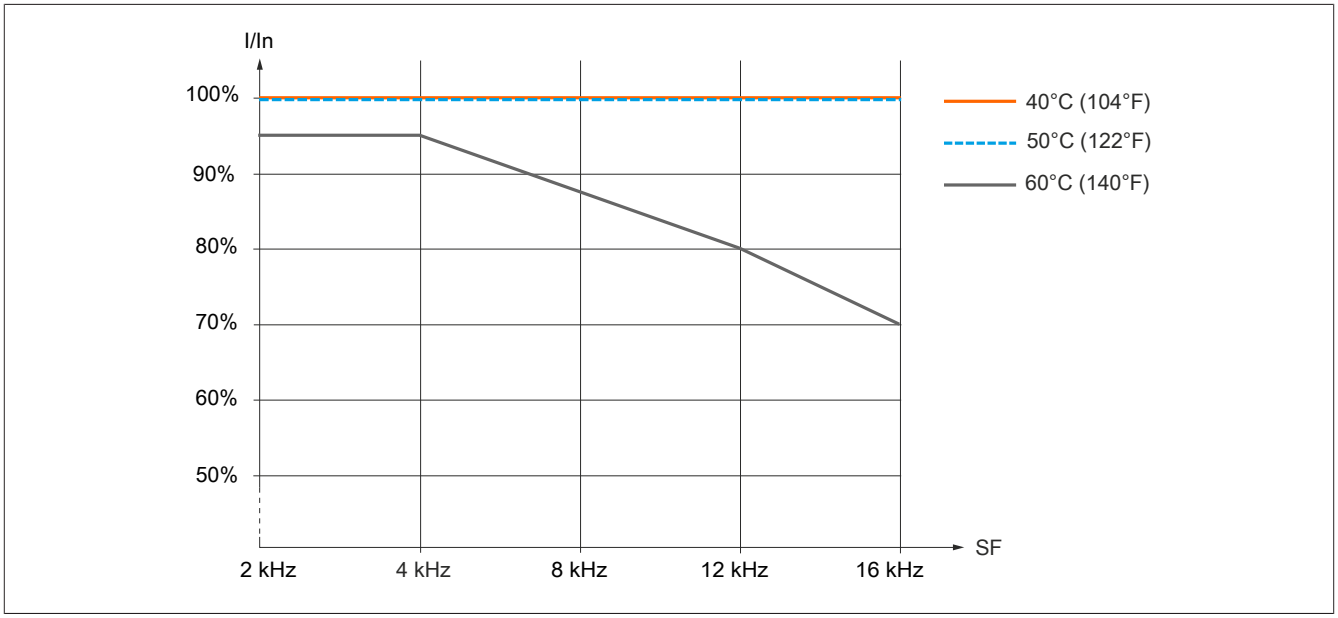


### 8I66T401100.00-000, 8I66T401500.00-000

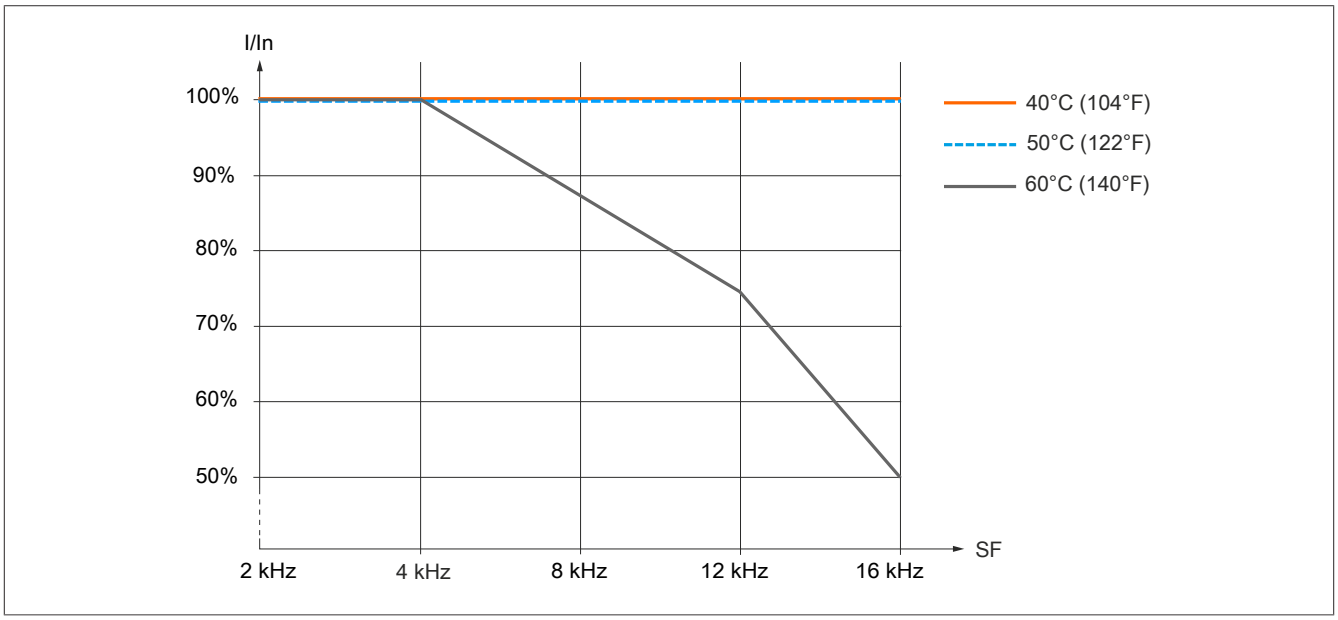
Mounting types A and B:



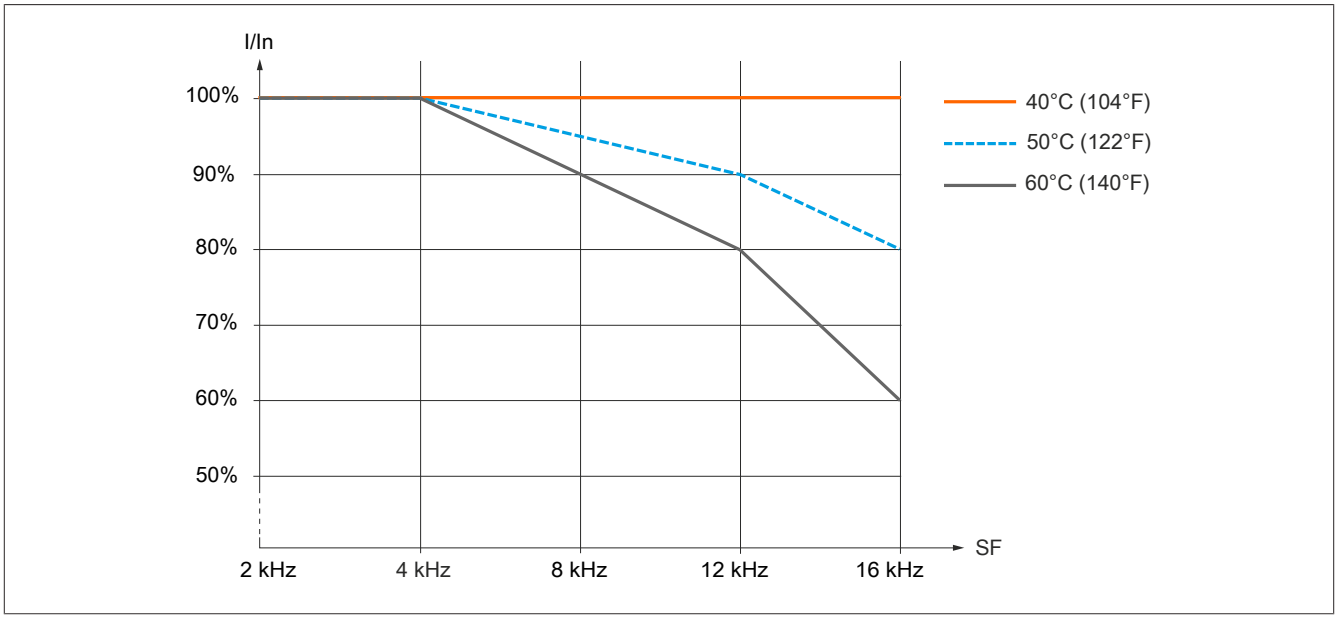

Mounting type C:



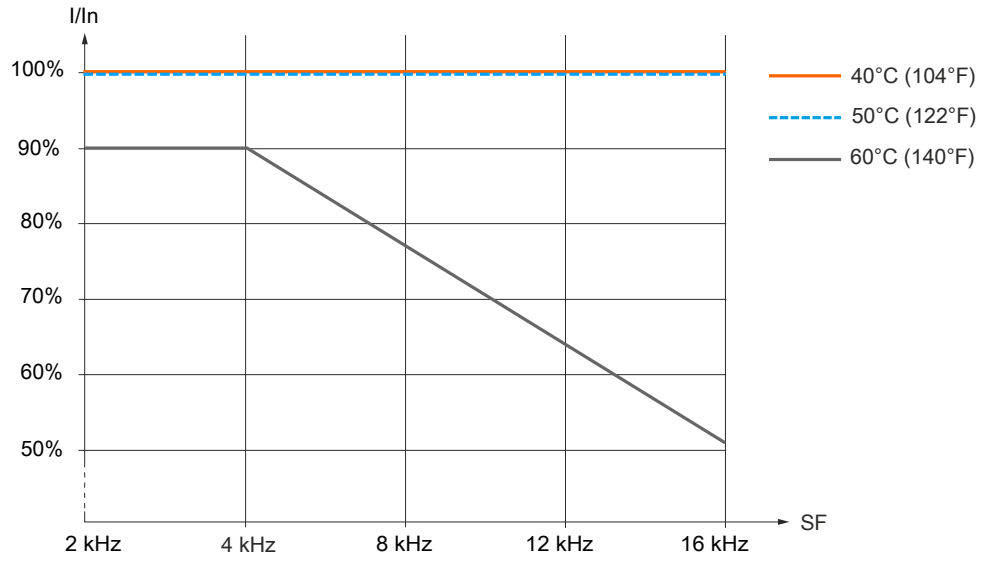
### 8I66T600075.00-000, 8I66T600150.00-000



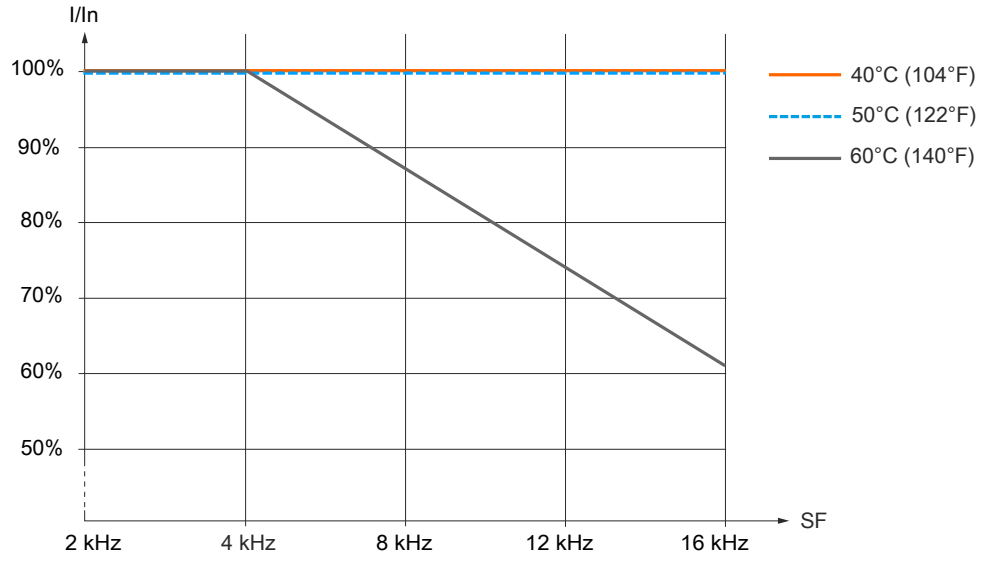

### 8I66T600220.00-000, 8I66T600400.00-000



### 8I66T600550.00-000, 8I66T600750.00-000

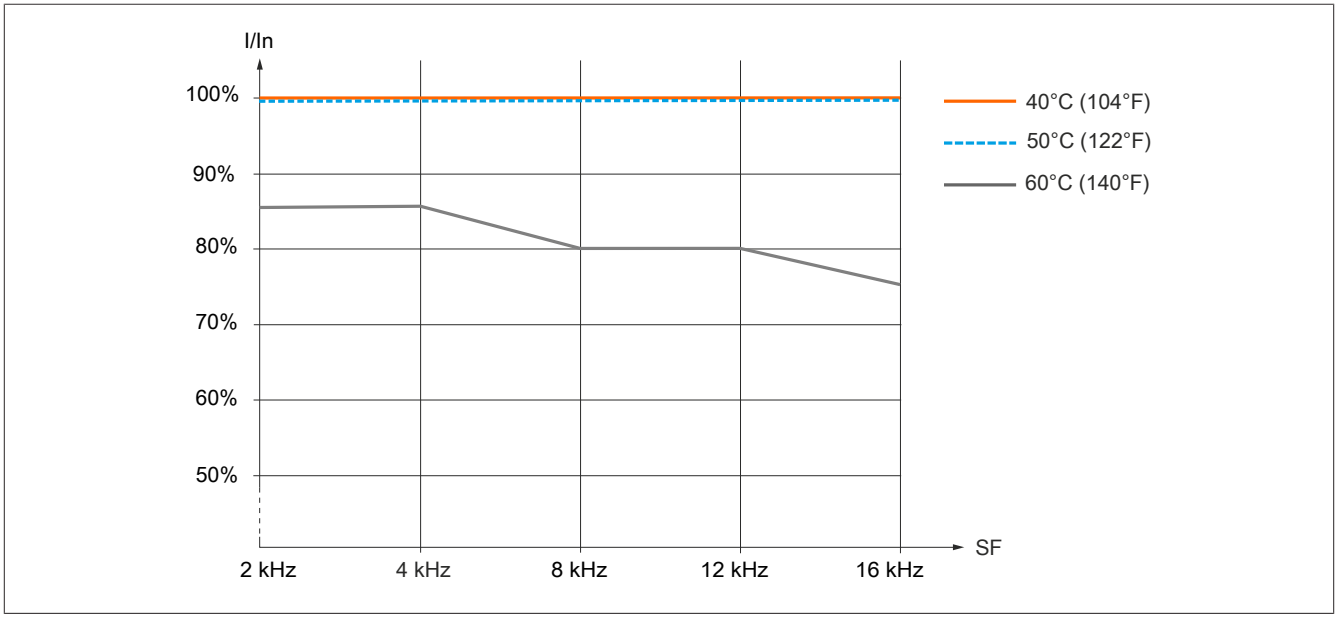



### 8I66T601100.00-000, 8I66T601500.00-000

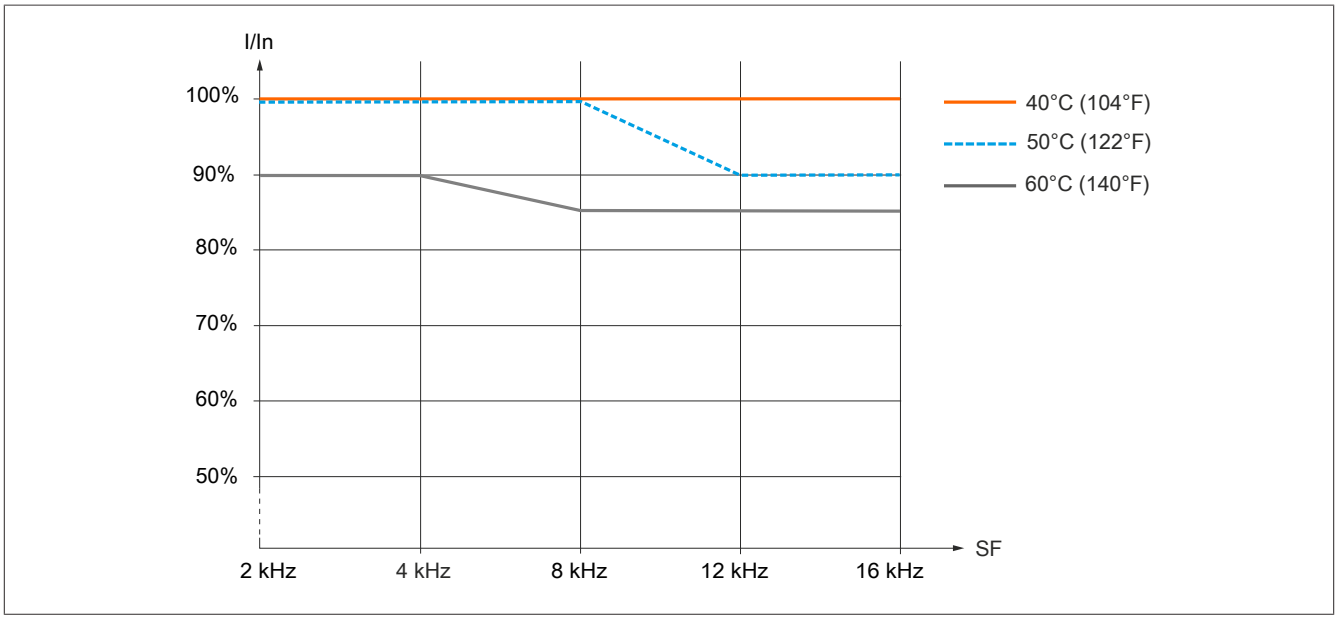


### 4.3.5.2 IP65/IP66 protection

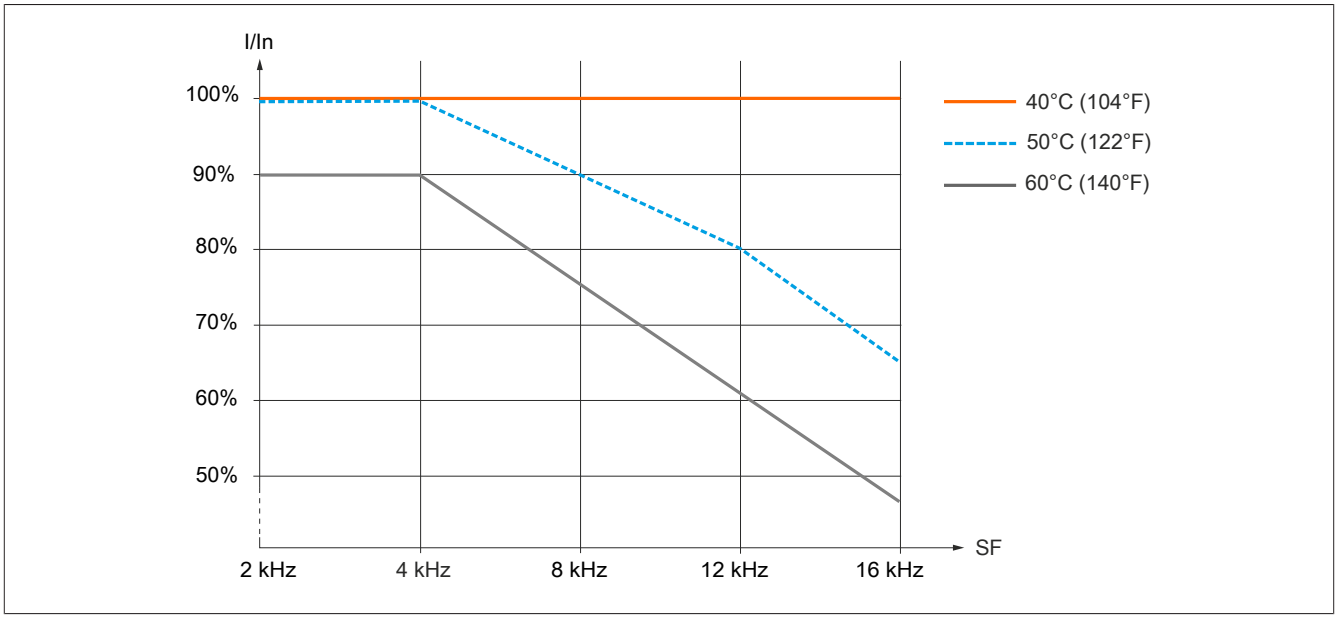
#### 8I66S200018.00-06x, 8I66S200037.00-06x, 8I66S200055.00-06x, 8I66S200075.00-06x



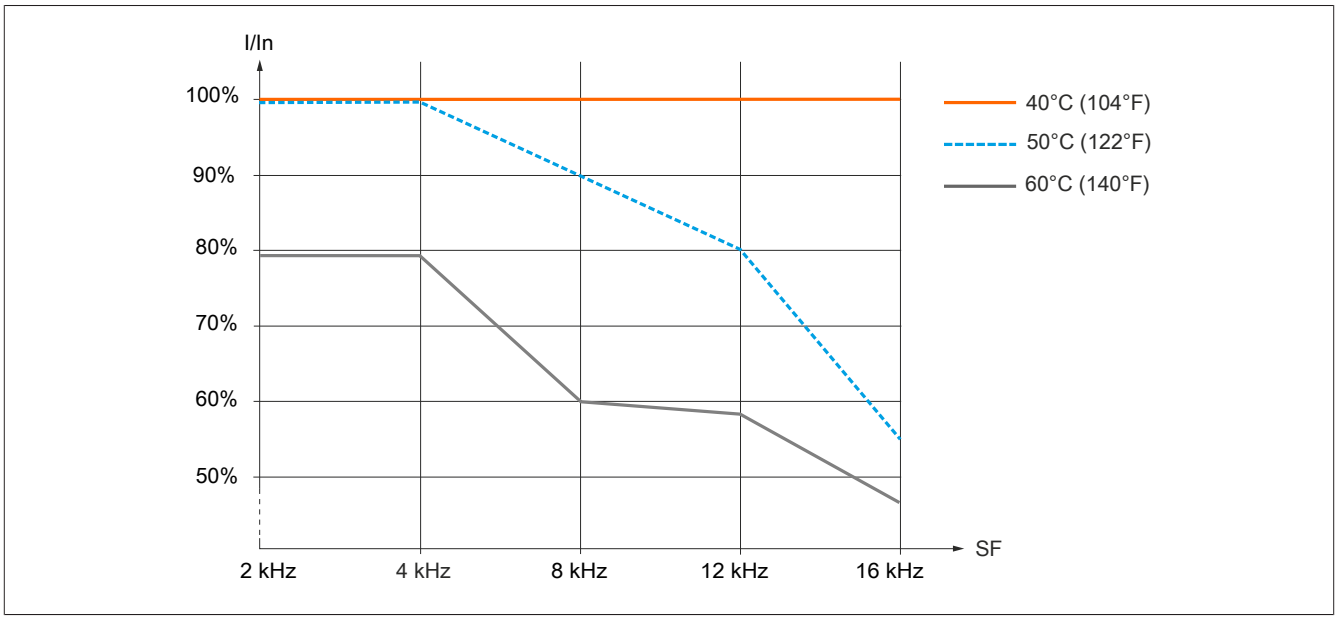

#### 8I66S200110.00-06x, 8I66S200150.00-06x, 8I66S200220.00-06x



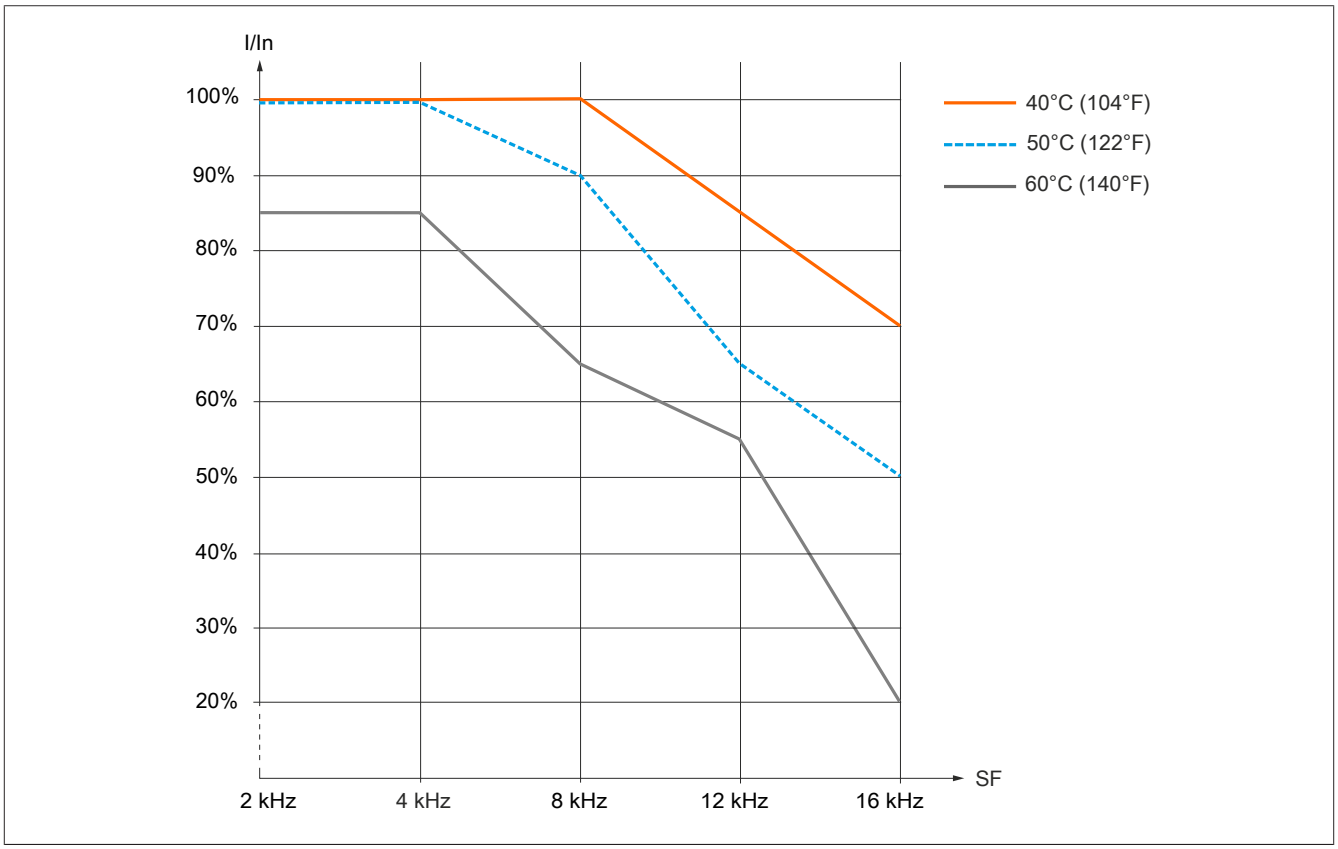
**8I66T400037.00-06x, 8I66T400055.00-06x, 8I66T400075.00-06x, 8I66T400110.00-06x, 8I66T400150.00-06x**




**8I66T400220.00-06x, 8I66T400300.00-06x, 8I66T400400.00-06x**



### 8I66T400550.00-06x, 8I66T400750.00-06x

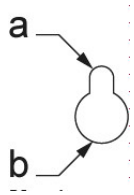


### 4.3.6 Mounting type

#### Mounting holes and screws

All inverters of all sizes must be mounted using screws as follows:

- Number of holes: The 4 mounting holes must be used.
- Inverter sizes 1 and 2 (IP20 protection) can also be mounted using just 2 holes (top left and bottom right).




| Size | Top mounting holes a mm (in) | Top mounting holes b (if applicable) mm (in) | Bottom mounting holes mm (in) | Recommended number of screws |
|---|---|---|---|---|
| 1 | 5 (0.2) | - | 5 (0.2) | M4 |
| 2 | 5 (0.2) | - | 5 (0.2) | M4 |
| 3 | 5 (0.2) | - | 5 (0.2) | M4 |
| 4 | 5 (0.2) | 11 (0.43) | 5 (0.2) | M4 |
| 5 | 6 (0.24) | 14 (0.55) | 6 (0.24) | M5 |

Table 41: IP20 protection

| Size | Upper holes a mm (in) | Upper holes b (if available) mm (in) | Lower holes mm (in) | Recommended screws |
|---|---|---|---|---|
| 1 | 5.5 (0.21) | 13 (0.51) | 5.5 (0.21) | M5 |
| 2 | 5.5 (0.21) | 13 (0.51) | 5.5 (0.21) | M5 |
| 3 | 5.5 (0.21) | 13 (0.51) | 5.5 (0.21) | M5 |
| 4 | 5.5 (0.21) | 13 (0.51) | 5.5 (0.21) | M5 |

Table 42: IP65/IP66 protection

**Note:**

**Screws are not included with the delivered product.**

## 4.4 Wiring the drive

### 4.4.1 Instructions for cable lengths

#### Consequences of using longer cables

When using inverters with motors, fast-switching transistors combined with lengthy motor cables can cause peaks in voltage of over twice the DC connection voltage. These high-voltage peaks can cause the motor winding insulation to wear prematurely.

The function for limiting overvoltage allows the use of longer cables, reducing torque performance in the process.

#### Length of the motor cables

The spacing between the inverter and the motor(s) is limited by the permitted power failure level, the permitted overvoltage on the motor(s), any stray capacitance current generated and the permitted heat loss.

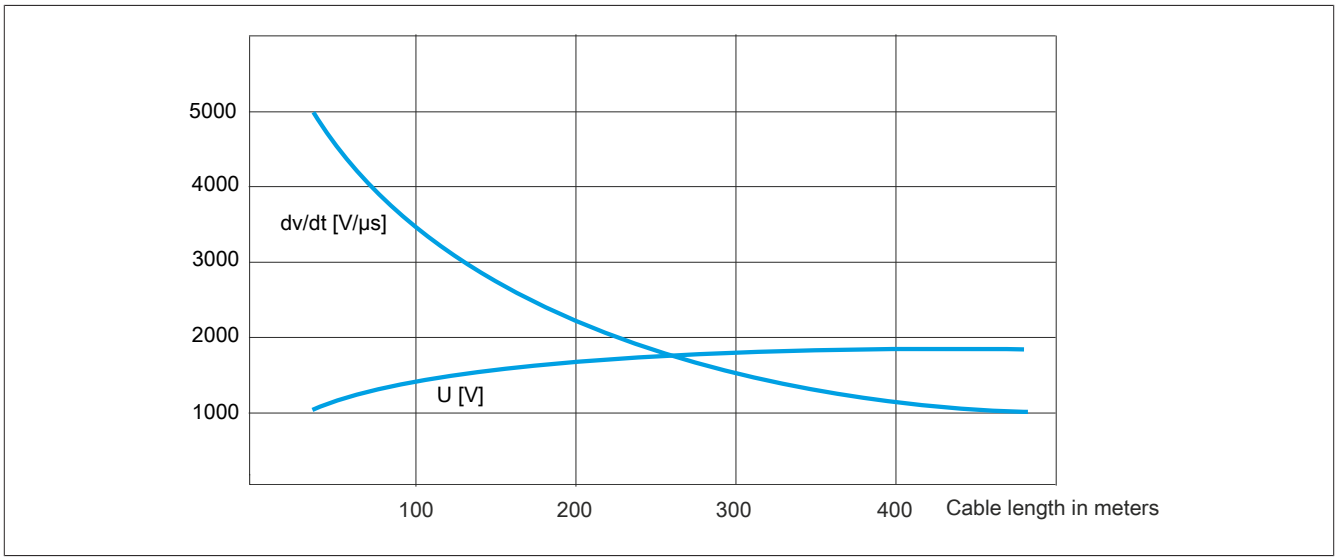
The maximum spacing is largely dependent on the motors used (insulating material), the type of motor cable used (shielded/unshielded), the cable paths (cable channels, underground cabling) as well as the options used.

#### Dynamic voltage load of the motor

Overvoltages at the motor terminals result from reflection in the motor cable. If the motor cable length is greater than 10 m, the motors are exposed to significantly higher voltage peaks. The longer the motor cable, the higher the overvoltage value.

The steep edges of the switching impulses at the output side of the inverter place a further load on the motors. The slew rate of the voltage is typically in excess of 5 kV/µs but decreases according to the length of the motor cable.

Motor load with overvoltage and slew rate when using a standard inverter.




#### Overview of workaround solutions

A number of simple measures can be taken to extend the service life of the motor:

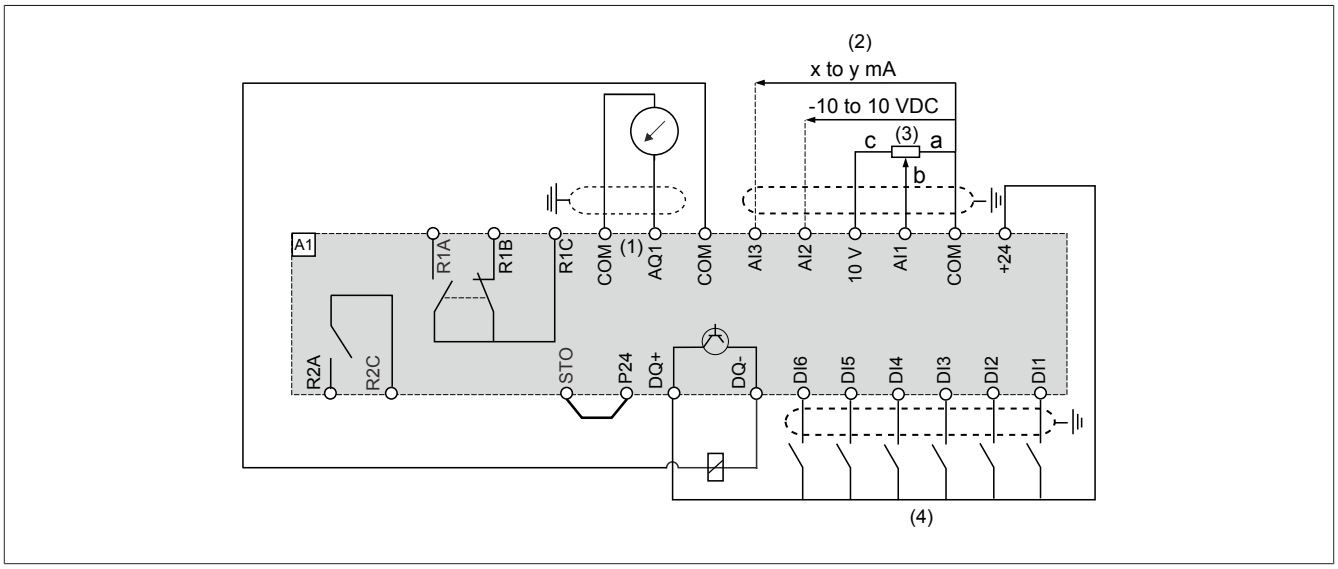
- Specification of a motor for inverter applications (IEC 60034-25B or NEMA 400 should be observed)
- Reduce the spacing between the motor and the inverter to a minimum
- Use an unshielded cable

> **Note:**
>
> **Electromagnetic compatibility is not guaranteed with unshielded cables.**

- Reducing the inverter switching frequency (A reduction to 2.5 Hz is recommended.)

## 4.4.2 Connection diagram

### Control block connection diagram




(1) Analog outputs

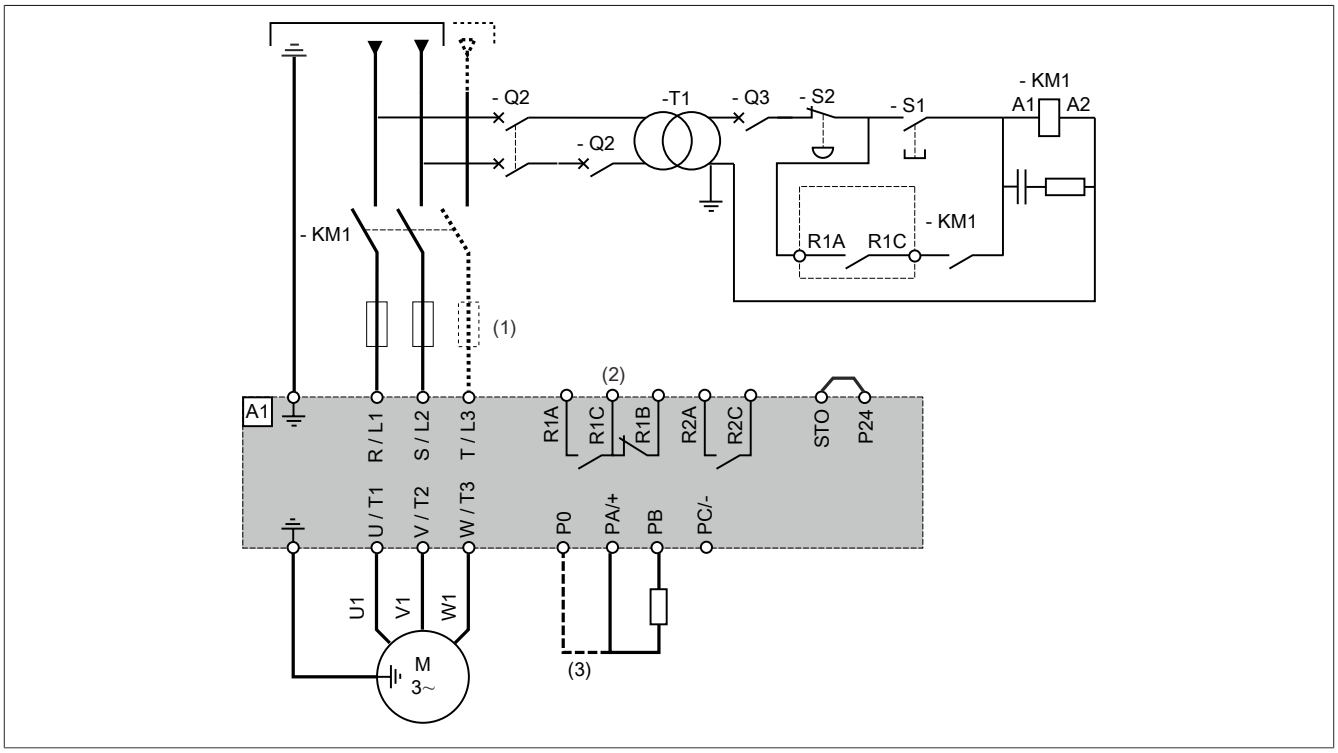
(2) Analog inputs

(3) Potentiometer (max. 10 kΩ)

(4) Digital inputs

### One-phase or two-phase power supply - Connection diagram with line contactor

Connection diagram conforming to standards ISO13849 Category 1 and IEC/EN 61508 Safety Integrity Level SIL 1, Stop Category 0 in accordance with the standard IEC/EN 60204-1.




(1) Line choke (if used)

(2) Use setting "Operating state 'Fault'" of relay output R1 to switch off the product when a fault has been detected.

(3) With the ACOPOSinverter P66, a braking resistor can be connected between connection pins PB and PA/+. If the jumper between P0 and PA/+ has not been replaced, the braking resistor is also permitted to be connected between PB and P0.

### One-phase or two-phase power supply - Connection diagram with downstream line contactor

If a move command is executed, and the downstream contactor between the inverter and the motor is still open, there may still be residual voltage present at the inverter output. This can result in incorrect estimation of the motor speed when the contacts of the downstream contactor are closed. This incorrect estimation of the motor speed can cause unanticipated operation or damage to the equipment.
In addition, there may be overvoltage present at the output of the inverter if the downstream contactor between the inverter and the motor is open while the power stage is still enabled.

## Warning!

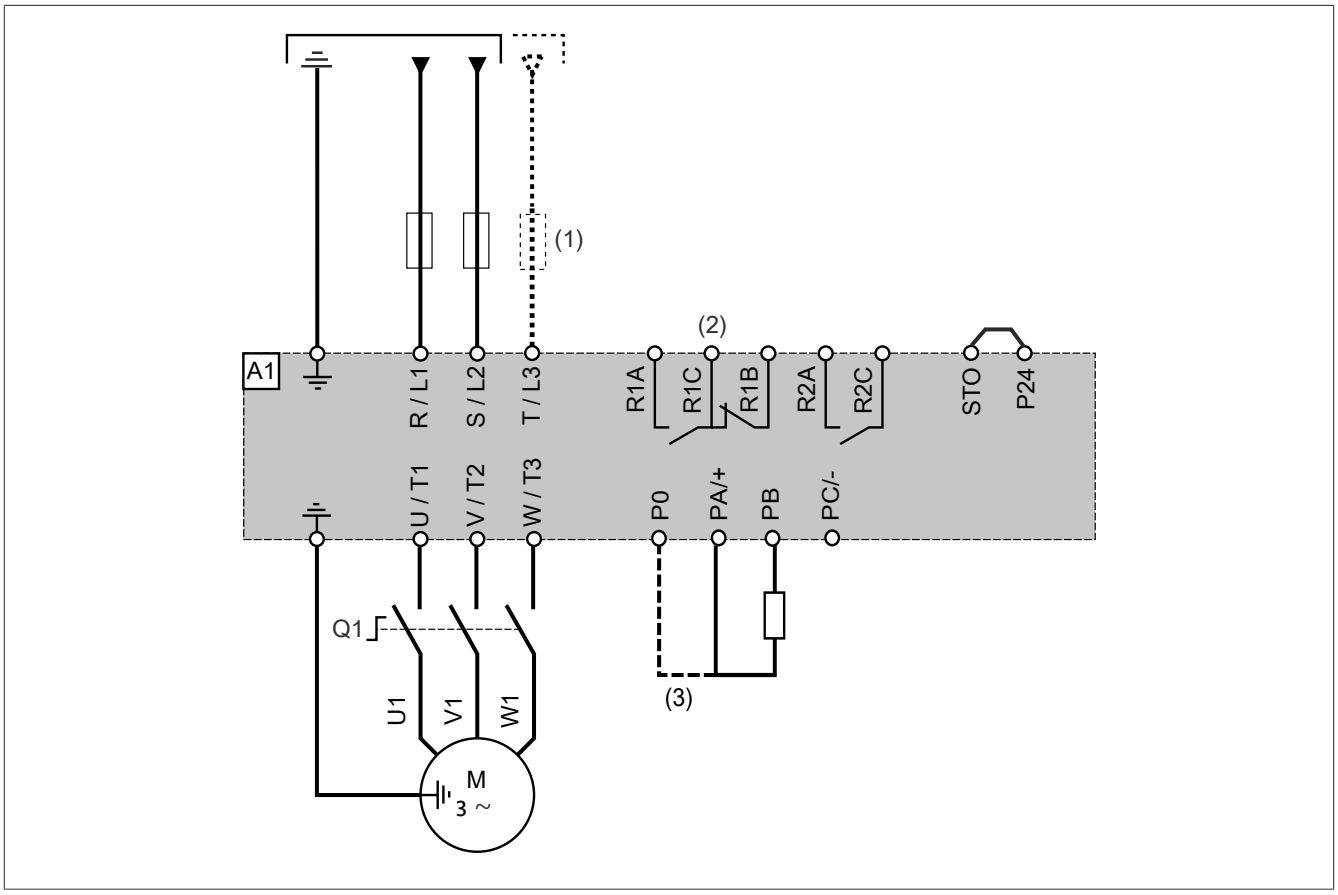
**UNANTICIPATED OPERATION OF THE EQUIPMENT OR DAMAGE TO THE EQUIPMENT**

**If a downstream contactor is used between the inverter and the motor, check the following:**

- **The contacts between the motor and the inverter must be closed before a move command is executed.**
- **It is not permitted for the power stage to be enabled when the contacts between the motor and the drive are opened.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

Connection diagram conforming to standards EN 954-1 Category 1 and IEC/EN 61508 Safety Integrity Level SIL 1, Stop Category 0 in accordance with the standard IEC/EN 60204-1.




(1) Line choke (if used)

(2) Use setting "Operating state 'Fault'" for relay output R1 to switch off the product when a fault has been detected.

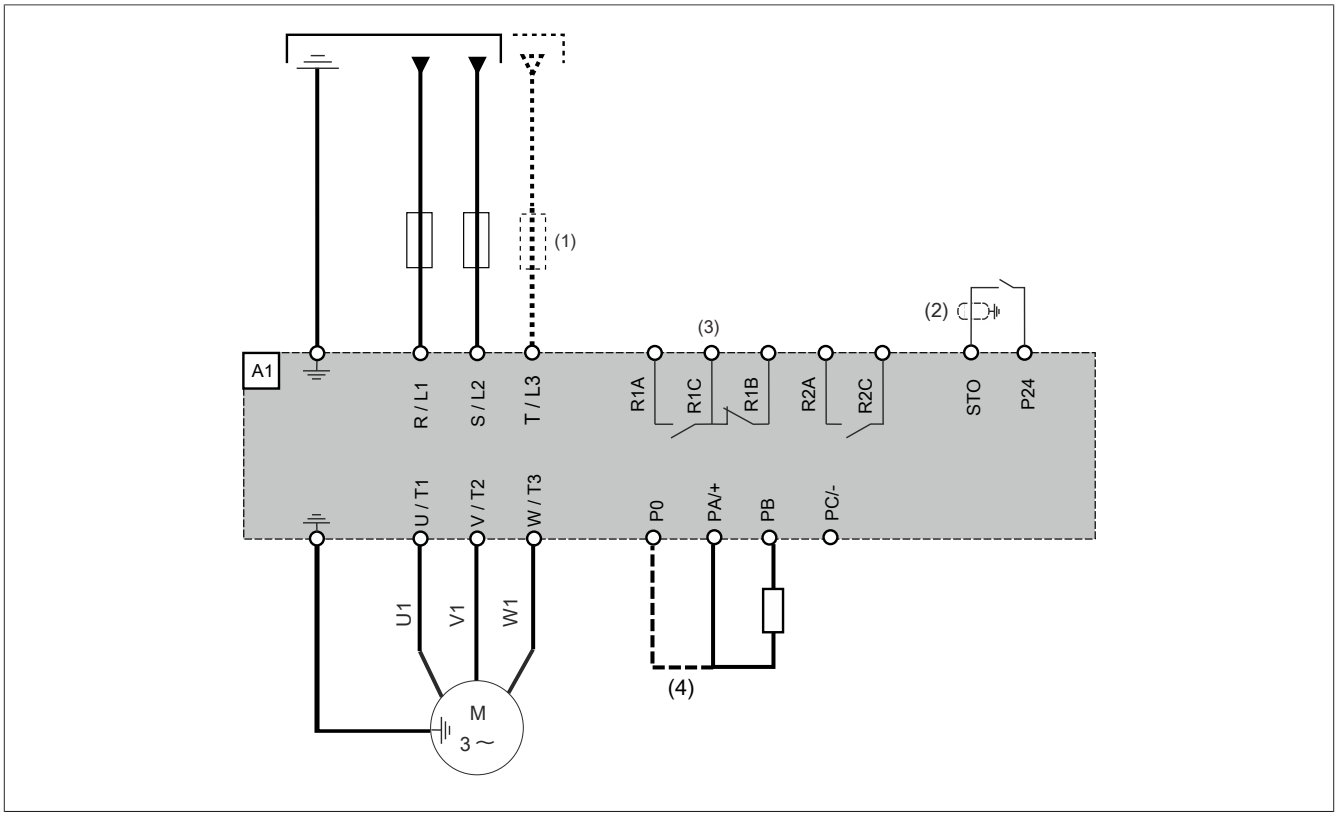
(3) With the ACOPOSinverter P66, a braking resistor can be connected between connection pins PB and PA/+. If the jumper between P0 and PA/+ has not been replaced, the braking resistor is also permitted to be connected between PB and P0.

### Connection diagram without a safety module

Connection diagram conforming to standards EN 954-1 Category 2 and IEC/EN 61508 Safety Integrity Level SIL 1, Stop Category 0 in accordance with the standard IEC/EN 60204-1.

The following connection diagram is suitable for machines with a short freewheel stop (machines with low inertia or high resistance torque).

When emergency switch-off is enabled, the power supply to the inverter is immediately interrupted and the motor stops in freewheel in compliance with category 0 of standard IEC/EN 60204-1.




(1) Line choke (if used)

(2) The shielding must be grounded at all times.

(3) Error relay contacts for remote signaling of inverter status

(4) With the ACOPOSinverter P66, a braking resistor can be connected between connection pins PB and PA/+. If the jumper between P0 and PA/+ has not been replaced, the braking resistor is also permitted to be connected between PB and P0.

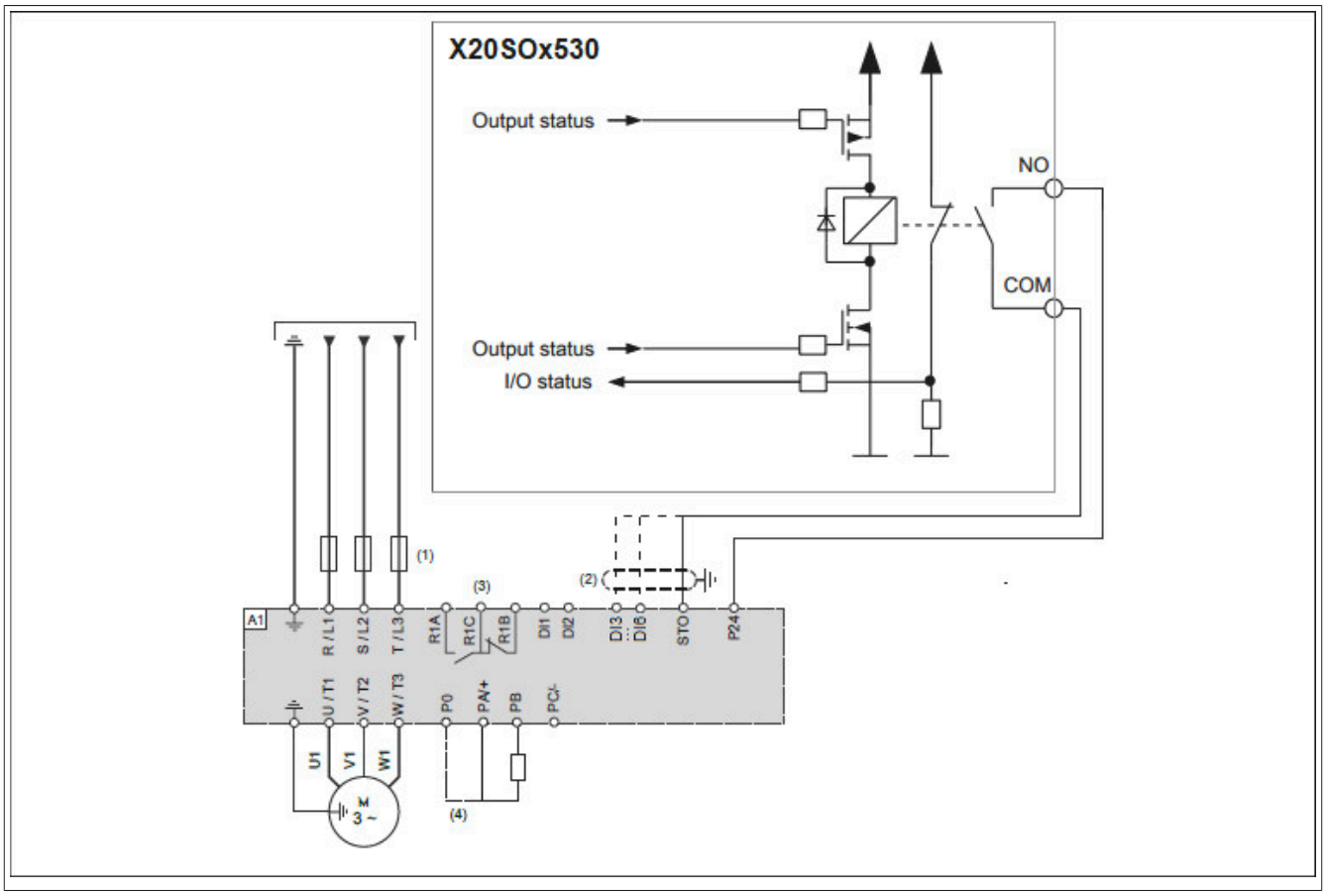
### Connection diagram with safety module

Connection diagram conforming to standards EN 954-1 Category 1 and IEC/EN 61508 Safety Integrity Level SIL 2, Stop Category 0 in accordance with the standard IEC/EN 60204-1.

The following connection diagram is suitable for machines with a short freewheel stop (machines with low inertia or high resistance torque).

When emergency switch-off is enabled, the power supply to the inverter is immediately interrupted and the motor stops in freewheel in compliance with category 0 of standard IEC/EN 60204-1.

The control unit must be equipped with a safe switch-off output (e.g. relay of an X20SOx530). The drive only controls the motor if the input of safety function STO "Safe Torque Off" is supplied with 24 VDC. The drive's factory setting is for safety function STO to be triggered via terminal connection STO. Using ACPi SafeConfigurator, the safety function can also be configured for two-channel operation.




(1) Line choke (if used)

(2) The shielding must be grounded at all times.

(3) Error relay contacts for remote signaling of inverter status

(4) With the ACOPOSinverter P66, a braking resistor can be connected between connection pins PB and PA/+. If the jumper between P0 and PA/+ has not been replaced, the braking resistor is also permitted to be connected between PB and P0.

### 4.4.3 Operation in an IT system

**Note:**

**RISK OF DAMAGE TO FREQUENCY INVERTER**

**To operate the inverter with an IT system, the integrated EMC filter must be disconnected as described in these instructions.**

**Failure to follow these instructions can result in damage to property.**

### 4.4.4 Disconnecting the integrated EMC filter

## Danger!

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before completing any of the procedures described in this section, carefully read through the instructions provided in section "Safety information".**

**Failure to follow these instructions will result in death or serious injury.**

To meet the requirements of IEC standard 61800-3, some drives have been equipped with an EMC filter. However, this integrated EMC filter also increases the leakage current to ground, which in rare cases has negative effects on the residual current protective device.

All drives that have an integrated EMC filter offer the possibility of disabling the Y-capacitor. This switches off the EMC filter and reduces the leakage currents to ground.

## Notice!

**Disconnection of the integrated EMC filter is only intended for use of the inverter in IT networks or other systems grounded via line conductors ("Wye w/ high-resistance grounded neutral"). Additional corrective measures must be taken to meet the requirements of the IEC standard after disconnection (e.g. connection of additional PFC or mains chokes).**

For an overview of the leakage currents, see section "Leakage current" on page 175.

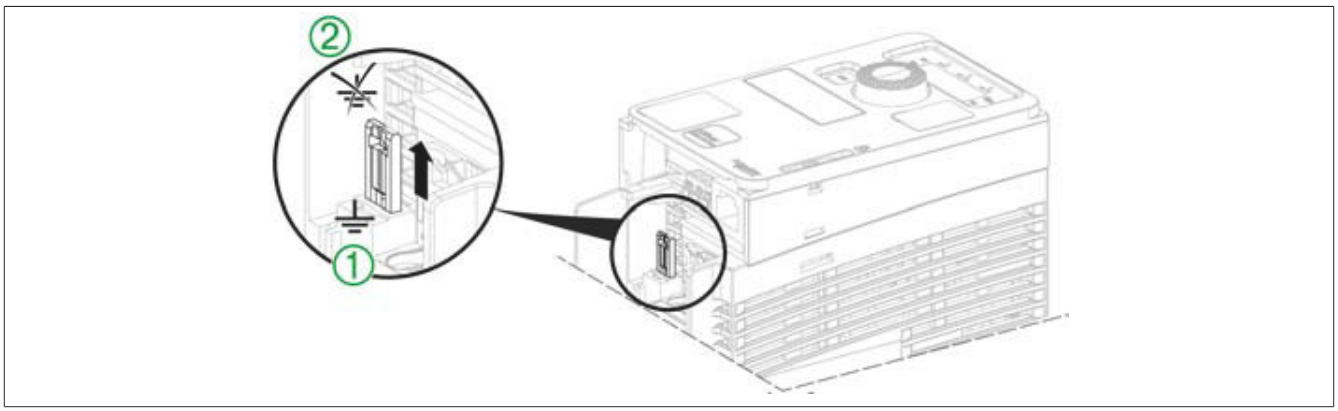
| Order number | Rating | Setting |
|---|---|---|
| 8I66S200018.00-0xx, 8I66S200037.00-0xx, 8I66S200055.00-0xx, 8I66S200075.00-0xx, 8I66S200110.00-0xx, 8I66S200150.00-0xx, 8I66S200220.00-0xx | Single-phase 200 V | IT jumper |
| 8I66T400037.00-0xx, 8I66T400055.00-0xx, 8I66T400075.00-0xx, 8I66T400110.00-0xx, 8I66T400150.00-0xx, 8I66T400220.00-0xx, 8I66T400300.00-0xx, 8I66T400400.00-0xx | Three-phase 400 V to 4 kW | IT jumper (as a screw) |
| 8I66T400550.00-0xx, 8I66T400750.00-0xx, 8I66T401100.00-000, 8I66T401500.00-000 | Three-phase 400 V starting at 5.5 kW | IT jumper |
| 8I66T200018.00-000, 8I66T200037.00-000, 8I66T200055.00-000, 8I66T200075.00-000, 8I66T200150.00-000, 8I66T200220.00-000, 8I66T200300.00-000, 8I66T200400.00-000, 8I66T200550.00-000, 8I66T200750.00-000, 8I66T201100.00-000, 8I66T201500.00-000 | Three-phase 200 V | - [1] |
| 8I66T600075.00-000, 8I66T600150.00-000, 8I66T600220.00-000, 8I66T600400.00-000, 8I66T600550.00-000, 8I66T600750.00-000, 8I66T601100.00-000, 8I66T601500.00-000 | Three-phase 600 V | - [1] |

1) These inverters are not equipped with an EMC filter.

#### 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000:

The following instructions must be observed to operate the inverter without an EMC filter:

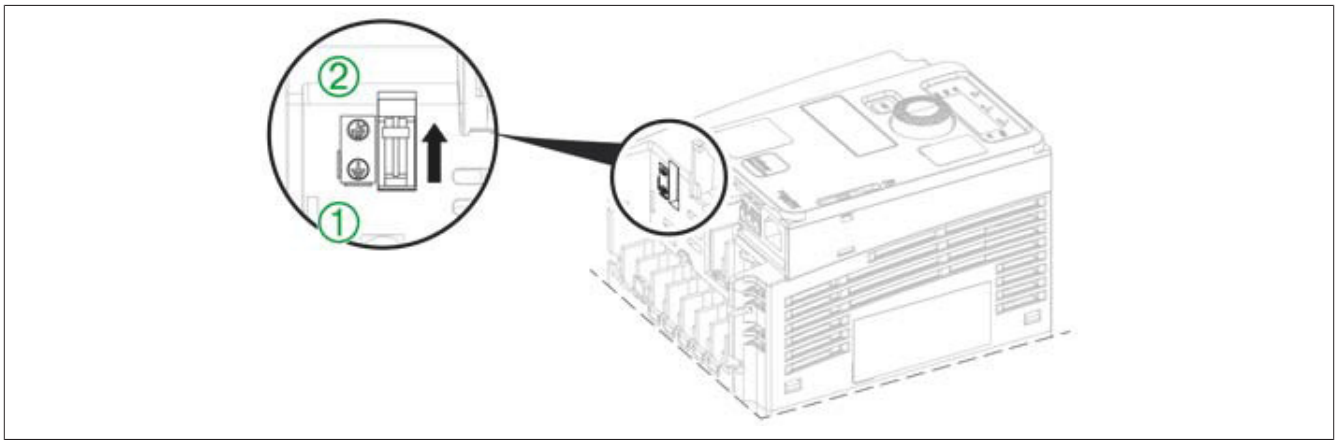
1) Remove the cover from the power terminals.
2) The switch is set to the **preset factory** position, as shown in the detailed view ①.
3) To disconnect the integrated EMC filter, move the switch to position ② as per the detailed view.
4) Replace the front cover.



**8I66S200110.00-000, 8I66S200150.00-000, 8I66S200220.00-000:**

The following instructions must be observed to operate the inverter without an EMC filter:

1) Remove the cover from the power terminals.
2) The switch is set to the **preset factory** position ⏚, as shown in the detailed view ①.
3) To disconnect the integrated EMC filter, move the switch to position ② as per the detailed view.
4) Replace the front cover.



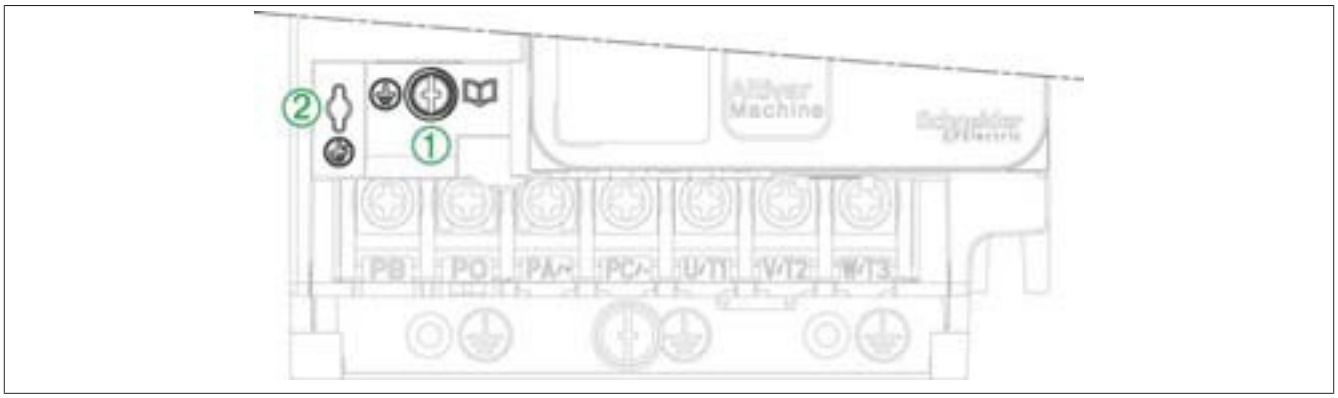

**8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000, 8I66T400150.00-000:**

The following instructions must be observed to operate the inverter without an EMC filter:

1) Remove the cover from the power terminals.
2) The screw is set to the **preset factory** position ⏚, as shown in the detailed view ①.
3) To separate the integrated EMC filter, remove the screw and move it to the ⏚ position, as shown in the detailed view ②.
4) Replace the front cover.

## Note:

- **Only use the supplied screws.**
- **Do not start up the inverter if the mounting screws have been removed.**



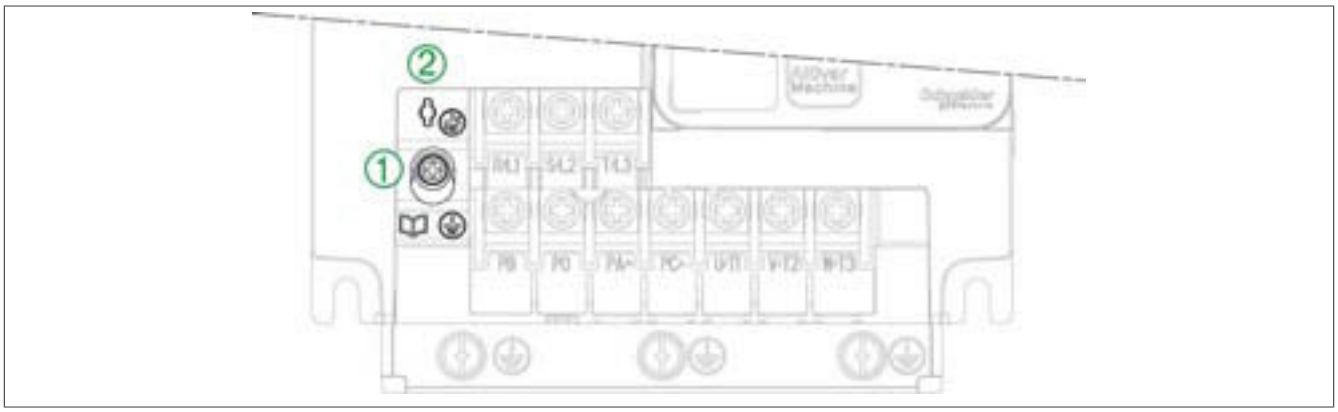
**8I66T400220.00-000, 8I66T400300.00-000, 8I66T400400.00-000:**

The following instructions must be observed to operate the inverter without an EMC filter:

1) Remove the cover from the power terminals.
2) The screw is set to the **preset factory** position ⏚, as shown in the detailed view ①.
3) To separate the integrated EMC filter, remove the screw and move it to the ⏚ position, as shown in the detailed view ②.
4) Replace the front cover.

**Note:**

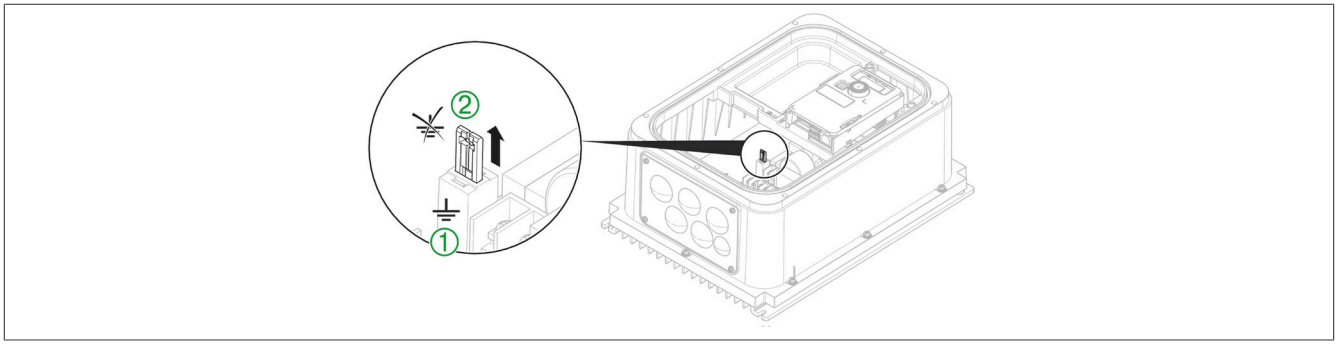
- **Only use the supplied screws.**
- **Do not start up the inverter if the mounting screws have been removed.**




**8I66S200xxx.00-06x, 8I66T400550.00-06x, 8I66T400750.00-06x:**

The following instructions must be observed to operate the inverter without an EMC filter:

1) Remove the front cover.
2) The switch is set to the **preset factory** position ⏚, as shown in the detailed view ①.
3) To disconnect the integrated EMC filter, move the switch to position ⏚, as shown in the detailed view ②.
4) Replace the front cover.



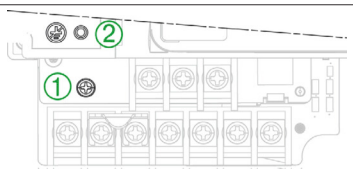
**8I66T4000xx.00-06x, 8I66T400110.00-06x, 8I66T400150.00-06x, 8I66T400220.00-06x, 8I66T400300.00-06x, 8I66T400400.00-06x:**

The following instructions must be observed to operate the inverter without an EMC filter:

1) Remove the front cover.
2) The screw is set to the **preset factory** position ⏚, as shown in the detailed view ①.
3) To disconnect the integrated EMC filter, loosen the screw and move it to position ⏚, as shown in the detailed view ②.
4) Replace the front cover.

## Note:

- **Only use the supplied screw.**
- **Do not start up the inverter if the mounting screw has been removed.**




### 4.4.5 Switch "SW1" - Configuration of the input circuit

Contrary to the typical definition of sink and source, the following statements apply to this product:

Sink: The digital inputs need a voltage sink, i.e. the current flows out of the inputs and outputs.

Source: The digital inputs need a voltage source, i.e. the current flows into the inputs and outputs.

## Warning!

**UNEXPECTED OPERATION OF THE EQUIPMENT**

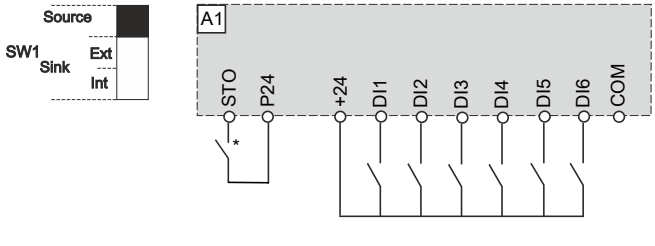
- **To ensure the safe grounding of circuits, all applicable standards and regulations such as NFPA 79 and EN 60204 must be observed.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

The switch is used to adjust the digital input function to the programmable control output technology. To access the switch, follow the procedure provided for accessing the control terminals. The switch is located under the control terminals.

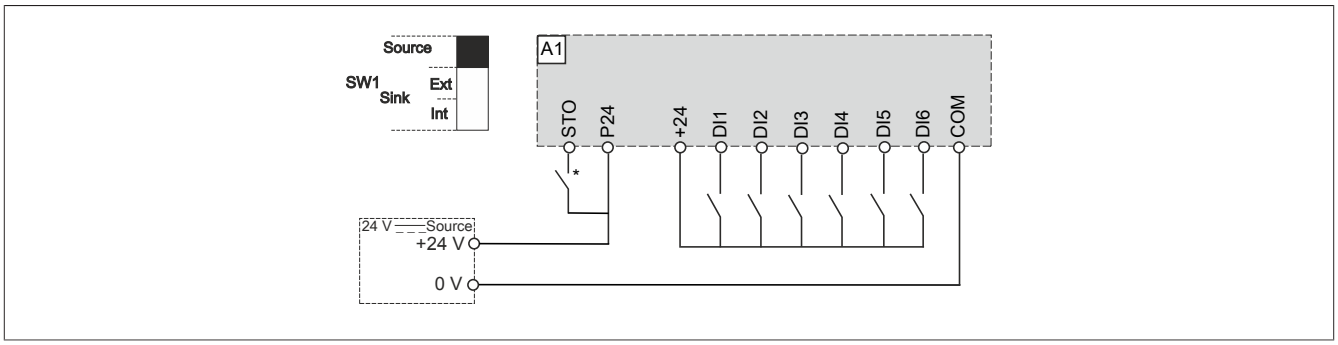
- Set the switch to "Source" (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to "Ext" if using PLC outputs with NPN transistors.

**Switch in position "Source (SRC)"**

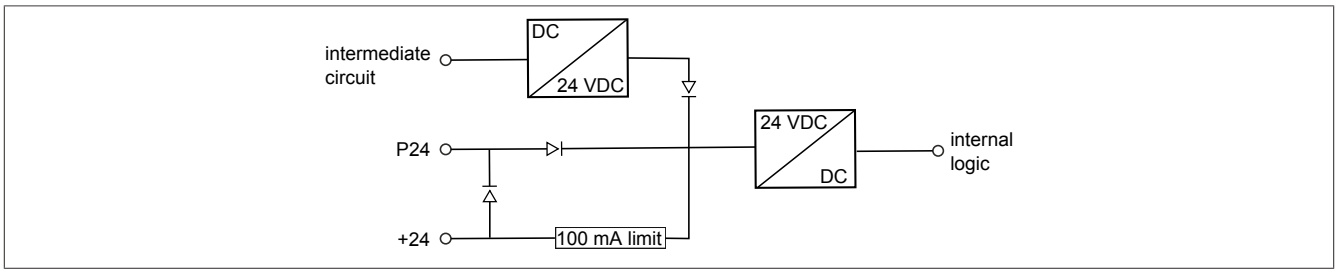



*) Optional safety logic

To ensure that the drive communicates in the POWERLINK network even without a supplied DC bus, the logic of the frequency inverter must be supplied redundantly. With SW1 in switch position "SRC", the following wiring variants can be used for this purpose:



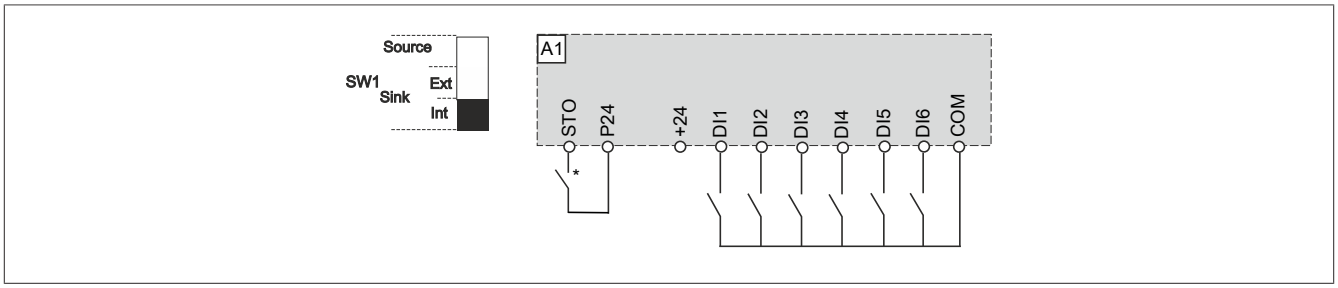

*) Optional safety logic




## Note:

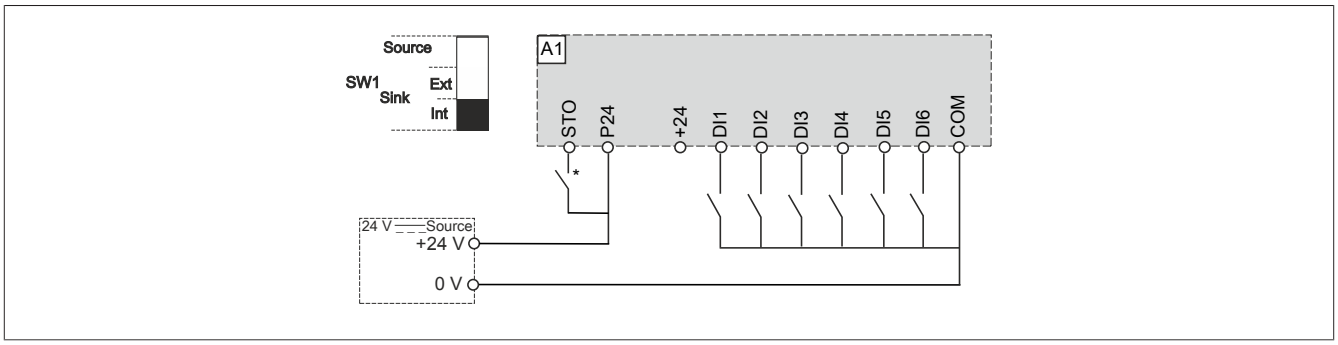
- **Terminal connection "P24" should be used for the redundant power supply of the drive logic.**
- **Terminal connection "+24" is used exclusively to provide the required signal line. The terminal connection is limited to a maximum output current of 100 mA and ensures that the signal I/Os (e.g. DI1, DI2,...) are not overloaded.**

**Switch in position "Sink int. (SKi)"**



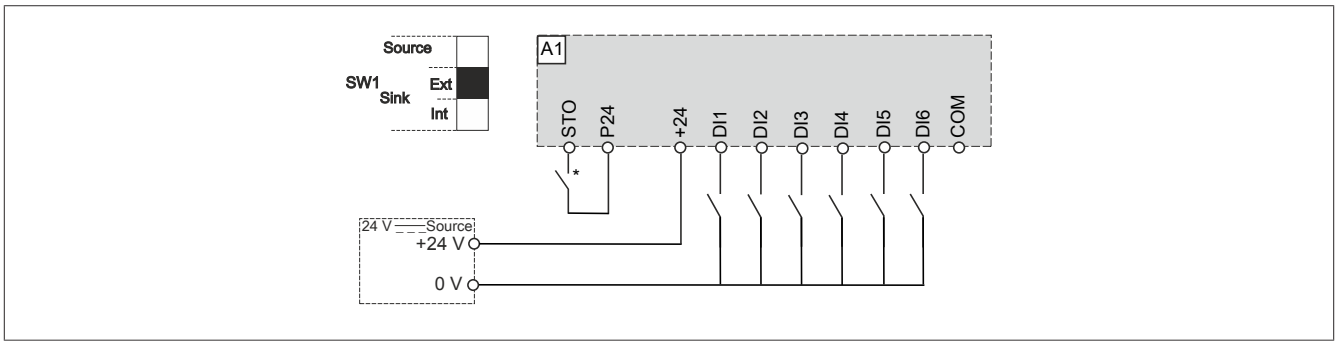

*) Optional safety logic

To ensure that the drive communicates in the POWERLINK network even without a supplied DC bus, the logic of the frequency inverter must be supplied redundantly. With SW1 in switch position "SKi", the following wiring variants can be used for this purpose.



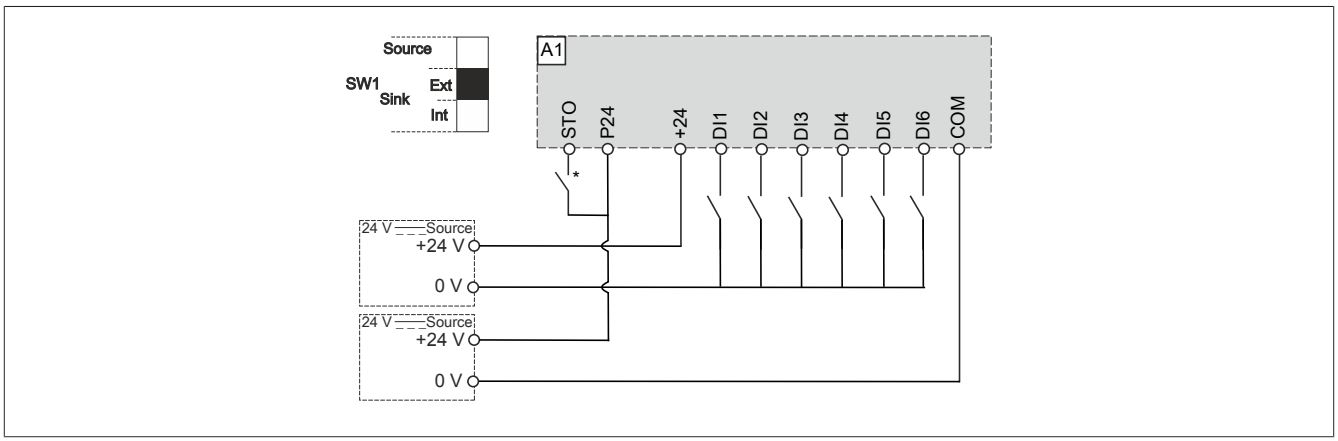

*) Optional safety logic

### Switch in position "Sink ext. (SKe)"




*) Optional safety logic

To ensure that the drive communicates in the POWERLINK network even without a supplied DC bus, the logic of the frequency inverter must be supplied redundantly. With SW1 in switch position "SKe", the following wiring variants can be used for this purpose.

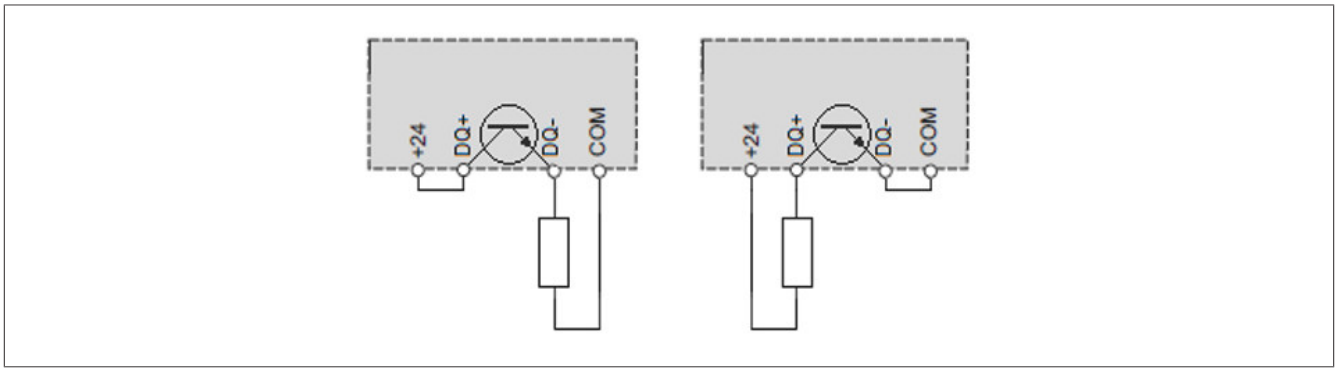



*) Optional safety logic

### Digital output DQ1

The digital output of the ACOPOSinverter essentially consists of a collector pin "DQ+" and an emitter pin "DQ-". It works independently of the position of switch "SW1". The output wiring (sink or source) of the digital output is determined solely by the wiring of the transistor.

Wiring examples for DQ1:



## 4.4.6 Characteristics of the power unit terminals

### Ground cable

The cross sections of the ground cable at the input and output side correspond to the cross sections of the input and output cable.
The cross section for the protective ground cable must be a minimum of 10 mm² (8 AWG) for copper cables (CU) and 16 mm² (6 AWG) for aluminum cables (AL).
Due to high discharge current, an additional protective ground connection must be wired.

### Tightening torque of the screws for the ground terminals

Size 1 and 2 inverters (all degrees of protection) and size 3 and 4 inverters (IP65 protection):

- Main grounding screw (M5): 2.4 N (21.1 lb.in)
- Input/Output grounding screw (M4): 1.4 N (12.4 lb.in)

Size 3, 4 and 5 inverters (IP20 protection): 2.4 N (21.1 lb.in)

### Size 1

Power supply terminals and output terminals

| Order number | Power supply terminals (L1, L2, L3) | | | Output terminals (U, V, W) | | |
|---|---|---|---|---|---|---|
| | Cable cross section | | Tightening torque | Cable cross section | | Tightening torque |
| | Min. | Max.[1] | Nominal value | Min. | Max.[1] | Nominal value |
| | mm² (AWG) | mm² (AWG) | Nm (lb.in) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| 8I66S200018.00-000, 8I66S200037.00-000, 8I66S200055.00-000, 8I66S200075.00-000 | 2.5 (14) | 4 (12) | 1 (8.9) | 2.5 (14) | 4 (12) | 1 (8.9) |
| 8I66S200018.00-06x, 8I66S200037.00-06x, 8I66S200055.00-06x, 8I66S200075.00-06x | 2.5 (14) | 4 (12)[2] | 1 (8.9) | 2.5 (14) | 4 (12)[2] | 1 (8.9) |

1) Maximum permitted terminal cross section
2) Ensure that the cable size corresponds to the dimensions of the cable gland.

### Size 2

Power supply terminals and output terminals

| Order number | Power supply terminals (L1, L2, L3) | | | Output terminals (U, V, W) | | |
|---|---|---|---|---|---|---|
| | Cable cross section | | Tightening torque | Cable cross section | | Tightening torque |
| | Min. | Max.[1] | Nominal value | Min. | Max.[1] | Nominal value |
| | mm² (AWG) | mm² (AWG) | Nm (lb.in) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| 8I66T400037.00-000, 8I66T400055.00-000, 8I66T400075.00-000, 8I66T400110.00-000, 8I66T400150.00-000, 8I66T600075.00-000, 8I66T600150.00-000 | 2.5 (14) | 6 (10) | 1.4 (12.4) | 2.5 (14) | 6 (10) | 1.4 (12.4) |
| 8I66T400037.00-06x, 8I66T400055.00-06x, 8I66T400075.00-06x, 8I66T400110.00-06x, 8I66T400150.00-06x | 2.5 (14) | 6 (10)[2] | 1.4 (12.4) | 2.5 (14) | 6 (10)[2] | 1.4 (12.4) |
| 8I66S200110.00-000, 8I66S200150.00-000 | 4 (12) | 6 (10) | 1.4 (12.4) | 4 (12) | 6 (10) | 1.4 (12.4) |
| 8I66S200220.00-000 | 6 (10) | 6 (10) | 1.4 (12.4) | 6 (10) | 6 (10) | 1.4 (12.4) |

1) Maximum permitted terminal cross section
2) Ensure that the cable size corresponds to the dimensions of the cable gland.

### Size 3

Power supply terminals and output terminals

| Order number | Power supply terminals (L1, L2, L3) | | | Output terminals (U, V, W) | | |
|---|---|---|---|---|---|---|
| | Cable cross section | | Tightening torque | Cable cross section | | Tightening torque |
| | Min. | Max.[1] | Nominal value | Min. | Max.[1] | Nominal value |
| | mm² (AWG) | mm² (AWG) | Nm (lb.in) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| 8I66T400220.00-000, 8I66T400300.00-000, 8I66T600220.00-000, 8I66T600400.00-000 | 2.5 (14) | 6 (10) | 1.4 (12.4) | 2.5 (14) | 6 (10) | 1.4 (12.4) |
| 8I66T400220.00-06x, 8I66T400300.00-06x | 2.5 (14) | 6 (10)[2] | 1.4 (12.4) | 2.5 (14) | 6 (10)[2] | 1.4 (12.4) |
| 8I66T400400.00-000 | 4 (12) | 6 (10) | 1.4 (12.4) | 2.5 (14) | 6 (10) | 1.4 (12.4) |
| 8I66T400400.00-06x | 4 (12) | 6 (10)[2] | 1.4 (12.4) | 2.5 (14) | 6 (10)[2] | 1.4 (12.4) |
| 8I66S200110.00-06x, 8I66S200150.00-06x | 4 (12) | 6 (10)[2] | 1.4 (12.4) | 4 (12) | 6 (10)[2] | 1.4 (12.4) |
| 8I66S200220.00-06x | 6 (10) | 6 (10)[2] | 1.4 (12.4) | 4 (12) | 6 (10)[2] | 1.4 (12.4) |

1) Maximum permitted terminal cross section
2) Ensure that the cable size corresponds to the dimensions of the cable gland.

### Size 4

Power supply terminals and output terminals

| Order number | Power supply terminals (L1, L2, L3) | | | Output terminals (U, V, W) | | |
|---|---|---|---|---|---|---|
| | Cable cross section | | Tightening torque | Cable cross section | | Tightening torque |
| | Min. | Max.[1] | Nominal value | Min. | Max.[1] | Nominal value |
| | mm² (AWG) | mm² (AWG) | Nm (lb.in) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| 8I66T600550.00-000 | 2.5 (14) | 16 (6) | 2.4 (20.8) | 2.5 (14) | 16 (6) | 2.4 (20.8) |
| 8I66T400550.00-06x | 4 (10) | 16 (6)[2] | 1.2...1.5 (10.6...13.3) | 2.5 (12) | 16 (6)[2] | 1.2...1.5 (10.6...13.3) |
| 8I66T600750.00-000 | 4 (12) | 16 (6) | 2.4 (20.8) | 4 (12) | 16 (6) | 2.4 (20.8) |
| 8I66T400750.00-06x | 6 (8) | 16 (6)[2] | 1.2...1.5 (10.6...13.3) | 2.5 (10) | 16 (6)[2] | 1.2...1.5 (10.6...13.3) |

1) Maximum permitted terminal cross section
2) Ensure that the cable size corresponds to the dimensions of the cable gland.

### Size 5

Power supply terminals and output terminals

| Order number | Power supply terminals (L1, L2, L3) | | | Output terminals (U, V, W) | | |
|---|---|---|---|---|---|---|
| | Cable cross section | | Tightening torque | Cable cross section | | Tightening torque |
| | Min. | Max.[1] | Nominal value | Min. | Max.[1] | Nominal value |
| | mm² (AWG) | mm² (AWG) | Nm (lb.in) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| 8I66T601100.00-000 | 6 (10) | 16 (6) | 2.4 (20.8) | 6 (10) | 16 (6) | 2.4 (20.8) |
| 8I66T601500.00-000 | 6 (10) | 16 (6) | 2.4 (20.8) | 6 (10) | 16 (6) | 2.4 (20.8) |

1) Maximum permitted terminal cross section

## 4.4.7 Wiring the power unit

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Check that the cable has been installed correctly!**

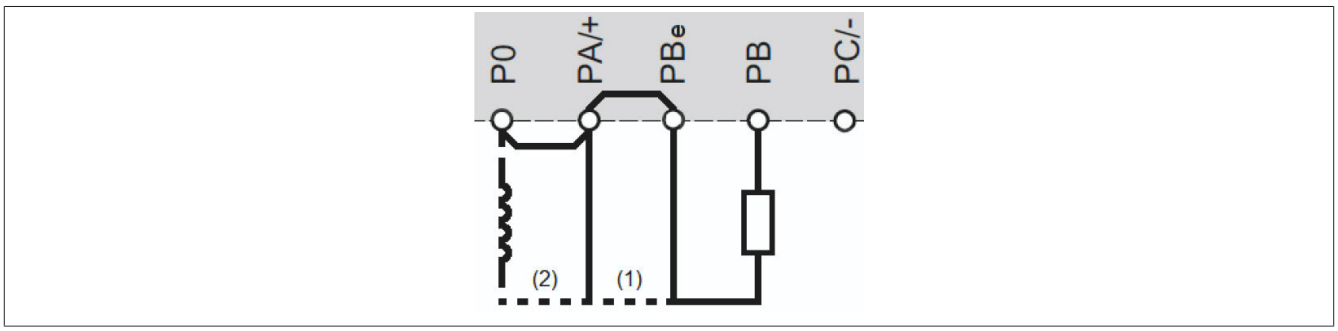
**Failure to follow these instructions will result in death or serious injury.**

### Power terminal functions

| Terminal | Function | ACOPOSinverter P66 |
|---|---|---|
| ⏚ | Ground terminal | All power ratings and sizes |
| R/L1 - S/L2/N | Power supply | ACOPOSinverter P66 1-phase |
| R/L1 - S/L2 - T/L3 | | ACOPOSinverter P66 3-phase |
| P0 | Additional filter devices | All power ratings and sizes |
| PB | Additional braking resistor | All power ratings and sizes |
| PA/+ | + pin, DC bus | All power ratings and sizes |
| PC/- | - pin, DC bus | All power ratings and sizes |
| U/T1 - V/T2 - W/T3 | Motor outlet | All power ratings and sizes |

### Difference between P0 and PBe

ACOPOSinverter devices provide several pins that allow direct access to the DC bus. In addition to standard pins PA/+, PC/- and PB, some inverters provide terminal connection P0 others provide terminal connection PBe.




**(1) Depending on the design of the drive, pin PBe is offered:**

It makes it possible to implement a braking resistor between PB and PBe.

For inverters without pin PBe, the braking resistor must be placed between PB and PA/+.

**(2) Depending on the design of the drive, pin P0 is offered:**

The connection pin P0 makes it possible to install an additional EMC filter. To do so, the jumper between P0 and PA/+ must be removed and replaced, for example, by a PFC choke.

This measure for attenuating harmonics in the supply network is only required in very rare cases. Therefore, the braking resistor is also permitted to be connected between pin PB and pin P0.

## Notice!

**If pin P0 is used to connect the braking resistor, make sure that the removable jumper is mounted between pin P0 and pin PA/+. The contact resistance between P0 and PA/+ must be as low as possible.**

**Braking resistors**

During controlled braking of the motor, the voltage in the DC bus increases because the kinetic energy has a feedback effect on the drive. A braking resistor increases the maximum transient braking torque of the drive, i.e. it can adsorb more excess energy and decelerate the motor more.

For all available braking resistors see section "Braking resistors" on page 582.

For additional information about the minimum values of the resistors to be connected, see "Technical data" on page 13 for the relevant inverter.

### Accessing the terminals for size 1 (IP20 protection)

## Danger!

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before performing the tasks described in this section, read the instructions contained in section "Safety information" carefully.**

**Failure to follow these instructions will result in death or serious injury.**

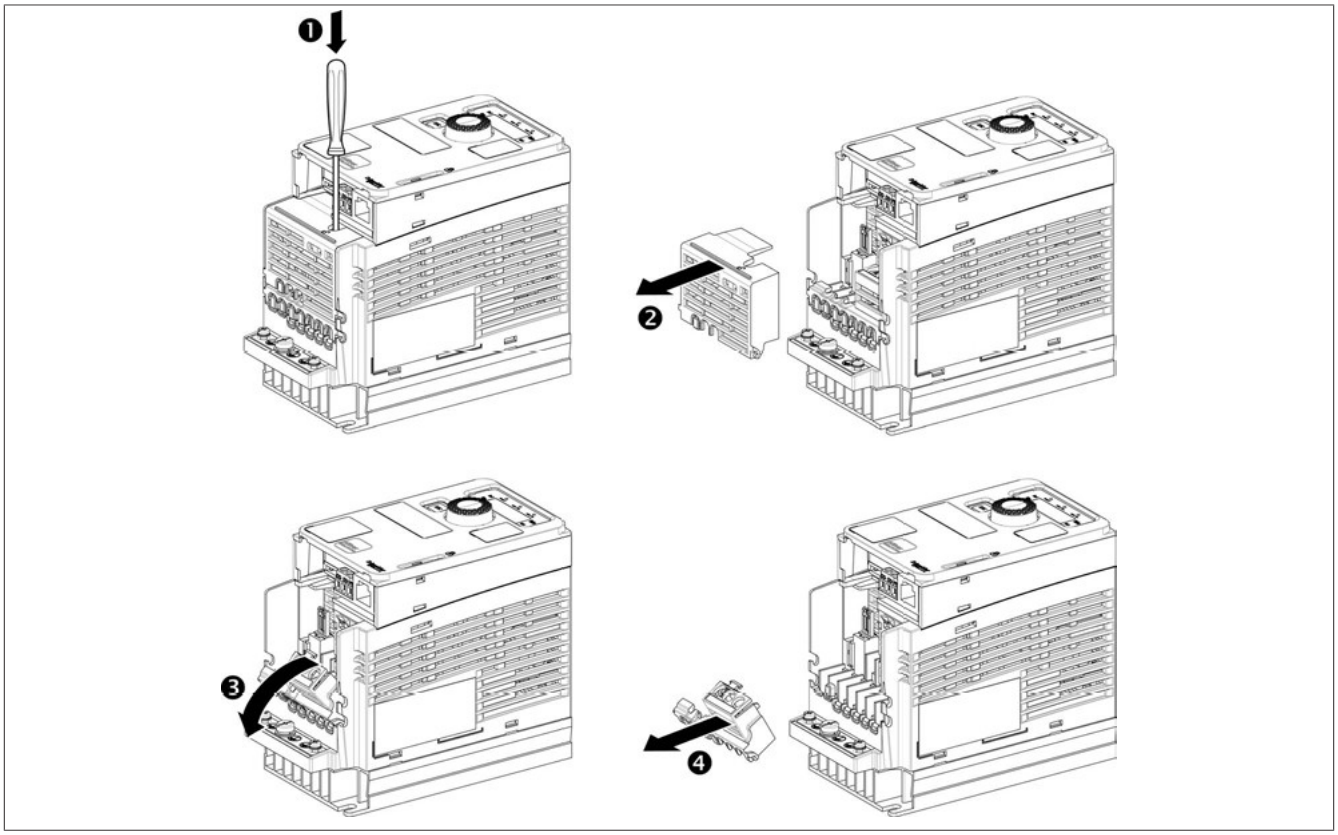
## Danger!

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Once you have wired the power terminals, replace the terminal and wiring covers correctly in order to maintain protection.**

**Failure to follow these instructions will result in death or serious injury.**

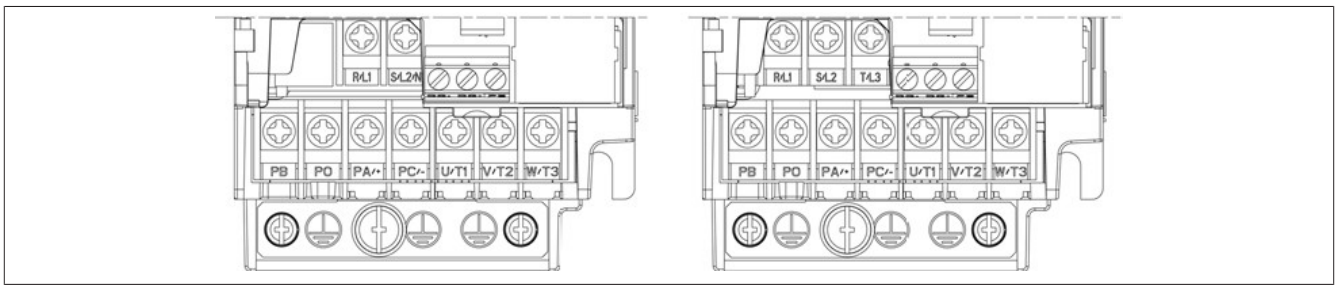
The power, motor and braking resistor terminals are located on the bottom of the inverter.




To access the power terminals for **size 1** inverters, follow the instructions below.

1) Break the safety clip using a screwdriver.
2) Remove the wiring cover.
3) Fold down the cover of the terminals.
4) Remove the cover from the terminals.

### Arrangement of the power terminals



### Accessing the terminals for size 2 (IP20 protection)

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before performing the tasks described in this section, read the instructions contained in section "Safety information" carefully.**

**Failure to follow these instructions will result in death or serious injury.**

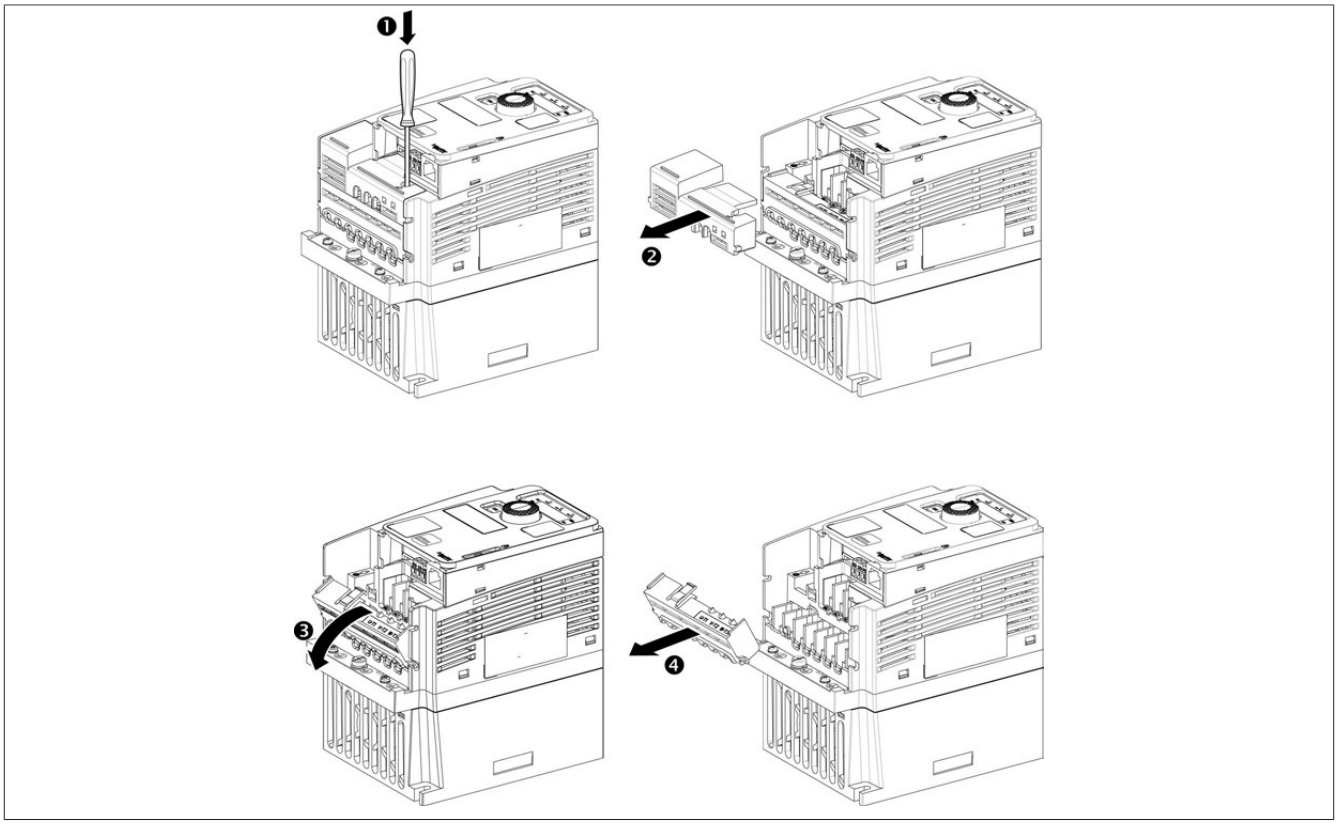
**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Once you have wired the power terminals, replace the terminal and wiring covers correctly in order to maintain protection.**

**Failure to follow these instructions will result in death or serious injury.**

The power, motor and braking resistor terminals are located on the bottom of the inverter.

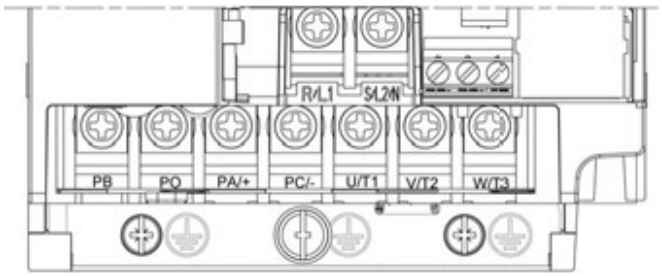



To access the power terminals for **size 2** inverters, follow the instructions below.

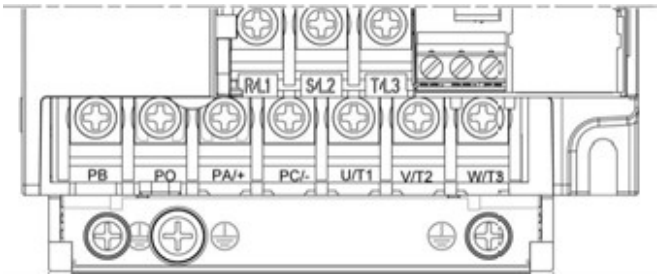
1) Break the safety clip using a screwdriver.
2) Remove the wiring cover.
3) Fold down the cover of the terminals.
4) Remove the cover from the terminals.

### Arrangement of the power terminals

1-phase




3-phase



### Accessing the terminals for size 3 (IP20 protection)

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before performing the tasks described in this section, read the instructions contained in section "Safety information" carefully.**

**Failure to follow these instructions will result in death or serious injury.**

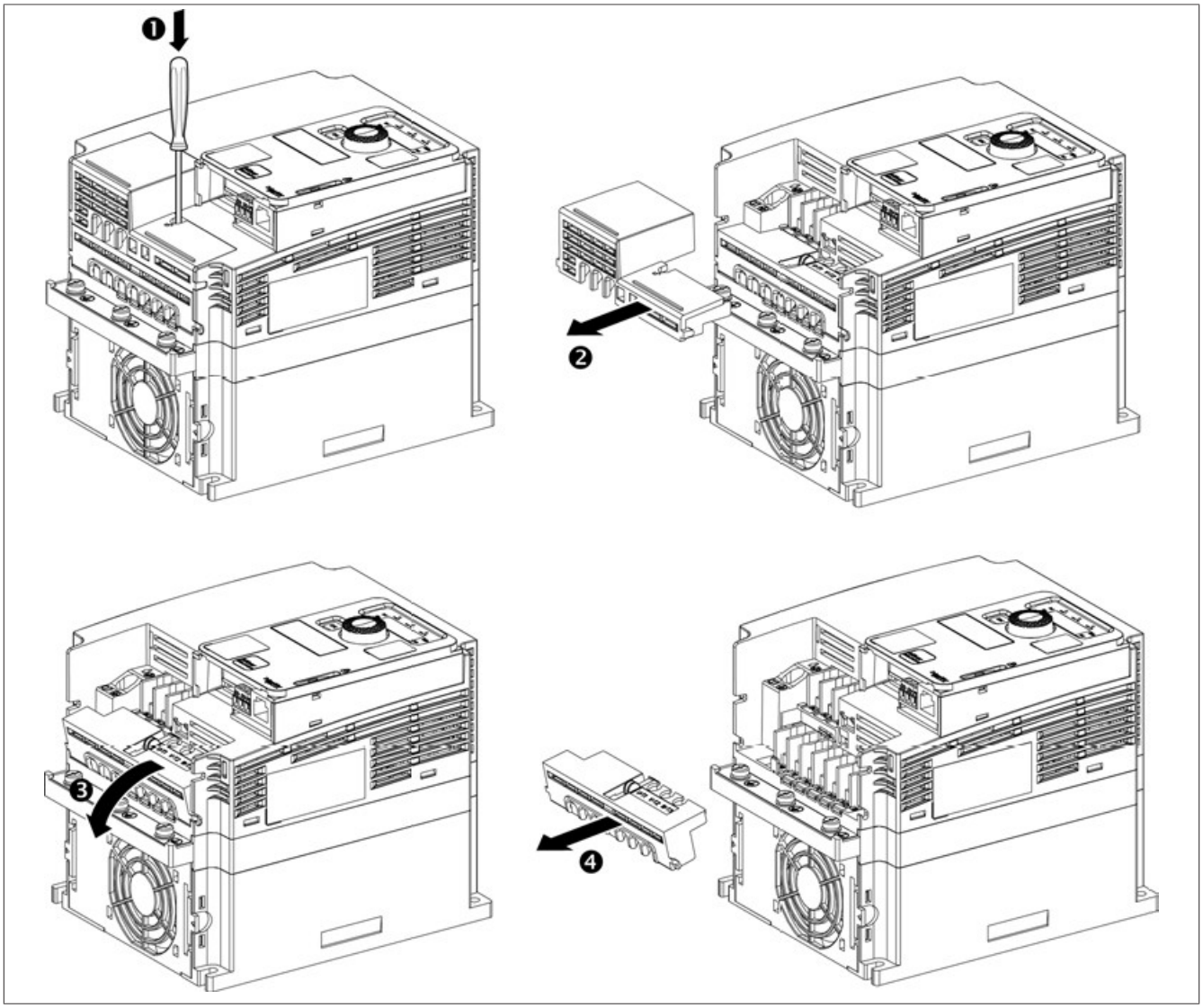
**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Once you have wired the power terminals, replace the terminal and wiring covers correctly in order to maintain protection.**

**Failure to follow these instructions will result in death or serious injury.**

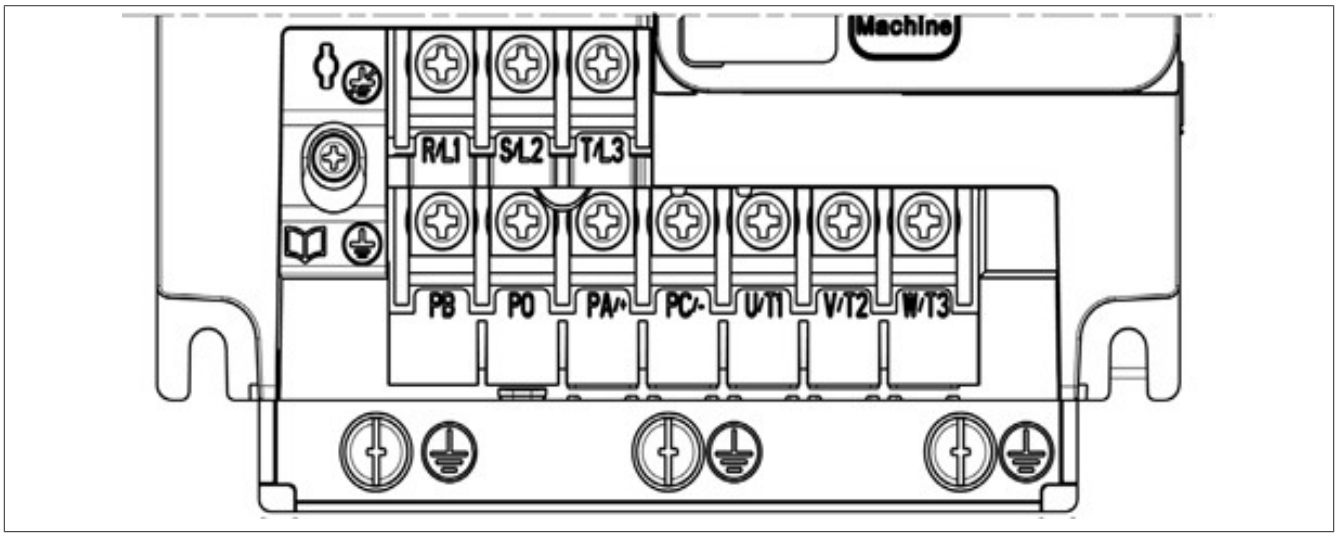
The power, motor and braking resistor terminals are located on the bottom of the inverter.




To access the power terminals for **size 3** inverters, follow the instructions below.

1) Break the safety clip using a screwdriver.
2) Remove the wiring cover.
3) Fold down the cover of the terminals.
4) Remove the cover from the terminals.

## Arrangement of the power terminals



### Accessing the terminals for size 4

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before performing the tasks described in this section, read the instructions contained in section "Safety information" carefully.**

**Failure to follow these instructions will result in death or serious injury.**

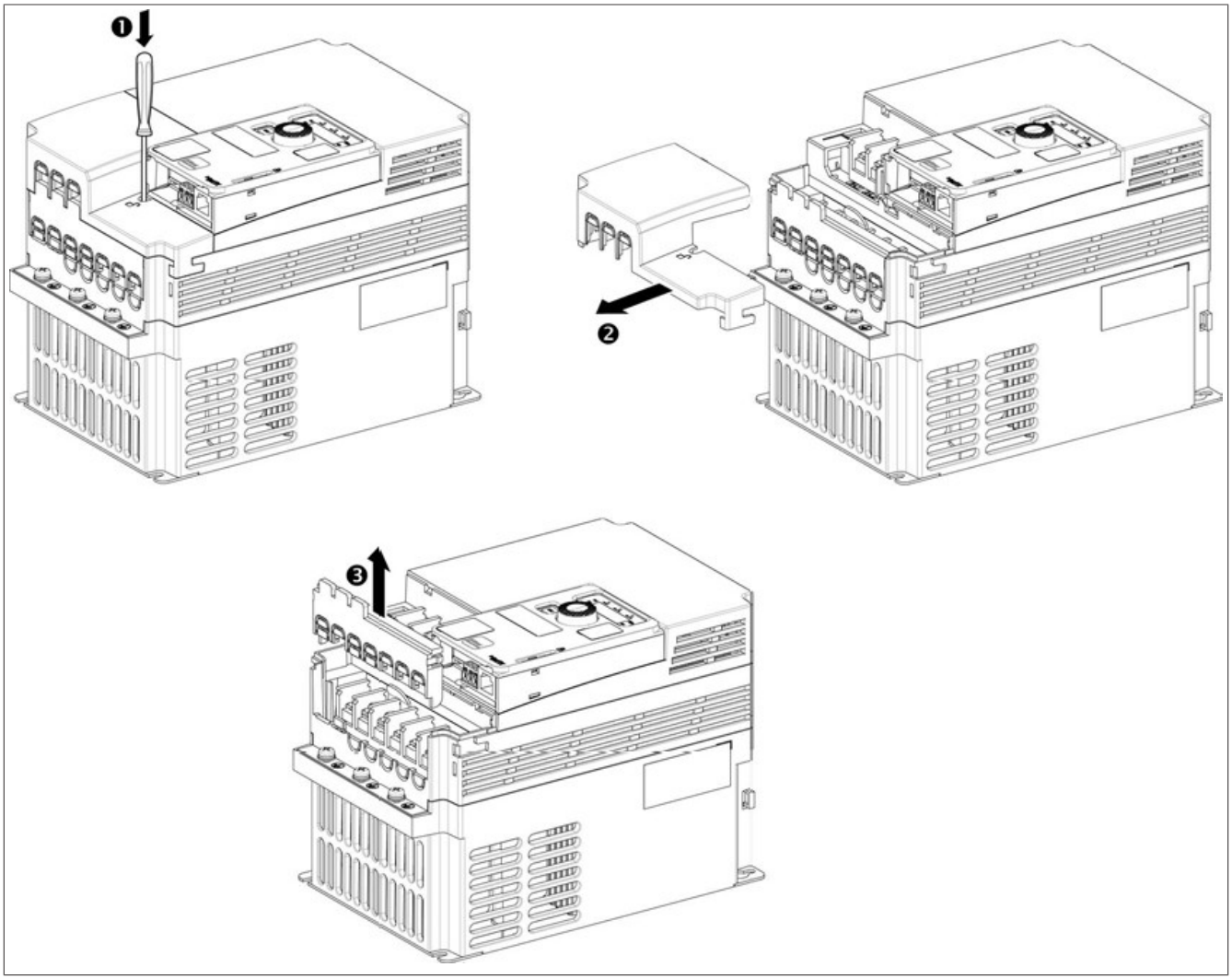
**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Once you have wired the power terminals, replace the terminal and wiring covers correctly in order to maintain protection.**

**Failure to follow these instructions will result in death or serious injury.**

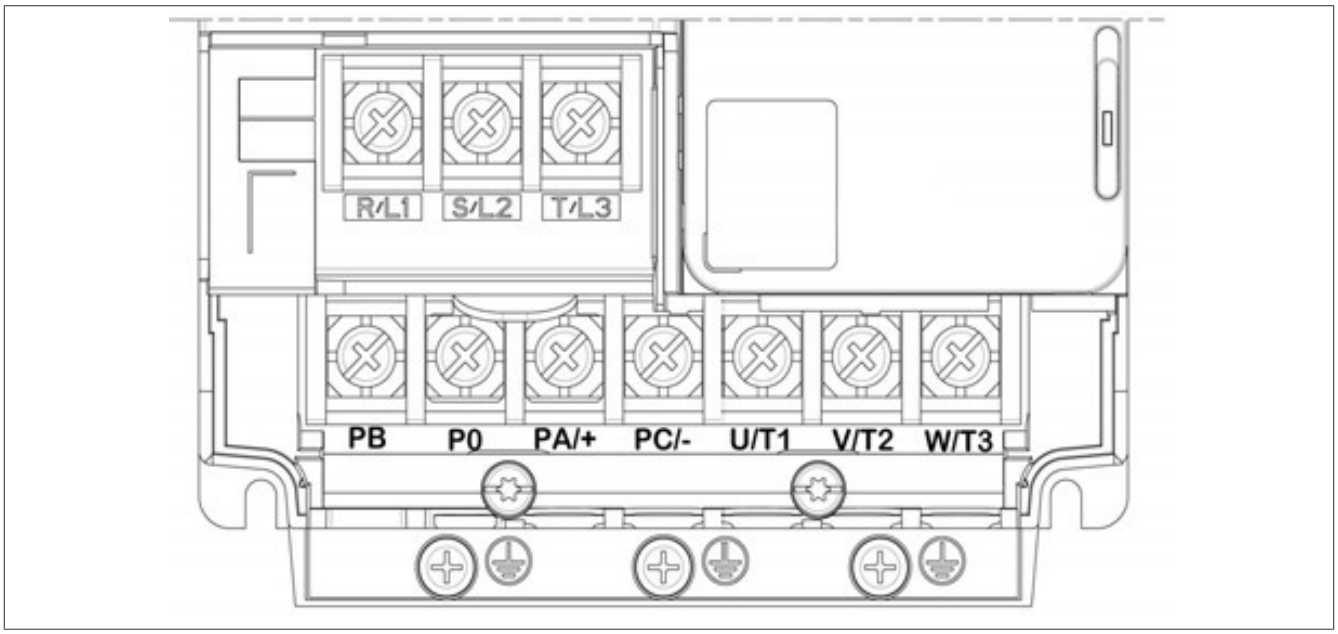
The power, motor and braking resistor terminals are located on the bottom of the inverter.




To access the power terminals for **size 4** inverters, follow the instructions below.

1) Break the safety clip using a screwdriver.
2) Remove the wiring cover.
3) Fold down the cover of the terminals.
4) Remove the cover from the terminals.

**Arrangement of power terminals for size 4**



### Accessing the terminals for size 5

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Before performing the tasks described in this section, read the instructions contained in section "Safety information" carefully.**

**Failure to follow these instructions will result in death or serious injury.**

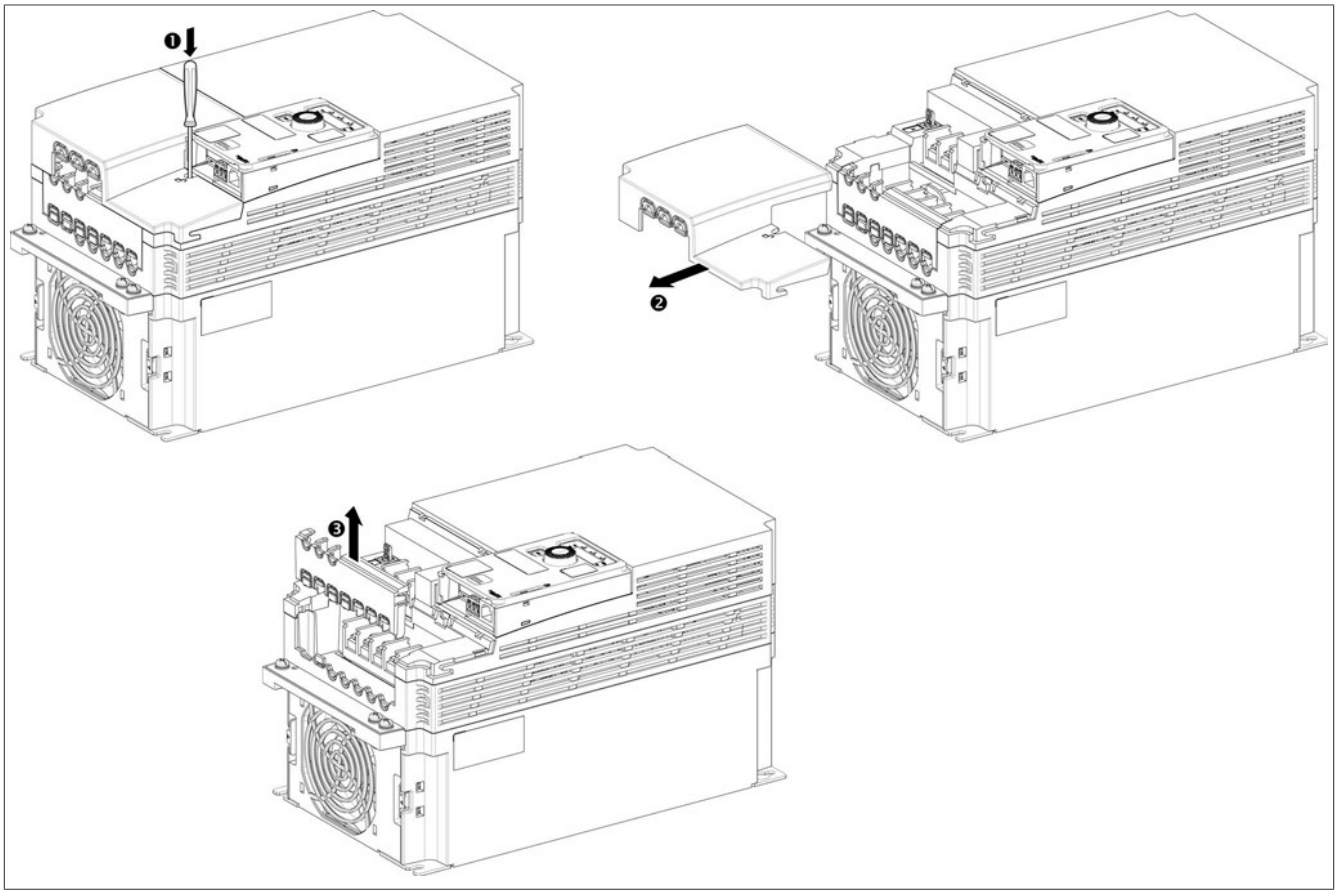
**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

**Once you have wired the power terminals, replace the terminal and wiring covers correctly in order to maintain protection.**

**Failure to follow these instructions will result in death or serious injury.**

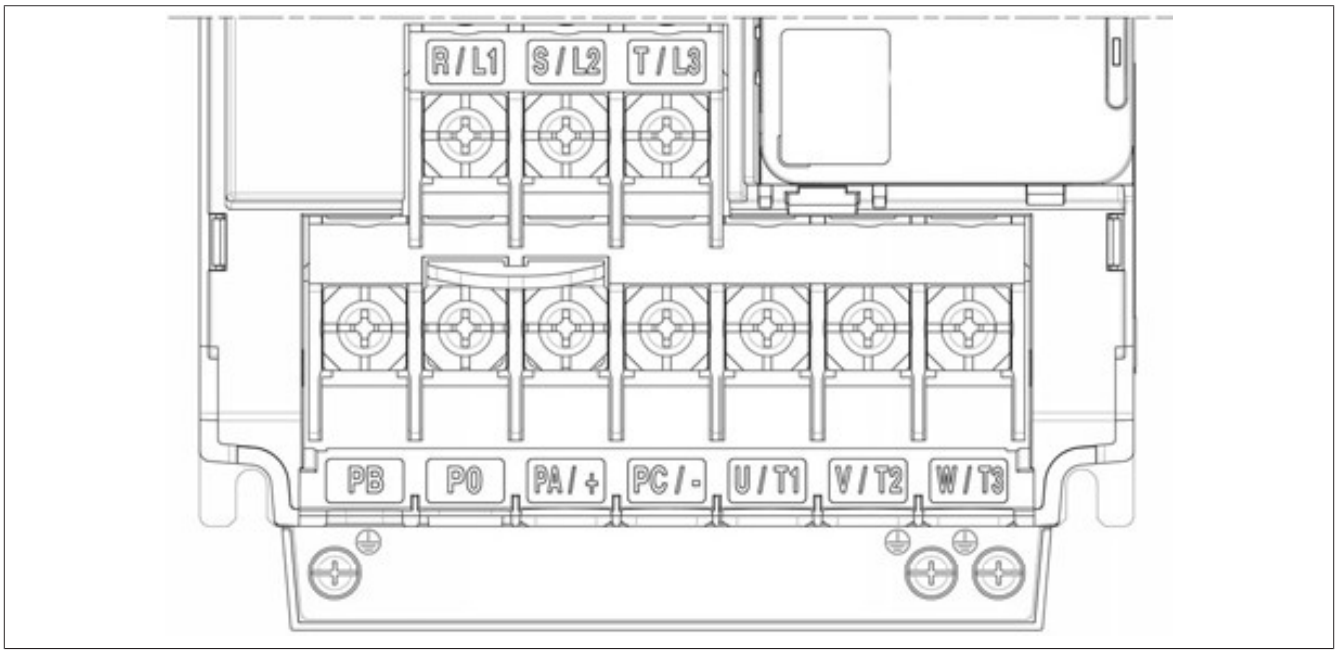
The power, motor and braking resistor terminals are located on the bottom of the inverter.




To access the power terminals for **size 5** inverters, follow the instructions below.

1) Break the safety clip using a screwdriver.
2) Remove the wiring cover.
3) Fold down the cover of the terminals.
4) Remove the cover from the terminals.

### Arrangement of the power terminals




### Accessing the terminals for sizes 1 to 3 (IP65/IP66 protection)

**Danger!**

**RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC**

**Before completing any of the procedures described in this chapter, carefully read through the instructions provided in section "Safety information".**

**Failure to follow these instructions will result in death or serious injury.**

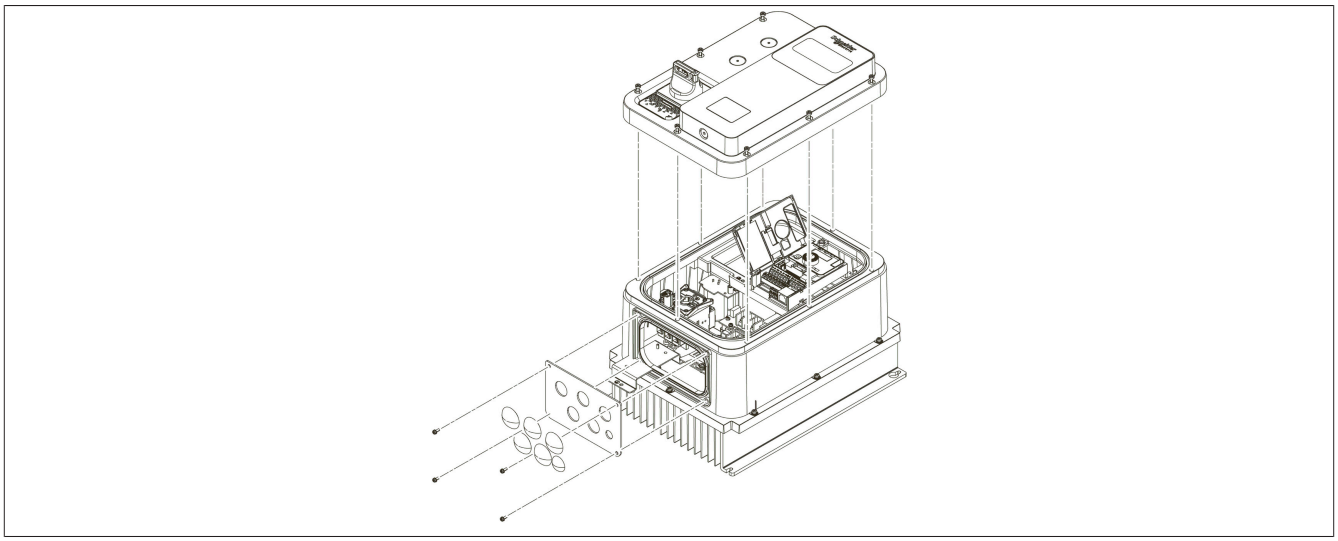
**Danger!**

**RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC**

**After wiring the power terminals, properly reinstall the terminal cover and wiring cover to maintain the degree of protection.**

**Failure to follow these instructions will result in death or serious injury.**

To gain access to the terminals, remove the cable gland plate and front cover as shown.



## Arrangement of the power terminals

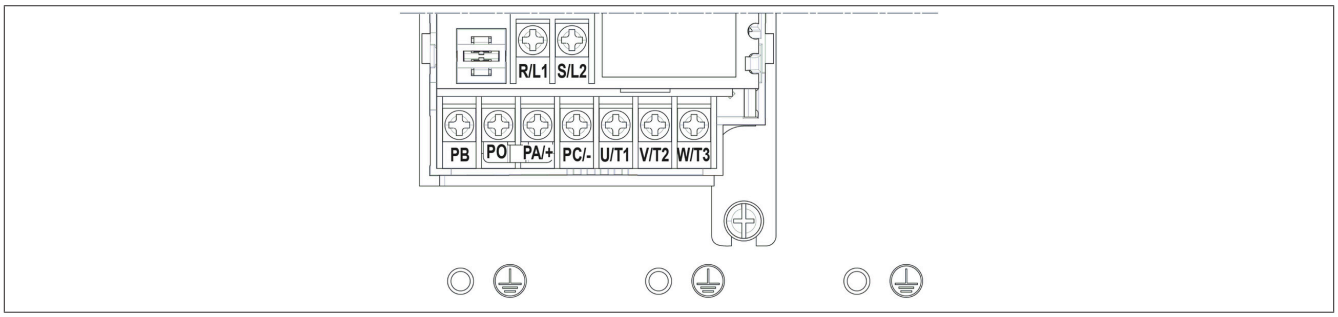



Figure 3: Size 1

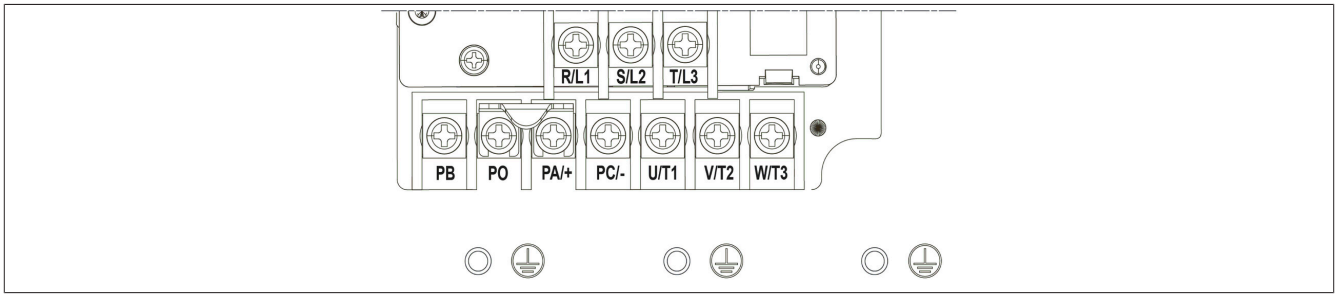



Figure 4: Size 2

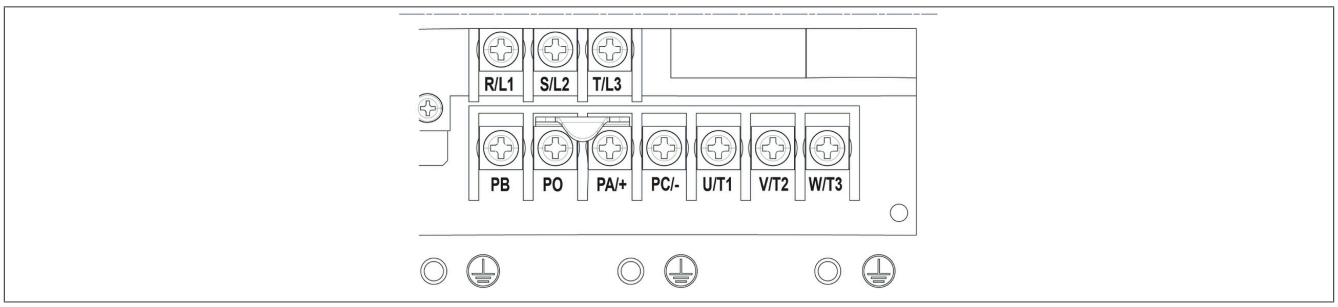



Figure 5: Size 3

### Accessing the terminals for size 4 (IP65/IP66 protection)

**Danger!**

**RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC**

**Before completing any of the procedures described in this chapter, carefully read through the instructions provided in section "Safety information".**

**Failure to follow these instructions will result in death or serious injury.**

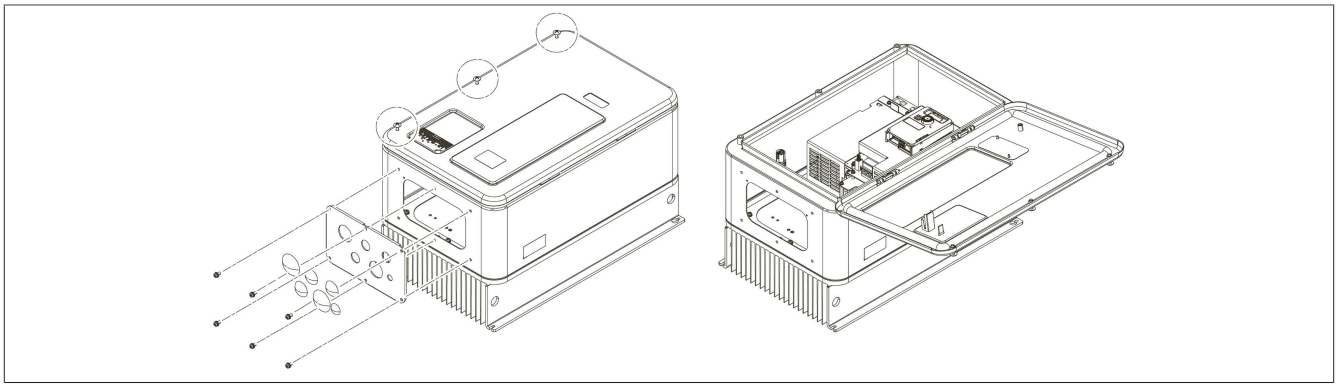
**Danger!**

**RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC**

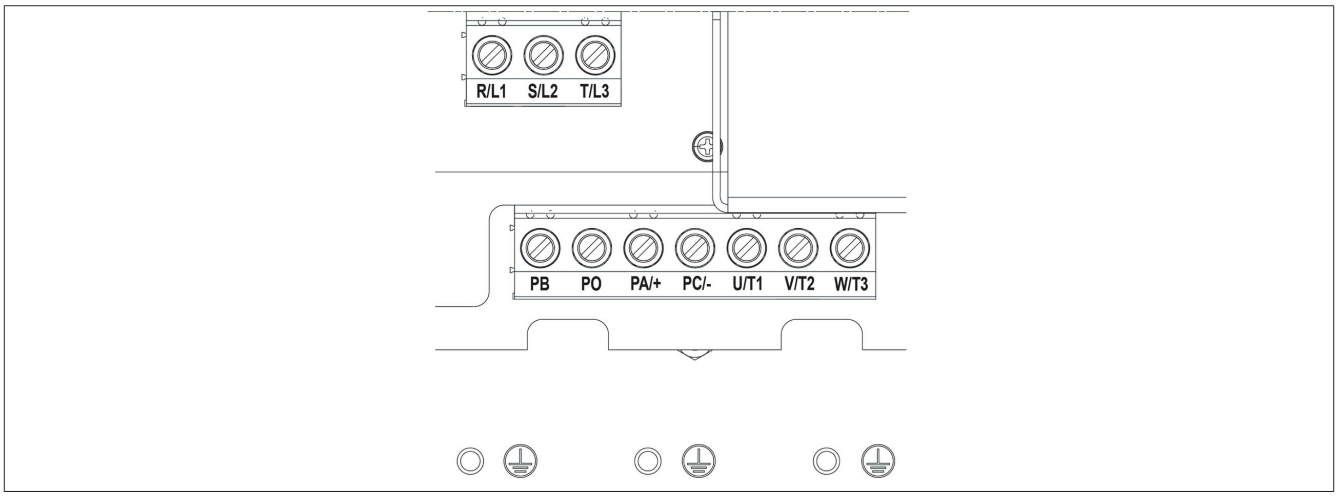
**After wiring the power terminals, properly reinstall the terminal cover and wiring cover to maintain the degree of protection.**

**Failure to follow these instructions will result in death or serious injury.**

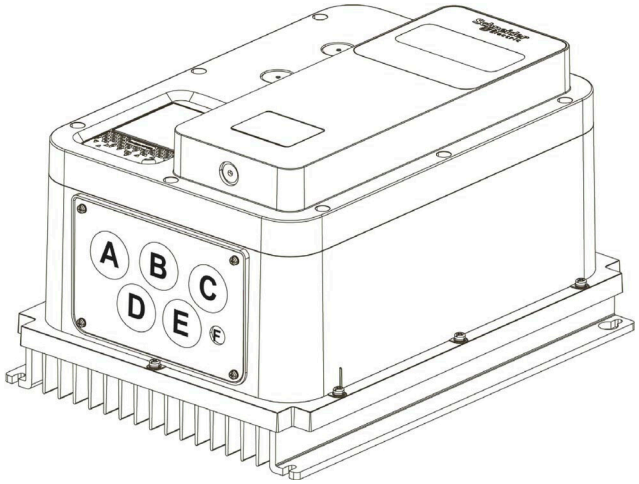
To gain access to the terminals, remove the cable gland plate and open the front cover as shown.



## Arrangement of the power terminals




## Cable routing in the cable gland plate (IP65/IP66 protection)

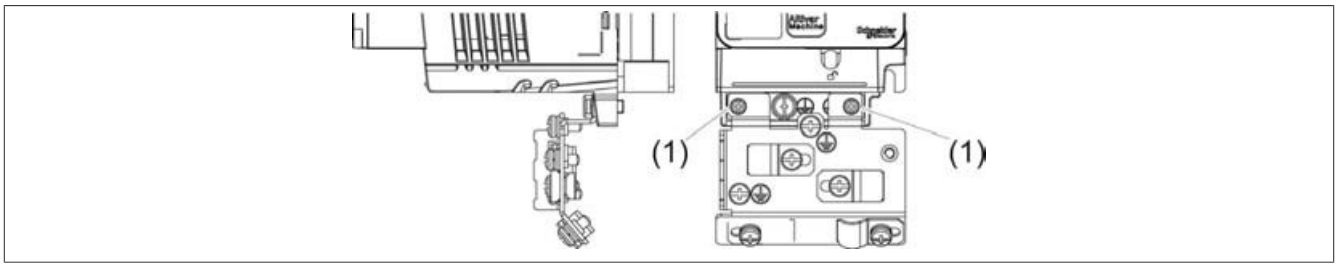



| Drill hole | Cables |
|---|---|
| A | Input cable |
| B | Control cable for relay output |
| C | Control cable for input/output |
| D | Brake resistor cable, if available |
| E | Motor cable |
| F | Ground cable |

### 4.4.8 Mounting the EMC plate assembly

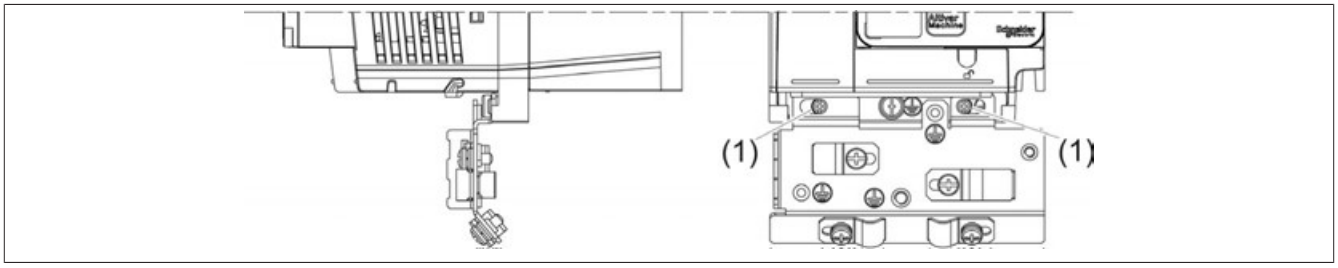
**Installing the EMC plate assembly for size 1**

Secure the EMC plate with two M5 HS screws (1).



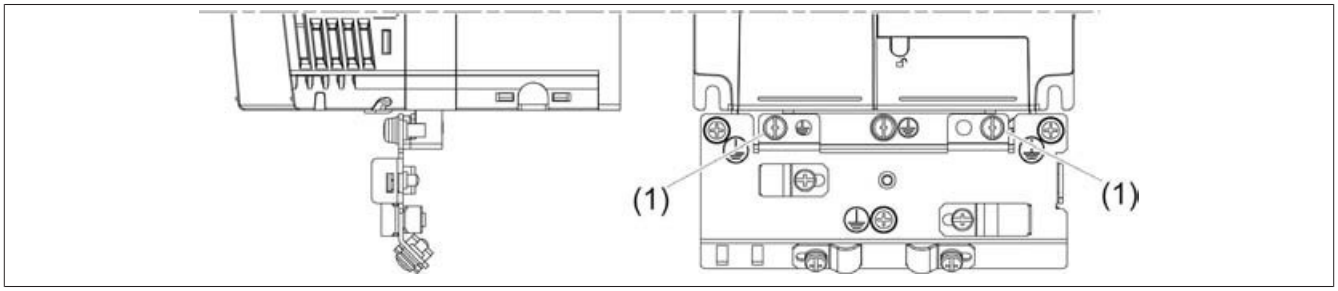

**Installing the EMC plate assembly for size 2**

Secure the EMC plate with two M5 HS screws (1).



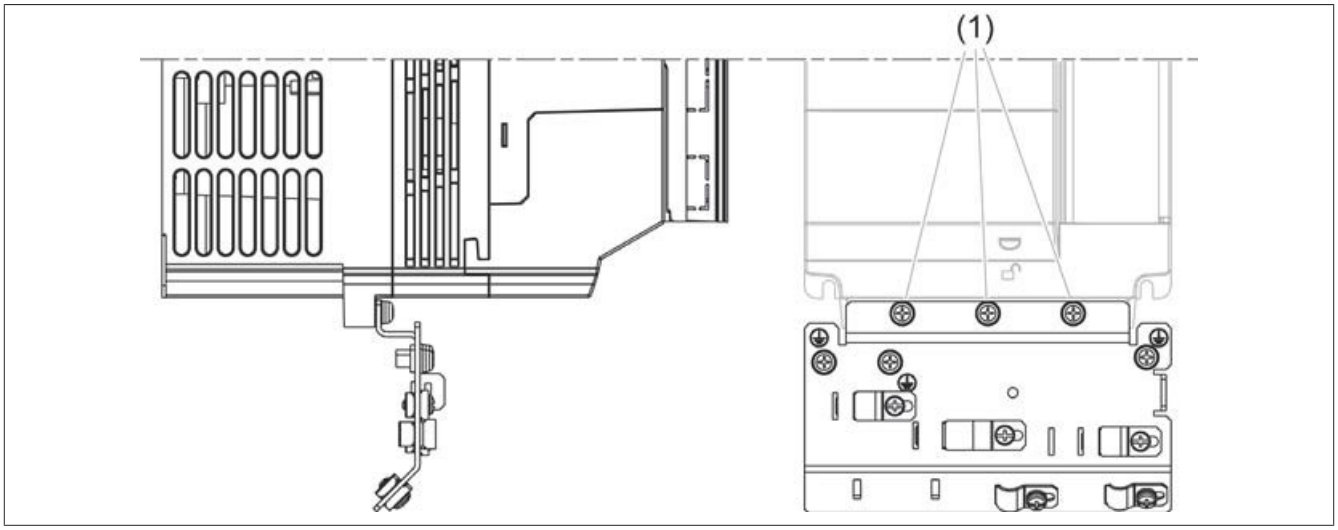

**Installing the EMC plate assembly for size 3**

Secure the EMC plate with two M5 HS screws (1).



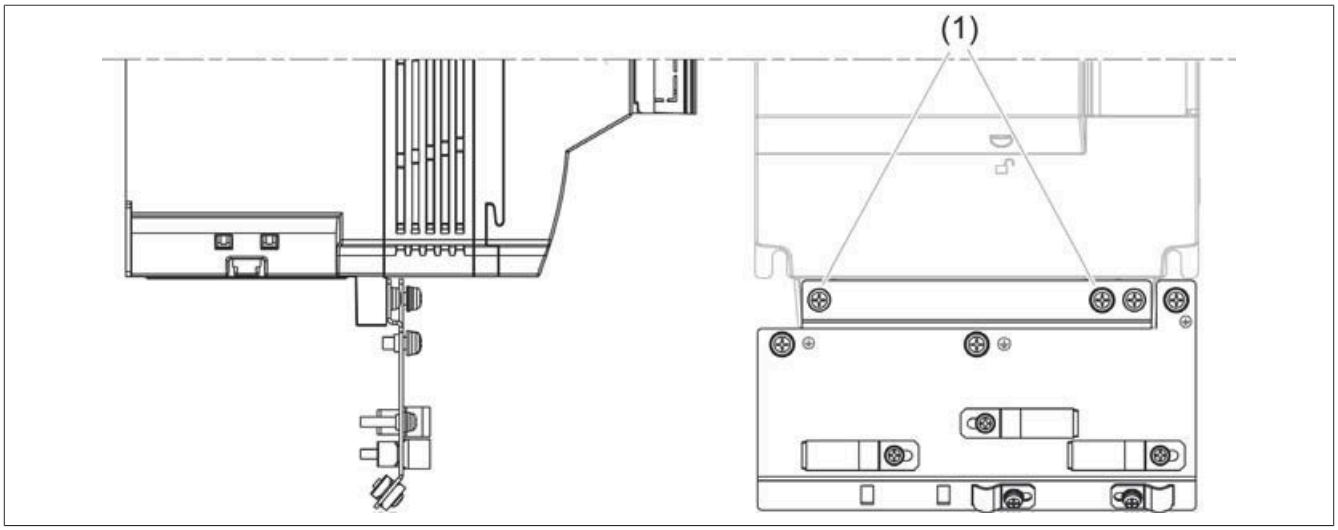

**Installing the EMC plate assembly for size 4**

Secure the EMC plate with three M5 HS screws (1).

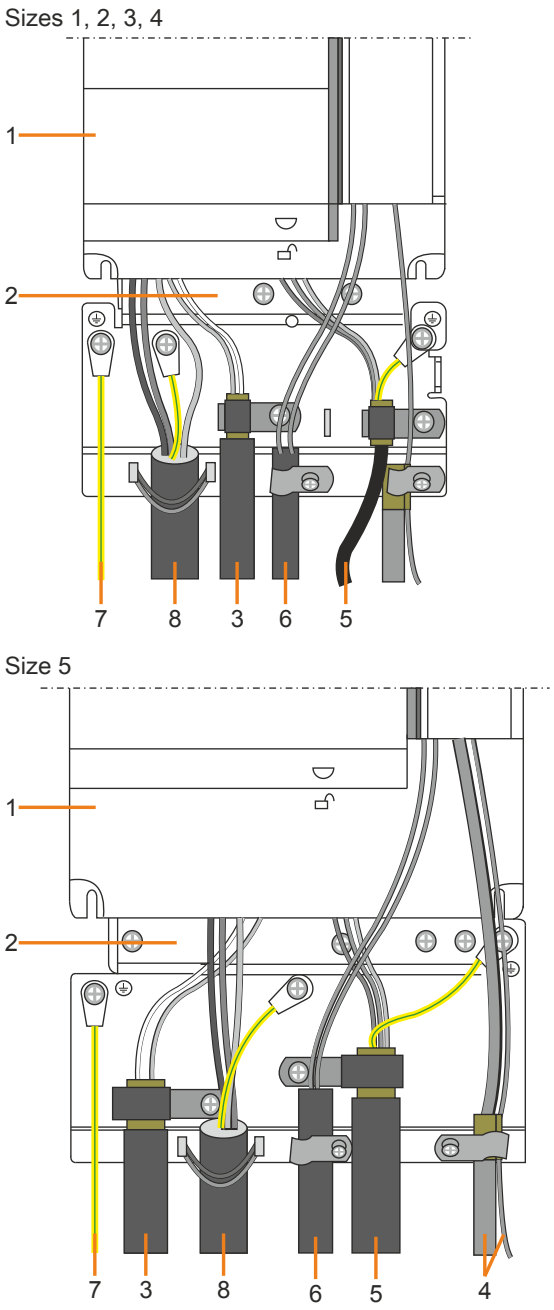


### Installing the EMC plate assembly for size 5

Secure the EMC plate with two M5 HS screws (1).



## Laying the EMC plate cable




1) ACOPOSinverter P66
2) Grounded, steel-sheet EMC plate
3) Shielded cable for connecting the braking resistor (if used). The shielding must be uninterrupted, and any intermediate connection terminals must be installed on the EMC plate.
4) Shielded control lines and lines to input-side connection of safety function STO.
5) Shielded motor cable, shielding grounded at both ends. This shielding must be uninterrupted, and any intermediate connection terminals must be installed on the EMC plate.
6) Non-shielded cables for relay contact output.
7) Protection ground connection.
8) Unshielded cable for power supply to the inverter.

### 4.4.9 Electromagnetic compatibility

Signal failures can trigger unanticipated reactions from the inverter, and from other devices in the vicinity of the inverter.

**Warning!**

**SIGNAL AND DEVICE FAILURES**

- **When wiring, all EMC requirements described in this document must be strictly observed.**
- **Ensure compliance with the EMC requirements described in this document.**
- **Ensure compliance with all applicable EMC guidelines and requirements for the site where the product is installed.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

#### Limit values

This product complies with the EMC requirements set by IEC 61800-3, provided that the procedures described in this manual are implemented during installation. If the selected configuration (product, line filter, various accessories and measures) does not comply with category C1 requirements, the following applies, as per IEC 61800-3:

**Warning!**

**RADIO INTERFERENCE**

**In residential areas, this product may trigger radio interference. In this case, additional corrective actions may need to be implemented.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

#### EMC requirements for the control cabinet

| EMC measures | Objective |
|---|---|
| Use mounting plates with good conductivity, connect large surfaces of metal parts, remove paint from contact areas | Good conductivity due to large contact surface area |
| Ground the control cabinet, control cabinet door and the mounting plate using grounding belts or ground cables. The line cross section must be at least 10 mm² (8 AWG). | Reduction in emissions |
| Fit switching contactors such as power contactors, relays or solenoids with interference filters or radio interference suppressors (for example, diodes, varistors, RC circuits) | Reduction in mutual interference. |
| Install power components and control components separately. | |

#### Shielded cables

| EMC measures | Objective |
|---|---|
| Connect large surfaces of cable shields, use cable terminals and grounding belts. | Reduction in emissions |
| Use cable terminals to connect large surfaces of the shielding on all shielded cables to the mounting plate at the control cabinet entry. | |
| Ground the shielding for digital signal cables at both ends. You can do this by connecting the shielding to large surfaces or via conductive connector housing. | Reduction in signal cable interference, reduction in emissions |
| Ground the shielding for analog signal cables at the device directly (signal input). Insulate the shielding at the other end of the cable, or use a capacitor for grounding (e.g. 10 nF, 100 V or higher). | Reduction in ground loops caused by low-frequency interference. |
| Only use shielded motor cables with copper braiding and coverage of at least 85%. Ground large surface areas of the shield on both sides. | Controlled deflection of interference current and reduction in emissions. |

### Cable installation

| EMC measures | Objective |
|---|---|
| Do not route fieldbus cables and signal cables in a single cable duct together with DC and AC voltage lines of more than 60 V. (Fieldbus cables, signal lines and analog cables can be routed in a single cable duct.) Recommendation: Use separate cable ducts and ensure a minimum distance of 20 cm between each duct. | Reduction in mutual interference. |
| Keep cables as short as possible. Do not install unnecessary cable loops, and use short cables between the central grounding point in the control cabinet and the external ground connection. | Reduction in capacitive and inductive interference. |
| Use equipotential bonding lines in the following cases: wide-area installations, different power supplies and cross-building installations. | Reduction in cable shield interference, and reduction in emissions. |
| Use fine-stranded wires with potential equalization. | Dispersion of high-frequency interference current. |
| If the motor and machine are not conductively connected by means of an insulated flange or connection without an interface contact, for example, the motor must be grounded using a grounding belt or cable. The wire cross section must be at least 10 mm² (6 AWG). | Reduction in emissions, increased immunity. |
| Use twisted-pair wires for the DC supply. For digital and analog inputs, use shielded, twisted cables with a pitch of between 25 mm and 50 mm. | Reduction in signal cable interference, reduction in emissions |

### Power supply

| EMC measures | Objective |
|---|---|
| Operate the product on a mains network with a grounded neutral conductor. | Ensures effectiveness of line filter. |
| Use overvoltage protection if there is a risk of overvoltage. | Reduction of the risk of damage due to overvoltage. |

### Additional measures for improving EMC

Depending on the application, the following measures can improve EMC-dependent values:

| EMC measures | Objective |
|---|---|
| Use mains chokes. | Reduction in mains harmonics and extension of product service life. |
| Use external mains filters. | Improvement in EMC limit values. |
| Additional EMC measures, such as mounting in a closed control cabinet with 15 dB shielding attenuation of radiated interference, for example. | |

## Note:

**If an additional input filter is used, it must be installed as close as possible to the inverter and connected directly to the mains via an unshielded cable.**

### 4.4.10 Electrical data for the control terminals

The following tables describe the terminal block connections of the control unit.

### 4.4.10.1 Digital inputs and outputs

| Pin | Short description | Key data |
|---|---|---|
| +24 | Power supply for digital inputs and outputs | Power supply from an internal source (see section "Switch "SW1" - Configuration of the input circuit" on page 142).<br>Power supply: 24 VDC (-15% to +20%)<br>Maximum output current: 100 mA |
| DI1<br>DI2<br>DI3<br>DI4 | Digital input 1, 2, 3, 4<br>• 24 VDC | Standard inputs that can be switched to sink or source mode via SW1 (see section "Switch "SW1" - Configuration of the input circuit" on page 142).<br><br>Switching voltage: 24 VDC (±25%)<br>Impedance: 3.5 kΩ<br>Filter time: < 1 ms<br>Response time: < 10 ms (8 ms at stop)<br><br>**Source mode**<br>Switching characteristics:<br>• TRUE at > 11 VDC<br>• FALSE at < 5 VDC<br><br>**Sink mode**<br>Switching characteristics:<br>• TRUE at < 10 VDC<br>• FALSE at > 16 VDC<br><br>**DI5 properties**<br>Input can be used as a pulse input.<br>Max. input frequency: 20 000 Hz<br><br>**DI6 properties**<br>Input can be switched to PTC mode by means of SW2 to enable detection of e.g. motor overheating by means of a PTC sensor (PTC "positive temperature coefficient").<br><br>**PTC mode**<br>Switching characteristics:<br>• TRUE at > 3 kΩ<br>• FALSE at < 1.8 kΩ<br>Short-circuit detection: At < 50 Ω |
| DI5 | Digital input 5<br>• 24 VDC (high-speed) | |
| DI6 | Digital input 6<br>• 24 VDC<br>• PTC | |
| DQ+<br>DQ- | Digital output 1<br>• 24 VDC | Digital output (floating)<br>DQ+: Switching voltage (collector)<br>DQ-: Reference potential (emitter)<br><br>Refresh rate: 2 ms<br>Permissible switching capacity with resistive load: Max. 100 mA, max. 30 VDC |
| R1A<br>R1B<br>R1C<br>R2A<br>R2C | Relay 1, 2<br>• 24 VDC<br>• 230 VAC | Relay (floating)<br>RxA: Normally open contact (NO)<br>RxB: Normally closed contact (NC)<br>RxC: Reference potential (COM "common")<br><br>Refresh rate: 2 ms<br>Service life (number of switching operations):<br>• 100,000 at max. load<br>• 1,000,000 at 1 A<br>Minimum switching capacity: 5 mA at 24 VDC<br><br>**R1 properties**<br>Permissible switching capacity with resistive load:<br>• Max. 3 A<br>• Max. 30 VDC<br>• Max. 250 VAC (OVC II)<br>Permissible switching capacity with inductive load (cos φ = 0.4 and L/R = 7 ms):<br>• Max. 2 A<br>• Max. 30 VDC<br>• Max. 250 VAC (OVC II)<br><br>**R2-properties**<br>Permissible switching capacity with resistive load:<br>• Max. 5 A<br>• Max. 30 VDC<br>• Max. 250 VAC (OVC II)<br><br>Permissible switching capacity with inductive load (cos φ = 0.4 and L/R = 7 ms): |

| Pin | Short description | Key data |
|---|---|---|
| | | • Max. 2 A<br>• Max. 30 VDC<br>• Max. 250 VAC (OVC II)<br><br> <br>**Notice!**<br>**Inductive load:**<br>**When switching inductive loads, an additional contactor may have to be implemented, which can reduce the inductively stored energy and protect the logic from voltage peaks.** |

## 4.4.10.2 Analog inputs and outputs

| Pin | Short description | Key data |
|---|---|---|
| 10 V | Power supply of the analog inputs | Power supply from internal<br>Power supply: 10 VDC (0% to +10%)<br>Maximum output current: 10 mA |
| AI1 | Analog input 1<br>- 0 V to +10 V | Analog inputs<br>AI1: Unipolar analog voltage input<br>AI2: Bipolar analog voltage input<br>AI3: Unipolar analog current input<br><br>Refresh rate: 2 ms<br>Resolution: 10 bits<br>Accuracy: ±0.5% at 25°C (77°F)<br>±0.7% at 25°C ±60K (77°F ±108°F)<br>Linearity: ±0.2% (max.: ±0.5%) of maximum<br><br>**AI1 properties**<br>Signal range: 0 to 10 V (or lower)<br>Impedance: 30 kΩ<br>Resolution: 10 bits<br><br>**AI2 properties**<br>Signal range: -10 to 10 V (or lower)<br>Impedance: 30 kΩ<br>Resolution: 10-bit + sign<br><br>**AI3 properties**<br>Signal range: 0 to 20 mA (or lower; e.g. 4 mA to 20 mA)<br>Impedance: 250 Ω<br>Resolution: 10 bits |
| AI2 | Analog input 2<br>- 10 V to +10 V | |
| AI3 | Analog input 3<br>- 0 to 20 mA | |
| AQ1 | Analog output 1<br>- 0 to 10 V<br>- 0 to 20 mA | Analog output<br>AQ1: Unipolar analog output that can be configured as a voltage or current output via parameter AO1T.<br><br>Refresh rate: 2 ms<br>Accuracy: ±1% at 25°C ±10K (77°F ±18°F)<br>±2% at 25°C ±60K (77°F ±108°F)<br>Linearity: ±0.3% of maximum<br><br>**AQ1 as voltage output**<br>Signal range: 0 V to 10 V (or lower)<br>Min. impedance: 470 Ω<br>Resolution: 10 bits<br><br>**AQ1 as current output**<br>Signal range: 0 to 20 mA (or lower; e.g. 4 mA to 20 mA)<br>Max. impedance: 800 Ω<br>Resolution: 10 bits |

### 4.4.10.3 General power supply

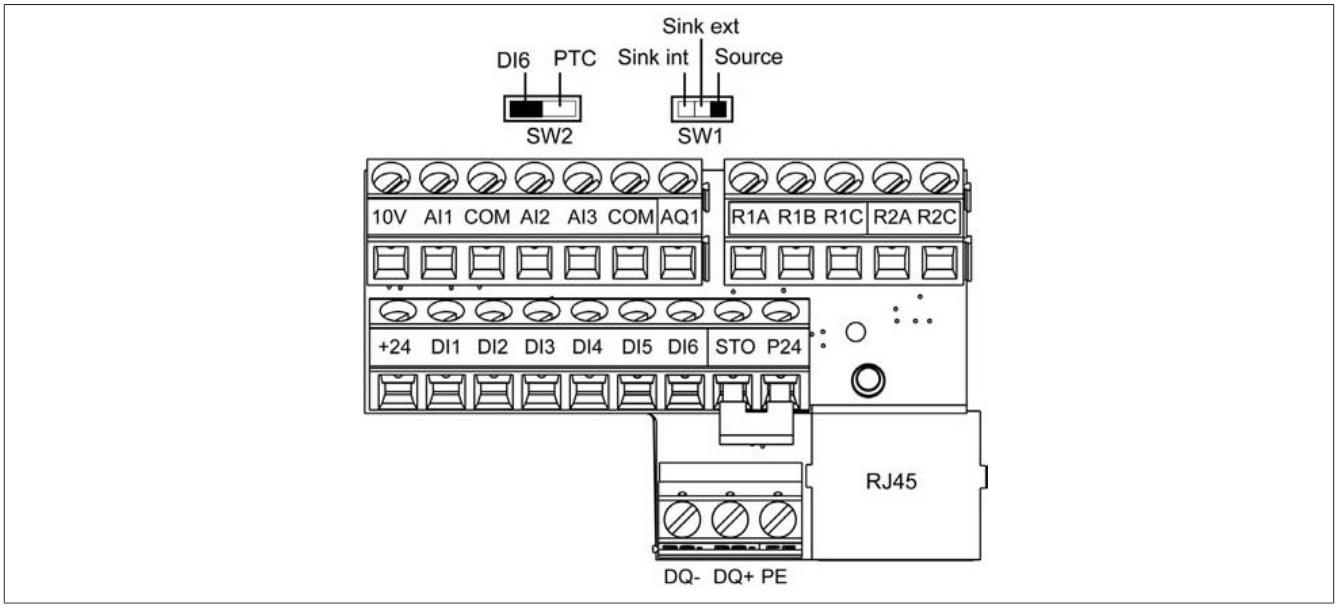
| Pin | Short description | Key data |
|---|---|---|
| STO | Torque enable<br>• 24 VDC | Input for safety function (STO "Safe Torque Off")<br><br>Switching voltage: 24 Vdc (±25%)<br>Impedance: 1.5 kΩ<br>Filter time: < 1 ms<br>Response time: < 10 ms<br><br>Torque enable:<br>• TRUE at > 17 VDC<br>• FALSE at < 2 VDC |
| P24 | Power supply<br>• 24 VDC from internal for STO safety function<br>• 24 VDC from external for redundant power supply | Connection for power supply (see section "Switch "SW1" - Configuration of the input circuit" on page 142).<br><br>**24 VDC from internal (via DC bus)**<br>Power supply for STO input: 24 Vdc (-15% to +20%)<br>Maximum output current: 100 mA<br><br>**24 VDC from external (redundant supply)**<br>Permissible supply voltage from external: 24 Vdc (±25%)<br>Maximum input current: 1.1 A (fuse required) |
| COM | Reference potential<br>• 0 VDC | Reference potential (COM "common") of the entire control unit (see section "Switch "SW1" - Configuration of the input circuit" on page 142).<br>Connection point "COM" is executed multiple times. All connections with this designation are internally connected. |

### 4.4.10.4 Other

| Pin | Short description | Key data |
|---|---|---|
| PE | Protective ground | Connection for protective ground conductor of the control unit<br><br>**Notice!**<br>**Wiring mandatory (see section "Wiring the control unit" on page 170)** |

## 4.4.11 Arrangement and characteristics of the control block terminals and communication and I/O ports

### Connection characteristics




Cable cross sections and tightening torque

| Control terminals | Cable cross section for relay output | | Cross section for various cables | | Tightening torque |
|---|---|---|---|---|---|
| | Min.[1] | Max. | Min.[1] | Max. | |
| | mm² (AWG) | mm² (AWG) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| All terminals | 0.75 (18) | 1.5 (16) | 0.5 (20) | 1.5 (16) | 0.5 (4.4) |

1) The value corresponds to the minimum permitted cross section for the terminal.

### RJ45 communication port

Connection options:

- PC with ACPi SafeConfigurator
- External graphic display terminal via Modbus serial cable
- Modbus or CANopen network

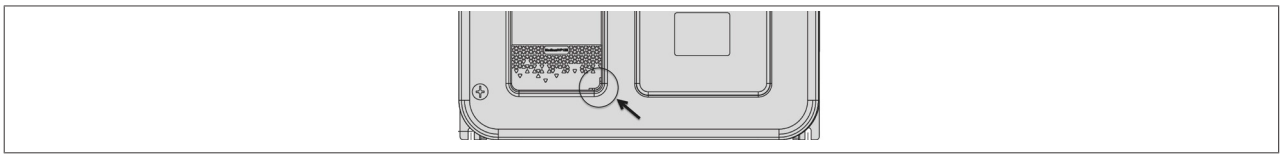
**Note:**

**Before connecting the RJ45 cable to the product, the cable should be inspected for damage. Connecting a damaged cable may cause the power supply to the controller to fail.**

### Using the RJ45 connection for ACOPOSinverter P66 with IP65/IP66 protection

### Connecting the cable to the RJ45 connection

1) Lift the rubber cap by carefully pulling on the tab.



The cap cannot be removed from the cover.

2) Connect the cable to the RJ45 connector with the other hand.

**Disconnecting the cable from the RJ45 connection**

1) Disconnect the cable from the RJ45 connector.
2) Refit the rubber cap.
3) Carefully press on the entire surface of the rubber cap to restore the original degree of protection of the inverter.

### 4.4.12 Wiring the control unit

**Protective Extra-Low Voltage (PELV) requirements for connected devices**

**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

- **Make sure that the temperature sensors in the motor comply with PELV requirements.**
- **Make sure that the motor encoder complies with PELV requirements.**
- **Make sure that all other devices connected via a signal cable comply with PELV requirements.**

**Failure to follow these instructions will result in death or serious injury.**

**Warning!**

**UNINTENDED OPERATION OF THE DEVICE**

- **Use a shielded cable for all digital and analog I/O and communication signals.**
- **Ground the cable shielding at a single point.**
- **Route communication and I/O cables separately from power cables.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

- Keep control circuits and power circuits separate. For digital and analog inputs/outputs, use shielded, twisted cables with a pitch of between 25 mm and 50 mm.
- We recommend using the cable ends described in section "Accessories".

**Access to the terminals**

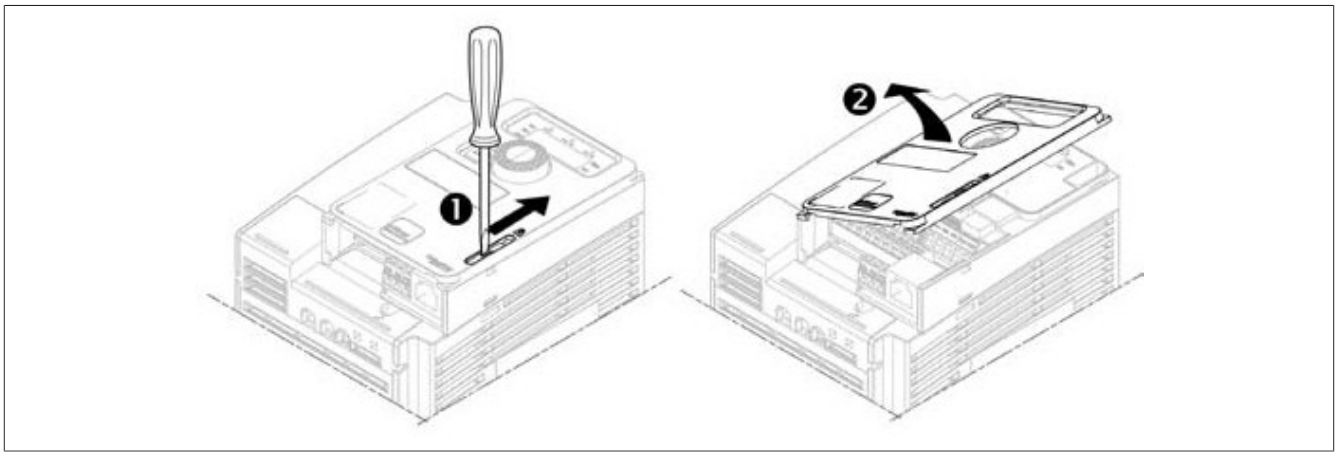
**Danger!**

**HAZARD OF ELECTRICAL SHOCK, EXPLOSION OR ARC FLASH**

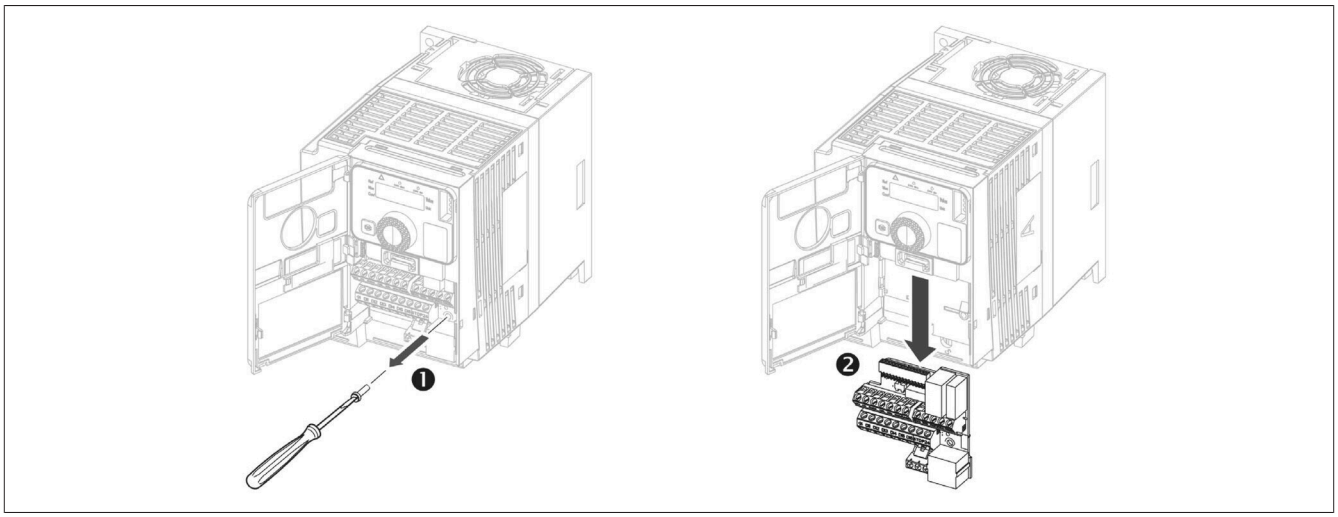
**Before completing any of the procedures described in this section, carefully read through the instructions provided in section "Safety information".**

**Failure to follow these instructions will result in death or serious injury.**

Open the cover to access the terminals, as shown in the examples. All screws are M3 slotted screws of 3.8 mm (0.15 in) in diameter.



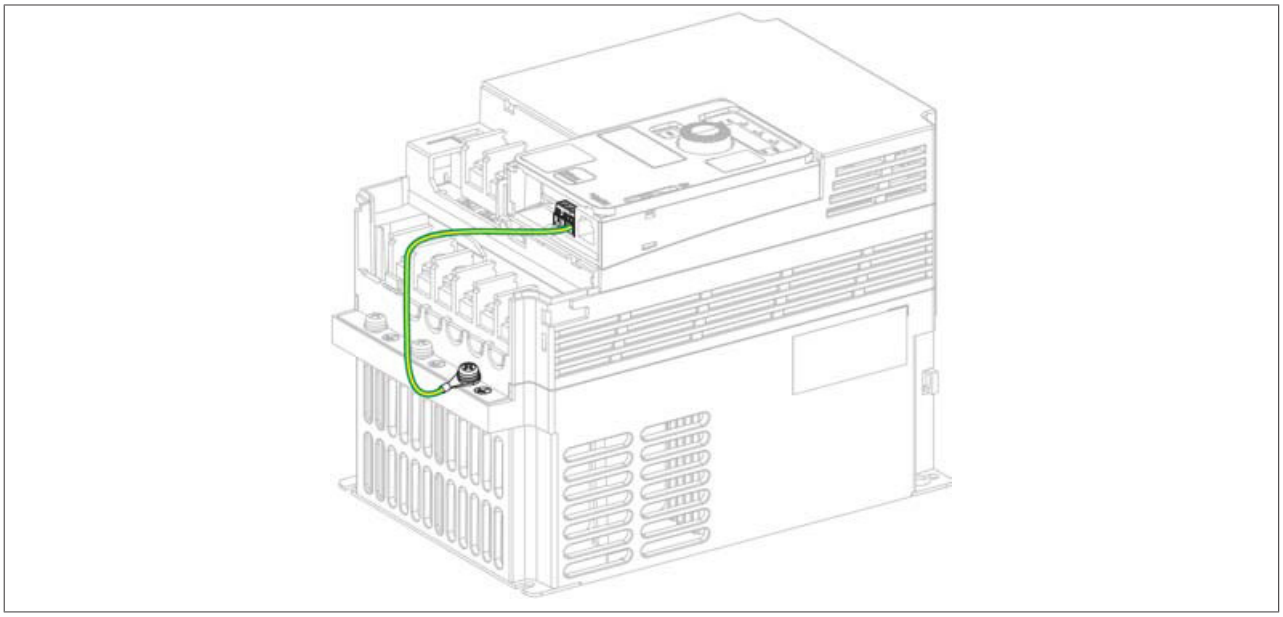

The control block can be removed to make wiring easier.




### Wiring the control block

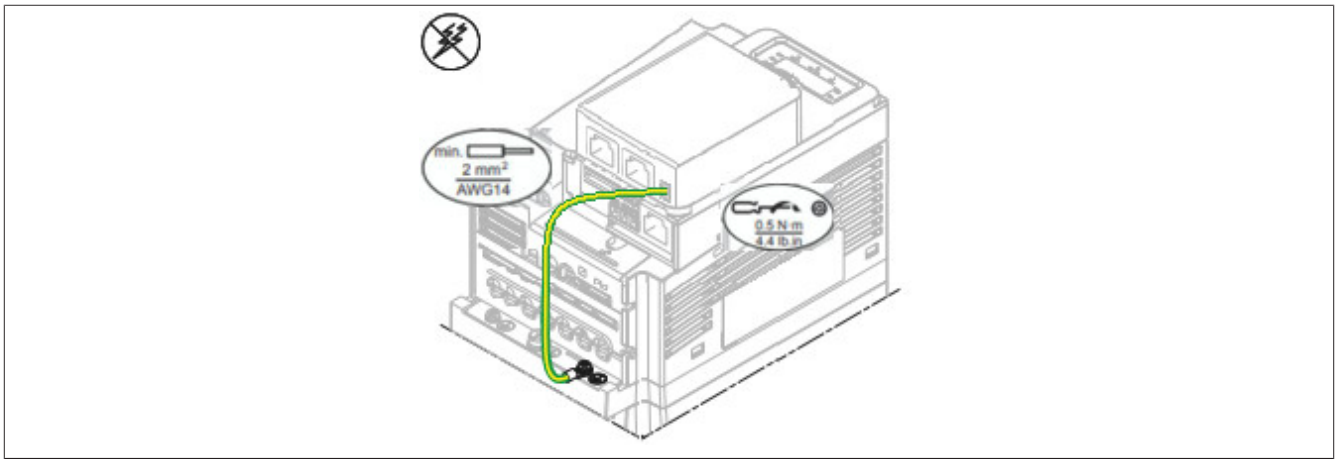
#### Procedure for wiring the control block terminals

1) Wire P24, the STO function, the digital inputs (DI1 to DI6) and terminals +24, DQ-, DQ+ and PE.
2) Wire 10 V, the analog inputs (AI1 to AI3), COM, digital input AQ1 and the COM terminals.
3) Wire the relay outputs.
4) Wire the PE terminal as shown below - Example for size 3.



### Wiring of the POWERLINK interface card

The POWERLINK interface card of the ACOPOSinverter P66 provides a separate terminal in addition to the two connections for the network cables to ensure a contact to PE of the drive. The green-yellow cable must be connected as follows:



## 4.5 Testing the installation

### Before switching on

Safety function STO (Safe Torque Off) does not interrupt the power supply to the DC bus. It only interrupts the power supply to the motor. DC bus voltage and mains voltage are still present in the inverter.

**Danger!**

**RISK OF ELECTRIC SHOCK**

- **Use safety function STO for its intended purpose only.**
- **Use a separate switch, outside the circuit for safety function STO, to disconnect the inverter from the mains voltage supply.**

**Failure to follow these instructions will result in death or serious injury.**

Incorrect settings, invalid data or faulty wiring can cause unexpected movement or signals as well as damage to components and the disabling of monitoring functions.

**Warning!**

**UNEXPECTED OPERATION OF THE EQUIPMENT**

- **Do not switch on the system until you have verified that there is no one in the operating area and that it is free from obstacles.**
- **Make sure that everyone involved in the operation has direct access to a fully functioning emergency switch-off button.**
- **Do not operate the inverter system using unknown settings or data.**
- **Make sure that the wiring has been implemented in accordance with the settings.**
- **Never change a parameter unless you are familiar with the function of the parameter and the consequences of a potential change.**
- **When commissioning, make sure to carefully check all operating states, operating conditions and potential error situations.**
- **Take into account the possibility of movement in the wrong direction or motor vibration.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

If a power stage is disabled unintentionally, following a power outage, error or functional failure, for example, the brake function in the motor may no longer operate in a controlled way.

**Warning!**

**UNEXPECTED OPERATION OF THE EQUIPMENT**

**Make sure that unbraked movements do not cause injury or damage to the device.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

### Mechanical installation

Check the mechanical installation of the overall inverter system:

1) Have the specified spacing requirements been observed during installation?
2) Have all mounting screws been tightened using the specified tightening torque?

### Electrical installation

Check the electrical connections and wiring:

1) Have all protective ground conductors been connected?
2) Have all fuses and circuit breakers been installed with the correct power values? Have the right types of fuse been used?
3) Have all cable ends been connected or insulated?
4) Have all cables and connections been connected and installed correctly?
5) Have the signal cables been connected correctly?
6) Do the required shield connections comply with the EMC requirements?
7) Have all actions been taken to ensure EMC compliance?

### Covers and gaskets

To ensure the required protection, make sure that all devices as well as the doors and covers of the control cabinet have been installed correctly.

## 4.6 Servicing

### Service

**Danger!**

**RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC**

**Before completing any of the procedures described in this section, carefully read through the instructions provided in section "Safety information".**

**Failure to follow these instructions will result in death or serious injury.**

During operating, the products described in these instructions can reach temperatures above 80°C.

**Warning!**

**HOT SURFACES**

- **Avoid all contact with hot surfaces.**
- **Keep flammable or heat-sensitive components away from the immediate vicinity of hot surfaces.**
- **Before handling the product, wait until it has cooled down sufficiently.**
- **Make sure that there is adequate heat dissipation by performing a test run on maximum load.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

**Note:**

**RISK OF DAMAGE TO THE FREQUENCY INVERTER**

**Perform the procedures listed below.**

**Failure to follow these instructions can result in damage to property.**

| Environment | Affected components: | Action | Frequency [1)] |
|---|---|---|---|
| Impacts to the product | Housing - Control block (LED display, if used) | Perform a visual inspection of the inverter. | At least once a year |
| Corrosion | Terminals - Male connectors - Screws - EMC plate | Inspect, and clean if necessary. | |
| Dust | Terminals - Fans - Vents - Air inlets and outlets for housing - Cabinet air filters | Inspect, and clean if necessary. | |

| Environment | Affected components: | Action | Frequency [1] |
|---|---|---|---|
| Temperature | In the vicinity of the product | Inspect, and adjust if necessary. | |
| Cooling | Fans | Check that the fans are functioning correctly. | At least once a year |
| | | Replace the fans. | After three to five years depending on operating conditions. |
| Vibration | | Check the tightening torque. | At least once a year |

1) Starting from the commissioning date. The actual service intervals required are determined by the specific ambient conditions.

It is possible that the fans may continue to function for a certain period after the inverter has been switched off.

**Caution!**

**OPERATING FANS**

**Before handling the fans, make sure that they have come to a complete stop.**

**Failure to follow these instructions can result in injury or damage to the equipment.**

### Replacement parts and repairs

Serviceable product: Please contact your designated customer service representative.

Replacement of fan: It is possible to order a new fan as part of an ACOPOSinverter servicing agreement.

## 4.7 Leakage current

The leakage current values are specified for a power system (TT/TN) at 3% unbalance between phases at maximum voltage and worst case tolerance of internal components.

Leakage currents are sometimes shared in 2 values with different frequencies. Values cannot be strictly added but both act together in Residual Current Device tripping.

| Phases/Voltage | Material number | IT jumper closed | | IT jumper open |
|---|---|---|---|---|
| | | Input frequency (mains frequency) = 50 Hz | Input frequency (mains frequency) = 60 Hz | |
| 1-phase 200 to 240 V | 8I66S200018.00-000 | 5.1 mA | 6.1 mA | <0.5 mA |
| | 8I66S200037.00-000 | | | |
| | 8I66S200055.00-000 | | | |
| | 8I66S200075.00-000 | | | |
| | 8I66S200110.00-000 | 7.42 mA | 8.9 mA | <0.5 mA |
| | 8I66S200150.00-000 | | | |
| | 8I66S200220.00-000 | | | |
| 3-phase 200 to 240 V | 8I66T200018.00-000 | No IT jumper available | | <0.5 mA |
| | 8I66T200037.00-000 | | | |
| | 8I66T200055.00-000 | | | |
| | 8I66T200075.00-000 | | | |
| | 8I66T200110.00-000 | | | |
| | 8I66T200150.00-000 | | | |
| | 8I66T200220.00-000 | | | |
| | 8I66T200300.00-000 | | | |
| | 8I66T200400.00-000 | | | |
| | 8I66T200550.00-000 | | | |
| | 8I66T200750.00-000 | | | |
| | 8I66T201100.00-000 | | | |
| | 8I66T201500.00-000 | | | |
| 3-phase 380 to 500 V | 8I66T400037.00-000 | 4.75 mA | 5.7 mA | <0.5 mA |
| | 8I66T400055.00-000 | | | |
| | 8I66T400075.00-000 | | | |
| | 8I66T400110.00-000 | | | |
| | 8I66T400150.00-000 | | | |
| | 8I66T400220.00-000 | 4.33 mA | 5.2 mA | |
| | 8I66T400300.00-000 | | | |
| | 8I66T400400.00-000 | | | |
| | 8I66T400550.00-000 | No IT jumper available | | |
| | 8I66T400750.00-000 | | | |
| | 8I66T401100.00-000 | No IT jumper available | | |
| | 8I66T401500.00-000 | | | |

| Phases/Voltage | Material number | IT jumper closed | | IT jumper open |
|---|---|---|---|---|
| | | Input frequency (mains frequency) = 50 Hz | Input frequency (mains frequency) = 60 Hz | |
| 3-phase 525 to 600 V | 8I66T600075.00-000 | No IT jumper available | | <0.5 mA |
| | 8I66T600150.00-000 | | | |
| | 8I66T600220.00-000 | | | |
| | 8I66T60040.00-000 | | | |
| | 8I66T600550.00-000 | | | |
| | 8I66T600750.00-000 | | | |
| | 8I66T601100.00-000 | | | |
| | 8I66T601500.00-000 | | | |

# 5 The drive

This chapter deals with the direct operation of the ACOPOSinverter and introduces the device parameters that are available for configuration, use and monitoring.

The ACOPOSinverter offers the possibility of direct operation, i.e. theoretically, no additional software is required to parameterize and use the device. Section "Optional graphic display terminal" on page 182 describes the handling of the device using an additional display.
Section "Description of the HMI" on page 191 describes the direct interaction via the 7-segment display.

Chapter "The drive in Automation Studio" on page describes how the drive can be used in an Automation Studio project to control it with a PLC.

Section "The drive in ACPi SafeConfigurator" on page 439 describes how the drive can be used in an FDT-container project, e.g. to enable or configure the safety functions offered.

## 5.1 Direct connection

**Installation**

1) For installation instructions, see section "Installation" on page 105.

**Parameterization**

2) Switch on the power supply to the inverter, but do not issue any move command.
3) Define the following settings:
   - If the frequency is not 50 Hz, set the rated frequency of the motor via **[Standard mot. freq]** (bFr).
   - Only set the motor parameter via menu **[MOTOR CONTROL]** (drC-) if the preset factory configuration defined for the inverter is unsuitable.
   - Only set the application functions via menu **[INPUTS / OUTPUTS CFG]** (I_O-), menu **[COMMAND]** (CtL-) and **[APPLICATION FUNCT.]** (FUn-) if the preset factory configuration defined for the inverter is unsuitable.
4) In menu **[SETTINGS]** (SEt-), set the following parameters:
   - **[Acceleration]** (ACC) and **[Deceleration]** (dEC)
   - **[Low speed]** (LSP) and **[High speed]** (HSP)
   - **[Mot. therm. current]** (ItH)
5) Start the inverter.

**Tips:**

- Before parameterizing, fill out the tables with user-specific settings.
- Parameter **[Factory settings]** (FCS) allows you to restore the factory settings at any stage.
- You can use the function index to find the description for the individual functions quickly and easily.
- Before configuring a function, read the compatibility table paragraph in section "[APPLICATION FUNCT.] (FUn-)" on page 301.

### Note:

**To ensure optimum inverter accuracy and response time, the following steps must be performed:**

- **In menu [MOTOR CONTROL] (drC-), specify the values indicated on the motor nameplate.**
- **Use parameter [Auto-tuning] (tUn) to autotune the connected motor in cold state.**

### Before switching on the inverter

## Warning!

**IRREPARABLE DAMAGE DUE TO INCORRECT SUPPLY VOLTAGE**

**Before switching on and configuring the product, make sure that it is approved for use with the existing mains voltage.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

### Getting started

If the inverter has not been switched on for a long time, the capacitors must be fully charged before the motor is started.

## Note:

**REDUCED CAPACITOR PERFORMANCE**

- **If the inverter has not been switched on for any of the time frames listed below, leave the inverter connected to the mains voltage for one hour before switching on the motor.**
  - **12 months when the maximum storage temperature is 50°C**
  - **24 months when the maximum storage temperature is 45°C**
  - **36 months when the maximum storage temperature is 40°C**
- **Remember that no move commands can be executed until one hour has passed.**
- **When commissioning the inverter for the first time, check the date of manufacture. If the inverter was manufactured more than 12 months ago, perform the specified procedure.**

**Failure to observe these instructions can result in damage to the equipment.**

If, for internal mains protection control reasons, the specified procedure cannot be performed without executing a move command, perform the procedure during the active power stage. However, the motor must be stopped, in order to prevent noticeable mains current in the capacitors.

### Switching on

## Note:

**When the factory settings are enabled, the motor can only be switched on during a normal power-up/manual reset or after a stop command if commands "Run forward", "Run reverse" and "Stop DC injection" have been reset. If these commands have not been reset, the inverter will display [Freewheel] (nSt) and will not start. If the function has been configured for automatic restart (parameter [Automatic restart] (Atr) in menu [FAULT MANAGEMENT] (FLt-)), these commands are not taken into account and a reset (to Null) is not required.**

### Inverter locked

The inverter is blocked and displays [Freewheel] (nSt) when a move command such as forward run, reverse run or DC braking is still active while the following is happening:

- A reset to the factory settings takes place.
- A manual error reset with [Fault reset] (RsF) is being carried out.
- A manual fault reset is being performed by switching the product off and on.
- A stop command is being output from a channel that is not the active channel command (e.g. the stop button on the display terminal in 2/3-wire control).

Before authorizing a new move command, all active move commands must first be disabled.

### Line contactor

**Note:**

**RISK OF DAMAGE TO FREQUENCY INVERTER**

**Do not switch on the frequency inverter for cycles shorter than 60 seconds.**

**Failure to observe these instructions can result in damage to the equipment.**

### Using a motor with low ratings or dispensing with a motor completely

In the factory settings, output phase monitoring is enabled by default ([Output Phase Loss] (OPL) = [YES] (YES). To test or service the inverter, without having to access a motor with the same rating as the inverter, you must disable output phase failure monitoring ([Output Phase Loss] (OPL) = [No] (nO)). This can be especially helpful in cases where you need to test a very large inverter with a small motor. Set [Motor control type] (Ctt) to [Standard] (Std) via menu [Motor control] (drC-).

**Note:**

**MOTOR OVERHEATING**

**An external protection system for thermal overload is required in the following situations:**

- **If a motor is connected to a nominal current that is less than 20% of the inverter current.**
- **If the motor shutdown function is used.**

**Failure to observe these instructions can result in damage to the equipment.**

**Danger!**

**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**

**If output phase monitoring is disabled, then phase loss and any resulting cable disconnection will not be detected.**

- **Make sure that the parameter settings do not result in unsafe states.**

**Failure to follow these instructions can result in death or serious injury.**

## 5.1.1 Factory configuration

### Factory settings

The ACOPOSinverter is factory preset for common operating conditions:

- Display: Inverter ready signal [Ready] (rdY), when the motor is ready for operation; and the motor speed when the motor is running.
- Logic inputs LI3 to LI6, analog inputs AI2 and AI3, logic output LO1, analog output AO1 and relay R2 are not assigned.
- Stop mode on error detection: Freewheel stop

| Code | Description | Factory settings |
|---|---|---|
| bFr | [Standard mot. freq] | [50 Hz IEC] |
| tCC | [2/3 wire control] | [2 wire] (2C): 2-conductor control |
| Ctt | [Motor control type] | [Standard] (Std): Standard motor curve |
| ACC | [Acceleration] | 3 seconds |
| dEC | [Deceleration] | 3 seconds |
| LSP | [Low speed] | 0 Hz |
| HSP | [High speed] | 50 Hz |
| ItH | [Mot. therm. current] | Motor nominal current (dependent on inverter size value) |
| SdC1 | [Auto DC inj. level 1] | 0.7 x inverter nominal current for 0.5 seconds |
| SFr | [Switching freq.] | 4 kHz |
| Frd | [Forward] | [LI1] (LI1): Logic input LI1 |
| rrS | [Reverse assign.] | [LI2] (LI2): Logic input LI2 |
| Fr1 | [Ref.1 channel] | [AI1] (AI1): Analog input AI1 |
| r1 | [R1 assignment] | [No fault] (FLt): The contact opens when an error is detected or when the inverter is switched off. |

| Code | Description | Factory settings |
|---|---|---|
| brA | [Dec ramp adapt.] | [YES] (YES): Function active (deceleration ramp adapted automatically) |
| Atr | [Automatic restart] | [No] (nO): Function not active |
| Stt | [Type of stop] | [Ramp stop] (rMP): One ramp |
| CFG | [Macro configuration] | [Start/Stop] (StS) |

## Note:

**To work with the least possible number of default inverter settings, select macro configuration [Macro configuration] (CFG) = [Start/Stop] (StS), followed by [Factory settings] (FCS) = [Macro-Conf] (InI).**

Check that the values specified above are compatible with the relevant application.

### 5.1.2 Application functions

The tables on the following pages show the function assignments for various applications, in order to guide your selection.

The applications in these tables relate to the following machines in particular:

- Hoisting gear: Cranes, overhead traveling cranes, portal cranes (vertical lifting, gear ratio, rotation), lifting platforms
- Transportation: Pallet loaders/unloaders, conveyor belts, roller tables
- Packaging: Carton packaging machines, labeling machines
- Textiles: Weaving looms, carding frames, washing machines, spinners, drawing frames
- Wood processing: Lathes, sawing, milling
- Process

Each machine has its own special features, and the combinations listed here are neither mandatory nor exhaustive.

Some functions are designed specifically for a particular application. In such cases, a reference to the application is provided in the form of a tab in the margin of the programming section of the corresponding pages.

#### Motor control functions

| Functions | Hoisting | Transport | Packaging | Textiles | Wood processing | Process |
|---|---|---|---|---|---|---|
| V/f characteristic curve | | ■ | | | ■ | |
| Sensorless flux vector control | ■ | ■ | ■ | ■ | ■ | ■ |
| 2-point vector control | ■ | | | ■ | | |
| Synchronous motor in open control loop | | | | ■ | | |
| Motor speed up to 599 Hz | | | | ■ | ■ | |
| Motor overvoltage limiting | | | | ■ | ■ | |
| DC bus connection (see "Installation" on page 105) | | | | ■ | | ■ |
| Motor fluxing using a logic input | ■ | ■ | ■ | | | |
| Switching frequency up to 16 kHz | | | | ■ | ■ | |
| Autotuning | ■ | ■ | ■ | ■ | ■ | ■ |

#### Functions of the frequency setpoints

| Functions | Hoisting | Transport | Packaging | Textiles | Wood processing | Process |
|---|---|---|---|---|---|---|
| Differential bipolar reference | ■ | ■ | ■ | | | |
| Reference delinearization (magnifying glass effect) | ■ | ■ | | | | |
| Frequency control input | | | | ■ | | ■ |
| Reference switching | | | ■ | | | |
| Reference summing | | | ■ | | | |
| Reference subtraction | | | ■ | | | |
| Reference multiplication | | | ■ | | | |
| Ramp with configurable profile | ■ | ■ | | | | |
| Frequency jog | | ■ | | ■ | | ■ |
| Preset speeds | ■ | ■ | ■ | | | |
| ± Speed using single-step buttons | | | | | | ■ |
| ± Speed using double-step buttons | ■ | | | | | |
| ± Speed around the reference | | | | ■ | | ■ |
| Save reference | | | | | | ■ |

#### Application-specific functions

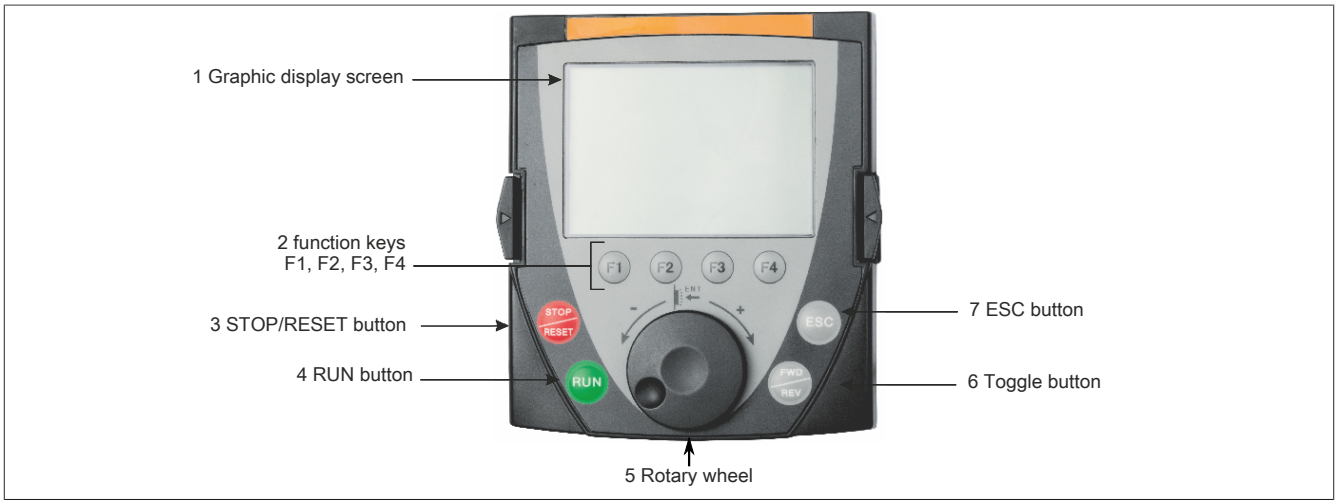
| Functions | Hoisting | Transport | Packaging | Textiles | Wood processing | Process |
|---|---|---|---|---|---|---|
| Fast stop. | | | | | ■ | |
| Brake controller | ■ | ■ | | | | |
| Load measurement | ■ | | | | | |
| High-speed hoisting | ■ | | | | | |
| Rope slack | ■ | | | | | |
| PID controllers | | | | | | ■ |
| Motor/generator torque limit | | ■ | | ■ | | ■ |
| Load distribution | ■ | ■ | | | | |
| Line contactor control | ■ | ■ | | | ■ | |
| Motor protection control | ■ | | | | | |
| Positioning by limit switch | ■ | ■ | ■ | | | |
| Calculated stopping distance (remote stop) after deceleration limit switch | | ■ | ■ | | | |
| Parameter switching | ■ | ■ | ■ | ■ | ■ | ■ |
| Motor or configuration switching | ■ | ■ | ■ | | | |
| Traverse control | | | | ■ | | |
| Stop mode | | ■ | | ■ | ■ | |

### Safety function / Error management

| Functions | Hoisting | Transport | Packaging | Textiles | Wood processing | Process |
|---|---|---|---|---|---|---|
| Safe Torque Off (STO) (see "Safety functions" on page 514) | ■ | ■ | ■ | ■ | ■ | ■ |
| Deferred stop on thermal alarm | ■ | | | | | ■ |
| Alarm management | ■ | ■ | ■ | ■ | ■ | ■ |
| Error management | ■ | ■ | ■ | ■ | ■ | ■ |
| IGBT tests | ■ | ■ | ■ | ■ | ■ | ■ |
| Catch on the fly | | | | ■ | ■ | |
| Motor protection with PTC sensors | ■ | ■ | ■ | ■ | ■ | ■ |
| Managing undervoltages | | | | ■ | ■ | |
| Loss: 4 to 20 mA | ■ | ■ | | ■ | ■ | ■ |
| Uncontrolled output cut (output phase loss) | | ■ | | | | |
| Automatic restart | | ■ | | | | |
| Measurement of motor speed via pulse input. | ■ | ■ | | | | |
| Load variation detection | ■ | | | | | |
| Underload detection | | | | | | ■ |
| Overload detection | | | | | | ■ |

## 5.1.3 Optional graphic display terminal

The graphic display terminal displays more detailed information compared to the integrated operator terminal.




5) Dial:

   **Press (ENT):**
   - To save the current value
   - To launch the selected menu or parameter

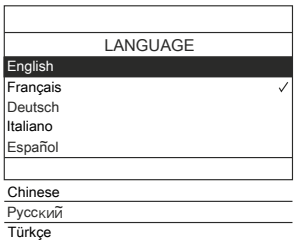
   **Turn +/-:**
   - To increase or reduce a value
   - To go to the next or previous line
   - To increase or reduce the setpoint when control via the terminal is enabled

6) Switching button: To switch the direction of rotation of the motor
7) ESC button: To discard a value, parameter or menu and return to the previous selection

> **Note:**
>
> **If control via the terminal is enabled, buttons 3, 4, 5 and 6 can be used to control the inverter directly.**

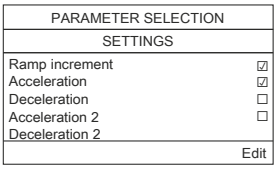
To enable the buttons on the external operator terminal, you first need to set **[Ref.1 channel]** (Fr1) to **[HMI]** (LCC).

Single selection

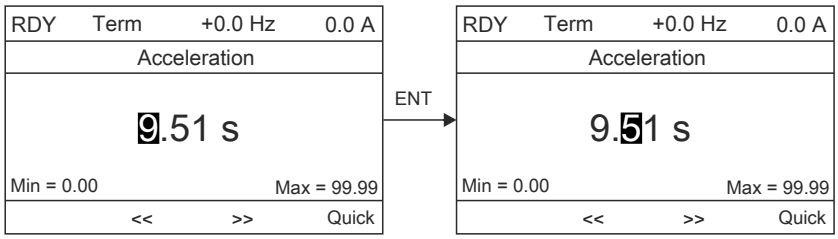



The first time you switch on the graphic display terminal, you need to select the required language.
When only one selection is possible, the selected item is indicated by a ✓ symbol.
Example: Only one language can be selected.

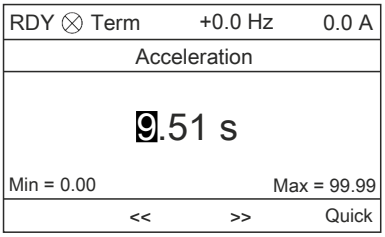
Multiple selection




When multiple selection is possible, the selected items are indicated by a ✓symbol.
Example: To create a **[USER MENU]**, you can select multiple parameters.



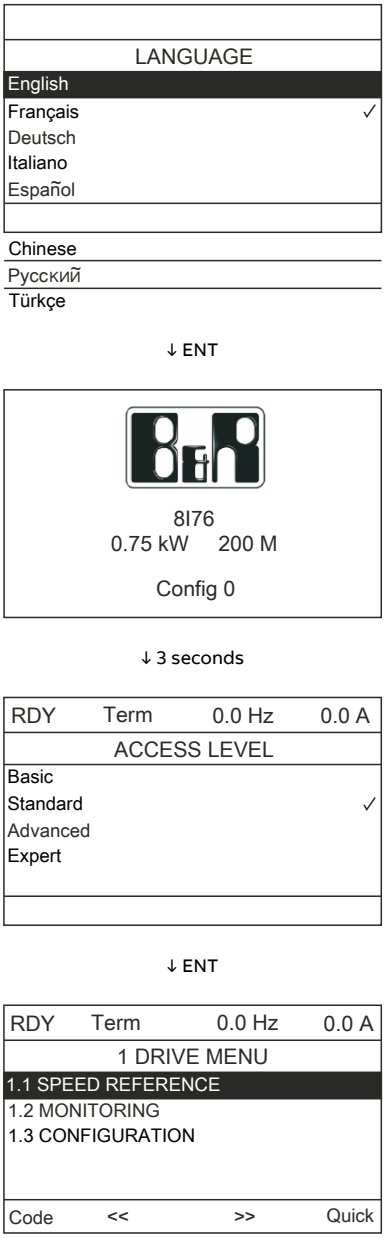

The << and >> arrows (F2 and F3) allow you to select the number that you want to change. To increase or reduce this value, turn the handwheel.




OFF display: In stop mode, a valid function block program is running on the ACOPOSinverter.

ON display: In operating mode, a valid function block program is running on the ACOPOSinverter. It is assumed that the inverter is operating. State and configuration parameters cannot be modified.

The first time you switch on the graphic display terminal, you need to select the required language.

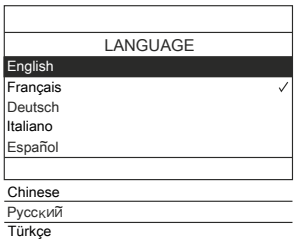



Display after first switching on the graphic display terminal for the first time.
Select the language and press ENT.

The sizing data for the inverter is now displayed.

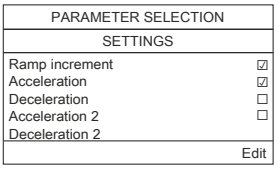
## Example of configuration windows

Single selection



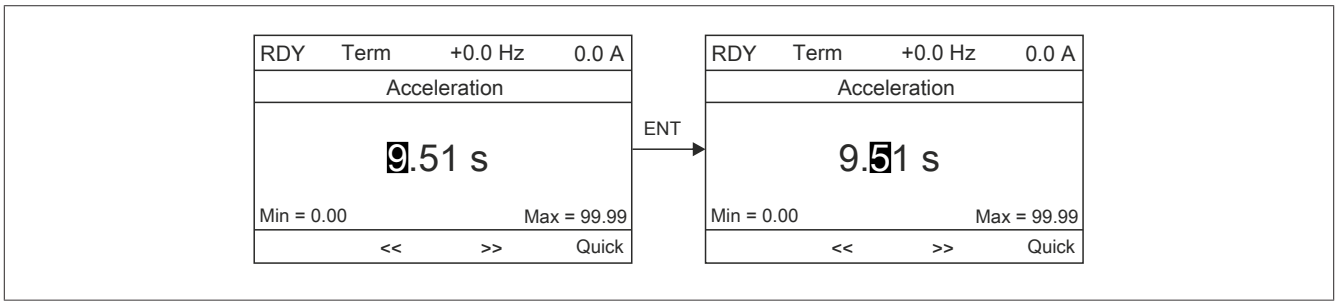

The first time you switch on the graphic display terminal, you need to select the required language.
When only one selection is possible, the selected item is indicated by a ✓ symbol.
Example: Only one language can be selected.

Multiple selection



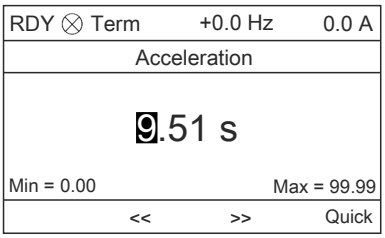

When multiple selection is possible, the selected items are indicated by a ✓symbol.
Example: To create a **[USER MENU]**, you can select multiple parameters.

**Example of a configuration window with one value:**




The << and >> arrows (F2 and F3) allow you to select the number that you want to change. To increase or reduce this value, turn the handwheel.

**Example of how to display a function block state**

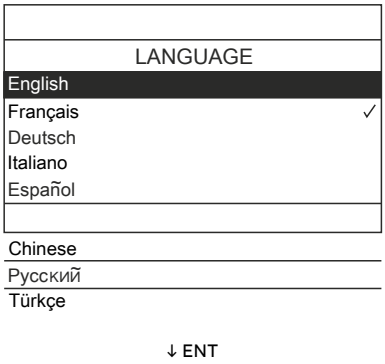



OFF display: In stop mode, a valid function block program is running on the ACOPOSinverter.

ON display: In operating mode, a valid function block program is running on the ACOPOSinverter. It is assumed that the inverter is operating. State and configuration parameters cannot be modified.

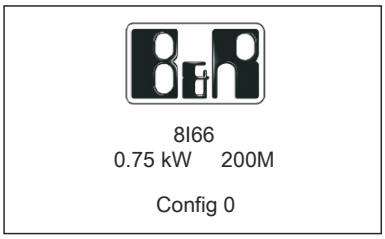
## Switching on the inverter with the graphic display terminal for the first time

The first time you switch on the graphic display terminal, you need to select the required language.



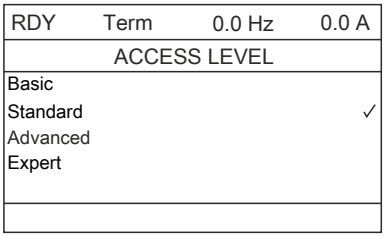

Screen displayed the first time the graphic display terminal is switched on. Select the language and press ENT.

↓ ENT

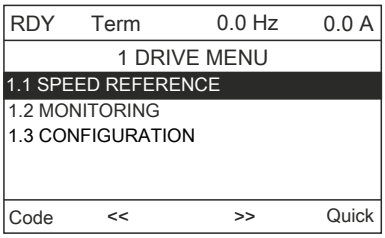



The sizing data for the inverter is now displayed.

↓ 3 seconds

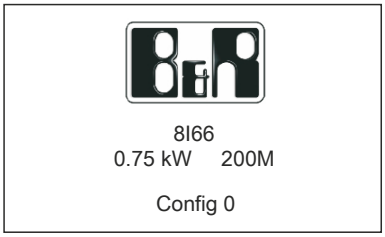



↓ ENT



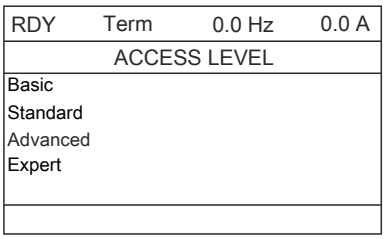
### 5.1.4 Switching on the inverter for the first time

The first time you switch on the inverter with the integrated operator terminal, option **[Standard mot. freq]** (bFr) is called directly from menu (CONF > ALL PARAMETERS > SIM).



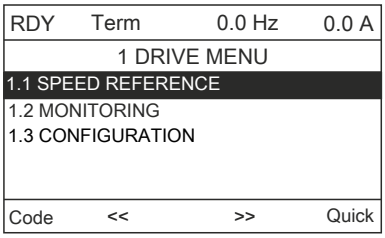

Screen displayed the first time the inverter is switched on.

↓ 3 seconds



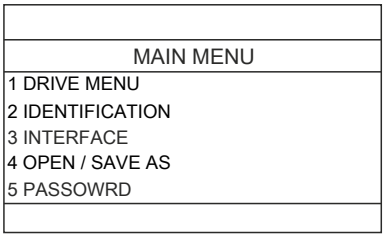

Screen **[ACCESS LEVEL]** is then displayed automatically.

↓ ENT




After three seconds, the screen switches automatically to menu **[1 DRIVE MENU]**. Select the menu and press ENT.

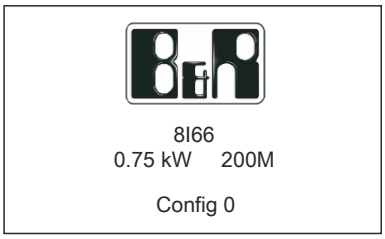
↓ ESC




Press ESC to display the main menu on the graphic display terminal.

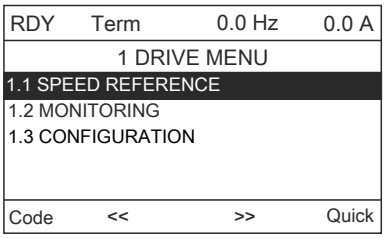
## Subsequent power ups

Each time the inverter is subsequently switched on with the integrated operator terminal, the inverter state menu will be called directly (same list as for **[Drive state]** (HS1)). Example: **[Ready]** (rdY).



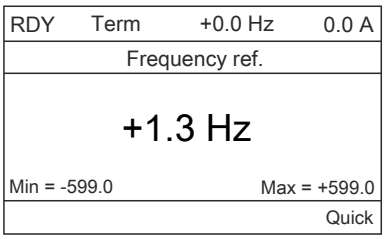

Screen displayed after the inverter is switched on.

↓ 3 seconds




After three seconds, the screen switches automatically to menu **[1 DRIVE MENU]**. Select the menu and press ENT.

↓ 10 seconds

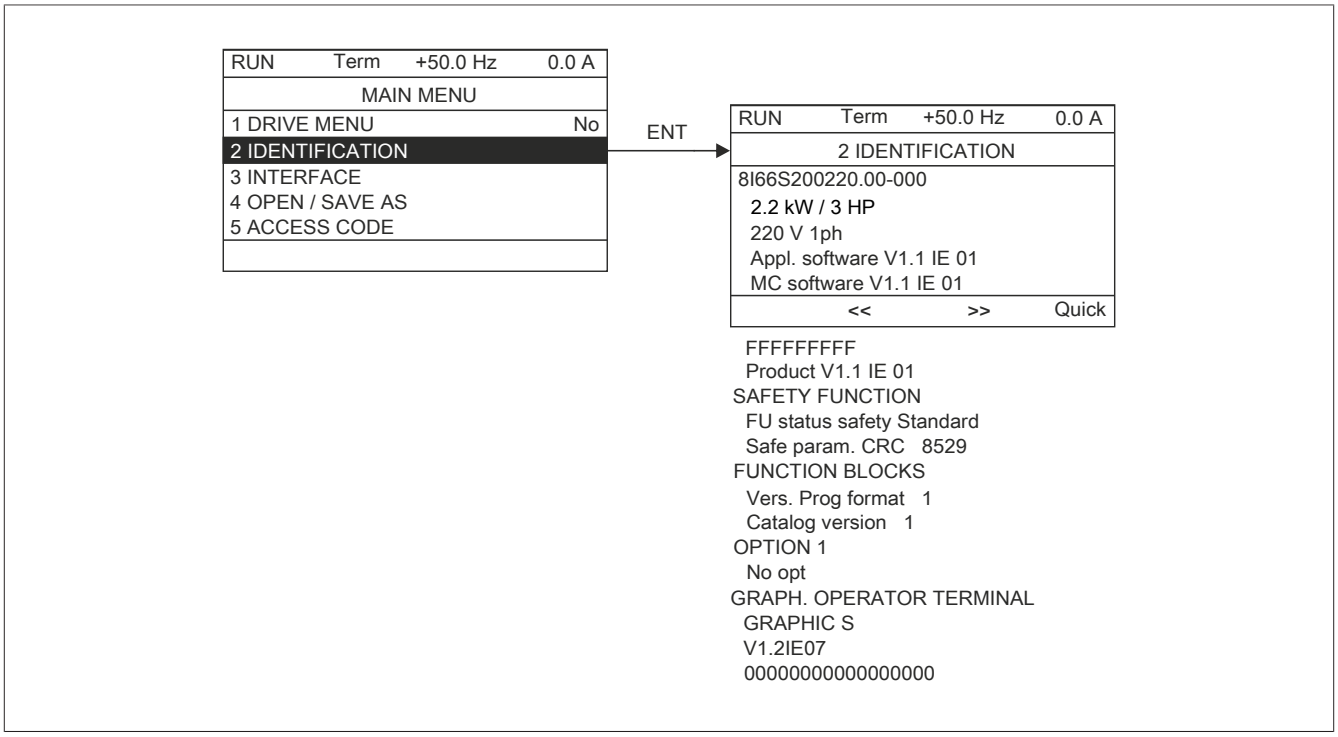



After 10 seconds, the screen automatically changes to the monitoring screen.

### Menu IDENTIFICATION

Menu **[IDENTIFICATION]** (OId-) can only be accessed via the graphic display terminal. This is a read-only menu that cannot be configured. The following information can be displayed:

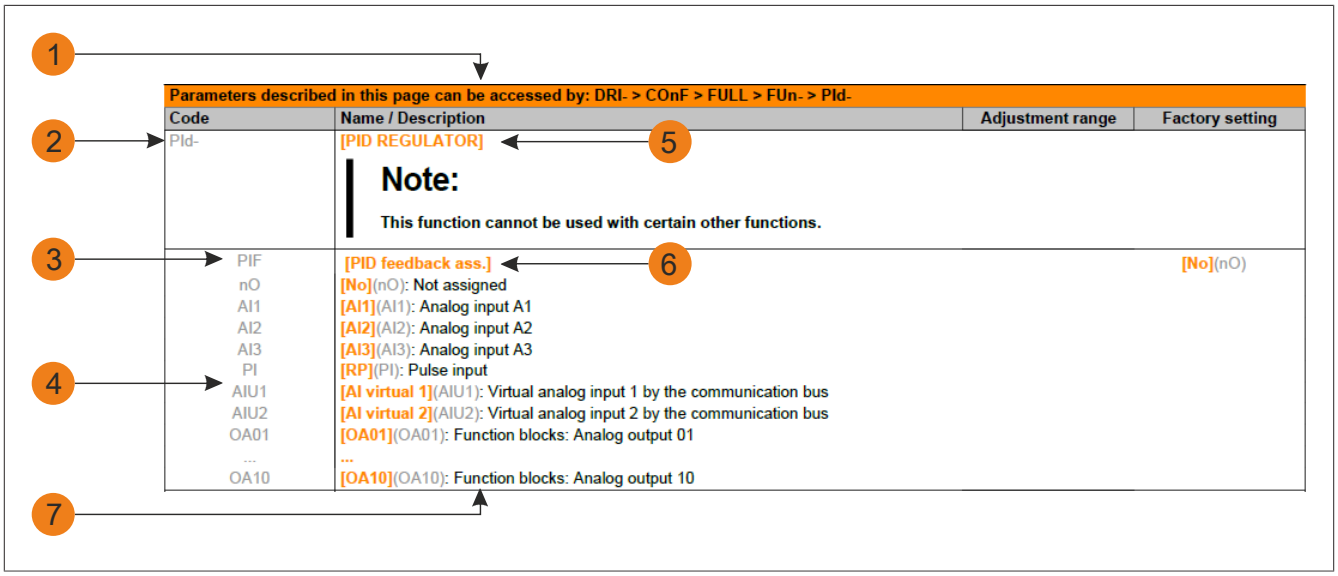
- Setpoint, nominal power and nominal voltage of the inverter
- Inverter software version
- Inverter serial number
- Safety function state and checksum
- Function block program and catalog version
- Option types available, with corresponding software version
- Graphic display terminal type and version



### 5.1.5 Structure of parameter tables

The parameter tables in the descriptions of the various menus are structured as follows:

Example:




1) Access to the parameters described on this page
2) Submenu code in 4-digit 7-segment display format
3) Parameter code in 4-digit 7-segment display format
4) Parameter value in 4-digit 7-segment display format
5) Name of the submenu on the graphic display terminal
6) Name of the parameter on the graphic display terminal
7) Value of the parameter on the graphic display terminal

**Note:**

**Text in square brackets [ ] corresponds to the text shown on the graphic display terminal.**

Sometimes the menu is followed by the note "(continued)". This helps you to determine your position within the tree structure.

Example:

| Parameters described in this page can be accessed by: DRI- > MOn- | |
|---|---|
| Code | Name / Description |
| MOn- | [1.2 MONITORING](continued) |
| CnFS | [Config. active]<br>View of the active configuration. |

In this case, "continued" indicates that submenu [APPLICATION FUNCT.] is located under submenu [PID REGULATOR].

A parameter can also contain pictograms. For each of these pictograms, a legend is provided at the bottom of the table.

Main pictograms:

These parameters only appear if the corresponding function has been selected in another menu. If the parameters can also be accessed and modified from within the configuration menu for the corresponding function, these menus will contain a detailed description of the parameters to make programming easier.

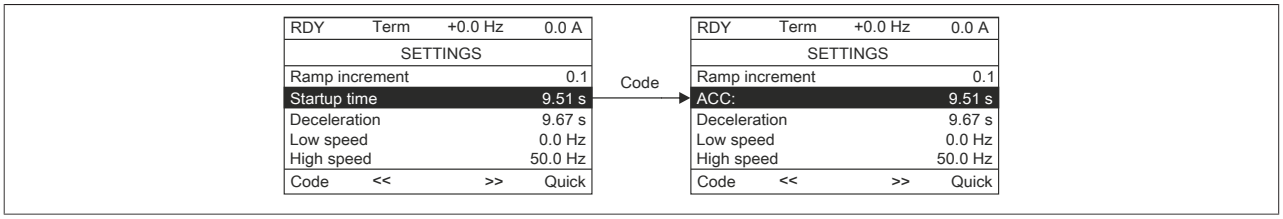
Parameter that can be modified during operation or when stopped.

To modify the assignment of these parameters, press and hold the ENT button for two seconds.

### 5.1.6 Searching for a parameter in this document

It is now easier to search for parameter descriptions:

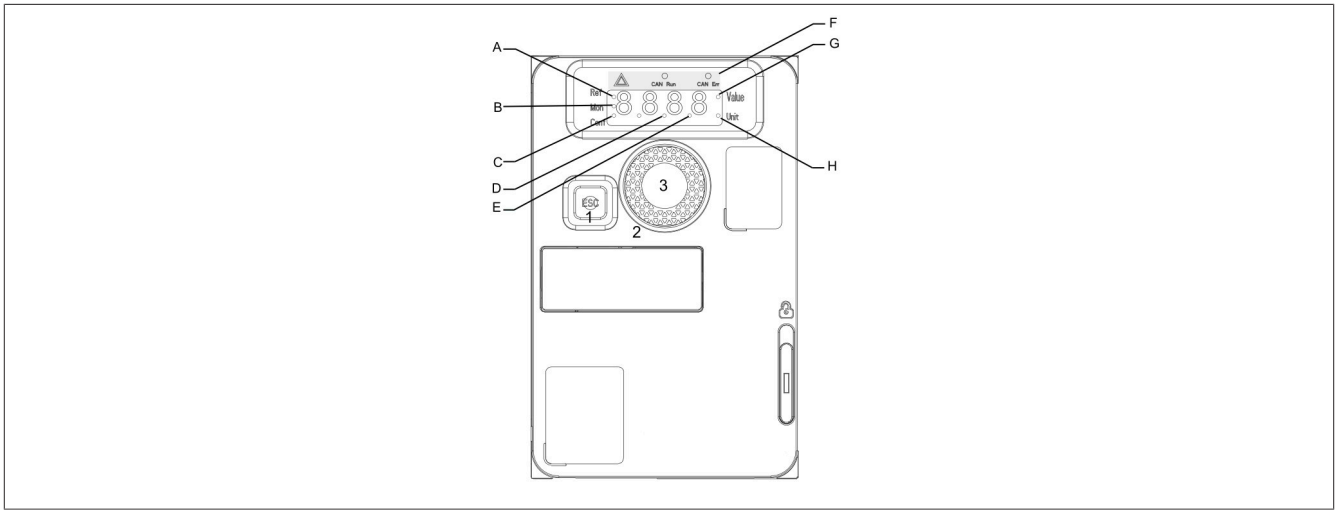
- Using the integrated operator terminal and external operator terminal: Use the parameter code dictionary directly to search the page containing the details for the displayed parameter.
- Using the graphic display terminal: Select the parameters that you want to search for and then press F1: **[Code]**. As long as the key remains pressed, the code of the parameter is displayed in place of the name. Example: ACC




### 5.1.7 Description of the HMI

#### Functions of the display and keys

1) The ESC button is used for navigating the menus (back) and when setting parameters (cancel).
2) The dial is used for navigating the menu (up or down) and for setting parameters (increasing or reducing a value or selecting an element). The dial can be used as virtual logic input 1 for the inverter frequency setpoint.
3) The ENT button (on the dial) is used for navigating the menu (forward) and when setting parameters (cancel).




A) Mode REF selected (rEF-)

B) Mode MON selected(MOn-)

C) Mode CONF selected (COnF)

D) Point where parameter value is displayed (1/100 unit)

E) Point where parameter value is displayed (1/10 unit)

F) The parameter value is currently displayed.

G) The parameter unit is currently displayed.

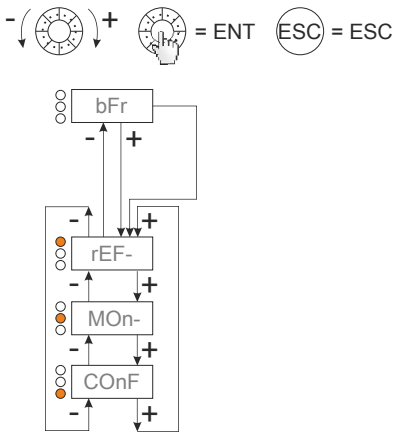
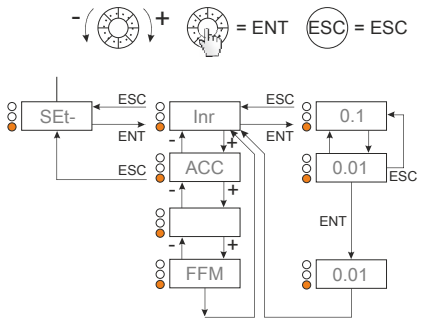
Normal display (no error code and no startup):
Displays the parameter selected from menu **[1.2 MONITORING]** (MOn-) (standard selection: **[Frequency ref.]** (FrH)).

- InIt: Initialization sequence (for external operator terminal only)
- tUN: Self-adjusting
- dCb: DC injection braking
- rdY: Inverter ready for operation

- nSt: Freewheel stop control
- CLI: Current limiting
- FLU: Vector control enabled
- nLP: Controller is switched on but DC bus is not charged.
- CtL: Controlled stop
- Obr: Adjusted deceleration
- SOC: Standby output cut
- USA: Undervoltage alarm
- SS1: Safety function SS1
- SLS: Safety function SLS
- StO: Safety function STO
- SMS: Safety function SMS
- gdL: Safety function GDL
- FSt: Fast stop

An unknown error is indicated by means of a blinking display. If a graphic display terminal is connected, the name of the known error is displayed.

## 5.1.8 Structure of the menus

| Switching on | | Parameter selection |
|---|---|---|
|  | This parameter is only used when the inverter is switched on for the first time.<br>You can modify it subsequently using menu [MOTOR CONTROL] (drC-) for [Standard mot. freq] (bFr).<br>[1.1 SPEED REFERENCE] (rEF-)<br>[1.2 MONITORING] (MOn-)<br>[1.3 CONFIGURATION] (COnF) |  |

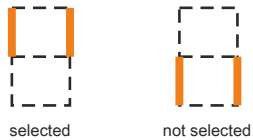
With the 7-segment display format, a dash after a menu and submenu code is used to separate this code from the parameter codes.

Example: Menu [APPLICATION FUNCT.] (FUn-), parameter [Acceleration] (ACC)

### Selection of multiple assignments for one parameter

Example: List of group 1 alarms from menu [INPUTS/ OUTPUTS CFG] (I_O-)

Multiple alarms can be selected. They must be "selected" as shown below. The number on the right indicates the following:




The same principle is used for all multiple selections.

## 5.2 Direct operation

Incorrect settings, invalid data or faulty wiring can cause unexpected movement, trigger signals, damage components and disable monitoring functions.

### Warning!

**UNEXPECTED OPERATION OF THE EQUIPMENT**

- **Do not operate the inverter system using unknown settings or data.**
- **Never change a parameter if you do not know exactly what its function is or what the impact of your change will be.**
- **When commissioning, carefully check all operating states, operating conditions and potential error situations.**
- **Make sure that everyone responsible for testing is within range of an emergency switch-off button.**
- **Test the functions after the product has been replaced or after changes have been made to the settings or data.**
- **Account for the possibility of movement in the wrong direction or motor vibration.**
- **Do not operate the system until you have verified that there is no one in the operating area and that it is free from obstacles.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

If a power stage is unintentionally disabled, as a result of a power outage, error or functional failure, for example, the motor will no longer operate in a controlled way.

### Note:

**MOVEMENTS WITHOUT BRAKING EFFECT**

**It should be ensured that movements without braking effect do not cause injury or damage to the device.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

## 5.2.1 Reference mode (rEF)

### 5.2.1.1 Introduction

Reference mode is used for monitoring and if the setpoint channel corresponds to analog input 1 ([Ref.1 channel] (Fr1) set to [AI virtual 1] (AIU1)); it is also used for setting the actual value by modifying the voltage value at the analog input.

If the local controller is enabled ([Ref.1 channel] (Fr1) set to **[HMI]** (LCC)), the handwheel or the up/down navigation buttons on the external operator terminal function as a potentiometer that can be used to increase or reduce the setpoint within the tolerances specified by other parameters ([Low speed] (LSP) or [High speed] (HSP)).

Do not use the ENT button to confirm a setpoint change.

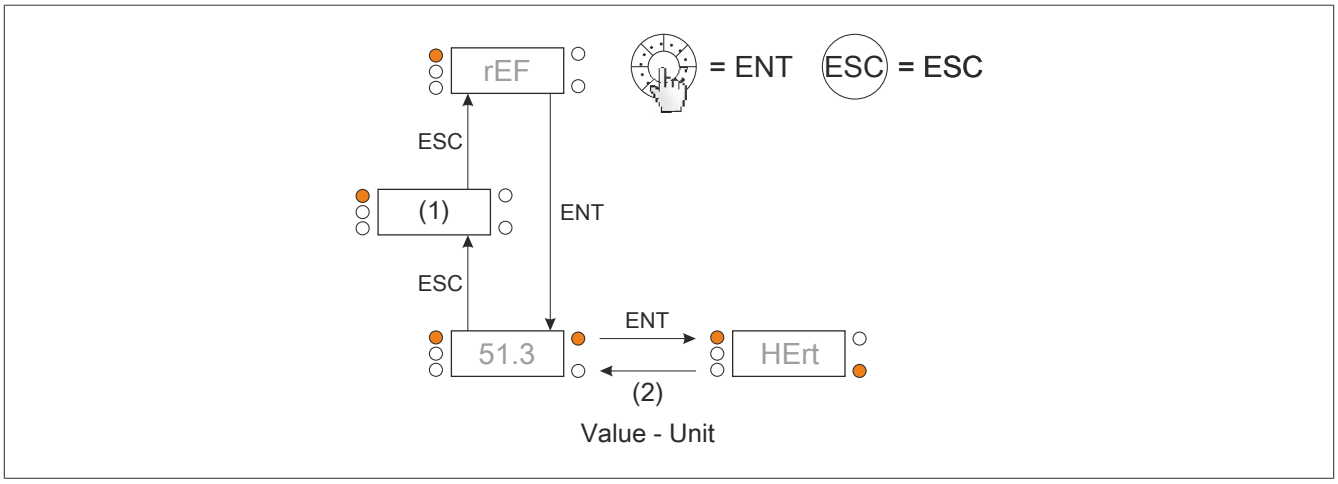
### 5.2.1.2 Tree structure

(1) Dependent on the actual setpoint channel.

Possible values: (AIU1) (LFr) (MFr) (rPI) (FrH) (rPC)

(2) 2 s or ESC

The parameter value shown on the diagram and the displayed parameter unit serve as examples here.



### 5.2.1.3 Menu

| The parameters described on this page can be accessed by: DRI- > rEF- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| rEF- | **[1.1 SPEED REFERENCE]**<br>The parameters displayed will vary according to the specific inverter settings. | | |
| AIV1<br>★<br>↻<br>(1) | **[Image input AIV1]**<br>Value of the first virtual analog input.<br>This parameter allows the frequency setpoint to be changed using the integrated handwheel. | 0 to 100%<br>from HSP-LSP | 0% |
| LFr<br>★<br>↻<br>(1) | **[HMI Frequency ref.]**<br>HMI frequency setpoint (signed value).<br>This parameter allows the frequency setpoint to be changed using the external HMI. | -599 to 599 Hz | 0 Hz |
| MFr<br>★<br>↻ | **[Multiplying coeff.]**<br>Multiplication of the frequency variables.<br>Access to this coefficient is possible if **[Multiplier ref. -]** (MA2,MA3) has been assigned to the graphic display terminal. | 0 to 100% | 100% |
| rPI<br>★<br>↻<br>(1) | **[Internal PID ref.]**<br>PID: Internal setpoint PI.<br>This parameter allows the internal PID setpoint to be changed using the integrated handwheel.<br>The internal PID setpoint is visible if **[PID feedback]**(PIF) is not set to **[No]**(nO). | 0 to 32767 | 150 |
| FrH<br>★ | **[Frequency ref.]**<br>Frequency setpoint before ramp (signed value).<br>The actual frequency setpoint applied to the motor, regardless of the selected setpoint channel. This parameter is read-only.<br>The frequency setpoint is visible if the command channel is not set to HMI or Virtual AI. | -599 to 599 Hz | - |
| rPC<br>★ | **[PID speed ref.]**<br>PID: Setpoint<br>The PID setpoint is visible if **[PID feedback]**(PIF) is not set to **[No]**(nO). | 0 to 65535 | - |

(1) It is not necessary to press the ENT button to confirm the modified setpoint.

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

↻ Parameter that can be modified during operation or when stopped.

## 5.2.2 Monitoring mode (MOn)

### 5.2.2.1 Introduction

The parameters can be accessed when the inverter is either running or stopped.

Some functions have a large number of parameters. To make programming easier, and to avoid having to scroll through countless parameters, these functions have been structured into submenus. Like menus, submenus are indicated by the inclusion of a hyphen after the code.

When the inverter is running, the value of one of the monitoring parameters is displayed. By default, the displayed value corresponds to the input frequency setpoint (parameter **[Frequency ref.]** (FrH)).

Once the value of the monitoring parameter to be changed is displayed, you can display the units by pressing the handwheel again, or you can confirm and save the new monitoring parameter value by pressing and holding the handwheel (ENT button) for 2 seconds. From now on, this parameter value will be displayed during operation (even after the inverter has been switched off).

If you do not confirm the new value by pressing and holding the ENT button again, the previous parameter value will be displayed when the inverter is switched back on again.

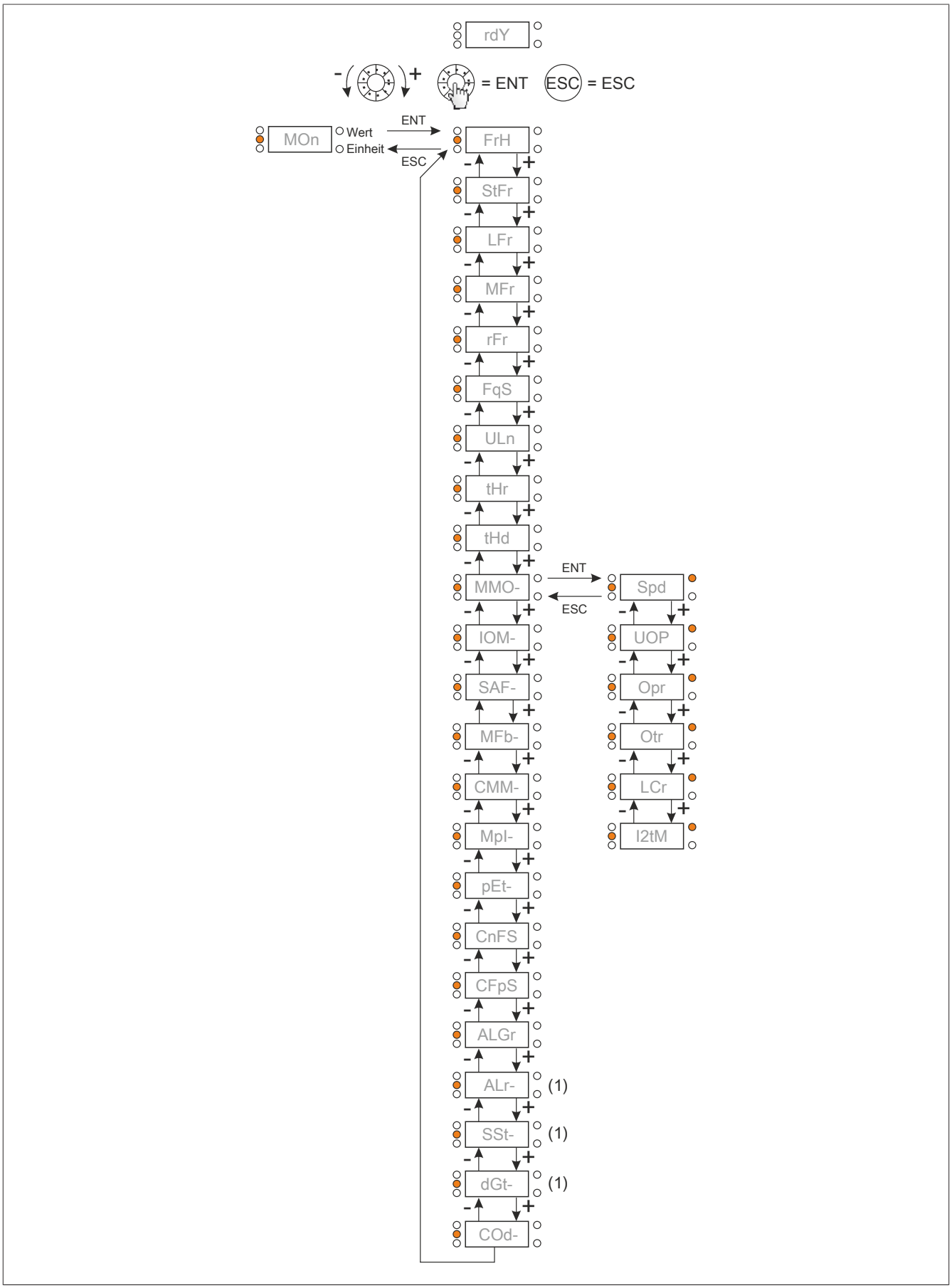
**Note:**

**After the inverter has been switched off, or after a mains supply failure, the parameters for the inverter state are displayed (Example: [Ready] (rdY)). The selected parameter will then be displayed when a move command is issued.**

### 5.2.2.2 Tree structure

The parameters shown on the diagram are provided as examples.

(1) Only displayed when the graphic display terminal is used



### 5.2.2.3 Menu

| The parameters described on this page can be accessed by: DRI- > MOn- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| MOn- | **[1.2 MONITORING]** | |
| AIV1 | **[Image input AIV1]**<br>First virtual AI value.<br>This parameter is read-only. It is used to display the frequency setpoint for the motor. | % |
| FrH | **[Frequency ref.]**<br>Frequency setpoint before ramp (signed value).<br>This parameter is read-only. It is used to display the frequency setpoint for the motor, regardless of the selected setpoint channel. | Hz |
| StFr | **[Stator Frequency]**<br>Displays the estimated stator frequency in Hz (signed value). | Hz |
| LFr | **[HMI Frequency ref.]**<br>HMI frequency setpoint (signed value).<br>This parameter is only displayed if the function has been enabled. It allows the frequency setpoint to be changed using the decentralized controller. It is not necessary to press the ENT button to change the setpoint. | Hz |
| MFr | **[Multiplying coeff.]**<br>Multiplication factor.<br>Multiplication coefficient, can be called if **[Multiplier ref. -]** (MA2,MA3) has been assigned. | % |
| MMF | **[Measured output fr.]**<br>Measured motor frequency (signed value).<br>The measured motor speed is displayed if a speed monitoring card is used. | Hz |
| rFr | **[Output frequency]**<br>Calculated motor frequency (signed value).<br>The value for rFr [0.1 Hz] and the corresponding value rFrD [rpm] are based on a direct measurement. A filter with a filter time of 100 ms is used to smooth the unfiltered raw value. The unfiltered raw value can be retrieved via parameter SrFr [0.1 Hz]. | Hz |
| FqS | **[Pulse in. work. freq.]**<br>Measured frequency of the pulse input. | Hz |
| ULn | **[Mains voltage]**<br>Mains voltage (from DC bus).<br>Mains voltage based on the DC bus measurements, with the motor running or stopped.<br>The value for ULn [0.1 V] is based on a direct measurement. A filter with a filter time of 500 ms is used to smooth the unfiltered raw value. The unfiltered raw value can be retrieved via parameter SULn [0.1 V]. | V |
| tHr | **[Motor thermal state]**<br>Thermal state of the motor.<br>100% = Rated thermal state, 118% = "OLF threshold value" (motor overload) | % |
| tHd | **[Drv.thermal state]**<br>Thermal state of the inverter.<br>100% = Nominal thermal state, 118% = "Threshold value OLF" (inverter overtemperature). | % |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

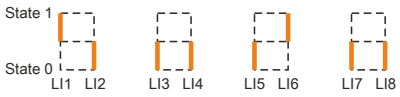
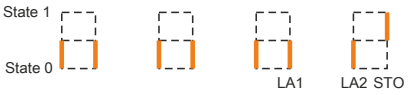
Parameter that can be modified during operation or when stopped.

#### 5.2.2.3.1 [MONIT. MOTOR] (MMO-)

| The parameters described on this page can be accessed by: DRI- > MOn- > MMO- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| MMO- | **[MOTOR MONITORING]** | |
| Spd | **[Motor speed]**<br>Motor speed in rpm (estimated value). | rpm |
| UOP | **[Motor voltage]**<br>Motor voltage (Estimated value). | V |

| The parameters described on this page can be accessed by: DRI- > MOn- > MMO- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| Opr | **[Motor power]**<br>Monitoring of output power (100% = Rated motor power, estimated value based on current measurement).<br>The value for Opr [%] is based on a direct measurement. A filter with a filter time of 1000 ms is used to smooth the unfiltered raw value. The unfiltered raw value can be retrieved via parameter SOpr [%]. | % |
| Otr | **[Motor torque]**<br>Output torque (100% = Nominal motor torque, estimated value based on current measurement).<br>The value for Otr [0.1%] is based on a direct measurement. A filter with a filter time of 1000 ms is used to smooth the unfiltered raw value. The unfiltered raw value can be retrieved via parameter 12-bit value SOtr, i.e. SOtr = 4096 corresponds to OTR = 1000 = 100%. | % |
| LCr | **[I motor]**<br>Calculated motor current (Measured value).<br>The value for LCr [0.1 A] is based on a direct measurement. A filter with a filter time of 300 ms is used to smooth the unfiltered raw value. The unfiltered raw value can be retrieved via parameter SLCr [0.1 A]. | A |
| I2tM | **[I²t overload level]**<br>Monitoring of the I²t overload level.<br>This parameter can be accessed if **[I²t model activation]** (I2tA) = **[YES]** (YES). | |

## 5.2.2.3.2 [I/O MAP] (IOM-)

| The parameters described on this page can be accessed by: DRI- > MOn- > IOM- | |
|---|---|
| **Code** | **Name/Description** |
| IOM- | **[I/O MAP]** |
| LIA- | **[LOGIC INPUT CONF.]**<br>Logic input functions. |
| LIA | **[Logic input 1 assignment]**<br>Read-only parameter, not configurable.<br>All of the functions assigned to the logic input are displayed so you can check for multiple assignments. If no functions have been assigned, **[No]** (nO) is displayed. Use the handwheel to scroll through the functions.<br>The time delay is shown on the graphic display terminal: **[LI1 On Delay]** (L1d). Possible values are the same as those shown for the configuration page. |
| L2A<br>to<br>L6A<br>LA1A<br>LA2A | **[Logic input -- assignment]**<br>All of the logic inputs available on the inverter are processed as shown in the LI1 example above. |
| LIS1 | **[State of logic inputs LI1 to LI6]**<br>Can be used to display the state of logic inputs LI1 to LI6 (segment display: High = 1, low = 0).<br>  <br>Above example: LI1 and LI6 are set to 1; LI2 and LI5 are set to 0. |
| LIS2 | **[LA1, LA2 and STO state]**<br>Can be used to display the state of LA1, LA2 and STO (Safe Torque Off) (segment display: High = 1, low = 0).<br>  <br>Above example: LA1 and LA2 are set to 0; STO (Safe Torque Off) is set to 1. |

| The parameters described on this page can be accessed by: DRI- > MOn- > IOM- > AIA- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| AIA- | **[ANALOG INPUTS IMAGE]**<br>Analog input functions. | |
| AI1C | **[AI1]**<br>Customized AI1 map: Value of analog input 1. | V |
| AI1A | **[AI1 assignment]**<br>AI1 function assignment. If no functions have been assigned, **[No]**(nO) is displayed.<br>The following parameters are displayed on the graphic display terminal when you press the ENT button for the parameter. | |
| nO | **[No]**(nO): Not assigned | |
| Fr1 | **[Ref.1 channel]**(Fr1): Setpoint source 1 | |
| Fr2 | **[Ref.2 channel]**(Fr2): Setpoint source 2 | |
| SA2 | **[Summing ref. 2]**(SA2): Setpoint total 2 | |
| PIF | **[PID feedback]**(PIF): Actual PI value (PI controller) | |
| tAA | **[Torque limitation]**(tAA): Torque limiting: Enabled via analog value | |
| dA2 | **[Subtract. ref. 2]**(dA2): Subtraction of setpoint 2 | |
| PIM | **[Manual PID ref.]**(PIM): Manually set frequency setpoint for the PI(D) controller (automatic/manual mode) | |
| FPI | **[PID speed ref.]**(FPI): Speed setpoint for the PI(D) controller (preset setpoint) | |
| SA3 | **[Summing ref. 3]**(SA3): Setpoint total 3 | |
| Fr1b | **[ch1B active]**(Fr1b): Setpoint source 1B | |
| dA3 | **[SubParam3]**(dA3): Subtraction of setpoint 3 | |

| The parameters described on this page can be accessed by: DRI- > MOn- > IOM- > AIA- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| FLOC<br>MA2<br>MA3<br>PES | [Forced local](FLOC): Setpoint source "Forced local"<br>[Multiplier ref. 2](MA2): Multiplication factor for setpoint 2<br>[Ref. 3 multiplier](MA3): Multiplication factor for setpoint 3<br>[Weight input](PES): External function for measuring weight | |
| UIL1 | [AI1 min value]<br>Minimum voltage value (0%). | V |
| UIH1 | [AI1 max value]<br>Maximum voltage value (100%). | V |
| AI1F | [AI1 filter]<br>Filter time of the low-pass filter for filtering interference. | s |
| AI2C | [AI2]<br>Customized AI2 map: Value of analog input 2. | V |
| AI2A | [AI2 assignment]<br>AI2 function assignment. If no functions have been assigned, [No](nO) is displayed.<br>The following parameters are displayed on the graphic display terminal when you press the ENT button for the parameter.<br>Identical to [AI1 assignment](AI1A). | |
| UIL2 | [AI2 min value]<br>Minimum voltage value (0%). | V |
| UIH2 | [AI2 max value]<br>Maximum voltage value (100%). | V |
| AI2F | [AI2 filter]<br>Filter time of the low-pass filter for filtering interference. | s |
| AI3C | [AI3]<br>Customized AI3 map: Value of analog input 3. | V |
| AI3A | [AI3 assignment]<br>AI3 function assignment. If no functions have been assigned, [No](nO) is displayed.<br>The following parameters are displayed on the graphic display terminal when you press the ENT button for the parameter.<br>Identical to [AI1 assignment](AI1A). | |
| CrL3 | [Min value]<br>Minimum current value (0%). | mA |
| CrH3 | [AI3 max value]<br>Maximum current value (100%). | mA |
| AI3F | [AI3 filter]<br>Filter time of the low-pass filter for filtering interference. | s |

| The parameters described on this page can be accessed by: DRI- > MOn- > IOM- > AOA- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| AOA- | [STAT ANALOG OUTPUT.]<br>Analog output functions.<br>The following parameters are displayed on the graphic display terminal when you press the ENT button for the parameter. | |
| AO1C | [AO1C]<br>Customized AO1 map: Value of analog output 1. | |
| AO1 | [AO1 assignment]<br>AO1 function assignment. If no functions have been assigned, [No](nO) is displayed.<br>Identical to [AO1 assignment](AOI). | |
| UOL1 | [AO1 min Output]<br>Minimum voltage value (0%). Can be accessed if [Type AO1](AO1t) is set to [Voltage](10U). | V |
| UOH1 | [AO1 max Output]<br>Maximum voltage value (100%). Can be accessed if [Type AO1](AO1t) is set to [Voltage](10U). | V |
| AOL1 | [AO1 min Output]<br>Minimum current value (0%). Can be accessed if [Type AO1](AO1t) is set to [0-20mA](0A). | mA |
| AOH1 | [AO1 max Output]<br>Maximum current value (100%). Can be accessed if [Type AO1](AO1t) is set to [0-20mA](0A). | mA |
| ASL1 | [AO1 min scal]<br>Minimum scaling value for AO1. | % |
| ASH1 | [AO1 max scal]<br>Maximum scaling value for AO1. | % |
| AO1F | [AO1 Filter]<br>Filter time of low-pass filter. | s |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

| The parameters described on this page can be accessed by: DRI- > MOn- > IOM- > FSI- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| FSI- | **[STATUS FREQ SIGNAL]**<br>Frequency signal state.<br>This menu is only shown on the graphic display terminal. | |
| PFrC | **[RP input]**<br>Filtered, customized pulse input frequency setpoint.<br>The following parameters are displayed on the graphic display terminal when you press the ENT button for the parameter. | Hz |
| PIA | **[RP assignment]**<br>Pulse input assignment. If no functions have been assigned, **[No]**(nO) is displayed.<br>Identical to **[AI1 assignment]**(AI1A). | |
| PIL | **[RP min value]**<br>Minimum RP value. Minimum pulse input (0%). | kHz |
| PFr | **[RP max value]**<br>Maximum pulse input value on maximum speed (100%). | kHz |
| PFI | **[RP filter]**<br>Filter time of the low-pass filter for filtering interference (pulse input). | ms |

## 5.2.2.3.3 [MONIT. SAFETY] (SAF-)

| The parameters described on this page can be accessed by: DRI- > MOn- > SAF- | |
|---|---|
| **Code** | **Name/Description** |
| SAF- | **[MONIT. SAFETY]**<br>For more information about the integrated safety functions, refer to the dedicated safety manual. |
| StOS | **[STO status]**<br>State of safety function STO (Safe Torque Off).<br><br>IdLE **[Idle]**(IdLE): STO has not been executed<br>StO **[Safe stop]**(StO): STO has been executed<br>FLt **[Fault]**(FLt): STO error detected |
| SLSS | **[SLS status]**<br>SLS (Safe Limit Speed) safety function states.<br><br>nO **[Not configured]**(nO): SLS not configured<br>IdLE **[Idle]**(IdLE): SLS has not been executed<br>WAIt **[TBD]**(WAIt): SLS waiting to be enabled<br>Strt **[TBD start]**(Strt): SLS in temporary state<br>SS1 **[Safe ramp]**(SS1): SLS ramp has been executed<br>SLS **[Spd limited]**(SLS): SLS torque limiting has been executed.<br>StO **[Safe stop]**(StO): SLS "Safe Torque Off" request has been executed<br>FLt **[Fault]**(FLt): SLS error detected |
| SS1S | **[SS1 Status]**<br>State of safety function "Safe stop 1"<br><br>nO **[Not configured]**(nO): SS1 not configured<br>IdLE **[Idle]**(IdLE): SS1 has not been executed<br>SS1 **[Safe ramp]**(SS1): SS1 ramp has been executed<br>StO **[Safe stop]**(StO): SS1 "Safe Torque Off" request has been executed<br>FLt **[Fault]**(FLt): SS1 error detected |
| SMSS | **[SMS status]**<br>State of safety function SMS (Safe Maximum Speed).<br><br>nO **[Not configured]**(nO): SMS not configured<br>SMS **[Active]**(SMS): SMS active<br>FtI **[Internal Err.]**(FtI): Internal SMS error<br>Fto **[Max Speed]**(Fto): Maximum speed reached |
| GdLS | **[GDL status]**<br>State of safety function Safety door locking (GDL)<br><br>nO **[Not configured]**(nO): GDL not set<br>oFF **[Inactive]**(oFF): GDL not active<br>Std **[Short Delay]**(Std): Short delay executed<br>LGd **[Long del.]**(LGd): Long delay executed<br>on **[Active]**(on): GDL active<br>LFt **[Internal Err.]**(LFt): Internal GDL error |
| SFFE | **[Safety fault reg.]**<br>Safety function error register.<br><br>Bit 0 = 1: Logic input debounce timeout<br>Bit 1: Reserved<br>Bit 2 = 1: Motor speed character changed during SS1 stop<br>Bit 3 = 1: Speed has reached SS1 trigger range<br>Bit 4: Reserved<br>Bit 5: Reserved<br>Bit 6 = 1: Motor speed character changed during SLS limitation<br>Bit 7 = 1: Speed has reached SLS trigger range<br>Bit 8: Reserved<br>Bit 9: Reserved<br>Bit 10: Reserved<br>Bit 11: Reserved<br>Bit 12: Reserved<br>Bit 13 = 1: Motor speed cannot be measured<br>Bit 14 = 1: Motor ground short circuit detected<br>Bit 15 = 1: Motor short circuit detected |

## 5.2.2.3.4 [COMMUNICATION MAP] (CMM-)

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| CMM- | **[COMMUNICATION MAP]**<br>This menu is displayed on the graphic display terminal only; with the exception of menus **[COM. SCANNER INPUT]**(ISA-) and **[COM SCAN OUTPUT MAP]**(OSA-). | |
| CMdC | **[Command channel]**<br>Active command channel. | |
| tErM | **[Terminals]** (tErM): Terminals | |
| HMI | **[HMI]**(HMI): Graphic display terminal or external operator terminal | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| tUd | **[+/- speed]**(tUd): +/- speed | |
| nEt | **[Com. card]**(nEt): Communication card (if used) | |
| P S | **[PC Tool]**(P S): PC software | |
| CMd | **[CMD value]**<br>Command register.<br>**[Profile]**(CHCF) is not set to **[I/O profile]**(IO).<br><br>Possible values with Profile DS402, separate or combined mode<br>Bit 0: Command "Switch on" / protection command<br>Bit 1: "Disable voltage"/ mains voltage supply permission<br>Bit 2: "Quick stop" / emergency switch-off<br>Bit 3: "Enable operation" / move command<br>Bit 4 to bit 6: Reserved (set to 0)<br>Bit 7: "Fault reset" / error acknowledgment active for 0 to 1 rising edges<br>Bit 8: Stop as per parameter **[Type of stop]**(Stt) without exiting "operating" state.<br>Bit 9: Reserved (set to 0)<br>Bit 10: Reserved (set to 0)<br>Bits 11 to 15: Can be assigned to a command<br><br>Possible values in I/O profile<br>Command **[2 wire]**(2C) as controlled by state.<br>Bit 0: Command "Forward" (switch on)<br>• 0: Command "Reverse"<br>• 1: Command "Forward"<br>The assignment of Bit 0 cannot be modified. It corresponds to the terminal block assignment. It is possible for it to be switched. Bit 0 (Cd00) is only active if the channel for this control word is active.<br>Bits 1 to 15: Can be assigned to commands<br><br>Edge-controlled command **[3 wire]**(3C).<br>Bit 0: Stop (Start permission).<br>• 0: Stop<br>• 1: Run mode only authorized for commands "Forward" and "Reverse"<br>Bit 1: Command "Forward" (if 0 to 1 rising edges)<br>The assignment of Bit 0 and Bit 1 cannot be modified. It corresponds to the terminal block assignment. It is possible for it to be switched. Bit 0 (Cd00) and Bit 1 (Cd01) are only active if the channel for this control word is active.<br>Bits 2 to 15: Can be assigned to commands | |
| rFCC | **[Channel ref. active]**<br>HMI setpoint channel. | |
| tErM | **[Terminals]** (tErM): Terminals | |
| LOC | **[Local]**(LOC): Handwheel | |
| HMI | **[HMI]**(HMI): Graphic display terminal or operator terminal | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| tUd | **[+/- Speed]**(tUd): +/- speed | |
| nEt | **[Com. card]**(nEt): Communication card (if used) | |
| P S | **[PC Tool]**(P S): PC software | |
| FrH | **[Frequency ref.]**<br>Frequency setpoint before ramp | Hz |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| EtA | **[ETA state word]**<br>State word<br><br>Possible values with profile DS402, separate or combined mode<br>Bit 0: "Ready to be switched on", waiting for mains voltage to be switched on<br>Bit 1: "Switched on", ready<br>Bit 2: "Operation enabled", currently operating<br>Bit 3: "Error"<br>• 0: No error<br>• 1: Error<br>Bit 4: "Voltage enabled", mains voltage present in the power unit<br>• 0: No mains voltage present in the power unit<br>• 1: Mains voltage present in the power unit<br>If the unit is supplied with current through the power unit only, this bit is always preset to 1.<br>Bit 5: Quick stop / emergency switch-off<br>Bit 6: "Switch-on locked", power unit mains voltage is disabled<br>Bit 7: Alarm<br>• 0: No alarm<br>• 1: Alarm<br>Bit 8: Reserved (=0)<br>Bit 9: Remote: Command or setpoint via network<br>• 0: Command or setpoint via the graphic display terminal or external operator terminal<br>• 1: Command or setpoint via the network<br>Bit 10: Target setpoint reached<br>• 0: The setpoint was not reached.<br>• 1: The setpoint was reached.<br>If the inverter is in speed mode, this corresponds to the speed setpoint.<br>Bit 11: "Internal limit active", setpoint outside limits<br>• 0: The setpoint is within the limits.<br>• 1: The setpoint is not within the limits.<br>If the inverter is in speed mode, the limits are defined using parameter **[Low speed]**(LSP) and **[High speed]** (HSP).<br>Bit 12 and Bit 13: Reserved (= 0)<br>Bit 14: "Stop key", STOPP via STOP key<br>• 0: STOP button not pressed<br>• 1: Stop triggered by pressing the STOP button on the graphic display terminal or external operator terminal<br>Bit 15: "Direction", direction of rotation<br>• 0: Forward on output<br>• 1: Reverse on output<br><br>The bit combination 0, 1, 2, 4, 5 and 6 defines the state as per the overview of states in the DSP 402 standard. | |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| | Possible values in I/O profile<br><br>**Note:**<br>**The value is identical in both the DS402 and I/O profiles. In the I/O profile, the description of the values is simplified and does not correspond to the DS402 overview of states.**<br><br>Bit 0: Reserved (=0 or 1)<br>Bit 1: Ready<br>• 0: Not ready<br>• 1: Ready<br>Bit 2: Operational<br>• 0: The inverter will not start if the setpoint is set to zero.<br>• 1: Operational. If a setpoint is equal to a value other than zero, the inverter can start.<br>Bit 3: Error<br>• 0: No error<br>• 1: Error<br>Bit 4: Mains voltage present in power unit<br>• 0: No mains voltage present in power unit<br>• 1: Mains voltage present in power unit<br>Bit 5: Reserved (=1)<br>Bit 6: Reserved (=0 or 1)<br>Bit 7: Alarm<br>• 0: No alarm<br>• 1: Alarm<br>Bit 8: Reserved (=0)<br>Bit 9: Command via a network<br>• 0: Command via terminal blocks or graphic display terminal<br>• 1: Command via network<br>Bit 10: Setpoint reached<br>• 0: The setpoint was not reached.<br>• 1: The setpoint was reached.<br>Bit 11: Setpoint outside limits<br>• 0: The setpoint is within the limits.<br>• 1: The setpoint is not within the limits.<br>If the inverter is in speed mode, the limits are defined using parameters LSP and HSP.<br>Bit 12 and Bit 13: Reserved (= 0)<br>Bit 14: Stop via STOP button<br>• 0: STOP button not pressed<br>• 1: Stop triggered by pressing the STOP button on the graphic display terminal or external operator terminal<br>Bit 15: Direction of rotation<br>• 0: Forward on output<br>• 1: Reverse on output | |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > Mnd- | |
|---|---|
| **Code** | **Name/Description** |
| Mnd- | **[MODBUS NETWORK DIAG]**<br>Modbus network diagnostics. |
| Mdb1 | **[COM LED]**<br>Displays the Modbus communication data. |
| M1Ct | **[Mb NET frames nb.]**<br>Modbus network frame counter: Number of frames processed. |
| M1EC | **[Mb NET CRC errors]**<br>Modbus network CRC error counter: Number of CRC errors. |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > ISA- | |
|---|---|
| **Code** | **Name/Description** |
| ISA- | **[COM. SCANNER INPUT]**<br>Used for CANopen® and Modbus network. |
| nM1 | **[Com Scan In1 val.]**<br>Value of the 1st input word |
| nM2 | **[Com Scan In2 val.]**<br>Value of the input word 2 |
| nM3 | **[Com Scan In3 val.]**<br>Value of the input word 3 |
| nM4 | **[Com Scan In4 val.]**<br>Value of the input word 4 |
| nM5 | **[Com Scan In5 val.]**<br>Value of the input word 5 |
| nM6 | **[Com Scan In6 val.]**<br>Value of the input word 6 |
| nM7 | **[Com Scan In7 val.]**<br>Value of the input word 7 |
| nM8 | **[Com Scan In8 val.]**<br>Value of the input word 8 |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > OSA- | |
|---|---|
| **Code** | **Name/Description** |
| OSA- | **[COM. SCAN OUTPUT MAP]** |
| nC1 | **[Com Scan Out1 val.]**<br>Value of the 1st output word |
| nC2 | **[Com Scan Out2 val.]**<br>Value of the output word 2 |
| nC3 | **[Com Scan Out3 val.]**<br>Value of the output word 3 |
| nC4 | **[Com Scan Out4 val.]**<br>Value of the output word 4 |
| nC5 | **[Com Scan Out5 val.]**<br>Value of the output word 5 |
| nC6 | **[Com Scan Out6 val.]**<br>Value of the output word 6 |
| nC7 | **[Com Scan Out7 val.]**<br>Value of the output word 7 |
| nC8 | **[Com Scan Out8 val.]**<br>Value of the output word 8 |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > C I- | |
|---|---|
| **Code** | **Name/Description** |
| C I- | **[CMD. WORD IMAGE]**<br>Map command word: Accessible via the graphic display terminal only. |
| CMd1 | **[Modbus CMD]**<br>Modbus command word map. |
| CMd2 | **[CANopen cmd.]**<br>CANopen® command word map. |
| CMd3 | **[Com. card CMD]**<br>Specifies the command word for the communication card. |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > r I- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| r I- | **[FREQ. REF. WORD MAP]**<br>Frequency setpoint map: Accessible via the graphic display terminal only. | |
| LFr1 | **[Modbus ref.]**<br>Modbus frequency setpoint map | Hz |
| LFr2 | **[CANopen ref.]**<br>CANopen® frequency setpoint map | Hz |
| LFr3 | **[Com. card ref.]**<br>Specifies the frequency setpoint of the communication card. | Hz |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > CnM- | |
|---|---|
| **Code** | **Name/Description** |
| CnM- | **[CANopen MAP]**<br>CANopen® map: Accessible via the graphic display terminal only. |
| COn | **[RUN LED]**<br>Displays the CANopen® RUN LED state. |
| CAnE | **[ERR LED]**<br>Displays the CANopen® error LED state. |

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO1- | |
|---|---|
| **Code** | **Name/Description** |
| PO1- | **[PDO1 IMAGE]**<br>Displays the RPDO1 and TPDO1. |
| rp11 | **[Received PDO1-1]**<br>First frame of the received PDO1. |
| rp12 | **[Received PDO1-2]**<br>Second frame of the received PDO1. |
| rp13 | **[Received PDO1-3]**<br>Third frame of the received PDO1. |
| rp14 | **[Received PDO1-4]**<br>Fourth frame of the received PDO1. |
| tp11 | **[Transmit PDO1-1]**<br>First frame of the transmit PDO1. |
| tp12 | **[Transmit PDO1-2]**<br>Second frame of the transmit PDO1. |
| tp13 | **[Transmit PDO1-3]**<br>Third frame of the transmit PDO1. |
| tp14 | **[Transmit PDO1-4]**<br>Fourth frame of the transmit PDO1. |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO2- | |
|---|---|
| **Code** | **Name/Description** |
| PO2- | **[PDO2 IMAGE]**<br>Displays RPDO2 and TPDO2 using the same structure as for **[PDO1 IMAGE]**(PO1-). |
| rp21 | **[Received PDO2-1]**<br>First frame of the received PDO2. |
| rp22 | **[Received PDO2-2]**<br>Second frame of the received PDO2. |
| rp23 | **[Received PDO2-3]**<br>Third frame of the received PDO2. |
| rp24 | **[Received PDO2-4]**<br>Fourth frame of the received PDO2. |
| tp21 | **[Transmit PDO2-1]**<br>First frame of the transmit PDO2. |
| tp22 | **[Transmit PDO2-2]**<br>Second frame of the transmit PDO2. |
| tp23 | **[Transmit PDO2-3]**<br>Third frame of the transmit PDO2. |
| tp24 | **[Transmit PDO2-4]**<br>Fourth frame of the transmit PDO2. |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > CnM- > PO3- | |
|---|---|
| **Code** | **Name/Description** |
| PO3- | **[PDO3 IMAGE]**<br>Displays RPDO3 and TPDO3 using the same structure as for **[PDO1 IMAGE]**(PO1-). |
| rp31 ★ | **[Received PDO3-1]**<br>First frame of the received PDO3. |
| rp32 ★ | **[Received PDO3-2]**<br>Second frame of the received PDO3. |
| rp33 ★ | **[Received PDO3-3]**<br>Third frame of the received PDO3. |
| rp34 ★ | **[Received PDO3-4]**<br>Fourth frame of the received PDO3. |
| tp31 ★ | **[Transmit PDO3-1]**<br>First frame of the transmit PDO3. |
| tp32 ★ | **[Transmit PDO3-2]**<br>Second frame of the transmit PDO3. |
| tp33 ★ | **[Transmit PDO3-3]**<br>Third frame of the transmit PDO3. |
| tp34 ★ | **[Transmit PDO3-4]**<br>Fourth frame of the transmit PDO3. |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

| The parameters described on this page can be accessed by: DRI- > MOn- > CMM- > CnM- > nMtS | |
|---|---|
| **Code** | **Name/Description** |
| nMtS | **[CANopen NMT state]**<br>Inverter NMT state of the CANopen® slave. |
| bOOt | **[Boot]**(bOOt): Switch on |
| StOP | **[Stopped]**(StOP): Stopped |
| OPE | **[Operational]**(OPE): In operation |
| POPE | **[Pre-op]**(POPE): Ready for operation |
| nbtp | **[Number of TX PDO]**<br>Number of transmit PDOs. |
| nbrp | **[Number of RX PDO]**<br>Number of received PDOs. |
| ErCO | **[Error code]**<br>CANopen® error register (from 1 to 5). |
| rEC1 | **[RX Error Counter]**<br>Rx controller, error counter (not stored when switched off). |
| tEC1 | **[TX Error Counter]**<br>Tx controller, error counter (not stored when switched off). |

## 5.2.2.3.5 [MONIT. PI] (MpI-)

| The parameters described on this page can be accessed by: DRI- > MOn- > MPI- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| MPI- | **[MONIT. PI]**<br><br>PID management. Only visible if **[PID feedback ass.]**(PIF) is not set to**[No]**(nO). | |
| rPI | **[Internal PID ref.]**<br>Internal PID setpoint: As a process value. | |
| rpE | **[PID error]**<br>PID error value. | |
| rpF | **[PID feedback]**<br>PID feedback. | |
| rpC | **[PID speed ref.]**<br>PID setpoint via graphic display terminal. | |
| rpO | **[PID Output]**<br><br>PID output value with limitation. | Hz |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.2.3.6 [MONIT. POWER TIME] (pEt-)

| The parameters described on this page can be accessed by: DRI- > MOn- > pEt- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| pEt- | **[MONIT. POWER TIME]** | |
| UNT | **[Unit]**<br>This parameter indicates the units of the current values for **[Consumption]** (ApH), **[Elapsed time]** (ptH), **[Run time]** (rtH) and **[Operating time motor, internal]** (rtHI).<br>This parameter is read only.<br>Bit 0, 1 = 0: ApH in Wh<br>Bit 0, 1 = 1: ApH in kWh<br>Bit 0, 1 = 2: ApH in MWh<br>Bit 2, 3 = 0: PtH in s<br>Bit 2, 3 = 1: PtH in min<br>Bit 2, 3 = 2: PtH in h<br>Bit 4, 5 = 0: RTH in s<br>Bit 4, 5 = 1: RTH in min<br>Bit 4, 5 = 2: RTH in h<br>Bit 6, 7 = 0: RTHI in s<br>Bit 6, 7 = 1: RTHI in min<br>Bit 6, 7 = 2: RTHI in h | 0 |
| ApH | **[Consumption]**<br>Energy consumption in Wh, kWh or MWh (cumulative consumption).<br>The value unit can be determined via parameter **[Unit]** (UNT):<br>Wh: If (UNT) & 0x03 = 0b 0000 0000<br>kWh: If (UNT) & 0x03 = 0b 0000 0001<br>MWh: If (UNT) & 0x03 = 0b 0000 0010 | Wh, kWh or MWh |
| rtH | **[Run time]**<br>Displays the operating hours (configurable) in seconds, minutes or hours (time period during which the motor is in operation).<br>The value unit can be determined via parameter **[Unit]** (UNT):<br>s: If (UNT) & 0x30 = 0b 0000 0000<br>min: If (UNT) & 0x30 = 0b 0001 0000<br>h: If (UNT) & 0x30 = 0b 0010 0000 | s, min, h |
| rtHI | **[Operating time motor, internal]**<br>Displays the operating hours (configurable) in seconds, minutes or hours (time period during which the motor is in operation).<br>The value unit can be determined via parameter **[Unit]** (UNT):<br>s: If (UNT) & 0x30 = 0b 0000 0000<br>min: If (UNT) & 0x30 = 0b 0100 0000<br>h: If (UNT) & 0x30 = 0b 1000 0000<br>Unlike **[Run time]** (rtH), this parameter is not reset by **[Operating t. reset]** (rpr). | s, min, h |
| ptH | **[Elapsed time]**<br>Displays the operating hours (configurable) in seconds, minutes or hours (time period during which the motor is in operation).<br>The value unit can be determined via parameter **[Unit]** (UNT):<br>s: If (UNT) & 0x0C = 0b 0000 0000<br>min: If (UNT) & 0x0C = 0b 0000 0100<br>h: If (UNT) & 0x0C = 0b 0000 1000 | s, min, h |
| rpr<br> <br>nO<br>APH<br>rtH<br>PtH | **[Operating t. reset]**<br>Resets the operating data.<br>**[No]**(nO): Reset not executed<br>**[Reset KWh]**(APH): Clears **[Reset KWh]**(APH)<br>**[Rst. runtime]**(rtH): Clears **[Rst. runtime]**(rtH)<br>**[rst. P On t.]**(PtH): Clears **[rst. P On t.]**(PtH) | |

Parameter that can be modified during operation or when stopped.

### 5.2.2.3.7 [Config. active] (CnFS)

| The parameters described on this page can be accessed by: DRI- > MOn- | |
|---|---|
| **Code** | **Name/Description** |
| MOn- | **[1.2 MONITORING](continued)** |
| CnFS | **[Config. active]**<br>Displays the current configuration. |
| nO | **[Active]**(nO): Transition state (configuration is modified) |
| CnF0 | **[CONFIGURATION 0]**(CnF0): Configuration 0 is active |
| CnF1 | **[Config 1]**(CnF1): Configuration 1 is active |
| CnF2 | **[Config 2]**(CnF2): Configuration 2 is active |
| CFpS<br>★ | **[Utilised param. set]**<br>Configuration parameter state (accessible if parameter set switching has been enabled). |
| nO | **[No]**(nO): Not assigned |
| CFP1 | **[Set 1 active]**(CFP1): Parameter set 1 is active |
| CFP2 | **[Set 2 active]**(CFP2): Parameter set 2 is active |
| CFP3 | **[Set 3 active]**(CFP3): Parameter set 3 is active |
| ALGr | **[Alarm groups]**<br>Currently affected alarm group numbers.<br>Alarm groups can be defined by the user via **[INPUTS/ OUTPUTS CFG]**(I_O-). |
| --- | **[---]**(---): No affected alarm groups |
| 1-- | **[1--]**(1--): Alarm group 1 |
| -2- | **[-2-]**(-2-): Alarm group 2 |
| 12- | **[12-]**(12-): Alarm groups 1 and 2 |
| --3 | **[--3]**(--3): Alarm group 3 |
| 1-3 | **[1-3]**(1-3): Alarm groups 1 and 3 |
| -23 | **[-23]**(-23): Alarm groups 2 and 3 |
| 123 | **[123]**(123): Alarm groups 1, 2 and 3 |
| SPd1<br>or SPd2<br>or ?SPd3 | **[Cust. output value]**<br>**[Cust. output value#]**(SPd1), **[Cust. output value#]**(SPd2) or **[Cust. output value#]**(SPd3), depending on parameter **[Scale factor display]**(SdS) (**[Cust. output value#]**(SPd3) in the factory settings). |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.2.3.8 [ALARMS] (ALr-)

| The parameters described on this page can be accessed by: DRI- > MOn- > ALGr- | |
|---|---|
| **Code** | **Name/Description** |
| ALGr- | **[ALARMS]**<br>List of currently configured alarms.<br>If an alarm is enabled, a ✓ will appear on the graphic display terminal. |
| nOAL | **[No alarm]**(nOAL) |
| PtCL | **[PTC alarm]**(PtCL) |
| EtF | **[External fault]**(EtF) |
| USA | **[UnderV. al.]**(USA) |
| CtA | **[I attained]**(CtA) |
| FtA | **[Freq. Th. attained]**(FtA) |
| F2A | **[Freq. Th. 2 attained]**(F2A) |
| SrA | **[Freq.ref.att]**(SrA) |
| tSA | **[Th.mot. att.]**(tSA) |
| tS2 | **[Th. mot2. att.]**(tS2) |
| tS3 | **[Th. mot3. att.]**(tS3) |
| UPA | **[Undervoltage Pre-alarm]**(UPA) |
| FLA | **[HSP attain.]**(FLA) |
| tHA | **[Al. °C drv]**(tHA) |
| AG1 | **[Alarm group 1]**(AG1) |
| AG2 | **[Alarm group 2]**(AG2) |
| AG3 | **[Alarm group 3]**(AG3) |
| PEE | **[PID error al]**(PEE) |
| PFA | **[PID fdbk al.]**(PFA) |
| AP3 | **[AI2 Al. 4-20mA]**(AP3) |
| SSA | **[Torque/current lim att.]**(SSA) |
| tAd | **[Th.drv.att.]**(tAd) |
| tJA | **[IGBT al.]**(tJA) |
| bOA | **[Brake R. al.]**(bOA) |
| ULA | **[Underload. Proc. Al.]**(ULA) |
| OLA | **[Overload. Proc. Al.]**(OLA) |
| rSdA | **[Rope slack alarm]**(rSdA) |
| ttHA | **[High torque alarm]**(ttHA) |
| ttLA | **[Low torque alarm]**(ttLA) |
| dLdA | **[Dynamic load alarm]**(dLdA) |
| FqLA | **[Fr.met. alar.]**(FqLA) |

## 5.2.2.3.9 [OTHER STATE] (SSt-)

| The parameters described on this page can be accessed by: DRI- > MOn- > SSt- | |
|---|---|
| **Code** | **Name/Description** |
| SSt- | **[OTHER STATE]**<br>List of secondary states. This menu is only shown on the graphic display terminal. |
| FL | **[In motor fluxing]**(FL) |
| PtCL | **[PTC alarm]**(PtCL) |
| FSt | **[Fast stop]**(FSt) |
| CtA | **[I attained]**(CtA) |
| FtA | **[Freq. Th. attained]**(FtA) |
| F2A | **[Freq. Th. 2 attain]**(F2A) |
| SrA | **[Freq.ref.att]**(SrA) |
| tSA | **[Motor th. state att.]**(tSA) |
| EtF | **[External fault]**(EtF) |
| AUtO | **[Auto restart]**(AUtO) |
| FtL | **[Remote]**(FtL) |
| tUn | **[Auto-tuning]**(tUn) |
| USA | **[Undervoltage]**(USA) |
| CnF1 | **[Config. 1 act.]**(CnF1) |
| CnF2 | **[Config 2 active]**(CnF2) |
| FLA | **[HSP attain.]**(FLA) |
| CFP1 | **[Set 1 active]**(CFP1) |
| CFP2 | **[Set 2 active]**(CFP2) |
| CFP3 | **[Set 3 active]**(CFP3) |
| brS | **[In braking]**(brS) |
| dbL | **[DC charged]**(dbL) |
| ttHA | **[High torque alarm]**(ttHA) |
| ttLA | **[Low torque alarm]**(ttLA) |
| MFrd | **[Forward]**(MFrd) |
| MrrS | **[Reverse assign.]**(MrrS) |
| FqLA | **[Fr.met. alar.]**(FqLA) |

## 5.2.2.3.10 [DIAGNOSTICS] (dGt-)

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > pFH- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| pFH- | **[FAULT HISTORY]**<br>Displays the last 8 detected errors. | |
| dP1 | **[1st last fault]**<br>Error record 1 (1 comes last). | |
| nOF | **[No fault]**(nOF): No error stored | |
| ASF | **[Angle error]**(ASF): Error in magnet wheel setting detected | |
| bLF | **[Brake control]**(bLF): 3-phase loss in brake motor | |
| brF | **[Brake feedback]**(brF): Error detected in braking contactor | |
| CFF | **[Incorrect config.]**(CFF): Invalid configuration when switching on | |
| CFI2 | **[Bad conf.]**(CFI2): Error when transferring configuration | |
| CnF | **[Com. card]**(CnF): Interruption in network communication | |
| COF | **[CANopen com.]**(COF): Interruption in CANopen® communication | |
| CrF | **[Precharge]**(CrF): Charging relay error | |
| CSF | **[Ch. Sw. fault]**(CSF): Error switching channels | |
| dLF | **[Dynamic load fault]**(dLF): Dynamic load error | |
| EEF1 | **[Control Eeprom]**(EEF1): EEPROM controller error | |
| EEF2 | **[Power Eeprom]**(EEF2): EEPROM power supply error | |
| EPF1 | **[External fault LI/Bit]**(EPF1): External error at LI or local connector | |
| EPF2 | **[External fault com.]**(EPF2): Interruption in external communication card | |
| FCF1 | **[Out. contact. stuck]**(FCF1): Output contactor closed | |
| FCF2 | **[Out. contact. open.]**(FCF2): Output contactor open | |
| HCF | **[Cards pairing]**(HCF): Error with hardware configuration | |
| HdF | **[IGBT desaturation]**(HdF): Hardware error | |
| ILF | **[Internal com. link]**(ILF): Interruption in internal communication option | |
| InF1 | **[Rating error]**(InF1): Unspecified inverter size | |
| InF2 | **[Incomp./unspec. power card]**(InF2): Unspecified or incompatible power card | |
| InF3 | **[Internal serial link]**(InF3): Interruption in internal serial communication | |
| InF4 | **[Internal-mftg zone]**(InF4): Internal manufacturing error | |
| InF6 | **[Internal - fault option]**(InF6): Unspecified error or incompatible option card | |
| InF9 | **[Internal- I measure]**(InF9): Error measuring current | |
| InFA | **[Internal-mains circuit]**(InFA): Input phase loss error | |
| InFb | **[Internal- th. sensor]**(InFb): Temperature sensor error (OC or SC) | |
| InFE | **[internal- CPU]**(InFE): CPU error (RAM, flash memory, task, etc.) | |
| LCF | **[Line contactor]**(LCF): Line contactor error | |
| LFF3 | **[AI3 4-20mA loss]**(LFF3): AI3 4 to 20 mA loss | |
| ObF | **[Overbraking]**(ObF): Overbraking | |
| OCF | **[Overcurrent]**(OCF): Overcurrent | |
| OHF | **[Inverter overheat]**(OHF): Inverter overheating | |
| OLC | **[Proc.Overload Flt]**(OLC): Torque overload | |
| OLF | **[Motor overload]**(OLF): Motor overload | |
| OPF1 | **[1 output phase loss]**(OPF1):Output phase loss - 1 | |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > pFH- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| OPF2 | **[3out ph loss]**(OPF2):Output phase loss - 3 | |
| OSF | **[Mains overvoltage]**(OSF): Oversupply error | |
| OtFL | **[PTC fault]**(OtFL): Motor overheating detected by PTCL: Standard product | |
| PHF | **[Input phase loss]**(PHF): Input phase loss - 1 | |
| PtFL | **[LI6=PTC overheat]**(PtFL): PtFL error (OC or SC) | |
| SAFF | **[Safety fault]**(SAFF): Triggers safety function | |
| SCF1 | **[Motor short circuit]**(SCF1): Motor short-circuit (hardware detection) | |
| SCF3 | **[Ground short circuit]**(SCF3): Direct ground short-circuit (hardware detection) | |
| SCF4 | **[IGBT short circuit]**(SCF4): IGBT short circuit (hardware detection) | |
| SCF5 | **[Motor short circuit]**(SCF5): Load short-circuit during Igon-loading sequence (hardware detection) | |
| SLF1 | **[Modbus com.]**(SLF1): Interruption in local serial Modbus communication | |
| SLF2 | **[PC com.]**(SLF2): Interruption in PC software communication | |
| SLF3 | **[HMI com.]**(SLF3): Interruption in communication with external operator terminal | |
| SOF | **[Overspeed]**(SOF): Overspeed | |
| SPF | **[Speed fdback loss]**(SPF): Missing encoder feedback signal | |
| SSF | **[Torque/current lim]**(SSF): Torque limiting error | |
| tJF | **[IGBT overheat]**(tJF): IGBT overheating | |
| tnF | **[Auto-tuning]**(tnF): Autotuning error | |
| ULF | **[Proc. underload Flt]**(ULF): Speed underload | |
| USF | **[Undervoltage]** (USF): Undervoltage | |
| HS1 | **[Drive state]**<br>HMI state for error record 1. | |
| tUn | **[Auto-tuning]**(tUn): Autotuning | |
| dCb | **[DC Injection]**(dCb): DC injection | |
| rdY | **[Ready]**(rdY): Inverter ready for operation | |
| nSt | **[Freewheel]**(nSt): Freewheel stop control | |
| rUn | **[Run]**(rUn): Motor is at steady state, or move command and setpoint are at zero. | |
| ACC | **[Acceleration]**(ACC): Startup time | |
| dEC | **[Deceleration]**(dEC): Deceleration time | |
| CLI | **[Current Limit]**(CLI): Current limit, applied when a synchronous motor is used and the motor fails to start | |
| FSt | **[Fast stop]**(FSt): Fast stop | |
| FLU | **[Motor fluxing]**(FLU): Vector control is enabled | |
| nLP | **[no mains V.]**(nLP): Controller is switched on but DC bus is not charged | |
| CtL | **[control.stop]**(CtL): Controlled stop | |
| Obr | **[Dec. adapt.]**(Obr): Deceleration adjusted | |
| SOC | **[Output cut]**(SOC): Standby output cutoff | |
| USA | **[Undervoltage Alarm]**(USA): Undervoltage alarm | |
| tC | **[In mfg. test]**(tC): TC indus mode enabled | |
| St | **[in autotest]**(St): Self-test executed | |
| FA | **[autotest err]**(FA): Error detected during self-test | |
| YES | **[Autotest OK]**(YES): Self-test successful | |
| EP | **[eeprom test]**(EP): Error detected during EEPROM self-test | |
| FLt | **[No drive flt]**(FLt): Product detected an error | |
| SS1 | **[SS1 active]**(SS1): Safety function "Safe Stop 1" is active | |
| SLS | **[SLS active]**(SLS): Safety function "Safely-Limited Speed" is active | |
| StO | **[STO active]**(StO): Safety function "Safe Torque Off" is active | |
| GdL | **[GdL active]**(GdL): GDL safety function | |
| Ep1 | **[ETA state word]**<br>State register for error record 1 (identical to **[ETA state word]**(EtA)). | |
| IP1 | **[ETI state word]**<br>Advanced state register for error record 1 (see communication parameter file). | |
| CMP1 | **[Cmd word]**<br>Command register for error record 1 (identical to **[Cmd word]**(CMd)). | |
| LCP1 | **[I motor]**<br>Motor current calculated for error record 1 (identical to **[I motor]**(LCr)). | A |
| rFp1 | **[Output frequency]**<br>Output frequency calculated for error record 1 (identical to **[Output frequency]**(rFr)). | Hz |
| rtp1 | **[Elapsed time]**<br>Operating time for error record 1 (identical to **[Elapsed time]**(rtH)). | h |
| ULp1 | **[Mains voltage]**<br>Mains voltage for error record 1 (identical to **[Mains voltage]**(ULn)). | V |
| tHP1 | **[Motor thermal state]**<br>Motor thermal state for error record 1 (identical to **[Motor thermal state]**(tHr)). | % |
| dCC1 | **[Command channel]**<br>Command channel for error record 1 (identical to **[Command channel]**(CMdC)). | |
| drC1 | **[Active channel ref.]**<br>Setpoint channel of error record 1 (identical to **[Command channel]**(CMdC)). | |
| Sr11 | **[Saf01 Reg n-1]**<br>SAF1 register x (1 in last position) | |
| Sr21 | **[SAF2 Reg n-1]**<br>SAF2 register x (1 in last position) | |
| SrA1 | **[SF00 Reg n-1]**<br>SF00 register x (1 in last position) | |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > pFH- | | |
|---|---|---|
| **Code** | **Name/Description** | **Unit** |
| Srb1 | **[SF01 Reg n-1]**<br>SF01 register x (1 in last position) | |
| SrC1 | **[SF02 Reg n-1]**<br>SF02 register x (1 in last position) | |
| Srd1 | **[SF03 Reg n-1]**<br>SF03 register x (1 in last position) | |
| SrE1 | **[SF04 Reg n-1]**<br>SF04 register x (1 in last position) | |
| SrF1 | **[SF05 Reg n-1]**<br>SF05 register x (1 in last position) | |
| SrG1 | **[SF06 Reg n-1]**<br>SF06 register x (1 in last position) | |
| SrH1 | **[SF07 Reg n-1]**<br>SF07 register x (1 in last position) | |
| SrI1 | **[SF08 Reg n-1]**<br>SF08 register x (1 in last position) | |
| SrJ1 | **[SF09 Reg n-1]**<br>SF09 register x (1 in last position) | |
| Sr?1 | **[SF10 Reg n-1]**<br>SF10 register x (1 in last position) | |
| SrL1 | **[SF11 Reg n-1]**<br>SF11 register x (1 in last position) | |
| dP2 | **[Past fault 2]**<br>Parameters **[SAF1 Reg n-2]**(Sr12), **[SAF2 Reg n-2]**(Sr22), **[SF00 Reg n-2]**(SrA2), **[SF01 Reg n-2]**(Srb2) and from **[SF02 Reg n-2]**(SrC2) to **[SF11 Reg n-2]**(SrL2) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP3 | **[Past fault 3]**<br>Parameters **[SAF1 Reg n-3]**(Sr13), **[SAF2 Reg n-3]**(Sr23), **[SF00 Reg n-3]**(SrA3), **[SF01 Reg n-3]**(Srb3) and from **[SF02 Reg n-3]**(SrC3) to **[SF11 Reg n-3]**(SrL3) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP4 | **[Past fault 4]**<br>Parameters **[SAF1 Reg n-4]**(Sr14), **[SAF2 Reg n-4]**(Sr24), **[SF00 Reg n-4]**(SrA4), **[SF01 Reg n-4]**(Srb4) and from **[SF02 Reg n-4]**(SrC4) to **[SF11 Reg n-4]**(SrL4) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP5 | **[Past fault 5]**<br>Parameters **[SAF1 Reg n-5]**(Sr15), **[SAF2 Reg n-5]**(Sr25), **[SF00 Reg n-5]**(SrA5), **[SF01 Reg n-5]**(Srb5) and from **[SF02 Reg n-5]**(SrC5) to **[SF11 Reg n-5]**(SrL5) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP6 | **[Past fault 6]**<br>Parameters **[SAF1 Reg n-6]**(Sr16), **[SAF2 Reg n-6]**(Sr26), **[SF00 Reg n-6]**(SrA6), **[SF01 Reg n-6]**(Srb6) and from **[SF02 Reg n-6]**(SrC6) to **[SF11 Reg n-6]**(SrL6) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP7 | **[Past fault 7]**<br>Parameters **[SAF1 Reg n-7]**(Sr17), **[SAF2 Reg n-7]**(Sr27), **[SF00 Reg n-7]**(SrA7), **[SF01 Reg n-7]**(Srb7) and from **[SF02 Reg n-7]**(SrC7) to **[SF11 Reg n-7]**(SrL7) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |
| dP8 | **[Past fault 8]**<br>Parameters **[SAF1 Reg n-8]**(Sr18), **[SAF2 Reg n-8]**(Sr28), **[SF00 Reg n-8]**(SrA8), **[SF01 Reg n-8]**(Srb8) and from **[SF02 Reg n-8]**(SrC8) to **[SF11 Reg n-8]**(SrL8) can be displayed using this parameter.<br>Identical to **[Past fault 1]**(dP1). | |

| The parameters described on this page can be accessed by:DRI- > MOn- > dGt- > pFL- | |
|---|---|
| **Code** | **Name/Description** |
| PFL- | **[CURRENT FAULT LIST]** |
| nOF | **[No fault]**(nOF): No error stored |
| ASF | **[Angle error]**(ASF): Error in magnet wheel setting detected |
| bLF | **[Brake control]**(bLF): 3-phase loss in brake motor |
| brF | **[Brake feedback]**(brF): Error detected in braking contactor |
| CFF | **[Incorrect config.]**(CFF): Invalid configuration when switching on |
| CFI2 | **[Bad conf.]**(CFI2): Error when transferring configuration |
| CnF | **[Com. card]**(CnF): Interruption in network communication |
| COF | **[CANopen com.]**(COF): Interruption in CANopen® communication |
| CrF | **[Precharge]**(CrF): Charging relay error |
| CSF | **[Ch. Sw. fault]**(CSF): Error switching channels |
| dLF | **[Dynamic load fault]**(dLF): Dynamic load error |
| EEF1 | **[Control Eeprom]**(EEF1): EEPROM controller error |
| EEF2 | **[Power Eeprom]**(EEF2): EEPROM power supply fault |
| EPF1 | **[External fault LI/Bit]**(EPF1): External error at LI or local connector |
| EPF2 | **[External fault com.]**(EPF2): Interruption in external communication card |
| FCF1 | **[Out. contact. stuck]**(FCF1): Output contactor closed |
| FCF2 | **[Out. contact. open.]**(FCF2): Output contactor open |
| HCF | **[Cards pairing]**(HCF): Error with hardware configuration |
| HdF | **[IGBT desaturation]**(HdF): Hardware error |
| ILF | **[Internal com. link]**(ILF): Interruption in internal communication option |
| InF1 | **[Rating error]**(InF1): Unspecified inverter size |
| InF2 | **[Incomp./unspec. power card]**(InF2): Unspecified or incompatible power card |
| InF3 | **[Internal serial link]**(InF3): Interruption in internal serial communication |

| The parameters described on this page can be accessed by:DRI- > MOn- > dGt- > pFL- | |
|---|---|
| **Code** | **Name/Description** |
| InF4 | **[Internal-mftg zone]**(InF4): Internal manufacturing error |
| InF6 | **[Internal - fault option]**(InF6): Unspecified error or incompatible option card |
| InF9 | **[Internal- I measure]**(InF9): Error measuring current |
| InFA | **[Internal-mains circuit]**(InFA): Input phase loss error |
| InFb | **[Internal- th. sensor]**(InFb): Temperature sensor error (OC or SC) |
| InFE | **[internal- CPU]**(InFE): CPU error (RAM, flash memory, task, etc.) |
| LCF | **[Line contactor]**(LCF): Line contactor error |
| LFF3 | **[AI3 4-20mA loss]**(LFF3): AI3 4 to 20 mA loss |
| ObF | **[Overbraking]**(ObF): Overbraking |
| OCF | **[Overcurrent]**(OCF): Overcurrent |
| OHF | **[Inverter overheat]**(OHF): Inverter overheating |
| OLC | **[Proc.Overload Flt]**(OLC): Torque overload |
| OLF | **[Motor overload]**(OLF): Motor overload |
| OPF1 | **[1 output phase loss]**(OPF1):Output phase loss - 1 |
| OPF2 | **[3out ph loss]**(OPF2):Output phase loss - 3 |
| OSF | **[Mains overvoltage]**(OSF): Oversupply error |
| OtFL | **[PTC fault]**(OtFL): Motor overheating detected by PTCL: Standard product |
| PHF | **[Input phase loss]**(PHF): Input phase loss - 1 |
| PtFL | **[LI6=PTC overheat]**(PtFL): PtFL error (OC or SC) |
| SAFF | **[Safety fault]**(SAFF): Triggers safety function |
| SCF1 | **[Motor short circuit]**(SCF1): Motor short circuit (hardware detection) |
| SCF3 | **[Ground short circuit]**(SCF3): Direct ground short-circuit (hardware detection) |
| SCF4 | **[IGBT short circuit]**(SCF4): IGBT short circuit (hardware detection) |
| SCF5 | **[Motor short circuit]**(SCF5): Load short-circuit during Igon-loading sequence (hardware detection) |
| SLF1 | **[Modbus com.]**(SLF1): Interruption in local serial Modbus communication |
| SLF2 | **[PC com.]**(SLF2): Interruption in PC software communication |
| SLF3 | **[HMI com.]**(SLF3): Interruption in communication with external operator terminal |
| SOF | **[Overspeed]**(SOF): Overspeed |
| SPF | **[Speed fdback loss]**(SPF): Missing encoder feedback signal |
| SSF | **[Torque/current lim]**(SSF): Torque limiting error |
| tJF | **[IGBT overheat]**(tJF): IGBT overheating |
| tnF | **[Auto-tuning]**(tnF): Autotuning error |
| ULF | **[Proc. underload Flt]**(ULF): Speed underload |
| USF | **[Undervoltage]** (USF): Undervoltage |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > AFI- | |
|---|---|
| **Code** | **Name/Description** |
| AFI- | **[MORE FAULT INFO]**<br>Additional error information |
| CnF | **[Com. network]**<br>Error code for the communication option card.<br>This parameter is read-only. The error code remains stored in the parameter even if the cause is corrected. The parameter is reset, after the inverter has been disconnected from and then reconnected to the power supply. The values of this parameter depend on the network card. Read the user's manual for the relevant card. |
| ILF1 | **[Internal link fault 1]**<br>Communication between option card 1 and the inverter was interrupted.<br>This parameter is read-only. The error code remains stored in the parameter even if the cause is corrected. The parameter is reset, after the inverter has been disconnected from and then reconnected to the power supply. |
| SFFE | **[Safety fault reg.]** (1)<br>The safety function detected an error.<br>Bit 0: 1 - Timeout during logic input debounce<br>Bit 1: Reserved<br>Bit 2: 1 - Motor speed character was changed during SS1 stop<br>Bit 3: 1 - Speed has reached the SS1 trigger range<br>Bit 4 to 5: Reserved<br>Bit 6: 1 - Motor speed character was changed during SLS limitation<br>Bit 7: 1 - Speed has reached the SLS trigger range<br>Bit 8 to bit 12: Reserved<br>Bit 13: 1 - Motor speed cannot be measured<br>Bit 14: 1 - Motor ground short circuit detected<br>Bit 15: 1 - Motor short circuit detected |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > AFI- | |
|---|---|
| **Code** | **Name/Description** |
| SAF1 | **[Safety fault Reg1]** (1)<br>This error register is used for application control.<br>Bit 0: 1 - PWRM consistency error detected<br>Bit 1: 1 - Error detected in safety function parameters<br>Bit 2: 1 - The automated application test detected an error.<br>Bit 3: 1 - The diagnostics check on the safety function detected an error.<br>Bit 4: 1 - The logic inputs diagnostics function detected an error.<br>Bit 5: 1 - Safety function SMS or GDL errors detected (see register **[SAFF Subcode 4]** (SF04) for more details)<br>Bit 6: 1 - Application watchdog management active<br>Bit 7: 1 - Motor control error detected<br>Bit 8: 1 - Error detected in internal serial connection<br>Bit 9: 1 - Error detected during logic input activation<br>Bit 10: 1 - Function "Safe Torque Off" triggered an error.<br>Bit 11: 1 - The application interface detected a safety function error.<br>Bit 12: 1 - Function "Safe Stop 1" detected a safety function error.<br>Bit 13: 1 - Function "Safely Limited Speed" triggered an error.<br>Bit 14: 1 - Motor data is corrupted.<br>Bit 15: 1 - Error detected in internal serial connection data flow |
| SAF2 | **[Safety fault Reg2]** (1)<br>This error register is used for motor control.<br>Bit 0: 1 - The consistency check for stator frequency detected an error.<br>Bit 1: 1 - Error detected in stator frequency calculation<br>Bit 2: 1 - Motor control watchdog management is active<br>Bit 3: 1 - Motor control hardware watchdog is active<br>Bit 4: 1 - The automated motor control test detected an error.<br>Bit 5: 1 - Error detected during chain testing<br>Bit 6: 1 - Error detected in internal serial connection<br>Bit 7: 1 - Error caused by direct short circuit detected<br>Bit 8: 1 - Frequency inverter PWM error detected<br>Bit 9: 1 - Internal GDL error detected<br>Bit 10: Reserved<br>Bit 11: 1 - The application interface detected a safety function error.<br>Bit 12 to bit 13: Reserved<br>Bit 14: 1 - Motor data is corrupted.<br>Bit 15: 1 - Error detected in internal serial connection data flow |
| SF00 | **[SAFF Subcode 0]** (1)<br>This error register is used for automated application tests.<br>Bit 0: Reserved<br>Bit 1: 1 - RAM stack overrun<br>Bit 2: 1 - Error in RAM address integrity detected<br>Bit 3: 1 - Error detected when accessing RAM data<br>Bit 4: 1 - Error detected in flash memory checksum<br>Bit 5 to 8: Reserved<br>Bit 9: 1 - Fast task overrun<br>Bit 10: 1 - Slow task overrun<br>Bit 11: 1 - Application task overrun<br>Bit 12 to bit 13: Reserved<br>Bit 14: 1 - The PWRM line is not enabled during the initialization phase.<br>Bit 15: 1 - The application hardware watchdog was not executed after the initialization phase |
| SF01 | **[SAFF Subcode 1]** (1)<br>This diagnostics error register is used for logic inputs.<br>Bit 0: 1 - Management - Error detected in state machine<br>Bit 1: 1 - Data required for test management is corrupted.<br>Bit 2: 1 - Error detected during channel selection<br>Bit 3: 1 - Test - Error detected in state machine<br>Bit 4: 1 - Test request is corrupted.<br>Bit 5: 1 - Pointer to test method is corrupted.<br>Bit 6: 1 - Incorrect test action provided<br>Bit 7: 1 - Error detected during results collection<br>Bit 8: 1 - Error detected at LI3, safety function cannot be activated.<br>Bit 9: 1 - Error detected at LI4, safety function cannot be activated.<br>Bit 10: 1 - Error detected at LI5, safety function cannot be activated.<br>Bit 11: 1 - Error detected at LI6, safety function cannot be activated.<br>Bit 12: 1 - The test sequence was updated while diagnostics was in progress.<br>Bit 13: 1 - Error detected in test type management<br>Bit 14 to 15: Reserved |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > AFI- | |
|---|---|
| **Code** | **Name/Description** |
| SF02 | **[SAFF Subcode 2]** (1)<br>This register is used for detected errors relating to application watchdog management.<br>Bit 0: 1 - Fast task error detected<br>Bit 1: 1 - Slow task error detected<br>Bit 2: 1 - Application task error detected<br>Bit 3: 1 - Background task error detected<br>Bit 4: 1 - Fast task / Safety function input error detected<br>Bit 5: 1 - Slow task / Safety function input error detected<br>Bit 6: 1 - Application task / Safety function inputs error detected<br>Bit 7: 1 - Application task / Safety function handling error detected<br>Bit 8: 1 - Safety function background task error detected<br>Bit 9 to 15: Reserved |
| SF03 | **[SAFF Subcode 3]** (1)<br>Bit 0: 1 - Debounce timeout<br>Bit 1: 1 - Inconsistent input<br>Bit 2: 1 - Consistency check - Error detected in state machine<br>Bit 3: 1 - Consistency check - Debounce timeout is corrupted<br>Bit 4: 1 - Error detected in response time data<br>Bit 5: 1 - Response time data is corrupted.<br>Bit 6: 1 - Undefined consumer queried<br>Bit 7: 1 - Configuration error detected<br>Bit 8: 1 - The inputs are not in nominal mode.<br>Bit 9 to 15: Reserved |
| SF04 | **[SAFF Subcode 4]** (1)<br>This register is used for detected errors relating to function **[Safe stop]** (StO).<br>Bit 0: 1 - No signal configured<br>Bit 1: 1 - State machine error detected<br>Bit 2: 1 - Internal data error detected<br>Bit 3 to 7: Reserved<br>Bit 8: 1 - SMS overspeed error detected<br>Bit 9: 1 - Internal SMS error detected<br>Bit 10: Reserved<br>Bit 11: 1 - Internal GDL error detected 1<br>Bit 12: 1 - GDL internal error detected 2<br>Bit 13 to 15: Reserved |
| SF05 | **[SAFF Subcode 5]** (1)<br>This register is used for detected errors relating to function **[Safe ramp]** (SS1).<br>Bit 0: 1 - State machine error detected<br>Bit 1: 1 - Motor speed sign changed during stop<br>Bit 2: 1 - Motor speed reached the output frequency threshold value.<br>Bit 3: 1 - Theoretical motor speed data is corrupted.<br>Bit 4: 1 - Unauthorized configuration<br>Bit 5: 1 - Error detected in theoretical motor speed calculation<br>Bit 6: Reserved<br>Bit 7: 1 - Speed sign check: Consistency error detected<br>Bit 8: 1 - Internal SS1 request corrupted<br>Bit 9 to 15: Reserved |
| SF06 | **[SAFF Subcode 6]** (1)<br>This register is used for detected errors relating to function **[Spd limited]** (SLS).<br>Bit 0: 1 - State machine error detected<br>Bit 1: 1 - Motor speed sign was changed during limitation<br>Bit 2: 1 - Motor speed reached the output frequency threshold value.<br>Bit 3: 1 - Data corrupted<br>Bit 4 to 15: Reserved |

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- > AFI- | |
|---|---|
| **Code** | **Name/Description** |
| SF07 | **[SAFF Subcode 7]** (1)<br>This register is used for detected errors relating to application watchdog management.<br>Bit 0 to 15: Reserved |
| SF08 | **[SAFF Subcode 8]** (1)<br>This register is used for detected errors relating to application watchdog management.<br>Bit 0: 1 - PWM task error detected<br>Bit 1: 1 - Fixed task error detected<br>Bit 2: 1 - ATMC watchdog error detected<br>Bit 3: 1 - DYNFCT watchdog error detected<br>Bit 4 to 15: Reserved |
| SF09 | **[SAFF Subcode 9]** (1)<br>This register is used for detected errors relating to automated motor control tests.<br>Bit 0: Reserved<br>Bit 1: 1 - RAM stack overrun<br>Bit 2: 1 - Error in RAM address integrity detected<br>Bit 3: 1 - Error detected when accessing RAM data<br>Bit 4: 1 - Error in flash memory checksum<br>Bit 5 to 8: Reserved<br>Bit 9: 1 - 1 ms task overrun<br>Bit 10: 1 - PWM task overrun<br>Bit 11: 1 - Fixed task overrun<br>Bit 12 to 13: Reserved<br>Bit 14: 1 - Unintended interruption<br>Bit 15: 1 - Hardware watchdog is not executed after the initialization phase |
| SF10 | **[SAFF Subcode 10]** (1)<br>This register is used for detected errors relating to direct motor control short circuits.<br>Bit 0: 1 - Ground short circuit - Configuration error detected<br>Bit 1: 1 - Short circuit - Configuration error detected<br>Bit 2: 1 - Ground short circuit<br>Bit 3: 1 - Short circuit<br>Bit 4 to 15: Reserved |
| SF11 | **[SAFF Subcode 11]** (1)<br>This register is used for detected errors relating to the motor control dynamic activity check.<br>Bit 0: 1 - Application has requested diagnostics for the direct short circuit.<br>Bit 1: 1 - Application has requested a consistency check for the stator frequency calculation (voltage and current).<br>Bit 2: 1 - Application has requested diagnostics for the speed statistics provided by motor control.<br>Bit 3 to 7: Reserved<br>Bit 8: 1 - Motor control diagnostics for the direct short circuit is enabled.<br>Bit 9: 1 - Motor control consistency check for stator frequency calculation is enabled.<br>Bit 10: 1 - Motor control diagnostics for the speed statistics provided by motor control is enabled.<br>Bit 11 to 15: Reserved |

(1) Hexadecimal values are displayed on the graphic display terminal. Example: SFFE = 0x0008 in hexadecimal format, SFFE = Bit 3

| The parameters described on this page can be accessed by: DRI- > MOn- > dGt- | |
|---|---|
| **Code** | **Name/Description** |
| dGt- | **[Diagnostics](continued)** |
| tAC | **[IGBT alarm counter]**<br>Transistor alarm time counter (time frame in which alarm "IGBT temperature" was active). |
| tAC2 | **[Min. freq time]**<br>Transistor alarm time counter at minimum clock frequency (time frame in which alarm "IGBT temperature" was active after the inverter automatically reduced clock frequency to the minimum value). |
| ntJ<br>★ | **[IGBT alarm Nb]**<br>Transistor alarm counter: Numerical value detected during lifecycle<br>Displayed when **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr). |
| SEr- | **[SERVICE MESSAGE]** |
| rFLt<br><br>nO<br>YES | **[Reset past faults]**<br>Reset all resettable errors detected so far.<br>**[No]** (nO): Reset not active<br>**[YES]**(YES): Reset executed. |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

## 5.2.2.3.11 [1.2 MONITORING] (COd-)

| The parameters described on this page can be accessed by: DRI- > MOn- > COd- | |
|---|---|
| **Code** | **Name/Description** |
| COd- | **[PASSWORD]**<br>HMI access code.<br>If you have lost your code, please contact B&R. |
| CSt | **[State]**<br>Inverter state (locked/unlocked) Information parameter, cannot be modified. |
| LC | **[Locked]** (LC): The inverter is locked and requires a password to unlock. |
| ULC | **[Unlocked]**(ULC): The inverter is not locked and does not require a password. |
| COd | **[PIN code 1]**<br>Trusted access code.<br><br>Enables the configuration to be protected by mean of an access code.<br>If access is protected using a code, only the parameters in menus **[1.2 MONITORING]**(MOn-) and **[1.1 SPEED REFERENCE]**(rEF-) can be accessed. Key MODE can be used to switch between menus.<br><br>**Note:**<br>**Make a note of the code before entering it.** |
| OFF | **[OFF]**(OFF): No access codes.<br>• Enter a code in order to lock access (2 to 9,999). The value on the display can be increased using the handwheel. Then press ENT. **[ON]**(On) will be displayed on the screen, indicating that access is locked. |
| On | **[ON]**(On): Access is locked by means of a code (2 to 9,999).<br>• To unlock access, enter the code (increase the value on the display using the handwheel) and then press ENT. The code remains on the display and access is unlocked until the next time the inverter is switched off. The next time the inverter is switched on, access is locked again.<br>• If an invalid code is entered, the display changes to **[ON]**(On). Access remains locked.<br>Access is unlocked (the code is shown on the display).<br>• To lock access again using the same code after it has been unlocked, use the handwheel to enter setting **[ON]**(On) and then press ENT. **[ON]**(On) will remain on the display, indicating that access is locked.<br>• To lock access using a new code after it has been unlocked, enter the new code (increase the value shown on the display using the handwheel) and then press ENT. **[ON]**(On) will be displayed on the screen, indicating that access is locked.<br>• To clear the access lock after it has been unlocked, use the handwheel to enter setting **[OFF]**(OFF) and then press ENT. **[OFF]**(OFF) will continue to be displayed. Access is unlocked and will still be unlocked after the next restart. |
| COd2<br>★ | **[PIN code 2]**<br>Access code 2. Displayed when **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr). |
| OFF | Value **[OFF]** (OFF) indicates that no password has been set for **[Unlocked]**(ULC) |
| On | Value **[ON]** (On) indicates that the inverter configuration is protected and that an access code must be entered to unlock it. Once the correct code has been entered, it remains on the display and the inverter is unlocked until the next time the power supply is switched off. |
| 8888 | PIN code 2 is an unlock code known only to B&R Product Support. |
| ULr | **[Upload rights]** |
| ULr0 | **[Permitted]**(ULr0): This indicates that ACPi SafeConfigurator or the graphic display terminal can store the entire configuration (password, protective functions, configuration). When editing the configuration, only unprotected parameters can be accessed. |
| ULr1 | **[Not allowed]**(ULr1): This indicates that ACPi SafeConfigurator or the graphic display terminal cannot store the configuration. |
| dLr | **[Download rights]** |
| dLr0 | **[Locked drv]**(dLr0): Inverter locked: This indicates that the configuration can only be downloaded to a locked inverter if the configuration for that inverter has the same password. If the passwords are different, the download is not permitted. |
| dLr1 | **[Unlock. drv]**(dLr1): Inverter unlocked: This indicates that the configuration can only be downloaded to a inverter that is not protected by an active password. |
| dLr2 | **[Not allowed]**(dLr2): Not permitted: The configuration cannot be downloaded. |
| dLr3 | **[Lock/unlock]**(dLr3): Locked and unlocked: Download is permitted based on case 0 or case 1. |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

## 5.2.3 Configuration mode (ConF)

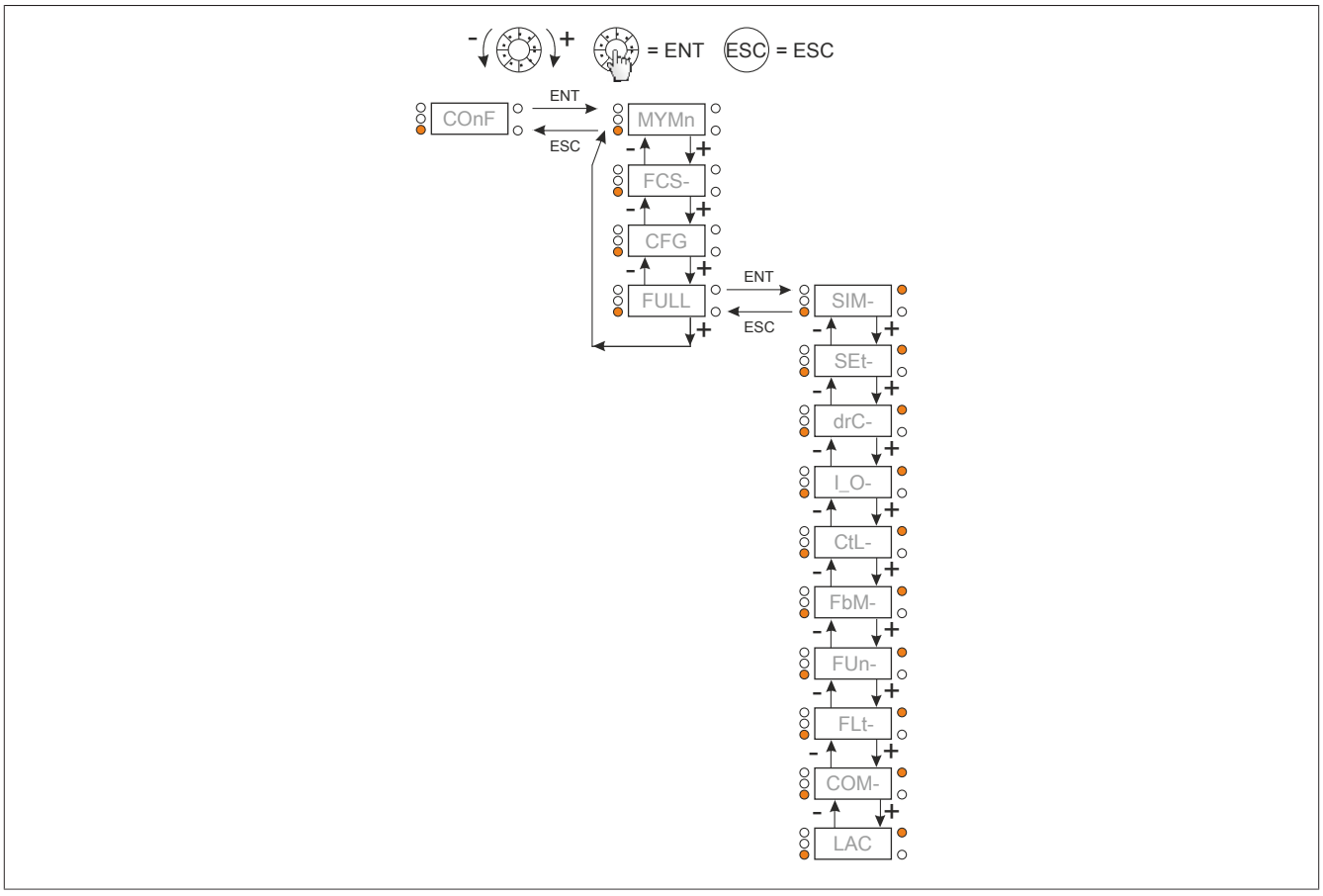
### 5.2.3.1 Introduction

The configuration mode is structured into 4 sections:

1) Menu "My Menu" contains up to 25 parameters for defining user-specific configurations via the graphic display terminal or ACPi SafeConfigurator.
2) Store/Access configured parameters: These two functions are used to store and access user-specific settings.
3) **[Macro configuration]**(CFG) This parameter enables the loading of preconfigured values for applications.
4) ALL PARAMETERS: This menu enables access to all other parameters. It contains 10 submenus:
   - **[SIMPLY START MENU]**(SIM-)
   - **[SETTINGS]**(SEt-)
   - **[MOTOR CONTROL]**(drC-)
   - **[INPUTS/ OUTPUTS CFG]**(I_O-)
   - **[COMMAND]**(CtL-)
   - **[FUNCTION BLOCK]**(FbM-)
   - **[APPLICATION FUNCT.]**(FUn-)
   - **[FAULT MANAGEMENT]**(FLt-)
   - **[COMMUNICATION]**(COM-)
   - **[ACCESS LEVEL]**(LAC)

### 5.2.3.2 Tree structure

The parameters are provided as an example.



### 5.2.3.3 My Menu

| The parameters described on this page can be accessed by: DRI- > COnF > MYMn | |
|---|---|
| **Code** | **Name/Description** |
| MYMn | [MY MENU]<br>This menu contains the parameters selected from menu [3.4 DISPLAY CONFIG.](dCF-). |

### 5.2.3.4 Factory settings

| The parameters described on this page can be accessed by: DRI- > COnF > FCS- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| FCS- | [Factory settings] | |
| FCSI | [Config. Source] | [Macro-Conf](InI) |
| | Choice of source configuration.<br>If the function for changing configurations has been set, [Config 1] (CFG1) and [Config 2] (CFG2) can be accessed.<br>**Note:**<br>**To load the default inverter settings stored previously ([Config 1](Str1) or [Config 2](Str2)), select source configuration [Select configuration](FCSI) = [Config 1](CFG1) or [Config 2](CFG2), followed by factory setting parameter [Goto FACTORY SETTINGS](GFS) = [YES](YES).** | |
| InI | [Macro-Conf](InI): Factory configuration: Restore selected macro configuration. | |
| CFG1 | [Config 1] (CFG1): Configuration 1 | |
| CFG2 | [Config 2] (CFG2): Configuration 2 | |
| FrY- | [PARAMETER GROUP LIST]<br>List of menus to be loaded.<br>**Note:**<br>**If the factory configuration is selected and factory settings have been restored, [PARAMETER GROUP LIST] will be empty.** | |
| ALL | [All] (ALL): All parameters | |
| drM | [Drive configuration](drM): Menu [1 DRIVE MENU](drI-) without [COMMUNICATION](COM-). In menu [2.4 DISPLAY CONFIG.][Return std name](GSP) is reset to [No](nO). | |
| MOt | [Motor param](MOt): Motor parameters The following selection options are only available if [Config. Source](FCSI) = [Macro configuration](InI). | |
| COM | [Comm. menu](COM): Menu [COMMUNICATION](COM-) without [Scan. In1 address](nMA1) to [Scan. IN8 address](nMA8) or [Scan. Out1 address](nCA1) to [Scan. Out8 address](nCA8). | |
| dIS | [Display config](dIS): Menu [3.3 MONITORING CONFIG.](MCF-) | |
| GFS | [Goto FACTORY SETTINGS]<br>**Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Make sure that restoring the factory settings is compatible with the wiring used.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>It is only possible to revert to the factory settings if at least one group of parameters has previously been selected. | |
| nO | [No](nO): No | |
| YES | [YES](YES): The parameter changes to [No](nO) automatically when the process is complete. | |
| SCSI | [Save config] | [No](nO) |
| | The active configuration to be saved does not appear for selection. If the configuration involves[Cnfg.0 act.](Str0), for example, only [Config 1](Str1) and [Config 2](Str2) are displayed. The parameter reverts back to [No](nO) when the process is complete. | |
| nO | [No](nO): No | |
| Str0 | [Cnfg.0 act.](Str0): ENT must be pressed and held for two seconds. | |
| Str1 | [Config 1](Str1): ENT must be pressed and held for two seconds. | |
| Str2 | [Config 2](Str2): ENT must be pressed and held for two seconds. | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.5 Macro configuration

| The parameters described on this page can be accessed by: DRI- > COnF > CFG | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory setting** |
| CFG | [Macro configuration] | [Start/Stop](StS) |
| ★ 2 s | **Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Make sure that the selected macro configuration is compatible with the type of wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| StS | [Start/Stop] (StS): Start/Stop | |
| HdG | [M. handling](HdG): Materials handling | |
| HSt | [Hoisting](HSt): Hoisting gear | |
| GEn | [Gen. Use](GEn): General applications | |
| PId | [PID regul.](PId): PID controllers | |
| nEt | [Network C.](nEt): Communication bus | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### Example of total return to factory settings

- [Selection config.] (FCSI) = [Macro conf] (InI)
- [PARAMETER GROUP](FrY-) = [All](ALL)
- [Goto FACTORY SETTINGS](GFS) = [Yes](YES)

### Assignment of the inputs / outputs

| Input/output | [Start/Stop] | [M. handling] | [Gen. Use] | [Hoisting] | [PID regul.] | [Network C.] |
|---|---|---|---|---|---|---|
| [AI1] | [Ref.1 channel] | [Ref.1 channel] | [Ref.1 channel] | [Ref.1 channel] | [Ref.1 channel] (PID setpoint) | [Ref.2 channel] ([Ref.1 channel] = Integrated Modbus) (1) |
| [AI2] | [No] | [Summing ref. 2] | [Summing ref. 2] | [No] | [PID feedback] | [No] |
| [AI3] | [No] | [No] | [No] | [No] | [No] | [No] |
| [AO1] | [No] | [No] | [No] | [No] | [No] | [No] |
| [R1] | [No fault] | [No fault] | [No fault] | [No fault] | [No fault] | [No fault] |
| [R2] | [No] | [No] | [No] | [Brk control] | [No] | [No] |
| [LI1] (2 wire) | [Forward] | [Forward] | [Forward] | [Forward] | [Forward] | [Forward] |
| [LI2] (2 wire) | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] |
| [LI3] (2 wire) | [No] | [2 preset speeds] | [Jog] | [FAULT RESET] | [PID integral reset] | [Ref. 2 switching] |
| [LI4] (2 wire) | [No] | [4 preset speeds] | [FAULT RESET] | [External fault] | [2 preset PID ref.] | [FAULT RESET] |
| [LI5] (2 wire) | [No] | [8 preset speeds] | [Torque limitation] | [No] | [4 preset PID ref.] | [No] |
| [LI6] (2 wire) | [No] | [FAULT RESET] | [No] | [No] | [No] | [No] |
| [LI1] (3 wire) | [Run] | [Run] | [Run] | [Run] | [Run] | [Run] |
| [LI2] (3 wire) | [Forward] | [Forward] | [Forward] | [Forward] | [Forward] | [Forward] |
| [LI3] (3 wire) | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] | [Reverse assign.] |
| [LI4] (3 wire) | [No] | [2 preset speeds] | [Jog] | [FAULT RESET] | [PID integral reset] | [Ref. 2 switching] |
| [LI5] (3 wire) | [No] | [4 preset speeds] | [FAULT RESET] | [External fault] | [2 preset PID ref.] | [FAULT RESET] |
| [LI6] (3 wire) | [No] | [8 preset speeds] | [Torque limitation] | [No] | [4 preset PID ref.] | [No] |
| [LO1] | [No] | [No] | [No] | [No] | [No] | [No] |
| Graphic display terminal keys | | | | | | |
| F1 key | [No] | [No] | [No] | [No] | [No] | Control via graphic display terminal |
| Keys F2, F3, F4 | [No] | [No] | [No] | [No] | [No] | [No] |

(1) For startup with an integrated Modbus, [Modbus Address](Add) must be configured first.

| | |
|---|---|
| | In 3-wire control, the assignment of inputs LI1 to LI6 shifts. |

**Note:**

**These pinouts are reinitialized every time the macro configuration changes.**

### Other configurations and settings

In addition to the I/O pinout, additional parameters are assigned, **however, only in macro configuration "Hoisting".**

**Hoisting:**

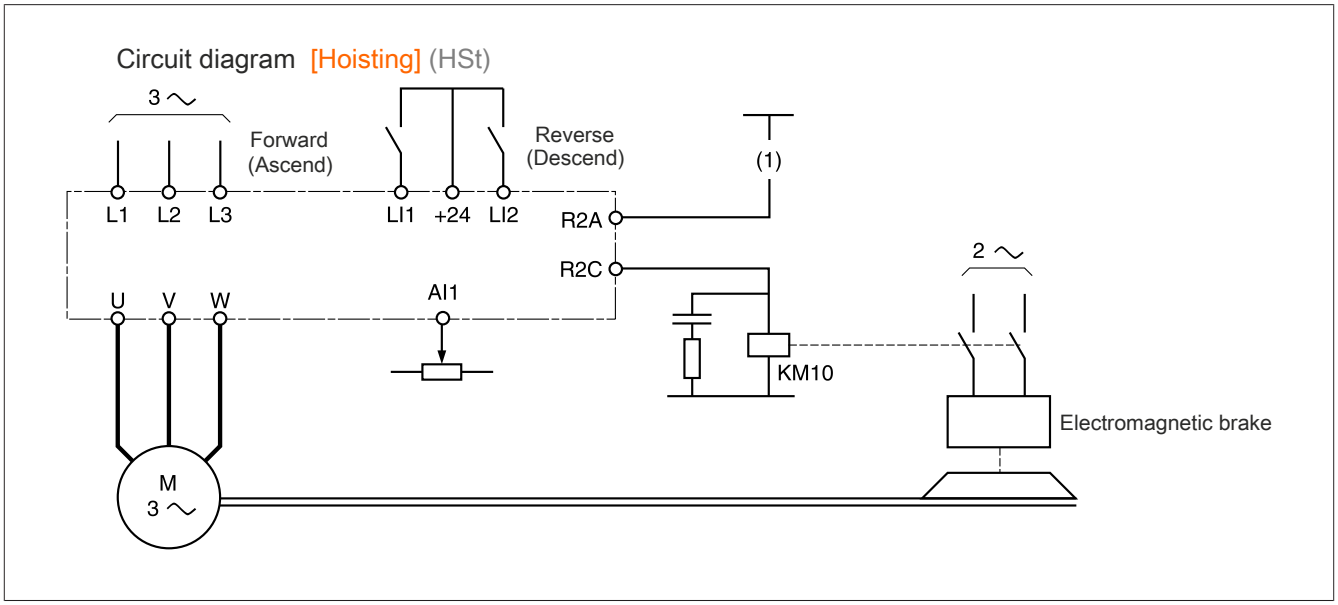
- [Movement type](bSt) = [Hoisting](UEr)
- [Brake contact](bCl) = [No](nO)
- [Brake impulse](bIP) = [YES](YES)
- [Brake release I FW](Ibr) = 0 A
- [Brake Release time](brt) = 0 s
- [Brake release freq.](bIr) = [Auto](AUtO)
- [Brake engage freq.](bEn) = [Auto](AUtO)
- [Brake engage time](bEt) = 0 s
- [Engage at reversal] (bEd) = [No](nO)
- [Jump at reversal](JdC) =[Auto](AUtO)
- [Time to restart](ttr) = 0 s
- [Current ramp time](brr) = 0 s
- [Low speed](LSP) = Motor rated slip calculated by inverter
- [Output Phase Loss](OPL) = [YES](YES))
  This parameter can no longer be changed.
- [Catch on the fly](FLr) = [No](nO)
  This parameter can no longer be changed.

**Revert to factory settings:**

Using [Config. Source](FCSI) = [Macro-Conf](InI) to revert to factory settings results in reversion to the selected macro configuration. The parameter [Macro configuration](CFG) does not change, however [Customized macro](CCFG) is deleted.

> **Note:**
>
> **The factory settings correspond to [Macro configuration](CFG) = [Start/Stop](StS), that is, the factory defined macro configuration.**

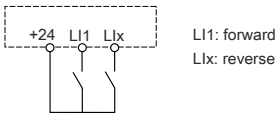
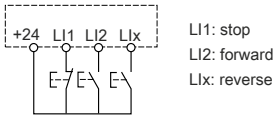
**Example diagrams for use with the macro configurations**




(1) If there is no existing safety function, a safety module contact must be integrated into the brake circuit, so that the brakes are engaged safely when the safety function "Safe Torque Off" is activated (see "Wiring instructions").

## 5.2.3.6 FuLL

### 5.2.3.6.1 [SIMPLY START] (SIM-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SIM- | **[SIMPLY START]** | | |
| tCC<br>2 s | **[2/3 wire control]** | | **[2 wire]**(2C) |
| | **Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Changing this parameter causes parameters [Reverse assign.](rrS) and [2 wire type](tCt) as well as the digital inputs assignments to revert to factory settings.**<br>**Check that this change is compatible with the wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | | |
| 2C | **[2 wire]**(2C)<br>**2-wire control (level-controlled)**: The input state (0 or 1) or edge (0 to 1 or 1 to 0) controls running or stopping.<br>  <br> | | |
| 3C | **[3 wire]**(3C)<br>**3-wire control (edge-controlled):** A "forward" or "reverse" pulse is sufficient to control motor startup. A "stop" pulse is sufficient to control motor stopping.<br>Source wiring example:<br>  <br> | | |
| CFG<br>2 s | **[Macro configuration]** | | **[Start/Stop]**(StS) |
| | **Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Make sure that the selected macro configuration is compatible with the type of wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | | |
| StS | **[Start/Stop]** (StS): Start/Stop | | |
| HdG | **[M. handling]**(HdG): Materials handling | | |
| HSt | **[Hoisting]**(HSt): Hoisting gear | | |
| GEn | **[Gen. Use]**(GEn): General applications | | |
| PId | **[PID regul.]**(PId): PID controllers | | |
| nEt | **[Network C.]**(nEt): Communication bus | | |
| CCFG | **[Customized macro]**<br>Read-only parameter, only visible if at least one macro configuration parameter has been modified. | | |
| nO | **[No]**(nO): No | | |
| YES | **[YES]**(YES): Yes | | |
| bFr | **[Standard mot. freq]** | | **[50 Hz IEC]**(50) |
| | This parameter changes the default setting of the following parameters: **[Rated motor volt.]**(UnS), **[High speed]**(HSP), **[Freq. threshold]**(Ftd), **[Rated motor freq.]**(FrS) and **[Max frequency]**(tFr). | | |
| 50 | **[50Hz IEC]**(50): 50 Hz inverter | | |
| 60 | **[60Hz NEMA]**(60): 60 Hz inverter | | |
| IPL | **[Input phase loss]** | | Yes or No, depending on the inverter power |
| | This parameter is available in this menu for 3-phase inverters only.<br>If a phase is lost, the inverter switches to error mode **[Input phase loss]**(PHF). If two or three phases are lost, however, the inverter resumes operation until an undervoltage error is triggered (the inverter triggers **[Input phase loss]**(PHF) in the case of a mains phase failure that results in power loss). | | |
| nO | **[Ignore]**(nO): Error ignored: To be used when the power to the inverter is supplied via a single-phase supply or by the DC bus. | | |
| YES | **[Freewheel]**(YES): Error when coasting to a stop. | | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| nPr | [Rated motor power] | See table. | See table. |

Rated motor power per the nameplate, in kW, if [Standard mot. freq](bFr) = [50 Hz IEC](50) or in HP, if [Standard mot. freq](bFr) = [60 Hz NEMA](60).

For induction motors with (BFR) = 50 Hz, the following table applies:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [10 W] | Max. value [10 W] | Default [10 W] |
| 8I66x200018.00-000 | 9 | 55 | 18 |
| 8I66x200037.00-000 | 9 | 75 | 37 |
| 8I66x200055.00-000 | 9 | 110 | 55 |
| 8I66x200075.00-000 | 9 | 150 | 75 |
| 8I66x200110.00-000 | 9 | 220 | 110 |
| 8I66x200150.00-000 | 18 | 300 | 150 |
| 8I66x200220.00-000 | 37 | 400 | 220 |
| 8I66T200300.00-000 | 55 | 550 | 300 |
| 8I66T200400.00-000 | 75 | 750 | 400 |
| 8I66T200550.00-000 | 110 | 1100 | 550 |
| 8I66T200750.00-000 | 150 | 1500 | 750 |
| 8I66T201100.00-000 | 220 | 1850 | 1100 |
| 8I66T201500.00-000 | 300 | 2200 | 1500 |
| 8I66T400037.00-000 | 9 | 75 | 37 |
| 8I66T400055.00-000 | 9 | 110 | 55 |
| 8I66T400075.00-000 | 9 | 150 | 75 |
| 8I66T400110.00-000 | 9 | 220 | 110 |
| 8I66T400150.00-000 | 18 | 300 | 150 |
| 8I66T400220.00-000 | 37 | 400 | 220 |
| 8I66T400300.00-000 | 55 | 550 | 300 |
| 8I66T400400.00-000 | 75 | 750 | 400 |
| 8I66T400550.00-000 | 110 | 1100 | 550 |
| 8I66T400750.00-000 | 150 | 1500 | 750 |
| 8I66T401100.00-000 | 220 | 1850 | 1100 |
| 8I66T401500.00-000 | 300 | 2200 | 1500 |
| 8I66T600075.00-000 | 9 | 150 | 75 |
| 8I66T600150.00-000 | 18 | 300 | 150 |
| 8I66T600220.00-000 | 37 | 400 | 220 |
| 8I66T600400.00-000 | 75 | 750 | 400 |
| 8I66T600550.00-000 | 110 | 1100 | 550 |
| 8I66T600750.00-000 | 150 | 1500 | 750 |
| 8I66T601100.00-000 | 220 | 1850 | 1100 |
| 8I66T601500.00-000 | 300 | 2200 | 1500 |

For induction motors with (BFR) = 60 Hz, the following table applies:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 HP] | Max. value [0.1 HP] | Default [0.1 HP] |
| 8I66x200018.00-000 | 1 | 8 | 3 |
| 8I66x200037.00-000 | 1 | 10 | 5 |
| 8I66x200055.00-000 | 1 | 15 | 8 |
| 8I66x200075.00-000 | 1 | 20 | 10 |
| 8I66x200110.00-000 | 1 | 30 | 15 |
| 8I66x200150.00-000 | 3 | 40 | 20 |
| 8I66x200220.00-000 | 5 | 50 | 30 |
| 8I66T200300.00-000 | 8 | 70 | 40 |
| 8I66T200400.00-000 | 10 | 100 | 50 |
| 8I66T200550.00-000 | 15 | 150 | 70 |
| 8I66T200750.00-000 | 20 | 200 | 100 |
| 8I66T201100.00-000 | 30 | 250 | 150 |
| 8I66T201500.00-000 | 40 | 300 | 200 |
| 8I66T400037.00-000 | 1 | 10 | 5 |
| 8I66T400055.00-000 | 1 | 15 | 8 |
| 8I66T400075.00-000 | 1 | 20 | 10 |
| 8I66T400110.00-000 | 1 | 30 | 15 |
| 8I66T400150.00-000 | 3 | 40 | 20 |
| 8I66T400220.00-000 | 5 | 50 | 30 |
| 8I66T400300.00-000 | 6 | 70 | 40 |
| 8I66T400400.00-000 | 8 | 100 | 50 |
| 8I66T400550.00-000 | 15 | 150 | 70 |
| 8I66T400750.00-000 | 20 | 200 | 100 |
| 8I66T401100.00-000 | 30 | 250 | 150 |
| 8I66T401500.00-000 | 40 | 300 | 200 |
| 8I66T600075.00-000 | 1 | 20 | 10 |
| 8I66T600150.00-000 | 3 | 40 | 20 |
| 8I66T600220.00-000 | 5 | 50 | 30 |
| 8I66T600400.00-000 | 8 | 100 | 50 |
| 8I66T600550.00-000 | 10 | 150 | 70 |
| 8I66T600750.00-000 | 15 | 200 | 100 |
| 8I66T601100.00-000 | 20 | 250 | 150 |
| 8I66T601500.00-000 | 30 | 300 | 200 |

| | | | |
|---|---|---|---|
| UnS | [Rated motor volt.] | 100 to 480 V | According to inverter performance |

Nominal voltage of the motor specified on the nameplate. 8I66S200xxx.00-000: 100 to 240 V - 8I66T40xxxx.00-000: 200 to 480 V - 8I66T60xxxx.00-000: 525 to 600 V

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| nCr | **[Rated mot. current]** | See table(1). | See table. |

Nominal current per the nameplate.

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 11 |
| 8I66x200037.00-000 | 8 | 50 | 19 |
| 8I66x200055.00-000 | 9 | 56 | 29 |
| 8I66x200075.00-000 | 12 | 72 | 35 |
| 8I66x200110.00-000 | 17 | 104 | 48 |
| 8I66x200150.00-000 | 20 | 120 | 61 |
| 8I66x200220.00-000 | 27 | 165 | 88 |
| 8I66T200300.00-000 | 34 | 206 | 125 |
| 8I66T200400.00-000 | 43 | 263 | 158 |
| 8I66T200550.00-000 | 68 | 413 | 206 |
| 8I66T200750.00-000 | 82 | 495 | 263 |
| 8I66T201100.00-000 | 135 | 810 | 369 |
| 8I66T201500.00-000 | 165 | 990 | 495 |
| 8I66T400037.00-000 | 3 | 23 | 10 |
| 8I66T400055.00-000 | 4 | 29 | 14 |
| 8I66T400075.00-000 | 5 | 35 | 20 |
| 8I66T400110.00-000 | 7 | 45 | 25 |
| 8I66T400150.00-000 | 10 | 62 | 35 |
| 8I66T400220.00-000 | 13 | 83 | 51 |
| 8I66T400300.00-000 | 17 | 107 | 72 |
| 8I66T400400.00-000 | 23 | 143 | 91 |
| 8I66T400550.00-000 | 35 | 215 | 119 |
| 8I66T400750.00-000 | 42 | 255 | 152 |
| 8I66T401100.00-000 | 69 | 416 | 213 |
| 8I66T401500.00-000 | 82 | 495 | 286 |
| 8I66T600075.00-000 | 4 | 26 | 11 |
| 8I66T600150.00-000 | 6 | 41 | 22 |
| 8I66T600220.00-000 | 9 | 59 | 30 |
| 8I66T600400.00-000 | 15 | 92 | 49 |
| 8I66T600550.00-000 | 22 | 135 | 74 |
| 8I66T600750.00-000 | 27 | 165 | 95 |
| 8I66T601100.00-000 | 42 | 255 | 145 |
| 8I66T601500.00-000 | 55 | 330 | 188 |

| | | | |
|---|---|---|---|
| FrS | **[Rated motor freq.]** | 10 to 800 Hz | 50 Hz |

Rated motor frequency given on the nameplate.
The factory setting is 50 Hz and is replaced by a default setting of 60 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz.
This parameter is not available if **[Motor control type]**(Ctt) = **[Sync. mot.]**(SYn).

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| nSP | **[Rated motor speed]** | See table. | See table for induction motors. |

Rated motor speed given on the nameplate.
This parameter is not available if **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn).
0 to 9999 rpm then 10.00 to 60.00 krpm on the integrated display terminal.
If, instead of the nominal speed, the nameplate indicates the synchronous speed and the slip in Hz or as a percentage, calculate the nominal speed as follows:

$$Nominal\ speed = Synchronous\ speed \times \frac{100 - slip\ as\ a\ \%}{100}$$

or

$$Nominal\ speed = Synchronous\ speed \times \frac{50 - slip\ in\ Hz}{50}\ (50\ Hz\ motors)$$

or

$$Nominal\ speed = Synchronous\ speed \times \frac{60 - slip\ in\ Hz}{60}\ (60\ Hz\ motors)$$

If (BFR) = 50:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66x200018.00-000 | 0 | 65535 | 1410 |
| 8I66x200037.00-000 | | | 1425 |
| 8I66x200055.00-000 | | | 1400 |
| 8I66x200075.00-000 | | | 1400 |
| 8I66x200110.00-000 | | | 1410 |
| 8I66x200150.00-000 | | | 1420 |
| 8I66x200220.00-000 | | | 1430 |
| 8I66T200300.00-000 | | | 1420 |
| 8I66T200400.00-000 | | | 1425 |
| 8I66T200550.00-000 | | | 1430 |
| 8I66T200750.00-000 | | | 1450 |
| 8I66T201100.00-000 | | | 1450 |
| 8I66T201500.00-000 | | | 1455 |
| 8I66T400037.00-000 | | | 1425 |
| 8I66T400055.00-000 | | | 1400 |
| 8I66T400075.00-000 | | | 1400 |
| 8I66T400110.00-000 | | | 1410 |
| 8I66T400150.00-000 | | | 1420 |
| 8I66T400220.00-000 | | | 1430 |
| 8I66T400300.00-000 | | | 1420 |
| 8I66T400400.00-000 | | | 1425 |
| 8I66T400550.00-000 | | | 1430 |
| 8I66T400750.00-000 | | | 1450 |
| 8I66T401100.00-000 | | | 1450 |
| 8I66T401500.00-000 | | | 1455 |
| 8I66T600075.00-000 | | | 1400 |
| 8I66T600150.00-000 | | | 1420 |
| 8I66T600220.00-000 | | | 1430 |
| 8I66T600400.00-000 | | | 1425 |
| 8I66T600550.00-000 | | | 1430 |
| 8I66T600750.00-000 | | | 1450 |
| 8I66T601100.00-000 | | | 1450 |
| 8I66T601500.00-000 | | | 1455 |

If (BFR) = 60:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66x200018.00-000 | 0 | 65535 | 1680 |
| 8I66x200037.00-000 | | | 1720 |
| 8I66x200055.00-000 | | | 1700 |
| 8I66x200075.00-000 | | | 1700 |
| 8I66x200110.00-000 | | | 1680 |
| 8I66x200150.00-000 | | | 1715 |
| 8I66x200220.00-000 | | | 1715 |
| 8I66T200300.00-000 | | | 1760 |
| 8I66T200400.00-000 | | | 1769 |
| 8I66T200550.00-000 | | | 1780 |
| 8I66T200750.00-000 | | | 1780 |
| 8I66T201100.00-000 | | | 1766 |
| 8I66T201500.00-000 | | | 1771 |
| 8I66T400037.00-000 | | | 1720 |
| 8I66T400055.00-000 | | | 1700 |
| 8I66T400075.00-000 | | | 1700 |
| 8I66T400110.00-000 | | | 1680 |
| 8I66T400150.00-000 | | | 1715 |
| 8I66T400220.00-000 | | | 1715 |
| 8I66T400300.00-000 | | | 1760 |
| 8I66T400400.00-000 | | | 1769 |
| 8I66T400550.00-000 | | | 1780 |
| 8I66T400750.00-000 | | | 1780 |
| 8I66T401100.00-000 | | | 1766 |
| 8I66T401500.00-000 | | | 1771 |
| 8I66T600075.00-000 | | | 1700 |
| 8I66T600150.00-000 | | | 1715 |
| 8I66T600220.00-000 | | | 1715 |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | | |
|---|---|---|---|---|
| **Code** | **Name/Description** | | **Setting range** | **Factory settings** |
| | **ACOPOSinverter P66** | **Setting range** | | |
| | | **Min. value [rpm]** | **Max. value [rpm]** | **Default [rpm]** |
| | 8I66T600400.00-000 | | | 1769 |
| | 8I66T600550.00-000 | | | 1780 |
| | 8I66T600750.00-000 | | | 1780 |
| | 8I66T601100.00-000 | | | 1766 |
| | 8I66T601500.00-000 | | | 1771 |
| tFr | **[Max frequency]**<br><br>The factory setting is 60 Hz and is replaced by a default setting of 72 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz.<br>The maximum value is limited by the following conditions:<br>It must not exceed 10 times the value of **[Rated motor freq.]**(FrS). | | 10 to 599 Hz<br>or 1*FrS(S) | 60 Hz (if (BFR) = 50 Hz) or 72 Hz (if (BFR) = 60 Hz) |
| tUn | **[Auto-tuning]** | | | **[No]**(nO) |
| tUS | **[Auto tuning status]**<br><br>This parameter is not stored when the inverter is switched off. It shows the autotuning state since the last time the device was commissioned. | | | **[Not done]**(tAb) |
| tAb | **[Not done]**(tAb): Autotuning has not been executed. | | | |
| PEnd | **[Idle]**(PEnd): Autotuning has been requested but has not been executed yet. | | | |
| PrOG | **[Active]**(PrOG): Autotuning is being performed. | | | |
| FAIL | **[Failed]**(FAIL): Autotuning failed. | | | |
| dOnE | **[Done]**(dOnE): The stator resistance measured by the autotuning function is used to control the motor. | | | |
| StUn | **[Tune selection]** | | | **[Default]**(tAb) |
| tAb | **[Default]**(tAb): The default value of the stator resistance is used to control the motor. | | | |
| MEAS | **[Measure]**(MEAS): The stator resistance measured by the autotuning function is used to control the motor. | | | |
| CUS | **[Customized]**(CUS): The manually configured stator resistance is used to control the motor. | | | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ItH | [Mot. therm. current] | See table(1). | See table. |

Motor thermal protection current, to be set to the rated operational current indicated on the nameplate.
If the motor control type for synchronous motors has been enabled: [Motor control type](Ctt) = [Sync. mot.](SYn)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 6 |
| 8I66x200037.00-000 | 6 | 50 | 16 |
| 8I66x200055.00-000 | 7 | 56 | 26 |
| 8I66x200075.00-000 | 9 | 72 | 28 |
| 8I66x200110.00-000 | 13 | 104 | 38 |
| 8I66x200150.00-000 | 16 | 120 | 49 |
| 8I66x200220.00-000 | 22 | 165 | 53 |
| 8I66T200300.00-000 | 27 | 206 | 96 |
| 8I66T200400.00-000 | 35 | 263 | 140 |
| 8I66T200550.00-000 | 55 | 416 | 175 |
| 8I66T200750.00-000 | 66 | 495 | 230 |
| 8I66T201100.00-000 | 108 | 810 | 290 |
| 8I66T201500.00-000 | 132 | 990 | 420 |
| 8I66T400037.00-000 | 3 | 23 | 6 |
| 8I66T400055.00-000 | 3 | 29 | 7 |
| 8I66T400075.00-000 | 4 | 35 | 15 |
| 8I66T400110.00-000 | 6 | 45 | 23 |
| 8I66T400150.00-000 | 8 | 62 | 31 |
| 8I66T400220.00-000 | 11 | 83 | 32 |
| 8I66T400300.00-000 | 14 | 107 | 63 |
| 8I66T400400.00-000 | 19 | 143 | 90 |
| 8I66T400550.00-000 | 28 | 215 | 102 |
| 8I66T400750.00-000 | 34 | 255 | 140 |
| 8I66T401100.00-000 | 55 | 416 | 179 |
| 8I66T401500.00-000 | 66 | 495 | 185 |
| 8I66T600075.00-000 | 3 | 26 | 15 |
| 8I66T600150.00-000 | 5 | 41 | 31 |
| 8I66T600220.00-000 | 7 | 59 | 32 |
| 8I66T600400.00-000 | 12 | 92 | 90 |
| 8I66T600550.00-000 | 18 | 135 | 102 |
| 8I66T600750.00-000 | 22 | 165 | 140 |
| 8I66T601100.00-000 | 34 | 255 | 179 |
| 8I66T601500.00-000 | 44 | 330 | 185 |

If a motor control type for induction motor has been enabled: [Motor control type](Ctt) ≠ [Sync. mot.](SYn)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 11 |
| 8I66x200037.00-000 | 6 | 50 | 19 |
| 8I66x200055.00-000 | 7 | 56 | 29 |
| 8I66x200075.00-000 | 9 | 72 | 35 |
| 8I66x200110.00-000 | 13 | 104 | 48 |
| 8I66x200150.00-000 | 16 | 120 | 61 |
| 8I66x200220.00-000 | 22 | 165 | 88 |
| 8I66T200300.00-000 | 27 | 206 | 125 |
| 8I66T200400.00-000 | 35 | 263 | 158 |
| 8I66T200550.00-000 | 55 | 413 | 206 |
| 8I66T200750.00-000 | 66 | 495 | 263 |
| 8I66T201100.00-000 | 108 | 810 | 369 |
| 8I66T201500.00-000 | 132 | 990 | 495 |
| 8I66T400037.00-000 | 3 | 23 | 10 |
| 8I66T400055.00-000 | 3 | 29 | 14 |
| 8I66T400075.00-000 | 4 | 35 | 20 |
| 8I66T400110.00-000 | 6 | 45 | 25 |
| 8I66T400150.00-000 | 8 | 62 | 35 |
| 8I66T400220.00-000 | 11 | 83 | 51 |
| 8I66T400300.00-000 | 14 | 107 | 72 |
| 8I66T400400.00-000 | 19 | 143 | 91 |
| 8I66T400550.00-000 | 28 | 215 | 119 |
| 8I66T400750.00-000 | 34 | 255 | 152 |
| 8I66T401100.00-000 | 55 | 416 | 213 |
| 8I66T401500.00-000 | 66 | 495 | 286 |
| 8I66T600075.00-000 | 3 | 26 | 11 |
| 8I66T600150.00-000 | 5 | 41 | 22 |
| 8I66T600220.00-000 | 7 | 59 | 30 |
| 8I66T600400.00-000 | 12 | 92 | 49 |
| 8I66T600550.00-000 | 18 | 135 | 74 |
| 8I66T600750.00-000 | 22 | 165 | 95 |
| 8I66T601100.00-000 | 34 | 255 | 145 |
| 8I66T601500.00-000 | 44 | 330 | 188 |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > SIM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ACC | [Acceleration] | 0.00 to 6000 s(2) | 3.0 s |
| | Time taken to accelerate from 0 to [Rated motor freq.](FrS). To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| dEC | [Deceleration] | 0.00 to 6000 s(2) | 3.0 s |
| | Time taken to decelerate from [Rated motor freq.](FrS) to 0. To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| LSP | [Low speed] | 0 to 599 Hz or (HSP) | 0 |
| | Motor speed with minimum setpoint, setting from 0 to [High speed](HSP). | | |
| HSP | [High speed] | 0 to 599 Hz | 50 Hz |
| | Motor speed with maximum setpoint, setting from [Low speed](LSP) to [Max frequency](tFr). The factory setting changes to 60 Hz if [Standard mot. freq](bFr) = [60 Hz NEMA] (60). | | |

(1) Corresponding to the nominal current of the inverter specified in the installation manual and on the nameplate.
(2) Range between 0.01 and 99.99 s, 0.1 and 999.9 s or 1 and 6,000 s, in accordance with [Ramp increment] (Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

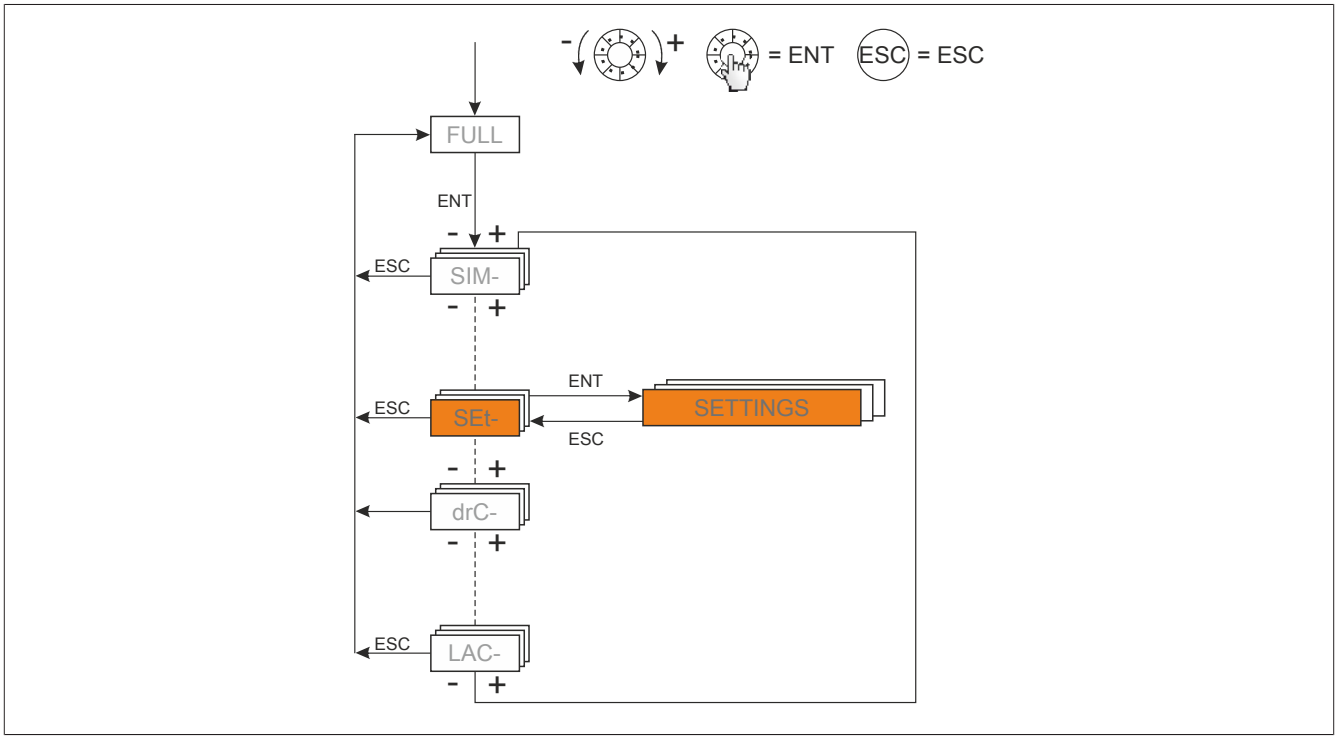
2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

## 5.2.3.6.2 [SETTINGS] (SEt-)

### With integrated display terminal

It is recommended to stop the motor before making any changes to the settings.

Via menu (COnF).




The adjustment parameters can be modified with the inverter running or stopped.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SEt- | [SETTINGS] | | |
| Inr | [Ramp increment] | | 0.1 |
| | This parameter applies to [Acceleration](ACC), [Deceleration] (dEC), [Acceleration 2](AC2) and [Deceleration 2] (dE2). | | |
| 0.01 | [0,01]: 99.99-second ramp | | |
| 0.1 | [0,1]: 999.9-second ramp | | |
| 1 | [1]: 6,000-second ramp | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ACC | **[Acceleration]** | 0.00 to 6000 s(1) | 3.0 s |
| | Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| dEC | **[Deceleration]** | 0.00 to 6000 s(1) | 3.0 s |
| | Time taken to decelerate from **[Rated motor freq.]**(FrS) to 0. Make sure that this value is compatible with the drive's moment of inertia. | | |
| AC2 | **[Acceleration 2]** | 0.00 to 6000 s(1) | 5 s |
| | Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| dE2 | **[Deceleration 2]** | 0.00 to 6000 s(1) | 5 s |
| | Time taken to decelerate from **[Rated motor freq.]**(FrS) to 0. Make sure that this value is compatible with the drive's moment of inertia. | | |
| tA1 | **[Begin Acc round]** | 0 to 100% | 10% |
| | Rounding of the acceleration ramp start as a % of ramp time **[Acceleration]**(ACC) or **[Acceleration 2]** (AC2). Available if **[Ramp type]**(rPt) = **[Customized]**(CUS). | | |
| tA2 | **[End Acc round]** | 0 to 100% | 10% |
| | Rounding of the acceleration ramp end as a % of acceleration time **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2). Can be set to between 0% and 100% - **[Begin Acc round]**(tA1). Available if **[Ramp type]**(rPt) = **[Customized]**(CUS). | | |
| tA3 | **[Begin Dec round]** | 0 to 100% | 10% |
| | Rounding of the deceleration ramp start as a % of ramp time **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2). Available if **[Ramp type]**(rPt) = **[Customized]**(CUS). | | |
| tA4 | **[End Dec round]** | 0 to 100% | 10% |
| | Rounding of the deceleration ramp end as a % of ramp time **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2). Can be set to between 0% and 100% - **[Begin Dec round]** (tA3). Available if **[Ramp type]**(rPt) = **[Customized]**(CUS). | | |
| LSP | **[Low speed]** | 0 to 599 Hz or (HSP) | 0 Hz |
| | Motor speed with minimum setpoint, setting from 0 to **[High speed]**(HSP). | | |
| HSP | **[High speed]** | 0 or (LSP) to 599 Hz or (TFR) | 50 Hz (if (BFR) = 50 Hz) or 60 Hz (if (BFR) = 60 Hz) |
| | Motor speed with maximum setpoint, setting from **[Low speed]**(LSP) to **[Max frequency]**(tFr). The factory setting changes to 60 Hz if **[Standard mot. freq]**(bFr) = **[60 Hz NEMA]** (60). | | |
| HSP2 | **[High speed 2]** | 0 to 599 Hz | 50 Hz |
| | Available if **[2 High speed]**(SH2) has not been set to**[No]**(nO). | | |
| HSP3 | **[High speed 3]** | 0 to 599 Hz | 50 Hz |
| | Available if **[4 High speed]**(SH4) has not been set to**[No]**(nO). | | |
| HSP4 | **[High speed 4]** | 0 to 599 Hz | 50.0 Hz |
| | Available if **[4 High speed]**(SH4) has not been set to**[No]**(nO). | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ItH | **[Mot. therm. current]** | See table(2). | See table. |

Motor thermal protection current, to be set to the rated operational current indicated on the nameplate.
If the motor control type for synchronous motors has been enabled: **[Motor control type]**(Ctt) = **[Sync. mot.]**(SYn)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 6 |
| 8I66x200037.00-000 | 6 | 50 | 16 |
| 8I66x200055.00-000 | 7 | 56 | 26 |
| 8I66x200075.00-000 | 9 | 72 | 28 |
| 8I66x200110.00-000 | 13 | 104 | 38 |
| 8I66x200150.00-000 | 16 | 120 | 49 |
| 8I66x200220.00-000 | 22 | 165 | 53 |
| 8I66T200300.00-000 | 27 | 206 | 96 |
| 8I66T200400.00-000 | 35 | 263 | 140 |
| 8I66T200550.00-000 | 55 | 416 | 175 |
| 8I66T200750.00-000 | 66 | 495 | 230 |
| 8I66T201100.00-000 | 108 | 810 | 290 |
| 8I66T201500.00-000 | 132 | 990 | 420 |
| 8I66T400037.00-000 | 3 | 23 | 6 |
| 8I66T400055.00-000 | 3 | 29 | 7 |
| 8I66T400075.00-000 | 4 | 35 | 15 |
| 8I66T400110.00-000 | 6 | 45 | 23 |
| 8I66T400150.00-000 | 8 | 62 | 31 |
| 8I66T400220.00-000 | 11 | 83 | 32 |
| 8I66T400300.00-000 | 14 | 107 | 63 |
| 8I66T400400.00-000 | 19 | 143 | 90 |
| 8I66T400550.00-000 | 28 | 215 | 102 |
| 8I66T400750.00-000 | 34 | 255 | 140 |
| 8I66T401100.00-000 | 55 | 416 | 179 |
| 8I66T401500.00-000 | 66 | 495 | 185 |
| 8I66T600075.00-000 | 3 | 26 | 15 |
| 8I66T600150.00-000 | 5 | 41 | 31 |
| 8I66T600220.00-000 | 7 | 59 | 32 |
| 8I66T600400.00-000 | 12 | 92 | 90 |
| 8I66T600550.00-000 | 18 | 135 | 102 |
| 8I66T600750.00-000 | 22 | 165 | 140 |
| 8I66T601100.00-000 | 34 | 255 | 179 |
| 8I66T601500.00-000 | 44 | 330 | 185 |

If a motor control type for induction motor has been enabled: **[Motor control type]**(Ctt) ≠ **[Sync. mot.]**(SYn)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 11 |
| 8I66x200037.00-000 | 6 | 50 | 19 |
| 8I66x200055.00-000 | 7 | 56 | 29 |
| 8I66x200075.00-000 | 9 | 72 | 35 |
| 8I66x200110.00-000 | 13 | 104 | 48 |
| 8I66x200150.00-000 | 16 | 120 | 61 |
| 8I66x200220.00-000 | 22 | 165 | 88 |
| 8I66T200300.00-000 | 27 | 206 | 125 |
| 8I66T200400.00-000 | 35 | 263 | 158 |
| 8I66T200550.00-000 | 55 | 413 | 206 |
| 8I66T200750.00-000 | 66 | 495 | 263 |
| 8I66T201100.00-000 | 108 | 810 | 369 |
| 8I66T201500.00-000 | 132 | 990 | 495 |
| 8I66T400037.00-000 | 3 | 23 | 10 |
| 8I66T400055.00-000 | 3 | 29 | 14 |
| 8I66T400075.00-000 | 4 | 35 | 20 |
| 8I66T400110.00-000 | 6 | 45 | 25 |
| 8I66T400150.00-000 | 8 | 62 | 35 |
| 8I66T400220.00-000 | 11 | 83 | 51 |
| 8I66T400300.00-000 | 14 | 107 | 72 |
| 8I66T400400.00-000 | 19 | 143 | 91 |
| 8I66T400550.00-000 | 28 | 215 | 119 |
| 8I66T400750.00-000 | 34 | 255 | 152 |
| 8I66T401100.00-000 | 55 | 416 | 213 |
| 8I66T401500.00-000 | 66 | 495 | 286 |
| 8I66T600075.00-000 | 3 | 26 | 11 |
| 8I66T600150.00-000 | 5 | 41 | 22 |
| 8I66T600220.00-000 | 7 | 59 | 30 |
| 8I66T600400.00-000 | 12 | 92 | 49 |
| 8I66T600550.00-000 | 18 | 135 | 74 |
| 8I66T600750.00-000 | 22 | 165 | 95 |
| 8I66T601100.00-000 | 34 | 255 | 145 |
| 8I66T601500.00-000 | 44 | 330 | 188 |

| | | | |
|---|---|---|---|
| UFr | **[IR compensation]** | 0 to 200% | 100% |

IR compensation.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SLP | **[Slip compensation]** | 0 to 300% | 100% |
| | Slip compensation. | | |
| SFC | **[K speed loop filter]** | 0 to 100 | 65 |
| | Speed filter coefficient. | | |
| SIt | **[Speed time integral]** | 1 to 65,535 ms | 63 ms |
| | Integral time constant for speed control. | | |
| VOLT | **[Speed prop. gain]** | 0 to 1,000% | 40% |
| | Proportional gain for speed control. | | |
| SPGU | **[UF inertia comp.]** | 0 to 1,000% | 40% |
| | Factor of inertia. | | |

(1) Range between 0.01 and 99.99 s, 0.1 and 999.9 s or 1 and 6,000 s, in accordance with **[Ramp increment]** (Inr).
(2) Corresponding to the nominal current of the inverter specified in the installation manual or on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.2.1 Parameter settings

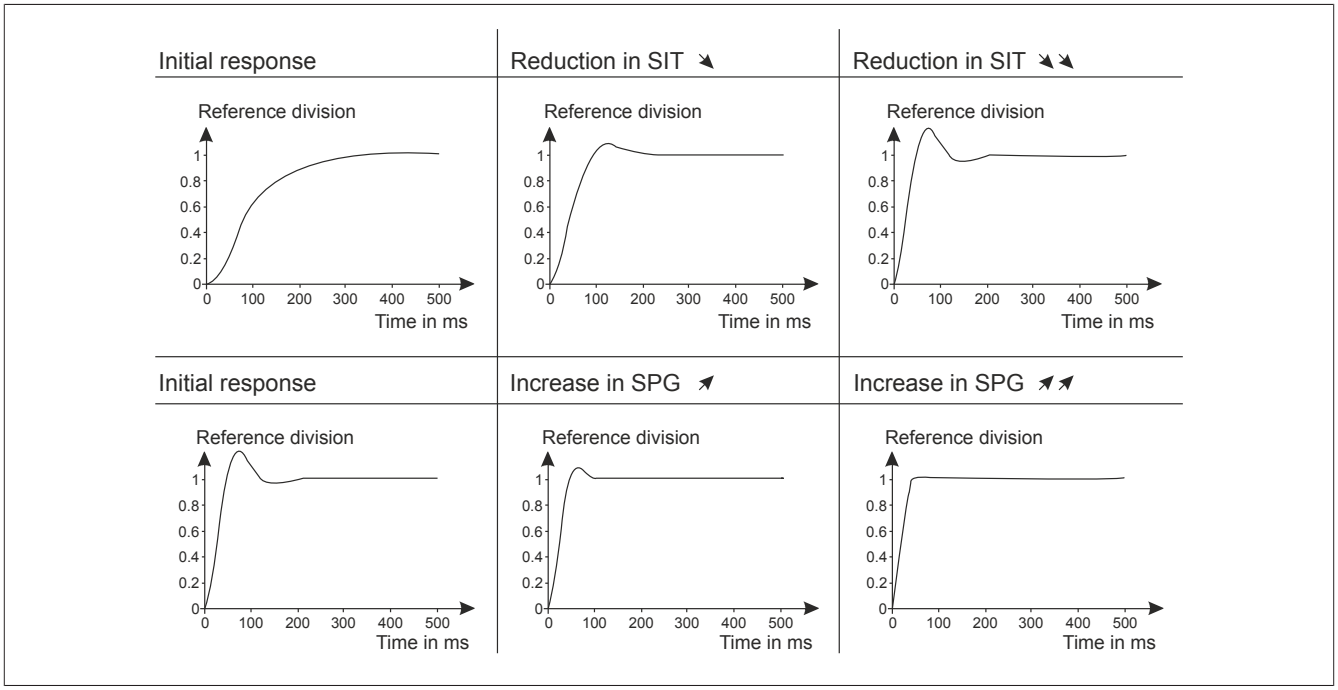
**Parameter settings for [K speed loop filter] (SFC), [Speed prop. gain] (SPG) and[Speed time integral] (SIt)**

The following parameters cannot be accessed if **[Motor control type]**(Ctt) is set to **[SVC U]**(UUC), **[Sync. mot.]**(SYn) or **[Energy Sav.]**(nLd).

**As a rule: Settings with [K speed loop filter](SFC) = 0**

The controller is an "IP" controller with speed setpoint filtering and is suitable for use in situations that require versatility and stability (for example, hoisting gear or high inertia machines).

- **[Speed prop. gain]**(SPG) affects speed overshoot.
- **[Speed time integral]**(SIt) affects bandwidth and response time.



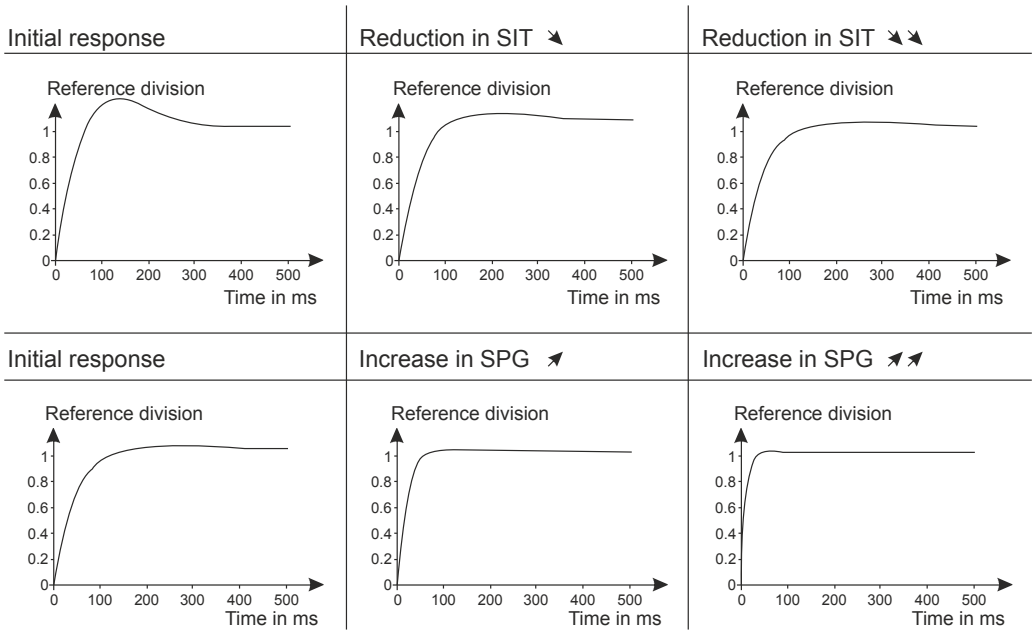

**Special case: Parameter [K speed loop filter](SFC) not equal to 0**

This parameter must be reserved for specific applications that require a short response time (for example, position control or distance control).

- When set to 100 as illustrated below, the controller is a "PI" controller without setpoint filtering.
- When set between 0 and 100, the resulting operation is an intermediate frequency between the settings indicated below and those on the previous page.

Example: Setting in which **[K speed loop filter]**(SFC) = 100

- **[Speed prop. gain]**(SPG) affects the bandwidth and the response time.
- **[Speed time integral]** (SIt) affects the speed overshoot.




| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SEt- | **[SETTINGS]** | | |
| dCF | **[Ramp divider]**<br>Reduction in deceleration ramp time. | 0 to 10 | 4 |
| IdC | **[DC inject. level 1]**<br>Level of DC injection braking current activated via logic input or selected as stop mode. | 0.1*INV to 1.41*INV (1) | 0.64*INV (1) |
| tdI | **[DC injection time 1]**<br>Maximum duration of current injection **[DC inject. level 1]**(IdC). After this time has elapsed, the direct current change to **[DC inject. level 2]**(IdC2). | 0.1 to 30 s | 0.5 s |
| IdC2 | **[DC inject. level 2]**<br>Current injection that will be enabled via the logic input or selected as stop mode once **[DC injection time 1]**(tdI) has expired. | 0.1*INV to IdC (1) | 0.5*INV (1) |
| tdC | **[DC injection time 2]**<br>Maximum duration of injection **[DC inject. level 2]**(IdC2), if the injection is selected as stop mode. | 0.1 to 30 s | 0.5 s |
| SdC1 | **[Auto DC inj. level 1]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Level of standstill DC injection current. **[Auto DC injection]**(AdC) is not set to **[No]**(nO). | 0 to 1.2*INV (1) | 0.7*INV (1) |
| tdC1 | **[Auto DC inj. time 1]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Standstill injection time. The parameter can be activated if **[Auto DC injection]**(AdC) is not set to **[No]**(nO).<br>If **[Motor control type]**(Ctt) is set to **[Sync. mot.]**(SYn), this time corresponds to the hold time at speed zero. | 0.1 to 30 s | 0.5 s |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SdC2 | **[Auto DC inj. level 2]** | 0 to 1.2*INV (1) | 0.5*INV (1) |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>2nd level of standstill DC injection current.<br>This parameter can be activated if **[Auto DC injection]**(AdC) is not set to **[No]**(nO). | | |
| tdC2 | **[Auto DC inj. time 2]** | 0 to 30 s | 0 s |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>2nd standstill injection time.<br>This parameter can be accessed if **[Auto DC injection]**(AdC) is set to **[YES]**(YES). | | |
| SFr | **[Switching freq.]** | 2 to 16 kHz or 4kHz (if (SVL) is enabled) | 4 kHz |
| | **Note:**<br>**MOTOR DAMAGE**<br>**If the EMC filter is separated in an IT power system, make sure that the inverter clock frequency does not exceed 4 kHz.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Switching frequency setting.<br>**Setting range:** The maximum value is limited to 4 kHz if parameter **[Motor surge limit]**(SVL) has been configured.<br>**Note:**<br>**In the event of an excessive temperature increase, the inverter will automatically reduce the clock frequency and then reset it again as soon as the temperature has reverted to within the normal range.** | | |
| CLI | **[CURRENT LIMIT.]** | 0 to 1.5*INV (1) | 1.5*INV (1) |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>• **Make sure that the motor has the required power rating for the applied maximum current.**<br>• **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Used to limit the motor current.<br>**Note:**<br>**If the setting is less than 0.25 In, the inverter can be locked in error mode [Output Phase Loss] (OPL) if this has been enabled. If this lies below the no-load current of the motor, the motor cannot run.** | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CL2 | [I Limit. 2 value] | 0 to 1.5*INV (1) | 1.5*INV (1) |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>• **Make sure that the motor has the required power rating for the applied maximum current.**<br>• **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | **Note:**<br>**If the setting is less than 0.25 In, the inverter can be locked in error mode [Output Phase Loss] (OPL) if this has been enabled. If this lies below the no-load current of the motor, the motor cannot run.** | | |
| FLU | [Motor fluxing] | | [No](FnO) |
| | **Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If parameter [Motor fluxing](FLU) is set to [continuous](FCt) fluxing will always occur, even when the motor is not running.**<br>**Make sure that this setting does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.** | | |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**To prevent motor overheating and damage, check whether the connected motor has the correct sizing for the magnetizing current.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | The parameter is available if [Motor control type](Ctt) is not set to [Sync. mot.](SYn).<br>In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.<br>In mode [continuous](FCt), the inverter automatically creates the magnetic flux at startup.<br>In mode [Not cont.](FnC), fluxing occurs when the motor has been started up.<br>The value of the magnetizing current is greater than [Rated mot. current](nCr) during the creation of the magnetic flux and is then regulated by the value of the magnetizing current of the motor. | | |
| FnC | [Not cont.](FnC): Non-continuous mode | | |
| FCt | [continuous](FCt): Continuous mode. This option is not possible if [Auto DC injection](AdC) is set to [YES](YES), or if [Type of stop](Stt) was set to [Freewheel](nSt). | | |
| FnO | [No](FnO): Function inactive. This option is not possible if [Brake assignment](bLC) is not set to [No](nO). | | |
| tLS | [Low speed time out] | 0 to 999.9 s | 0 s |
| | Maximum operating time with [Low speed](LSP). Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts when the speed setpoint is greater than LSP and if a move command still exists. | | |
| | **Note:**<br>**A value of 0 indicates an unlimited period of time.** | | |
| | **Note:**<br>**If [Low speed time out](tLS) is not equal to 0, parameter [Type of stop](Stt) is forced to [Ramp stop] (rMP) (only if "stop via ramp" can be configured).** | | |
| JGF | [Setpoint step mode] | 0 to 10 Hz | 10 Hz |
| | Reference in jog operation. | | |
| JGt | [Jog delay] | 0 to 2 s | 0.5 s |
| | Debounce delay between two consecutive step modes. | | |

(1) Corresponding to the nominal current of the inverter specified on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

To change the assignment of this parameter, press the ENT key for 2 seconds.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SEt- | **[SETTINGS] (Continued)** | | |
| SP2 | **[Preset speed 2]**<br>2nd preset speed. | 0 to 599 Hz | 10 Hz |
| SP3 | **[Preset speed 3]**<br>3rd preset speed. | 0 to 599 Hz | 15 Hz |
| SP4 | **[Preset speed 4]**<br>4th preset speed. | 0 to 599 Hz | 20 Hz |
| SP5 | **[Preset speed 5]**<br>5th preset speed. | 0 to 599 Hz | 25 Hz |
| SP6 | **[Preset speed 6]**<br>6th preset speed. | 0 to 599 Hz | 30 Hz |
| SP7 | **[Preset speed 7]**<br>7th preset speed. | 0 to 599 Hz | 35 Hz |
| SP8 | **[Preset speed 8]**<br>8th preset speed. | 0 to 599 Hz | 40 Hz |
| SP9 | **[Preset speed 9]**<br>9th preset speed. | 0 to 599 Hz | 45 Hz |
| SP10 | **[Preset speed 10]**<br>10th preset speed. | 0 to 599 Hz | 50 Hz |
| SP11 | **[Preset speed 11]**<br>11th preset speed. | 0 to 599 Hz | 55 Hz |
| SP12 | **[Preset speed 12]**<br>12th preset speed. | 0 to 599 Hz | 60 Hz |
| SP13 | **[Preset speed 13]**<br>13th preset speed. | 0 to 599 Hz | 70 Hz |
| SP14 | **[Preset speed 14]**<br>14th preset speed. | 0 to 599 Hz | 80 Hz |
| SP15 | **[Preset speed 15]**<br>15th preset speed. | 0 to 599 Hz | 90 Hz |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SP16 | **[Preset speed 16]**<br>16th preset speed. | 0 to 599 Hz | 100 Hz |
| MFr | **[Multiplying coeff.]**<br>Multiplication factor that is accessible when **[Multiplier ref.]**(MA2, MA3) is assigned to the graphic display terminal. | 0 to 100% | 100% |
| SrP | **[+/-Speed limitation]**<br>Limitation of +/- speed variation. | 0 to 50% | 10% |
| rPG | **[PID prop. gain]**<br>Proportional gain. | 0.01 to 100 | 1 |
| rIG | **[PID integral gain]**<br>Integral gain. | 0.01 to 100 | 1 |
| rdG | **[PID derivative gain]**<br>D component PID controller. | 0.00 to 100 | 0 |
| PrP | **[PID ramp]**<br>Ramp-up/down ramp of the PID, which is set for a range of **[Min PID reference]**(PIP1) to **[Max PID reference]** (PIP2) or vice versa. | 0 to 99.9 s | 0 s |
| POL | **[Min PID output]**<br>Minimum value of regulator output in hertz. | -599 to 599 Hz | 0 Hz |
| POH | **[Max PID output]**<br>Maximum value of regulator output in hertz. | 0 to 599 Hz | 60 Hz |
| PAL | **[Min fbk alarm]**<br>Minimum monitoring threshold for regulator feedback. | (2) | 100 |
| PAH | **[Max fbk alarm]**<br>Maximum monitoring threshold for regulator feedback. | (2) | 1.000 |
| PEr | **[PID error Alarm]**<br>Regulator error monitoring threshold. | 0 to 65535 (2) | 100 |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PSr | [Speed input %] | 1 to 100% | 100% |
| | Multiplying coefficient for predictive speed input. | | |
| rP2 | [Preset ref. PID 2] | (2) | 300 |
| | Preset PID value. | | |
| rP3 | [Preset ref. PID 3] | (2) | 600 |
| | Preset PID value. | | |
| rP4 | [Preset ref. PID 4] | (2) | 900 |
| | Preset PID value. | | |

(2) If there is no graphic display terminal used, values above 9,999 in four-digit display format are shown with a period as the thousands separator; for example, 15.65 for 15,650.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SEt- | [SETTINGS](Continued) | | |
| Ibr | [Brake release I FW] | 0 to 1.36*INV (1) | 0 |
| | Brake release current threshold for ascending or forward movement. | | |
| Ird | [Brake release I Rev] | 0 to 1.36*INV (1) | 0 |
| | Brake release current threshold for descending or counterclockwise rotation. | | |
| brt | [Brake Release time] | 0 to 5.00 s | 0 s |
| | Brake release time delay. | | |
| blr | [Brake release freq.] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |
| AUtO | [Auto](AUtO): Nominal value | | |
| bEn | [Brake engage freq.] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |
| | Threshold of the braking torque frequency. | | |
| tbE | [Brake engage delay] | 0 to 5.00 s | 0 s |
| | Time delay before request to engage brake. | | |
| bEt | [Brake engage time] | 0 to 5.00 s | 0 s |
| | Brake engage time (brake response time). | | |
| JdC | [Jump at reversal] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |
| AUtO | [Auto](AUtO): Nominal value | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ttr | **[Time to restart]**<br>Time between the end of a brake release sequence and the start of a brake engage sequence. | 0.00 to 15.00 s | 0.00 s |
| tLIM | **[Motoring torque lim]**<br>Torque limiting for motor operation in percent or increments of 0.1% of the nominal torque in accordance with parameter **[Torque increment]**(IntP). | 0 to 300% | 100% |
| tLIG | **[Gen. torque lim]**<br>Torque limiting for generator operation in percent or increments of 0.1% of nominal torque in accordance with parameter **[Torque increment]**(IntP). | 0 to 300% | 100% |
| trH | **[Traverse freq. high]**<br>High traverse frequency. | 0 to 10 Hz | 4 Hz |
| trL | **[Traverse freq. low]**<br>Low traverse frequency. | 0 to 10 Hz | 4 Hz |
| qSH | **[Quick step High]**<br>High quick step. | 0 to **[Traverse freq. high]**(trH) | 0 Hz |
| qSL | **[Quick step Low]**<br>Low quick step. | 0 to **[Traverse freq. low]**(trL) | 0 Hz |
| Ctd | **[Current threshold]**<br>Current threshold value of function **[I attained]**(CtA); assigned to a relay or a logic output. | 0 to 65535<br>or 1.5*INV (1) | INV (1) |
| ttH | **[High torque thd.]**<br>Higher torque threshold value of function **[High torque alarm]**(ttHA); assigned to a relay or logic output (as a percentage of the nominal torque). | -300% to +300% | 100% |
| ttL | **[Low torque thd.]**<br>Lower torque threshold value of function **[Low torque alarm]**(ttLA); assigned to a relay or logic output, as a percentage of the nominal torque. | -300% to +300% | 50% |
| FqL | **[Pulse warning thd.]**<br>Frequency threshold value of function **[FREQUENCY METER]**(FqF-); assigned to a relay or a logic output. | 0 Hz to 20,000 kHz | 0 Hz |
| Ftd | **[Freq. threshold]**<br>Frequency threshold value of function **[Freq. Th. attained]**(FtA); assigned to a relay or a logic output or used by function **[PARAM. SET SWITCHING]**(MLP-). | 0 to 599 Hz | HSP |
| F2d | **[Freq. threshold 2]**<br>Frequency threshold value of function **[Freq. Th. 2 attained]**(F2A); assigned to a relay or a logic output or used by function **[PARAM. SET SWITCHING]**(MLP-). | 0 to 599 Hz | HSP |

**The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| FFt | **[Freewheel stop Thd.]** | 0.2 to 599 Hz | 0.2 Hz |

Speed threshold value below which the motor switches into freewheel stop.
This parameter supports switching from a ramp stop or fast stop to a freewheel stop based on a "Low frequency" threshold value.
This parameter is accessible if **[Type of stop]**(Stt) is set to **[Fast stop]**(FSt) or **[Ramp stop]**(rMP) and if **[Brake assignment]**(bLC) and **[Auto DC injection]**(AdC) are not configured.

**Problem**
If a stop ramp (deceleration ramp to standstill) is requested on the drive, overshooting may occur in the control process for induction motors. In doing so, the default value for the speed overshoots the target and the motor turns uncontrolled in the opposite direction. If this behavior is observed, the value for parameter **[Freewheel stop Thd.]** (FFt) is probably configured too low.

**Recommendation**
The "slip frequency" can be used as a guide value for parameter **[Freewheel stop Thd.]** (FFt). It can be determined using the configured values for **[Rated motor speed]** (nSP) and **[Rated motor freq.]** (FrS).

- **[Rated motor speed]** (nSP): Nominal speed of the motor
- **[Rated motor freq.]** (FrS): Nominal frequency of the motor

**Step 1:** Calculate the "synchronous speed".
The synchronous speed is a theoretical value derived from the nominal frequency and number of motor pole pairs. It corresponds to the speed of a synchronous motor.
$n_{sync}$ [rpm] = 6 FRS [0.1 Hz] / $n_{Polpairs}$

**Step 2:** Calculate the "slip frequency".
The recommended value for parameter **[Freewheel stop Thd.]** (FFt) is then calculated according to the following formula:
FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]

**Example calculation**
NSP = 1380 [rpm]
FRS = 500 [0.1 Hz]
$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$
$n_{syn}$c [rpm] = 6 * 500 / 2
$n_{sync}$ [rpm] = 1500
FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]
FFT [0.1 Hz] = (1500 - 1380) / 1500 * 500
FFT [0.1 Hz] = 40

**Determining the "synchronous speed"**
If the number of motor pole pairs is unknown, the synchronous speed (step 1) can also be determined using a logical series. The following table shows four different logical series that result for nominal frequencies 10 Hz, 50 Hz, 60 Hz and 800 Hz.

| Formula | $n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$ | | | |
|---|---|---|---|---|
| $n_{Polpairs}$ | Series 1 (FRS = 100) | Series 2 (FRS = 500) | Series 3 (FRS = 600) | Series 4 (FRS = 8000) |
| 1 | $n_{sync}$ [rpm] = 600 | $n_{sync}$ [rpm] = 3000 | $n_{sync}$ [rpm] = 3600 | $n_{sync}$ [rpm] = 48000 |
| 2 | $n_{sync}$ [rpm] = 300 | $n_{sync}$ [rpm] = 1500 | $n_{sync}$ [rpm] = 1800 | $n_{sync}$ [rpm] = 24000 |
| 3 | $n_{sync}$ [rpm] = 200 | $n_{sync}$ [rpm] = 1000 | $n_{sync}$ [rpm] = 1200 | $n_{sync}$ [rpm] = 1600 |
| 4 | $n_{sync}$ [rpm] = 150 | $n_{sync}$ [rpm] = 750 | $n_{sync}$ [rpm] = 900 | $n_{sync}$ [rpm] = 1200 |
| ... | ... | ... | ... | ... |

The values of the logical series become smaller as the number of pole pairs increases. To determine the synchronous speed of the motor, the value for NSP [rpm] must be placed in the logical sequence. The next larger value corresponds to the synchronous speed.

| | | | |
|---|---|---|---|
| ttd | **[Motor therm. level]** | 0 to 118% | 100% |

Trip threshold for motor thermal alarm (logic output or relay).

| | | | |
|---|---|---|---|
| JPF | **[Skip Frequency]** | 0 to 599 Hz | 0 Hz |

Skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

| | | | |
|---|---|---|---|
| JF2 | **[Skip Frequency 2]** | 0 to 599 Hz | 0 Hz |

2nd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

| | | | |
|---|---|---|---|
| JF3 | **[3rd Skip Frequency]** | 0 to 599 Hz | 0 Hz |

3rd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

| | | | |
|---|---|---|---|
| JFH | **[Skip Frequency Hyst.]** | 0.1 to 10 Hz | 1 Hz |

The parameter is visible if at least one of the skip frequencies **[Skip Frequency]**(JPF), **[Skip Frequency 2]**(JF2) or **[3rd Skip Frequency]**(JF3) is not equal to 0.
Area for the skip frequency: From (JPF - JFH) to (JPF + JFH), for example.
This setting applies to all 3 frequencies (JPF, JF2, JF3) together.

| | | | |
|---|---|---|---|
| LUn | **[Unld. Thr. Nom. Speed.]** | 20 to 100% of **[Rated mot. current]**(nCr) | 60% |

Threshold value for underload when the motor is at nominal frequency (**[Nominal Motor Freq]**(FrS)) as a percentage of the nominal torque.
Only visible if **[Unld T. Del. Detect]**(ULt) is not set to 0.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > SEt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LUL | **[Underload freq.=0]**<br>Threshold value for underload for a frequency of zero, as a percentage of nominal torque.<br>Only visible if **[Unld T. Del. Detect]**(ULt) is not set to 0. | 0 to **[Nom. freq. overload]**(LUn) | 0% |
| rMUd | **[Underl. det. freq. thresh.val]**<br>Underload detection frequency threshold value. | 0 to 599 Hz | 0 Hz |
| Srb | **[Hysteresis Freq.Att.]**<br>Maximum difference between frequency setpoint and motor frequency; defines operation in steady state. | 0.3 to 599 Hz | 0.3 Hz |
| FtU | **[Underload T.B.Rest.]**<br>Permissible minimum time frame between underload detection and automatic restart.<br>For an automatic restart to take place, the value for **[Max. restart time]**(tAr) must exceed the value for this parameter for at least one minute. | 0 to 6 min | 0 min |
| LOC | **[Ovld Detection Thr.]**<br>Overload detection threshold value, as a percentage of the motor nominal current **[Rated mot. current]**(nCr). For the function to be executed, this value must be lower than the threshold current.<br>Only visible if **[Ovld Time Detect.]**(tOL) is not set to 0.<br>This parameter is used to detect an "application overload". This is not thermal overload of the motor or inverter. | 70% to 150% of **[Rated mot. current]** (nCr) | 110% |
| FtO | **[Overload T.B.Rest.]**<br>Permissible minimum time frame between overload detection and automatic restart.<br>For an automatic restart to take place, the value for **[Max. restart time]**(tAr) must exceed the value for this parameter for at least one minute. | 0 to 6 min | 0 min |
| LbC | **[Load sharing correction]**<br>Nominal compensation in Hz. | 0 to 599 Hz | 0 Hz |
| FFM | **[Fan mode]**<br>If **[Fan mode]**(FFM) is set to **[Never]**(Stp), the frequency inverter fan is deactivated.<br>**Note:**<br>**OVERHEATING**<br>**Make sure that the ambient temperature does not exceed 40°C (104°F) when the fan is switched off. Otherwise, the service life of the electronic components is greatly reduced.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | **[Standard]**(Std) |
| Std | **[Standard]**(Std): The fan starts automatically when the inverter reaches 70% of its maximum thermal reference rating (THD = 70). | | |
| rUn | **[Always]**(rUn): The fan is always active. | | |
| StP | **[Never]**(Stp): The fan is disabled (not recommended). | | |
| SdS | **[Scale factor display]**<br>Used to display a value in relation to output frequency **[Output frequency]**(rFr): Machine speed, motor speed, etc.<br>The display shows the following:<br>$[Kd.sp\ Anzeigewert](SPd3) = \frac{[Skal.Faktor\ HMI](SdS) \times [Motorfrequenz](rFr)}{1000}$ *bis zwei Dezimalstellen*<br>• If **[Scale factor display]**(SdS) ≤ 1, **[Cust. output value]**(SPd1) will display (possible resolution = 0.01)<br>• If 1 < **[Scale factor display]**(SdS) ≤ 10, **[Cust. output value]**(SPd2) will display (possible resolution = 0.1)<br>• If **[Scale factor display]**(SdS) > 10, **[Cust. output value]**(SPd3) will display (possible resolution = 1)<br>• If **[Scale factor display]**(SdS) > 10 and **[Scale factor display]**(SdS) x **[Output frequency]**(rFr) > 9.999<br>**Example:** For 24.223, 24,22 appears on the display.<br>If for **[Scale factor display]**(SdS) > 10 and **[Scale factor display]**(SdS) x **[Output frequency]**(rFr) > 65,535, the display is locked at 65,54.<br>**Example:** Display motor speed for 4-pin motor, 1,500 rpm at 50 Hz (synchronous speed):<br>**[Scale factor display]**(SdS) = 30<br>**[Cust. output value]**(SPd3) = 1.500 at**[Output frequency]**(rFr) = 50 Hz | 0.1 to 200 | 30 |

(1) Corresponding to the nominal current of the inverter specified on the nameplate.

**The parameters described on this page are accessed by:** DRI- > COnF > FULL > SEt-

Code

Name/Description

Setting range

Factory settings

SEt-

[SETTINGS](Continued)

Ibr

| | | |
|---|---|---|
| [Brake release I FW] | 0 to 1.36*INV (1) | 0 |

### [Brake release I FW]

0 to 1.36*INV (1)

0

Brake release current threshold for ascending or forward movement.

Ird

| | | |
|---|---|---|
| [Brake release I Rev] | 0 to 1.36*INV (1) | 0 |

### [Brake release I Rev]

0 to 1.36*INV (1)

0

Brake release current threshold for descending or counterclockwise rotation.

brt

| | | |
|---|---|---|
| [Brake Release time] | 0 to 5.00 s | 0 s |

### [Brake Release time]

0 to 5.00 s

0 s

Brake release time delay.

bIr

| | | |
|---|---|---|
| [Brake release freq.] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |

### [Brake release freq.]

[Auto](AUtO)
0 to 10 Hz

[Auto](AUtO)

AUtO

[Auto](AUtO): Nominal value

bEn

| | | |
|---|---|---|
| [Brake engage freq.] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |

### [Brake engage freq.]

[Auto](AUtO)
0 to 10 Hz

[Auto](AUtO)

Threshold of the braking torque frequency.

tbE

| | | |
|---|---|---|
| [Brake engage delay] | 0 to 5.00 s | 0 s |

### [Brake engage delay]

0 to 5.00 s

0 s

Time delay before request to engage brake.

bEt

| | | |
|---|---|---|
| [Brake engage time] | 0 to 5.00 s | 0 s |

### [Brake engage time]

0 to 5.00 s

0 s

Brake engage time (brake response time).

JdC

| | | |
|---|---|---|
| [Jump at reversal] | [Auto](AUtO)<br>0 to 10 Hz | [Auto](AUtO) |

### [Jump at reversal]

[Auto](AUtO)
0 to 10 Hz

[Auto](AUtO)

AUtO

[Auto](AUtO): Nominal value

ttr

| | | |
|---|---|---|
| [Time to restart] | 0.00 to 15.00 s | 0.00 s |

### [Time to restart]

0.00 to 15.00 s

0.00 s

Time between the end of a brake release sequence and the start of a brake engage sequence.

tLIM

| [Motoring torque lim] | 0 to 300% | 100% |
|---|---|---|

### [Motoring torque lim]

0 to 300%

100%

Torque limiting for motor operation in percent or increments of 0.1% of the nominal torque in accordance with parameter [Torque increment](IntP).

tLIG

| [Gen. torque lim] | 0 to 300% | 100% |
|---|---|---|

### [Gen. torque lim]

0 to 300%

100%

Torque limiting for generator operation in percent or increments of 0.1% of nominal torque in accordance with parameter [Torque increment](IntP).

trH

| [Traverse freq. high] | 0 to 10 Hz | 4 Hz |
|---|---|---|

### [Traverse freq. high]

0 to 10 Hz

4 Hz

High traverse frequency.

trL

| [Traverse freq. low] | 0 to 10 Hz | 4 Hz |
|---|---|---|

### [Traverse freq. low]

0 to 10 Hz

4 Hz

Low traverse frequency.

qSH

| [Quick step High] | 0 to [Traverse freq. high](trH) | 0 Hz |
|---|---|---|

### [Quick step High]

0 to [Traverse freq. high](trH)

0 Hz

High quick step.

qSL

| | | |
|---|---|---|
| [Quick step Low] | 0 to [Traverse freq. low](trL) | 0 Hz |

### [Quick step Low]

0 to [Traverse freq. low](trL)

0 Hz

Low quick step.

Ctd

| | | |
|---|---|---|
| [Current threshold] | 0 to 65535 or 1.5*INV (1) | INV (1) |

### [Current threshold]

0 to 65535 or 1.5*INV (1)

INV (1)

Current threshold value of function [I attained](CtA); assigned to a relay or a logic output.

ttH

| | | |
|---|---|---|
| [High torque thd.] | -300% to +300% | 100% |

### [High torque thd.]

-300% to +300%

100%

Higher torque threshold value of function [High torque alarm](ttHA); assigned to a relay or logic output (as a percentage of the nominal torque).

ttL

| | | |
|---|---|---|
| [Low torque thd.] | -300% to +300% | 50% |

### [Low torque thd.]

-300% to +300%

50%

Lower torque threshold value of function [Low torque alarm](ttLA); assigned to a relay or logic output, as a percentage of the nominal torque.

FqL

| | | |
|---|---|---|
| [Pulse warning thd.] | 0 Hz to 20,000 kHz | 0 Hz |

### [Pulse warning thd.]

0 Hz to 20,000 kHz

0 Hz

Frequency threshold value of function [FREQUENCY METER](FqF-); assigned to a relay or a logic output.

Ftd

| | | |
|---|---|---|
| [Freq. threshold] | 0 to 599 Hz | HSP |

**[Freq. threshold]**

0 to 599 Hz

HSP

Frequency threshold value of function **[Freq. Th. attained]**(FtA); assigned to a relay or a logic output or used by function **[PARAM. SET SWITCHING]**(MLP-).

F2d

| | | |
|---|---|---|
| [Freq. threshold 2] | 0 to 599 Hz | HSP |

**[Freq. threshold 2]**

0 to 599 Hz

HSP

Frequency threshold value of function **[Freq. Th. 2 attained]**(F2A); assigned to a relay or a logic output or used by function **[PARAM. SET SWITCHING]**(MLP-).

FFt

| | | |
|---|---|---|
| [Freewheel stop Thd.] | 0.2 to 599 Hz | 0.2 Hz |

**[Freewheel stop Thd.]**

0.2 to 599 Hz

0.2 Hz

Speed threshold value below which the motor switches into freewheel stop.

This parameter supports switching from a ramp stop or fast stop to a freewheel stop based on a "Low frequency" threshold value.

This parameter is accessible if **[Type of stop]**(Stt) is set to **[Fast stop]**(FSt) or **[Ramp stop]**(rMP) and if **[Brake assignment]**(bLC) and **[Auto DC injection]**(AdC) are not configured.

**Problem**

If a stop ramp (deceleration ramp to standstill) is requested on the drive, overshooting may occur in the control process for induction motors. In doing so, the default value for the speed overshoots the target and the motor turns uncontrolled in the opposite direction. If this behavior is observed, the value for parameter **[Freewheel stop Thd.]** (FFt) is probably configured too low.

**Recommendation**

The "slip frequency" can be used as a guide value for parameter **[Freewheel stop Thd.]** (FFt). It can be determined using the configured values for **[Rated motor speed]** (nSP) and **[Rated motor freq.]** (FrS).

- **[Rated motor speed]** (nSP): Nominal speed of the motor
- **[Rated motor freq.]** (FrS): Nominal frequency of the motor

**Step 1:** Calculate the "synchronous speed".
The synchronous speed is a theoretical value derived from the nominal frequency and number of motor pole pairs. It corresponds to the speed of a synchronous motor.
$n_{sync}$ [rpm] = 6 FRS [0.1 Hz] / $n_{Polpairs}$

**Step 2:** Calculate the "slip frequency".
The recommended value for parameter **[Freewheel stop Thd.]** (FFt) is then calculated according to the following formula:
FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]

**Example calculation**
NSP = 1380 [rpm]
FRS = 500 [0.1 Hz]
$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$
$n_{syn}$c [rpm] = 6 * 500 / 2
$n_{sync}$ [rpm] = 1500

FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]
FFT [0.1 Hz] = (1500 - 1380) / 1500 * 500
FFT [0.1 Hz] = 40

**Determining the "synchronous speed"**
If the number of motor pole pairs is unknown, the synchronous speed (step 1) can also be determined using a logical series. The following table shows four different logical series that result for nominal frequencies 10 Hz, 50 Hz, 60 Hz and 800 Hz.

| **Formula** | **$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$** | | | |
|---|---|---|---|---|
| **$n_{Polpairs}$** | **Series 1 (FRS = 100)** | **Series 2 (FRS = 500)** | **Series 3 (FRS = 600)** | **Series 4 (FRS = 8000)** |
| 1 | $n_{sync}$ [rpm] = 600 | $n_{sync}$ [rpm] = 3000 | $n_{sync}$ [rpm] = 3600 | $n_{sync}$ [rpm] = 48000 |
| 2 | $n_{sync}$ [rpm] = 300 | $n_{sync}$ [rpm] = 1500 | $n_{sync}$ [rpm] = 1800 | $n_{sync}$ [rpm] = 24000 |
| 3 | $n_{sync}$ [rpm] = 200 | $n_{sync}$ [rpm] = 1000 | $n_{sync}$ [rpm] = 1200 | $n_{sync}$ [rpm] = 1600 |
| 4 | $n_{sync}$ [rpm] = 150 | $n_{sync}$ [rpm] = 750 | $n_{sync}$ [rpm] = 900 | $n_{sync}$ [rpm] = 1200 |
| ... | ... | ... | ... | ... |

Formula

$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$

$n_{Polpairs}$

Series 1
(FRS = 100)

Series 2
(FRS = 500)

Series 3
(FRS = 600)

Series 4
(FRS = 8000)

1

$n_{sync}$ [rpm] = 600

$n_{sync}$ [rpm] = 3000

$n_{sync}$ [rpm] = 3600

$n_{sync}$ [rpm] = 48000

2

$n_{sync}$ [rpm] = 300

$n_{sync}$ [rpm] = 1500

$n_{sync}$ [rpm] = 1800

$n_{sync}$ [rpm] = 24000

3

$n_{sync}$ [rpm] = 200

$n_{sync}$ [rpm] = 1000

$n_{sync}$ [rpm] = 1200

$n_{sync}$ [rpm] = 1600

4

$n_{sync}$ [rpm] = 150

$n_{sync}$ [rpm] = 750

$n_{sync}$ [rpm] = 900

$n_{sync}$ [rpm] = 1200

...

...

...

...

...

The values of the logical series become smaller as the number of pole pairs increases. To determine the synchronous speed of the motor, the value for NSP [rpm] must be placed in the logical sequence. The next larger value corresponds to the synchronous speed.

ttd

[Motor therm. level] 0 to 118% 100%

## [Motor therm. level]

0 to 118%

100%

Trip threshold for motor thermal alarm (logic output or relay).

JPF

[Skip Frequency] 0 to 599 Hz 0 Hz

## [Skip Frequency]

0 to 599 Hz

0 Hz

Skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

JF2

[Skip Frequency 2] 0 to 599 Hz 0 Hz

## [Skip Frequency 2]

0 to 599 Hz

0 Hz

2nd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

JF3

[3rd Skip Frequency] 0 to 599 Hz 0 Hz

## [3rd Skip Frequency]

0 to 599 Hz

0 Hz

3rd skip frequency. This parameter prevents prolonged operation within an adjustable range around the regulated frequency. This function can be used to prevent a critical speed from being reached, which would cause resonance. Setting the function to 0 disables it.

JFH

| [Skip Frequency Hyst.] | 0.1 to 10 Hz | 1 Hz |
|---|---|---|

### [Skip Frequency Hyst.]

0.1 to 10 Hz

1 Hz

The parameter is visible if at least one of the skip frequencies [Skip Frequency](JPF), [Skip Frequency 2](JF2) or [3rd Skip Frequency](JF3) is not equal to 0.

Area for the skip frequency: From (JPF - JFH) to (JPF + JFH), for example.

This setting applies to all 3 frequencies (JPF, JF2, JF3) together.

LUn

| [Unld. Thr. Nom. Speed.] | 20 to 100% of [Rated mot. current](nCr) | 60% |
|---|---|---|

### [Unld. Thr. Nom. Speed.]

20 to 100% of
[Rated mot. current](nCr)

60%

Threshold value for underload when the motor is at nominal frequency ([Nominal Motor Freq](FrS)) as a percentage of the nominal torque.

Only visible if [Unld T. Del. Detect](ULt) is not set to 0.

LUL

| [Underload freq.=0] | 0 to [Nom. freq. overload](LUn) | 0% |
|---|---|---|

### [Underload freq.=0]

0 to [Nom. freq. overload](LUn)

0%

Threshold value for underload for a frequency of zero, as a percentage of nominal torque.

Only visible if [Unld T. Del. Detect](ULt) is not set to 0.

rMUd

| [Underl. det. freq. thresh.val] | 0 to 599 Hz | 0 Hz |
|---|---|---|

### [Underl. det. freq. thresh.val]

0 to 599 Hz

0 Hz

Underload detection frequency threshold value.

Srb

| [Hysteresis Freq.Att.] | 0.3 to 599 Hz | 0.3 Hz |
|---|---|---|

### [Hysteresis Freq.Att.]

0.3 to 599 Hz

0.3 Hz

Maximum difference between frequency setpoint and motor frequency; defines operation in steady state.

FtU

| [Underload T.B.Rest.] | 0 to 6 min | 0 min |
|---|---|---|

### [Underload T.B.Rest.]

0 to 6 min

0 min

Permissible minimum time frame between underload detection and automatic restart.

For an automatic restart to take place, the value for **[Max. restart time]**(tAr) must exceed the value for this parameter for at least one minute.

LOC

| [Ovld Detection Thr.] | 70% to 150% of [Rated mot. current] (nCr) | 110% |
|---|---|---|

### [Ovld Detection Thr.]

70% to 150% of
**[Rated mot. current]** (nCr)

110%

Overload detection threshold value, as a percentage of the motor nominal current **[Rated mot. current]**(nCr). For the function to be executed, this value must be lower than the threshold current.

Only visible if **[Ovld Time Detect.]**(tOL) is not set to 0.

This parameter is used to detect an "application overload". This is not thermal overload of the motor or inverter.

FtO

| [Overload T.B.Rest.] | 0 to 6 min | 0 min |
|---|---|---|

### [Overload T.B.Rest.]

0 to 6 min

0 min

Permissible minimum time frame between overload detection and automatic restart.

For an automatic restart to take place, the value for **[Max. restart time]**(tAr) must exceed the value for this parameter for at least one minute.

LbC

| [Load sharing correction] | 0 to 599 Hz | 0 Hz |
|---|---|---|

**[Load sharing correction]**

0 to 599 Hz

0 Hz

Nominal compensation in Hz.

FFM

| [Fan mode] | [Standard](Std) |
|---|---|

**[Fan mode]**

**[Standard]**(Std)

If **[Fan mode]**(FFM) is set to **[Never]**(Stp), the frequency inverter fan is deactivated.

> **Note:**
>
> **OVERHEATING**
>
> **Make sure that the ambient temperature does not exceed 40°C (104°F) when the fan is switched off. Otherwise, the service life of the electronic components is greatly reduced.**
>
> **Failure to observe these instructions can result in damage to the equipment.**

Std

**[Standard]**(Std): The fan starts automatically when the inverter reaches 70% of its maximum thermal reference rating (THD = 70).

rUn

**[Always]**(rUn): The fan is always active.

StP

**[Never]**(Stp): The fan is disabled (not recommended).

SdS

| [Scale factor display] | 0.1 to 200 | 30 |
|---|---|---|

**[Scale factor display]**

0.1 to 200

30

Used to display a value in relation to output frequency **[Output frequency]**(rFr): Machine speed, motor speed, etc.

The display shows the following:

$$[Kd.sp\ \ Anzeigewert]\ (SPd3) = \frac{[Skal.Faktor\ \ HMI]\ (SdS) \times [Motorfrequenz]\ (rFr)}{1000}\ \ bis\ \ zwei\ \ Dezimalstellen$$

- If **[Scale factor display]**(SdS) ≤ 1, **[Cust. output value]**(SPd1) will display (possible resolution = 0.01)
- If 1 < **[Scale factor display]**(SdS) ≤ 10, **[Cust. output value]**(SPd2) will display (possible resolution = 0.1)
- If **[Scale factor display]**(SdS) > 10, **[Cust. output value]**(SPd3) will display (possible resolution = 1)
- If **[Scale factor display]**(SdS) > 10 and **[Scale factor display]**(SdS) x **[Output frequency]**(rFr) > 9.999

**Example:** For 24.223, 24,22 appears on the display.

If for **[Scale factor display]**(SdS) > 10 and **[Scale factor display]**(SdS) x **[Output frequency]**(rFr) > 65,535, the display is locked at 65,54.

**Example:** Display motor speed for 4-pin motor, 1,500 rpm at 50 Hz (synchronous speed):

**[Scale factor display]**(SdS) = 30

**[Cust. output value](SPd3) = 1.500 at[Output frequency](rFr) = 50 Hz**

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

Parameter that can be modified during operation or when stopped.

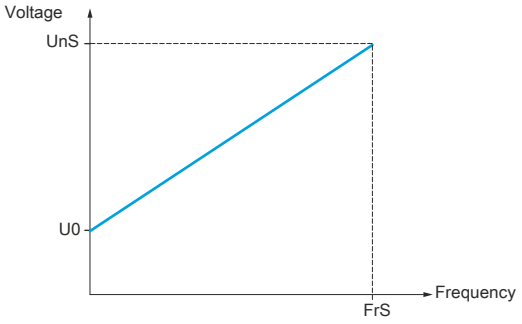
### 5.2.3.6.3 [MOTOR CONTROL] (drC-)

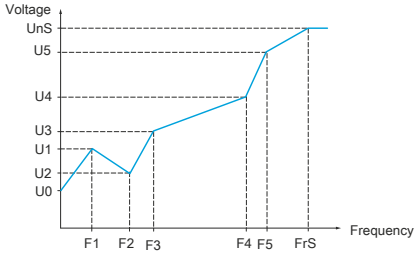
The parameters in the [DRIVE DATA] (drC-) menu can only be changed if the inverter is stopped and no run command is present, with the following limitations:

- [Auto-tuning](tUn) can cause the motor to start.
- A parameter whose code contains the arrow sign, can be modified with the motor running or stopped.

**Note:**

**If one of the following parameters is changed with respect to the factory settings, we recommend autotuning.**

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| drC- | [MOTOR CONTROL] | | |
| bFr | [Standard mot. freq] | | [50 Hz IEC](50) |
| | This parameter is used to change the default setting of the following parameters: [High speed](HSP), [Freq. threshold](Ftd), [Rated motor volt.](UnS), [Rated motor freq.](FrS) and [Max frequency](tFr). | | |
| 50 | [50 Hz IEC](50): IEC | | |
| 60 | [60 Hz NEMA] (60): NEMA | | |
| tFr | [Max frequency] | 10 to 599 Hz or 1*FrS(S) | 60 Hz (if (BFR) = 50 Hz) or 72 Hz (if (BFR) = 60 Hz) |
| | The default factory setting is 60 Hz or 72 Hz if [Standard mot. freq](bFr) is set to 60 Hz.<br>The maximum value is limited by the following conditions:<br>It is not permitted to exceed 10 times the value of [Rated motor freq.](FrS). | | |
| Ctt | [Motor control type] | | [Standard](Std) |
| | **Note:**<br>**Select the characteristic curve before you enter the parameter values.** | | |
| UUC | [SVC U](UUC): Sensorless vector control with internal speed control based on calculation of the actual voltage value. For types of application that require high performance during startup or operation. | | |
| Std | [Standard](Std): Standard motor curve. For straightforward applications that do not require high performance. Simple motor control curve with a constant voltage/frequency ratio, with possibility of controlling the lower characteristic curve. This characteristic curve is generally used for motors that are connected in parallel. Some specific applications for high-performance motors connected in parallel may require [SVC U](UUC). | | |
| |  | | |
| | **Note:**<br>**U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by changing the UFr value.** | | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| UF5 | **V/F 5pts**(UF5): 5-segment V/F profile: Functions as a **[Standard]**(Std) profile, but also supports resonance (saturation) prevention.<br>  <br><br>This profile is defined using parameter values UnS, FrS, U0 to U5 and F1 to F5.<br>S > F5 > F4 > F3 > F2 > F1<br>Frequencies F1, F2, F3, F4 and F5 must be entered in ascending order and must be less than parameter [**[Rated motor freq.]** (FrS). Otherwise, an invalid configuration is obtained and error **[Invalid configuration]** (CFI) is triggered.<br>**Note:**<br>**U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by changing the UFr value.** | | |
| SYn | **[Sync. mot.]**(SYn): Only for synchronous motors with a permanent magnet and sinusoidal electromotive force (EMF). The induction motor parameters cannot be accessed using this selection, however it is possible for synchronous motor parameters to be accessed. | | |
| UFq | **[V/F Quad.]**(UFq): Variable torque. Can be used for pump and fan applications. | | |
| nLD | **[Energy Sav.]**(nLd): Energy saving. For straightforward applications without a high-dynamic requirement. | | |

## 5.2.3.6.3.1 [ASYNC. MOTOR] (ASY-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ASY- | **[ASYNC. MOTOR]**<br>Only visible if **[Motor control type]**(Ctt) is not set to **[Sync. mot.]**(SYn). | | |
| nPr | **[Rated motor power]**<br>This parameter cannot be accessed if **[Motor control type]** (Ctt) is set to **[Sync. mot.]** (SYn).<br>The nominal motor power specified on the nameplate is displayed in kW if **[Standard mot. freq]**(bFr) = **[50 Hz IEC]**(50), and in HP, if **[Standard mot. freq]**(bFr) = **[60 Hz NEMA]**(60).<br>For induction motors with (BFR) = 50 Hz, the following table applies: | See table. | See table. |

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [10 W] | Max. value [10 W] | Default [10 W] |
| 8I66x200018.00-000 | 9 | 55 | 18 |
| 8I66x200037.00-000 | 9 | 75 | 37 |
| 8I66x200055.00-000 | 9 | 110 | 55 |
| 8I66x200075.00-000 | 9 | 150 | 75 |
| 8I66x200110.00-000 | 9 | 220 | 110 |
| 8I66x200150.00-000 | 18 | 300 | 150 |
| 8I66x200220.00-000 | 37 | 400 | 220 |
| 8I66T200300.00-000 | 55 | 550 | 300 |
| 8I66T200400.00-000 | 75 | 750 | 400 |
| 8I66T200550.00-000 | 110 | 1100 | 550 |
| 8I66T200750.00-000 | 150 | 1500 | 750 |
| 8I66T201100.00-000 | 220 | 1850 | 1100 |
| 8I66T201500.00-000 | 300 | 2200 | 1500 |
| 8I66T400037.00-000 | 9 | 75 | 37 |
| 8I66T400055.00-000 | 9 | 110 | 55 |
| 8I66T400075.00-000 | 9 | 150 | 75 |
| 8I66T400110.00-000 | 9 | 220 | 110 |
| 8I66T400150.00-000 | 18 | 300 | 150 |
| 8I66T400220.00-000 | 37 | 400 | 220 |
| 8I66T400300.00-000 | 55 | 550 | 300 |
| 8I66T400400.00-000 | 75 | 750 | 400 |
| 8I66T400550.00-000 | 110 | 1100 | 550 |
| 8I66T400750.00-000 | 150 | 1500 | 750 |
| 8I66T401100.00-000 | 220 | 1850 | 1100 |
| 8I66T401500.00-000 | 300 | 2200 | 1500 |
| 8I66T600075.00-000 | 9 | 150 | 75 |
| 8I66T600150.00-000 | 18 | 300 | 150 |
| 8I66T600220.00-000 | 37 | 400 | 220 |
| 8I66T600400.00-000 | 75 | 750 | 400 |
| 8I66T600550.00-000 | 110 | 1100 | 550 |
| 8I66T600750.00-000 | 150 | 1500 | 750 |
| 8I66T601100.00-000 | 220 | 1850 | 1100 |
| 8I66T601500.00-000 | 300 | 2200 | 1500 |

For induction motors with (BFR) = 60 Hz, the following table applies:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 HP] | Max. value [0.1 HP] | Default [0.1 HP] |
| 8I66x200018.00-000 | 1 | 8 | 3 |
| 8I66x200037.00-000 | 1 | 10 | 5 |
| 8I66x200055.00-000 | 1 | 15 | 8 |
| 8I66x200075.00-000 | 1 | 20 | 10 |
| 8I66x200110.00-000 | 1 | 30 | 15 |
| 8I66x200150.00-000 | 3 | 40 | 20 |
| 8I66x200220.00-000 | 5 | 50 | 30 |
| 8I66T200300.00-000 | 8 | 70 | 40 |
| 8I66T200400.00-000 | 10 | 100 | 50 |
| 8I66T200550.00-000 | 15 | 150 | 70 |
| 8I66T200750.00-000 | 20 | 200 | 100 |
| 8I66T201100.00-000 | 30 | 250 | 150 |
| 8I66T201500.00-000 | 40 | 300 | 200 |
| 8I66T400037.00-000 | 1 | 10 | 5 |
| 8I66T400055.00-000 | 1 | 15 | 8 |
| 8I66T400075.00-000 | 1 | 20 | 10 |
| 8I66T400110.00-000 | 1 | 30 | 15 |
| 8I66T400150.00-000 | 3 | 40 | 20 |
| 8I66T400220.00-000 | 5 | 50 | 30 |
| 8I66T400300.00-000 | 6 | 70 | 40 |
| 8I66T400400.00-000 | 8 | 100 | 50 |
| 8I66T400550.00-000 | 15 | 150 | 70 |
| 8I66T400750.00-000 | 20 | 200 | 100 |
| 8I66T401100.00-000 | 30 | 250 | 150 |
| 8I66T401500.00-000 | 40 | 300 | 200 |
| 8I66T600075.00-000 | 1 | 20 | 10 |
| 8I66T600150.00-000 | 3 | 40 | 20 |
| 8I66T600220.00-000 | 5 | 50 | 30 |
| 8I66T600400.00-000 | 8 | 100 | 50 |
| 8I66T600550.00-000 | 10 | 150 | 70 |
| 8I66T600750.00-000 | 15 | 200 | 100 |
| 8I66T601100.00-000 | 20 | 250 | 150 |
| 8I66T601500.00-000 | 30 | 300 | 200 |

**The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| COS | **[Motor 1 Cosinus Phi]**<br>The nominal cosine phi of the motor<br>This parameter can be accessed if **[Motor param choice]**(MPC) = **[Mot Cos]**(COS). | See table. | See table. |

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.01] | Max. value [0.01] | Default [0.01] |
| 8I66x200018.00-000 | 50 | 100 | 75 |
| 8I66x200037.00-000 | | | 75 |
| 8I66x200055.00-000 | | | 75 |
| 8I66x200075.00-000 | | | 77 |
| 8I66x200110.00-000 | | | 79 |
| 8I66x200150.00-000 | | | 79 |
| 8I66x200220.00-000 | | | 81 |
| 8I66T200300.00-000 | | | 78 |
| 8I66T200400.00-000 | | | 79 |
| 8I66T200550.00-000 | | | 82 |
| 8I66T200750.00-000 | | | 84 |
| 8I66T201100.00-000 | | | 85 |
| 8I66T201500.00-000 | | | 85 |
| 8I66T400037.00-000 | | | 75 |
| 8I66T400055.00-000 | | | 75 |
| 8I66T400075.00-000 | | | 77 |
| 8I66T400110.00-000 | | | 79 |
| 8I66T400150.00-000 | | | 79 |
| 8I66T400220.00-000 | | | 81 |
| 8I66T400300.00-000 | | | 78 |
| 8I66T400400.00-000 | | | 79 |
| 8I66T400550.00-000 | | | 82 |
| 8I66T400750.00-000 | | | 84 |
| 8I66T401100.00-000 | | | 85 |
| 8I66T401500.00-000 | | | 85 |
| 8I66T600075.00-000 | | | 77 |
| 8I66T600150.00-000 | | | 79 |
| 8I66T600220.00-000 | | | 81 |
| 8I66T600400.00-000 | | | 79 |
| 8I66T600550.00-000 | | | 82 |
| 8I66T600750.00-000 | | | 84 |
| 8I66T601100.00-000 | | | 85 |
| 8I66T601500.00-000 | | | 85 |

| | | | |
|---|---|---|---|
| UnS | **[Rated motor volt.]**<br>This parameter cannot be accessed if **[Motor control type]** (Ctt) is set to **[Sync. mot.]** (SYn).<br>Nominal voltage of the motor specified on the nameplate. | 100 to 500 V | In accordance with inverter power and **[Standard mot. freq]**(bFr) |
| nCr | **[Rated mot. current]**<br>This parameter cannot be accessed if **[Motor control type]** (Ctt) is set to **[Sync. mot.]** (SYn).<br>Nominal current per the nameplate. | See table(1). | See table. |

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 11 |
| 8I66x200037.00-000 | 8 | 50 | 19 |
| 8I66x200055.00-000 | 9 | 56 | 29 |
| 8I66x200075.00-000 | 12 | 72 | 35 |
| 8I66x200110.00-000 | 17 | 104 | 48 |
| 8I66x200150.00-000 | 20 | 120 | 61 |
| 8I66x200220.00-000 | 27 | 165 | 88 |
| 8I66T200300.00-000 | 34 | 206 | 125 |
| 8I66T200400.00-000 | 43 | 263 | 158 |
| 8I66T200550.00-000 | 68 | 413 | 206 |
| 8I66T200750.00-000 | 82 | 495 | 263 |
| 8I66T201100.00-000 | 135 | 810 | 369 |
| 8I66T201500.00-000 | 165 | 990 | 495 |
| 8I66T400037.00-000 | 3 | 23 | 10 |
| 8I66T400055.00-000 | 4 | 29 | 14 |
| 8I66T400075.00-000 | 5 | 35 | 20 |
| 8I66T400110.00-000 | 7 | 45 | 25 |
| 8I66T400150.00-000 | 10 | 62 | 35 |
| 8I66T400220.00-000 | 13 | 83 | 51 |
| 8I66T400300.00-000 | 17 | 107 | 72 |
| 8I66T400400.00-000 | 23 | 143 | 91 |
| 8I66T400550.00-000 | 35 | 215 | 119 |
| 8I66T400750.00-000 | 42 | 255 | 152 |
| 8I66T401100.00-000 | 69 | 416 | 213 |
| 8I66T401500.00-000 | 82 | 495 | 286 |
| 8I66T600075.00-000 | 4 | 26 | 11 |
| 8I66T600150.00-000 | 6 | 41 | 22 |
| 8I66T600220.00-000 | 9 | 59 | 30 |
| 8I66T600400.00-000 | 15 | 92 | 49 |
| 8I66T600550.00-000 | 22 | 135 | 74 |
| 8I66T600750.00-000 | 27 | 165 | 95 |
| 8I66T601100.00-000 | 42 | 255 | 145 |
| 8I66T601500.00-000 | 55 | 330 | 188 |

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| FrS | **[Rated motor freq.]** | 10 to 599 Hz | 50 Hz |
| | This parameter cannot be accessed if **[Motor control type]** (Ctt) is set to **[Sync. mot.]** (SYn).<br>Rated motor frequency given on the nameplate.<br>The default factory setting is 50 Hz or 60 Hz if **[Standard mot. freq]**(bFr) is set to 60 Hz. | | |
| nSP | **[Rated motor speed]** | See table. | See table. |
| | This parameter cannot be accessed if **[Motor control type]** (Ctt) is set to **[Sync. mot.]** (SYn).<br>0 to 9999 rpm then 10.00 to 65.53 krpm on the integrated display terminal.<br>If, instead of the nominal speed, the nameplate indicates the synchronous speed and the slip in Hz or as a percentage, calculate the nominal speed as follows: | | |

$$\text{Nominalspeed} = \text{Synchronousspeed} \times \frac{100 - \text{slip } in\ \%}{100}$$

or

$$\text{Nominalspeed} = \text{Synchronousspeed} \times \frac{50 - \text{slip } in\ Hz}{50} \left(50 - Hz - motors\right)$$

or

$$\text{Nominal speed} = \text{Synchronous speed} \times \frac{60 - \text{Slip in } Hz}{60} \left(60 - Hz\ \text{motors}\right)$$

If (BFR) = 50:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66x200018.00-000 | 0 | 65535 | 1410 |
| 8I66x200037.00-000 | | | 1425 |
| 8I66x200055.00-000 | | | 1400 |
| 8I66x200075.00-000 | | | 1400 |
| 8I66x200110.00-000 | | | 1410 |
| 8I66x200150.00-000 | | | 1420 |
| 8I66x200220.00-000 | | | 1430 |
| 8I66T200300.00-000 | | | 1420 |
| 8I66T200400.00-000 | | | 1425 |
| 8I66T200550.00-000 | | | 1430 |
| 8I66T200750.00-000 | | | 1450 |
| 8I66T201100.00-000 | | | 1450 |
| 8I66T201500.00-000 | | | 1455 |
| 8I66T400037.00-000 | | | 1425 |
| 8I66T400055.00-000 | | | 1400 |
| 8I66T400075.00-000 | | | 1400 |
| 8I66T400110.00-000 | | | 1410 |
| 8I66T400150.00-000 | | | 1420 |
| 8I66T400220.00-000 | | | 1430 |
| 8I66T400300.00-000 | | | 1420 |
| 8I66T400400.00-000 | | | 1425 |
| 8I66T400550.00-000 | | | 1430 |
| 8I66T400750.00-000 | | | 1450 |
| 8I66T401100.00-000 | | | 1450 |
| 8I66T401500.00-000 | | | 1455 |
| 8I66T600075.00-000 | | | 1400 |
| 8I66T600150.00-000 | | | 1420 |
| 8I66T600220.00-000 | | | 1430 |
| 8I66T600400.00-000 | | | 1425 |
| 8I66T600550.00-000 | | | 1430 |
| 8I66T600750.00-000 | | | 1450 |
| 8I66T601100.00-000 | | | 1450 |
| 8I66T601500.00-000 | | | 1455 |

If (BFR) = 60:

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66x200018.00-000 | 0 | 65535 | 1680 |
| 8I66x200037.00-000 | | | 1720 |
| 8I66x200055.00-000 | | | 1700 |
| 8I66x200075.00-000 | | | 1700 |
| 8I66x200110.00-000 | | | 1680 |
| 8I66x200150.00-000 | | | 1715 |
| 8I66x200220.00-000 | | | 1715 |
| 8I66T200300.00-000 | | | 1760 |
| 8I66T200400.00-000 | | | 1769 |
| 8I66T200550.00-000 | | | 1780 |
| 8I66T200750.00-000 | | | 1780 |
| 8I66T201100.00-000 | | | 1766 |
| 8I66T201500.00-000 | | | 1771 |
| 8I66T400037.00-000 | | | 1720 |
| 8I66T400055.00-000 | | | 1700 |
| 8I66T400075.00-000 | | | 1700 |
| 8I66T400110.00-000 | | | 1680 |
| 8I66T400150.00-000 | | | 1715 |
| 8I66T400220.00-000 | | | 1715 |
| 8I66T400300.00-000 | | | 1760 |
| 8I66T400400.00-000 | | | 1769 |
| 8I66T400550.00-000 | | | 1780 |
| 8I66T400750.00-000 | | | 1780 |
| 8I66T401100.00-000 | | | 1766 |

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY- | | | | |
|---|---|---|---|---|
| Code | Name/Description | | Setting range | Factory settings |

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66T401500.00-000 | | | 1771 |
| 8I66T600075.00-000 | | | 1700 |
| 8I66T600150.00-000 | | | 1715 |
| 8I66T600220.00-000 | | | 1715 |
| 8I66T600400.00-000 | | | 1769 |
| 8I66T600550.00-000 | | | 1780 |
| 8I66T600750.00-000 | | | 1780 |
| 8I66T601100.00-000 | | | 1766 |
| 8I66T601500.00-000 | | | 1771 |

tUn

[Auto-tuning] [No](nO)

2 s

**Warning!**

**UNEXPECTED MOVEMENT**

**The motor is moved during autotuning in order to fine-adjust the control loop.**

- **Do not switch on the system until it has been verified that there is no one in the operating area and that it is free from obstacles.**

**Failure to follow these instructions can result in serious bodily injury and even death or damage to the material.**

The motor is executes small movements during autotuning. It is normal for the system to vibrate and produce some noise.

- Autotuning is only performed if no stop command has been activated. If function "Freewheel stop" or "Fast stop" has been assigned to a logic input, this input must be set to 1 (input at 0 active).
- Autotuning has priority over any movement or premagnetization commands. These will not be taken into account until after autotuning.
- If autotuning reports an error, the inverter displays [No action](nO) and, depending on the configuration of [Autotune fault mgt](tnL), it then switches to error mode [Auto-tuning](tnF).
- Autotuning may last for 1 to 2 seconds. Do not interrupt the process. Wait until the display changes to [No action](nO).

**Note:**

**The thermal state of the motor greatly affects the tuning result. Perform tuning when the motor is stopped and when it is cold.**

In order to perform autotuning again, wait until the motor has stopped and cooled down completely. First set [Auto-tuning](tnF) to [Erase tune](CLr), then repeat the autotuning process.
To calculate the thermal state of the motor, autotuning can be performed without enabling[Erase tune](CLr) first.
In all cases, the motor must be stopped before any tuning procedure is performed.
Cable length also affects tuning results. If the wiring is changed, the tuning procedure must be repeated.

nO [No action](nO): Autotuning not running
YES [Do tune](YES): Autotuning is performed immediately if possible, at which point the parameter automatically changes to [No action](nO). If the inverter state does not permit immediate tuning, the parameter changes to [No](nO) and the procedure must be repeated.
CLr [Erase tune](CLr): The motor parameters recorded by autotuning are reset. The standard motor parameter values are used to control the motor. [Auto tuning status](tUS) = [Not done](tAb).

tUS

[Auto tuning status] [Not done](tAb)

(For information only, cannot be modified)
This parameter is not stored when the inverter is switched off. It shows the autotuning state since the last time the device was commissioned.

tAb [Not done](tAb): Autotuning has not been executed.
PEnd [Idle] (PEnd): Autotuning has been requested but has not been performed yet.
PrOG [Active](PrOG): Autotuning is being performed.
FAIL [Failed](FAIL): Autotuning has failed.
dOnE [Done](dOnE): The motor parameters calculated during autotuning are used to control the motor.

StUn

[Tune selection] [Default](tAb)

(For information only, cannot be modified)

tAb [Default](tAb): The standard motor parameter values are used to control the motor.
MEAS [Measure](MEAS): The values calculated during autotuning are used to control the motor.
CUS [Customized](CUS): The manually set values are used to control the motor.

**Note:**

**Autotuning can increase motor performance considerably.**

tUnU

[Auto tuning usage] [Therm Mot](tM)

This parameter indicates the methods that were used to change the motor parameters in accordance with the calculated thermal state of the motor.

nO [No](nO): Thermal state not calculated.

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tM | [Therm Mot](tM): Calculation of the stator thermal state, based on the motor's nominal current and current consumption. | | |
| Ct | [Cold tun](Ct): Calculation of the stator thermal state, based on the stator resistance calculated during the initial tuning of the cold motor and the autotuning performed at each startup.<br>**Note:**<br>**Before [Auto tuning usage] (TUNU) is set to [Cold tun] (CT), autotuning must be performed to obtain reference values for a cold motor.** | | |
| AUt<br>2 s | [Automatic autotune] | | [No](nO) |
| | **Warning!**<br>**UNEXPECTED MOVEMENT**<br>**If this function is enabled, autotuning is performed every time the inverter is switched on.**<br>• **Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | | |
| | The motor must be switched off when the inverter is switched on.<br>[Automatic autotune](AUt) = [YES](YES) if [Auto tuning usage](tUnU) = [Cold tun](Ct). The motor stator resistance value calculated during the tuning process is used to calculate the motor thermal state when the device is switched on. | | |
| nO | [No](nO): Function is disabled. | | |
| YES | [YES](YES): Tuning is performed automatically on each startup. | | |
| onE | [One](onE): Tuning is performed on the first move command. | | |
| FLU<br>(1)<br>2 s | [Motor fluxing] | | [No](FnO) |
| | **Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If parameter [Motor fluxing](FLU) is set to [continuous](FCt) fluxing will always occur, even when the motor is not running.**<br>**Make sure that this setting does not result in unsafe states.**<br>**Failure to follow these instructions will result in death or life-threatening injury.** | | |
| | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**To prevent motor overheating and damage, check whether the connected motor has the correct sizing for the magnetizing current.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | If [Motor control type](Ctt) = [Sync. mot.](SYn), [Not cont.](FnC) replaces the factory setting.<br>In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.<br>In mode [continuous](FCt), the inverter automatically creates the magnetic flux at startup.<br>In mode [Not cont.](FnC), fluxing occurs when the motor has been started up.<br>The magnetic flux current is greater than [Rated mot. current](nCr) (configured nominal motor current) if magnetization has been established. After this, the flux current will be adjusted to the motor's magnetizing current. | | |
| FnC | [Not cont.](FnC): Non-continuous mode | | |
| FCt | [continuous](FCt): Continuous mode. This option is not possible if [Auto DC injection](AdC) is set to [YES](YES), or if [Type of stop](Stt) was set to [Freewheel](nSt). | | |
| FnO | [No](FnO): Function inactive. This option is not possible if [Brake assignment](bLC) is not set to [No](nO).<br>If [Motor control type](Ctt) is set to [Sync. mot.](SYn), parameter[Motor fluxing](FLU) results in the assignment of the rotor and not of the magnetization.<br>If [Brake assignment](bLC) is not [No](nO), parameter [Motor fluxing](FLU) has no effect. | | |
| MPC | [Motor param choice] | | [Motor power](nPr) |
| nPr | [Motor power](nPr) | | |
| COS | [Mot Cos](COS) | | |

(1) Corresponding to the nominal current of the inverter specified in the installation manual and on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.3.2 [ASYNC. MOTOR] (ASY-) - Expert mode

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > ASY- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ASY- | **[ASYNC. MOTOR]** | | |
| rSA | **[Cust stator resist.]** | 0 to 65,535 mΩ | 0 mΩ |
| ★ (1) | Cold state stator resistance (per winding), modifiable value.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |
| LFA | **[Lfw]** | 0 to 655.35 mH | 0 mH |
| ★ | Stray inductance in cold state, modifiable value.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |
| IdA | **[Idw]** | 0 to 6,553.5 A | 0 A |
| ★ | Customized adjusted magnetizing current.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |
| trA | **[Cust. rotor t const.]** | 0 to 65,535 ms | 0 ms |
| ★ | Customized adjusted rotor time constant.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |

(1) On the integrated display terminal: 0 to 9999 then 10.00 to 65.53 (10,000 to 65,535).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.3.3 Synchronous motor parameters

These parameters can be accessed if **[Motor control type]**(Ctt) is set to **[Sync. mot.]** (SYn).

In this case, the induction motor parameters are inaccessible.

After choosing the inverter, do the following:

**1. Enter the motor nameplate.**

**2. Perform measurement.**

- Perform **[Auto-tuning]**(tUn).
- Check the magnetic reluctance of the synchronous motor.

If **[Saliency mot. state]**(SMOt) displays **[Med salient]**(MLS) or **[High salient]**(HLS):

- Perform the steps under **3. Improve the measurement results**.
- Perform the steps under **4. Adjust PHS**.

If **[Saliency mot. state]**(SMOt) displays **[Low salient]**(LLS):

- Perform the steps under **4. Adjust PHS**.

**3. Improve tuning results.**

## Note:

**MOTOR OVERHEATING AND DAMAGE**

- **It must be ensured that the motor has the required nominal power for the maximum current applied.**
- **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**

**Failure to observe these instructions can result in damage to the equipment.**

- Set **[PSI align curr. max]**(MCr) in accordance with the maximum motor current. The maximum value of **[PSI align curr. max]**(MCr) is delimited by **[CURRENT LIMIT.]**(CLI). If you have no data to hand, set **[PSI align curr. max]**(MCr) to **[Auto]**(AUtO).
- Execute a second (tUn) after the change to (MCr).

**4. Adjust PHS.**

Adjust **[Syn. EMF constant]**(PHS) to achieve optimal behavior.

- Start the motor using the lowest stable frequency possible for the machine (without load).
- Check and make note of the value of **[% error EMF sync]**(rdAE).
  - If the value of **[% error EMF sync]**(rdAE) is less than 0%, **[Syn. EMF constant]**(PHS) can be increased.
  - If the value of **[% error EMF sync]**(rdAE) is greater than 0%, **[Syn. EMF constant]**(PHS) can be decreased.

    The value of **[% error EMF sync]**(rdAE) should be close to 0%.
- Stop the motor to change (PHS) in accordance with the (previously noted) value for (rdAE).

## Note:

**The inverter must be selected in such a way that depending on the required behavior, it is supplied with sufficient but not excessive current so that the current can be measured more precisely, especially at high frequency signal injection. See [HF inj. activation] (HFI).**

**Power values can be increased for motors with high cogging, if high frequency injection is enabled. See [HF inj. activation] (HFI).**

## 5.2.3.6.3.4 [SYNCHRONOUS MOTOR] (SYn-)

**The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > SYN-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| SYN- | [Sync. mot.] | | |
| nCrS | [Nominal I sync.] | See table(1). | See table. |

Nominal current of the synchronous motor as provided on the nameplate.

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 3 | 23 | 6 |
| 8I66x200037.00-000 | 8 | 50 | 16 |
| 8I66x200055.00-000 | 9 | 56 | 26 |
| 8I66x200075.00-000 | 12 | 72 | 28 |
| 8I66x200110.00-000 | 17 | 104 | 38 |
| 8I66x200150.00-000 | 20 | 120 | 49 |
| 8I66x200220.00-000 | 27 | 165 | 53 |
| 8I66T200300.00-000 | 34 | 206 | 96 |
| 8I66T200400.00-000 | 43 | 263 | 140 |
| 8I66T200550.00-000 | 68 | 413 | 175 |
| 8I66T200750.00-000 | 82 | 495 | 230 |
| 8I66T201100.00-000 | 135 | 810 | 290 |
| 8I66T201500.00-000 | 165 | 990 | 420 |
| 8I66T400037.00-000 | 3 | 23 | 6 |
| 8I66T400055.00-000 | 4 | 29 | 7 |
| 8I66T400075.00-000 | 5 | 35 | 15 |
| 8I66T400110.00-000 | 7 | 45 | 23 |
| 8I66T400150.00-000 | 10 | 62 | 31 |
| 8I66T400220.00-000 | 13 | 83 | 32 |
| 8I66T400300.00-000 | 17 | 107 | 63 |
| 8I66T400400.00-000 | 23 | 143 | 90 |
| 8I66T400550.00-000 | 35 | 215 | 102 |
| 8I66T400750.00-000 | 42 | 255 | 140 |
| 8I66T401100.00-000 | 69 | 416 | 179 |
| 8I66T401500.00-000 | 82 | 495 | 185 |
| 8I66T600075.00-000 | 4 | 26 | 15 |
| 8I66T600150.00-000 | 6 | 41 | 31 |
| 8I66T600220.00-000 | 9 | 59 | 32 |
| 8I66T600400.00-000 | 15 | 92 | 90 |
| 8I66T600550.00-000 | 22 | 135 | 102 |
| 8I66T600750.00-000 | 27 | 165 | 140 |
| 8I66T601100.00-000 | 42 | 255 | 179 |
| 8I66T601500.00-000 | 55 | 330 | 185 |

| | | | |
|---|---|---|---|
| PPnS | [Pole pairs] | See table. | See table. |

Number of pole pairs on the synchronous motor

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value | Max. value | Default |
| 8I66x200018.00-000 | 1 | 50 | 3 |
| 8I66x200037.00-000 | | | 3 |
| 8I66x200055.00-000 | | | 3 |
| 8I66x200075.00-000 | | | 4 |
| 8I66x200110.00-000 | | | 4 |
| 8I66x200150.00-000 | | | 4 |
| 8I66x200220.00-000 | | | 4 |
| 8I66T200300.00-000 | | | 5 |
| 8I66T200400.00-000 | | | 5 |
| 8I66T200550.00-000 | | | 5 |
| 8I66T200750.00-000 | | | 5 |
| 8I66T201100.00-000 | | | 5 |
| 8I66T201500.00-000 | | | 5 |
| 8I66T400037.00-000 | | | 3 |
| 8I66T400055.00-000 | | | 3 |
| 8I66T400075.00-000 | | | 3 |
| 8I66T400110.00-000 | | | 4 |
| 8I66T400150.00-000 | | | 4 |
| 8I66T400220.00-000 | | | 4 |
| 8I66T400300.00-000 | | | 5 |
| 8I66T400400.00-000 | | | 5 |
| 8I66T400550.00-000 | | | 5 |
| 8I66T400750.00-000 | | | 5 |
| 8I66T401100.00-000 | | | 5 |
| 8I66T401500.00-000 | | | 5 |
| 8I66T600075.00-000 | | | 3 |
| 8I66T600150.00-000 | | | 4 |
| 8I66T600220.00-000 | | | 4 |
| 8I66T600400.00-000 | | | 5 |
| 8I66T600550.00-000 | | | 5 |
| 8I66T600750.00-000 | | | 5 |
| 8I66T601100.00-000 | | | 5 |
| 8I66T601500.00-000 | | | 5 |

**The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > SYN-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| nSPS | **[Nom motor spdsync]** | See table. | See table. |

Rated motor speed given on the nameplate.

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [rpm] | Max. value [rpm] | Default [rpm] |
| 8I66x200018.00-000 | 0 | 48000 | 3200 |
| 8I66x200037.00-000 | | | 2960 |
| 8I66x200055.00-000 | | | 3120 |
| 8I66x200075.00-000 | | | 2580 |
| 8I66x200110.00-000 | | | 1920 |
| 8I66x200150.00-000 | | | 2100 |
| 8I66x200220.00-000 | | | 1560 |
| 8I66T200300.00-000 | | | 1200 |
| 8I66T200400.00-000 | | | 1160 |
| 8I66T200550.00-000 | | | 1000 |
| 8I66T200750.00-000 | | | 1000 |
| 8I66T201100.00-000 | | | 2000 |
| 8I66T201500.00-000 | | | 2000 |
| 8I66T400037.00-000 | | | 3200 |
| 8I66T400055.00-000 | | | 3360 |
| 8I66T400075.00-000 | | | 2400 |
| 8I66T400110.00-000 | | | 2000 |
| 8I66T400150.00-000 | | | 2040 |
| 8I66T400220.00-000 | | | 1620 |
| 8I66T400300.00-000 | | | 1200 |
| 8I66T400400.00-000 | | | 1160 |
| 8I66T400550.00-000 | | | 1000 |
| 8I66T400750.00-000 | | | 1000 |
| 8I66T401100.00-000 | | | 2000 |
| 8I66T401500.00-000 | | | 2000 |
| 8I66T600075.00-000 | | | 2400 |
| 8I66T600150.00-000 | | | 2040 |
| 8I66T600220.00-000 | | | 1620 |
| 8I66T600400.00-000 | | | 1160 |
| 8I66T600550.00-000 | | | 1000 |
| 8I66T600750.00-000 | | | 1000 |
| 8I66T601100.00-000 | | | 2000 |
| 8I66T601500.00-000 | | | 2000 |

| | | | |
|---|---|---|---|
| tqS | **[Motor torque]** | See table. | See table. |

Nominal torque of the motor as provided on the nameplate.

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 Nm] | Max. value [0.1 Nm] | Default [0.1 Nm] |
| 8I66x200018.00-000 | 1 | 65535 | 5 |
| 8I66x200037.00-000 | | | 13 |
| 8I66x200055.00-000 | | | 19 |
| 8I66x200075.00-000 | | | 27 |
| 8I66x200110.00-000 | | | 46 |
| 8I66x200150.00-000 | | | 57 |
| 8I66x200220.00-000 | | | 79 |
| 8I66T200300.00-000 | | | 171 |
| 8I66T200400.00-000 | | | 263 |
| 8I66T200550.00-000 | | | 517 |
| 8I66T200750.00-000 | | | 705 |
| 8I66T201100.00-000 | | | 450 |
| 8I66T201500.00-000 | | | 587 |
| 8I66T400037.00-000 | | | 8 |
| 8I66T400055.00-000 | | | 11 |
| 8I66T400075.00-000 | | | 21 |
| 8I66T400110.00-000 | | | 52 |
| 8I66T400150.00-000 | | | 70 |
| 8I66T400220.00-000 | | | 95 |
| 8I66T400300.00-000 | | | 171 |
| 8I66T400400.00-000 | | | 263 |
| 8I66T400550.00-000 | | | 517 |
| 8I66T400750.00-000 | | | 705 |
| 8I66T401100.00-000 | | | 450 |
| 8I66T401500.00-000 | | | 587 |
| 8I66T600075.00-000 | | | 21 |
| 8I66T600150.00-000 | | | 70 |
| 8I66T600220.00-000 | | | 95 |
| 8I66T600400.00-000 | | | 263 |
| 8I66T600550.00-000 | | | 517 |
| 8I66T600750.00-000 | | | 705 |
| 8I66T601100.00-000 | | | 450 |
| 8I66T601500.00-000 | | | 587 |

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > SYN- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tUn | **[Auto-tuning]** | | **[No]**(nO) |

**Warning!**

**UNEXPECTED MOVEMENT**

**The motor is moved during autotuning in order to fine-adjust the control loop.**

- **Do not switch on the system until you have verified that there is no one in the operating area and that it is free from obstacles.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

The motor is executes small movements during autotuning. It is normal for the system to vibrate and produce some noise.

- Autotuning is only performed if no stop command has been activated. If function "Freewheel stop" or "Fast stop" has been assigned to a logic input, this input must be set to 1 (input at 0 active).
- Autotuning has priority over any movement or premagnetization commands. These will not be taken into account until after autotuning.
- If autotuning reports an error, the inverter displays **[No action]**(nO) and, depending on the configuration of **[Autotune fault mgt]**(tnL), it then switches to error mode **[Auto-tuning]**(tnF).
- Autotuning may last for 1 to 2 seconds. Do not interrupt this procedure. Wait until the display changes to **[No action]**(nO).

**Note:**

**The thermal state of the motor greatly affects the tuning result. Perform tuning when the motor is stopped and when it is cold.**

**In order to perform autotuning again, wait until the motor has stopped and cooled down completely. First set [Auto-tuning](tnF) to [Erase tune](CLr) and then repeat the autotuning process.**

**To calculate the thermal state of the motor, autotuning can be performed without enabling[Erase tune](CLr) first.**

**In all cases, the motor must be stopped before any tuning procedure is performed. Cable length also affects tuning results. If the cabling is changed, the tuning procedure must be repeated.**

| | |
|---|---|
| nO | **[No action]**(nO): Autotuning is not running. |
| YES | **[Do tune]**(YES): Autotuning is performed immediately if possible, at which point the parameter automatically changes to **[No action]**(nO). If the inverter state does not permit immediate tuning, the parameter changes to **[No]**(nO) and the procedure must be repeated. |
| CLr | **[Erase tune]**(CLr): The motor parameters recorded by autotuning are reset. The standard motor parameter values are used to control the motor. **[Auto tuning status]**(tUS) = **[Not done]**(tAb). |
| tUS | **[Auto tuning status]** **[Not done]**(tAb)<br>(For information only, cannot be modified)<br>This parameter is not stored when the inverter is switched off. It shows the autotuning state since the last time the device was commissioned. |
| tAb | **[Not done]**(tAb): Autotuning has not been executed. |
| PEnd | **[Idle]** (PEnd): Autotuning has been requested but has not been performed yet. |
| PrOG | **[Active]**(PrOG): Autotuning is being performed. |
| FAIL | **[Failed]**(FAIL): Autotuning has failed. |
| dOnE | **[Done]**(dOnE): The motor parameters calculated during autotuning are used to control the motor. |
| StUn | **[Tune selection]** **[Default]**(tAb)<br>(For information only, cannot be modified) |

**Note:**

**Autotuning can increase motor performance considerably.**

| | |
|---|---|
| tAb | **[Default]**(tAb): The standard motor parameter values are used to control the motor. |
| MEAS | **[Measure]**(MEAS): The values calculated during autotuning are used to control the motor. |
| CUS | **[Customized]**(CUS): The manually set values are used to control the motor. |
| tUnU | **[Auto tuning usage]** **[Therm Mot]**(tM)<br>This parameter indicates the methods that were used to change the motor parameters in accordance with the calculated thermal state of the motor. |
| nO | **[No]**(nO): Thermal state not calculated. |
| tM | **[Therm Mot]**(tM): Calculation of the stator thermal state, based on the motor's nominal current and current consumption. |
| Ct | **[Cold tun]**(Ct): Calculation of the stator thermal state, based on the stator resistance calculated during the initial tuning of the cold motor and the autotuning performed at each startup. |

**Note:**

**Before [Auto tuning usage] (TUNU) is set to [Cold tun] (CT), autotuning must be performed to obtain reference values for a cold motor.**

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > SYN- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AUt | **[Automatic autotune]** | | **[No]**(nO) |
| | | | |
| | **Warning!**<br>**UNEXPECTED MOVEMENT**<br>**If this function is enabled, autotuning is performed every time the inverter is switched on.**<br>**Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | | |
| | The motor must be switched off when the inverter is switched on.<br>**[Automatic autotune]** (AUt) = **[YES]** (YES) if **[Auto tuning usage]** (tUnU) = **[Cold tun]** (Ct). The motor stator resistance value calculated during the tuning process is used to calculate the motor thermal state when the device is switched on. | | |
| nO | **[No]**(nO): Function disabled | | |
| YES | **[YES]**(YES): Tuning is performed automatically on each startup. | | |
| onE | **[One]**(onE): Tuning is performed on the first move command. | | |
| SMOt | **[Saliency mot. state]**<br>(For information only, cannot be modified) Magnetic reluctance information for synchronous motors.<br>This parameter can be accessed if **[Tune selection]**(StUN) = **[Measure]**(MEAS) | | |
| | **Note:**<br>**For a motor with lower magnetic reluctance, the standard control process is recommended.** | | |
| nO | **[No]** (nO): Tuning is not performed. | | |
| LLS | **[Low salient]**(LLS): Low magnetic reluctance (recommended configuration: **[Angle setting type]**(ASt) = **[PSI align]**(PSI) or **[PSIO align]**(PSIO) and **[HF inj. activation]**(HFI) = **[No]**(nO)). | | |
| MLS | **[Med salient]**(MLS): Medium magnetic reluctance (**[Angle setting type]**(ASt) = **[SPM align]**(SPMA) is possible. **[HF inj. activation]**(HFI) = **[YES]**(YES) is possible). | | |
| HLS | **[High salient]**(HLS): High magnetic reluctance (**[Angle setting type]**(ASt) = **[IPM align]**(IPMA) is possible. **[HF inj. activation]**(HFI) = **[Yes]**(YES) is possible). | | |
| ASt | **[Set angle type]** | | **[PSIO align]**(PSIO) |
| | Mode for measuring phase shift angle. Only visible if **[Motor control type]**(Ctt) = **[Sync. mot.]**(SYn).<br>**[PSI align]**(PSI) and **[PSIO align]**(PSIO) work for all types of synchronous motor. **[SPM align]**(SPMA) and **[Assign IPM]**(IPMA) increase performance, depending on the type of synchronous motor. | | |
| IPMA | **[IPM align]**(IPMA): IPM motor (Interior-buried permanent magnet motor) assignment. Assignment mode for the interior-buried permanent motor (this motor normally has a high magnetic reluctance). It uses a high-frequency application that produces much less noise then standard assignment mode. | | |
| SPMA | **[SPM align]**(SPMA): SPM motor (Surface-mounted permanent magnet motor) assignment. Assignment mode for the surface-mounted permanent motor (this motor normally has medium or low magnetic reluctance). It uses a high-frequency application that produces much less noise then standard assignment mode. | | |
| PSI | **[PSI align]**(PSI): Pulse signal application. Standard assignment mode after pulse signal injection. | | |
| PSIO | **[PSIO align]**(PSIO): Optimized pulse signal application. Optimized standard assignment mode after pulse signal application. The phase shift angle measurement time is reduced after the first move command or measurement procedure, even if the inverter has been switched off. | | |
| nO | **[No action]**(nO): No assignment. | | |
| HFI | **[HF inj. activation]** | | **[No]**(nO) |
| | Enabling the high-frequency signal application in RUN. This function allows the motor speed to be calculated in such a way that torque can be achieved at low frequencies without speed feedback. | | |
| | **Note:**<br>**The higher the cogging, the more efficient function [HF inj. activation](HFI).** | | |
| | To ensure the power values, it may be required to adjust the speed control parameters (**[K speed loop filter]**(SFC), **[Speed time integral]**(SIt) and **[Speed prop. gain]**(SPG)) and the phase control loop (Expert parameters **[HF PLL bandwidth]**(SPb) and **[Speed fdback loss]**(SPF)).<br>The high-frequency application is not efficient in motors with low cogging.<br>A 4-Hz PWM frequency is suitable (**[Switching freq.]**(SFr)).<br>In cases of instability without load, it is recommended to reduce **[Speed prop. gain]**(SPG) and **[HF PLL bandwidth]**(SPb). For low frequencies, adjust the speed control loop parameters for dynamic behavior and the PLL gain for accurate speed calculation.<br>In the case of instability with load, it can be helpful to increase parameter **[Angle error Comp.]**(PEC) (especially for SPM motors). | | |
| nO | **[No]**(nO): Function disabled. | | |
| YES | **[YES]**(YES): High-frequency injection is used to calculate speed. | | |

(1) On the integrated display terminal: 0 to 9999 then 10.00 to 65.53 (10,000 to 65,536).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

To change the assignment of this parameter, press the ENT key for 2 seconds.

## 5.2.3.6.3.5 [SYNCHRONOUS MOTOR] (SYn-) Expert mode

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > drC- > SYN- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SYN- | **[Sync. mot.]** | | |
| rSAS | **[Cust. stator R syn]** | 0 to 65,535 mΩ | 0 mΩ |
| | Cold-state stator resistance (per winding). The factory setting is replaced by the result from motor measurement if motor measurement was performed.<br>This value can be entered by the user, if known. | | |
| (1) | | | |
| LdS | **[Autotune L d-axis]** | 0 to 655.35 mH | 0 mH |
| | "d" axis stator inductance in mH (per phase).<br>For motors with smooth poles: **[Autotune L d-axis]**(LdS) = **[Autotune L q-axis]**(LqS) = Stator inductance L.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |
| LqS | **[Autotune L q-axis]** | 0 to 655.35 mH | 0 mH |
| | Stator inductance axis "q" in mH (per phase).<br>For motors with smooth poles: **[Autotune L d-axis]**(LdS) = **[Autotune L q-axis]**(LqS) = Stator inductance L.<br>The factory setting is replaced by the autotuning result, if autotuning has been performed. | | |
| PHS | **[Syn. EMF constant]** | 0 to 6553.5 mV/rpm | 0 mV/rpm |
| | Synchronous motor EMF constant in mV per rpm (peak voltage per phase).<br>During operation without load, PHS assignment is used to reduce the current. | | |
| (1) | | | |
| FrSS | **[Nominal freq sync.]** | 10 to 800 Hz | **[Nom motor spdsync]** (nSPS)*<br>**[Pole pairs]**(PPnS) / 60 |
| | Rated motor frequency for synchronous motors in Hz. Automatically updated in accordance with data from **[Nom motor spdsync]**(nSPS) and **[Pole pairs]**(PPnS). | | |
| SPb | **[HF PLL bandwidth]** | 0 to 100 Hz | 25 Hz |
| | Bandwidth of PLL stator frequency. | | |
| SPF | **[Speed fdback loss]** | 0 to 200% | 100% |
| | Red. factor of PLL stator frequency. | | |
| PEC | **[Angle error Comp.]** | 0 to 500% | 0% |
| | Angular position error compensation in high frequency mode.<br>This increases performance at low frequencies in generator and motor mode, especially for SPM motors. | | |
| AUtO | **[Auto]** (AUtO): The inverter takes a value equal to the nominal slip of the motor, calculated using the inverter parameters. | | |
| FrI | **[High-frequency injection frequency]** | 250 to 1,000 Hz | 500 Hz |
| | Frequency of the high-frequency injection signal. This affects the noise level during angle offset measurement and the accuracy of speed calculation. | | |
| HIr | **[HF current level]** | 0 to 200% | 25% |
| | Current level value for the high-frequency injection signal. This affects the noise level during angle offset measurement and the accuracy of speed calculation. | | |
| MCr | **[PSI align curr. max]** | **[Auto]**(AUtO) to 300% | **[Auto]**(AUtO) |
| | Current level as a % of **[Nominal I sync.]**(nCrS) for angle offset measurement modes **[PSI align]**(PSI) and **[PSIO align.]**(PSIO). This parameter affects inductance measurement. **[PSI align curr. max]**(MCr) is used for measurement.<br>This current must be greater than or equal to the maximum current level for this application. Otherwise, instability may occur.<br>If **[PSI align curr. max]**(MCr) = **[Auto]**(AUtO), **[PSI align curr. max]**(MCr) = 150% of **[Nominal I sync.]**(nCrS) during measurement and 100% of **[Nominal I sync.]**(nCrS) during angle offset measurement with standard assignment (**[PSI align]**(PSI) or **[PSIO align.]**(PSIO)). | | |
| ILr | **[Injection level align]** | 0 to 200% | 50% |
| | Current level as a % of **[Nominal I sync.]**(nCrS) for IPMA measurement of the high-frequency phase-shift angle. | | |
| SIr | **[Boost level align.]** | 0 to 200% | 100% |
| | Current level as a % of **[Nominal I sync.]**(nCrS) for SPMA measurement of the high-frequency phase-shift angle. | | |
| rdAE | **[% error EMF sync]** | -3276.7 to 3275.8 | - |
| | Power ratio D-axis<br>Use **[% error EMF sync]**(rdAE) to adjust **[Syn. EMF constant]**(PHS); **[% error EMF sync]**(rdAE) should be close to 0.<br>If the value of **[% error EMF sync]**(rdAE) is less than 0%, **[Syn. EMF constant]**(PHS) can be increased.<br>If the value of **[% error EMF sync]**(rdAE) is greater than 0%, **[Syn. EMF constant]**(PHS) can be decreased. | | |

(1) On the integrated display terminal: 0 to 9999 then 10.00 to 65.53 (10,000 to 65,536).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.3.6 [MOTOR CONTROL] (drC-) (continued)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| drC- | **[MOTOR CONTROL]** | | |
| VOLT | **[Speed prop. gain]**<br>Speed control proportional gain<br>Visible if **[Motor control type]**(Ctt) is not set to **[Standard]**(Std), **[V/F 5pts]**(UF5) or **[V/F Quad.]**(UFq). | 0 to 1,000% | 40% |
| SPGU | **[UF inertia comp.]**<br>Factor of inertia for the following motor control curves:<br>Visible if **[Motor control type]**(Ctt) = **[Standard]**(Std), **[V/F 5pts]**(UF5) or **[V/F Quad.]**(UFq). | 0 to 1,000% | 40% |
| Slt | **[Speed time integral]**<br>Integral time constant for speed control<br>Visible if **[Motor control type]**(Ctt) is not set to **[Standard]**(Std), **[V/F 5pts]**(UF5) or **[V/F Quad.]**(UFq). | 1 to 65,535 ms | 63 ms |
| SFC | **[K speed loop filter]**<br>Speed filter coefficient (0 (IP) to 100 (PI)). | 0 to 100 | 65 |
| FFH | **[Spd est. filter time]**<br>Only available in Expert mode.<br>Frequency used to filter the calculated speed. | 0 to 100 ms | 6.4 ms |
| CrtF | **[Cur. ref. filter time]**<br>Only available in Expert mode.<br>Filter time for the current setpoint filter [of the control curve (if **[No]**(nO): Stator natural frequency)]. | 0 to 100 ms | 3.2 ms |
| UFr | **[IR compensation]**<br>Used to optimize torque at very low speed or for adjustment in special cases (Example: To reduce **[IR compensation]**(UFr) for motors connected in parallel. If torque is not sufficient at low speed, increase **[IR compensation]**(UFr). If the value is too high, this can prevent the motor from starting (locking mechanism) or result in a change of current limiting mode. | 0 to 200% | 100% |
| SLP | **[Slip compensation]**<br>This parameter cannot be accessed if **[Motor control type]**(Ctt) = **[Sync. mot.]**(SYn).<br>This parameter is set to 0% if **[Motor control type]**(Ctt) = **[V/F Quad.]**(UFq).<br>Adjust the slip compensation to the value set by nominal motor speed.<br>The speeds given on motor nameplates are not necessarily exact.<br>If the slip setting is lower than the actual slip, it means that the motor is not rotating at the correct speed in steady state; it is rotating at a speed lower than the setpoint.<br>If the slip setting is higher than the actual slip, it means that the motor is overcompensated and the speed is unstable. | 0 to 300% | 100% |
| U1 | **[U1]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 800 V depending on size | 0 V |
| F1 | **[F1]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 599 Hz | 0 Hz |
| U2 | **[U2]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 800 V depending on size | 0 V |
| F2 | **[F2]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 599 Hz | 0 Hz |
| U3 | **[U3]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 800 V depending on size | 0 V |
| F3 | **[F3]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 599 Hz | 0 Hz |
| U4 | **[U4]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 800 V depending on size | 0 V |
| F4 | **[F4]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 599 Hz | 0 Hz |
| U5 | **[U5]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 800 V depending on size | 0 V |
| F5 | **[F5]**<br>V/f profile setting This parameter can be accessed if **[Motor control type]**(Ctt) = **[V/F 5pts]**(UF5). | 0 to 599 Hz | 0 Hz |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CLI | [CURRENT LIMIT.] | 0 to 1.5*INV | 1.5*INV |

**Caution!**

**MOTOR OVERHEATING AND DAMAGE**

- **Make sure that the motor has the required power rating for the applied maximum current.**
- **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**

**Failure to observe these instructions can result in damage to the equipment.**

First current limitation.

**Note:**

**If the setting is less than 0.25 in, the inverter can lock in error mode [Output Phase Loss](OPL), if this has been enabled). If it is less than the motor no-load current, the motor cannot run.**

| | | | |
|---|---|---|---|
| SFt | [Switch. freq type] | | [SFR type 1](HF1) |
| | The motor clock frequency is always changed (reduced) if the inverter's internal temperature is too high. | | |
| HF1 | [SFR type 1](HF1): Optimized for heating<br>Used by the system to adjust the clock frequency to the motor frequency. | | |
| HF2 | [SFR type 2](HF2): Motor noise optimization (for high clock frequency)<br>Allows the system to maintain a selected clock frequency [Switching freq.](SFr), independently of the motor frequency [Output frequency](rFr).<br>In the case of overheating, the inverter automatically reduces the clock frequency.<br>When the temperature returns to normal value, the frequency is also increased back to its original value. | | |
| SFr | [Switching freq.] | 2 to 16 kHz or 4 kH (if (SVL) enabled | 4 kHz |

**Caution!**

**MOTOR DAMAGE**

**If the EMC filter is separated in an IT power system, make sure that the inverter clock frequency does not exceed 4 kHz.**

**Failure to observe these instructions can result in damage to the equipment.**

Switching frequency setting.
Setting range: The maximum value is limited to 4 kHz if parameter [Motor surge limit](SVL) has been configured.

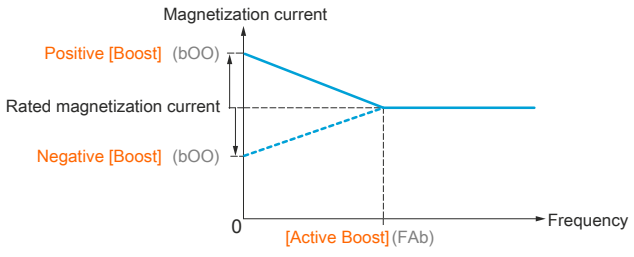
**Note:**

**In the event of an excessive temperature increase, the inverter will automatically reduce the clock frequency and then reset it again once the temperature has reverted to within the normal range.**

At high motor speeds, it is advisable to increase PWM frequency [Switching freq.](SFr) to 8, 12 or 16 kHz.

| | | |
|---|---|---|
| nrd | [Noise reduction] | [No](nO) |
| | Random frequency modulation prevents any resonance that may occur at a fixed frequency. | |
| nO | [No](nO): Fixed frequency | |
| YES | [YES](YES): Frequency with random modulation | |
| bOA | [Boost activation] | [Dynamic](dYnA) |
| nO | [Inactive] (nO): No boost | |
| dYnA | [Dynamic](dYnA): Dynamic boost | |
| StAt | [Static](StAt): Static boost | |
| bOO | [Boost] | -100 to 100% 0% |

This parameter can be accessed if [Boost activation](bOA) is not set to [No](nO).
Adjustment of motor magnetizing current at low speeds as a percentage of nominal magnetizing current. This parameter is used to increase or decrease the time required to build up torque. It allows gradual adjustment up to the frequency, which is defined via [Action Boost](FAb). For motors with conical rotors, negative values are particularly common.



| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| FAb | **[Action Boost]** | 0 to 599 Hz | 0 Hz |
| ★ | This parameter can be accessed if **[Boost activation]**(bOA) is not set to **[No]**(nO).<br>A frequency that is no longer affected by **[Boost]**(bOO) once it exceeds the magnetizing current. | | |
| SVL | **[Motor surge limit.]** | | **[No]**(nO) |
| | This function limits motor overvoltage and can be used for the following types of application:<br>• NEMA motors<br>• Japanese motors<br>• Spindle motors<br>• Rewound motors<br>This parameter can be left set to **[No]**(nO) for 230/400 V motors operated at 230 V and for cases where the cable between the inverter and the motor does not exceed the following lengths:<br>• 4 m for unshielded cables<br>• 10 m for shielded cables<br>**Note:**<br>**If [Motor surge limit](SVL) = [YES](YES), the maximum clock frequency[Switching freq.](SFr) is changed.** | | |
| nO | **[No]**(nO): Function not active | | |
| YES | **[YES]**(YES): Function active | | |
| SOP | **[Volt surge limit. opt]** | | 10 µs |
| ★ | Optimization parameter for transient overvoltages at the motor terminals. This parameter can be accessed if **[Motor surge limit]**(SVL) = **[YES]**(YES).<br>Set to 6, 8 or 10 µs, as per the following table. | | |
| 6 | **[6 µs]**(6) | | |
| 8 | **[8 µs]**(8) | | |
| 10 | **[10 µs]**(10) | | |
| | **Note:**<br>**This parameter can be used for 8I66T40xxxx.00-000 inverters.** | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

The value for parameter **[Volt surge limit. opt]**(SOP) corresponds to the damping time for the cable used. It is used to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC-bus nominal voltage.

The following table shows examples of the correlation between parameter **[Volt surge limit. opt]**(SOP) and the length of the cable between the inverter and the motor. For longer cable lengths, a filter or dV/dt protective filter must be used.

For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length provided in the table row that corresponds to the power for one motor to the length that corresponds to total power, and select the shorter length.

Example: Two 7.5 kW motors (10 HP)

Take the lengths from the 15 kW (20 HP) column that are shorter than those in the 7.5 kW (10 HP) column. Divide the corresponding length by the number of motors to obtain the length per motor (for an unshielded "GORSE" cable where SOP = 6, the result is 40 m / 2 motors = 20 m per motor. This is the maximum for each 7.5 kW (10 HP) motor).

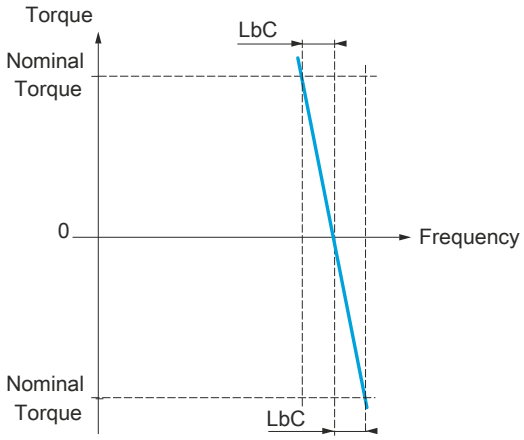
In special cases (for example, different types of cable, different motor powers in parallel, different cable lengths in parallel, etc.), we recommend using an oscilloscope to check the overvoltage values obtained at the motor terminals.

To retain the overall inverter performance, the SOP value is not permitted to be increased unnecessarily.

Overview of the correlation between the SOP parameter and the cable length for a 400 V power supply

| P66 | Motor | | Cable cross section (min) | | Maximum cable length in meters | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Setpoint | Power | | | | Unshielded "GORSE" H07 RN-F 4Gxx cable | | | Shielded "GORSE" GVCSTV-LS/LH cable | | | Shielded "BELDEN" 2950x cable | | |
| | kW | HP | In mm² | AWG | SOP = 10 | SOP = 8 | SOP = 6 | SOP = 10 | SOP = 8 | SOP = 6 | SOP = 10 | SOP = 8 | SOP = 6 |
| 8I66T400037.00-000 | 0.37 | 0.50 | 1.5 | 14 | 100 m | 70 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400055.00-000 | 0.55 | 0.75 | 1.5 | 14 | 100 m | 70 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400075.00-000 | 0.75 | 1 | 1.5 | 14 | 100 m | 70 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400110.00-000 | 1.1 | 1.5 | 1.5 | 14 | 100 m | 70 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400150.00-000 | 1.5 | 2 | 1.5 | 14 | 100 m | 70 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400220.00-000 | 2.2 | 3 | 1.5 | 14 | 110 m | 65 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400300.00-000 | 3 | - | 1.5 | 14 | 110 m | 65 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |
| 8I66T400400.00-000 | 4 | 5 | 2.5 | 12 | 110 m | 65 m | 45 m | 105 m | 85 m | 65 m | 50 m | 40 m | 30 m |

In the case of 230/400 V motors operated at 230 V, parameter **[Motor surge limit]** (SVL) is still equal to **[No]** (nO).

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Clear all** |
| drC- | **[MOTOR CONTROL](continued)** | | |
| Vbr | **[Braking level]**<br>Braking transistor power-on voltage (see "[DC BUS] (dCC-)" on page 386). | 8I66x2: 335 to 395 VDC<br>8I66T4: 698 to 820 VDC<br>8I66T6: 941 to 995 VDC | In accordance with nominal inverter voltage |
| LbA | **[Load sharing]**<br>When two motors are connected mechanically and are therefore at the same speed, and each motor is controlled by an inverter, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque.<br>These parameters can only be accessed if **[Motor control type]**(Ctt) = **[SVC U]**(UUC).<br>nO **[No]**(nO): Function inactive<br>YES **[YES]**(YES): Function active | | **[No]**(nO) |
| LbC | **[Load sharing correction]**<br>Nominal compensation in Hz.<br>This parameter can be accessed if **[Load sharing]**(LbA) = **[YES]**(YES).<br>  | 0 to 599 Hz | 0 Hz |

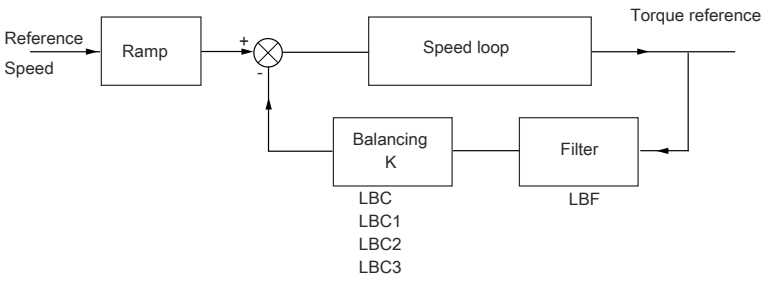
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

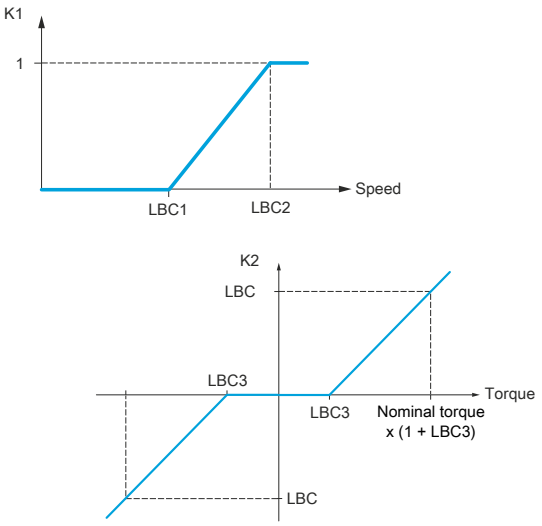
## 5.2.3.6.3.7 [MOTOR CONTROL] (drC-) Load balancing parameters

**Load balancing parameters can be accessed at Expert level.**

Principle:




Load sharing factor K is determined by the torque and speed, with two factors K1 and K2 (K = K1 x K2).



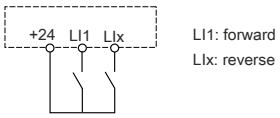
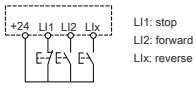

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > drC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| drC- | **[MOTOR CONTROL]** | | |
| LbC1 | **[Correction min spd]**<br>This parameter can be accessed if **[Load sharing]**(LbA) = **[YES]**(YES) is configured.<br>Minimum speed for load distribution correction in Hz. Below this threshold, no corrections are made. Used to cancel correction at very low speed, as this correction would hamper motor rotation. | 0 to 598.9 Hz | 0 Hz |
| LbC2 | **[Correction max spd]**<br>This parameter can be accessed if **[Load sharing]**(LbA) is set to **[YES]**(YES).<br>Speed threshold in Hz above which maximum load correction is applied. | **[Correction min spd]**(LbC1) + 0.1 at 599 Hz | 0.1 Hz |
| LbC3 | **[Torque offset]**<br>This parameter can be accessed if **[Load sharing]**(LbA) = **[YES]**(YES) is configured.<br>Minimum torque for load correction as a % of the rated torque. Below this limit value, no corrections are made. Used to avoid torque instability when torque direction is not constant. | 0 to 300% | 0% |
| LbF | **[Sharing filter]**<br>This parameter can be accessed if **[Load sharing]**(LbA) = **[YES]**(YES) is configured.<br>The (filter) time constant for the correction in ms. Used with flexible mechanical couplings to prevent instability. | 0 to 20 s | 100 ms |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.4 [INPUTS/OUTPUTS](I_O-)

The parameters in menu [INPUTS/OUTPUTS](I-O-) can only be changed if the inverter has been stopped and no move command has been given.

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| I_O- | [INPUTS/ OUTPUTS] | |
| tCC<br>2 s | [2/3 wire control] | [2 wire](2C) |
| | **Warning!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Changing this parameter causes parameters [Reverse assign.](rrS) and [2 wire type](tCt) as well as the digital inputs assignments to revert to factory settings.**<br>**Check that this change is compatible with the wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| 2C | [2 wire](2C) **2-wire control (level-controlled):** This is the input state (0 or 1) or edge (0 to 1 or 1 to 0) that controls operation or stopping. Source wiring example:<br>  | |
| 3C | [3 wire](3C) **3-wire control (edge-controlled):** Impulse "Forward" or "Reverse" is sufficient to control motor startup. Impulse "Stop" is sufficient to control motor stopping. Source wiring example:<br>  | |
| tCt<br>2 s | [2 wire type] | [Transition](trn) |
| | **Warning!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Make sure that this parameter setting is compatible with the type of wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| LEL | [Level](LEL): State 0 or 1 determines whether operation (1) or a stop (0) takes place. | |
| trn | [Transition](trn): A state change (edge or transition) is required to initiate operation and to prevent an inadvertent restart after power failure. | |
| PFO | [Fwd priority](PFO): State 0 or 1 is taken into account for operation or stopping, but input signal "Forward" takes priority over input signal "Reverse". | |
| rUn | [Run] | [No](nO) |
| | Stop command assignment<br>Only visible if [2/3 wire control](tCC) is set to [3 wire](3C). | |
| LI1 | [LI1](LI1): Logic input LI1, if not in [I/O profile](IO) | |
| Cd00 | [Cd00](Cd00): In [I/O profile](IO), logic input switchover is possible | |
| Frd | [Forward] | [LI1](LI1) |
| | Forward command assignment. | |
| LI1 | [LI1](LI1): Logic input LI1, if not in [I/O profile](IO) | |
| Cd00 | [Cd00](Cd00): In [I/O profile](IO), logic input switchover is possible | |
| rrS | [Reverse assign.] | [LI2](LI2) |
| | Assignment of the reverse direction command. | |
| nO | [No](nO): Not assigned | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...) | |
| | If [Profile] (CHCF) is set to [Not separ.] (SIM) or [Separate] (SEP), then parameters [CD11] (Cd11) to [CD15] (Cd15), [C111] (C111) to [C115] (C115), [C211] (C211) to [C215] (C215) as well as [C311] (C311) to [C315] (C315) will not be available. | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

## 5.2.3.6.4.1 [LI1 CONFIGURATION] (L1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > L1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| L1- | **[LI1 CONFIGURATION]** | | |
| L1A | **[Logic input 1 assignment]**<br>Read-only parameter, cannot be configured.<br>It displays all the functions that are assigned to input LI1 in order to check for multiple assignments. | | |
| nO | **[No]**(nO): Not assigned | | |
| rUn | **[Run]**(rUn): Enabled to start | | |
| Frd | **[Forward]**(Frd): Operation in forward direction | | |
| rrS | **[Reverse assign.]**(rrS): Operation in reverse direction | | |
| rPS | **[Ramp type]**(rPS): Switch ramp | | |
| JOG | **[Frequency Jog]**(JOG): Step mode | | |
| USP | **[+speed around ref.]**(USP): Increase speed | | |
| dSP | **[-speed around ref.]**(dSP): Decrease speed | | |
| PS2 | **[2 preset speeds]**(PS2): 2 preset speeds | | |
| PS4 | **[4 preset speeds]**(PS4): 4 preset speeds | | |
| PS8 | **[8 preset speeds]**(PS8): 8 preset speeds | | |
| rFC | **[Ref. 2 switching]**(rFC): Setpoint switching | | |
| nSt | **[Freewheel]**(nSt): Freewheel stop | | |
| dCI | **[DC Injection]**(dCI): Stop via DC injection braking | | |
| FSt | **[Fast stop]**(FSt): Fast stop | | |
| FLO | **[Forced local]**(FLO): Mode "Forced local" | | |
| rSF | **[Fault reset]**(rSF): Error reset | | |
| tUL | **[Auto-tuning]**(tUL): Autotuning | | |
| SPM | **[Save setpoint]**(SPM): Setpoint storage | | |
| FLI | **[Pre Fluxing]**(FLI): Motor magnetization | | |
| PAU | **[Auto / manual]**(PAU): Auto / manual PI(D) | | |
| PIS | **[PID integral reset]**(PIS): PI(D) integral shunt | | |
| Pr2 | **[2 preset PID ref.]**(Pr2): 2 PI(D) preset setpoints | | |
| Pr4 | **[4 preset PID ref.]**(Pr4): 4 PI(D) preset setpoints | | |
| tLA | **[Torque limitation]**(tLA): Permanent torque limitation | | |
| EtF | **[External fault]**(EtF): External error | | |
| rCA | **Output contact. fdbk]**(rCA): Downstream contactor feedback | | |
| CnF1 | **[2 config. switching]**(CnF1): Configuration switchover 1 | | |
| CnF2 | **[3 config. switching]**(CnF2): Configuration switchover 2 | | |
| CHA1 | **[2 parameter sets]**(CHA1): Parameter switchover 1 | | |
| CHA2 | **[3 parameter sets]**(CHA2): Parameter switchover 2 | | |
| tLC | **[Analog limit. act.]**(tLC): Torque limiting: Enabled (analog input) via logic input | | |
| CCS | **[Cmd switching]**(CCS): Command channel switchover | | |
| InH | **[Fault inhibition]**(InH): Error inhibition | | |
| PS16 | **[16 preset speeds]**(PS16): 16 preset speeds | | |
| LC2 | **[Current limit 2]**(LC2): Current-limiting switchover | | |
| rCb | **[Ref 1B switching]**(rCb): Setpoint channel switchover (1 after 1B) | | |
| trC | **[Traverse control]**(trC): Traverse control | | |
| bCI | **[Brake feedback]**(bCI): Logic input brake feedback | | |
| SAF | **[Stop FW limit sw.]**(SAF): Forward stop switch | | |
| SAr | **[Stop RV limit sw.]**(SAr): Reverse stop switch | | |
| dAF | **[Slowdown forward]**(dAF): Forward deceleration achieved | | |
| dAr | **[Slowdown reverse]**(dAr): Reverse deceleration achieved | | |
| CLS | **[Disable limit sw.]**(CLS): Clear limit switch | | |
| LES | **[Drive lock]**(LES): Emergency switch-off | | |
| rtr | **[Init. traverse ctrl.]**(rtr): Reload traverse control | | |
| SnC | **[Counter wobble]** (SnC): Counter wobble synchronization | | |
| rPA | **[Prod. reset]**(rPA): Reset product | | |
| SH2 | **[2 HSP]**(SH2): High speed 2 | | |
| SH4 | **[4 HSP]**(SH4): High speed 4 | | |
| FPS1 | **[Preset spd2]**(FPS1): Preset speed 1 function key assignment | | |
| FPS2 | **[Preset spd3]**(FPS2): Preset speed 2 function key assignment | | |
| FPr1 | **[PID ref. 2]**(FPr1): Preset PI 1 function key assignment | | |
| FPr2 | **[PID ref. 3]**(FPr2): Preset PI 2 function key assignment | | |
| FUSP | **[+speed around ref.]**(FUSP): Speed increase function key | | |
| FdSP | **[-speed around ref.]**(FdSP): Speed decrease function key | | |
| Ft | **[T/K]**(Ft ): Bumpless function key assignment | | |
| USI | **[+speed around ref.]**(USI): Increase speed around setpoint | | |
| dSI | **[-speed around ref.]**(dSI): Decrease speed around setpoint | | |
| SLS1 | **[SLS ch.1]**(SLS1): Safety function SLS channel 1 | | |
| SLS2 | **[SLS ch.2]**(SLS2): Safety function SLS channel 2 | | |
| SS11 | **[SS1 ch.1]**(SS11): Safety function SS1 channel 1 | | |
| SS12 | **[SS1 ch.2]**(SS12): Safety function SS1 channel 2 | | |
| StO1 | **[STO ch.1]**(St01): Safety function STO channel 1 | | |
| StO2 | **[STO ch.2]**(St02): Safety function STO channel 2 | | |
| SMS1 | **[SMS ch.1]**(SMS1): Safety function SMS channel 1 | | |
| SMS2 | **[SMS ch.2]**(SMS2): Safety function SMS channel 2 | | |
| L1d | **[LI1 On Delay]**<br>This parameter is used to enable delayed consideration of the logic input's transition to state 1. This delay can be set to a value from 0 to 200 ms, and it serves to filter possible interference. The change to state 0 is taken into account without delay. | 0 to 200 ms | 0 ms |

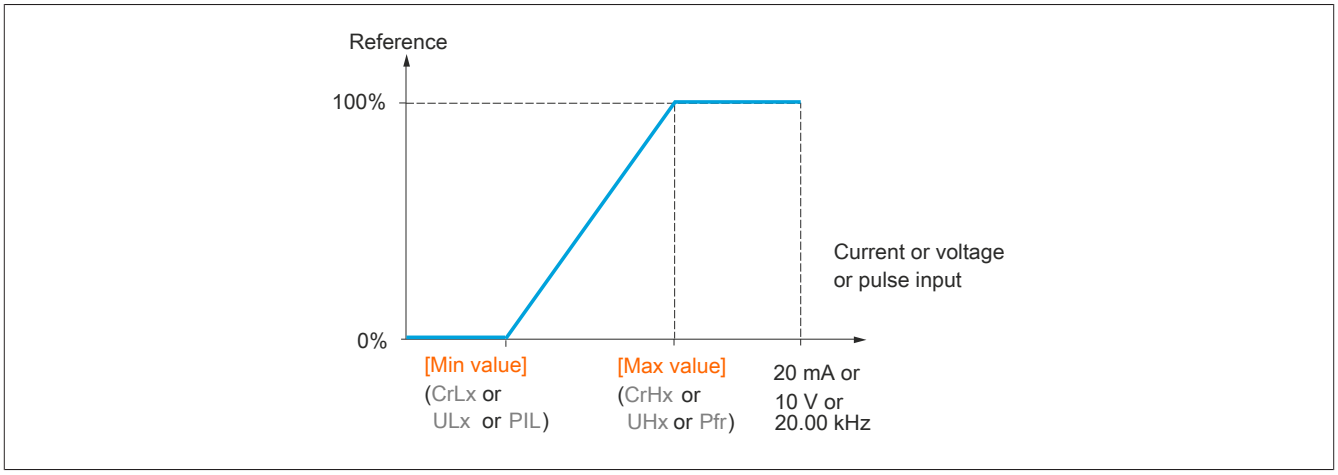
| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| I_O- | **[INPUTS/OUTPUTS](continued)** | | |
| L2-<br>Up to<br>L6- | **[LIx CONFIGURATION]**<br>All available logic inputs of the inverter are processed as shown in example LI1 above (up to LI6). | | |
| L5- | **[LI5 CONFIGURATION]**<br>The parameters determined for LI5 are used as an pulse input. | | |
| PIA | **[RP assignment]**<br>Read-only parameter, cannot be configured.<br>This parameter displays all the functions assigned to the pulse input. This allows compatibility problems to be checked, for example.<br><br>Identical to **[AI1 assignment]**(AI1A). | | |
| PIL | **[RP min value]**<br>Scaling parameters for pulse input 0% in Hz * 10 unit. | 0 to 20.00 kHz | 0 kHz |
| PFr | **[RP max value]**<br>Scaling parameters for pulse input 100% in Hz * 10 unit. | 0 to 20.00 kHz | 20.00 kHz |
| PFI | **[RP filter]**<br>I/O for external pulse input low-pass filter cutoff time. | 0 to 1000 ms | 0 ms |
| LA1-<br>LA2- | **[LIx CONFIGURATION]**<br>The inverter's two analog inputs, AI1 and AI2, can be used as logic inputs and are processed in the same way as LI1 in the example above. | | |

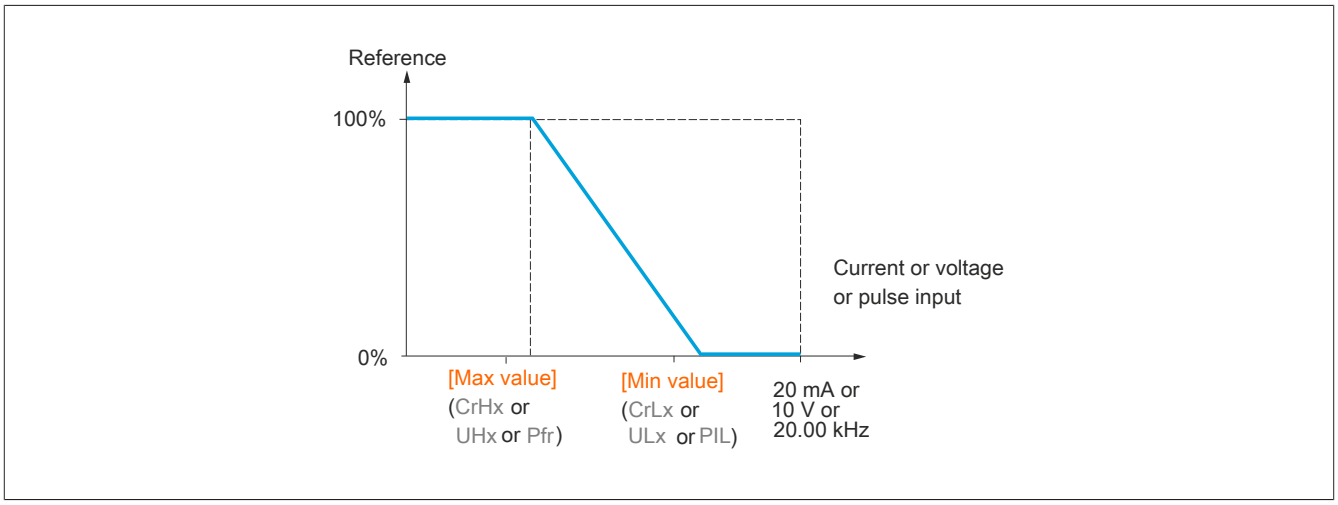
### Analog inputs and pulse input configuration

The minimum and maximum values for the inputs (in V, mA, etc.) are converted to a percentage in order to adapt the setpoints to the type of application.

### Minimum and maximum input values:

The minimum value corresponds to a 0% setpoint and the maximum value to a 100% setpoint. The minimum value can be greater than the maximum value:

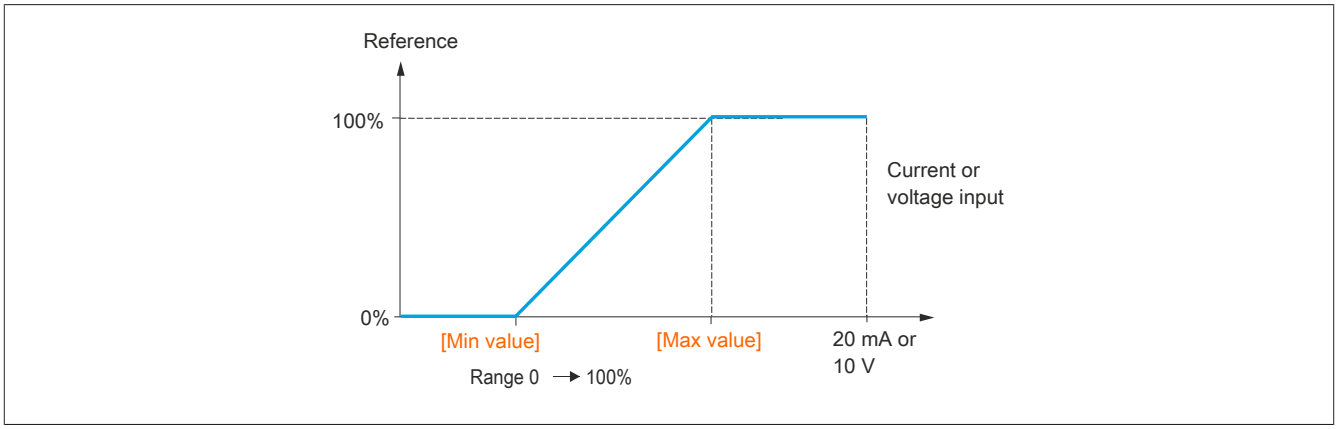


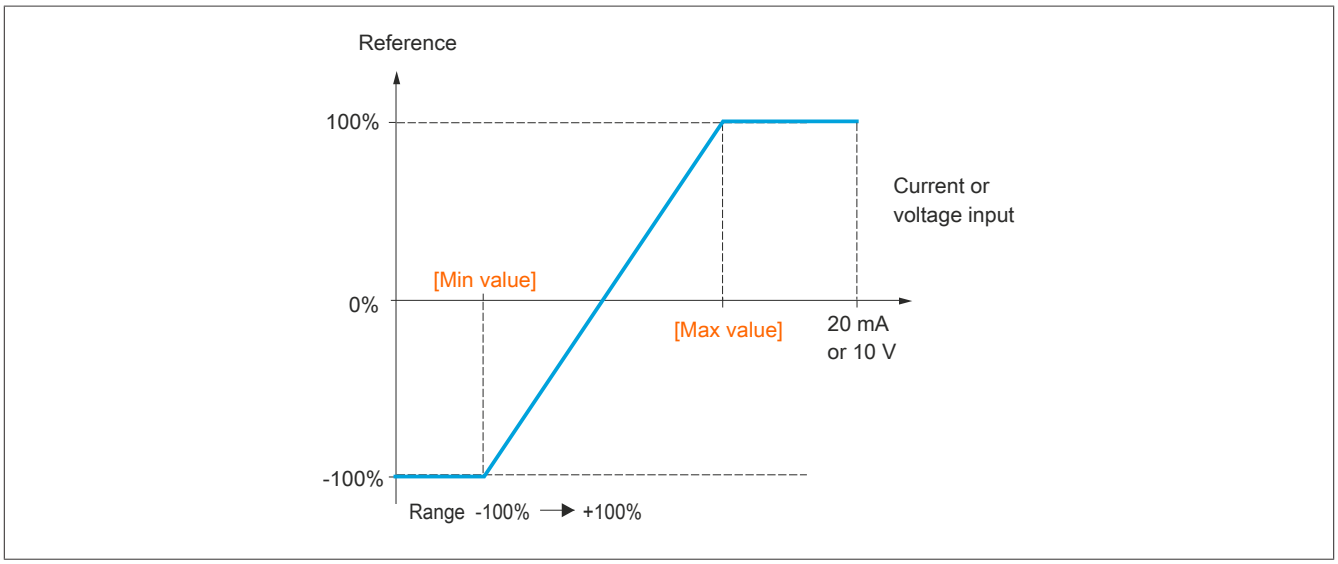



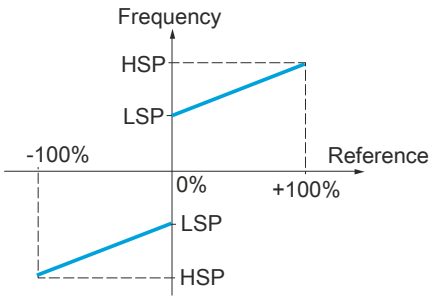
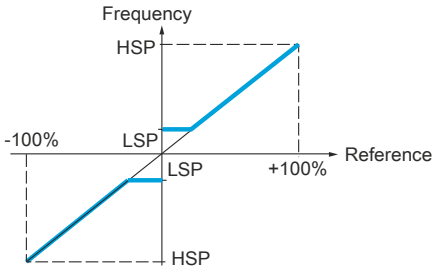
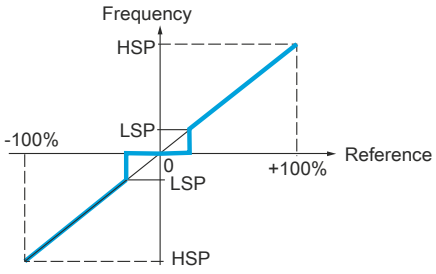
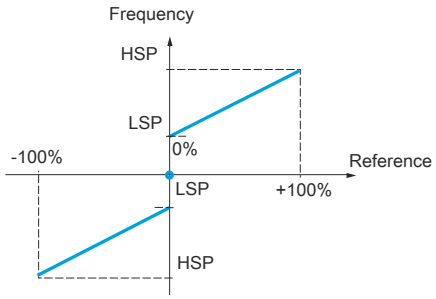

For bidirectional inputs (±), the minimum and maximum values are relative to the absolute value, for example, ± 2 related to 8 V.

**Area (output values): Only for analog inputs:**

With this parameter, the reference range is set to [0% → 100%] or [-100% → +100%]. This will result in bidirectional output from unidirectional input.



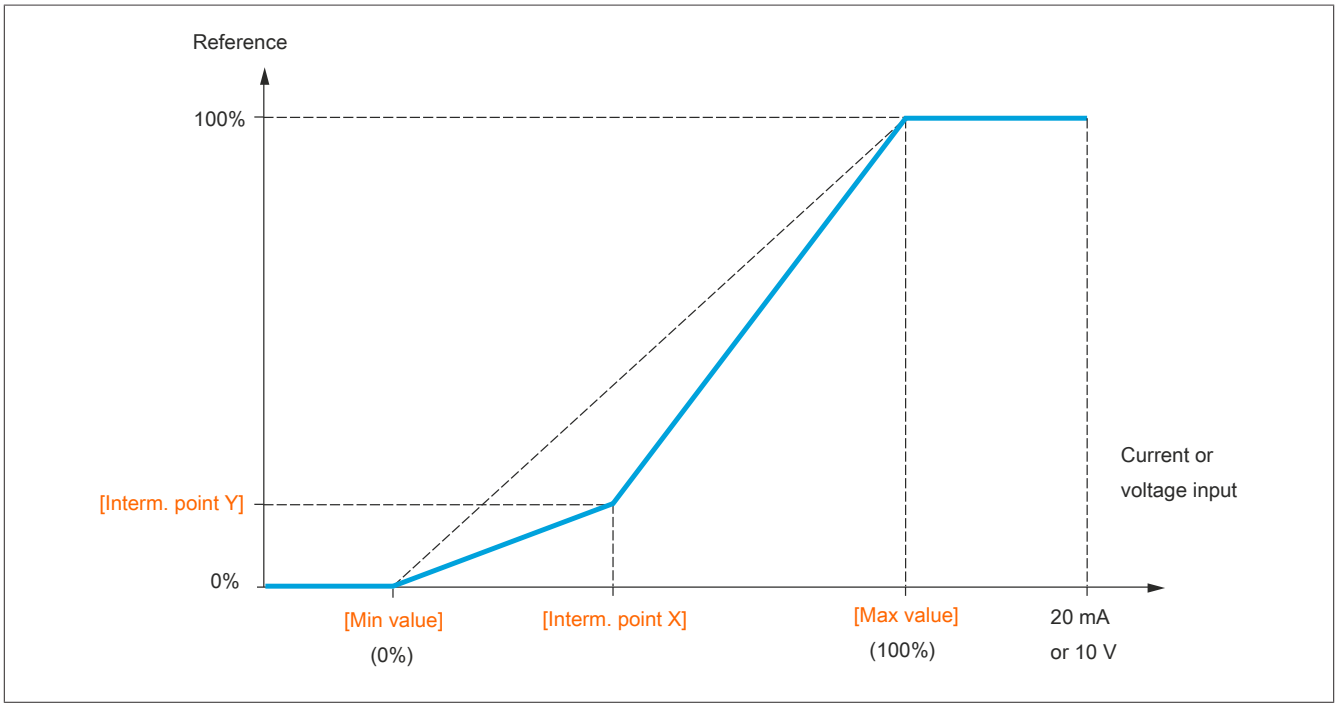
| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > bSP | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| bSP | [Reference template] | | [Standard] (bSd) |
| | **Note:**<br>**[Type of ref.] (bSP) is forced to [Deadband](bnS) and cannot be changed if setpoint [Ref Frequency] (LFr) or (LFRD) is specified by a controller.** | | |
| bSd | [Standard] (bSd) | | |
| |  When setpoint = 0, frequency = LSP | | |
| bLS | [Pedestal](bLS) | | |
| |  When setpoint = 0 to LSP, frequency = LSP | | |
| bnS | [LSP inhibition](bnS) | | |
| |  When setpoint = 0 to LSP, frequency = 0 | | |
| bnS0 | [Deadband 0](bnS0) | | |
| |  This process is identical to [Default] (bSd), but in the following cases the frequency at reference = 0 is also = 0.<br>The signal is below [Min value], which in turn is greater than 0 (example: 1 V on a 2-10-V input).<br>The signal is lower than [Min value], which in turn is greater than [Max value] (Example: 11 V on a 10-0-V input).<br>If "bidirectional" has been set for the input field, the process is identical to [Default] (bSd).<br>This parameter defines how the speed reference is taken into account, for analog inputs and Pulse input only. In the case of the PID regulator, this is the PID output reference.<br>The limit values are defined by parameters [Low speed](LSP) and [High speed](HSP). | | |

Parameter that can be modified during operation or when stopped.

**Delinearization: Only for analog inputs**

To delinearize the input, determine an intermediate point on the input/output curve of this input:

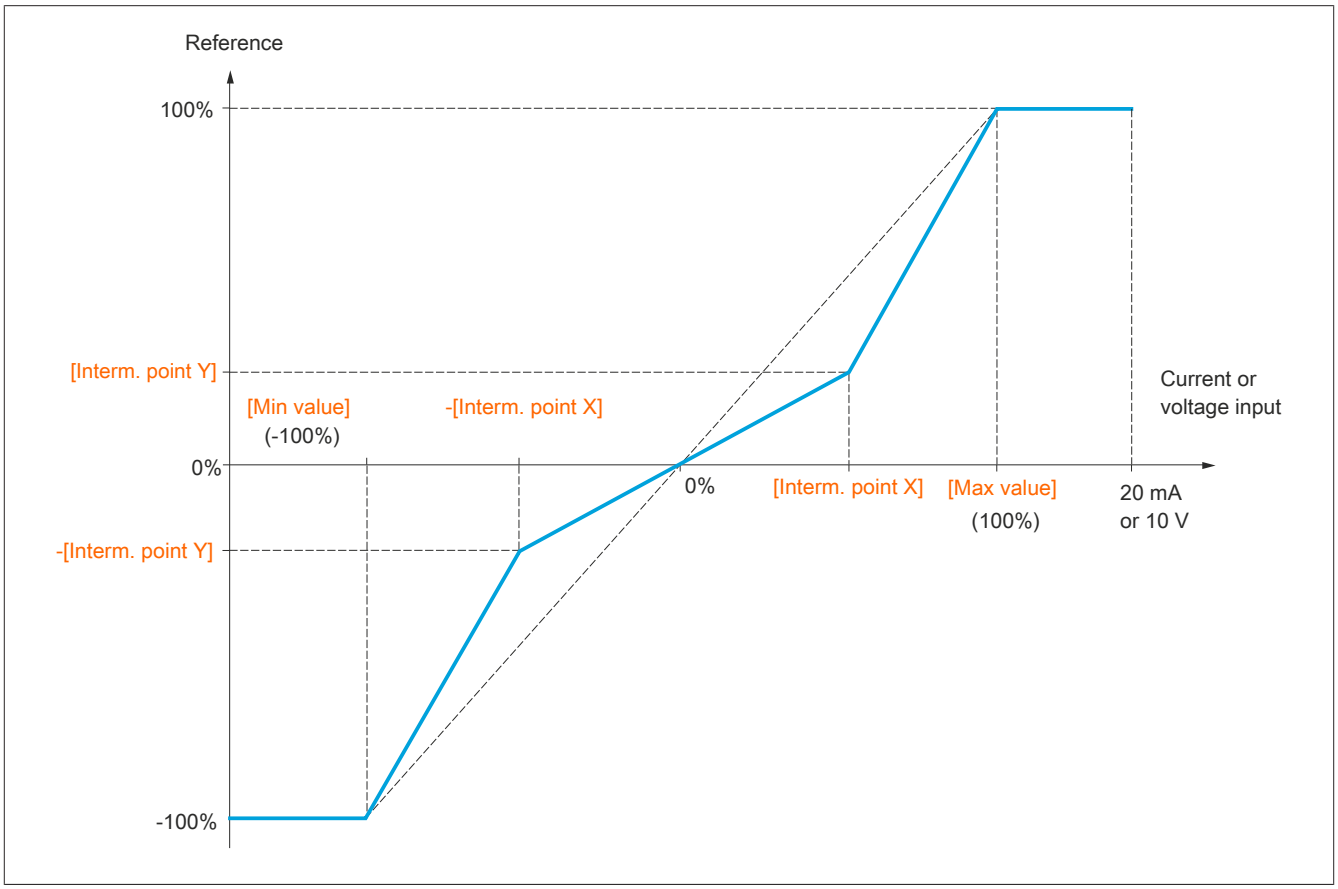
Range 0 → 100%




**Note:**

**For [AI1 Interm. point] 0% corresponds to the [Min value] and 100% to the [Max value].**

Range -100% → 100%



### 5.2.3.6.4.2 [AI1 CONFIGURATION] (AI1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AI1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AI1- | **[AI1 CONFIGURATION]** | | |
| AI1A | **[AI1 assignment]**<br>Read-only parameter, cannot be configured. This parameter displays all functions assigned to the AI1 input. This allows compatibility problems to be checked, for example. | | |
| nO | **[No]**(nO): Not assigned | | |
| AO1 | **[AO1 assignment]**(AO1): Analog output AO1 | | |
| Fr1 | **[Ref.1 channel]**(Fr1): Setpoint source 1 | | |
| Fr2 | **[Ref.2 channel]**(Fr2): Setpoint source 2 | | |
| SA2 | **[Summing ref. 2]**(SA2): Setpoint total 2 | | |
| PIF | **[PID feedback]**(PIF): PI actual value (PI control) | | |
| tAA | **[Torque limitation]**(tAA): Torque limiting: Enabled via analog value | | |
| dA2 | **[Subtract. ref. 2]**(dA2): Subtraction setpoint 2 | | |
| PIM | **[Manual PID ref.]**(PIM): Manual setpoint frequency for the PI(D) controller (auto-man) | | |
| FPI | **[PID speed ref.]**(FPI): Speed setpoint for the PI(D) controller (predictive setpoint) | | |
| SA3 | **[Summing ref. 3]**(SA3): Setpoint total 3 | | |
| Fr1b | **[ch1B active]**(Fr1b): Setpoint source 1B | | |
| dA3 | **[SubParam3]**(dA3): Subtraction setpoint 3 | | |
| FLOC | **[Forced local]**(FLOC): Setpoint source "Forced local" | | |
| MA2 | **[Multiplier ref. 2]**(MA2): Multiplication setpoint 2 | | |
| MA3 | **[Multiplication ref 3]**(MA3): Multiplication setpoint 3 | | |
| PES | **[Weight input]**(PES): Hoisting: External weight measurement function | | |
| AI1t | **[Type AI1]** | | **[Voltage]**(10U) |
| 10U | **[Voltage]**(10U): Positive voltage input 0 to 10 V (negative values are interpreted as zero: | | |
| UIL1 | **[AI1 min value]**<br>Parameter value for voltage scaling AI1 = 0% | 0 to 10.0 V | 0 V |
| UIH1 | **[AI1 max value]**<br>Parameter value for voltage scaling AI1 = 100% | 0 to 10.0 V | 10.0 V |
| AI1F | **[AI1 filter]**<br>Interference filtering. | 0 to 10.00 s | 0 s |
| AI1L | **[AI1 range]** | | **[0 - 100%]**(POS) |
| POS | **[0 - 100%]**(POS): Positive logic | | |
| nEG | **[+/- 100%]**(nEG): Positive and negative logic | | |
| AI1E | **[AI1 Interm. point X]**<br>Input delinearization point coordinate. Signal at physical input as a percentage.<br>0% corresponds to **[AI1 min value]**(UIL1). 100% corresponds to **[AI1 max value]**(UIH1). | 0 to 100% | 0% |
| AI1S | **[AI1 Interm. point Y]**<br>Output delinearization point coordinate (frequency reference). Percentage of internal frequency setpoint that corresponds to percentage **[AI1 Interm. point X]**(AI1E) of the signal at the physical input. | 0 to 100% | 0% |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AI2- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AI2- | **[AI2 CONFIGURATION]** | | |
| AI2A | **[AI2 assignment]**<br>Identical to **[AI1 assignment]**(AI1A) | | |
| AI2t | **[Type AI2]** | | **[Voltage +/-]**(n10U) |
| 10U | **[0-10V]**(10U): Positive voltage input 0 to 10 V (negative values are interpreted as zero: the input is unidirectional). | | |
| n10U | **[Voltage +/-]**(n10U): Positive and negative voltage input +/- 10 V (input is bidirectional). | | |
| UIL2 | **[AI2 min value]**<br>Parameter value for voltage scaling AI2 = 0% | 0 to 10.0 V | 0 V |
| UIH2 | **[AI2 max value]**<br>Parameter value for voltage scaling AI2 = 100% | 0 to 10.0 V | 10.0 V |
| AI2F | **[AI2 filter]**<br>Disturbance filtering. | 0 to 10.00 s | 0 s |
| AI2L | **[AI2 range]**<br>This parameter can be accessed if **[Type AI2]**(AI2t) = **[Voltage +/-]**(n10U). | | **[0 - 100%]**(POS) |
| POS | **[0 - 100%]**(POS): Positive logic | | |
| nEG | **[+/- 100%]**(nEG): Positive and negative logic | | |
| AI2E | **[AI2 Interm. point X]**<br>Input delinearization point coordinate. Signal at physical input as a percentage.<br>0% corresponds to **[Min value]** if the range = 0 → 100%.<br>0% corresponds to $\frac{[Max\ value]\ +\ [Min\ value]}{2}$ if the range = -100% → + 100%.<br>100% corresponds to **[Max value]**. | 0 to 100% | 0% |
| AI2S | **[AI2 Interm. point Y]**<br>Output delinearization point coordinate (frequency reference). Percentage of the internal frequency setpoint that corresponds to percentage **[AI2 Interm. point X]**(A12E) of the signal at the physical input. | 0 to 100% | 0% |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AI3- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AI3- | **[AI3 CONFIGURATION]** | | |
| AI3A | **[AI3 assignment]**<br>Identical to **[AI1 assignment]**(AI1A). | | |
| AI3t<br>0 A | **[AI3 Type]**<br>**[0-20mA]**(0A): Current input 0 to 20 mA | | **[0-20mA]**(0A) |
| CrL3 | **[Min value]**<br>Parameter value for current scaling AI3 = 0% | 0 to 20.0 mA | 0 mA |
| CrH3 | **[AI3 max value]**<br>Parameter value for current scaling AI3 = 100% | 0 to 20.0 mA | 20.0 mA |
| AI3F | **[AI3 filter]**<br>Disturbance filtering. | 0 to 10.00 s | 0 s |
| AI3L<br>POS<br>nEG | **[Range AI3]**<br>**[0 - 100%]** (POS): Unidirectional input<br>**[+/- 100%]**(nEG): Bidirectional input<br>Example: At an input of 4 to 20 mA.<br>4 mA corresponds to a -100% setpoint.<br>12 mA corresponds to a 0% setpoint.<br>20 mA corresponds to a +100% setpoint.<br>Since, from a physical perspective, AI3 involves a bidirectional input, configuration**[+/- 100%]**(nEG) is only permitted to be used if the applied signal involves a unidirectional signal. A bidirectional signal is not compatible with a bidirectional configuration. | | **[0 - 100%]**(POS) |
| AI3E | **[AI3 Interm. point X]**<br>Input delinearization point coordinate. Signal at physical input as a percentage.<br>0% corresponds to **[Min value]**(CrL3) if the range = 0 → 100%.<br>0% corresponds to $\frac{[AI3\ max.\ value]\ (CrH3) - [AI3\ min.\ value]}{(CrL3)}$ if the range = -100% → +100%.<br>100% corresponds to **[AI3 max value]**(CrH3). | 0 to 100% | 0% |
| AI3S | **[AI3 Interm. point Y]**<br>Output delinearization point coordinate (frequency reference).<br>Percentage of the internal frequency setpoint that corresponds to percentage **[AI3 Interm. point X]**(A13E) of the signal at the physical input. | 0 to 100% | 0% |

## 5.2.3.6.4.3 [Virtual AI1 ](AU1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AU1- | |
|---|---|
| **Code** | **Name/Description** |
| AU1- | **[VIRTUAL AI1]** |
| AU1A | **[AIV1 assignment]**<br>Virtual analog input 1 using the handwheel on the front of the product.<br>Identical to **[AI1 assignment]**(AI1A). |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AU2- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| AU2- | **[VIRTUAL AI2]** | |
| AU2A | **[AIV2 assign.]**<br>Possible assignment for **[AI virtual 2]**(AIU2): Virtual analog input 2 via the communication channel, configured via **[AI2 net. channel]**(AIC2).<br>Identical to **[AIV1 assignment]**(AU1A). | |
| AIC2<br>★<br><br><br><br>nO<br>Mdb<br>CAn<br>nEt | **[AI2 net. channel]**<br>**[VIRTUAL AI2]**(AU2A) Source channel.<br>This parameter is also accessible via submenu **[PID REGULATOR]**(PId-).<br>Scale: The value 8192 transmitted by this input corresponds to 10 V on a 10-V input.<br><br>**[No]**(nO): Not assigned<br>**[Modbus]**(Mdb): Integrated Modbus<br>**[CANopen com.]**(CAn): Integrated CANopen®<br>**[Com. card]**(nEt): Communication card (if used) | **[No]**(nO) |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.4.4 [R1 CONFIGURATION] (r1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > r1- > r1 | | | |
|---|---|---|---|
| **Code** | **Name/Description** | | **Factory settings** |
| r1- | **[R1 CONFIGURATION]** | | |
| r1 | **[R1 assignment]** | | **[No fault]**(FLt) |
| nO | **[No]**(nO): Not assigned | | |
| FLt | **[No fault]**(FLt): Inverter error detection state (relay is normally enabled and will be disabled in the event of an error) | | |
| rUn | **[Run]**(rUn): Inverter in operation | | |
| FtA | **[Freq. Th. attained]**(FtA): Frequency threshold value reached (**[Freq. Th. attained]**(Ftd)) | | |
| FLA | **[HSP attain.]** (FLA): High speed reached | | |
| CtA | **[I attained]** (CtA): Current threshold value reached (**[Current threshold]** (Ctd)) | | |
| SrA | **[Freq.ref.att]**(SrA): Frequency setpoint reached | | |
| tSA | **[Th.mot. att.]**(tSA): Motor thermal state 1 reached | | |
| PEE | **[PID error al]**(PEE): PID controller error alarm | | |
| PFA | **[PID fdbk al.]**(PFA): PID controller error alarm | | |
| F2A | **[Freq. Th. 2 attained]**(F2A): Frequency threshold value 2 reached (**[Freq. threshold 2]**(F2d)) | | |
| tAd | **[Th. drv. att.]**(tAd): Inverter thermal state reached | | |
| ULA | **[Underload. Proc. Al.]**(ULA): Underload alarm | | |
| OLA | **[Overload alarm]**(OLA): Overload alarm | | |
| rSdA | **[Rope slack]**(rSdA): Slack rope (see parameter **[Rope slack config.]**(rSd)). | | |
| ttHA | **[High torque alarm]**(ttHA): Motor torque exceeds upper threshold value **[High torque thd.]**(ttH). | | |
| ttLA | **[Low torque alarm]**(ttLA): Motor torque below lower threshold value**[Low torque thd.]**(ttL). | | |
| MFrd | **[Forward]**(MFrd): Motor rotating to the right | | |
| MrrS | **[Reverse assign.]**(MrrS): Motor rotating to the left | | |
| tS2 | **[Th. mot2. att.]**(tS2): Motor thermal threshold value 2 (TTD2) reached | | |
| tS3 | **[Th. mot3. att.]**(tS3): Motor thermal threshold value 3 (TTD3) reached | | |
| AtS | **[Neg Torque]**(AtS): Negative torque (brakes) | | |
| CnF0 | **[Cnfg.0 act.]**(CnF0): Configuration 0 is active | | |
| CnF1 | **[Config 1]**(CnF1): Configuration 1 is active | | |
| CnF2 | **[CONFIGURATION 2 state]**(CnF2): 2 config. switching is active | | |
| CFP1 | **[Set 1 active]**(CFP1): Parameter set 1 is active | | |
| CFP2 | **[Set 2 active]**(CFP2): Parameter set 2 is active | | |
| CFP3 | **[Set 3 active]**(CFP3): Parameter set 3 is active. | | |
| dbL | **[DC bus load]**(dbL): DC bus load | | |
| brS | **[In braking]**(brS): Inverter is braking | | |
| PrM | **[P. removed]**(PrM): Drive locked by input "Safe Torque Off" | | |
| FqLA | **[Fr.met. alar.]**(FqLA): Measured speed setpoint reaches **[Pulse warning thd.]**(FqL) | | |
| MCP | **[I present]**(MCP): Motor current present | | |
| LSA | **[Limit sw. att]**(LSA): Limit switch reached | | |
| dLdA | **[Dynamic load alarm]**(dLdA): Load variation detection | | |
| AG1 | **[Alarm group 1]**(AGI): Alarm group 1 | | |
| AG2 | **[Alarm group 2]**(AG2): Alarm group 2 | | |
| AG3 | **[Alarm group 3]**(AG3): Alarm group 3 | | |
| PMC | **[LI6=PTC al.]**(PLA): LI6 = PtCL alarm | | |
| EFA | **[Ext. fault al.]**(EFA): Alarm external error | | |
| USA | **[Undervoltage Alarm]**(USA): Undervoltage alarm | | |
| UPA | **[Undervoltage Pre-alarm]**(UPA): Undervoltage threshold value | | |
| tHA | **[FI °C alarm]**(tHA): Inverter overheating | | |
| SSA | **[Torque/current lim att.]**(SSA): Torque limiting alarm | | |
| tJA | **[IGBT al.]**(tJA): Thermal transition alarm | | |
| AP3 | **[AI3 Al. 4-20]**(AP3): 4-20 mA AI3 failure alarm | | |
| rdY | **[Brake R. al.]**(rdY): Ready for operation | | |
| r1d [1] | **[R1 Delay time]**<br>The state change takes place after the defined time elapses if the information becomes true.<br>In assignment **[No fault]**(FLt),, the deceleration cannot be defined and therefore remains at 0. | 0 to 60,000 ms | 0 ms |
| r1S | **[R1 Active at]**<br>Operating logic configuration: | | **[1]**(POS) |
| POS | **[1]**(POS): State 1 if the information is true. | | |
| nEG | **[0]**(nEG): State 0 if the information is true. | | |
| | Configuration **[1]**(POS) cannot be changed at assignment**[No fault]**(FLt). | | |
| r1H | **[R1 holding time]**<br>The state change takes place after the defined time elapses if the information becomes false.<br>For assignment **[No fault]**(FLt),, switch-off delay cannot be defined and therefore remains at 0. | Up to 9,999 ms | 0 ms |
| r1F | **[Fallback R1 activation]**<br>This parameter can be accessed if **[R1 configuration]**(r1) = **[No]**(nO). | | **[No]**(nO) |
| nO | **[No]** (nO): Relay controlled via OL1R. Relay is disconnected if the inverter is in operating state "Error". | | |
| YES | **[YES]**(YES): Relay controlled via OL1R. | | |

1) 0 to 9,999 ms, then 10.00 to 60.00 s on the integrated display terminal.

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > r2- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| r2- | **[R2 CONFIGURATION]** | | |
| r2 | **[R2 assignment]** | | **[No]**(nO) |
| | Identical to **[R1 assignment]**(r1) with the following addition: | | |
| bLC | **[Brk control]**(bLC): Braking contactor control | | |
| LLC | **[Line contactor]**(LLC): Line contactor control | | |
| OCC | **[Out. contact.]**(OCC): Motor contactor control | | |
| EbO | **[End reel]** (EbO): End of winding (function "Traverse control") | | |
| tSY | **[Sync. wobble]**(tSY): Counter wobble synchronization | | |
| r2d (1) | **[R2 Delay time]** | 0 to 60,000 ms | 0 ms |
| | For assignments **[No fault]**(FLt),**[Brk control]**(bLC), **[Out. contact.]**(OCC) and **[Line contactor]**(LLC), the delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes true. | | |
| r2S | **[R2 Active at]** | | **[1]**(POS) |
| | Operating logic configuration: | | |
| POS | **[1]**(POS): State 1 if the information is true | | |
| nEG | **[0]** (nEG): State 0 if the information is true | | |
| | For configuration **[1]**(POS), assignments **[No fault]**(FLt), **[Brk control]** (bLC), **[DC charging]** (dCo) and **[Line contactor]** (LLC) cannot be changed. | | |
| r2H | **[R2 Holding time]** | 0 to 9,999 ms | 0 ms |
| | For assignments **[Brk control]**(FLt),**[Brk control]**(bLC), and **[Line contactor]**(LLC) the switch-off delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes false. | | |
| r2F | **[Enable Relay2 fallback]** | | **[No]**(nO) |
| | This parameter can be accessed if **[R2 assignment]**(r2) = **[No]**(nO). | | |
| nO | **[No]** (nO): Relay controlled via OL1R. Relay is disconnected if the inverter is in operating state "Error" | | |
| YES | **[YES]**(YES): Relay controlled via OL1R | | |

(1) 0 to 9,999 ms, then 10.00 to 60.00 s on the integrated display terminal.

### 5.2.3.6.4.5 [LO1 configuration] (LO1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > LO1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LO1- | **[LO1 CONFIGURATION]** | | |
| LO1 | **[LO1 assignment]** | | **[No]**(nO) |
| | Identical to **[R1 assignment]**(r1) with the following addition (display only for information purposes, as this selection can only be configured from menu **[APPLICATION FUNCT.]**(FUn-)): | | |
| bLC | **[Brk control]**(bLC): Braking contactor control | | |
| LLC | **[Line contactor]**(LLC): Line contactor control | | |
| OCC | **[Out. contact.]**(OCC): Motor contactor control | | |
| EbO | **[End reel]** (EbO): End of winding (function "Traverse control") | | |
| tSY | **[Sync. wobble]**(tSY): Counter wobble synchronization | | |
| GdL | **[GDL]**(GdL): Safety function GDL | | |
| LO1d | **[LO1 Delay time]** | 0 to 60,000 ms (1) | 0 ms |
| | For assignments **[No fault]**(FLt),**[Brk control]**(bLC), **[Out. contact.]**(OCC) and **[Line contactor]**(LLC) the delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes true. | | |
| LO1S | **[LO1 active at]** | | **[1]**(POS) |
| | Operating logic configuration: | | |
| POS | **[1]**(POS): State 1 if the information is true. | | |
| nEG | **[0]**(nEG): State 0 if the information is true. | | |
| | Configuration **[1]**(POS) cannot be changed for assignments **[No fault]**(FLt), **[Brk control]**(bLC) and **[Line contactor]**(LLC). | | |
| LO1H | **[LO1 holding time]** | 0 to 9,999 ms | 0 |
| | For assignments **[No fault]**(FLt),**[Brk control]**(bLC) and **[Line contactor]**(LLC), the switch-off delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes false. | | |
| LO1F | **[Enable DQ1 fallback]** | | **[No]**(nO) |
| | Available if **[LO1 assignment]** LO1) is set to **[No]**(nO): Not assigned | | |
| YES | **[Yes]** (YES): Logic output regulated by (OL1R). The logic output is disabled if the inverter is in operating state "Fault". | | |
| nO | **[No]**(nO): Logic output regulated by (OL1R). | | |

(1) 0 to 9,999 ms, then 10.00 to 60.00 s on the integrated display terminal.

Analog output AO1 can be used as a logic output by assigning DO1. In this case, this output corresponds to the minimum value of AO1 (0 V or 0 mA, for example) when set to 0. When set to 1, it corresponds to the maximum value of AO1 (10 V or 20 mA, for example).

The electrical characteristics of this analog input remain unchanged. As these characteristics are different from the characteristics of a logic output, it is necessary to check that they are compatible with the intended type of application.

## 5.2.3.6.4.6 [DO1 configuration] (dO1-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > dO1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| dO1- | **[DO1 CONFIGURATION]** | | |
| dO1 | **[D01 assignment]** | | **[No]**(nO) |
| | Identical to **[R1 assignment]**(r1) with the following addition (display only for information purposes, as this selection can only be configured from menu **[APPLICATION FUNCT.]**(FUn-)): | | |
| bLC | **[Brk control]**(bLC): Braking contactor control | | |
| LLC | **[Line contactor]**(LLC): Line contactor control | | |
| OCC | **[Out. contact.]**(OCC): Motor contactor control | | |
| EbO | **[End reel]** (EbO): End of winding (function "Traverse control") | | |
| tSY | **[Sync. wobble]**(tSY): Counter wobble synchronization | | |
| dO1d | **[DO1 delay time]** | 0 to 60,000 ms (1) | 0 ms |
| | For assignments **[No fault]**(FLt),**[Brk control]**(bLC), **[Out. contact.]**(OCC) and **[Line contactor]**(LLC), the delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes true. | | |
| dO1S | **[DO1 active at]** | | **[1]**(POS) |
| | Operating logic configuration: | | |
| POS | **[1]**(POS): State 1 if the information is true | | |
| nEG | **[0]** (nEG): State 0 if the information is true | | |
| | Configuration **[1]**(POS) cannot be changed for assignments **[No fault]**(FLt), **[Brk control]**(bLC) and **[Line contactor]**(LLC). | | |
| dO1H | **[DO1 holding time]** | 0 to 9,999 ms | 0 ms |
| | For assignments **[No fault]**(FLt),**[Brk control]**(bLC) and **[Line contactor]**(LLC), the switch-off delay cannot be defined and therefore remains at 0.<br>The status change takes place after the configured time period, if the information becomes false. | | |

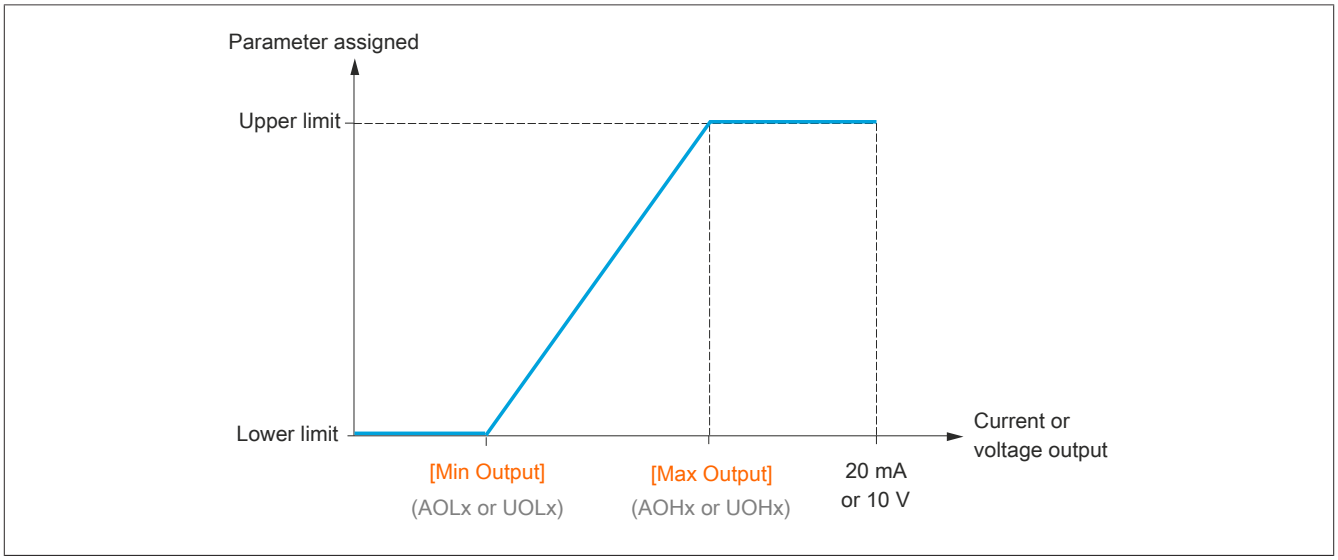
(1) 0 to 9,999 ms, then 10.00 to 60.00 s on the integrated display terminal.

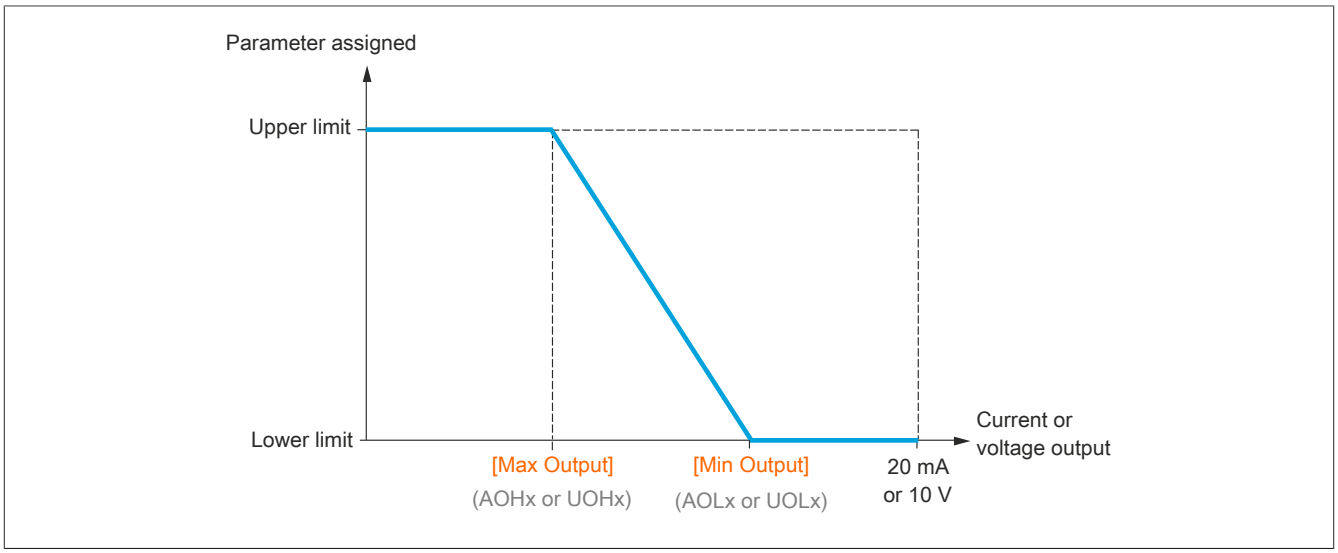
### 5.2.3.6.4.7 [AO1 configuration] (AO1-)

#### Analog output configuration

#### Minimum and maximum values (output values):

The minimum output value, in volts, corresponds to the lower limit value of the assigned parameter, and the maximum value corresponds to its upper limit value. The minimum value may be greater than the maximum value.



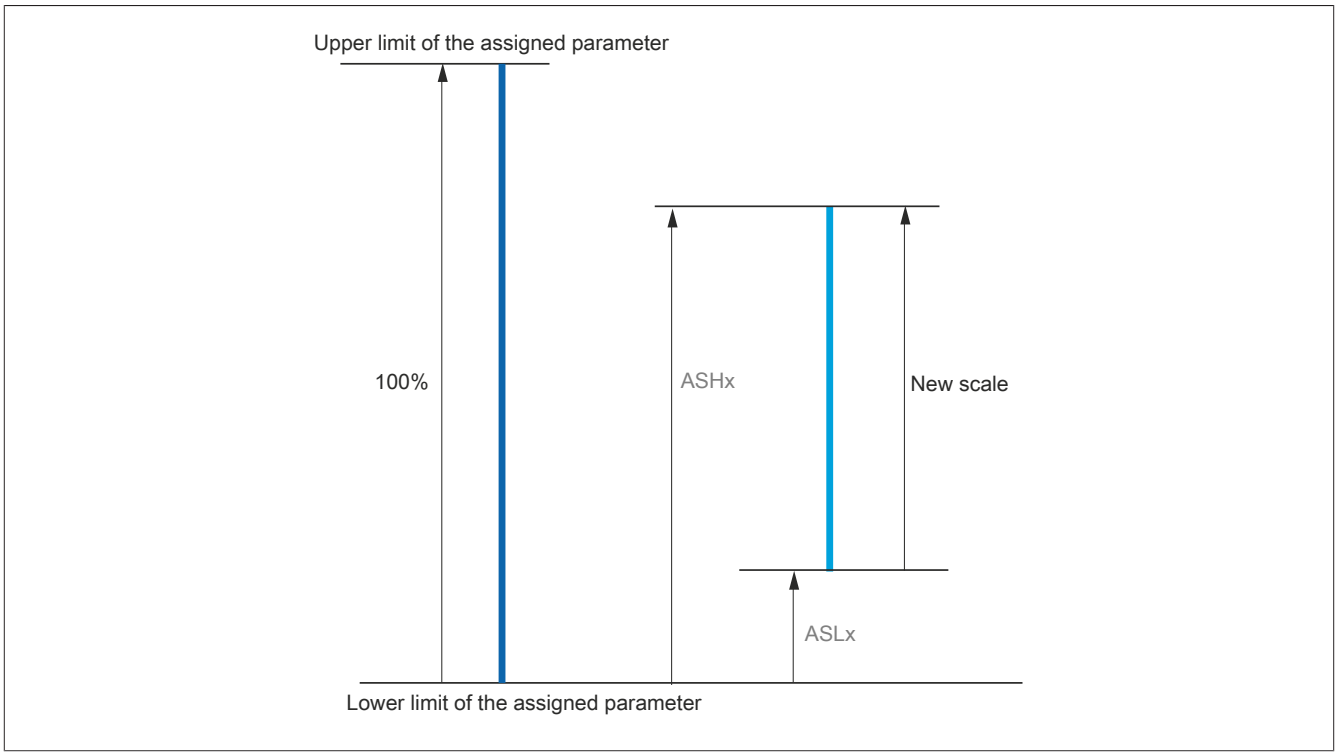

#### Scaling of the assigned parameter

The assigned parameter's scale can be adapted according to requirements. In order to do so, the upper and lower limit values of each analog input are changed via the corresponding parameter.

The parameter values are given as percentages. 100% corresponds to the total variation range of the configured parameter. Accordingly, the following applies: 100% = Upper limit value - Lower limit value.

For example, for parameter **[Sign torque +/-]**(Stq) (varies between -3 and +3 times the rated torque), the setting is 100% of 6 times the rated torque.

- Parameter **[Scaling AOx min]**(ASLx) changes the lower limit value: New value = Lower limit value + (range x ASLx). The factory preset value, 0%, does not change the lower limit value.
- Parameter **[Scaling AOx max]**(ASHx) changes the upper limit value: New value = Lower limit value + (range x ASLx). The factory preset value, 100%, does not change the upper limit value.
- The value of parameter **[Scaling AOx min]**(ASLx) must always be less than the value of parameter **[Scaling AOx max]**(ASHx).




### Application example 2

The motor current value at output AO1 should be transferred with 0-20 mA (range: 2 In motor). In this case, In motor is equivalent to 0.8 times the value of In inverter.

Parameter **[I motor]**(OCr) varies between 0 and 2 times the rated inverter current or in the range of 2.5 times the inverter rated current.

Parameter **[AO1 max scal]**(ASL1) does not change the lower limit value. Consequently, this value remains at the factory setting of 0%.

Parameter **[AO1 min scal]**(ASH1) changes the upper limit value by 0.5 times the nominal motor torque, i.e. 100 - 100/5 = 80% (New value = Lower limit value + (range x ASH1)).

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > AO1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AO1- | **[AO1 CONFIGURATION]** | | |
| AO1 | **[AO1 assignment]** | | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned. | | |
| OCr | **[I motor]**(OCr): Current in the motor, between 0 and 2 In (In = rated current of inverter indicated on the inverter nameplate). | | |
| OFr | **[Motor freq]**(OFr): Frequency output from 0 to **[Max frequency]**(tFr). | | |
| OFS | **[Output ramp]**(OFS): Signed motor frequency between -**[Max frequency]**(tFr) and +**[Max frequency]**(tFr). | | |
| OrP | **[Motor torq.]**(OrP): From 0 to**[Max frequency]**(tFr). | | |
| trq | **[Sign torque]**(trq): Motor torque, between 0 and 3 times the nominal motor torque. | | |
| Stq | **[M Motor +/-]**(Stq): Signed motor torque, between -3 and +3 times the motor torque. Sign "+" corresponds to motor operation; sign "-" corresponds to generator operation (braking). | | |
| OrS | **[Ramp +/-]**(OrS): Signed ramp output, between -**[Max frequency]**(tFr) and +**[Max frequency]**(tFr). | | |
| OPS | **[PID ref.]**(OPS): PID controller setpoint, between **[Min PID reference]**(PIP1) and**[Max PID reference]**(PIP2). | | |
| OPF | **[PID feedback]**(OPF): PID controller feedback, between **[Min PID feedback]**(PIF1) and **[Max PID feedback]**(PIF2). | | |
| OPE | **[PID error]**(OPE): PID controller error, between -5% and +5% of (**[Max PID feedback]**(PIF2) - **[Min PID feedback]**(PIF1)). | | |
| OPI | **[PID Output]**(OPI): PID controller output, between **[Low speed]**(LSP) and **[High speed]**(HSP). | | |
| OPr | **[Motor power]**(OPr): Motor power, between 0 and 2.5 times the **[Rated motor power]**(nPr). | | |
| UOP | **[Motor voltage]**(UOP): Voltage applied to motor, between 0 and **[Rated motor volt.]**(UnS). | | |
| tHr | **[Mot thermal]**(tHr): Thermal motor state, between 0 and 200% of the thermal rated state. | | |
| tHr2 | **[Mot therm2]**(tHr2): Thermal motor state 2, between 0 and 200% of the thermal rated state. | | |
| tHr3 | **[Mot therm3]**(tHr3): Thermal motor state 3, between 0 and 200% of the thermal rated state. | | |
| tHd | **[Drv thermal]**(tHd): Thermal inverter state, between 0 and 200% of the thermal rated state. | | |
| tqL | **[Torque lim.]**(tqL): Torque limiting, between 0 and 3 times the nominal motor torque. | | |
| d01 | **[DO1]**(dO1): Assignment to a logic output. This assignment can only occur if **[D01 assignment]**(dO1) has been assigned. This is the only possible selection in this case. It is displayed for information purposes only. | | |
| tqMS | **[Torque 4Q]**(tqMS): Signed motor torque, between -3 and +3 times the motor torque. Signs "+" and "-" correspond to the physical torque direction regardless of the operating mode (motor or generator). | | |
| AO1t | **[Type AO1]** | | **[0-20mA]**(0A) |
| 10U | **[Voltage]**(10U): Voltage output | | |
| 0 A | **[0-20mA]**(0A): Current output | | |
| AOL1 | **[AO1 min Output]** | 0 to 20.0 mA | 0 mA |
| ★ | To access this parameter, **[Type AO1]**(AO1t) must be set to **[0-20mA]**(0A). | | |
| AOH1 | **[AO1 max Output]** | 0 to 20.0 mA | 20.0 mA |
| ★ | To access this parameter, **[Type AO1]**(AO1t) must be set to **[0-20mA]**(0A). | | |
| UOL1 | **[AO1 min Output]** | 0 to 10.0 V | 0 V |
| ★ | To access this parameter, **[Type AO1]**(AO1t) must be set to **[Voltage]**(10U). | | |
| UOH1 | **[AO1 max Output]** | 0 to 10.0 V | 10.0 V |
| ★ | To access this parameter, **[Type AO1]**(AO1t) must be set to **[Voltage]**(10U). | | |
| ASL1 | **[AO1 max scal]** | 0 to 100.0% | 0% |
| | Scaling of the lower limit of the assigned parameter as a % of the maximum possible variation. | | |
| ASH1 | **[AO1 min scal]** | 0 to 100.0% | 100.0% |
| | Scaling for the upper limit value of the assigned parameter, as a % of the maximum possible variation. | | |
| AO1F | **[AO1 Filter]** | 0 to 10.00 s | 0 s |
| | Interference filtering. This parameter is forced to 0 if **[AO1 assignment]**(AO1) is set to **[DO1]**(dO1). | | |
| AOF1 | **[Enable Relay1 fallback]** | | **[No]**(nO) |
| | Available if **[AO1 assignment]** (AO1) is set to **[No]**(nO): Not assigned | | |
| YES | **[Yes]**(YES): (AO1) is used as a logic output and controlled by (AO1C). This output is disabled if the inverter is in operating state "Fault". | | |
| nO | **[No]**(nO): (AO1) is used as a logic output and controlled by (AO1C). | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.4.8 [ALARM GRP1 DEFINITION] (A1C-)

In the following submenus, alarms are arranged into between one and three groups. The individual groups can be assigned to the remote signaling of a relay or a logic output. These groups can also be displayed on the graphic display terminal (see menu **[3.3 MONITORING CONFIG.]**(MCF-)) and via menu **[1.2 MONITORING]**(MOn-).

If there are selected alarms in a group, the corresponding alarm group is enabled.

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > I_O- > A01- | |
|---|---|
| **Code** | **Name/Description** |
| A1C- | **[ALARM GRP1 DEFINITION]**<br>Selections must be made on the basis of the following list: |
| PMC | **[LI6=PTC al.]**(PLA): LI6 = PtCL alarm |
| EFA | **[Ext. fault al.]**(EFA): Alarm external error |
| USA | **[Undervoltage Alarm]**(USA): Undervoltage alarm |
| CtA | **[I attained]** (CtA): Current threshold value reached (**[Current threshold]** (Ctd)) |
| FtA | **[Freq. Th. attained]**(FtA): Frequency threshold value reached (**[Freq. threshold]**(Ftd)) |
| F2A | **[Freq. Th. 2 attained]**(F2A): Frequency threshold value 2 reached (**[Freq. Th. 2 attain]**(F2d)) |
| SrA | **[Freq.ref.att]**(SrA): Frequency setpoint reached |
| tSA | **[Th.mot. att.]**(tSA): Motor thermal state 1 reached |
| tS2 | **[Th. mot2. att.]**(tS2): Motor thermal state 2 reached |
| tS3 | **[Th. mot3. att.]**(tS3): Motor thermal state 3 reached |
| UPA | **[Undervoltage Pre-alarm]**(UPA): Undervoltage threshold value |
| FLA | **[HSP attain.]** (FLA): High speed reached |
| tHA | **[FI °C alarm]**(tHA): Inverter overheating |
| PEE | **[PID error al]**(PEE): PID controller error alarm |
| PFA | **[PID fdbk al]**(PFA): PID feedback alarm |
| AP3 | **[AI3 Al. 4-20]**(AP3): Alarm for the display of a missing 4-20-mA signal at input AI3 |
| SSA | **[Torque/current lim att.]**(SSA): Torque limiting alarm |
| tAd | **[Th. drv. att.]**(tAd): Inverter thermal state reached |
| tJA | **[IGBT al.]**(tJA): IGBT alarm |
| ULA | **[Underload. Proc. Al.]**(ULA): Underload alarm |
| OLA | **[Overload process alarm]**(OLA): Overload alarm |
| rSdA | **[Rope slack alarm]**(rSdA): Slack rope (see parameter **[Rope slack config.]**(rSd)) |
| ttHA | **[High torque alarm]**(ttHA): Motor torque exceeds upper threshold value **[High torque thd.]**(ttH) |
| ttLA | **[Low torque alarm]**(ttLA): Motor torque below lower threshold value **[Low torque thd.]**(ttL) |
| FqLA | **[Fr.met. alar.]**(FqLA): Measured speed setpoint reached: **[Pulse warning thd.]**(FqL) |
| dLdA | **[Dynamic load alarm]**(dLdA): Load variation detection (see **[DYNAMIC LOAD DETECT.]**(dLd-)) |
| A2C- | **[ALARM GRP2 DEFINITION]**<br>Identical to **[ERROR ALARM GR. 1]** (A1C-) |
| A3C- | **[ALARM GRP3 DEFINITION]**<br>Identical to **[ERROR ALARM GR. 1]** (A1C-) |

### 5.2.3.6.5 [COMMAND] (CtL-)

The parameters in menu [COMMAND] (CtL-) can only be changed if the inverter has been stopped and no move command has been given.

#### Command and reference channels

Move commands (forward, reverse, stop, etc.) and setpoints can be transferred using the following channels:

| Command | Setpoint |
|---|---|
| Terminals: Logic inputs LI or analog inputs LA, used as logic inputs<br>External operator terminal<br>Graphic display terminal<br>Integrated Modbus<br>Integrated CANopen®<br>Communication card | Terminals: Analog inputs AI, pulse input<br>External operator terminal<br>Graphic display terminal<br>Integrated Modbus<br>Integrated CANopen®<br>Communication card<br>+/- speed via the terminals<br>+/- speed via the graphic display terminal |

**Danger!**

**UNINTENDED OPERATION OF DEVICES**

**If analog inputs [AI1] (A11) and[AI2] (A12) are used as logic inputs in a configuration ([LAI1] (LAI1) or [LAI2] (LAI2)), their behavior in analog input mode remains active (Example: [Ref.1 channel] (Fr1) is still set to [AI1] (A11)).**

- **Delete the configuration of [AI1] (A11) or [AI2] (A12) in analog input mode.**
- **Check that this behavior does not present a risk to personnel or equipment.**

**Failure to follow these instructions can result in death or serious injury.**

**Warning!**

**UNEXPECTED OPERATION OF THE EQUIPMENT**

**If analog input [AI1] (A11) or [AI2] (A12) is used as logic input ([LAI1] (LAI1) or [LAI2] (LAI2)), its behavior in analog input mode remains active (Example: [Ref.1 channel] (Fr1) is still set to [AI1] (A11)).**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

**Note:**

**[LAI1] (LAI1) and [LAI2] (LAI2) can only be used as logic inputs in source mode.**

- **24 V power supply (max. 30 V)**
- **State 0 if <7.5 V, state 1 if >8.5 V**

**Note:**

**The stop buttons on the graphic display terminal or the external operator terminal can be programmed as lower-priority buttons. A stop button only has priority if parameter [Stop Key priority] (PSt) in menu [COMMAND] (CtL-) is set to [YES] (YES):**

The ACOPOSinverter's behavior can be adjusted to requirements:

- [Not separ.] (SIM): Command and setpoint are transferred via the same channel.
- [Separate] (SEP): Command and setpoint can be transferred via different channels.

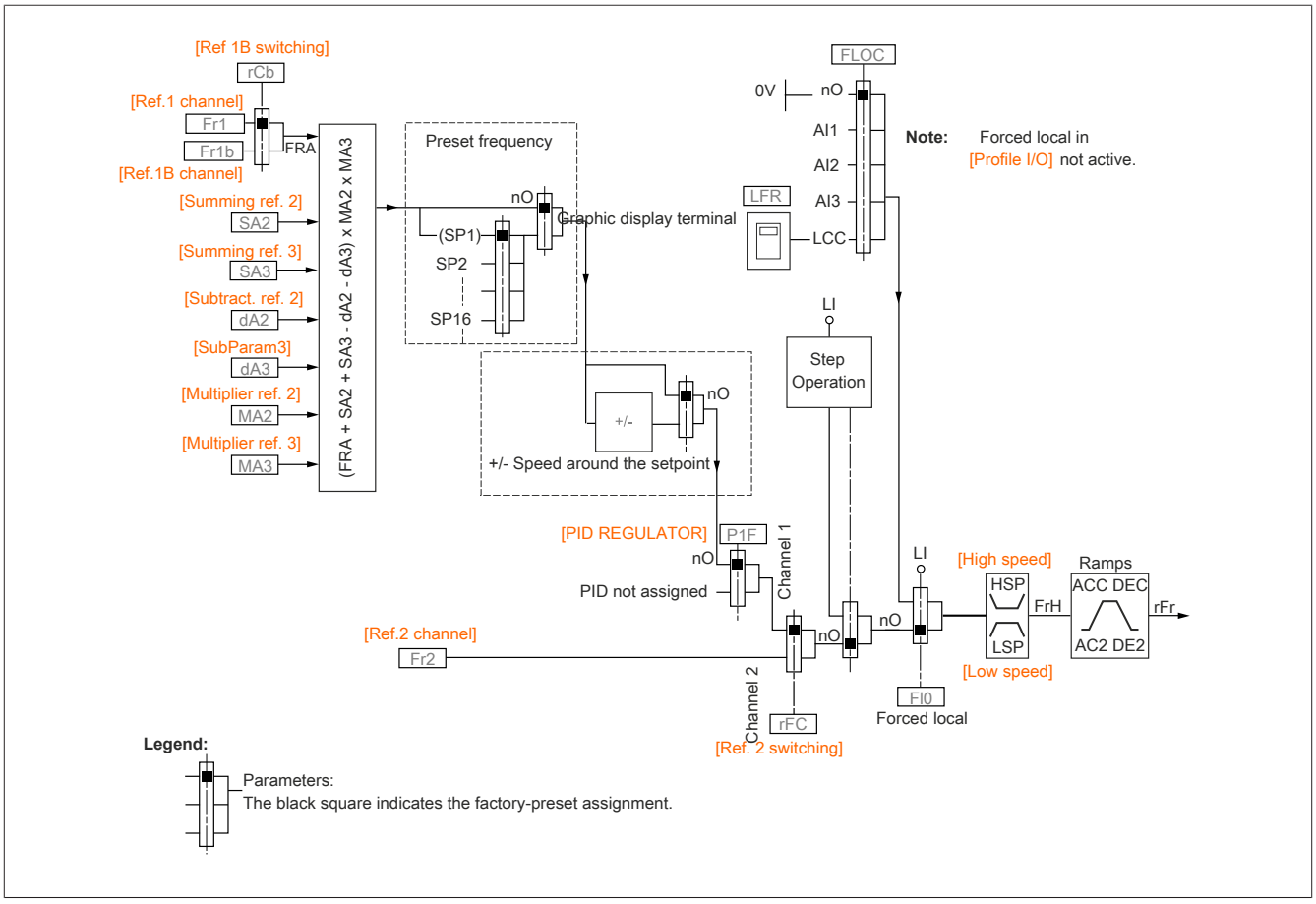
In these configurations, control is via the communication bus in accordance with the standard (only 5 freely assignable bits). Access to the application functions is not possible via the communication interface.

- [I/O profile] (IO): Command and setpoint can originate from different channels. This configuration both simplifies and extends communication interface use. Commands can be transferred via the logic inputs on the terminals or via the communication bus. When transmitting via the bus, the commands are available as a word that functions as a virtual terminal with only logic inputs. Application functions can be assigned to the bits in this word. More than one function can be assigned to the same bit.

## Note:

**Stop commands sent via the graphic display terminal or the external operator terminal remain active, even if the terminals no longer constitute the active command channel.**

**Setpoint channels for configurations [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO), PID not configured**




Fr1, SA2, SA3, dA2, dA3, MA2, MA3:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card

Fr1b for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card

Fr1b for SIM:

- Terminals, only available if Fr1 = Terminals

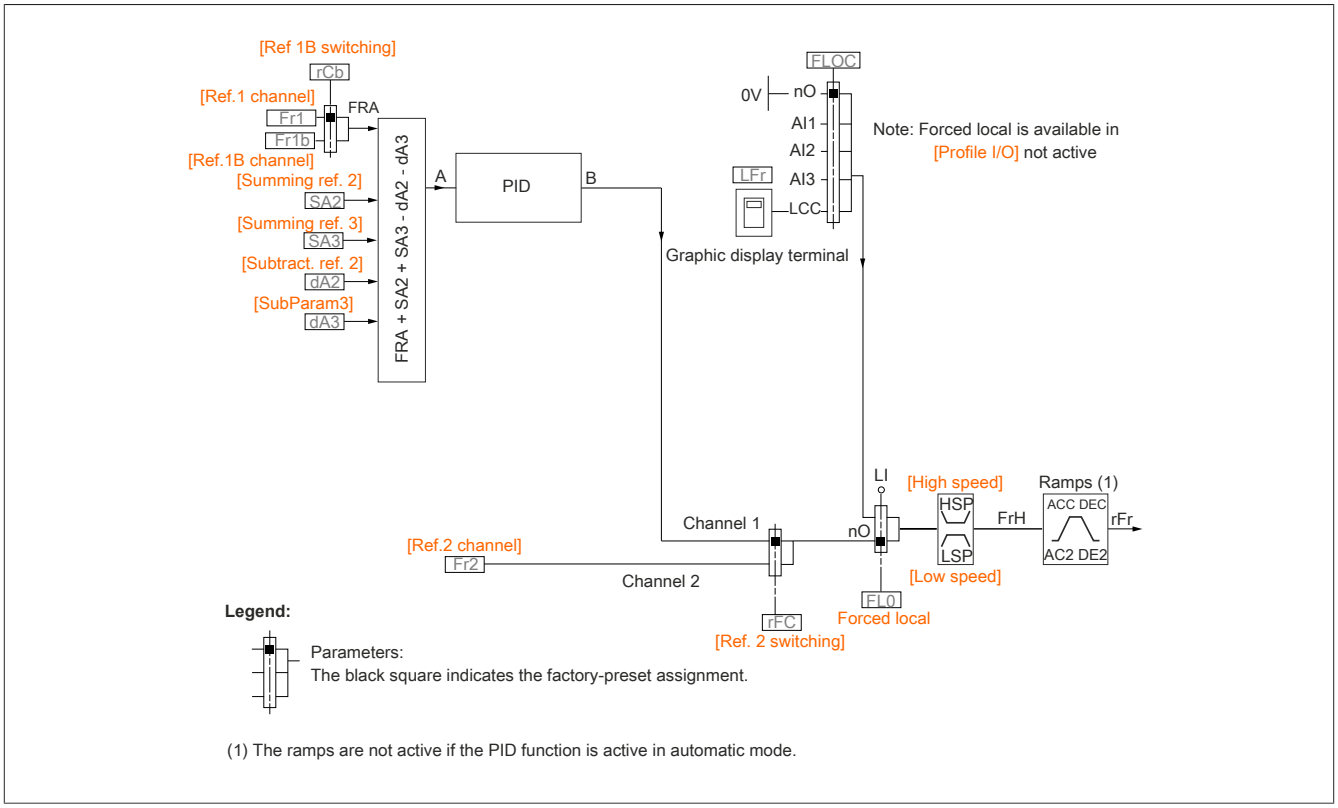
Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card and +/- speed

## Note:

**[Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in menu [APPLICATION FUNCT.] (Fun-).**

**Not separ. for configurations [Not separ.] (SIM), [Separate] (SEP) and [I/O profile] (IO), PID configured with PID setpoints at the terminals**




Fr1:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card

Fr1b for SEP and IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen® and POWERLINK communication card

Fr1b for SIM:

- Terminals, only available if Fr1 = Terminals

SA2, SA3, dA2, dA3:

- Terminals only

Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card **and +/- speed**

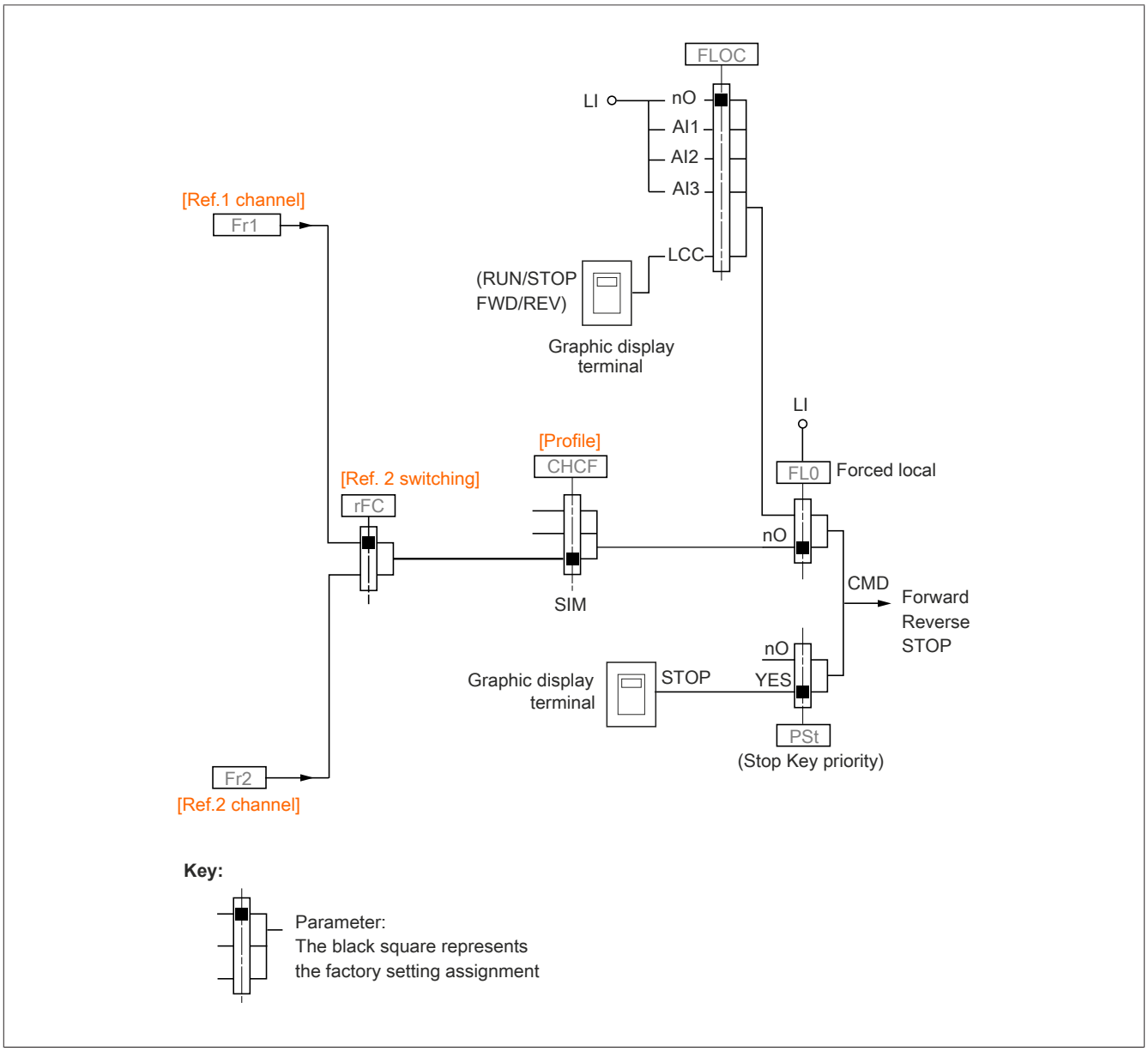
> **Note:**
>
> **[Ref.1B channel] (Fr1b) and [Ref 1B switching] (rCb) must be configured in menu [APPLICATION FUNCT.] (Fun-).**

## Command channel for configuration [Together] (SIM)

Setpoint and command together

The command channel is determined by the reference channel. Parameters Fr1, Fr2, rFC, FLO and FLOC are valid for setpoint and command.

Example: If setpoint setting Fr1 = AI1 (analog input at the terminals), control is executed via LI (logic input at the terminals).



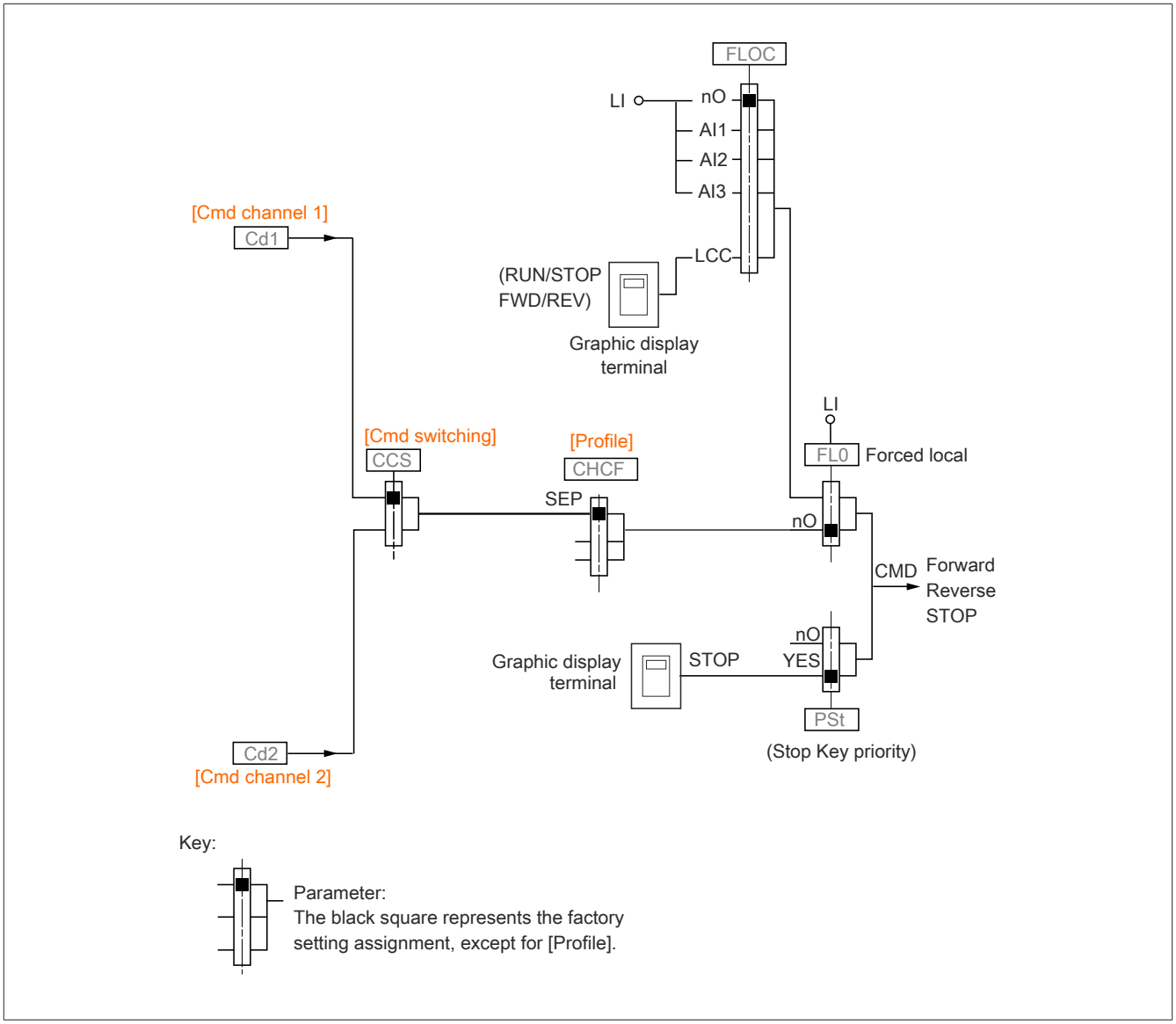
### Command channel for the configuration [separated] (SEP)

Separate reference and command

Parameters FLO and FLOC apply for setpoint and command.

Example: For a setpoint in mode "Forced local" via AI1 (analog input at the terminals), the command is executed in mode "Forced local" via LI (logic input at the terminals)

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.



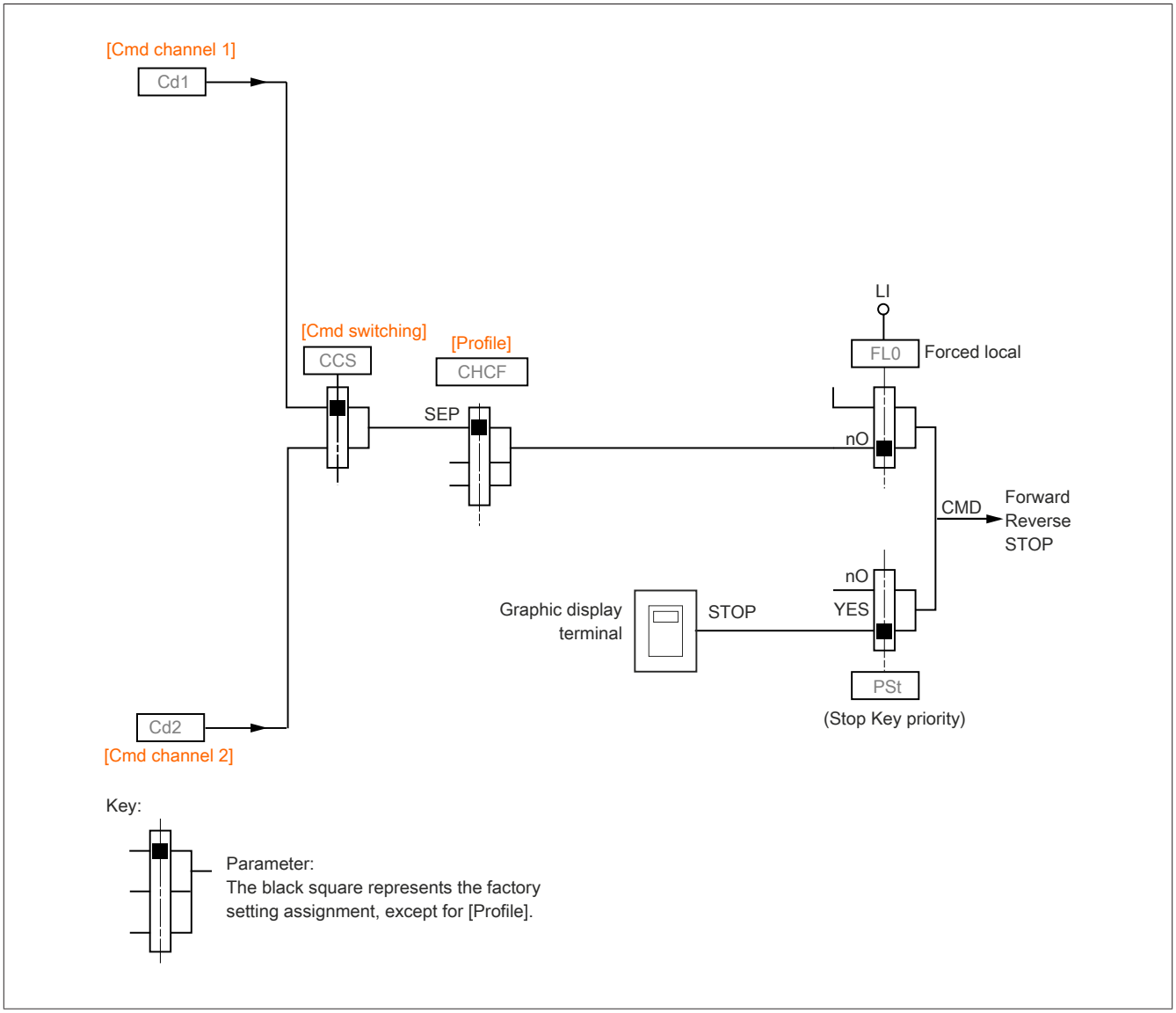

Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card

### Command channel for configuration [I/O profile] (IO)

Setpoint and command separate, as in configuration [Separate] (SEP).

The command channels Cd1 and Cd2 are independent of the reference channels Fr1, Fr1b and Fr2.




Cd1, Cd2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication card

A command or an action can be assigned to the following elements:

- Static channel by selecting input LI or a Cxxx bit:
  - For example, if you select LI3, this action is triggered by LI3, regardless of the switched command channel.
  - For example, if you select C214, this action is triggered by the integrated CANopen® with bit 14, regardless of the switched command channel.
- Switchable channel by selecting a CDxx bit:
  - For example, if you select Cd11, this action is triggered by the following elements:
    LI12, if the terminal channel is active
    C111, if the channel for the integrated Modbus is active
    C211, if the channel for the integrated Modbus is active
    C311, if the communication card channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to internal switchable CDxx bits are inactive.

## Note:

**Cd06 to Cd13 can only be used to switch between two networks. There are no equivalent logic inputs.**

| Terminals | Integrated Modbus | Integrated CANopen® | Communication card | Internal bit, switchable |
|---|---|---|---|---|
| | | | | CD00 |
| LI2 (1) | C101 (1) | C201 (1) | C301 (1) | CD01 |
| LI3 | C102 | C202 | C302 | CD02 |
| LI4 | C103 | C203 | C303 | CD03 |
| LI5 | C104 | C204 | C304 | CD04 |
| LI6 | C105 | C205 | C305 | CD05 |
| - | C106 | C206 | C306 | CD06 |
| - | C107 | C207 | C307 | CD07 |
| - | C108 | C208 | C308 | CD08 |
| - | C109 | C209 | C309 | CD09 |
| - | C110 | C210 | C310 | CD10 |
| - | C111 | C211 | C311 | CD11 |
| - | C112 | C212 | C312 | CD12 |
| LAI1 | C113 | C213 | C313 | CD13 |
| LAI2 | C114 | C214 | C314 | CD14 |
| - | C115 | C215 | C315 | CD15 |
| OL01 to OL10 | | | | |

(1) If [2/3 wire control](tCC) is set to [3 wire](3C), access to LI2, C101, C201 and C301 is not possible.

### Assignment conditions for the logic inputs and control bits

The following elements are available for every command or function that can be assigned to a logic input or a control bit:

| | |
|---|---|
| [LI1](LI1) to [LI6](LI6) | Drive with or without option |
| [LAI1](LAI1) to [LAI2](LAI2) | Analog inputs as logic inputs |
| [C101](C101) to [C110](C110) | With integrated Modbus, in configuration [I/O profile](IO) |
| [C111](C111) to [C115](C115) | With integrated Modbus, regardless of configuration |
| [C201](C201) to [C210](C210) | With integrated CANopen®, in configuration [I/O profile](IO) |
| [C211](C211) to [C215](C215) | With integrated CANopen®, regardless of configuration |
| [C301](C301) to [C310](C310) | With a communication card, in configuration [I/O profile](IO) |
| [C311](C311) to [C315](C315) | With a communication card, regardless of configuration |
| [CD00](Cd00) to [CD10](Cd10) | In configuration [I/O profile](IO) |
| [CD11](Cd11) to [CD15](Cd15) | Regardless of configuration |
| [OL01](OL01) to [OL10](OL10) | Regardless of configuration |

## Note:

**In configuration [I/O profile](IO), access to LI1 is not possible if [2/3 wire control](tCC) is set to [3 wire](3C). Access to LI2, C101, C201 and C301 is not possible either.**

## Warning!

**LOSS OF CONTROL**

**Inactive command channels are not monitored (no error detection due to communication interruption).**

**Make sure that the commands and functions assigned to bits C101 to C315 do not result in unsafe states in the event of a communication interruption.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > CtL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| CtL- | **[COMMAND]** | |
| Fr1 | **[Ref.1 channel]** | **[AI1]**(AI1) |
| AI1 | **[AI1]**(AI1): Analog input A1 | |
| AI2 | **[AI2]**(AI2): Analog input A2 | |
| AI3 | **[AI3]**(AI3): Analog input A3 | |
| LCC | **[HMI]**(LCC): Graphic display terminal or external operator terminal source | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| nEt | **[Com. card]**(nEt): Communication card (if used) | |
| PI | **[RP]**(PI): Pulse input | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 with dial (only available if **[Profile]**(CHCF) is not set to **[Not separ.]**(SIM)). | |
| rIn | **[RV Inhibition]** | **[No]**(nO) |
| | Suppression of movement in left direction of rotation; does not apply to direction queries transmitted by logic inputs.<br>Requests from logic inputs for reverse rotation will be taken into account.<br>Requests from the graphic display terminal for reverse rotation will not be taken into account.<br>Requests from the fieldbus for reverse rotation will not be taken into account.<br>Any speed setpoint for reverse rotation originating from the PID, summation input, etc. will be interpreted as null frequency (0Hz). | |
| nO | **[No]**(nO) | |
| YES | **[YES]**(YES) | |
| PSt | **[Stop Key priority]** | **[YES]**(YES) |
| 2 s | **Warning!**<br>**LOSS OF CONTROL**<br>**This function disables the stop buttons of the external operator terminal if parameter[Command channel](CMdC) is not set to [HMI](HMI).**<br>**Only set this parameter to[No](nO) if suitable alternative stop functions are available.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| | This is a freewheel stop. If the active command channel is the graphic display terminal, then this stop is done in accordance with **[Type of stop]** (Stt) regardless of the configuration for **[Stop Key priority]**(PSt). | |
| nO | **[No]**(nO) | |
| YES | **[YES]**(YES): Gives priority to STOP on the graphic display terminal when the graphic display terminal is not enabled as the command channel. | |
| CHCF | **[Profile]** | **[Together]**(SIM) |
| 2 s | **Warning!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Disabling [I/O profile](IO) restores the frequency inverter to factory settings.**<br>**It is important that the factory setting restoration is compatible with the wiring used.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| SIM | **[Not separ.]**(SIM): Setpoint and command not separate. | |
| SEP | **[Separate]**(SEP): Setpoint and command separate. The access to this assignment is not possible in the **[I/O profile]**(IO). | |
| I/O | **[I/O profile]**(IO): I/O profile | |
| CCS | **[Cmd switching]** | **[ch1 active]**(Cd1) |
| ★ | To access this parameter, **[Profile]**(CHCF) must be set to **[Separate]**(SEP) or **[I/O profile]**(IO).<br>In state 0 of the assigned input or bit, channel **[Cmd channel 1]**(Cd1) is active.<br>In state 1 of the assigned input or bit, channel **[Cmd channel 2]**(Cd2) is active.<br>If **[Profile]**(CHCF) is set to **[Not separ.]**(SIM), the parameter can only be configured on **[ch1 active]**(Cd1). | |
| Cd1 | **[ch1 active]**(Cd1): **[Cmd channel 1]**(Cd1) active (no switchover) | |
| Cd2 | **[Channel 2 active]**(Cd2): **[Cmd channel 2]**(Cd2) active (no switchover) | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions (not Cd00 to Cd15). | |
| Cd1 | **[Cmd channel 1]** | **[Terminals]**(tEr) |
| ★ | To access this parameter, **[Profile]**(CHCF) must be set to **[Separate]**(SEP) or **[I/O profile]**(IO). | |
| tEr | **[Terminals]**(tEr): Terminals | |
| LCC | **[HMI]**(LCC): Graphic display terminal or external operator terminal | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| nEt | **[Com. card]**(nEt): Communication card (if used) | |
| Cd2 | **[Cmd channel 2]** | **[Modbus]**(Mdb) |
| ★ | To access this parameter, **[Profile]**(CHCF) must be set to **[Separate]**(SEP) or **[I/O profile]**(IO). | |
| tEr | **[Terminals]**(tEr): Terminals | |
| LCC | **[HMI]**(LCC): Graphic display terminal or external operator terminal | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > CtL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| nEt | [Com. card](nEt): Communication card (if used) | |
| rFC | [Ref. 2 switching] | [Ref.1 channel](Fr1) |
| | In state 0 of the assigned input or bit, channel [Cmd channel 1](Cd1) is active.<br>In state 1 of the assigned input or bit, channel [Cmd channel 2](Cd2) is active. | |
| Fr1 | [Ref.1 channel](Fr1): [Cmd channel 1](Cd1) active (no switchover) | |
| Fr2 | [Ref.2 channel](Fr2): [Cmd channel 2](Cd2) active (no switchover) | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See the assignment conditions (not Cd00 to Cd15). | |
| Fr2 | [Ref.2 channel] | [No](nO) |
| nO | [No](nO): Not assigned. If [Profile](CHCF) is set to[Together](SIM), the command via the terminals has the setpoint zero. If [Profile](CHCF) is set to [Separate](SEP) or [I/O profile](IO) is set, the setpoint is zero. | |
| AI1 | [AI1](AI1): Analog input A1 | |
| AI2 | [AI2](AI2): Analog input A2 | |
| AI3 | [AI3](AI3): Analog input A3 | |
| Updt | [+/- speed](Updt): Command +/- speed | |
| LCC | [HMI](LCC): Graphic display terminal or external operator terminal | |
| Mdb | [Modbus](Mdb): Integrated Modbus | |
| CAn | [CANopen com.](CAn): Integrated CANopen® | |
| nEt | [Com. card](nEt): Communication card (if used) | |
| PI | [RP](PI): Pulse input | |
| AIU1 | [AI virtual 1](AIU1): Virtual analog input 1 with handwheel | |
| COP | [Copy channel 1 <> 2] | [No](nO) |
| 2 s | **Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**This parameter may cause unexpected movements such as change in direction of rotation of the motor, sudden acceleration or stopping.**<br>• **It is important that the setting for this parameter does not lead to unexpected movements.**<br>• **It is important that the setting for this parameter does not lead to unstable states.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | |
| | Enables the copying of the setpoint and/or the current command by switchover, for example to avoid fluctuations in speed.<br>If [Profile](CHCF) is set to [Not separ.](SIM) or [Separate](SEP), only copying from channel 1 to channel 2 is possible.<br>If [Profile](CHCF) is set to [I/O profile](IO), copying in both directions is possible.<br>A reference or a command cannot be copied to a channel on the terminals.<br>The copied setpoint is [Frequency ref.](FrH) (before ramp), except if the setpoint of the target channel is given via the +/- speed. In this case, setpoint [Output frequency](rFr) (after ramp) will be copied. | |
| nO | [No](nO): No copy | |
| SP | [Reference](SP): Copy of the setpoint | |
| Cd | [Command](Cd): Copy of the command | |
| ALL | [Cmd and ref](ALL): Copy of the command and reference | |

| | |
|---|---|
| ☆ | These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming. |
| 2 s | To change the assignment of this parameter, press the ENT key for 2 seconds. |

As the graphic display terminal may be selected as the command and/or reference channel, its action modes can be configured.

The parameters on this page can only be accessed on the graphic display terminal, and not on the integrated display terminal.

Comments:

- The command and/or setpoint of the operator terminal is only active when the command and/or setpoint channels are also active via the terminal, with the exception of **[T/K]**(Ft) (command via the operator terminal), which has priority on these channels. By pressing **[T/K]**(Ft) again (command via the operator terminal), the control is transferred back to the selected channel.
- Command and reference via the display terminal are impossible if the latter is connected to more than one inverter.
- The functions JOG, preset frequencies and +/- speed are only accessible if **[Profile]**(CHCF) is set to **[Together]**(SIM).
- The functions for the predefined PID setpoint are only accessible if **[Profile]**(CHCF) is set to **[Together]**(SIM) or **[Separate]**(SEP).
- Function **[T/K]**(Ft) (command via the operator terminal) is accessible, regardless of the setting in **[Profile]**(CHCF).

| The parameters described on this page are accessed by: DRI- > COnF > FULL > CtL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| CtL- | **[COMMAND]** | |
| Fn1 | **[F1 key assignment]** | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | |
| FJOG | **[Jog]**(FJOG): JOG step mode | |
| FPS1 | **[Preset spd2]**(FPS1): Via keystroke, the inverter is preset with second speed **[Preset speed 2]**(SP2). Press STOP to stop the frequency inverter. | |
| FPS2 | **[Preset spd3]**(FPS2): Via keystroke, the inverter is preset with third speed **[Preset speed 3]**(SP3). Press STOP to stop the frequency inverter. | |
| FPr1 | **[PID ref. 2]**(FPr1): Defines a PID setpoint that is equal to second preselected PID setpoint **[Preset ref. PID 2]**(rP2). A move command will not be sent. Only executable if **[Ref.1 channel]**(Fr1) is set to **[HMI]**(LCC). Not compatible with function **[T/K]**(Ft). | |
| FPr2 | **[PID ref. 3]**(FPr2): Defines a PID setpoint that is equal to the third preselected PID setpoint **[Preset ref. PID 3]**(rP3). A move command will not be sent. Only executable if **[Ref.1 channel]**(Fr1) is set to **[HMI]**(LCC). Not compatible with function **[T/K]**(Ft). | |
| FUSP | **[+speed around ref.]**(FUSP): + speed; only executable if **[Ref.2 channel]**(Fr2) is set to **[HMI]**(LCC). Press the key to control the inverter and increase the speed. Press STOP to stop the frequency inverter. | |
| FdSP | **[-speed around ref.]**(FdSP): - speed; only executable if **[Ref.2 channel]** (Fr2) is set to **[HMI]** (LCC) and if **[+speed around ref.]** (FUSP) is assigned to another key. Press a key to control the inverter and decrease the speed. Press STOP to stop the frequency inverter. | |
| Ft | **[T/K]**(Ft): Command via the operator terminal; takes priority over **[Cmd switching]**(CCS) and **[Ref. 2 switching]**(rFC). | |
| Fn2 | **[F2 key assignment]**<br>Identical to **[F1 key assignment]**(Fn1). | **[No]**(nO) |
| Fn3 | **[F3 key assignment]**<br>Identical to **[F1 key assignment]**(Fn1). | **[No]**(nO) |
| Fn4 | **[F4 key assignment]**<br>Identical to **[F1 key assignment]**(Fn1). | **[No]**(nO) |
| bMp<br>★ | **[HMI cmd.]**<br>If function**[T/K]**(Ft) is assigned to a key and is active, this parameter defines behavior for the point in time at which the graphic display terminal or the external operator terminal takes back control. | **[Stop]**(StOP) |
| StOP | **[Stop]**(StOP): Stops inverter; controlled direction of operation and setpoint of the previous channel are copied (to be taken into account on the next move command). | |
| bUMF | **[Bumpless]**(bUMF): Does not stop the inverter; the controlled direction of operation and the setpoint of the previous channel are copied. | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.6 [APPLICATION FUNCT.] (FUn-)

Summary of functions:

| Code | Name |
|---|---|
| (rEF-) | [REFERENCE SWITCH.] |
| (OAI-) | [REF. OPERATIONS] |
| (rPt-) | [RAMP] |
| (Stt-) | [STOP CONFIGURATION] |
| (AdC-) | [Auto DC injection] |
| (JOG-) | [JOG] |
| (PSS-) | [PRESET SPEEDS] |
| (UPd) | [+/- speed] |
| (SrE-) | [+- SPEED AROUND REF] |
| (SPM-) | [MEMO REFERENCE] |
| (FLI-) | [FLUXING BY LI] |
| (bLC-) | [BRAKE LOGIC CONTROL] |
| (ELM-) | [EXTERNAL LOAD MEAS.] |
| (HSH-) | [HIGH SPEED HOISTING] |
| (PId-) | [PID REGULATOR] |
| (Pr1-) | [PRESET PID REF] |
| (tOL-) | [TORQUE LIMITATION] |
| (CLI-) | [CURRENT LIMIT.] |
| (I2t-) | [DYN CURRENT LIMIT] |
| (LLC-) | [LINE CONTACTOR COMMAND] |
| (OCC-) | [OUTPUT CONTACTOR CMD] |
| (LPO-) | [POSITIONING BY SENSORS] |
| (MLP-) | [PARAM. SET SWITCHING] |
| (MMC-) | [MULTIMOTORS/CONFIG.] |
| (tnL-) | [AUTO-TUNING BY LI] |
| (trO-) | [TRAVERSE CONTROL] |
| (CHS-) | [HSP SWITCHING] |
| (dCC-) | [DC BUS] |

The parameters in menu **[APPLICATION FUNCT.]**(Fun-) can only be changed if the inverter has been stopped and no move command has been given. Parameters with an arrow symbol in the "Code" column are exceptions to this rule. These parameters can be modified with the inverter running or stopped.

## Note:

**Compatibility of functions**

**The choice of application functions may be limited by the number of inputs and outputs and by the incompatibility of some functions with one another. Functions not listed in the table below are do not have these types of limitations.**

**If functions are not compatible with one another, the first configured function will block the configuration of the other functions.**

**Each of the functions on the following pages can be assigned to one of the inputs or outputs.**

## Danger!

**UNINTENDED OPERATION OF DEVICES**

**Several functions can be assigned to the same input and simultaneously enabled by this input.**

**Make sure that the assignment of several functions to a single input does not result in unsafe states.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

The assignment of an input to several functions is only possible on levels **[Advanced]**(AdU) and **[Expert]**(EPr).

Before assigning a command, setpoint or function to an input or output, make sure that this input or output has not already been assigned and that no incompatible functions have been assigned to any other input or output.

The factory settings or the macro configurations of the inverter automatically configure the functions, **which in turn can prohibit the assignment of other functions**.

**It may be necessary to remove one or more functions from the configuration in order to be able to enable another function.** Check the compatibility table below.

Stop functions have priority over move commands.

Frequency references via logic commands have priority over analog references.

## Note:

**This compatibility table does not affect the control commands that can be assigned to the keys of the graphic display terminal.**

| | Reference operations | +/- speed | Preset speeds | PID regulator | Traverse control | JOG operation | Reference switching | Skip frequency | Brake logic control | Auto DC injection | Catch on the fly | Output contactor command | DC injection stop | Fast stop | Freewheel stop | +/- speed around a reference | High speed hoisting | Load sharing | Positioning by sensors |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reference configurations | | | ↑ | ● (2) | | ↑ | ↑ | ↑ | | | | | | | | | | | |
| +/- speed | | | | | ● | ● | ↑ | ↑ | | | | | | | | | | | |
| Preset frequencies | ← | | | | | ↑ | ↑ | ↑ | | | | | | | | | | | |
| PID controllers | ● (2) | | | | ● | ● | ↑ | ↑ | ● | | | | | | | ● | ● | ● | ● |
| Traverse control | | ● | | ● | | ● | ↑ | ↑ | | | | | | | | ● | ● | | |
| JOG operation | ← | ● | ← | ● | ● | | | ↑ | ● | ← | | | | | | ● | ● | | |
| Reference switching | ← | ← | ← | ← | ← | | | ↑ | | | | | | | | ↑ | | | |
| Skip frequency | ← | ← | ← | ← | ← | ← | ← | | | | | | | | | ← | | | |
| Brake logic | | | | ● | | ● | | | | | ● | ● | ● | | | | | | |
| Auto DC injection | | | | | | ↑ | | | | | | | ↑ | | ↑ | | | | |
| Catch on the fly | | | | | | | | | ● | | | | | | | | | | |
| Motor protection command | | | | | | | | | ● | | | | | | | | | | |
| DC injection braking | | | | | | | | | ● | ← | | | | ● (1) | ↑ | | | | |
| Fast stop | | | | | | | | | | | | | ● (1) | | ↑ | | | | |
| Freewheel stop | | | | | | | | | | ← | | | ← | ← | | | | | |
| +/- speed around the setpoint | | | | ● | ● | ● | ← | ↑ | | | | | | | | | | | |
| High-speed hoisting | | | | ● | ● | ● | | | | | | | | | | | | | |
| Load distribution | | | | ● | | | | | | | | | | | | | | | |
| Positioning via limit switch | | | | ● | | | | | | | | | | | | | | | |

(1) Priority is given to the first of these two stop modes to be activated.
(2) Only the multiplier reference is incompatible with the PID regulator.

● Incompatible functions

Compatible functions

Not applicable

Priority functions (functions, which cannot be active at the same time):

← ↑ The function indicated by an arrow has priority over the other function.

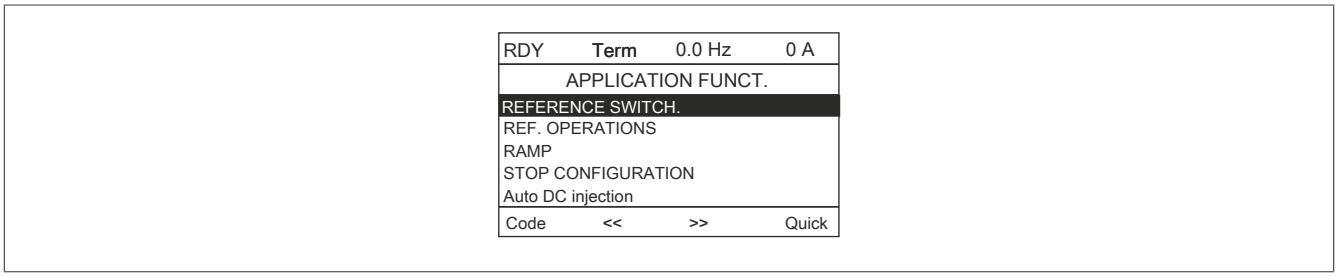
### Incompatible functions

The following function cannot be accessed or is disabled after an automatic restart:

This function is only possible for the following types of control: **[2/3 wire control]**(tCC) = **[2 wire]**(2C) and **[2 wire type]**(tCt) = **[Level]** (LEL) or **[Fwd priority]**(PFO).

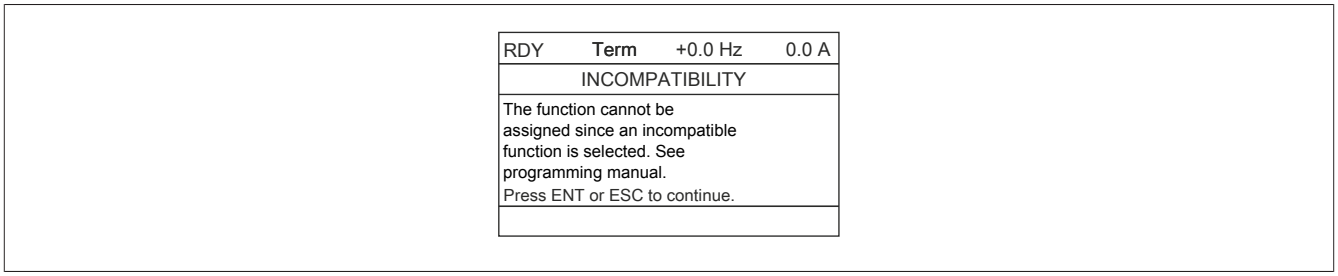
Via the monitoring menu **[1.2 MONITORING]**(MOn-) the functions assigned to each input can be displayed in order to check compatibility.

When a function is assigned, a ✓ appears on the graphic display terminal, as illustrated in the example below:




If a function should be assigned that is incompatible with another function that has already been assigned, an alarm message will appear:

- With the graphic display terminal:



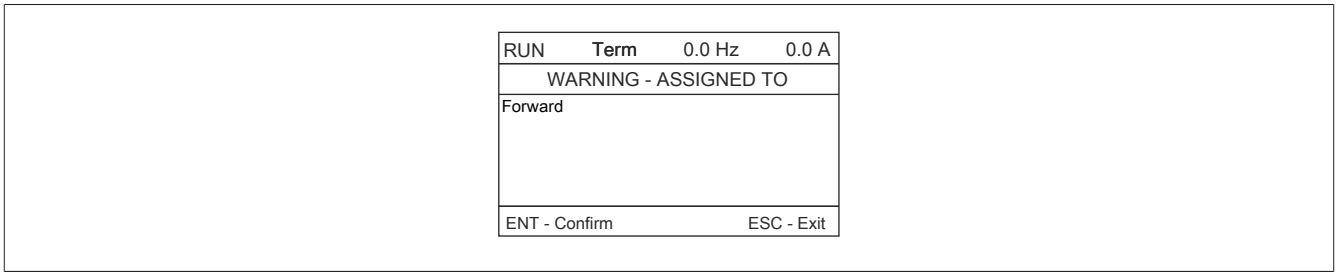

- With the integrated operator terminal and external operator terminal:

COMP flashes until ENT or ESC is pressed.

If a logic input, analog input, setpoint channel or bit is assigned to a function, pressing the HELP button will display the functions that may already have been activated by this input, bit or channel.

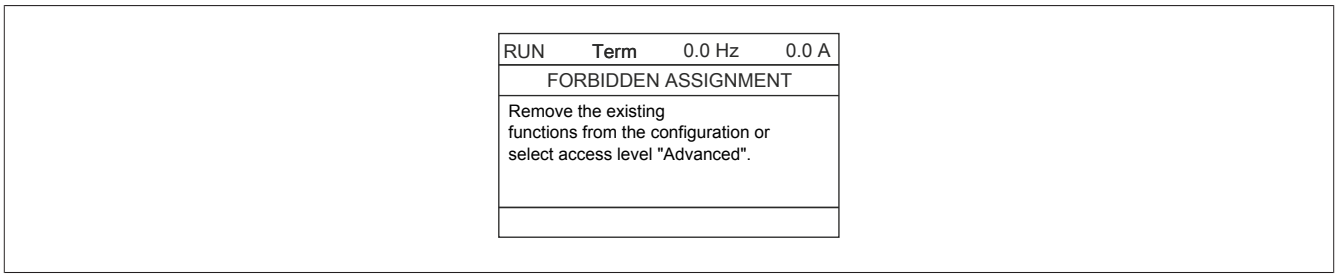
When a logic input, an analog input, a setpoint channel or a bit that has already been assigned is assigned to another function, the following screens appear:

- With the graphic display terminal:




If the access level permits this new assignment, pressing ENT confirms the assignment.

If the access level does not permit this new assignment, pressing ENT results in the following display:




- With the integrated operator terminal:

The code for the first function, which is already assigned, is displayed blinking.

If the access level permits this new assignment, pressing ENT confirms the assignment.

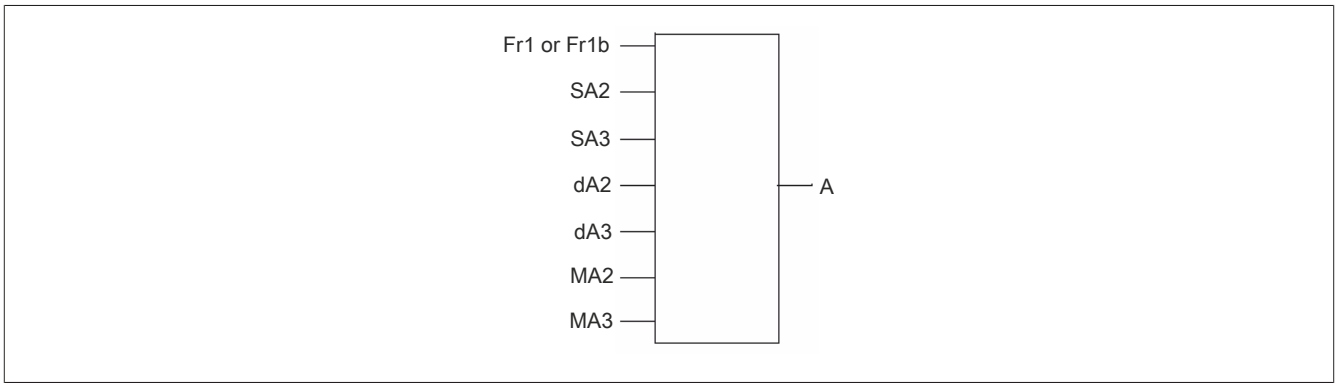
If the access level does not permit this new assignment, pressing ENT has no effect and the message continues to flash. It is only possible to exit by pressing ESC.

### 5.2.3.6.6.1 [REFERENCE SWITCH.] (rEF-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > rEF- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| rEF- | **[REFERENCE SWITCH.]** | |
| rCb | **[Ref 1B switching]** | **[ch1 active]**(Fr1) |
| | In state 0 of the assigned input or bit, **[Ref.1 channel]**(Fr1) is active.<br>In state 1 of the assigned input or bit, **[Ref.1B channel]**(Fr1b) is active.<br>**[Ref 1B switching]**(rCb) is forced to **[ch1 active]**(Fr1) if **[Profile]**(CHCF) is set to **[Not separ.]**(SIM) and **[Ref.1 channel]**(Fr1) is assigned via the terminals (analog inputs, pulse input). | |
| Fr1 | **[ch1 active]**(Fr1): No switchover, **[Ref.1 channel]**(Fr1) active. | |
| Fr1b | **[ch1B active]**(Fr1b): No switchover, **[Ref.1B channel]**(Fr1b) active. | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions (excluding **[Cd00]**(Cd00) to **[Cd15]**(Cd15)). | |
| Fr1b | **[Ref.1B channel]** | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | |
| AI1 | **[AI1]**(AI1): Analog input A1 | |
| AI2 | **[AI2]**(AI2): Analog input A2 | |
| AI3 | **[AI3]**(AI3): Analog input A3 | |
| LCC | **[HMI]**(LCC): Graphic display terminal or external operator terminal source | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| nEt | **[Com. card]**(nEt): Optional communication card source | |
| PI | **[RP]**(PI): Pulse input | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 with dial (only available if **[Profile]**(CHCF) is not set to **[Not separ.]**(SIM)). | |

### 5.2.3.6.6.2 [REF. OPERATIONS] (OAI-)

#### Input addition/ Input subtraction / Multiplier

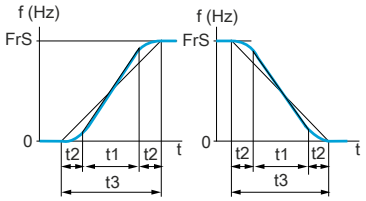
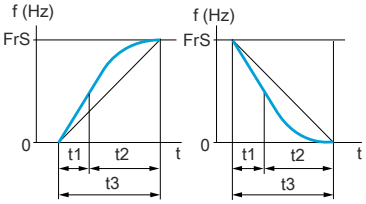
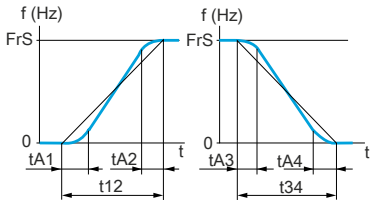



A = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- If SA2, SA3, dA2 and dA3 are not assigned, they are set to 0.
- If MA2 and MA3 are not assigned, they are set to 1.
- A is limited by parameters "Low speed" LSP and "High speed" HSP.
- During multiplication, the signal at MA2 or MA3 is captured in %. 100% corresponds to the maximum value of the corresponding input. If MA2 or MA3 are sent by the communication bus or the graphic display terminal, a multiplication variable MFr must be sent via the bus or the graphic display terminal.
- The inversion of the direction of rotation in case of a negative result can be locked (**[RV Inhibition]**(SIn)).

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > OAI- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| OAI- | **[REF. OPERATIONS]**<br>Reference = (Fr1 or Fr1b + SA2 + SA3 - dA2 - dA3) x MA2 x MA3.<br>**Note:**<br>**This function cannot be used with certain other functions.** | |
| SA2 | **[Summing ref. 2]**<br>Selection of a setpoint to be added to **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b). | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | |
| AI1 | **[AI1]**(AI1): Analog input A1 | |
| AI2 | **[AI2]**(AI2): Analog input A2 | |
| AI3 | **[AI3]**(AI3): Analog input A3 | |
| LCC | **[HMI]**(LCC): Graphic display terminal or external operator terminal source | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | |
| nEt | **[Com. card]**(nEt): Optional communication card source | |
| PI | **[RP]**(PI): Pulse input | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 with handwheel | |
| AIU2 | **[AI virtual 2]**(AIU2): Virtual analog input 2 via communication bus | |
| SA3 | **[Summing ref. 3]**<br>Selection of a setpoint to be added to **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).<br>Identical to **[Summing ref. 2]**(SA2). | **[No]**(nO) |
| dA2 | **[Subtract. ref. 2]**<br>Selection of a setpoint to be subtracted from **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).<br>Identical to **[Summing ref. 2]**(SA2). | **[No]**(nO) |
| dA3 | **[SubParam3]**<br>Selection of a setpoint to be subtracted from **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).<br>Identical to **[Summing ref. 2]**(SA2). | **[No]**(nO) |
| MA2 | **[Multiplier ref. 2]**<br>Selection of a setpoint to be multiplied by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).<br>Identical to **[Summing ref. 2]**(SA2).<br>This parameter is incompatible with the PID controller. **[No]** (nO) is the only value that can be set. | **[No]**(nO) |
| MA3 | **[Multiplier ref. 3]**<br>Selection of a setpoint to be multiplied by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b).<br>Identical to **[Summing ref. 2]**(SA2).<br>This parameter is incompatible with the PID controller. **[No]** (nO) is the only value that can be set. | **[No]**(nO) |

## 5.2.3.6.6.3 [RAMP] (rPt-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > rPt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| rPt- | **[RAMP]** | | |
| rPt | **[Ramp type]** | | **[Linear]**(LIn) |
| LIn | **[Linear]**(LIn) | | |
| S | **[S ramp]**(S) | | |
| U | **[U ramp]**(U) | | |
| CUS | **[Customized]**(CUS) | | |
| | S-shaped ramps<br>  <br><br>The rounding coefficient is unchangeable:<br>t1 = 0.6 times the configured ramp time (linear)<br>t2 = 0.4 times the configured ramp time (round)<br>t3 = 1.4 times the configured ramp time | | |
| | U-shaped ramps<br>  <br><br>The rounding coefficient is unchangeable:<br>t1 = 0.5 times the configured ramp time (linear)<br>t2 = 1.0 times the configured ramp time (round)<br>t3 = 1.5 times the configured ramp time | | |
| | Customized ramps<br>  <br><br>tA1: Can be set between 0 and 100%<br>tA2: Can be set between 0 and (100%- tA1)<br>tA3: Can be set between 0 and 100%<br>tA4: Can be set between 0 and (100%- tA3)<br>t12 = ACC * (tA1(%) / 100 + tA2(%) / 100 + 1)<br>t34 = DEC * (tA3(%) / 100 + tA4(%) / 100 + 1) | | |
| Inr | **[Ramp increment]** | | **[0.1]**(0.1) |
| (1) | This parameter is used for **[Acceleration]**(ACC), **[Deceleration]**(dEC), **[Acceleration 2]**(AC2) and **[Deceleration 2]**(dE2). | | |
| 0.01 | **[0,01]**: 99.99-second ramp | | |
| 0.1 | **[0,1]**: 999.9-second ramp | | |
| 1 | **[1]**: 6,000-second ramp | | |
| ACC | **[Acceleration]** | 0.00 to 6000 s(2) | 3.0 s |
| (1) | Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| dEC | **[Deceleration]** | 0.00 to 6000 s(2) | 3.0 s |
| (1) | Time taken to decelerate from **[Rated motor freq.]**(FrS) to 0. To ensure ramp repeatability, the value of this parameter must be defined in accordance with what is possible for the application. | | |
| tA1 | **[Begin Acc round]** | 0 to 100% | 10% |
| (1) | Rounding of the acceleration ramp start as a % of ramp time **[Acceleration]**(ACC) or **[Acceleration 2]** (AC2).<br>Can be set between 0 and 100%.<br>The parameter is accessible if **[Ramp type]**(rPt) is of type **[Customized]**(CUS). | | |
| tA2 | **[End Acc round]** | 0 to 100% | 10% |
| (1) | Rounding of the acceleration ramp end as a % of acceleration time **[Acceleration]**(ACC) or **[Acceleration 2]**(AC2).<br>Can be set from 0 to (100% - **[Begin Acc round]**(tA1)).<br>The parameter is accessible if **[Ramp type]**(rPt) is of type **[Customized]**(CUS). | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > rPt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tA3 | **[Begin Dec round]**<br>Rounding of the deceleration ramp start as a % of ramp time **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2).<br>Can be set between 0 and 100%<br>The parameter is accessible if **[Ramp type]**(rPt) is of type **[Customized]**(CUS). | 0 to 100% | 10% |
| tA4 | **[End Dec round]**<br>Rounding of the deceleration ramp end as a % of ramp time **[Deceleration]**(dEC) or **[Deceleration 2]**(dE2).<br>Can be set from 0 to (100% - **[Begin Dec round]**(tA3)).<br>The parameter is accessible if **[Ramp type]**(rPt) is of type **[Customized]**(CUS). | 0 to 100% | 10% |
| Frt | **[Ramp 2 threshold]**<br>Ramp switching threshold.<br>Switching the 2nd Ramp if **[Ramp 2 threshold]**(Frt) is not equal to 0 (the value 0 disables the function) and motor frequency exceeds **[Ramp 2 threshold]**(Frt). The switchover of the ramp using the threshold value and switchover **[Ramp switching]**(rPS) can be used together as follows: | 0 to 599 Hz, depending on size | 0 Hz |
| rPS | **[Ramp switching]**<br>At state 0 of the assigned input or bit, the acceleration ramp defined by parameter **[Acceleration]**(ACC) and the deceleration ramp defined by parameter **[Deceleration]**(dEC) are active.<br>At state 1 of the assigned input or bit, the acceleration ramp defined by parameter **[Acceleration 2]**(AC2) and the deceleration ramp defined by parameter **[Deceleration 2]**(dE2) are active. | | **[No]**(nO) |
| AC2 | **[Acceleration 2]**<br>Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). In order to ensure ramp repeatability, the value of this parameter must be defined in accordance with the relevant application options.<br>The parameter is accessible if **[Ramp 2 threshold]**(Frt) is greater than 0 or if **[Ramp switching]**(rPS) is assigned. | 0.00 to 6000 s(2) | 5.0 s |
| dE2 | **[Deceleration 2]**<br>Time taken to decelerate from **[Rated motor freq.]**(FrS) to 0. In order to ensure ramp repeatability, the value of this parameter must be defined in accordance with the relevant application options.<br>The parameter is accessible if **[Ramp 2 threshold]**(Frt) is greater than 0 or if **[Ramp switching]**(rPS) is assigned. | 0.00 to 6000 s(2) | 5.0 s |
| brA | **[Dec ramp adapt.]**<br>**Note:**<br>**MOTOR DAMAGE**<br>**This parameter is only permitted to be set to [YES](YES) or [No](nO) if the connected motor is a synchronous motor with a permanent magnet.**<br>**Other settings demagnetize synchronous motors with a permanent magnet.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Activating this function automatically adapts the deceleration ramp if it has been set at too low a value with respect to the inertia of the load, which can cause an overvoltage error.<br>**[Dec ramp adapt.]**(brA) is forced to **[No]**(nO) if brake logic control **[Brake assignment]**(bLC) has been assigned.<br>The function is incompatible with applications requiring:<br>• Positioning on a ramp<br>• Use of a braking resistor (this would not preserve its function) | | **[YES]**(YES) |
| nO | **[No]**(nO): Function not active | | |
| YES | **[YES]**(YES): Function active, for applications that do not require high deceleration time.<br>Depending on the size of the inverter and **[Motor control type]**(Ctt), the following parameters are displayed.A higher deceleration time can be achieved with these parameters than with parameter **[YES]**(YES). The selection must be defined by comparative tests. | | |
| dYnA | **[brake mot A]** (dYnA): Addition of a constant current flow component<br>If **[adj. decel ramp]** (brA) is configured to **[brake mot x]** (dYnx), the dynamic powers for brakes are improved by adding a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor. | | |

| Code | Name/Description | Frequency | Ramp |
|---|---|---|---|
| LI or bit | | | |
| 0 | | <Frt | ACC, dEC |
| 0 | | >Frt | AC2, dE2 |
| 1 | | <Frt | AC2, dE2 |
| 1 | | >Frt | AC2, dE2 |

(1) The parameter can also be accessed via menu **[SETTINGS]**(SEt-).
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s in accordance with **[Ramp increment]**(Inr).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.6.4 [STOP CONFIGURATION] (Stt-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > Stt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| Stt- | **[STOP CONFIGURATION]**<br>**Note:**<br>**Some types of stop cannot be used with all other functions.** | | |
| Stt | **[Type of stop]**<br>Stop mode when the move command disappears or when a stop command is issued.<br>**Note:**<br>**If function "Brake logic" is released or if [Low speed time out](tLS) is not equal to 0, only "Stop via ramp" can be configured.** | | **[Ramp stop](rMP)** |
| rMP | **[Ramp stop](rMP)**: Stopping via ramp | | |
| FSt | **[Fast stop](FSt)**: Fast stop | | |
| nSt | **[Freewheel](nSt)**: Freewheel stop | | |
| dCI | **[DC injection]** (dCI): Stop by DC injection braking. Only available if **[Motor control type](Ctt)** is not set to **[Sync. mot.](SYn)**. | | |
| FFt<br>(1) | **[Freewheel stop Thd.]**<br>Speed threshold value below which the motor switches into freewheel stop.<br>This parameter supports switching from a ramp stop or fast stop to a freewheel stop based on a "Low frequency" threshold value.<br>This parameter is accessible if **[Brake assignment](bLC)** and **[Auto DC supply](AdC)** are not configured.<br>**Problem**<br>If a stop ramp (deceleration ramp to standstill) is requested on the drive, overshooting may occur in the control process for induction motors. In doing so, the default value for the speed overshoots the target and the motor turns uncontrolled in the opposite direction. If this behavior is observed, the value for parameter **[Freewheel stop Thd.]** (FFt) is probably configured too low.<br><br>**Recommendation**<br>The "slip frequency" can be used as a guide value for parameter **[Freewheel stop Thd.]** (FFt). It can be determined using the configured values for **[Rated motor speed]** (nSP) and **[Rated motor freq.]** (FrS).<br>• **[Rated motor speed]** (nSP): Nominal speed of the motor<br>• **[Rated motor freq.]** (FrS): Nominal frequency of the motor<br><br>**Step 1:** Calculate the "synchronous speed".<br>The synchronous speed is a theoretical value derived from the nominal frequency and number of motor pole pairs. It corresponds to the speed of a synchronous motor.<br>$n_{sync}$ [rpm] = 6 FRS [0.1 Hz] / $n_{Polpairs}$<br><br>**Step 2:** Calculate the "slip frequency".<br>The recommended value for parameter **[Freewheel stop Thd.]** (FFt) is then calculated according to the following formula:<br>FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]<br><br>**Example calculation**<br>NSP = 1380 [rpm]<br>FRS = 500 [0.1 Hz]<br>$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$<br>$n_{syn}$c [rpm] = 6 * 500 / 2<br>$n_{sync}$ [rpm] = 1500<br>FFT [0.1 Hz] = ($n_{sync}$ [rpm] - NSP [rpm]) / $n_{sync}$ [rpm] * FRS [0.1 Hz]<br>FFT [0.1 Hz] = (1500 - 1380) / 1500 * 500<br>FFT [0.1 Hz] = 40<br><br>**Determining the "synchronous speed"**<br>If the number of motor pole pairs is unknown, the synchronous speed (step 1) can also be determined using a logical series. The following table shows four different logical series that result for nominal frequencies 10 Hz, 50 Hz, 60 Hz and 800 Hz. | 0.2 to 599 Hz | 0.2 Hz |
| nSt | **[Freewheel]**<br>This stop is activated when the input or bit change to 0. If the input switches back to state 1 and the move command is still active, the motor starts running again only if **[2/3 wire control](tCC)** = **[2 wire](2C)** and **[2 wire type](tCt)** = **[Level](LEL)** or **[Fwd priority](PFO)**. Otherwise, a new move command is required. | | **[No](nO)** |
| nO | **[No](nO)**: Not assigned | | |
| LI1 | **[LI1](LI1)**: Logic input LI1 | | |

| **Formula** | **$n_{sync}$ [rpm] = 6 * FRS [0.1 Hz] / $n_{Polpairs}$** | | | |
|---|---|---|---|---|
| **$n_{Polpairs}$** | **Series 1 (FRS = 100)** | **Series 2 (FRS = 500)** | **Series 3 (FRS = 600)** | **Series 4 (FRS = 8000)** |
| 1 | $n_{sync}$ [rpm] = 600 | $n_{sync}$ [rpm] = 3000 | $n_{sync}$ [rpm] = 3600 | $n_{sync}$ [rpm] = 48000 |
| 2 | $n_{sync}$ [rpm] = 300 | $n_{sync}$ [rpm] = 1500 | $n_{sync}$ [rpm] = 1800 | $n_{sync}$ [rpm] = 24000 |
| 3 | $n_{sync}$ [rpm] = 200 | $n_{sync}$ [rpm] = 1000 | $n_{sync}$ [rpm] = 1200 | $n_{sync}$ [rpm] = 1600 |
| 4 | $n_{sync}$ [rpm] = 150 | $n_{sync}$ [rpm] = 750 | $n_{sync}$ [rpm] = 900 | $n_{sync}$ [rpm] = 1200 |
| ... | ... | ... | ... | ... |

The values of the logical series become smaller as the number of pole pairs increases. To determine the synchronous speed of the motor, the value for NSP [rpm] must be placed in the logical sequence. The next larger value corresponds to the synchronous speed.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > Stt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ... | [...](...): See the assignment conditions. | | |
| FSt | **[Fast stop assignment]**<br>The stop is activated if the input is set to 0 or the bit changes to 1 (state 0 of the bit in [I/O profile](IO)).<br>If the input switches back to state 1 and the move command is still active, the motor starts running again only if [2/3 wire control](tCC) = [2 wire](2C) and [2 wire type](tCt) = [Level](LEL) or [Fwd priority](PFO). Otherwise, a new move command is required.<br>**Note:**<br>**This function cannot be used with certain other functions.** | | [No](nO) |
| nO<br>LI1<br>... | [No](nO): Not assigned<br>[LI1](LI1): Logic input LI1<br>[...](...): See the assignment conditions.<br>If [Profile](CHCF) is set to [Not separate](SIM) or [Separate](SEP), then [CD11](Cd11) to [CD15](Cd15), [C111](C111) to [C115](C115), [C211](C211) to [C215](C215), [C311](C311) to [C315](C315) are not available. | | |
| dCF<br>(1) | **[Ramp divider]**<br>This parameter is accessible if [Type of stop](Stt) = [Fast stop](FSt) and [Fast stop assign.](FSt) is not equal to [No](nO) and [Stop type](PAS) is not equal to [Fast stop](FSt).<br>The enabled ramp ([Deceleration](dEC) or [Deceleration 2](dE2)) is subsequently divided by this coefficient during the stop commands.<br>Value 0 corresponds to a minimum ramp time. | 0 to 10 | 4 |
| dCI | **[DC injection assign.]**<br>**Warning!**<br>**UNINTENTIONAL MOVEMENT**<br>• **Do not use DC injection braking in order to generate a holding torque if the motor is not running.**<br>• **Instead, use a holding brake in order to hold the motor in a standstill position.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**<br>DC injection braking is initiated when the assigned input or bit changes to state 1.<br>If the input switches back to state 1 and the move command is still active, the motor starts running again only if [2/3 wire control](tCC) = [2 wire](2C) and [2 wire type](tCt) = [Level](LEL) or [Fwd priority](PFO). Otherwise, a new move command is required.<br>**Note:**<br>**This function cannot be used with certain other functions.** | | [No](nO) |
| nO<br>LI1<br>... | [No](nO): Not assigned<br>[LI1](LI1): Logic input LI1<br>[...](...): See the assignment conditions. | | |
| IdC<br>(1)(3) | **[DC inject. level 1]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Level of DC injection braking current activated via logic input or selected as stop mode.<br>This parameter is accessible if [Type of stop](Stt) = [DC Injection](dCI) or if [DC injection assign.](dCI) is not equal to [No](nO). | 0.1*INV to 1.41*INV (2) | 0.64*INV (2) |
| tdI<br>(1)(3) | **[DC injection time 1]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Maximum duration of current injection [DC inject. level 1](IdC). After this time has expired, the braking current changes to level [DC inject. level 2](IdC2).<br>This parameter is accessible if [Type of stop](Stt) = [DC Injection](dCI) or if [DC injection assign.](dCI) is not equal to [No](nO). | 0.1 to 30 s | 0.5 s |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > Stt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| IdC2 | **[DC inject. level 2]** | 0.1*INV to IdC(2) | 0.5*INV (2) |
| ★ ↻ (1)(3) | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>The braking current is activated by the logic input or selected as a stop mode once time span **[DC injection time 1]**(tdI) has expired.<br>This parameter is accessible if **[Type of stop]**(Stt) = **[DC Injection]**(dCI) or if **[DC injection assign.]**(dCI) is not equal to **[No]**(nO). | | |
| tdC | **[DC injection time 2]** | 0.1 to 30 s | 0.5 s |
| ★ ↻ (1)(3) | **Caution!**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Maximum braking time **[DC inject. level 2]**(IdC2) for the DC injection braking, only selected as stop configuration.<br>This parameter is accessible if **[Stop type]**(Stt) is set to **[DC Injection]**(dCI). | | |
| dOtd | **[Disable Output Trigger Definition]** | | **[Ramp stop]**(rMp) |
| | Disabling stop configuration. | | |
| nSt | **[Freewheel]**(nSt): Disabling inverter function | | |
| rMp | **[Ramp stop]**(rMp): Stops ramp, then disables inverter function. | | |

(1) The parameter can also be accessed via menu **[SETTINGS]**(SEt-).
(2) Corresponding to the nominal current of the inverter specified on the nameplate.
(3) These settings are independent of function **[Auto DC injection]**(AdC-).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

↻ Parameter that can be modified during operation or when stopped.

## 5.2.3.6.6.5 [Auto DC injection] (AdC-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > AdC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| AdC- | [Auto DC injection] | | |
| AdC<br>2 s | [Auto DC injection] | | [YES](YES) |
| | **Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If parameter [Auto DC injection](AdC) is set to [continuous](Ct), the DC brake is always active, even if the motor is not running.**<br>**Make sure that this setting does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.** | | |
| | **Warning!**<br>**UNINTENTIONAL MOVEMENT**<br>• **Do not use DC injection braking in order to generate a holding torque if the motor is not running.**<br>• **Instead, use a holding brake in order to hold the motor in a standstill position.**<br>**Failure to follow these instructions can result in death, serious injury or damage to property.** | | |
| | Automatic current injection on stopping (at the end of the ramp) | | |
| | **Note:**<br>**This function blocks the function [Motor fluxing](FLu). If [Motor fluxing](FLu) is set to [continuous](FCt), [Auto DC injection](AdC) must be set to [No](nO).** | | |
| | **Note:**<br>**[Auto DC injection](AdC) is set to [No](nO) if [Motor control type](Ctt) is set to [Sync. mot.](SYn).**<br>**[Auto DC injection](AdC) is forced to [No](nO) if [Brake assignment](bLC) is not set to [No](nO).**<br>**This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the frequency inverter running.** | | |
| nO | [No](nO): No supply | | |
| YES | [YES](YES): Supply with adjustable duration | | |
| Ct | [continuous](Ct): Continuous supply at standstill | | |

**The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > AdC-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| SdC1 | [Auto DC inj. level 1] | 0 to 1.2*INV (2) | 0.7*INV (2) |

**Caution!**

**MOTOR OVERHEATING AND DAMAGE**

**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**

**Failure to observe these instructions can result in damage to the equipment.**

Level of standstill DC injection current.
[Auto DC injection](AdC) is not set to [No](nO).

| | | | |
|---|---|---|---|
| tdC1 | [Auto DC inj. time 1] | 0.1 to 30 s | 0.5 s |

**Note:**

**MOTOR OVERHEATING AND DAMAGE**

**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**

**Failure to observe these instructions can result in damage to the equipment.**

Standstill injection time. The parameter can be activated if [Auto DC injection](AdC) is not set to [No](nO).
If [Motor control type](Ctt) is set to [Sync. mot.](SYn), this time corresponds to the hold time at speed zero.

| | | | |
|---|---|---|---|
| SdC2 | [Auto DC inj. level 2] | 0 to 1.2*INV (2) | 0.5*INV (2) |

**Note:**

**MOTOR OVERHEATING AND DAMAGE**

**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**

**Failure to observe these instructions can result in damage to the equipment.**

2. Level of standstill DC injection current.
This parameter can be activated if [Auto DC injection](AdC) is not set to [No](nO).

| | | | |
|---|---|---|---|
| tdC2 | [Auto DC inj. time 2] | 0 to 30 s | 0 s |

**Caution!**

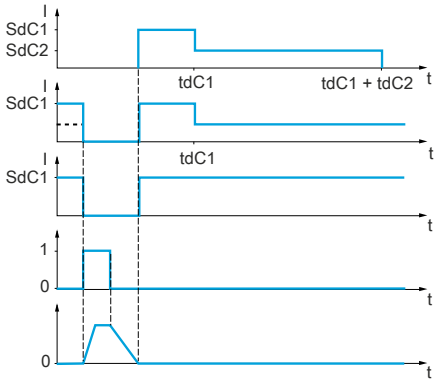
**MOTOR OVERHEATING AND DAMAGE**

**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**

**Failure to observe these instructions can result in damage to the equipment.**

2. Standstill injection time.
This parameter can be accessed if [Auto DC injection](AdC) is set to [YES](YES).

| AdC | SdC2 |
|---|---|
| YES | x |
| Ct | ≠ 0 |
| Ct | = 0 |
| Movement command | |
| Speed | |



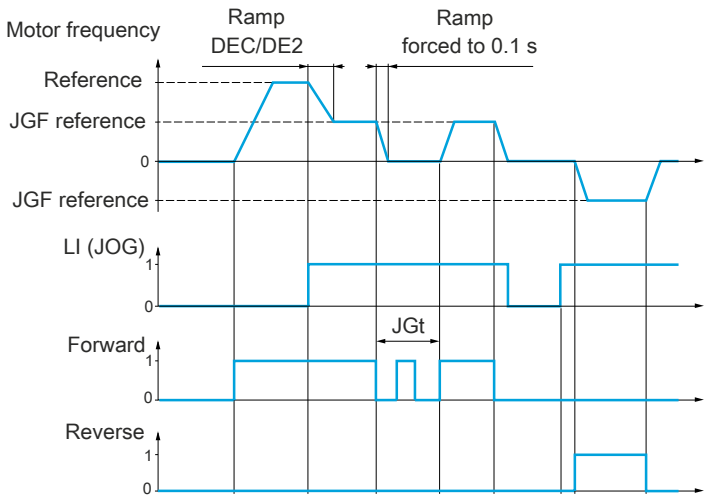

(1) The parameter can also be accessed via menu [SETTINGS](SEt-).
(2) Corresponding to the nominal current of the inverter specified on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

To change the assignment of this parameter, press the ENT key for 2 seconds.

## 5.2.3.6.6.6 [JOG] (JOG-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > JOG- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| JOG- | [JOG]<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| JOG | [JOG]<br>Pulse operation.<br>The JOG function is only active if the command channel and the reference channels are on the terminals.<br>The function is active if the assigned input or bit is at 1.<br>Example: Operation via 2-wire control (tCC = 2C).<br>  <br> | | [LI3](LI3) |
| nO<br>LI1<br>... | [No](nO): Not assigned<br>[LI1](LI1): Logic input LI1<br>[...](...): See the assignment conditions (excluding [Cd00](Cd00) to [Cd15](Cd15))<br>If [Profile] (CHCF) is set to [Not separ.](SIM) or [Separate] (SEP), parameters [CD11] (Cd11) to [CD15] (Cd15), [C111] (C111) to [C115] (C115), [C211] (C211) to [C215] (C215) and [C311] (C311) to [C315] (C315) are not available. | | |
| JGF<br>(1) | [Setpoint step mode]<br>Reference in jog operation<br>This parameter can be accessed if [JOG](JOG) is not set to [No](nO). | 0 to 10 Hz | 10 Hz |
| JGt<br>(1) | [Jog delay]<br>Anti-repeat delay between 2 consecutive jog operations.<br>This parameter can be accessed if [JOG](JOG) is not set to [No](nO). | 0 to 2.0 s | 0.5 s |

(1) This parameter can also be accessed via menu [SETTINGS](SEt-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

#### 5.2.3.6.6.7 [PRESET SPEEDS] (PSS-)

2, 4, 8 or 16 frequencies can be preset, in which case 1, 2, 3 or 4 logic inputs will be required.

**Note:**

**2 and 4 frequencies must be configured in order to obtain 4 frequencies.**

**2, 4 and 8 frequencies must be configured in order to obtain 8 frequencies.**

**2, 4, 8 and 16 frequencies must be configured in order to obtain 16 frequencies.**

Combination table for preset speed inputs.

| 16 frequencies LI (PS16) | 8 frequencies LI (PS8) | 4 frequencies LI (PS4) | 2 frequencies LI (PS2) | Frequency reference |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Reference (1) |
| 0 | 0 | 0 | 1 | SP2 |
| 0 | 0 | 1 | 0 | SP3 |
| 0 | 0 | 1 | 1 | SP4 |
| 0 | 1 | 0 | 0 | SP5 |
| 0 | 1 | 0 | 1 | SP6 |
| 0 | 1 | 1 | 0 | SP7 |
| 0 | 1 | 1 | 1 | SP8 |
| 1 | 0 | 0 | 0 | SP9 |
| 1 | 0 | 0 | 1 | SP10 |
| 1 | 0 | 1 | 0 | SP11 |
| 1 | 0 | 1 | 1 | SP12 |
| 1 | 1 | 0 | 0 | SP13 |
| 1 | 1 | 0 | 1 | SP14 |
| 1 | 1 | 1 | 0 | SP15 |
| 1 | 1 | 1 | 1 | SP16 |

(1) Setpoint 1 = (SP1).

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PSS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PSS- | **[PRESET SPEEDS]**<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| PS2<br>nO<br>LI1<br>... | **[2 preset speeds]**<br>**[No]**(nO): Not assigned<br>**[LI1]**(LI1): Logic input LI1<br>**[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| PS4 | **[4 preset speeds]**<br>Identical to **[2 preset speeds]**(PS2).<br>In order to obtain 4 speeds, 2 speeds must also be configured. | | **[No]**(nO) |
| PS8 | **[8 preset speeds]**<br>Identical to **[2 preset speeds]**(PS2).<br>In order to obtain 8 speeds, 2 and 4 speeds must also be configured. | | **[No]**(nO) |
| PS16 | **[16 preset speeds]**<br>Identical to **[2 preset speeds]**(PS2).<br>In order to obtain 16 speeds, 2, 4 and 8 speeds must also be configured. | | **[No]**(nO) |
| SP2<br>(1) | **[Preset speed 2]**<br>2nd preset frequency | 0 to 599 Hz | 10 Hz |
| SP3<br>(1) | **[Preset speed 3]**<br>3rd preset speed | 0 to 599 Hz | 15 Hz |
| SP4<br>(1) | **[Preset speed 4]**<br>4th preset speed | 0 to 599 Hz | 20 Hz |
| SP5<br>(1) | **[Preset speed 5]**<br>5th preset frequency | 0 to 599 Hz | 25 Hz |
| SP6<br>(1) | **[Preset speed 6]**<br>6th preset speed | 0 to 599 Hz | 30 Hz |
| SP7<br>(1) | **[Preset speed 7]**<br>7th preset frequency | 0 to 599 Hz | 35 Hz |
| SP8<br>(1) | **[Preset speed 8]**<br>8th preset frequency | 0 to 599 Hz | 40 Hz |
| SP9<br>(1) | **[Preset speed 9]**<br>9th preset speed | 0 to 599 Hz | 45 Hz |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PSS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SP10 (1) | **[Preset speed 10]**<br>10th preset speed | 0 to 599 Hz | 50 Hz |
| SP11 (1) | **[Preset speed 11]**<br>11th preset speed | 0 to 599 Hz | 55 Hz |
| SP12 (1) | **[Preset speed 12]**<br>12th preset speed | 0 to 599 Hz | 60 Hz |
| SP13 (1) | **[Preset speed 13]**<br>13th preset speed | 0 to 599 Hz | 70 Hz |
| SP14 (1) | **[Preset speed 14]**<br>14th preset speed | 0 to 599 Hz | 80 Hz |
| SP15 (1) | **[Preset speed 15]**<br>15th preset frequency | 0 to 599 Hz | 90 Hz |
| SP16 (1) | **[Preset speed 16]**<br>16th preset speed<br>The display of parameter **[Preset speed x]**(SPx) is based on the number of configured speeds. See combination table for preset PID references. | 0 to 599 Hz | 100 Hz |
| JPF | **[Skip Frequency]**<br>Skip frequency. This parameter prevents operation within an adjustable range around the regulated frequency. This function is used to prevent a critical speed, which would generate resonance. Setting the function to 0 renders it inactive. | 0 to 599 Hz | 0 Hz |
| JF2 | **[Skip Frequency 2]**<br>2nd skip frequency. This parameter prevents operation within an adjustable range around the regulated frequency. This function is used to prevent a critical speed, which would generate resonance. Setting the function to 0 renders it inactive. | 0 to 599 Hz | 0 Hz |
| JF3 | **[3rd Skip Frequency]**<br>3rd skip frequency. This parameter prevents operation within an adjustable range around the regulated frequency. This function is used to prevent a critical speed, which would generate resonance. Setting the function to 0 renders it inactive. | 0 to 599 Hz | 0 Hz |
| JFH | **[Skip Frequency Hyst.]**<br>This parameter is visible if at least one skip frequency **[Skip Frequency]**(JPF), **[Skip Frequency 2]**(JF2) or **[3rd Skip Frequency]**(JF3) is not equal to 0.<br>Range for the skip frequency: From (JPF - JFH) to (JPF + JFH), for example.<br>This setting applies to all three frequencies (JPF, JF2, JF3). | 0.1 to 10 Hz | 1 Hz |

(1) This parameter can also be accessed via menu **[SETTINGS]**(SEt-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.8 [+/- speed ] (UPd-)

Two types of operation are available:

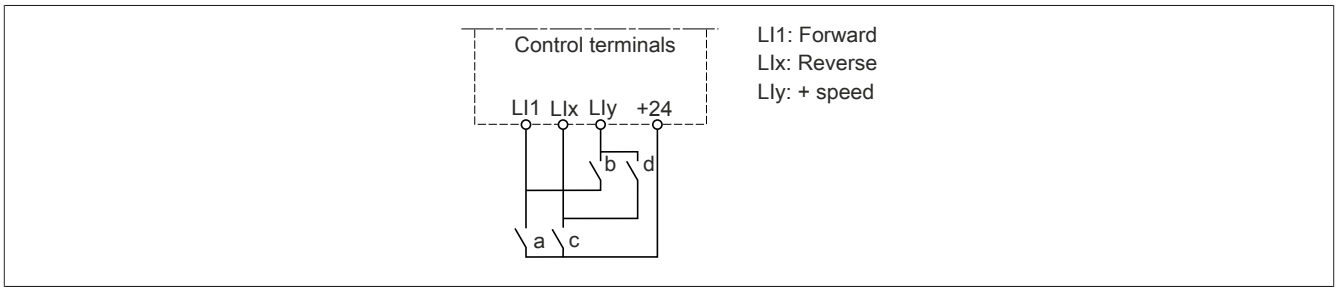
- **Use of single-step buttons:** Two logic inputs are required in addition to rotational direction(s). If the input is set to "+ speed", the speed increases. If the input is set to "- speed", the speed reduces.
- **Use of double-step buttons:** Only one logic input assigned to "+ speed" is required.

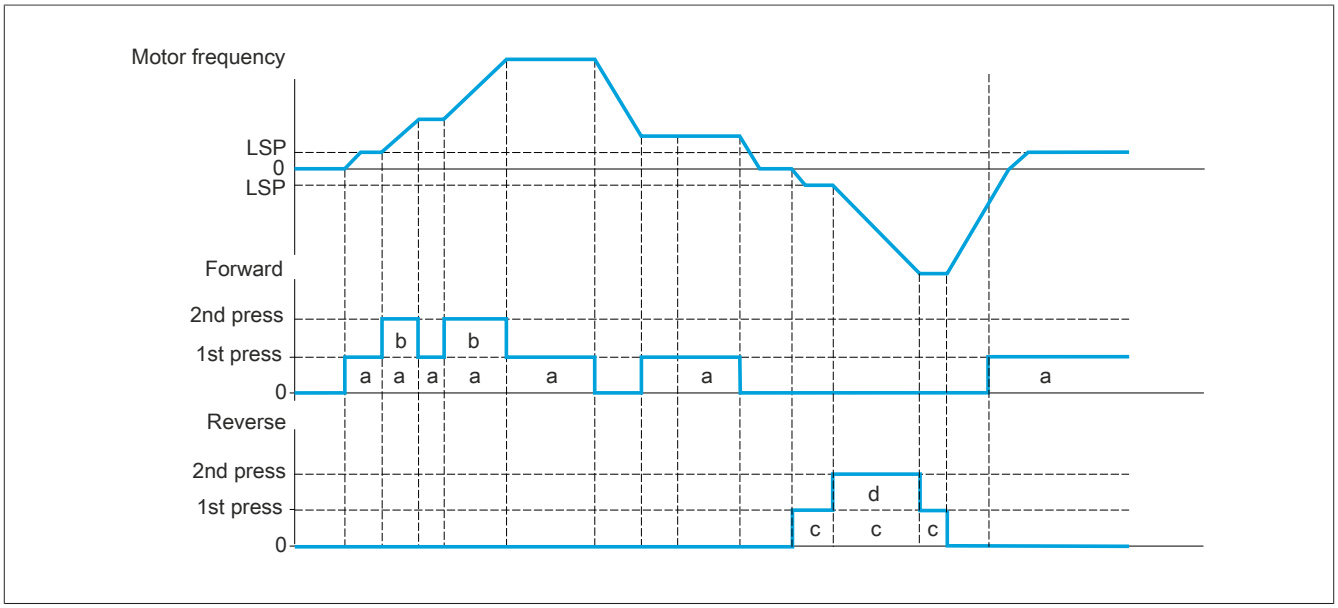
+/- speed with double-press buttons:

Description: 1 button that can be pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

| | Released (-speed) | 1. Push (Speed maintained) | 2. Push (+ speed) |
|---|---|---|---|
| Forward button | - | a | a and b |
| Reverse button | - | c | c and d |

Connection example:




Do not use this "+/-speed" type with 3-wire control.

In both cases, the maximum speed is specified by [High speed](HSP).

## Note:

**In the event of a setpoint switchover by [Ref. 2 switching](rFC) from any setpoint channel to a different setpoint channel with "+/- speed", the value of setpoint [Output frequency](r-Fr) (after ramp) can be copied over at the same time in accordance with parameter [Copy channel 1 --> 2](COP).**

**In the event of a setpoint switchover by [Ref. 2 switching](rFC) from one setpoint channel to another with "+/- speed", the value of setpoint [Output frequency](rFr) (after ramp) is copied over at the same time.**

**In this way, the speed can be prevented from incorrectly being reset to zero when switching takes place.**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > UPd- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| UPd- | **[+/- speed]**<br>This function is accessible if the reference channel **[Ref.2 channel]**(Fr2) is set to **[+/- speed]**(UPdt).<br>**Note:**<br>**This function cannot be used with certain other functions.** | |
| USP | **[Assign. + SPEED]**<br>Function active if the assigned input or bit is at 1. | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions.<br>If **[Profile]** (CHCF) is set to **[Not separ.]**(SIM) or **[Separate]** (SEP), parameters **[CD11]** (Cd11) to **[CD15]** (Cd15), **[C111]** (C111) to **[C115]** (C115), **[C211]** (C211) to **[C215]** (C215) and **[C311]** (C311) to **[C315]** (C315) are not available. | |
| dSP | **[-Speed assignment]**<br>The function is active if the assigned input or bit is at 1.<br>The assignment is identical to **[+ speed assignment]** (USP). | **[No]**(nO) |
| Str | **[Reference saved]**<br>This parameter, which is assigned to function "+/- speed", can be used to save the setpoint in the following cases:<br>• If the move commands disappear (saved to RAM).<br>• If the mains supply is severed or the move commands disappear (saved to EEPROM).<br>As a consequence, the next time the frequency inverter starts up, the speed setpoint is the last setpoint saved. | **[No]**(nO) |
| nO | **[No]**(nO): No saving (at the next start-up, the speed setpoint is **[Low speed]**(LSP)) | |
| rAM | **[RAM]**(rAM): Saving to RAM | |
| EEP | **[EEPROM]**(EEP): Saving to EEPROM | |

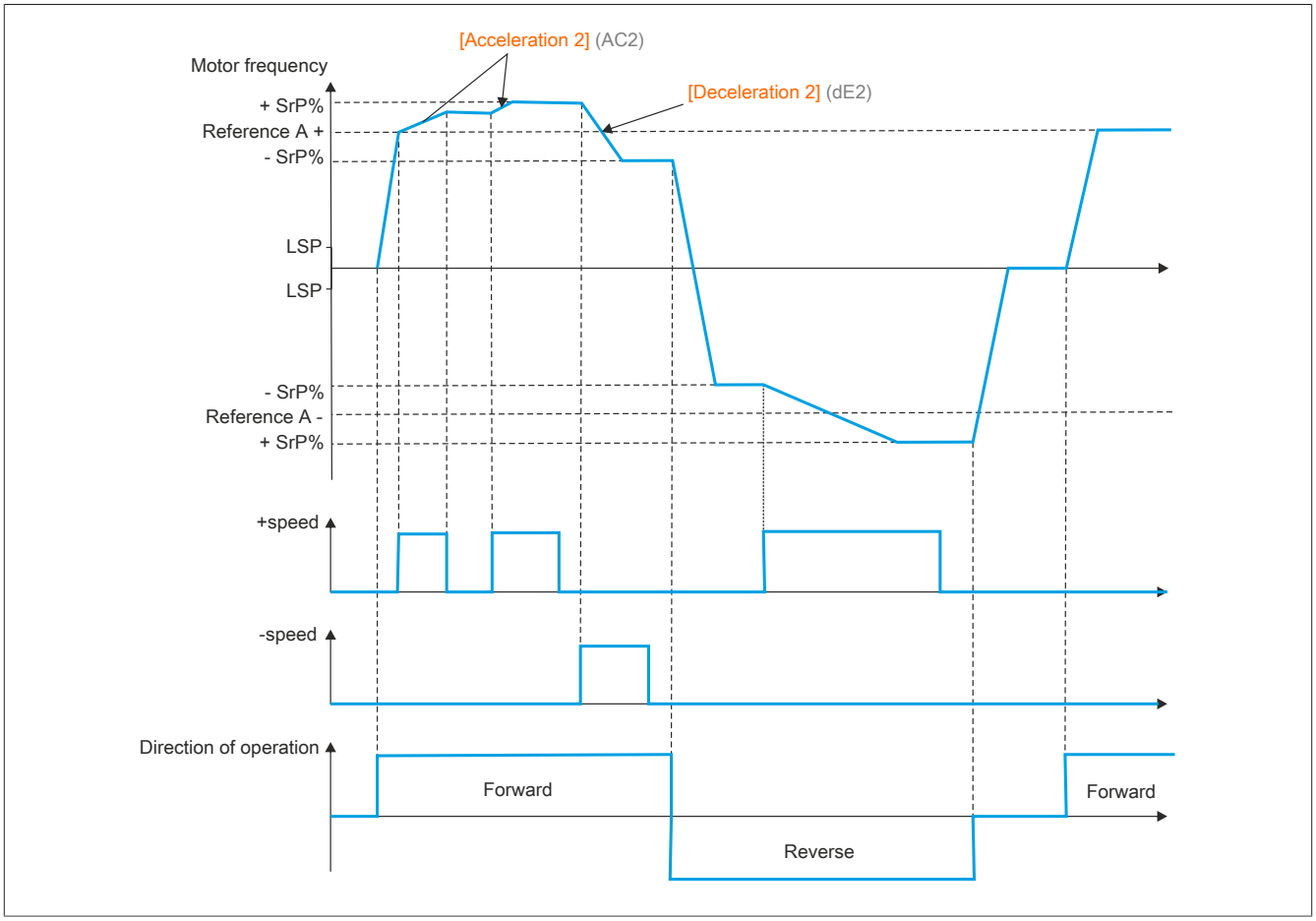
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.6.9 [+- SPEED AROUND REF] (SrE-)

The setpoint is returned by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b); if necessary with functions "Addition"/"Subtraction"/"Multiplication" and the preset speeds. For the sake of simplicity, this will hereinafter be called Reference A. The action of the + speed and - speed keys can be set to a percentage of Setpoint A. On stopping, the setpoint (A ± speed) is not stored. The inverter then runs with only one reference A+.

The maximum total setpoint is limited by **[High speed]**(HSP) and the minimum setpoint by **[Low speed]**(LSP).

Example of 2-wire control:



| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > SrE- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SrE- | **[+- SPEED AROUND REF]**<br>This function is accessible for the reference channel **[ref1 channel]** (Fr1).<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| USI<br>nO<br>LI1<br>... | **[Assign. + SPEED]**<br>**[No]**(nO): Not assigned<br>**[LI1]**(LI1): Logic input LI1<br>**[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| dSI | **[-Speed assignment]**<br>Function active if the assigned input or bit is at 1.<br>The assignment is identical to **[+ Speed assignment]**(uSi). | | **[No]**(nO) |
| SrP | **[+/-Speed limitation]**<br>This parameter limits the variation range with +/- speed and is expressed as a % of the setpoint. The ramps used with this function are **[Acceleration 2]**(AC2) and **[Deceleration 2]**(dE2).<br>This parameter is accessible if "± speed" is assigned. | 0 to 50% | 10% |
| AC2<br>(1) | **[Acceleration 2]**<br>Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). In order to ensure ramp repeatability, the value of this parameter must be defined in accordance with the relevant application options.<br>This parameter is accessible if **[+/- speed]**(tUd) is assigned. | 0.00 to 6000 s(2) | 5.00 s |
| dE2<br>(1) | **[Deceleration 2]**<br>Time taken to decelerate from **[Rated motor freq.]**(FrS) to 0. In order to ensure ramp repeatability, the value of this parameter must be defined in accordance with the relevant application options.<br>This parameter is accessible if **[+/- speed]**(tUd) is assigned. | 0.00 to 6000 s(2) | 5.00 s |

(1) This parameter can also be accessed via menu **[SETTINGS]**(SEt-).
(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

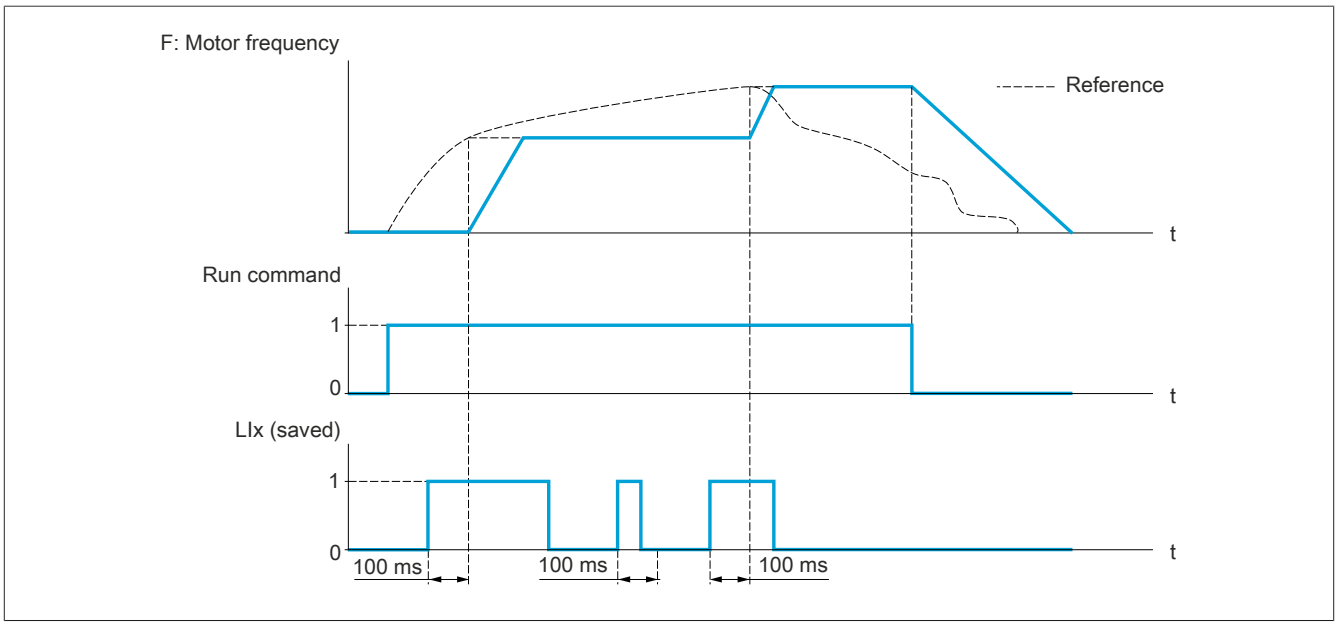
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.10 [MEMO REFERENCE] (SPM-)

Storing of a speed setpoint level using a logic input command that lasts longer than 0.1 s.

- This function is used to control the speed of several inverters alternately via one analog setpoint and one logic input for each inverter.
- It is also used to confirm a line setpoint (communication bus or network) on several inverters via a logic input. This allows movements to be synchronized by preventing variations when the setpoint is sent.
- The setpoint is recorded 100 ms after the rising edge of the recording request. A new reference is subsequently recorded only if a new request is made.




| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > SPM- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| SPM- | **[MEMO REFERENCE]** | |
| SPM | **[Ref. memo ass.]**<br>Assignment to a logic input<br>The function is active if the assigned input is active. | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions. | |
| LI6 | **[LI6]**(LI1): Logic input LI6 | |
| LAI1 | **[LA1]**(LA1): Logic input LA1 | |
| LAI2 | **[LA2]**(LA2): Logic input LA2 | |

### 5.2.3.6.6.11 [FLUXING BY LI] (FLI-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > FLI- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| FLI- | **[FLUXING BY LI]** | |
| FLU<br>2 s<br>(1) | **[Motor fluxing]**<br>**Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If parameter [Motor fluxing](FLU) is set to [continuous](FCt) fluxing will always occur, even when the motor is not running. Make sure that this setting does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to property.** | **[No]**(FnO) |
| FnC | **[Not cont.]**(FnC): Non-continuous mode | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > FLI- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| FCt | [continuous](FCt): Permanent mode<br>This option is not possible if [Auto DC injection](AdC) is set to [YES](YES) or if [Type of stop](Stt) has been set to [Freewheel](nSt). | |
| FnO | [No](FnO): Function inactive<br>In order to obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.<br>In mode [continuous](FCt), the inverter automatically creates the fluxing when starting up.<br>In mode [Not cont.](FnC), fluxing occurs when the motor has been started up.<br>The magnetic flux current is greater than [Rated mot. current](nCr) (configured nominal motor current) if magnetization has been established. After this, the flux current will be adjusted to the motor's magnetizing current.<br>If [Motor control type](Ctt) is set to [Sync. mot.](SYn), parameter[Motor fluxing](FLU) results in the assignment of the rotor and not of the magnetization.<br>If [Brake assignment](bLC) is not [No](nO), parameter [Motor fluxing](FLU) has no effect. | |
| FLI<br>★ | [Fluxing assignment] | [No](nO) |
| | **Caution!**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**To prevent motor overheating and damage, check whether the connected motor has the correct sizing for the magnetizing current.**<br>**Failure to observe these instructions can result in damage to the equipment.** | |
| | The assignment is only possible if [Motor fluxing](FLU) = [Not cont.](FnC).<br>If an LI or a bit is assigned to the motor fluxing command, flux is built up when the assigned input or bit is at 1. If an LI or a bit has not been assigned, or if the assigned LI or bit is at 0 when a move command is sent, fluxing occurs when the motor starts. | |
| nO | [No](nO): Not assigned | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See the assignment conditions. | |
| ASt<br>★ | [Angle setting type]<br>Mode for measuring phase shift angle. Only visible if [Motor control type](Ctt) is set to [Sync. mot.](SYn).<br>[PSI align](PSI) and [PSIO align](PSIO) work for all types of synchronous motor. [SPM align](SPMA) and [Assign IPM](IPMA) increase performance, depending on the type of synchronous motor. | [PSIO align](PSIO) |
| IPMA | [IPM align](IPMA): IPM motor (Interior-buried permanent magnet motor) assignment. Assignment mode for the interior-buried permanent motor (this motor normally has a high magnetic reluctance). It uses a high-frequency application that produces much less noise then standard assignment mode. | |
| SPMA | [SPM align](SPMA): SPM motor (Surface-mounted permanent magnet motor) assignment. Assignment mode for the surface-mounted permanent motor (this motor normally has medium or low magnetic reluctance). It uses a high-frequency application that produces much less noise then standard assignment mode. | |
| PSI | [PSI align](PSI): Pulse signal application. Standard assignment mode after pulse signal applied. | |
| PSIO | [PSIO align](PSIO): Optimized pulse signal application. Optimized standard assignment mode after pulse signal applied. The phase shift angle measurement time is reduced after the first move command or measurement procedure, even if the inverter has been switched off. | |
| nO | [No action](nO): No assignment. | |

(1) This parameter can also be accessed via menu [SETTINGS](SEt-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.6.12 [BRAKE LOGIC CONTROL] (bLC-)

This function is used to control an electromagnetic brake via the inverter during horizontal and vertical hoisting applications and when machines are unbalanced.

**Principle:**

- Vertical hoisting movement:

  Maintain the motor torque in the driving load holding direction during brake release and engage, in order to hold the load, start smoothly when the brake is engaged and stop smoothly when the brake is released.
- Horizontal hoisting movement:

  To prevent jolting, synchronize brake release with torque build-up during startup and application of brakes at zero speed on stopping.

**Recommended settings for brake logic control for a vertical hoisting application:**

**Warning!**

**UNEXPECTED OPERATION OF THE EQUIPMENT**

**Check that the selected settings will not result in a loss of control over the load being lifted.**

**Failure to follow these instructions can result in serious injury and death or damage to the equipment.**

- [Brake impulse](bIP): [YES](YES). Make sure that the forward direction of operation corresponds to hoisting the load.

  For applications in which the lowered load differs very much from the raised load, set bIP = 2 Ibr (Example: Always lift with a load and lower when load is empty).
- Brake release current ([Brake release I FW](Ibr) and [Brake release I Rev](Ird) if [Brake impulse](bIP) = 2 Ibr): Set the brake release current to the rated current according to the motor nameplate.

  When testing, adjust the brake release current to achieve slip-free holding of the load.
- Acceleration time: For hoisting applications it is advisable to set the acceleration ramps to at least 0.5 seconds. Check that the inverter does not go into current limit mode.

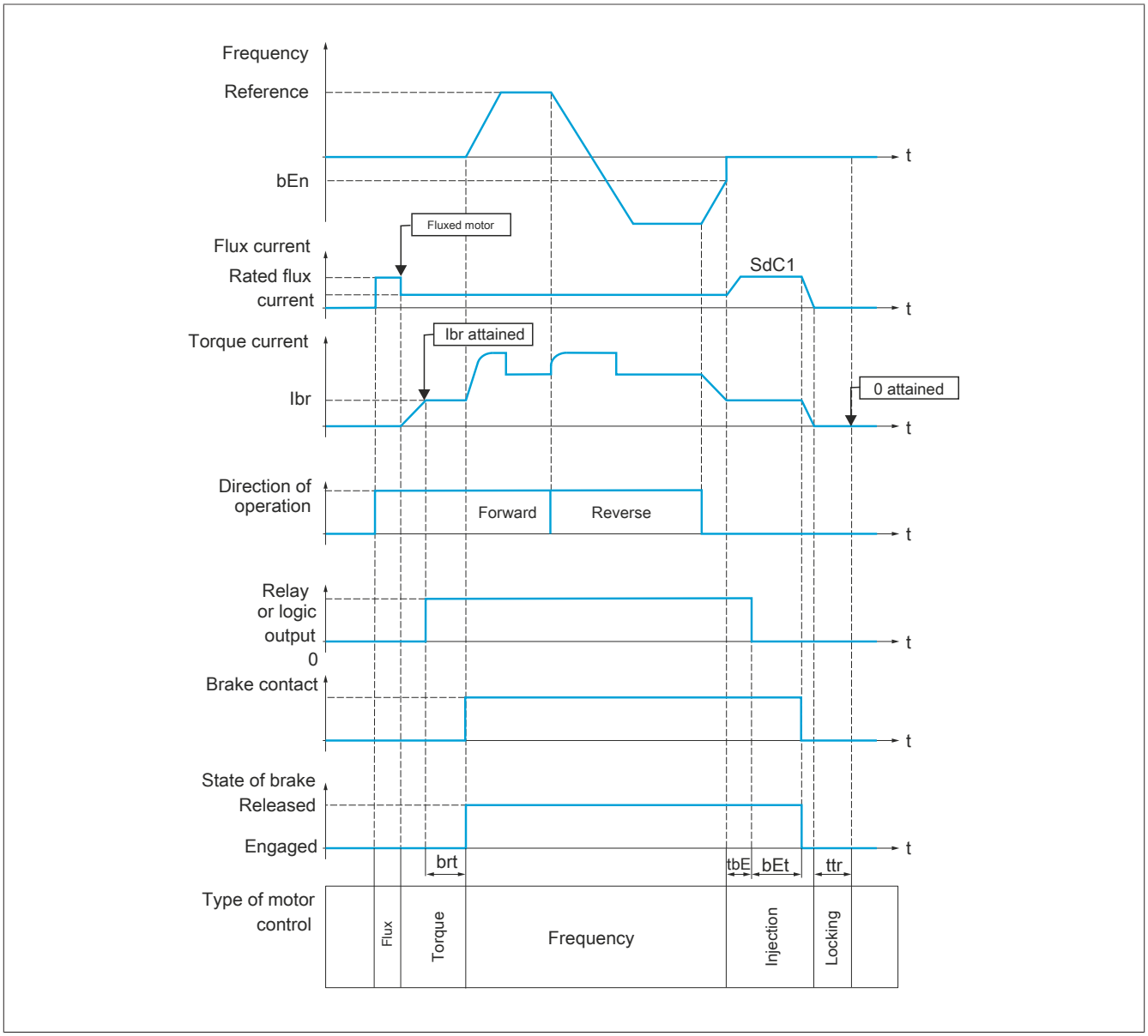
  The same recommendation also applies to deceleration.

  Please note: For a hoisting movement, a braking resistor must be used.
- [Brake Release time](brt): To be set according to the brake type. This is the time required for the mechanical brake to release.
- [Brake release freq.](bIr) only in open control loop: Leave in mode [Auto](AUtO) and synchronize if necessary.
- [Brake engage freq.](bEn): Leave in mode [Auto](AUtO) and synchronize if necessary.
- [Brake engage time](bEt): To be set according to the brake type. It is the time required for the mechanical brake to engage.

**Recommended settings for brake logic control for a horizontal hoisting application:**

- [Brake impulse](bIP): No
- [Brake release current](Ibr): Set to 0.
- [Brake Release time](brt): To be set according to the brake type. This is the time required for the mechanical brake to release.
- [Brake release freq.](bEn) only in open control loop: Leave in mode [Auto](AUtO) and synchronize if necessary.
- [Brake engage time](bEt): To be set according to the brake type. It is the time required for the mechanical brake to engage.

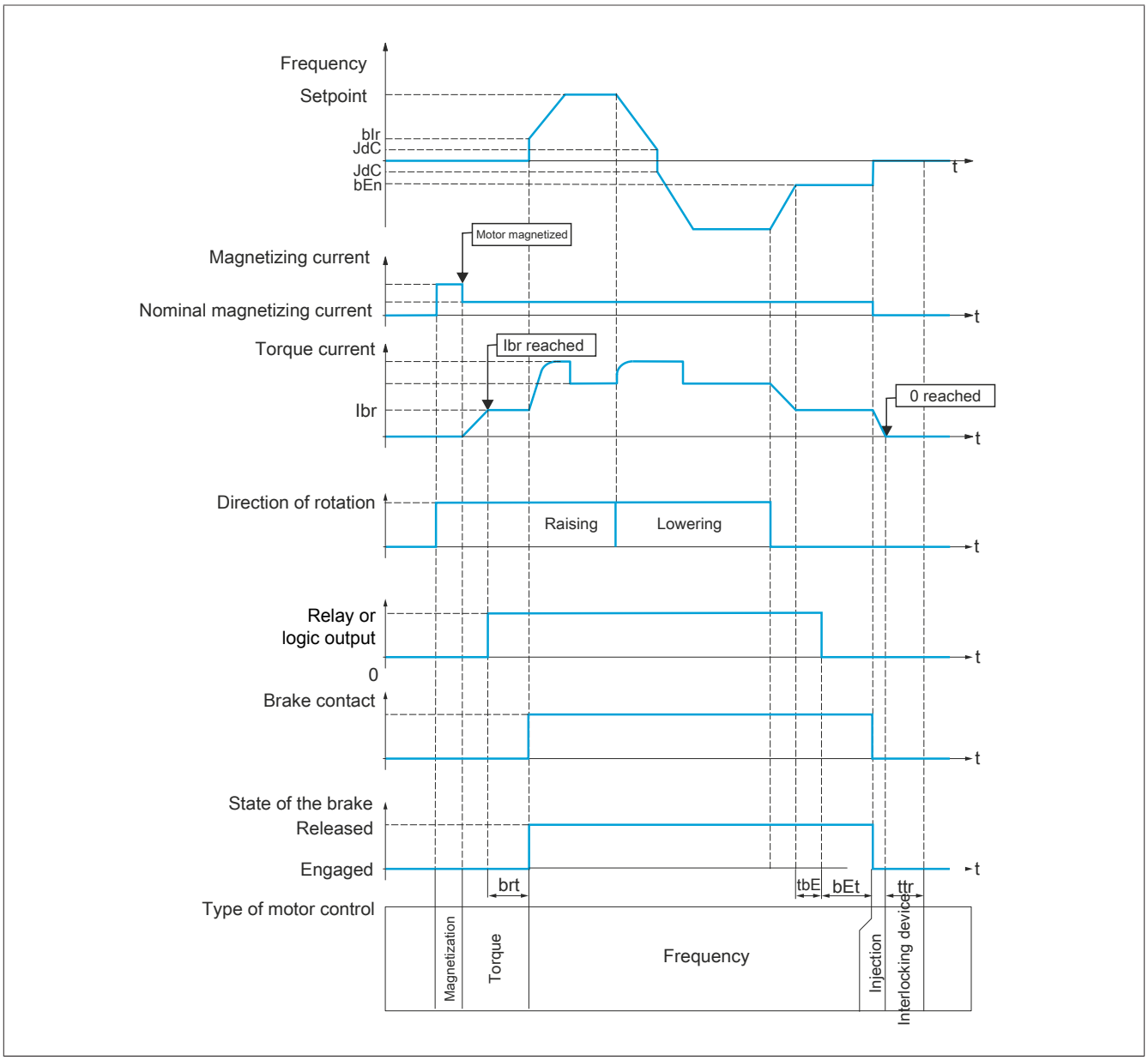
## Brake logic control, horizontal movement in open control loop




Legend:

- (bEn): **[Brake engage freq.]**
- (bEt): **[Brake engage time]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake release I FW]**
- (SdC1): **[Auto DC inj. level 1]**
- (tbE):**[Brake engage delay]**
- (ttr): **[Time to restart]**

## Brake logic control, vertical movement in open control loop




Legend:

- (bEn): **[Brake engage freq.]**
- (bEt): **[Brake engage time]**
- (bIr): **[Brake release freq.]**
- (brt): **[Brake Release time]**
- (Ibr): **[Brake release I FW]**
- (JdC): **[Jump at reversal]**
- (tbE):**[Brake engage delay]**
- (ttr): **[Time to restart]**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > bLC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| bLC- | [BRAKE LOGIC CONTROL]<br><br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| bLC | [Brake assignment]<br>Logic output or control relay.<br><br>**Note:**<br>**If the brake is assigned, only a ramp stop is possible. Check parameter [Type of stop](Stt).**<br><br>The brake logic control can only be assigned if [Motor control type](Ctt) is not equal to [Standard](Std), [V/F 5pts](UF5), [V/F Quad.](UFq) or [Sync. mot.](SYn). | | [No](nO) |
| nO | [No](nO): Function not assigned (in this case, none of the functions can be accessed). | | |
| r2 | [R2](r2): Relay | | |
| LO1 | [LO1](LO1): Logic output | | |
| dO1 | [DO1](dO1): Analog output AO, which can be used as a logic output. Selection is possible if [AO1 assignment](AO1) is set to [No](nO). | | |
| bSt | [Movement type] | | [Hoisting](UEr) |
| HOr | [Traveling](HOr): Resistive-load movement (translational motion of overhead traveling cranes, for example).<br><br>**Note:**<br>**If [Motor control type](Ctt) is set to [Standard](Std) or [V/F 5pts](UF5), [Movement type](bSt) is forced to [Traveling](HOr).** | | |
| UEr | [Hoisting](UEr): Driving-load movement (hoisting winch, for example)<br><br>**Note:**<br>**If [Weight sensor ass.](PES) is not equal [No](nO), [Movement type](bSt) is forced to [Hoisting](UEr).** | | |
| bCI | [Brake contact]<br>If the brake has a monitoring contact (closed for released brake). | | [No](nO) |
| nO | [No](nO): Not assigned | | |
| LI1 | [LI1](LI1): Logic input LI1 | | |
| ... | [...](...): See the assignment conditions. | | |
| bIP | [Brake impulse]<br>Brake start pulse.<br>This parameter can be accessed if [Weight sensor ass.](PES) is set to [No](nO). The parameter is set to [Yes](YES) if [Movement type](bSt) is set to [Hoisting](UEr). | | [YES](YES) |
| nO | [No](nO): The motor torque is specified in the required direction using [Brake release I FW](Ibr). | | |
| YES | [Yes](YES): The motor torque direction is "forward" (make sure that this direction of rotation corresponds to the lifting operation), using [Brake release I FW](Ibr). | | |
| 2Ibr | [2 IBR](2Ibr):The torque has the required direction of rotation, with current [Brake release I FW](Ibr) for forward and [Brake release I Rev](Ird) for reverse; for certain specific applications. | | |
| Ibr | [Brake release I FW]<br>Brake release current threshold for ascending or forward movement.<br>This parameter is accessible if [Weight sensor ass.](PES) is set to [No](nO). | 0 to 1.36*INV (2) | 0 |
| (1) | | | |
| Ird | [Brake release I Rev]<br>Brake release current threshold for descending or counterclockwise rotation.<br>This parameter is accessible if [Brake impulse](bIP) is set to [2 IBR](2Ibr). | 0 to 1.36*INV (2) | 0 |
| brt | [Brake Release time]<br>Brake release time delay. | 0 to 5.00 s | 0 s |
| (1) | | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > bLC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| blr<br>(1) | **[Brake release freq.]**<br>Brake release frequency threshold (initialization of acceleration ramp).<br>This parameter is accessible if **[Movement type]**(bSt) is set to **[Hoisting]**(UEr). | **[Auto]**(AUtO) to 10 Hz | **[Auto]**(AUtO) |
| AUtO | **[Auto]**(AUtO): The inverter is assigned a value that is equal to the motor nominal slip and calculated using the drive parameters.<br>**0 to 10 Hz**: Manual adjustment | | |
| bEn<br>(1) | **[Brake engage freq.]**<br>Threshold of the braking torque frequency.<br>**Note:**<br>**[Brake engage freq.](bEn) cannot be greater than [Low speed](LSP).** | **[Auto]**(AUtO)<br>0 to 10 Hz | **[Auto]**(AUtO) |
| AUtO | **[Auto]**(AUtO): The inverter is assigned a value that is equal to the motor nominal slip and calculated using the drive parameters.<br>**0 to 10 Hz**: Manual adjustment | | |
| tbE<br>(1) | **[Brake engage delay]**<br>Time delay before request to engage brake. | 0 to 5.00 s | 0 s |
| bEt<br>(1) | **[Brake engage time]**<br>Brake engage time (brake response time). | 0 to 5.00 s | 0 s |
| SdC1<br>(1) | **[Auto DC inj. level 1]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Level of standstill DC injection current.<br>**Note:**<br>**This parameter is accessible if [Movement type](bSt) is set to [Traveling](HOr).** | 0 to 1.2*INV (2) | 0.7*INV (2) |
| bEd<br>(1) | **[Engage at reversal]**<br>This parameter can be used to select whether or not the brake engages on transition to zero speed when the operating direction is reversed. | | **[No]**(nO) |
| nO<br>YES | **[No]**(nO): The brake does not release.<br>**[YES]**(YES): The brake releases. | | |
| JdC<br>(1) | **[Jump at reversal]**<br>This parameter is accessible if **[Movement type]**(bSt) is set to **[Hoisting]**(UEr). | **[Auto]**(AUtO) to 10 Hz | **[Auto]**(AUtO) |
| AUtO<br>- | **[Auto]**(AUtO): The inverter is assigned a value that is equal to the motor nominal slip and calculated using the drive parameters.<br>**0 to 10 Hz**: Manual adjustment<br>When the reference direction is reversed, this parameter can be used to avoid loss of torque (and consequential release of load) on transition to zero speed. The parameter is irrelevant if **[Engage at reversal]**(bEd) = **[Yes]**(YES). | | |
| ttr<br>(1) | **[Time to restart]**<br>Time between the end of a brake release sequence and the start of a brake engage sequence. | 0.00 to 15.00 s | 0 s |

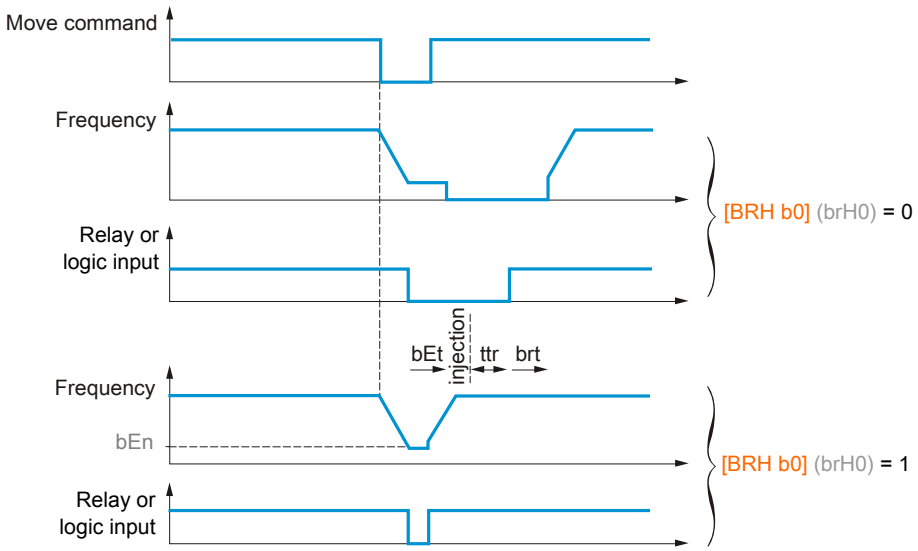
(1) This parameter can also be accessed via menu **[SETTINGS]**(SEt-).
(2) Corresponding to the nominal current of the inverter specified on the nameplate.

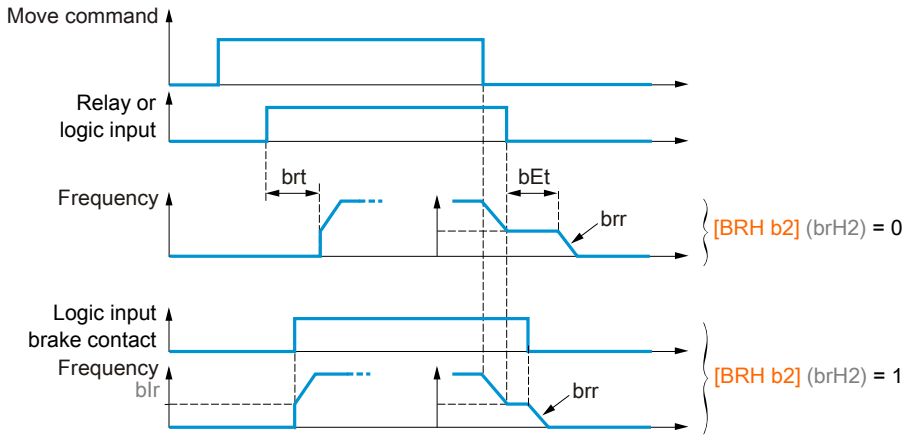
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## Brake control logic expert parameters

The following brake logic sequence parameters are accessible in Expert mode only.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > bLC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| bLC- | **[BRAKE LOGIC CONTROL]**<br><br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| brH0<br><br>0<br>1 | **[BRH b0]**<br>Selection of the brake restart sequence if a run command is repeated while the brake is engaging.<br>**[0]**(0): The release/engage sequence has been fully executed.<br>**[1]**(1): The brake is immediately reopened.<br><br>A run command may be requested during the brake release phase. The **[BRH b0]**(brH0) setting determines whether or the sequence for re-releasing the brake is executed.<br><br>  <br><br><br>**Note:**<br>**If a move command is requested during phase "ttr", the full brake controller sequence is initialized.** | | 0 |
| brH1<br><br>0<br><br>1 | **[BRH b1]**<br>Deactivation of the brake contact fault in steady state.<br>**[0]**(0): Error "Brake feedback" in steady state is active (error state if the contact is open during operation). Error **[Brake feedback]**(brF) is monitored during all operating phases.<br>**[1]**(1): Error "Brake feedback" in steady state is not active. Error **[Brake feedback]**(brF) is only monitored during brake release and brake engage phases. | | 0 |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > bLC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| brH2 | [BRH b2] | | 0 |
| | Taking into account brake feedback for the brake controller sequence. | | |
| 0 | [0](0): Brake feedback is not taken into account. | | |
| 1 | [1](1): Brake feedback is taken into account. | | |
| | If a logic input is assigned to the brake feedback, the following applies:<br>• [BRH b2](brH2) = 0: During the brake release sequence, the setpoint is enabled after [Brake Release time](brt) has elapsed. During the brake release sequence, the current switches to 0 in accordance with ramp [Current ramp time](brr) after [Brake engage time](bEt) has elapsed.<br>• [BRH b2](brH2)= 1: When the brakes are released, the setpoint is enabled when the logic input changes to 1. When the brakes are engaged, in accordance with [Current ramp time](brr), the current switches to 0 if the logic input changes to 0. | | |
| |  | | |
| brr | [Current ramp time] | 0 to 5.00 s | 0 s |
| | Time of the ramp for the torque current (increase and decrease) for a current change that corresponds to the value[Brake release I FW](Ibr). | | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

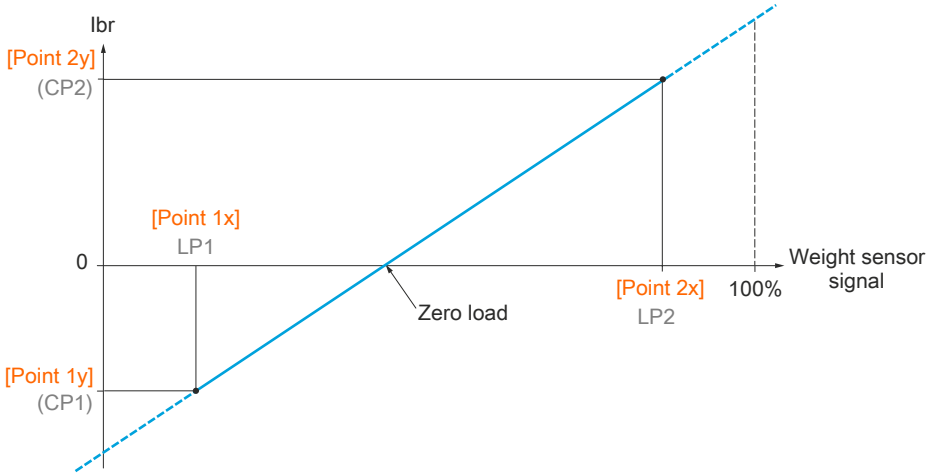
### 5.2.3.6.6.13 [EXTERNAL LOAD MEAS.] (ELM-)

#### Load measurement

Based on the information provided by a load sensor, this function adapts current [Brake release I FW](Ibr) to function [BRAKE LOGIC CONTROL](bLC-). The signal from the load sensor can be assigned to an analog input (usually a 4-20 mA signal) or the pulse input, depending on the type of load sensor.

**Example: Measuring the total weight of a hoisting winch and its load.**

Current [Brake release I FW] (Ibr) is adjusted according to the following characteristic curve:




| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > ELM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ELM- | [EXTERNAL LOAD MEAS.] | | |
| PES | [Weight sensor ass.] | | [No](nO) |
| | **Warning!**<br>**LOSS OF CONTROL**<br>**To prevent loss of control of the load being lifted, make sure that [Point 1x](LP1), [Point 2x](LP2), [Point 1Y](CP1) and [Point 2Y](CP2) have been configured correctly.**<br>**Perform a comprehensive commissioning check in order to confirm the values assigned to parameters [Point 1x](LP1), [Point 2x](LP2), [Point 1Y](CP1) and [Point 2Y](CP2).**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**<br>This parameter can be configured if [BRAKE LOGIC CONTROL](bLC-) is not set to [No](nO). | | |
| nO | [No](nO): Not assigned | | |
| AI1 | [AI1](AI1): Analog input A1 | | |
| AI2 | [AI2](AI2): Analog input A2 | | |
| AI3 | [AI3](AI3): Analog input A3 | | |
| PI | [RP](PI): Pulse input | | |
| AIU1 | [AI virtual 1](AIU1): Virtual analog input 1 with handwheel | | |
| AIU2 | [AI virtual 2](AIU2): Virtual analog input 2 via communication bus | | |
| LP1 | [Load measure. Pt 1X] | 0 to LP2-0.01% | 0% |
| ★ | 0 to 99.99% of signal on assigned input.<br>[Point 1x](LP1) must be less than [Point 2x](LP2).<br>This parameter is accessible if [Weight sensor ass.](PES) is assigned. | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > ELM- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CP1 | **[Point 1Y]**<br><br>Current corresponding to load **[Point 1x]**(LP1); in A.<br>This parameter is accessible if **[Weight sensor ass.]**(PES) is assigned. | -32767 or -1.36*INV to 32767 or 1.36*INV (1) | -INV (1) |
| LP2 | **[Point 2x]**<br><br>0.01 to 100% of signal on assigned input.<br>**[Point 2x]**(LP2) must be greater than **[Point 1x]**(LP1).<br>This parameter is accessible if **[Weight sensor ass.]**(PES) is assigned. | 1 or LP1+0.01% to 100% | 50% |
| CP2 | **[Load sensor point 2Y]**<br><br>Current corresponding to load **[Point 2x]**(LP2); in A.<br>This parameter is accessible if **[Weight sensor ass.]**(PES) is assigned. | -32767 or -1.36*INV to 32767 or 1.36*INV (1) | 0 |
| IbrA | **[Ibr 4-20 mA loss]**<br><br>Brake release current in the event of the loss of the load sensor information.<br>This parameter can be accessed if the load sensor is assigned to an analog current input and the 4-20 mA loss error is disabled.<br>Recommended setting: Rated motor current for a hoisting application. | 0 to 1.36*INV (1) | 0 |

(1) Corresponding to the nominal current of the inverter specified on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

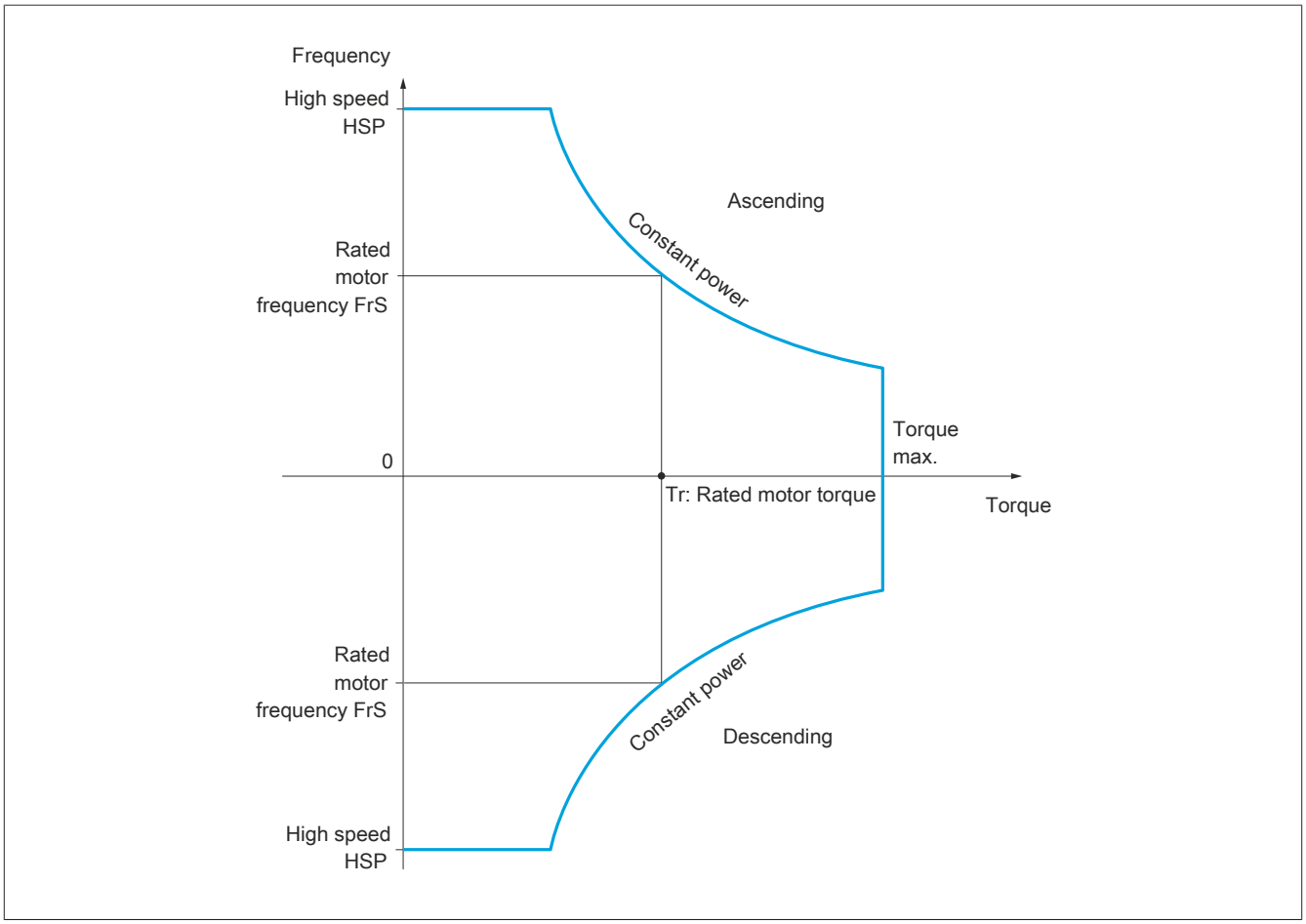
### 5.2.3.6.6.14 [HIGH SPEED HOISTING] (HSH-)

This function can be used to optimize the cycle times for hoisting movements for zero or lightweight loads. It authorizes operation at "constant power" in order to reach a speed greater than the rated speed without exceeding the rated motor current.

The speed is limited by parameter **[High speed]**(HSP).

The function acts on the speed reference limitation and not on the reference itself.

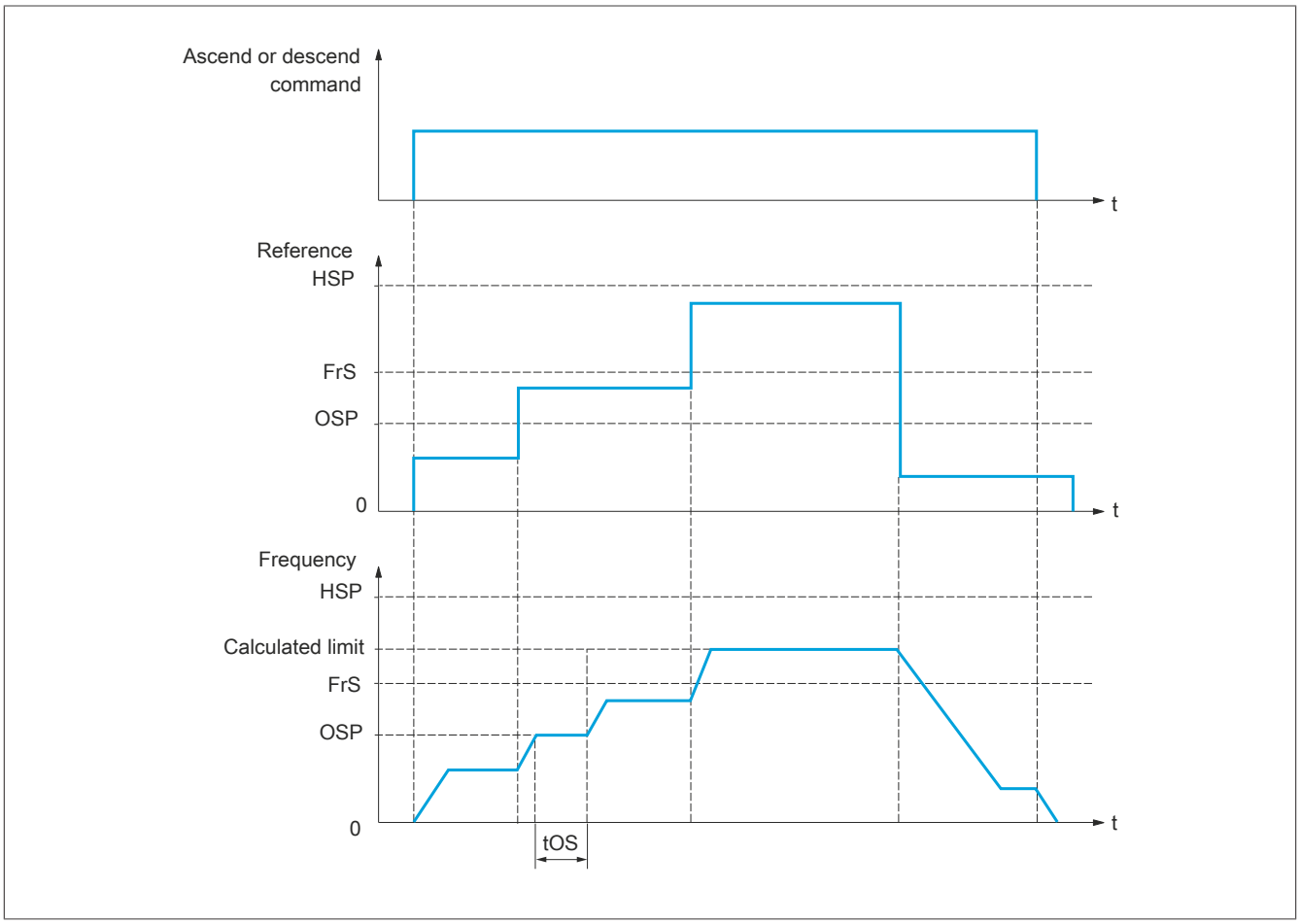
Principle:




There are 2 possible operating modes:

- "Speed reference" mode: The maximum permissible speed is calculated by the inverter during a speed step that is set so that the inverter can measure the load.
- "Current limiting" mode: The maximum permissible speed is the speed that supports current limiting in motor mode, in the "hoisting" direction only. For the "Lowering" direction, operation is always in "Speed reference" mode.

**"Frequency reference" mode:**

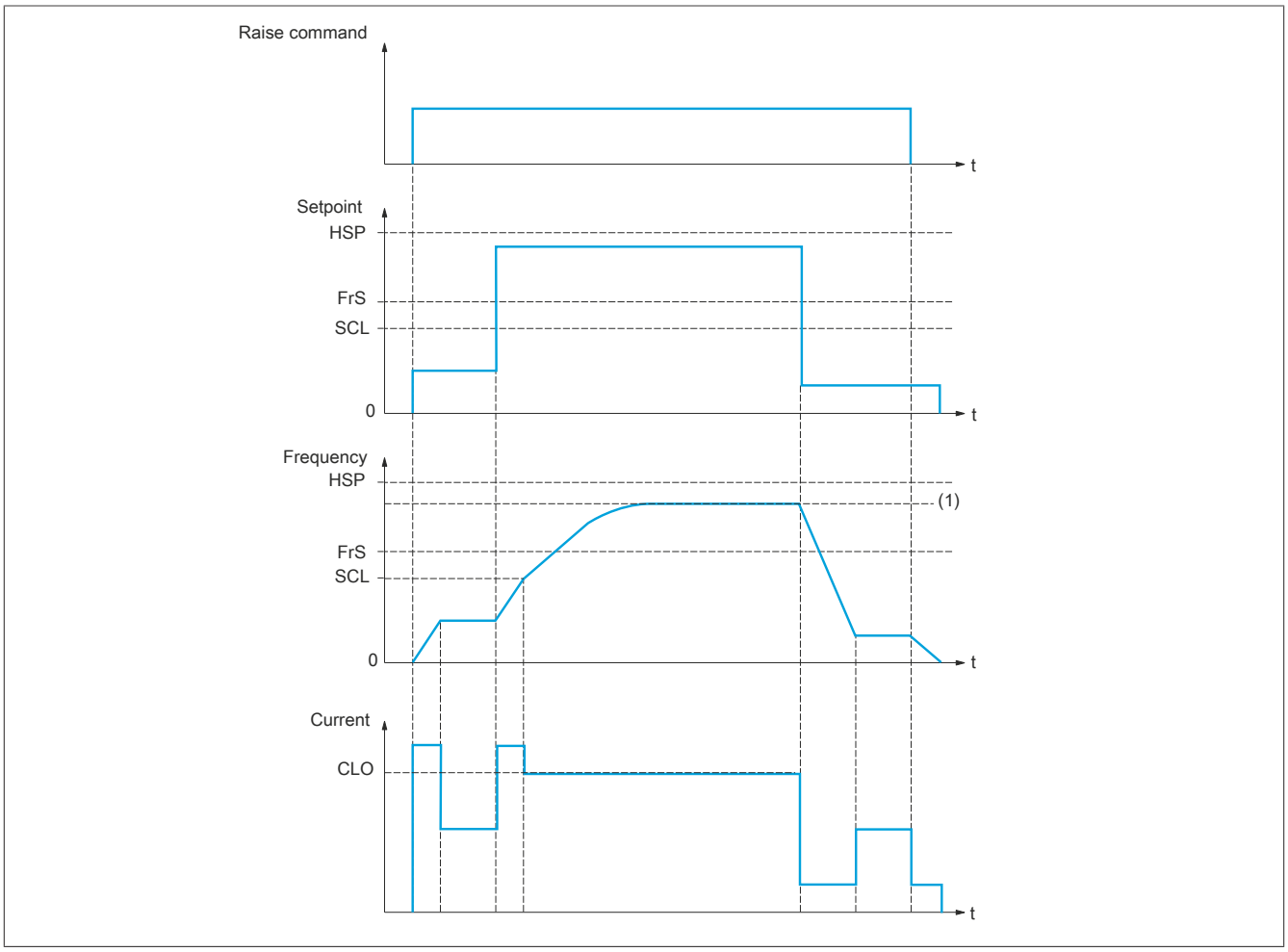



OSP: Adjustable frequency step for load measurement

tOS: Load measuring time

Two parameters are used to reduce the frequency calculated by the inverter for the ascending and descending direction.

**"Current limiting" mode:**




(1) Based on the limit value required by the current limit

SCL: Adjustable frequency threshold, above which current limiting is active.

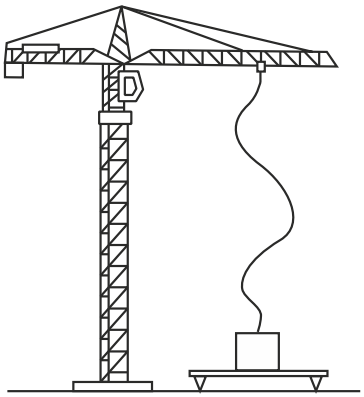
CLO: Current limiting for HSP function, large frequency.

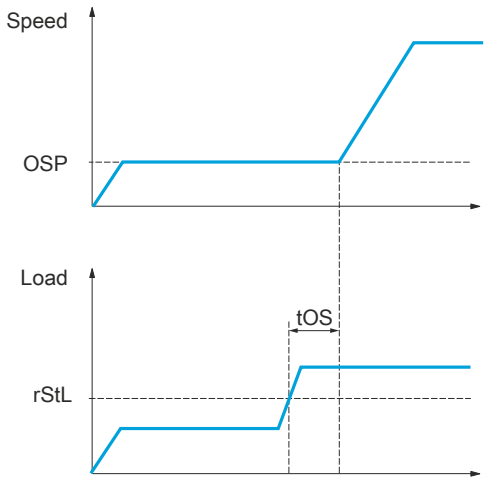
## Note:

**The speed reached for a specific current will be lower in case of network undervoltage in comparison with nominal network voltage.**

## Rope slack

The "rope slack" function can be used to prevent starting up at high speed when a load has been set down ready for lifting but the cable is still slack (as in figure below).






The frequency step (parameter OSP) is used for measuring the load. As long as the frequency level has not reached adjustable threshold value **[Rope slack trq level]**(rStL), which corresponds to the weight of the load hook, the effective measuring cycle will not be triggered.

Menu **[INPUTS / OUTPUTS CFG]**(I_O-) can be used to assign a logic output or relay to the displayed state "Slack rope".

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > HSH- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| HSH- | **[HIGH SPEED HOISTING]**<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| HSO<br>nO<br>SSO<br>CSO | **[High speed hoisting optim]**<br>**[No]**(nO): Function not active<br>**[Speed ref]**(SSO): Mode "Frequency reference"<br>**[Current Limit]**(CSO): Mode "Current limiting" | | **[No]**(nO) |
| COF | **[Motor speed coeff.]**<br>Frequency reduction coefficient calculated by the inverter for the lifting direction.<br>The parameter can be accessed if **[High speed hoisting optim]**(HSO) is set to **[Speed ref]**(SSO). | 0 to 100% | 100% |
| COr | **[Gen. speed coeff]**<br>Frequency reduction coefficient calculated by the inverter for descending direction.<br>This parameter is accessible if **[High speed hoisting optim]**(HSO) is not set to **[No]**(nO). | 0 to 100% | 50% |
| tOS | **[Load measuring tm.]**<br>Duration of frequency step for measurement.<br>This parameter is accessible if **[High speed hoisting optim]**(HSO) is not set to **[No]**(nO). | 0.1 s to 65 s | 0.5 s |
| OSP | **[Measurement spd]**<br>Speed stabilized for measurement.<br>This parameter is accessible if **[High speed hoisting optim]**(HSO) is not set to **[No]**(nO). | 0 to **[Rated motor freq.]**(FrS) | 40 Hz |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > HSH- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CLO | **[High speed I Limit]** | See table(1). | See table. |
| ★ | HSP limitation current.<br>The parameter can be accessed if **[High speed hoisting optim]**(HSO) is set to **[Current Limit]**(CSO). | | |

**Note:**

**If the setting is less than 0.25 In, the inverter can be locked in error mode [Output Phase Loss] (OPL) if this has been enabled.**

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | 0 | 23 | 15 |
| 8I66x200037.00-000 | | 50 | 33 |
| 8I66x200055.00-000 | | 56 | 37 |
| 8I66x200075.00-000 | | 72 | 48 |
| 8I66x200110.00-000 | | 104 | 69 |
| 8I66x200150.00-000 | | 120 | 80 |
| 8I66x200220.00-000 | | 165 | 110 |
| 8I66T200300.00-000 | | 206 | 137 |
| 8I66T200400.00-000 | | 263 | 175 |
| 8I66T200550.00-000 | | 413 | 275 |
| 8I66T200750.00-000 | | 495 | 330 |
| 8I66T201100.00-000 | | 810 | 540 |
| 8I66T201500.00-000 | | 990 | 660 |
| 8I66T400037.00-000 | | 23 | 15 |
| 8I66T400055.00-000 | | 29 | 19 |
| 8I66T400075.00-000 | | 35 | 23 |
| 8I66T400110.00-000 | | 45 | 30 |
| 8I66T400150.00-000 | | 62 | 41 |
| 8I66T400220.00-000 | | 83 | 55 |
| 8I66T400300.00-000 | | 107 | 71 |
| 8I66T400400.00-000 | | 143 | 95 |
| 8I66T600075.00-000 | | 26 | 17 |
| 8I66T600150.00-000 | | 41 | 27 |
| 8I66T600220.00-000 | | 59 | 39 |
| 8I66T600400.00-000 | | 92 | 61 |
| 8I66T600550.00-000 | | 135 | 90 |
| 8I66T600750.00-000 | | 165 | 110 |
| 8I66T601100.00-000 | | 255 | 170 |
| 8I66T601500.00-000 | | 330 | 220 |

| | | | |
|---|---|---|---|
| SCL | **[I Limit. frequency]** | 0 to 599 Hz, depending on size | 40 Hz |
| ★ | Frequency threshold, above which the high-speed limitation current is active.<br>The parameter can be accessed if **[High speed hoisting optim]**(HSO) is set to **[Current Limit]**(CSO). | | |
| rSd | **[Rope slack config.]** | | **[No]**(nO) |
| ★ | Function "Rope slack".<br>This parameter is accessible if **[High speed hoisting optim]**(HSO) is not set to **[No]**(nO). | | |
| nO | **[No]**(nO): Function not active | | |
| drI | **[Drive estim.]**(drI): Load measurement by estimating the inverter torque. | | |
| PES | **[Ext. Sensor]**(PES): Load measurement via sensor; assignment only possible if **[Weight sensor ass.]**(PES) is not set to **[No]**(nO). | | |
| rStL | **[Rope slack trq level]** | 0 to 100% | 0% |
| ★ | Threshold value of the setting that corresponds to a load that is slightly less than the weight of the empty load hook, in % of the rated load.<br>This parameter is accessible if **[Rope slack trq level]**(rSd) has been assigned. | | |

(1) Corresponding to the nominal current of the inverter specified in the installation manual and on the nameplate.

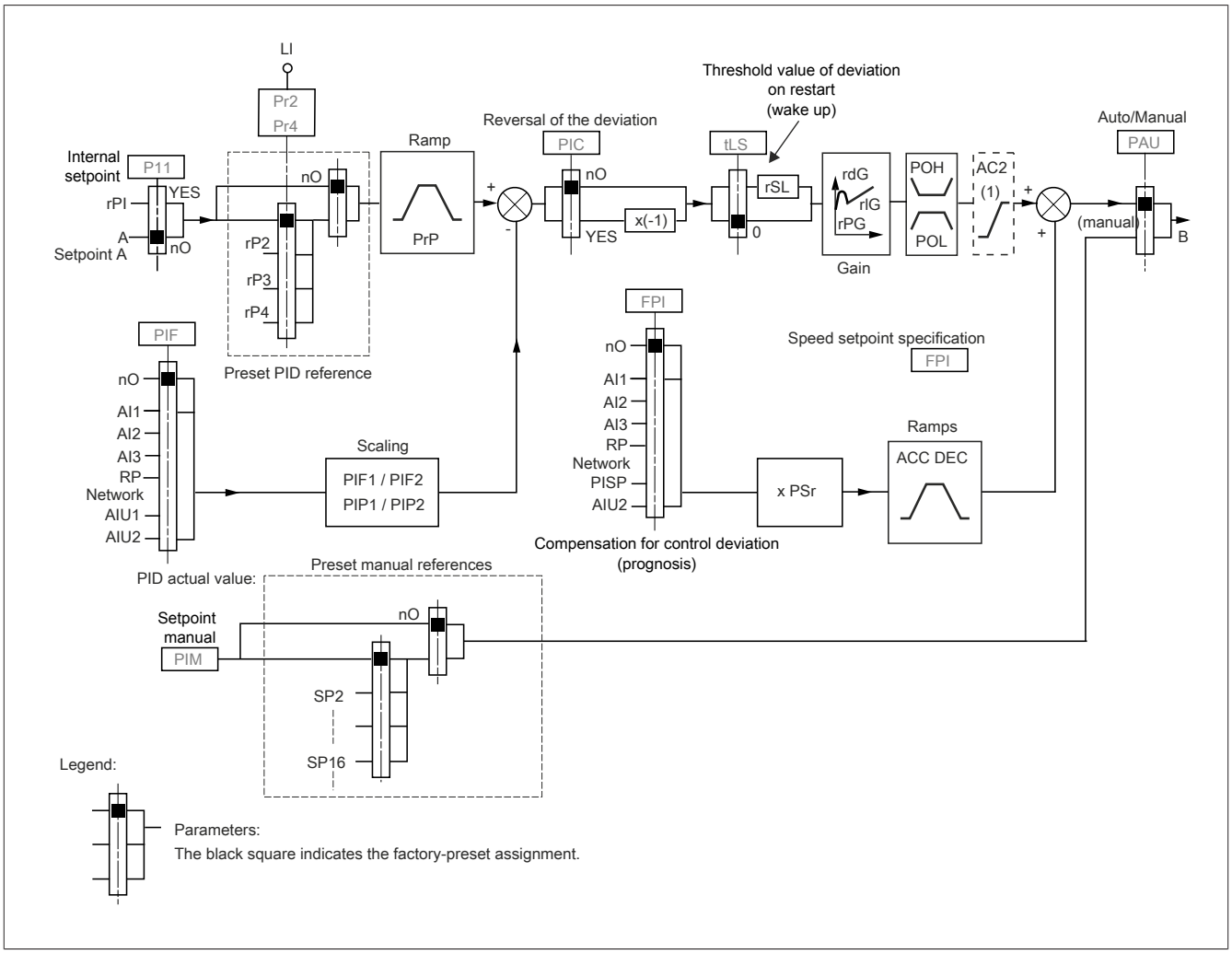
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.15 [PID REGULATOR] (PId-)

#### Overview

The function is enabled if the PID actual value (measured value) is assigned to an analog input.




(1) Ramp AC2 is only active when function "PID" starts up and during PID wake-up.

#### PID- feedback:

The actual PID value must be assigned to one of the analog inputs AI1 to AI3 based on the expansion cards existing at the pulse input.

#### PID reference:

The PID setpoint must be assigned to the following parameters: Preset setpoints via logic inputs (rP2, rP3, rP4).

In accordance with the configuration of **[PID initial ref]** (PII):

Internal setpoint (rPI) or setpoint A (**[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b)).

**Combination table for preset PID setpoints:**

| LI (Pr4) | LI (Pr2) | Pr2 = nO | Reference |
|---|---|---|---|
| | | | rPI or A |
| 0 | 0 | | rPI or A |
| 0 | 1 | | rP2 |
| 1 | 0 | | rP3 |
| 1 | 1 | | rP4 |

A predictive speed reference can be used to initialize the speed on restarting the process.

**Scaling of feedback and references:**

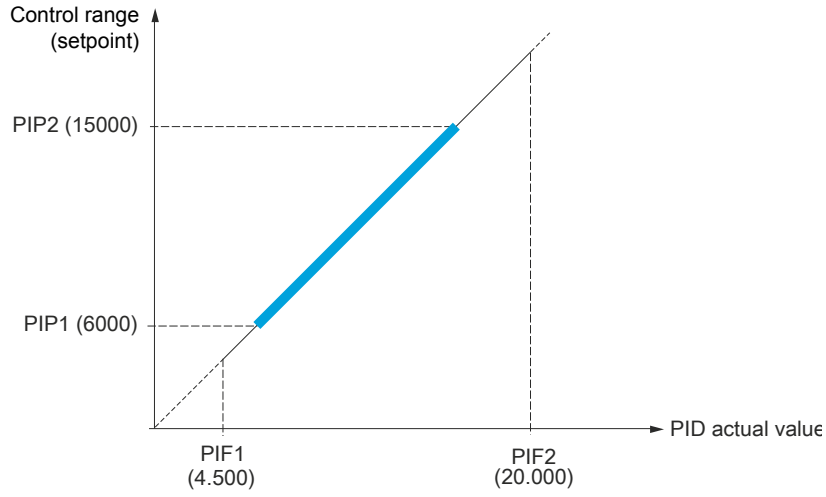
- Parameters **[Min PID feedback]**(PIF1) and **[Max PID feedback]**(PIF2) can be used to scale the PID actual value (encoder range). **This scaling absolutely must be retained for all further parameters.**
- Parameters **[Min PID reference]**(PIP1) and **[Max PID reference]**(PIP2) to scale the control range, i.e. the setpoint. **The control range must be within the sensor range.**

The maximum value of the scaling parameters is 32767. To simplify commissioning, it is recommended to use values as close to this maximum value as possible while still staying within a power of 10 of the real values.

**Example** (see characteristic curve below): Adjustment of the volume in a tank, between 6 $m^3$ and 15 $m^3$.

- Used 4-20 mA encoder, 4.5 $m^3$ for 4 mA and 20 $m^3$ for 20 mA, where PIF1 = 4500 and PIF2 = 20000.
- Control range 6 to 15 $m^3$, where PIP1 = 6000 (min. reference) and PIP2 = 15000 (max. reference).
- Example references:
  - rP1 (internal setpoint) = 9500
  - rP2 (preset setpoint) = 6500
  - rP3 (preset setpoint) = 8000
  - rP4

Menu **[3.4 DISPLAY CONFIG.]** is used to adapt the name of the displayed unit and its format to the specific user.



**Additional parameters:**

- **[PID wake up thresh.]**(rSL): This parameter can be used to define the threshold value of the PID deviation from which the PID controller can be re-enabled (wake-up) after it has stopped as a result of having exceeded low-frequency time threshold **[Low speed time out]**(tLS).
- Inverted correction direction **[PID correct. reverse]**(PIC): If **[PID correct. reverse]**(PIC) is set to **[No]**(nO), the motor speed increases if the deviation is positive. Example: Pressure control via compressor. If **[PID correct. reverse]**(PIC) is set to **[Yes]**(YES), the motor speed decreases if the deviation is positive. Example: Temperature control via cooling fan.
- The integral gain may be short-circuited by a logic input.
- An alarm on the PID feedback may be configured and indicated by a logic output.
- An alarm on the PID error may be configured and indicated by a logic output.

**"Manual - Automatic" operation with PID**

This function combines the PID regulator, the preset frequencies and a manual reference. Depending on the state of the logic input, the frequency reference is given by the preset frequencies or by a manual reference input via the PID function.

**Manual setpoint [Manual reference](PIM):**

- Analog inputs AI1 to AI3
- Pulse input

**Specification speed setpoint [Speed ref. assign.](FPI):**

- **[AI1]**(AI1): Analog input
- **[AI2]**(AI2): Analog input
- **[AI3]**(AI3): Analog input
- **[RP]**(PI): Pulse input
- **[HMI]**(LCC): Graphic display terminal or external operator terminal
- **[Modbus]**(Mdb): Integrated Modbus
- **[CANopen com.]**(CAn): Integrated CANopen®
- **[Com. card]**(nEt): Communication card (if used)

**Setting up the PID regulator**

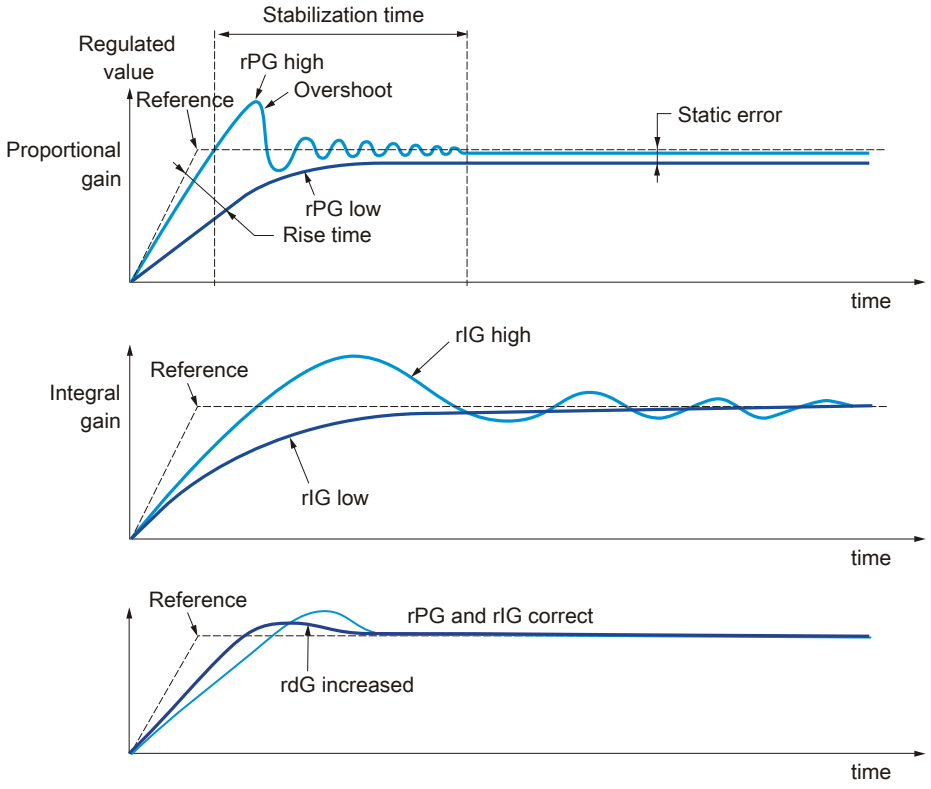
**1. Configuration in mode PID**

**2. Start testing the factory settings.**

For optimization of the inverter, synchronize **[PID prop. gain]**(rPG) or **[PID integral gain]**(rIG) step-by-step and independently of each other and monitor the effect on the PID actual value in relation to the setpoint.

**3. If the factory settings are unstable or the setpoint is not met.**

- Test the frequency range of the system under load with a reference value under manual operation (without PID controls):
  - Speed must remain stable in steady state, and correspond to the reference; the PID feedback value must remain stable.
  - In temporary operation, the speed must follow the ramp and stabilize quickly; the PID actual value must follow the speed. Otherwise, check the inverter settings and/or encoder signals and the wiring.
- Switch to PID mode.
- Set **[Dec ramp adapt.]**(brA) to **[No]**(nO) (no self-alignment of the ramp).
- Set **[PID ramp]**(PrP) to the permissible minimum value for the machine, without triggering overbraking **[Overbraking]**(ObF).
- Set integral component **[PID integral gain]**(rIG) to the minimum value.
- Leave D component **[PID derivative gain]**(rdG) at 0.
- Observe the PID feedback and the reference.
- Switch the frequency inverter ON/OFF a number of times or vary the load or reference rapidly a number of times.
- Set P component **[PID prop. gain]**(rPG) to a value that allows for the best compromise between response time and stability during temporary phases (slight overshoot and 1 to 2 vibrations prior to stability).
- If the setpoint is not complied with in steady state, increase I component **[PID integral gain]**(rIG) progressively and in the case of instability (oscillation), reduce P component **[PID prop. gain]**(rPG). Achieve a compromise between response time and precision (see diagram).
- Finally, with the D component, overshoot can be reduced and response time improved, with a stability compromise as compensation that is not easy to achieve because it depends on three gain factors.
- Test the entire setpoint range.




The oscillation frequency depends on the system kinematics.

| Parameter | Rise time | Overshoot | Stabilization time | Static error |
|---|---|---|---|---|
| rPG ↗ | ↘ ↘ | ↗ | = | ↘ |
| rIG ↗ | ↘ | ↗ ↗ | ↗ | ↘ ↘ |
| rdG ↗ | = | ↘ | ↘ | = |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PId- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PId- | **[PID REGULATOR]**<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| PIF | **[PID feedback ass.]** | | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | | |
| AI1 | **[AI1]**(AI1): Analog input A1 | | |
| AI2 | **[AI2]**(AI2): Analog input A2 | | |
| AI3 | **[AI3]**(AI3): Analog input A3 | | |
| PI | **[RP]**(PI): Pulse input | | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 via the communication bus | | |
| AIU2 | **[AI virtual 2]**(AIU2): Virtual analog input 2 via the communication bus | | |
| AIC2 | **[AI2 net. channel]** | | **[No]**(nO) |
| ★ | This parameter is accessible if **[PID feedback ass.]**(PIF) is set to **[AI virtual 2]**(AIU2). The parameter can also be accessed via menu **[INPUTS / OUTPUTS CFG]**(I_O-). | | |
| nO | **[No]**(nO): Not assigned | | |
| Mdb | **[Modbus]**(Mdb): Integrated Modbus | | |
| CAn | **[CANopen com.]**(CAn): Integrated CANopen® | | |
| nEt | **[Com. card]**(nEt): Communication card (if used) | | |
| PIF1 | **[Min PID feedback]** | 0 to **[Max PID feedback]**(PIF2)(2) | 100 |
| ★ | Value for minimum feedback. | | |
| (1) | | | |
| PIF2 | **[Max PID feedback]** | **[Min PID feedback]**(PIF1) to 32767(2) | 1.000 |
| ★ | Value for maximum feedback. | | |
| (1) | | | |
| PIP1 | **[Min PID reference]** | **[Min PID feedback]**(PIF1) to **[Max PID reference]**(PIP2)(2) | 150 |
| ★ | Minimum process value. | | |
| (1) | | | |
| PIP2 | **[Max PID reference]** | **[Min PID reference]**(PIP1) to **[Max PID feedback]**(PIF2)(2) | 900 |
| ★ | Maximum process value. | | |
| (1) | | | |
| PII | **[Act. internal PID ref.]** | | **[No]**(nO) |
| ★ | Internal PID regulator reference. | | |
| nO | **[No]**(nO): The setpoint of the PID controller is returned by **[Ref.1 channel]**(Fr1) or **[Ref.1B channel]**(Fr1b), if necessary with functions "Addition"/"Subtraction"/"Multiplication" and the preset speeds. | | |
| YES | **[YES]**(YES): The setpoint of the PID controller is defined as an internal setpoint by parameter **[Internal PID ref.]**(rPI). | | |
| rPI | **[Internal PID ref.]** | **[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2) | 150 |
| ★ | Internal PID regulator reference.<br>The parameter can also be accessed via menu **[1.2 MONITORING]**(MOn-). | | |
| rPG | **[PID prop. gain]** | 0.01 to 100 | 1 |
| ★ | Proportional gain. | | |
| rIG | **[PID integral gain]** | 0.01 to 100 | 1 |
| ★ | Integral gain. | | |
| rdG | **[PID derivative gain]** | 0.00 to 100 | 0 |
| ★ | Derivative gain. | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PId- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PrP<br>(1) | **[PID ramp]**<br>Acceleration/Deceleration ramp of the PID, which is defined for a range of **[Min PID reference]**(PIP1) to **[Max PID reference]**(PIP2) or vice versa. | 0 to 99.9 s | 0 s |
| PIC | **[PID correct. reverse]**<br>Inverted correction direction **[PID correct. reverse]**(PIC):<br>If **[PID correct. reverse]**(PIC) is set to **[No]**(nO), motor speed increases if the deviation is positive. Example: Pressure control via compressor.<br>If **[PID correct. reverse]**(PIC) is set to **[Yes]**(YES), the motor speed decreases if the deviation is positive. Example: Temperature control via cooling fan.<br><br>nO **[No]**(nO): No<br>YES **[YES]**(YES): Yes | | **[No]**(nO) |
| POL<br>(1) | **[Min PID output]**<br>Minimum value of regulator output in hertz. | - 599 to 599 Hz | 0 Hz |
| POH<br>(1) | **[Max PID output]**<br>Maximum value of regulator output in hertz. | 0 to 599 Hz | 60 Hz |
| PAL<br>(1) | **[Min fbk alarm]**<br>Minimum monitoring threshold for regulator feedback. | **[Min PID feedback]**(PIF1)<br>to<br>**[Max PID feedback]**(PIF2)(2) | 100 |
| PAH<br>(1) | **[Max fbk alarm]**<br>Maximum monitoring threshold for regulator feedback. | **[Min PID feedback]**(PIF1)<br>to<br>**[Max PID feedback]**(PIF2)(2) | 1.000 |
| PEr<br>(1) | **[PID error Alarm]**<br>Regulator error monitoring threshold. | 0 to 65535 (2) | 100 |
| PIS | **[PID integral reset]**<br>If the assigned input or bit is in state 0, the function is inactive (I component of the PID is valid).<br>If the assigned input or bit is in state 1, the function is active (I component of the PID is locked).<br><br>nO **[No]**(nO): Not assigned<br>LI1 **[LI1]**(LI1): Logic input LI1<br>... **[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| FPI | **[Speed ref. assign.]**<br>Specified frequency input of the PID controller.<br><br>nO **[No]**(nO): Not assigned<br>AI1 **[AI1]**(AI1): Analog input A1<br>AI2 **[AI2]**(AI2): Analog input A2<br>AI3 **[AI3]**(AI3): Analog input A3<br>LCC **[HMI]**(LCC): Graphic display terminal or external operator terminal source<br>Mdb **[Modbus]**(Mdb): Integrated Modbus<br>CAn **[CANopen com.]**(CAn): Integrated CANopen®<br>nEt **[Com. card]**(nEt): Optional communication card source<br>PI **[RP]**(PI): Pulse input<br>AIU1 **[AI virtual 1]**(AIU1): Virtual analog input 1 with handwheel | | **[No]**(nO) |
| PSr<br>(1) | **[Speed input %]**<br>Multiplying coefficient for predictive speed input.<br>This parameter is not accessible if **[Speed ref. assign.]**(FPI) is set to **[No]**(nO). | 0 to 100% | 100% |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PId- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PAU | **[Auto/Manual assign]** | | **[No]**(nO) |
| ★ | If the assigned input or bit is in state 0, the PID controller is active.<br>If the assigned input or bit is in state 1, manual operation is active. | | |
| nO | **[No]**(nO): Not assigned | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | **[...]**(...): See the assignment conditions. | | |
| AC2 | **[Acceleration 2]** | 0.00 to 6000 s(3) | 5 s |
| ★<br>(1) | Time taken to accelerate from 0 to **[Rated motor freq.]**(FrS). In order to ensure ramp repeatability, the value of this parameter must be defined in accordance with the relevant application options.<br>Ramp AC2 is only active when function PID starts up and during PID wake-ups. | | |
| PIM | **[Manual reference]** | | **[No]**(nO) |
| ★ | Frequency input in manual operation. This parameter can be accessed if **[Auto/Manual assign]**(PAU) is not equal to **[No]**(nO).<br>The preset speeds are active on the manual reference if they have been configured. | | |
| nO | **[No]**(nO): Not assigned | | |
| AI1 | **[AI1]**(AI1): Analog input A1 | | |
| AI2 | **[AI2]**(AI2): Analog input A2 | | |
| AI3 | **[AI3]**(AI3): Analog input A3 | | |
| PI | **[RP]**(PI): Pulse input | | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 with handwheel | | |
| tLS | **[Low speed time out]** | 0 to 999.9 s | 0 s |
| (1) | Maximum operating time with **[Low speed]**(LSP).<br>Following an operation with **[Low speed]**(LSP) for a defined period, a motor stop is requested automatically. The motor restarts when the frequency setpoint is greater than **[Low speed]**(LSP) and if a move command is still present.<br>**Note:**<br>**A value of 0 indicates an unlimited period of time.**<br>If **[Low speed time out]**(tLS) is not equal to 0, parameter **[Type of stop]**(Stt) is forced to **[Ramp stop]**(rMP) (only if "Stop via ramp" can be configured). | | |
| rSL | **[PID wake up thresh.]** | 0.0 to 100.0 | 0 |
| ★<br>2 s | **Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>If functions "PID" and "Duration of operation at low speed" **[Low speed time out]**(tLS) are configured at the same time, the PID controller may attempt to set a lower speed than **[Low speed]**(LSP).<br>This results in unsatisfactory operation, such as startup, rotation at low frequency, standstill, etc.<br>With parameter **[PID wake up thresh.]**(rSL) (threshold value of the deviation when restarting), a PID deviation minimum threshold can be set for the restart after a standstill in the event of lengthy operation with low speed **[Low speed]**(LSP). **[PID wake up thresh.]**(rSL) is a percentage of the PID deviation (the value depends on parameters **[Min PID feedback]**(PIF1) and **[Max PID feedback]**(PIF2)). The function is inactive if **[Low speed time out]**(tLS) = 0 or if **[PID wake up thresh.]**(rSL) = 0. | | |

(1) The parameter can also be accessed via menu **[SETTINGS]**(SEt-).
(2) If no graphic display terminal is being used, the values over 9,999 on the four-digit display are shown with a period as thousands separator, for example, 15.65 for 15,650.
(3) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6000 s according to **[Ramp increment]**(Inr).

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

## PID management

### Description of the problem

A position reference is sent to the inverter (PISP parameter).

An analog potentiometer that is read in AI1 (PIF is set to AI1) is used as a feedback value.

If the stop command (CMDD bit 8) is now triggered, the PISP parameter changes and the stop command is released. In this case the control does not compensate for the full difference between the position reference and the actual position.

The movement only occurs for a certain distance, resulting in a difference between the position reference and the actual value.

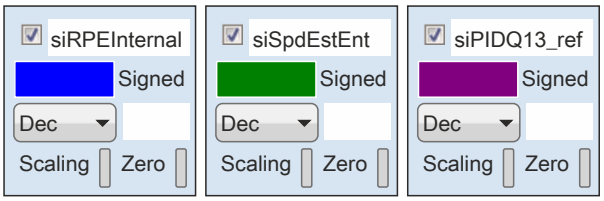
If the stop command is now triggered again and then removed, the delay fault is compensated and the motor moves into the correct position (it is really only the stop command that is triggered and reset - there is no other control - and the PID of the inverter compensates for the difference between the reference and the actual position).

**Test case 1: The PID response corresponds to the response time of the PID feedback.**

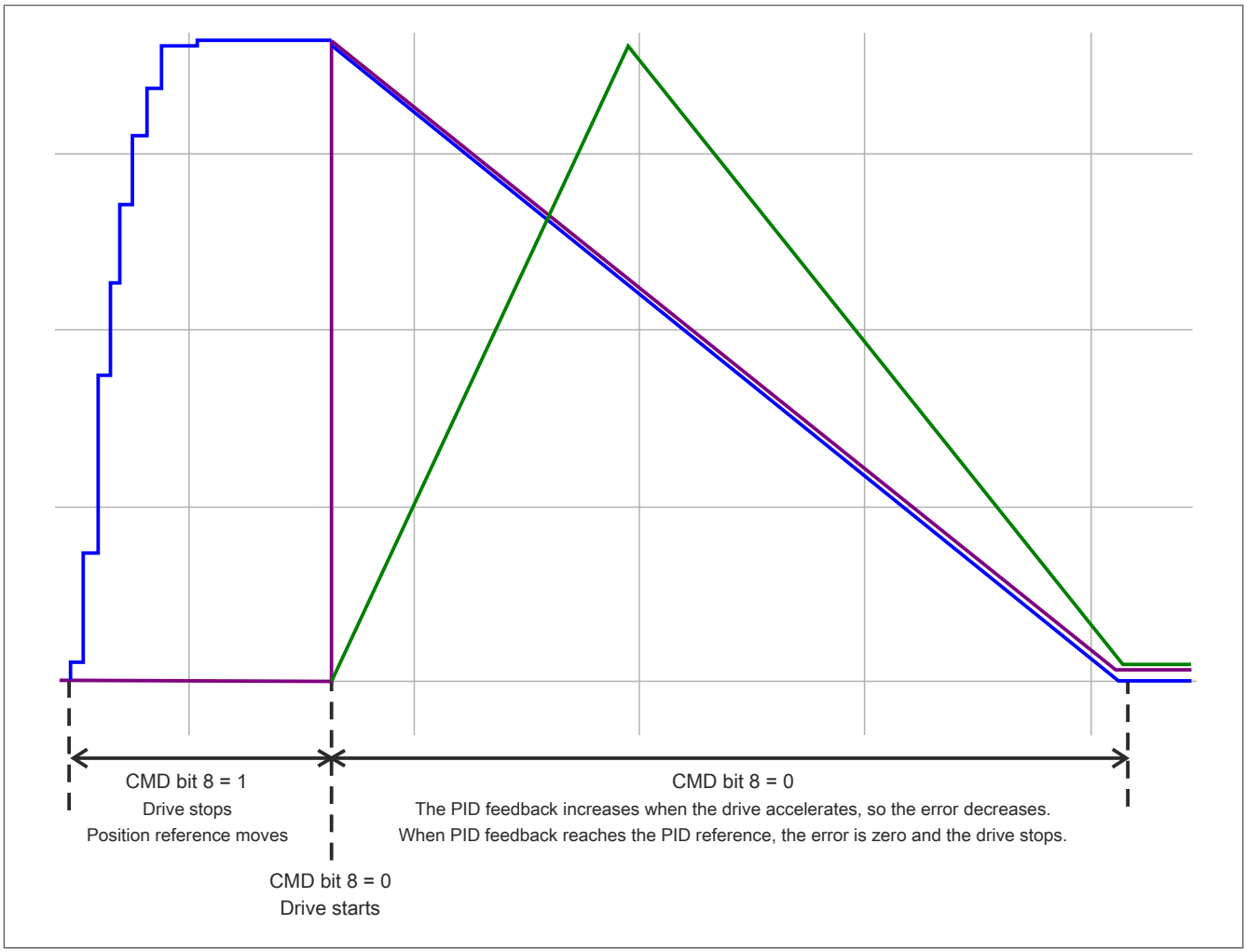
**ACOPOSinverter PID configuration:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | PIF: | AIV1 | PIF1: | 0 | RPG: | 1.00 | POL: | -500 |
| DEC: | 1 | AIC1: | CAN | PIF2: | 8192 | RIG: | 0.01 | POH: | 500 |
| HSP: | 50.0 Hz | AIV1: | 0 | PIP1: | 0 | RDG: | 0.00 | AC2: | 30 |
| LSP: | 0.0 Hz | | | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

**Test results:**




siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



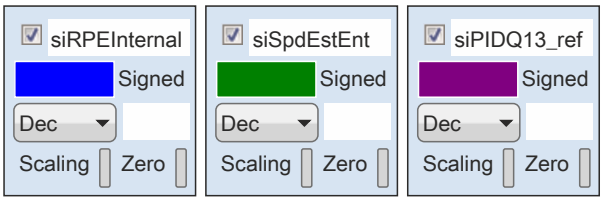

This is the expected behavior. The fault remains positive, the inverter accelerates. As a result, the PID feedback increases (the fault decreases), so the PID reference size is reached. The motor is in the run mode, but with a speed of 0.

**Test case 2: The PID response is faster than the response time of the PID feedback.**

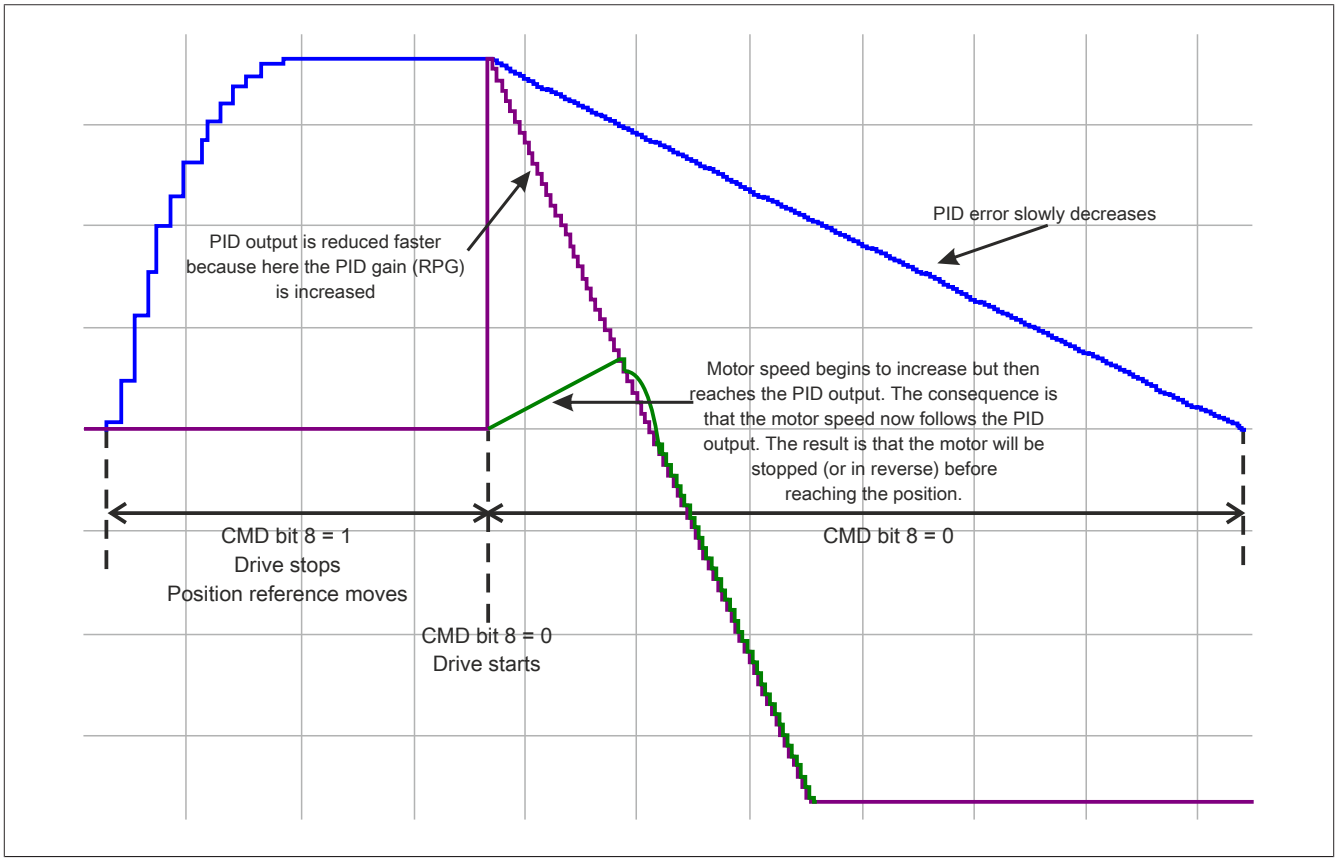
**ACOPOSinverter PID configuration:**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | | | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | PIF: | AIV1 | PIF2: | 8192 | RIG: | 0.01 | POH: | 500 |
| HSP: | 50.0 Hz | AIC1: | CAN | PIP1: | 0 | RDG: | 0.00 | AC2: | 30 |
| LSP: | 0.0 Hz | AIV1: | 0 | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

**Test results:**




siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



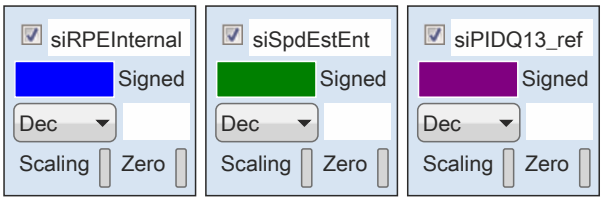

In this case the PID gain (RPG) is set to a higher value to obtain a higher PID responsiveness. With this setting the PID output reacts faster in comparison to the motor speed and the PID feedback. The motor speed is therefore reaches the PID output, which has already reduced before reaching the position. This results in a positioning fault.

**Test case 3: PID response to STOPP with stop bit.**

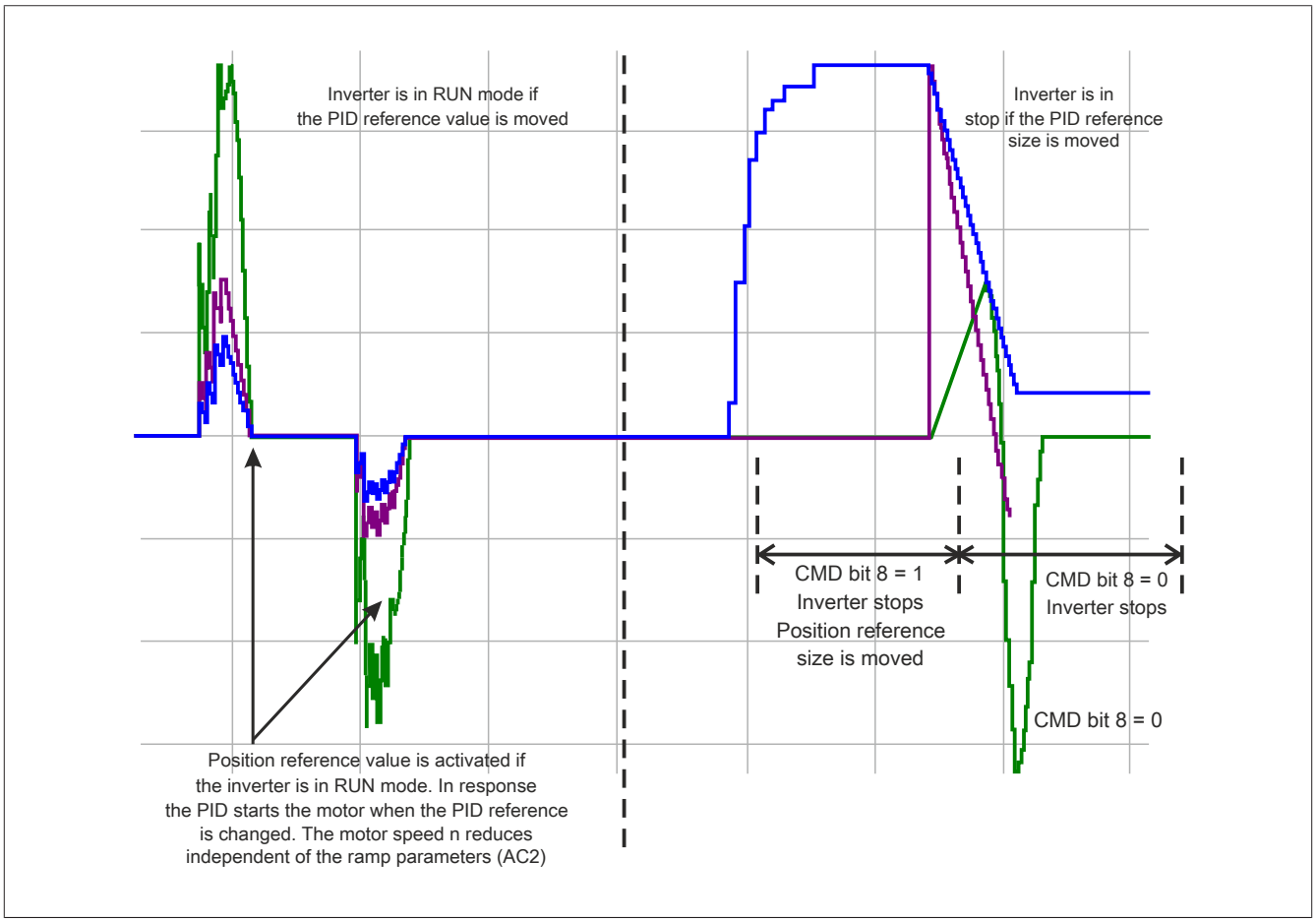
**ACOPOSinverter PID configuration:**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | PIF: | AIV1 | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | AIC1: | CAN | PIF2: | 8192 | RIG: | 0.01 | POH: | 500 |
| HSP: | 50.0 Hz | AIV1: | 0 | PIP1: | 0 | RDG: | 0.00 | AC2: | 30 |
| LSP: | 0.0 Hz | | | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

**Test results:**




siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output




If the inverter is already in the RUN mode if the PID reference variable is changed, the motor responds without subsequent gain. The response is immediate.

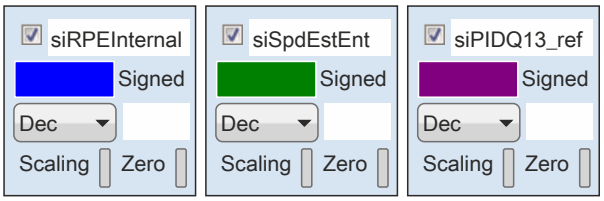
If the inverter stops (e.g. by CMD-bit 8), the motor responds, but accelerates on the basis of the AC2 parameter. The result would be that the motor physically reaches the PID output via the tracking of the AC2 ramp and loses time during this. This results in a positioning error compared to the start without AC2 tracking.

### Test case 4: Reset time

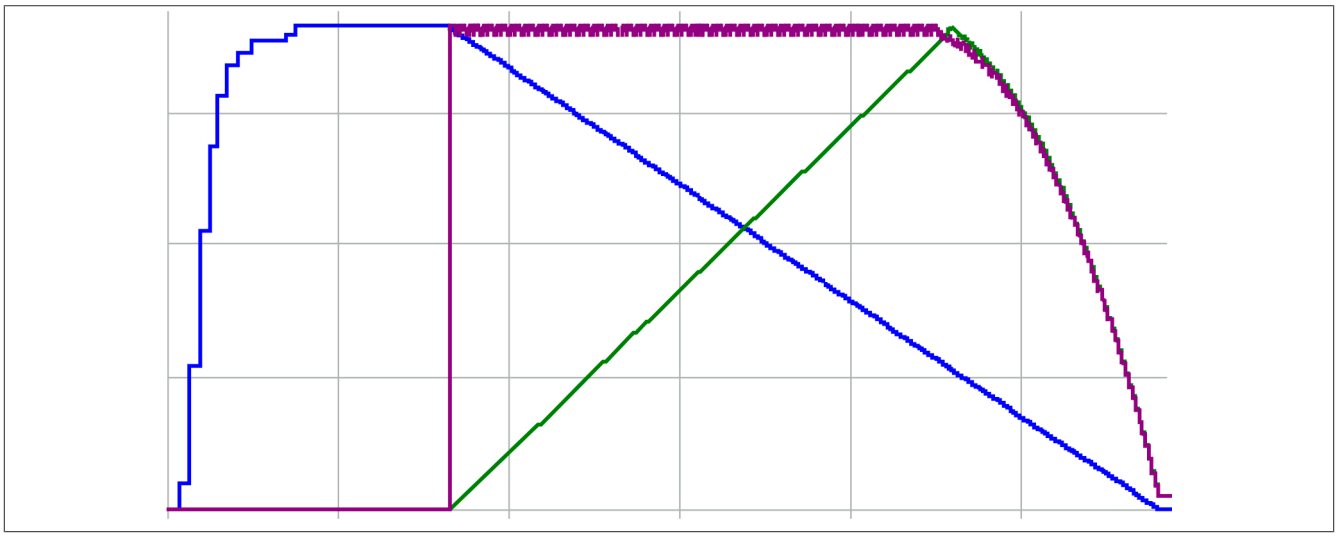
**ACOPOSinverter PID configuration:**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | | | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | PIF: | AIV1 | PIF2: | 8192 | RIG: | 5.00 | POH: | 500 |
| HSP: | 50.0 Hz | AIC1: | CAN | PIP1: | 0 | RDG: | 0.00 | AC2: | 30 |
| LSP: | 0.0 Hz | AIV1: | 0 | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

**Test results:**




siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



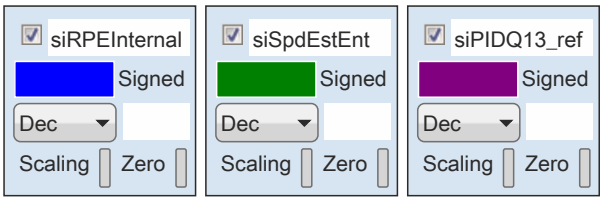
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. For this reason, the motor speed will be adapted according to the ramp so that the PID output is achieved. This integral intervention allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

**Test case 5: Reset time + AC2 ramp reduction**

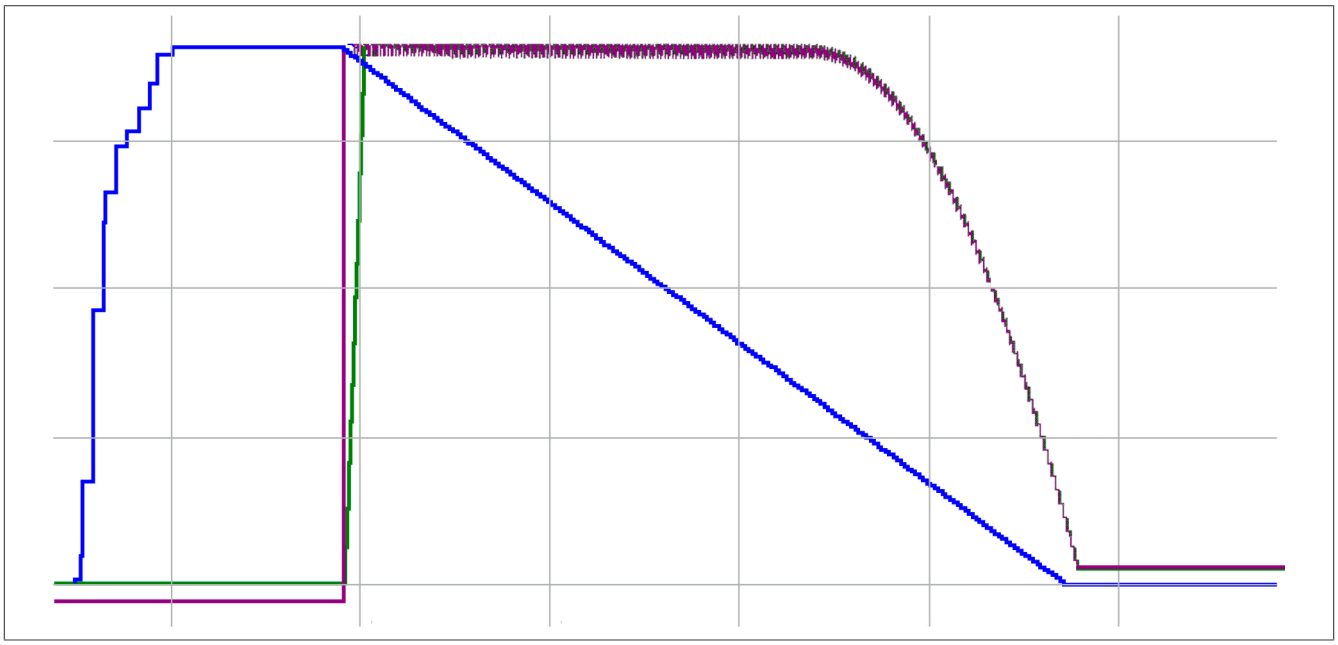
**ACOPOSinverter PID configuration:**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | | | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | PIF: | AIV1 | PIF2: | 8192 | RIG: | 5.00 | POH: | 500 |
| HSP: | 50.0 Hz | AIC1: | CAN | PIP1: | 0 | RDG: | 0.00 | AC2: | 1 |
| LSP: | 0.0 Hz | AIV1: | 0 | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

**Test results:**



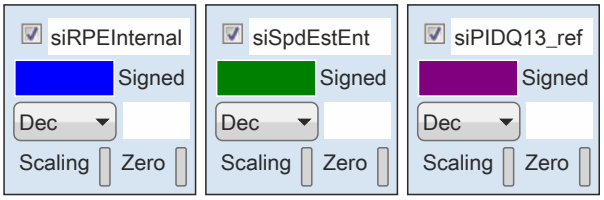

siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



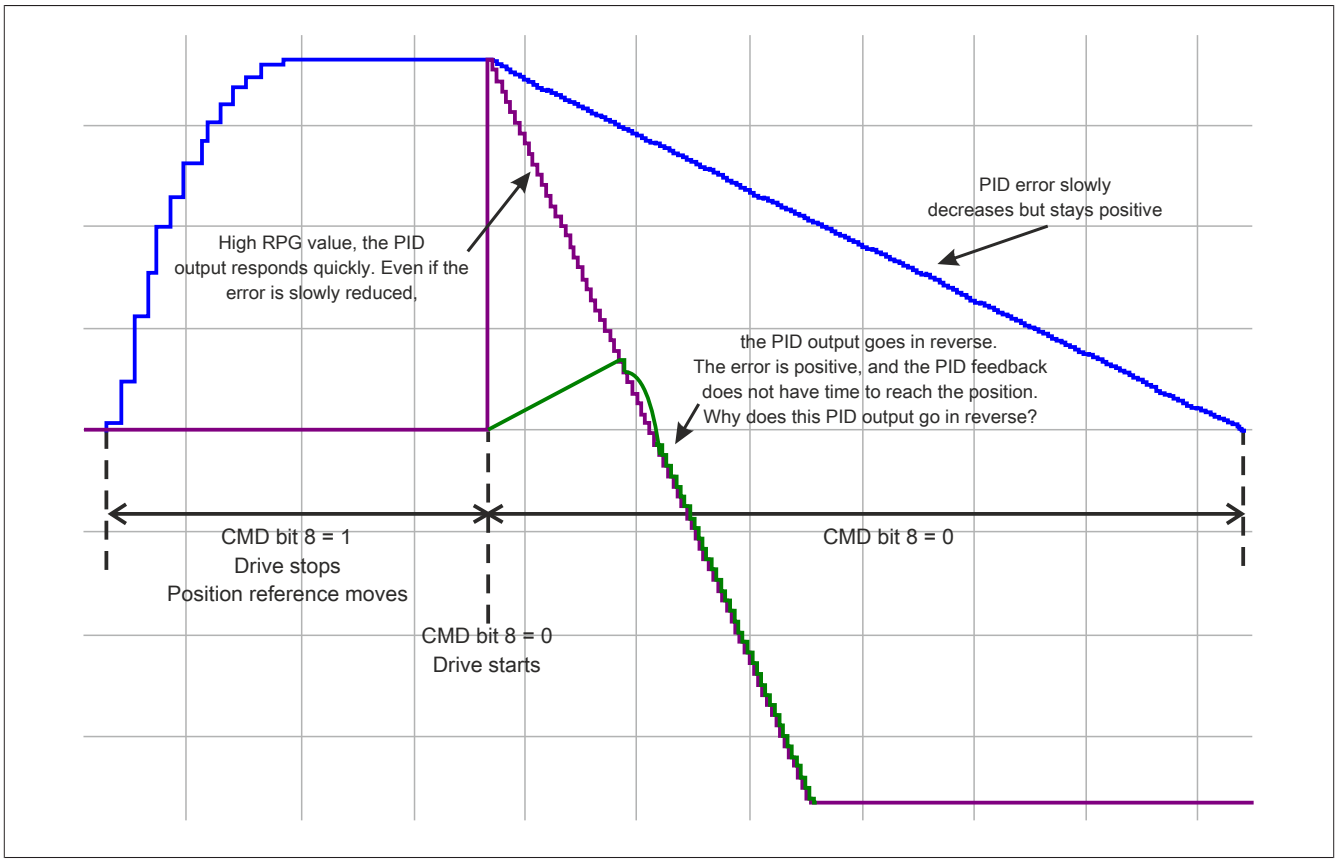
If the PID reference variable has been moved, the inverter is stopped (CMD bit 8 = 1). The AC2 parameter has the same effect as previously when starting in this example. With AC2 = 0.1 s, the PID output is reached more quickly. This reset time allows the generation of the average value for the PID fault and then adds it to the PID output. This produces a PID output that does not only follow a linear ramp.

**What results in a falling ramp (with reversing direction) with proportional gain and a continually positive error?**

This must be studied.




siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output



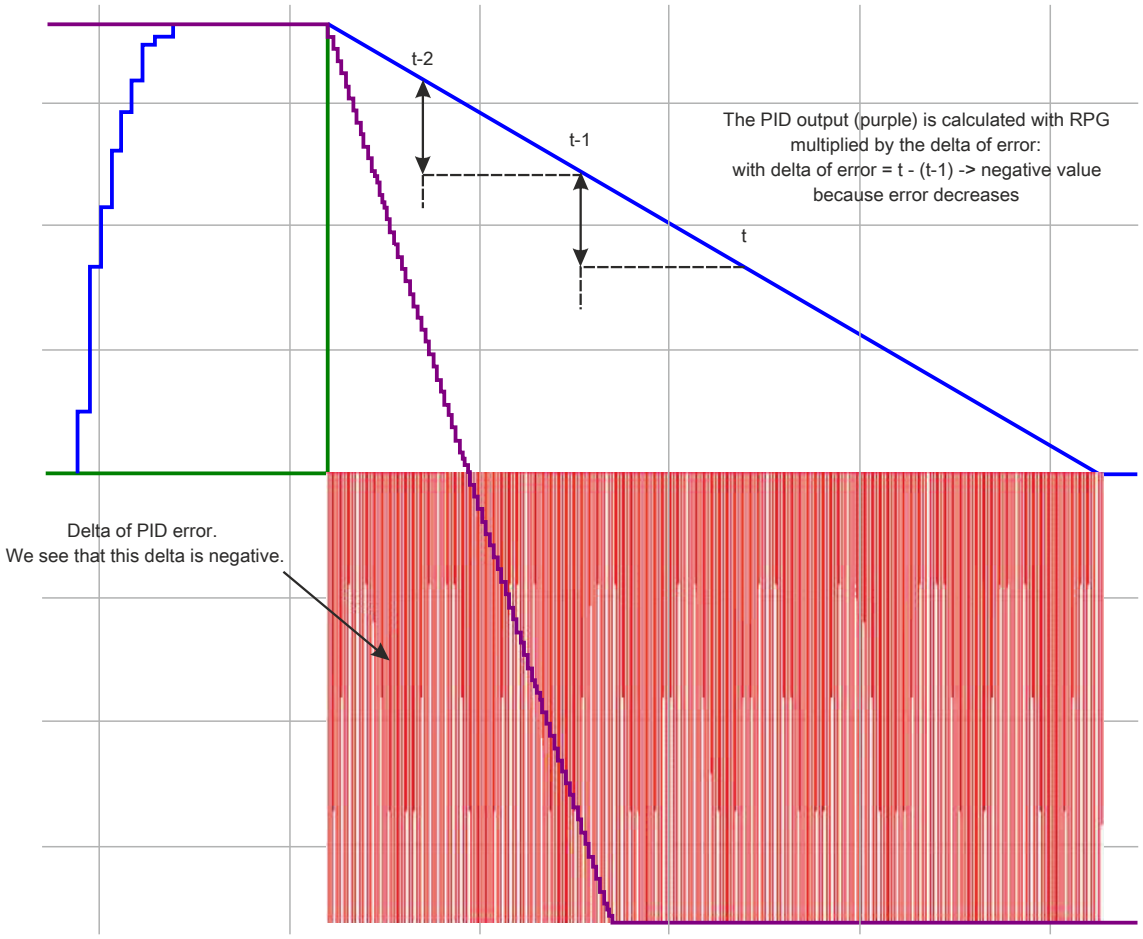

In the case of a high RPG-value the PID output responds more rapidly. This PID output is even reversed in the case of a positive fault. The PID Feedback does not have enough time to reach the PID reference variable, but the inverter turns round. In practical use, this means that this position is never reached.

The behavior is also similar to when the inverter is in RUN mode and the PID reference variable changes.

**Explanation:**

Taking into account the inverter settings.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | | | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | PIF: | AIV1 | PIF2: | 8192 | RIG: | 0.01 | POH: | 500 |
| HSP: | 50.0 Hz | AIC1: | CAN | PIP1: | 0 | RDG: | 0.00 | AC2: | 1 |
| LSP: | 0.0 Hz | AIV1: | 0 | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

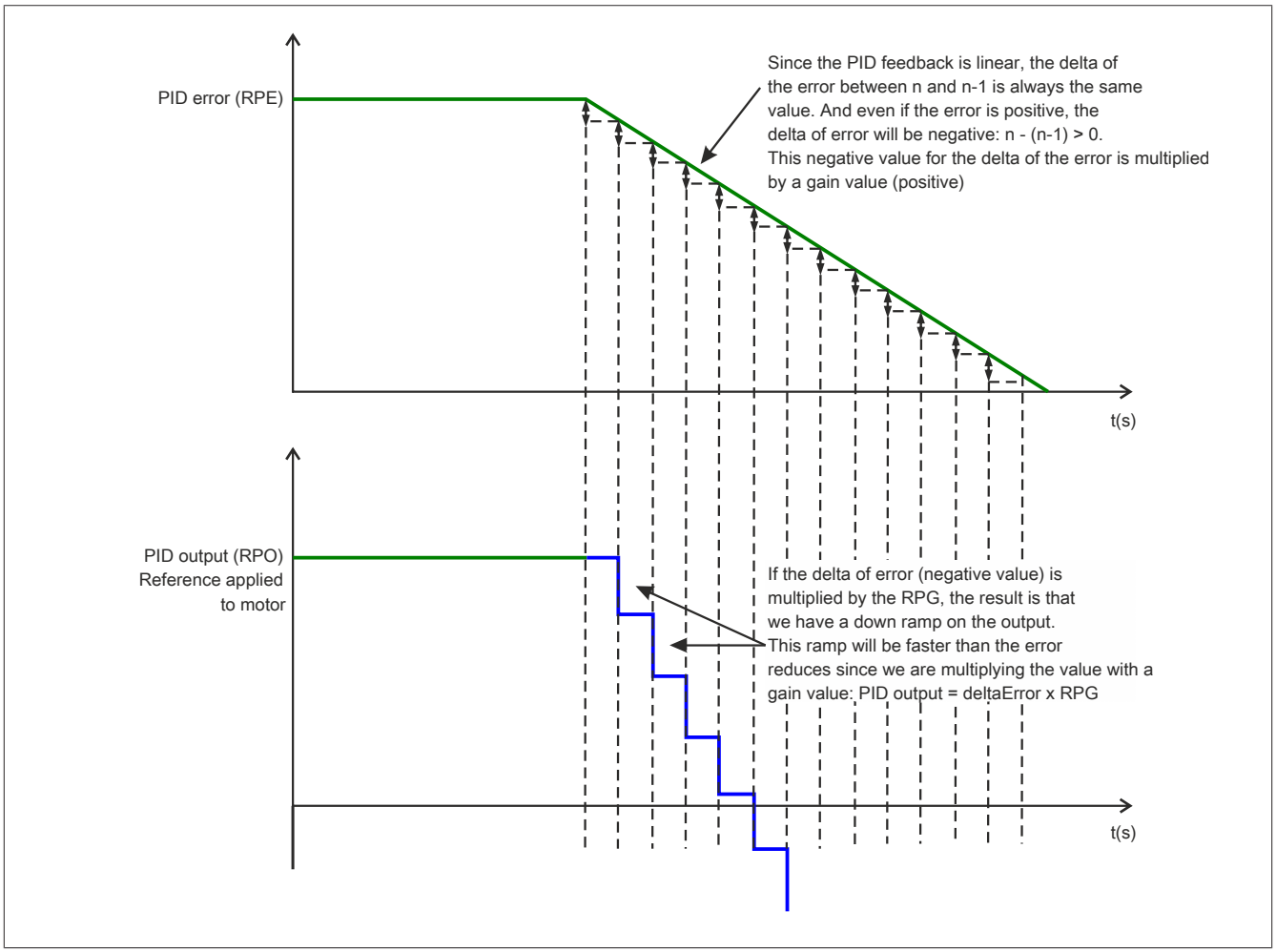



**In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta of the error.** Since the PID feedback is linear, the delta value for the fault between t and t-1 will always be the same value. And even in the case of a positive error, the delta value of the error is negative: t-(t-1) < 0. This negative delta value of the error is multiplied by a gain (positive) value.

The result: The error is positive, but the delta value of the error is negative. Multiplied by the gain, the PID output decreases.

If POL = 0, the PID output is limited to 0. If POL permits a negative value, the PID output is negative and the motor can be run in reverse.

## Diagram




### Conclusion and recommendation

- In our inverters PID output is calculated by multiplying the RPG-value (gain) with the delta value of the error. Even in the case of a positive error, the delta value of the error is negative if this error reduces. The delta value of the error is multiplied by the RPG-value. For this reason with a high RPG-value the PID output is a falling ramp up to 0 (or reversal operation at POL < 0).
- If the motor has also been stopped in the event of a change of the PID reference, the motor starts, but follows the AC2 parameters. This is not the case if the inverter is in RUN mode and the PID reference variable is moved.
- For correct behavior, the PID must be adjusted. Proportional gain cannot be used alone. The same applies for the integral gain - it cannot be completely suppressed. You can have a minimum value of 0.01 for it, but it is always present.

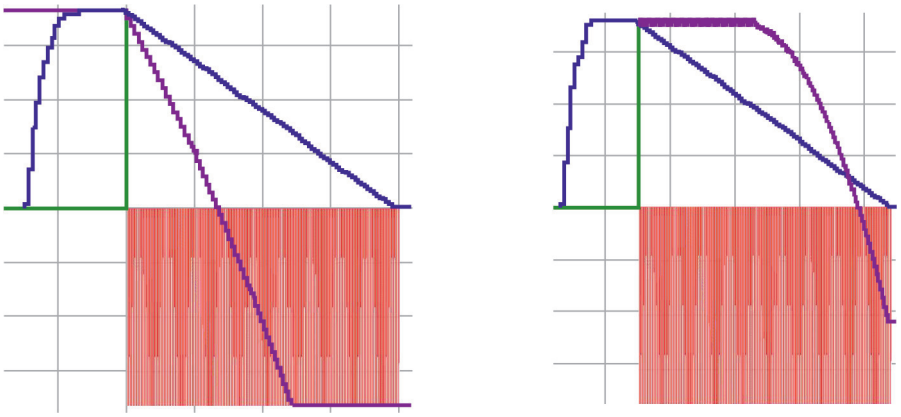
The points 1 and/or 2 may be the result of a poor positioning at the customer site.

Our recommendation:

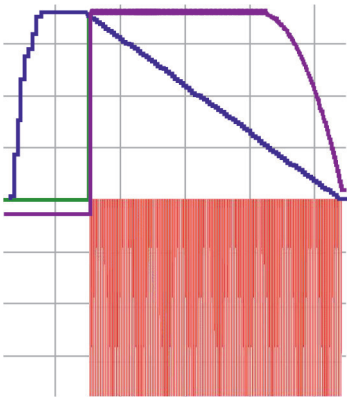
- **In the first step, the AC2 value should be reduced to a minimum.** This reduces the difference in behavior when starting of the motor when the inverter is already in the RUN mode and the motor is started at the stopping of the inverter.
- **Adjust the PID values RPG and RIG in the second step** (and, if possible, also RDG). The objective is to find the best compromise of dynamics and precision at the stop.

| | |
|---|---|
| RPG: | 7.00 |
| RIG: | 1.00 |
| RDG: | 0.00 |
| PRP: | 0.0 s |

| | |
|---|---|
| RPG: | 7.00 |
| RIG: | 3.00 |
| RDG: | 0.00 |
| PRP: | 0.0 s |



| | |
|---|---|
| RPG: | 7.00 |
| RIG: | 5.00 |
| RDG: | 0.00 |
| PRP: | 0.0 s |



- The specified reference must be used in the third step. Using the specified reference, a reference speed can be sent directly to the output of the PID controller.

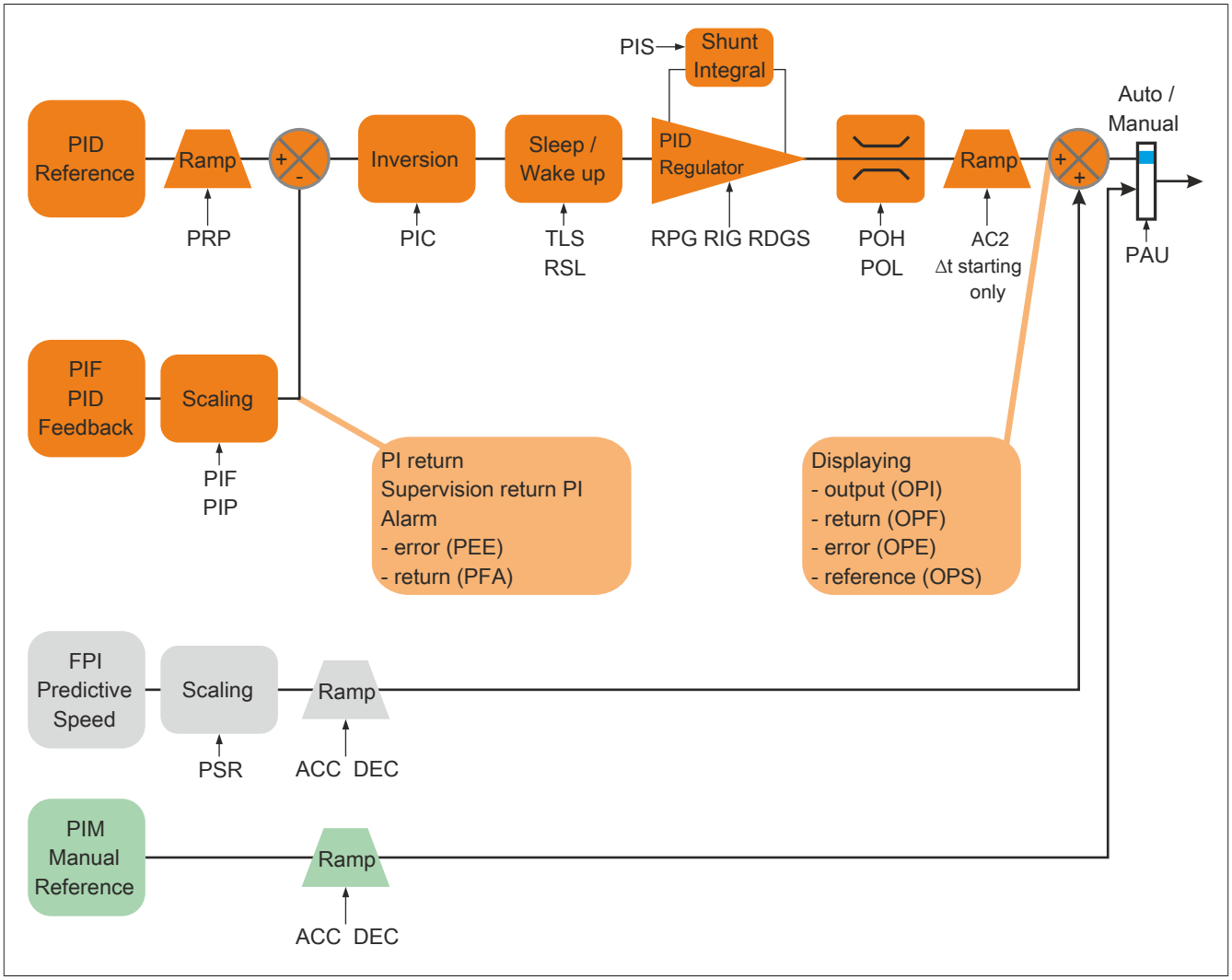
| The parameters described below are accessed as follows: DRI- > COnF > FULL > FUn- > PId- | | | |
|---|---|---|---|
| **Code** | **Description** | **Setting range** | **Factory settings** |
| PId- | **[PID REGULATOR]** | | |
| FPI | **[Speed ref. assign.]**<br>Specified frequency input of the PID controller. | | |
| nO | Not assigned (function not active) | | |
| AI1 | Analog input | | |
| AI2 | Analog input | | |
| AI3 | Analog input | | |
| AI4 | Analog input | | |
| LCC | Graphic display terminal | | |
| Mdb | Integrated Modbus | | |
| CAn | Integrated CANopen | | |
| nEt | POWERLINK communication card (if used) | | |
| APP | Integrated control card (if used) | | |
| PI | Frequency input | | |
| PSr | **[Speed input %]**<br>Multiplication factor for the specified frequency input.<br>The parameter is not accessible when **[Speed ref. assign.]** (FPI) = **[No]** (nO). | 1 to 100% | 100% |

Parameter that can be modified during operation or when stopped.

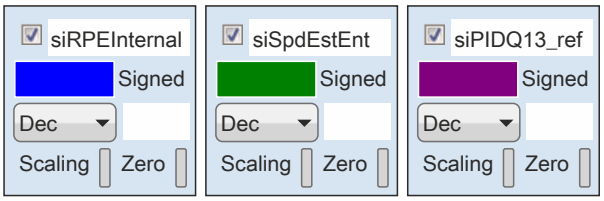
In order to use the FPI, this must be configured on the reference channel and the PSR value defined.

Send the target speed for the speed specification via the configured channel.

With the reference for the speed specification, you can add a frequency reference to this PID output.



Below you will find a configuration example for the given reference.

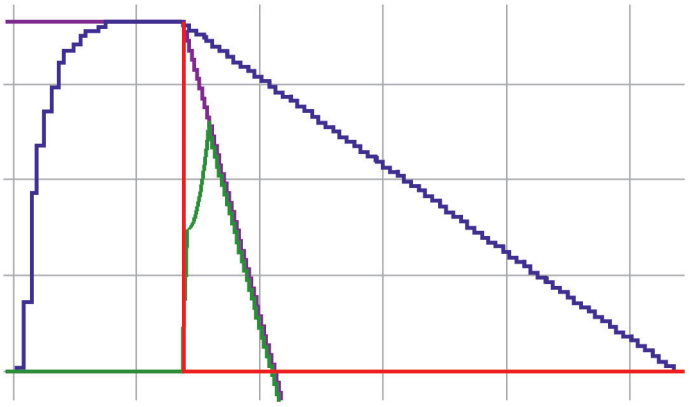



siRPEInternal = PID fault
siSpdEstEnt = Motor speed
siPIDQ13_ref = PID output

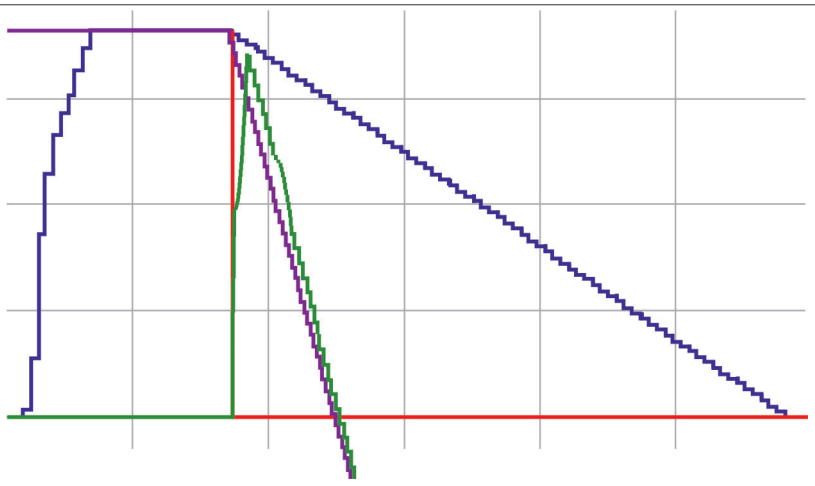
Drive configuration

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ACC: | 1 | PIF: | AIV1 | PIF1: | 0 | RPG: | 7.00 | POL: | -500 |
| DEC: | 1 | AIC1: | CAN | PIF2: | 8192 | RIG: | 0.01 | POH: | 500 |
| HSP: | 50.0 Hz | AIV1: | 0 | PIP1: | 0 | RDG: | 0.00 | AC2: | 1 |
| LSP: | 0.0 Hz | | | PIP2: | 8192 | PRP: | 0.0 s | DE2: | 30 |

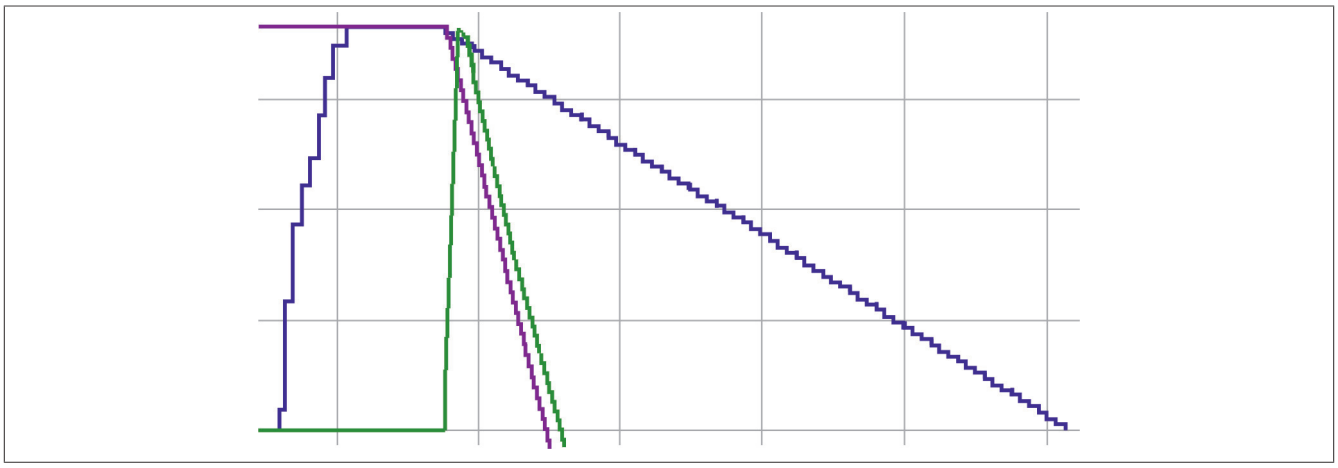
**PSR = 1% - Target speed 0 rpm**



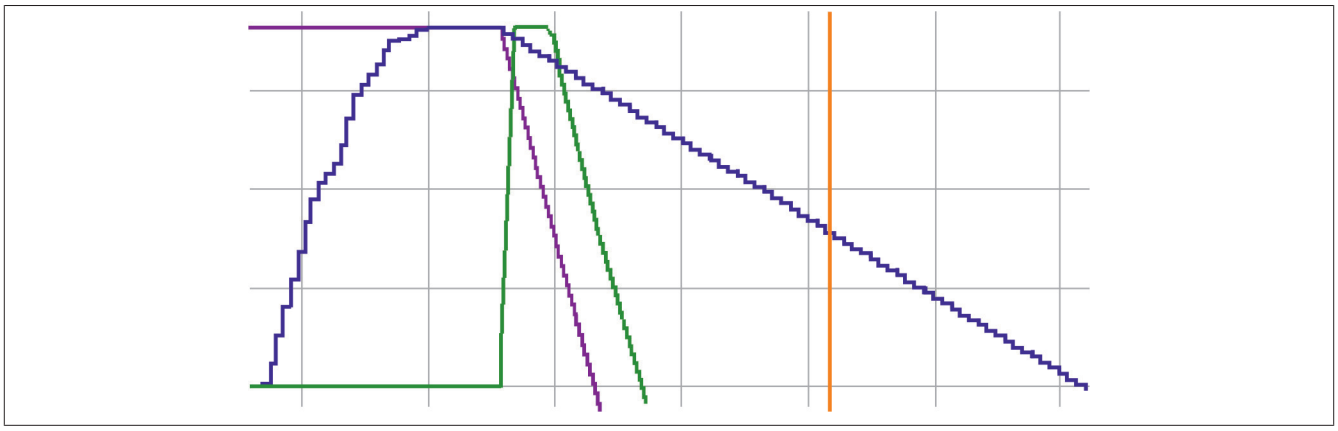
**PSR = 1% - Target speed 1500 rpm**



**PSR = 10% - Target speed 1500 rpm**



**PSR = 50% - Target speed 1500 rpm**



## 5.2.3.6.6.16 [PRESET PID REF] (PrI-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > PrI- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PrI- | **[PRESET PID REF]**<br>The function is accessible if **[PID feedback ass.]**(PIF) is assigned. | | |
| Pr2 | **[2 preset PID ref.]**<br>If the assigned input or bit is at state 0, the function is inactive.<br>If the assigned input or bit is at state 1, the function is active.<br><br>nO **[No]**(nO): Not assigned<br>LI1 **[LI1]**(LI1): Logic input LI1<br>... **[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| Pr4 | **[4 preset PID ref.]**<br>Make sure that **[2 preset PID ref.]**(Pr2) has been assigned before you assign this function.<br>Identical to **[2 preset PID ref.]**(Pr2).<br>If the assigned input or bit is at state 0, the function is inactive.<br>If the assigned input or bit is at state 1, the function is active. | | **[No]**(nO) |
| rP2<br>(1) | **[Preset ref. PID 2]**<br>This parameter is accessible if **[2 preset PID ref.]**(Pr2) is assigned. | **[Min PID reference]**(PIP1)<br>to<br>**[Max PID reference]**(PIP2)(2) | 300 |
| rP3<br>(1) | **[Preset ref. PID 3]**<br>This parameter is accessible if **[3 preset PID ref.]**(Pr3) is assigned. | **[Min PID reference]**(PIP1)<br>to<br>**[Max PID reference]**(PIP2)(2) | 600 |
| rP4<br>(1) | **[Preset ref. PID 4]**<br>This parameter is accessible if **[4 preset PID ref.]**(Pr4) is assigned. | **[Min PID reference]**(PIP1)<br>to<br>**[Max PID reference]**(PIP2)(2) | 900 |

(1) The parameter can also be accessed via menu **[SETTINGS]**(SEt-).

(2) If no graphic display terminal is being used, the values over 9,999 on the four-digit display are shown with a period as thousands separator, for example, 15.65 for 15,650.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

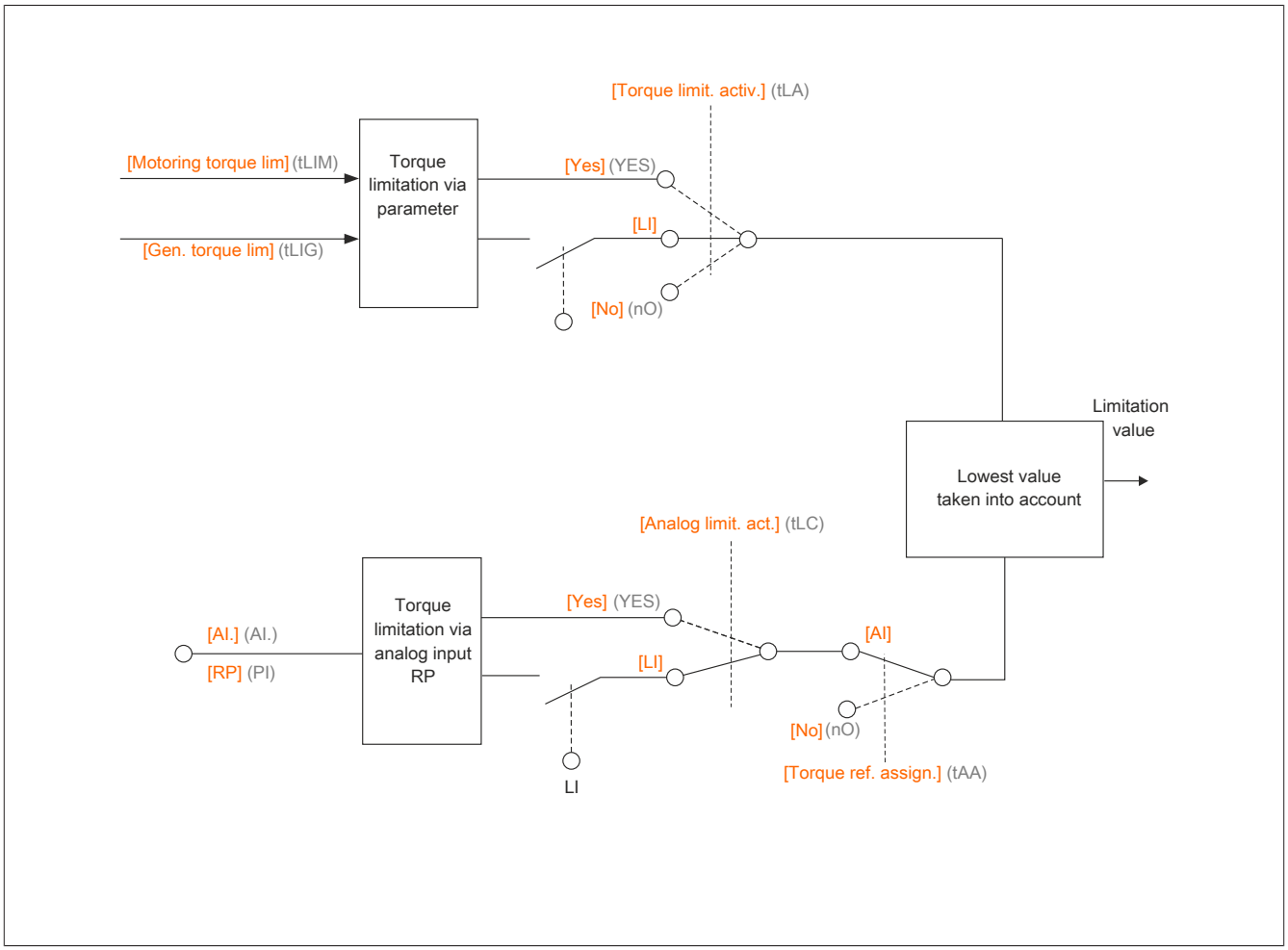
Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.17 [TORQUE LIMITATION] (tOL-)

There are two types of torque limitation:

- With a value that is fixed by a parameter
- With a value specified by an analog input (AI or pulse input)

If both types are enabled, the lowest value is taken into account. The two types of limitation can be configured or switched remotely using a logic input or via the communication bus.




| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tOL- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tOL- | **[TORQUE LIMITATION]** | | |
| tLA | **[Torque limit. activ.]**<br>If the assigned input or bit is at state 0, the function is inactive.<br>If the assigned input or bit is at state 1, the function is active. | | **[No]**(nO) |
| nO | **[No]**(nO): Function not active | | |
| YES | **[YES]**(YES): Function always active | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | **[...]**(...): See the assignment conditions. | | |
| IntP | **[Torque increment]**<br>This parameter is accessible if **[Torque limit. activ.]**(tLA) is set to **[No]**(nO).<br>Selection of the unit of parameters **[Motoring torque lim]**(tLIM) and **[Gen. torque lim]**(tLIG). | | **[1%]**(1) |
| 0.1 | **[0.1%]**(0.1): Unit 0.1% | | |
| 1 | **[1%]**(1): Unit 1% | | |
| tLIM | **[Motoring torque lim]**<br>This parameter is accessible if **[Torque limit. activ.]**(tLA) is set to **[No]**(nO).<br>Torque limiting for motor operation in percent or 0.1% of the nominal torque in accordance with parameter **[Torque increment]**(IntP). | 0 to 300% | 100% |
| (1) | | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tOL- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tLIG<br>(1) | **[Gen. torque lim]**<br>This parameter is accessible if **[Torque limit. activ.]**(tLA) is set to **[No]**(nO).<br>Torque limiting for generator operation in percent or 0.1% of the nominal torque in accordance with parameter **[Torque increment]**(IntP). | 0 to 300% | 100% |
| tAA | **[Torque ref. assign.]**<br>If the function has been assigned, limitation varies between 0% and 300% of the nominal torque on the basis of signal 0% to 100%, which is used for the assigned input.<br>Examples: 12 mA on a 4-20 mA input results in limitation to 150% of the nominal torque.<br>2.5 V on a 10 V input results in 75% of the rated torque. | | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned (function not active) | | |
| AI1 | **[AI1]** (AI1): Analog input | | |
| AI2 | **[AI2]** (AI2): Analog input | | |
| AI3 | **[AI3]** (AI3): Analog input | | |
| PI | **[RP]**(PI): Pulse input | | |
| AIU1 | **[AI virtual 1]**(AIU1): Virtual analog input 1 with handwheel | | |
| AIU2 | **[AI virtual 2]**(AIU2): Virtual input via communication bus, which is configured via **[AI2 net. channel]**(AIC2). | | |
| tLC | **[Analog limit. act.]**<br>This parameter is accessible if **[Torque limit. activ.]**(tLA) is set to **[No]**(nO).<br><br>Identical to **[Torque limit. activ.]**(tLA).<br><br>Assigned input or bit changes to state 0:<br>The limit is provided by parameters**[Motoring torque lim]**(tLIM) and **[Gen. torque lim]**(tLIG) if **[Torque limit. activ.]**(tLA) is not equal to **[No]**(nO).<br>No limit if **[Torque limit. activ.]**(tLA) is set to **[No]**(nO).<br>Assigned input or bit changes to state 1:<br>The limit depends on the input assigned to **[Torque ref. assign.]**(tAA).<br><br>**Note:**<br>**If [Torque limitation](tLA) and [Torque ref. assign.](tAA) are enabled at the same time, the lowest value is taken into account.** | | **[YES]**(YES) |

(1) This parameter can also be accessed via menu **[SETTINGS]**(SEt-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.18 [CURRENT LIMIT] (CLI-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > CLI- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CLI- | **[CURRENT LIMIT.]** | | |
| LC2 | **[Current limit 2]**<br>If the assigned input or bit is at state 0, the first current limiting is active.<br>If the assigned input or bit is at state 1, the second current limiting is active.<br>nO **[No]**(nO): Function not active<br>LI1 **[LI1]**(LI1): Logic input LI1<br>... **[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| CL2 | **[I Limit. 2 value]**<br>**Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>• **Make sure that the motor has the required power rating for the applied maximum current.**<br>• **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>Second current limitation<br>This parameter is accessible if **[Current limit 2]**(LC2) is not equal to **[No]**(nO).<br>The configuration mode is limited to 1.5 In.<br>**Note:**<br>**If the setting is less than 0.25 in, the inverter can lock in error mode [Output Phase Loss](OPL), if this has been enabled). If it is less than the motor no-load current, the motor cannot run.** | 0 to 1.5*INV (1) | 1.5*INV (1) |
| CLI | **[CURRENT LIMIT.]**<br>**Caution!**<br>**MOTOR OVERHEATING AND DAMAGE**<br>• **Make sure that the motor has the required power rating for the applied maximum current.**<br>• **In order to calculate the maximum current, take the motor work cycle and all the factors involved in using the motor into account, including derating requirements.**<br>**Failure to observe these instructions can result in damage to the equipment.**<br>First current limitation.<br>This parameter is accessible if **[Current limit 2]**(LC2) is not equal to **[No]**(nO).<br>The configuration mode is limited to 1.5 In.<br>**Note:**<br>**If the setting is less than 0.25 in, the inverter can lock in error mode [Output Phase Loss](OPL), if this has been enabled). If it is less than the motor no-load current, the motor cannot run.** | 0 to 1.5*INV (1) | 1.5*INV (1) |

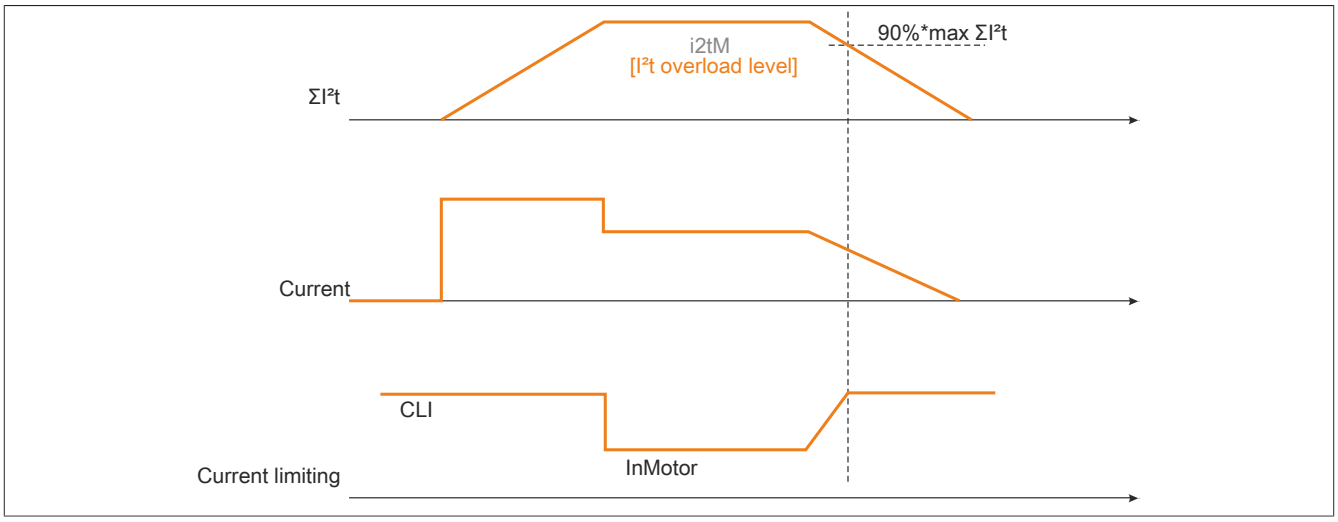
(1) Corresponding to the nominal current of the inverter specified on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.19 [DYN CURRENT LIMIT] (I2t-)

The ACOPOSinverter is available for setting the BMP motors with ACPi SafeConfigurator. The field device tool (FDT) files can be downloaded and installed to install the ACOPOSinverter.




**The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > I2T-**

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| I2t- | **[DYN CURRENT LIMIT]** | | |
| I2tA | **[I²t model activation]**<br>I²t model activation for current limiting<br><br>nO: **[No]**(nO): Function not active<br>YES: **[YES]**(...): Function always active<br><br>If i²t ≥ Max.Σi²t, **[I²t overload level]** (I2tM) = 100 and current limiting = InMotor.<br>If i²t ≤ Max.Σi²t*90%, **[I²t overload level]**(I2tM) ≤ 90 and current limiting = CLI.<br>This parameter can be accessed if **[max time of I²tl]** (I2tt) does not equal **[0.00 ]** (0.00). | | **[No]**(nO) |
| I2tI | **[max current of I²tl]**<br>Maximum current of I²t model | | See table(1). |

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value [0.1 A] | Max. value [0.1 A] | Default [0.1 A] |
| 8I66x200018.00-000 | The I2tI value must be at least 1 greater than the specified nominal value for the motor current, i.e. I2tI > nCr (for induction motors) or I2tI > nCrS (for synchronous motors) | 65535 | 24 |
| 8I66x200037.00-000 | | | 51 |
| 8I66x200055.00-000 | | | 57 |
| 8I66x200075.00-000 | | | 73 |
| 8I66x200110.00-000 | | | 105 |
| 8I66x200150.00-000 | | | 121 |
| 8I66x200220.00-000 | | | 166 |
| 8I66T200300.00-000 | | | 207 |
| 8I66T200400.00-000 | | | 264 |
| 8I66T200550.00-000 | | | 414 |
| 8I66T200750.00-000 | | | 496 |
| 8I66T201100.00-000 | | | 811 |
| 8I66T201500.00-000 | | | 991 |
| 8I66T400037.00-000 | | | 24 |
| 8I66T400055.00-000 | | | 30 |
| 8I66T400075.00-000 | | | 36 |
| 8I66T400110.00-000 | | | 46 |
| 8I66T400150.00-000 | | | 63 |
| 8I66T400220.00-000 | | | 84 |
| 8I66T400300.00-000 | | | 108 |
| 8I66T400400.00-000 | | | 144 |
| 8I66T400550.00-000 | | | 216 |
| 8I66T400750.00-000 | | | 256 |
| 8I66T401100.00-000 | | | 417 |
| 8I66T401500.00-000 | | | 496 |
| 8I66T600075.00-000 | | | 27 |
| 8I66T600150.00-000 | | | 42 |
| 8I66T600220.00-000 | | | 60 |
| 8I66T600400.00-000 | | | 93 |
| 8I66T600550.00-000 | | | 136 |
| 8I66T600750.00-000 | | | 166 |
| 8I66T601100.00-000 | | | 256 |
| 8I66T601500.00-000 | | | 331 |

| | | | |
|---|---|---|---|
| I2tt | **[max time of I²tl]**<br>Maximum time of I²t model | 0.00 to 655.35 | **[0.00 ]** (0.00) |

(1) Corresponding to the nominal current of the inverter specified in the installation manual and on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

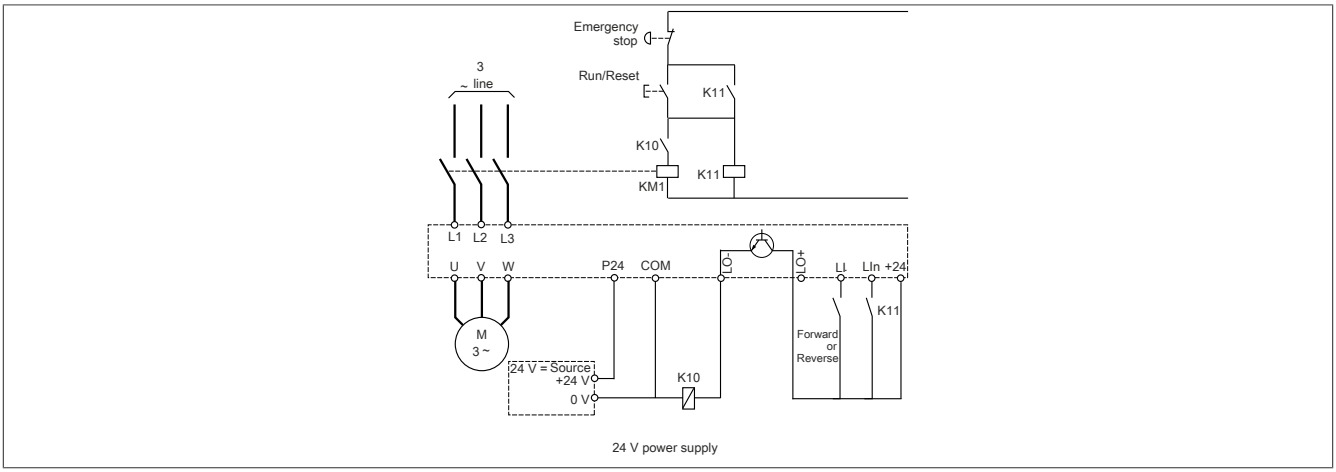
### 5.2.3.6.6.20 [INPUT CONTACTOR CONTROL] (LLC-)

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the inverter is locked. For example, if the stop mode is stop on ramp, the contactor will open when the motor reaches zero speed.

**Note:**

**The inverter control must be supplied by an external 24 V power source.**

Cabling example:




**Note:**

**After enabling "Emergency switch-off", it is necessary to enable "Run/reset".**

LIx = Move command **[Forward]**(Frd) or **[Reverse assign.]**(rrS)

LO-/LO+ = **[Input contactor assign]**(LLC)

LIn = **[Drive lock]**(LES)

**Note:**

**INVERTER DAMAGE**

**Do not use the function for cycles shorter than 60 seconds.**

**Failure to observe these instructions can result in damage to the equipment.**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > LLC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LLC- | **[INPUT CONTACTOR CONTROL]** | | |
| LLC | **[Input contactor assign]**<br>Logic output or control relay | | **[No]**(nO) |
| nO | **[No]**(nO): Function not assigned (in this case, none of the functions can be accessed). | | |
| LO1 | **[LO1]**(LO1): Logic output LO1 | | |
| r2 | **[R2]**(r2): Relay R2 | | |
| dO1 | **[D01]**(dO1): Analog output AO, which can be used as a logic output. Selection is possible if **[AO1 assignment]**(AO1) is set to **[No]**(nO). | | |
| LES | **[Drive lock]** | | **[No]**(nO) |
| ★ | This parameter can be accessed if **[Input contactor assign]**(LLC) is not equal to **[No]**(nO).<br>The inverter is locked when the assigned input or bit changes to state 0. | | |
| nO | **[No]**(nO): Function not active | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | **[...]**(...): See the assignment conditions. | | |
| LCt | **[Mains V. time out]** | 5 to 999 s | 5 s |
| ★ | Monitoring time for closing of line contactor. If after this time there is no voltage present in the power circuit of the inverter, it will be locked with error **[Line contactor]**(LCF). | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.6.21 [OUTPUT CONTACTOR CONTROL] (OCC-)

This allows the inverter to control a contactor located between the inverter and the motor. The request for the contactor to close is made when a move command is sent. The request for the contactor to open is made when there is no longer any current in the motor.

## Note:

**If braking with direct current supply is used, the output contactor will not close as long as braking with direct current supply is active.**

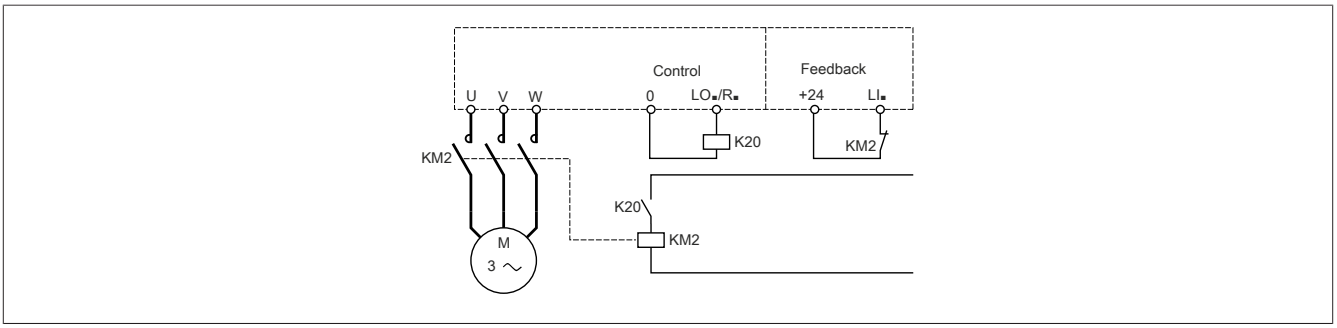
The corresponding logic input must be at 1 if there is no move command and at 0 during operation.

In the event of an inconsistency, the inverter triggers error FCF2 if the output contactor does not close (LIx at 1) and error FCF1 if it is stuck (LIx at 0).

With parameter [Delay start out. contact.](dbS), triggering the error can be delayed in case of a move command and parameter [Delay to open cont.](dAS) delays the error in the event of a stop command.

## Note:

**Error FCF2 (the contactor does not close) can be switched on again by changing the move command from 1 to 0 (0 → 1 → 0 with a 3-wire control).**




Functions [Out. contactor ass.](OCC) and [Output contact. fdbk](rCA) can be used individually or at the same time.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > OCC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| OCC- | [OUTPUT CONTACTOR CONTROL] | | |
| OCC | [Out. contactor ass.] | | [No](nO) |
| | Logic output or control relay | | |
| nO | [No](nO): Function not assigned (in this case, none of the functions can be accessed). | | |
| LO1 | [LO1](LO1): Logic output LO1 | | |
| r2 | [R2](r2): Relay R2 | | |
| dO1 | [DO1](dO1): Analog output AO, which can be used as a logic output. Selection is possible if [AO1 assignment](AO1) is set to [No](nO). | | |
| rCA | [Output contact. fdbk] | | [No](nO) |
| | The motor starts up when the assigned input or bit changes to 0. | | |
| nO | [No](nO): Function not active | | |
| LI1 | [LI1](LI1): Logic input LI1 | | |
| ... | [...](...): See the assignment conditions. | | |
| dbS | [Delay start out. contact.] | 0.05 to 60 s | 0.15 s |
| ★ | Time delay for: | | |
| ↻ | Motor control following the sending of a run command | | |
| | Output contactor fault monitoring, if the feedback is assigned. If the contactor fails to close at the end of the set time, the frequency inverter will lock in error mode FCF2. | | |
| | This parameter is accessible if [Out. contactor ass.](OCC) or [Output contact. fdbk](rCA) are assigned. The time delay must be greater than the closing time of the output contactor. | | |
| dAS | [Delay to open cont.] | 0 to 5.00 s | 0.10 s |
| ★ | Time delay for monitoring motor contactor opening after the motor has stopped. | | |
| | This parameter is accessible if [Output contact. fdbk](rCA) is assigned. | | |
| ↻ | The time delay must be greater than the opening time of the output contactor. If it is set to 0, the fault will not be monitored. | | |
| | If the contactor does not open after the set time, this will cause locking via error FCF1. | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

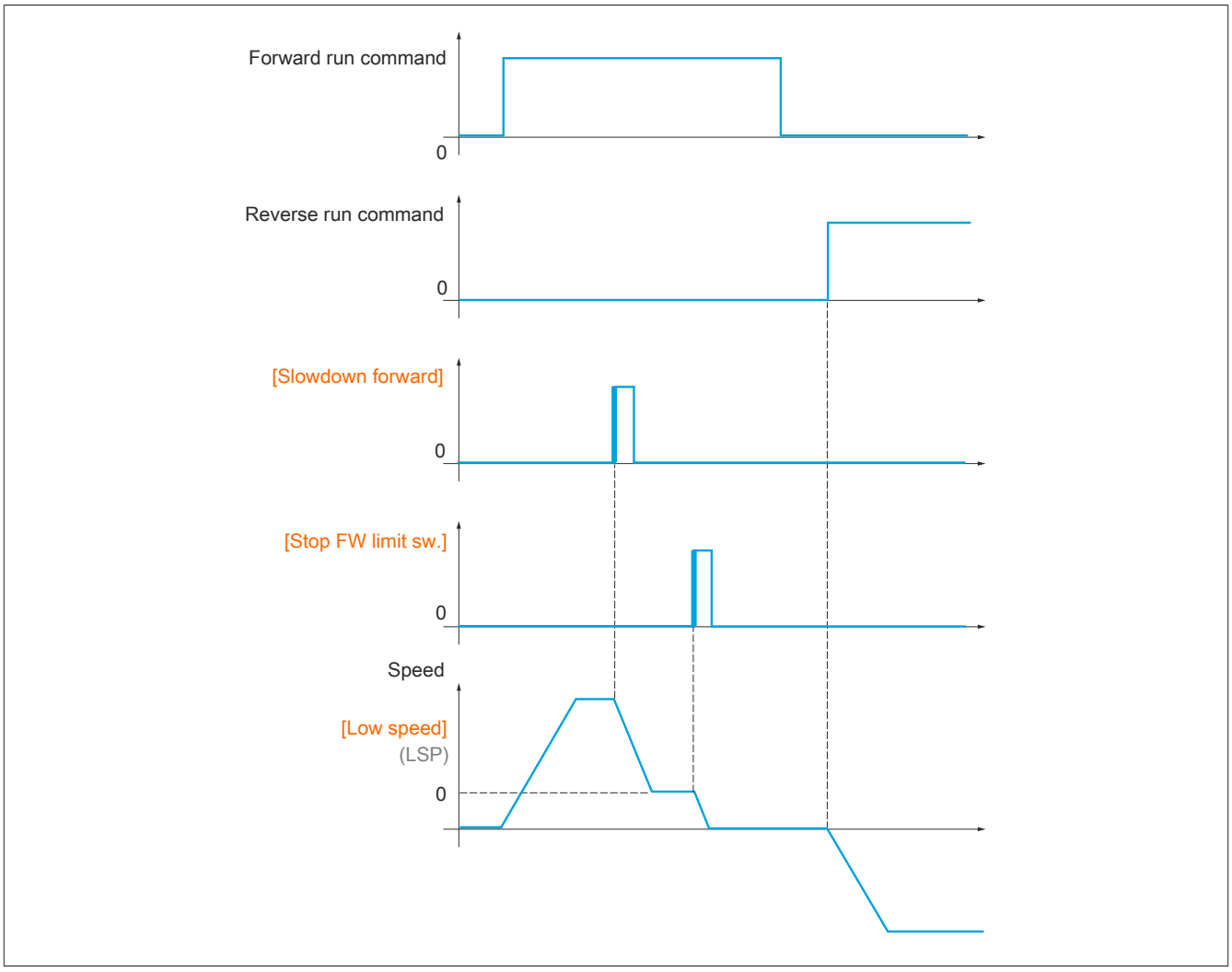
↻ Parameter that can be modified during operation or when stopped.

### 5.2.3.6.6.22 [POSITIONING BY SENSORS] (LPO-)

This function is used for managing positioning using position sensors or limit switches linked to logic inputs or using control word bits:

- Braking
- Stop

The action logic for the inputs and bits can be configured on a rising edge (change from 0 to 1) or a falling edge (change from 1 to 0). The example below has been configured on a rising edge:



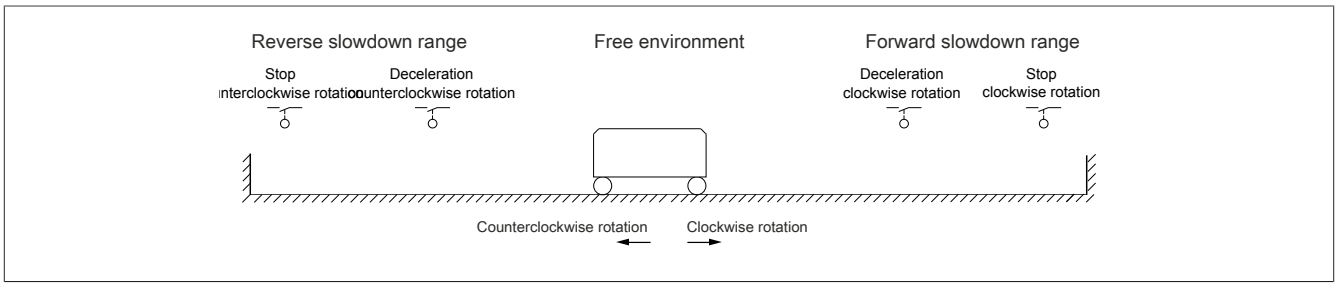

The slowdown mode and stop mode can be configured.

The operation is identical for both directions of operation. Slowdown and stopping operate according to the same logic, specified below.

**Example: Forward slowdown on rising edge**

- Forward slowdown takes place on a rising edge (change from 0 to 1) of the input or bit assigned to forward slowdown if this rising edge occurs in forward operation. The slowdown command is then memorized, even in the event of a power outage. Operation in the opposite direction is authorized at high frequency. The slowdown command is deleted on a falling edge (change from 1 to 0) of the input or bit assigned to forward slowdown if this falling edge occurs in reverse operation.
- A bit or a logic input can be assigned to disable this function.
- Although forward slowdown is disabled while the disable input or bit is at 1, sensor changes continue to be monitored and saved.

**Example: Positioning of limit switch on rising edge**




## Warning!

**LOSS OF CONTROL**

- **Make sure to connect the limit switches correctly.**
- **Make sure to install the limit switches correctly. The limit switches must be installed at a sufficient distance from the mechanical end stop in order to ensure an appropriate stop distance.**
- **In order for them to be operational, the limit switches must be reset.**
- **Make sure the limit switches function correctly.**

**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**

**Operation with short cams:**

## Warning!

**LOSS OF CONTROL**

**Before commissioning the motor for the first time or after having reset the configuration to factory settings, the motor must always be started up outside of the slowdown and stop ranges.**

**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**

## Warning!

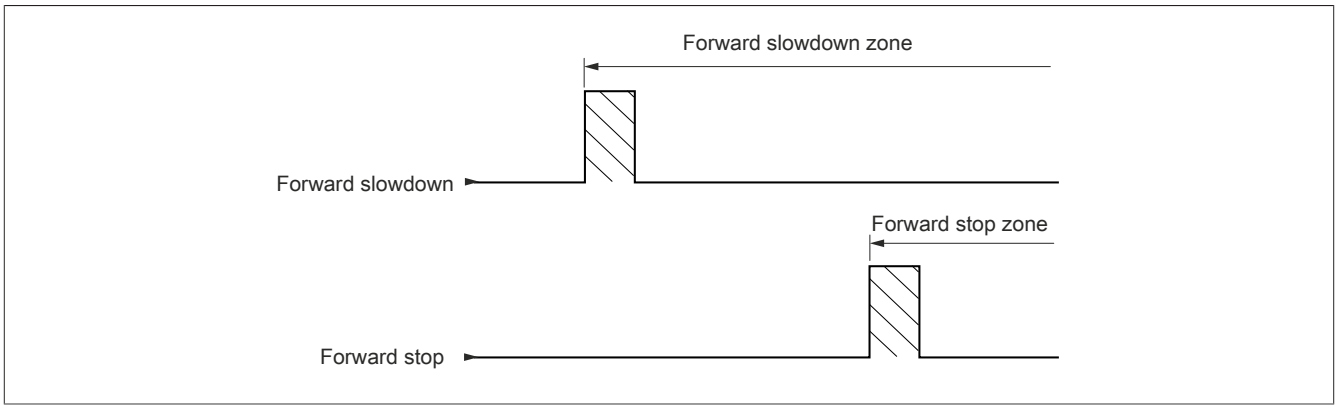
**LOSS OF CONTROL**

**If the inverter is switched off, the current range will be stored.**

**If the system has been moved manually while the inverter was switched off, you need to restore the original position before switching the inverter back on.**

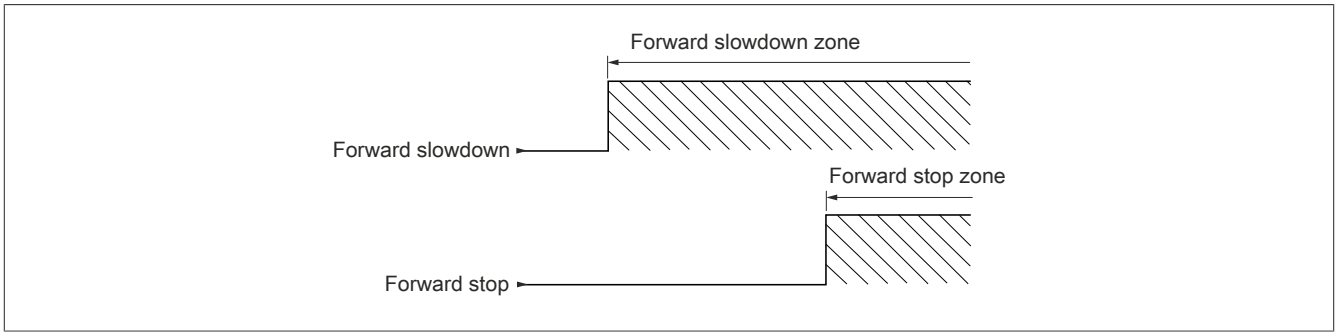
**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**

In this instance, when operating for the first time or after restoring the factory settings, the inverter must initially be started outside the slowdown and stop zones in order to initialize the function.




**Operation with long cams:**

In this instance, there is no limitation, which means the function can be initialized across the entire system to be controlled.



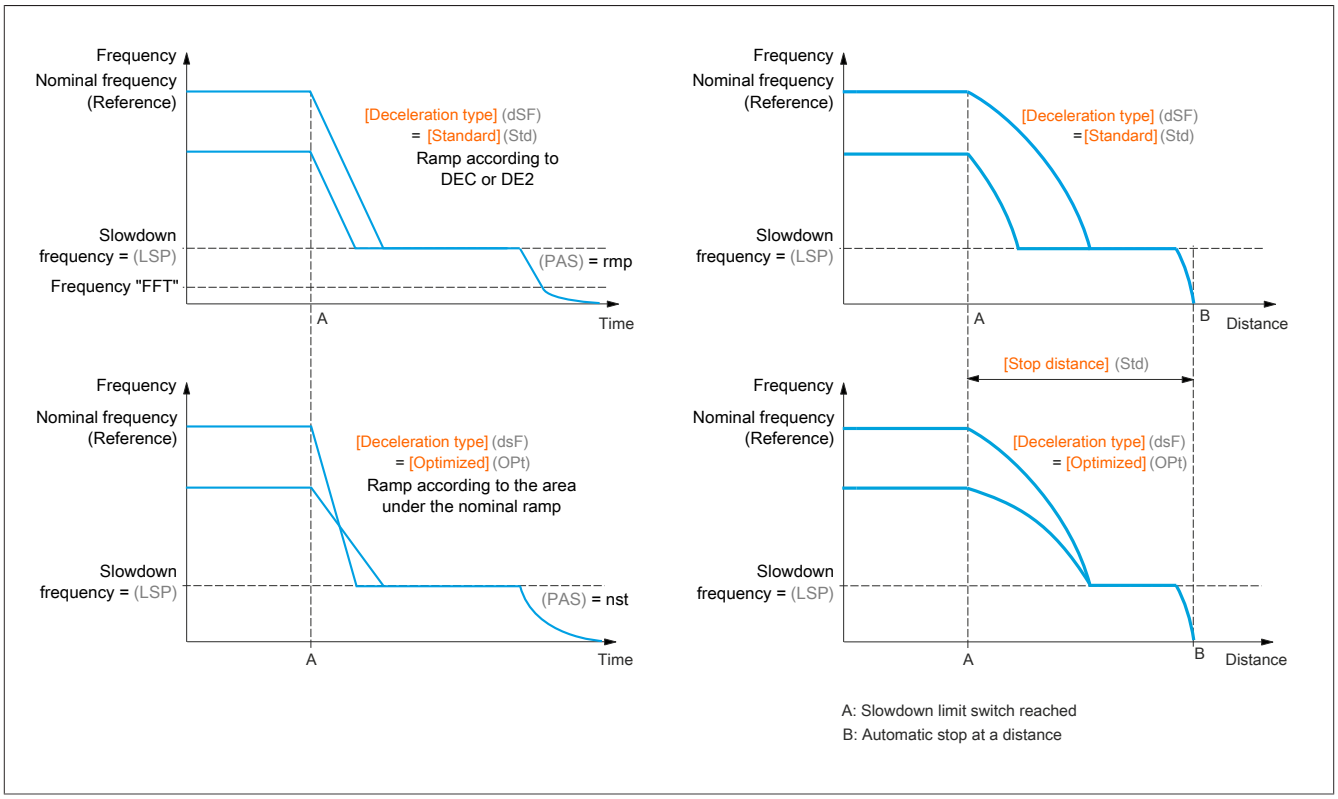

**Calculated stopping distance (remote stop) after deceleration limit switch**

This function can be used to control the stopping of the moving part automatically once a preset distance has been traveled after the slowdown limit switch.

On the basis of the rated linear speed and the speed estimated by the inverter when the slowdown limit switch is tripped, the inverter will induce the stop at the configured distance.

This function is useful in applications where one shared limit switch (for violations) with manual restart is shared for both directions. It will then only respond to ensure safety if the distance is exceeded. The stop limit switch retains priority in respect of the function.

Depending on parameter **[Deceleration type]** (dSF), one of the following four modes of operation is achieved:




## Note:

- **If the deceleration ramp is modified while stopping at a distance is in progress, this distance will not be observed.**
- **If the direction is modified while stopping at a distance is in progress, this distance will not be observed.**

## Warning!

**LOSS OF CONTROL**

**Make sure that the configured distance is actually possible.**

**This function does not replace the limit switch.**

**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > LPO- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LPO- | **[POSITIONING BY SENSORS]**<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| SAF | **[Stop FW limit sw.]**<br>Forward stop switch. | | **[No]**(nO) |
| nO<br>LI1<br>... | **[No]**(nO): Not assigned<br>**[LI1]**(LI1): Logic input LI1<br>**[...]**(...): See the assignment conditions.<br>If **[Profile]** (CHCF) is set to **[Not separ.]**(SIM) or **[Separate]** (SEP), parameters **[CD11]** (Cd11) to **[CD15]** (Cd15), **[C111]** (C111) to **[C115]** (C115), **[C211]** (C211) to **[C215]** (C215) and **[C311]** (C311) to **[C315]** (C315) are not available. | | |
| SAr | **[Stop RV limit sw.]**<br>Reverse stop switch.<br>Identical to **[Stop FW limit sw.]**(SAF). | | **[No]**(nO) |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > LPO- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SAL | [Stop limit config.] | | [Active low](LO) |
| ★ | **Warning!**<br>**LOSS OF CONTROL**<br>**If [Stop limit config.](SAL) is set to [Active high](HIG), the stop command is active while the signal is active and is not applied if the connection is interrupted.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.** | | |
| | Actuation level stop switch.<br>This parameter can be accessed if at least one limit switch or one stop sensor has been assigned. It is used to define the positive or negative logic of the bits or inputs assigned to the stop. | | |
| LO | [Active low](LO): Stop command on a falling edge (change from 1 to 0) of the bits or the assigned inputs. | | |
| HIG | [Active high](HIG): Stop command on a rising edge (change from 0 to 1) of the bits or the assigned inputs. | | |
| dAF | [Slowdown forward] | | [No](nO) |
| | Slowdown achieved on forward movement.<br>Identical to [Stop FW limit sw.](SAF). | | |
| dAr | [Slowdown reverse] | | [No](nO) |
| | Slowdown achieved on reverse movement.<br>Identical to [Stop FW limit sw.](SAF). | | |
| dAL | [Slowdown limit cfg.] | | [Active low](LO) |
| ★ | **Warning!**<br>**DANGER OF DAMAGE TO THE DEVICE**<br>**If [Slowdown limit cfg.](dAL) is set to [Active high](HIG), the slowdown command is enabled while the signal is active (the slowdown command is not output if, for any reason, there is no signal).**<br>**Make sure that this setting will not result in unsafe states.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | This parameter can be accessed if at least one limit switch or one slowdown sensor has been assigned. It is used to define the positive or negative logic of the bits or inputs assigned to the slowdown. | | |
| LO | [Active low](LO): Slowdown command on a falling edge (change from 1 to 0) of the bits or assigned inputs. | | |
| HIG | [Active high](HIG): Slowdown command on a rising edge (change from 0 to 1) of the bits or assigned inputs. | | |
| CLS | [Disable limit sw.] | | [No](nO) |
| ★ | **Warning!**<br>**LOSS OF CONTROL**<br>**If [Disable limit sw.](CLS) is set to an input and is enabled, the limit switch control is locked.**<br>**Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.** | | |
| | This parameter can be accessed if at least one limit switch or one sensor has been assigned.<br>When the assigned bit or input is in state 1, the action of the limit switch is deactivated. If the inverter was presently being slowed down or stopped by the limit switch, it will now continue running until it attains its reference speed. | | |
| nO | [No](nO): Function not active | | |
| LI1 | [LI1](LI1): Logic input LI1 | | |
| ... | [...](...): See the assignment conditions. | | |
| PAS | [Stop type] | | [Ramp stop](rMP) |
| ★ | This parameter can be accessed if at least one limit switch or one sensor has been assigned. | | |
| rMP | [Ramp stop](rMP): Via ramp | | |
| FSt | [Fast stop](FSt): Fast stop (ramp reduced by [Ramp divider](dCF) ) | | |
| nSt | [Freewheel](nSt): Freewheel stop | | |
| dSF | [Deceleration type] | | [Standard](Std) |
| ★ | This parameter can be accessed if at least one limit switch or one sensor has been assigned. | | |
| Std | [Standard](Std): Uses the valid ramp [Deceleration](dEC) or [Deceleration 2](dE2) | | |
| OPt | [Optimized](OPt): The ramp time is calculated on the basis of the actual speed when the slowdown contact switches, in order to limit the operating time at low speed (optimization of the cycle time: The braking time is constant, regardless of the output speed). | | |
| Std | [Stop distance] | | [No](nO) |
| ★ | This parameter can be accessed if at least one limit switch or one sensor has been assigned.<br>Enabling and adjusting function "Stop at distance calculated after the slowdown limit switch". | | |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > LPO- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| nO<br>- | [No](nO): Function not active (as a consequence, the next two parameters will be inaccessible).<br>0.01 to 10.00: Setting the stopping distance in meters. | | |
| nLS<br>☆ | [Rated linear speed]<br>The parameter can be accessed if at least one limit switch or one sensor has been assigned and [Stop distance](Std) is not set to [No](nO).<br>Rated linear speed in meters/second. | 0.20 to 5.00 m/s | 1.00 m/s |
| SFd<br>☆ | [Stop corrector]<br>The parameter can be accessed if at least one limit switch or one sensor has been assigned and [Stop distance](Std) is not set to [No](nO).<br>Scaling factor applied to the stop distance to compensate, for example, a nonlinear ramp. | 50 to 200% | 100% |
| MStP<br>☆<br><br><br>nO<br>YES | [Memo Stop]<br>This parameter can be accessed if a limit switch or sensor has been assigned to function "POSITIONING ABOVE ENCODER OR LIMIT SWITCH".<br>With or without storing the system position.<br><br>[No](nO): Without system position storing<br>[YES](YES): With system position storing | | [No](nO) |
| PrSt<br>☆<br><br><br>nO<br>YES | [Priority restart]<br>This parameter can be accessed if at least one limit switch or one encoder has been assigned.<br>The startup has priority, even if the stop switch is enabled.<br><br>[No](nO): No priority for restart if stop switch has been enabled<br>[YES](YES): Priority for restart even if stop switch has been enabled<br>This parameter is forced to be set to [No](nO) if [Memo Stop](MStP) = [YES](YES). | | [No](nO) |

☆ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.6.23 [PARAM. SET SWITCHING] (MLP-)

It is possible to select a set of 1 to 15 parameters via menu [SETTINGS](SEt-). After that, 2 or 3 different values can be assigned to these parameters. The 2 or 3 value groups can be switched by 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).

This switching can also be controlled by one or two frequency threshold values. Every threshold value functions like a logic input (0 = Threshold value not reached; 1 = Threshold value reached).

| | Values 1 | Values 2 | Values 3 |
|---|---|---|---|
| Parameter 1 | Parameter 1 | Parameter 1 | Parameter 1 |
| Parameter 2 | Parameter 2 | Parameter 2 | Parameter 2 |
| Parameter 3 | Parameter 3 | Parameter 3 | Parameter 3 |
| Parameter 4 | Parameter 4 | Parameter 4 | Parameter 4 |
| Parameter 5 | Parameter 5 | Parameter 5 | Parameter 5 |
| Parameter 6 | Parameter 6 | Parameter 6 | Parameter 6 |
| Parameter 7 | Parameter 7 | Parameter 7 | Parameter 7 |
| Parameter 8 | Parameter 8 | Parameter 8 | Parameter 8 |
| Parameter 9 | Parameter 9 | Parameter 9 | Parameter 9 |
| Parameter 10 | Parameter 10 | Parameter 10 | Parameter 10 |
| Parameter 11 | Parameter 11 | Parameter 11 | Parameter 11 |
| Parameter 12 | Parameter 12 | Parameter 12 | Parameter 12 |
| Parameter 13 | Parameter 13 | Parameter 13 | Parameter 13 |
| Parameter 14 | Parameter 14 | Parameter 14 | Parameter 14 |
| Parameter 15 | Parameter 15 | Parameter 15 | Parameter 15 |
| Values for input LI or bit or frequency threshold value 2 | 0 | 1 | 0 or 1 |
| Values for input LI or bit or frequency threshold value 3 | 0 | 0 | 1 |

**Note:**

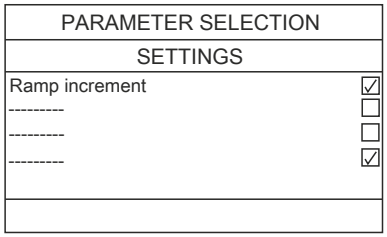
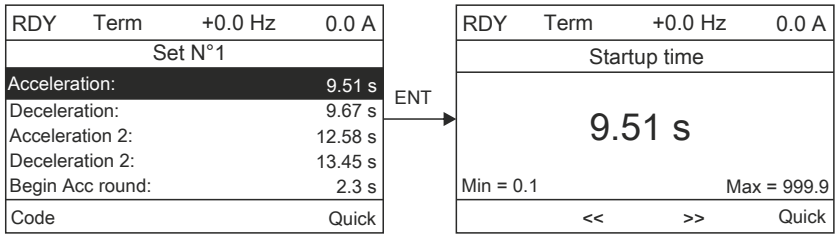
**Do not change these parameters in menu [SETTINGS](SEt-), as any change made in this menu ([SETTINGS](SEt-)) is lost at the next power-on. During operation, the parameters can be set via menu [PARAM. SET SWITCHING](MLP-) in the active configuration.**

**Note:**

**Parameter set switching cannot be configured from the integrated display terminal.**

The parameters can only be adjusted on the integrated display terminal if the function was previously configured via the graphic display terminal, PC software or via the bus or communication network. If the function has not been configured, menu [PARAM. SET SWITCHING](MLP-) and submenus [Set N°1](PS1-), [Set N°2](PS2-) and [Set N°3](PS3-) are not displayed.

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > MLP- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| MLP- | [PARAM. SET SWITCHING] | |
| CHA1 | [2 parameter sets]<br>Switching 2 parameter sets. | [No](nO) |
| nO | [No](nO): Not assigned | |
| FtA | [Freq. Th. attained](FtA): Switching via [Freq. threshold](Ftd) | |
| F2A | [Freq. Th. 2 attained](F2A): Switching via [Freq. threshold 2](F2d) | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See the assignment conditions. | |
| CHA2 | [3 parameter sets]<br>Identical to [2 parameter sets](CHA1).<br><br>Switching 3 parameter sets.<br>**Note:**<br>**To obtain 3 parameter sets, [2 parameter sets](CHA1) must also be configured.** | [No](nO) |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > MLP- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| SPS | **[PARAMETER SELECTION]**<br>This parameter is only accessible on the graphic display terminal if **[2 parameter sets]**(CHA1) is not set to **[No]**(nO).<br>Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed.<br>Select 1 to 15 parameters using ENT (a check mark ✓ appears by your selections) or cancel the parameter selection using ENT.<br>Example:<br>  | |
| PS1-<br>S101<br>...<br>S115 | **[Set N°1]**<br>Parameter is accessible if at least 1 parameter in **[PARAMETER SELECTION]** has been selected.<br>Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected.<br>With the graphic display terminal:<br>  <br>With the integrated operator terminal:<br>Proceed as in the Settings menu using the parameters that appear. | |
| PS2-<br>S201<br>...<br>S215 | **[Set N°2]**<br>Parameter is accessible if at least 1 parameter in **[PARAMETER SELECTION]** has been selected.<br>Identical to **[Set N°1]**(PS1-). | |
| PS3-<br>S301<br>...<br>S315 | **[Set N°3]**<br>This parameter is accessible if **[3 parameter sets]**(CHA2) is not equal to **[No]**(nO) and if at least 1 parameter has been selected in **[PARAMETER SELECTION]**.<br>Identical to **[Set N°1]**(PS1-). | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## Note:

**It is recommended that an attempt be made to switch parameters in the stopped state and a check is made to ensure that it has been performed correctly.**

Some parameters are interdependent and in this case may be restricted at the time of switching.

The mutual dependency of parameters must be taken into account, **even between different sets**.

Example: The highest **[Low speed]** (LSP) must be lower than the lowest **[High speed]** (HSP).

### 5.2.3.6.6.24 [MULTIMOTORS/CONFIG.] (MMC-)

**Switching of the motors or configuration [MULTIMOTORS/CONFIG.](MMC-)**

The inverter can contain up to 3 configurations, which can be stored via menu **[Factory settings]**(FCS-).

Each of these configurations can be activated remotely, enabling adaptation to:

- 2 or 3 different motors or mechanisms (multimotor mode)
- 2 or 3 different configurations for a single motor (multiconfiguration mode)

The two switching modes cannot be combined.

## Note:

**The following conditions MUST be observed:**

- **Switching may only take place when stopped (inverter locked). If a switching request is sent during operation, it will not be executed until the next stop.**
- **In the event of motor switching, the following additional conditions apply:**
  - **When the motors are switched, the power and control terminals concerned must also be switched as appropriate.**
  - **The maximum power of the inverter must not be exceeded by any of the motors.**
- **All the configurations to be switched must be set and saved in advance in the same hardware configuration, this being the definitive configuration (option and communication cards). In the event of non-compliance with this provision, there is the danger that the inverter will be locked with error [Incorrect config.](CFF).**

**Menu and parameters that can be switched in mode "Multimotor"**

- **[SETTINGS]**(SEt-)
- **[MOTOR CONTROL]**(drC-)
- **[INPUTS/ OUTPUTS CFG]**(I_O-)
- **[COMMAND]**(CtL-)
- **[APPLICATION FUNCT.]**(Fun-), with the exception of function **[MULTIMOTORS/CONFIG.]** (only configure once)
- **[FAULT MANAGEMENT]**(FLt)
- **[MY MENU]**
- **[USER CONFIG.]**: The name of the configuration specified by the user in menu **[Factory settings]**(FCS-)

**Menu and parameters that can be switched in mode "Multiconfiguration"**

As in multimotor mode, except for the motor parameters that are common to the three configurations:

- Nominal current
- Thermal current
- Nominal voltage
- Rated frequency
- Nominal speed
- Nominal power
- IR compensation
- Slip compensation
- Synchronous motor parameters
- Type of thermal protection
- Thermal state
- The autotuning parameters and motor parameters that can be accessed in expert mode
- Type of motor control

## Note:

**No other menus or parameters can be switched.**

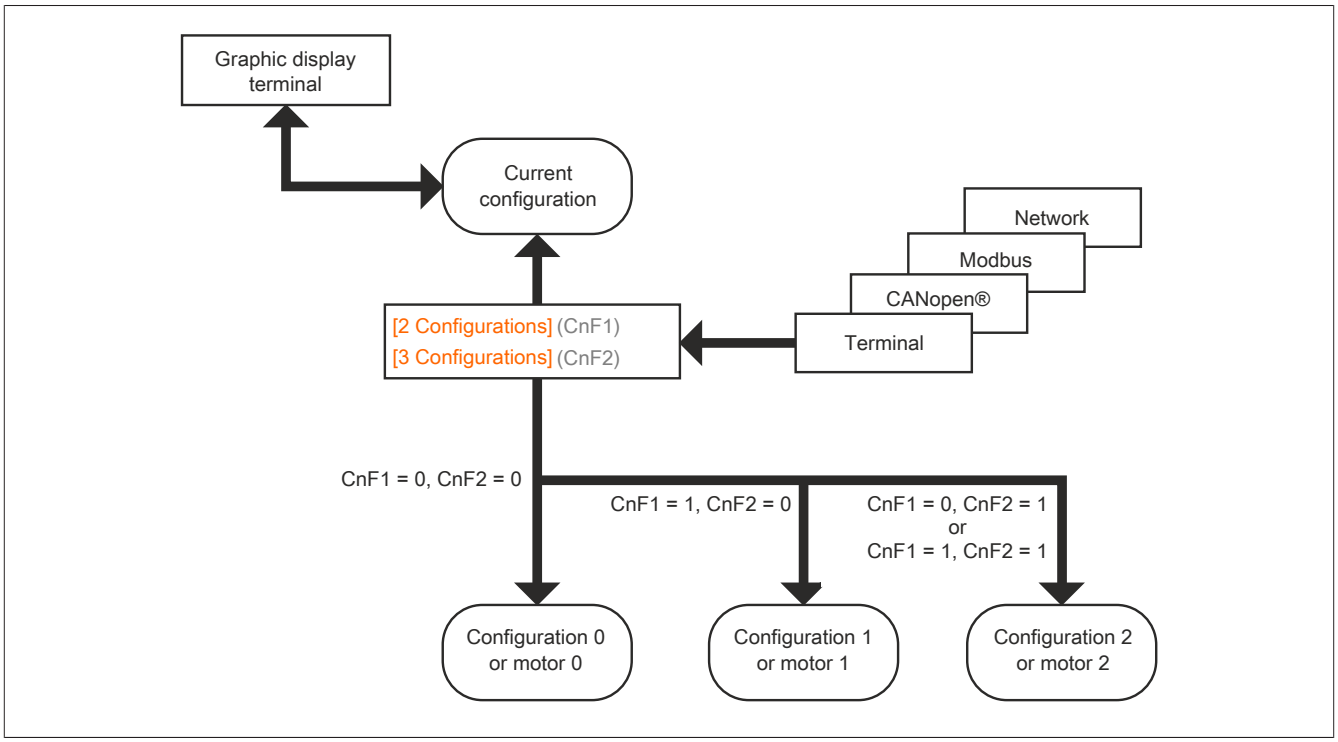
**Transferring configurations to other inverters with the graphic display terminal when using function [MULTIMOTORS/CONFIG.](MMC-)**

Example: A is the source, B is the target. In this example, configuration switching occurs via the logic input.

1) Connect graphic display terminal to inverter A.
2) Set LI ([2 Configurations](CnF1)) and LI ([3 Configurations](CnF2)) to 0.
3) Download configuration 0 as a file on the graphic display terminal (Example: File 1 of the graphic display terminal).
4) Set LI ([2 Configurations](CnF1)) to 1 and leave LI ([3 Configurations](CnF2)) at 0.
5) Download configuration 1 as a file on the graphic display terminal (Example: File 2 of the graphic display terminal).
6) Set LI ([3 Configurations](CnF2)) to 1 and leave LI ([2 Configurations](CnF1)) at 1.
7) Download configuration 2 as a file on the graphic display terminal (Example: File 3 of the graphic display terminal).
8) Connect graphic display terminal to inverter B.
9) Set LI ([2 Configurations](CnF1)) and LI ([3 Configurations](CnF2)) to 0.
10) Configure inverter B to factory settings.
11) Upload the configuration file 0 onto the inverter (file 1 on the graphic display terminal in this example).
12) Set LI ([2 Configurations](CnF1)) to 1 and leave LI ([3 Configurations](CnF2)) at 0.
13) Upload the configuration file 1 onto the inverter (file 2 on the graphic display terminal in this example).
14) Set LI ([3 Configurations](CnF2)) to 1 and leave LI ([2 Configurations](CnF1)) at 1.
15) Upload the configuration file 2 onto the inverter (file 3 on the graphic display terminal in this example).

## Note:

**Steps 6, 7, 14 and 15 are only required if function [MULTIMOTORS/CONFIG.](MMC-) is used with 3 configurations or 3 motors.**



### Switching command

Depending on the number of motors or selected configuration (2 or 3), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

| LI<br>2 motors or configurations | LI<br>3 motors or configurations | Number of configurations<br>or active motors |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 2 |
| 1 | 1 | 2 |

### Schematic diagram for mode "Multimotor"

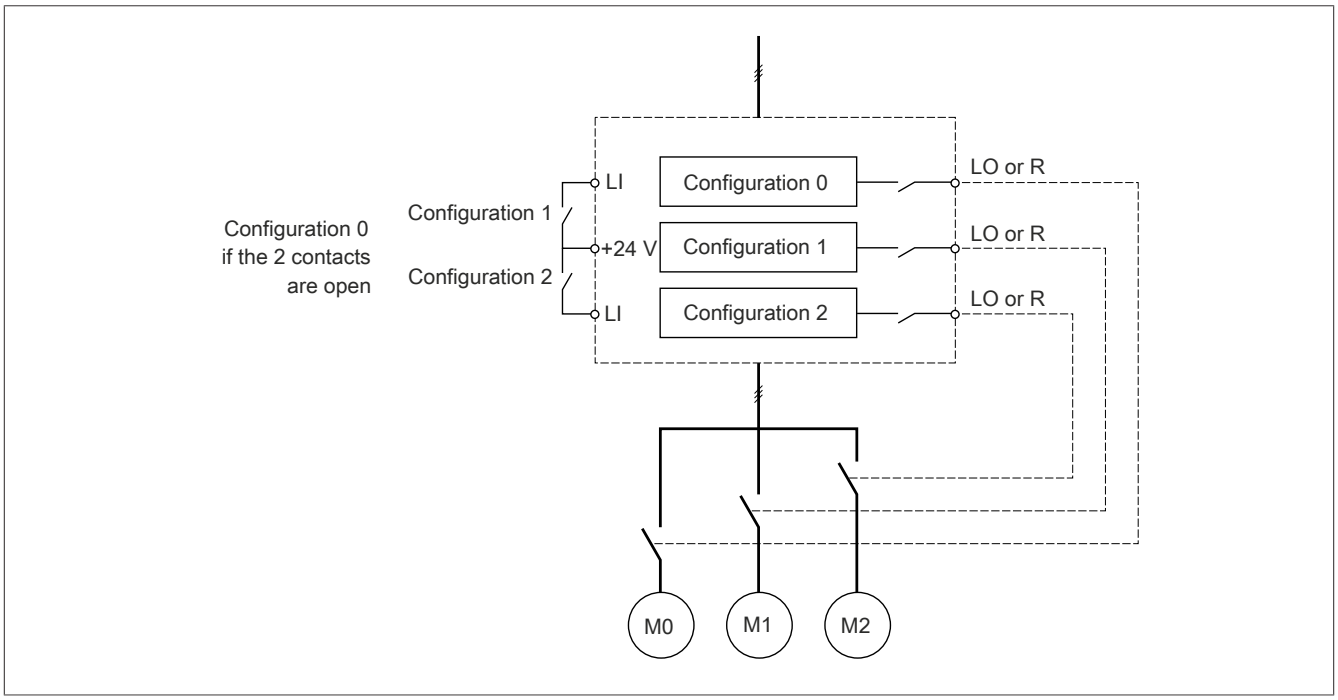
## Note:

**MOTOR OVERHEATING**

**The individual motor thermal states are not stored when the inverter is switched off. When the inverter is switched back on, it does not know the thermal state of the connected motors.**

**In order to ensure correct temperature monitoring of the motors, an external temperature sensor must be installed for each motor.**

**Failure to observe these instructions can result in damage to the equipment.**




### Autotuning in mode "Multimotor"

This autotuning can be performed:

- Manually using a logic input when the motor changes
- Automatically on each 1st enabling of the motor after the inverter is switched on if parameter **[Automatic autotune]** (AUt) is set to **[YES]** (YES).

### Motor thermal states in mode "Multimotor":

The inverter protects each of the three motors separately, with each thermal state observing all stop times including the switch-off time of the inverter itself.

### Configuration information output

Via menu [INPUTS/OUTPUTS](I-O-) any configuration or any motor (2 or 3) can be assigned to a logic output in order to transfer information locally.

**Note:**

**Due to the changeover of menu [INPUTS/OUTPUTS](I-O-), these outputs must be assigned in all configurations if the information is necessary.**

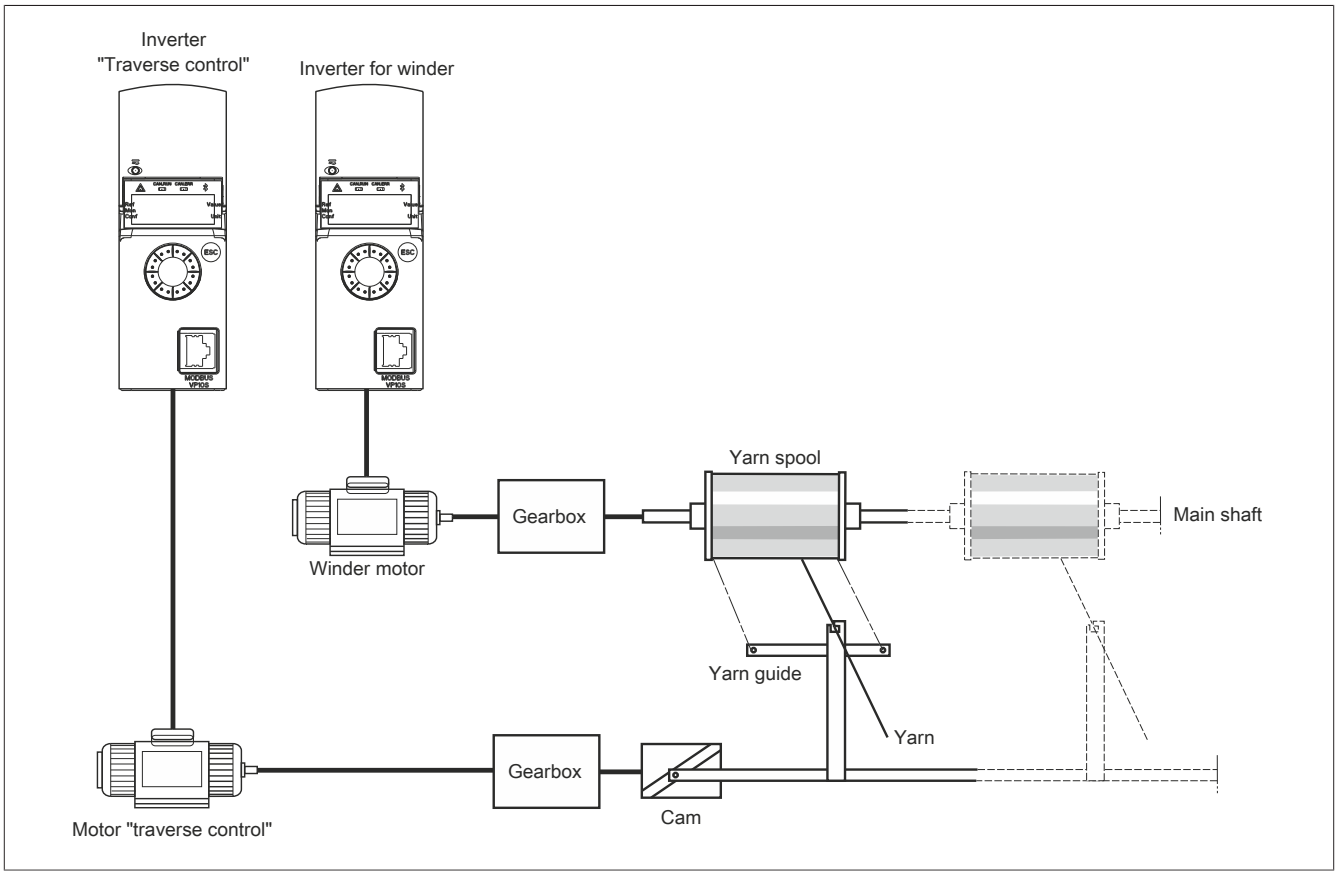
| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > MMC- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| MMC- | [MULTIMOTORS/CONFIG.] | |
| CHM | [Multimotors] | [No](nO) |
| | **Note:**<br>**MOTOR OVERHEATING**<br>**If the inverter is switched off, the thermal states of the connected motors are not stored.**<br>**When the inverter is switched back on, the inverter does not know the thermal state of the connected motors.**<br>• **In order to ensure that the temperature of each connected motor is monitored correctly, separate temperature sensors must be used.**<br>**Failure to observe these instructions can result in damage to the equipment.** | |
| nO | [No](nO): Several possible configurations | |
| YES | [YES](YES): Several possible motors | |
| CnF1 | [2 Configurations]<br>Switching between two motors or two configurations. | [No](nO) |
| nO | [No](nO): No switchover | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See the assignment conditions. | |
| | If [Profile] (CHCF) is set to [Not separ.](SIM) or [Separate] (SEP), parameters [CD11] (Cd11) to [CD15] (Cd15), [C111] (C111) to [C115] (C115), [C211] (C211) to [C215] (C215) and [C311] (C311) to [C315] (C315) are not available. | |
| CnF2 | [Configuration 3]<br>Switching of 3 motors or 3 configurations<br>Identical to [2 Configurations](CnF1). | [No](nO) |
| | **Note:**<br>**To obtain 3 motors or 3 configurations, [2 Configurations](CnF1) must also be configured.** | |

## 5.2.3.6.6.25 [AUTO-TUNING BY LI] (tnL-)

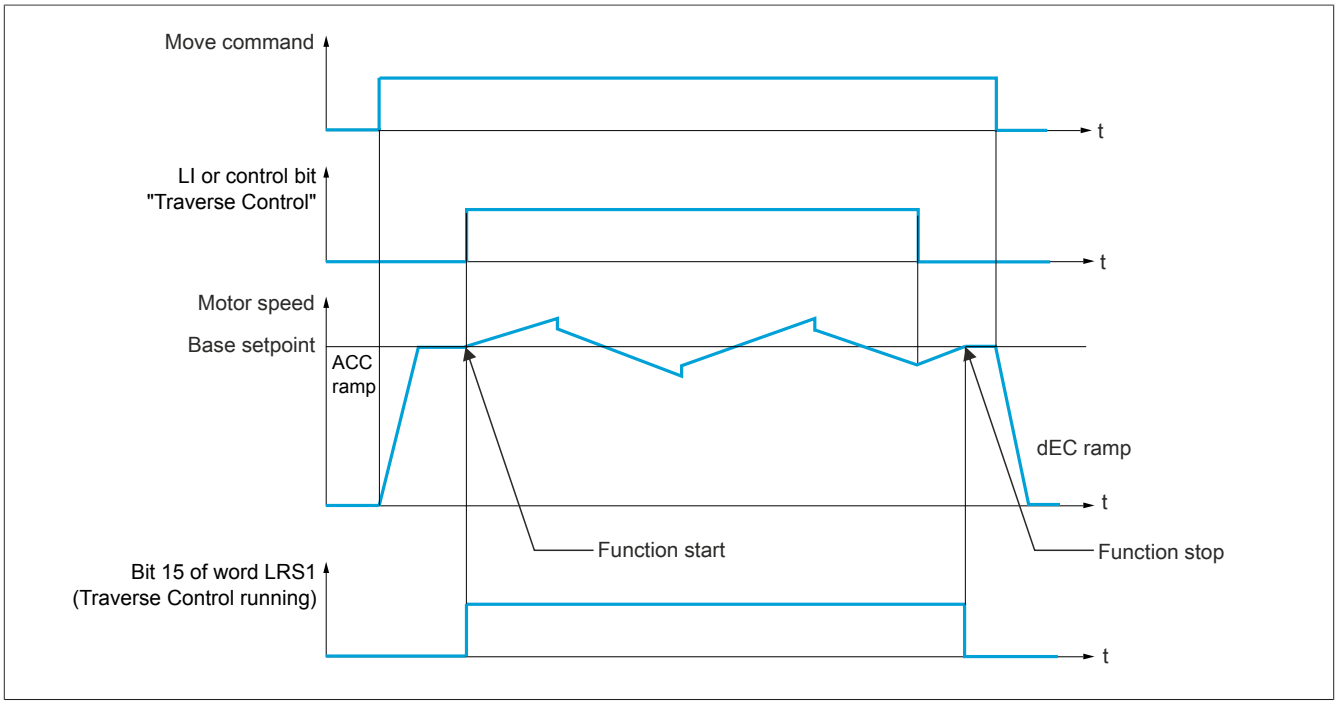
| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tnL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| tnL- | [AUTO-TUNING VIA LI] | |
| tUL | [Auto-tune assign.]<br>Autotuning is performed when the assigned input or bit changes to 1. | [No](nO) |
| | **Note:**<br>**The motor is placed under voltage by the autotuning.** | |
| nO | [No](nO): Not assigned | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See the assignment conditions. | |

### 5.2.3.6.6.26 [TRAVERSE CONTROL] (tr0-)

Winding reels of yarn (in textile applications)




The speed of rotation of the cam must follow a precise profile to ensure that the reel is steady, compact and linear.



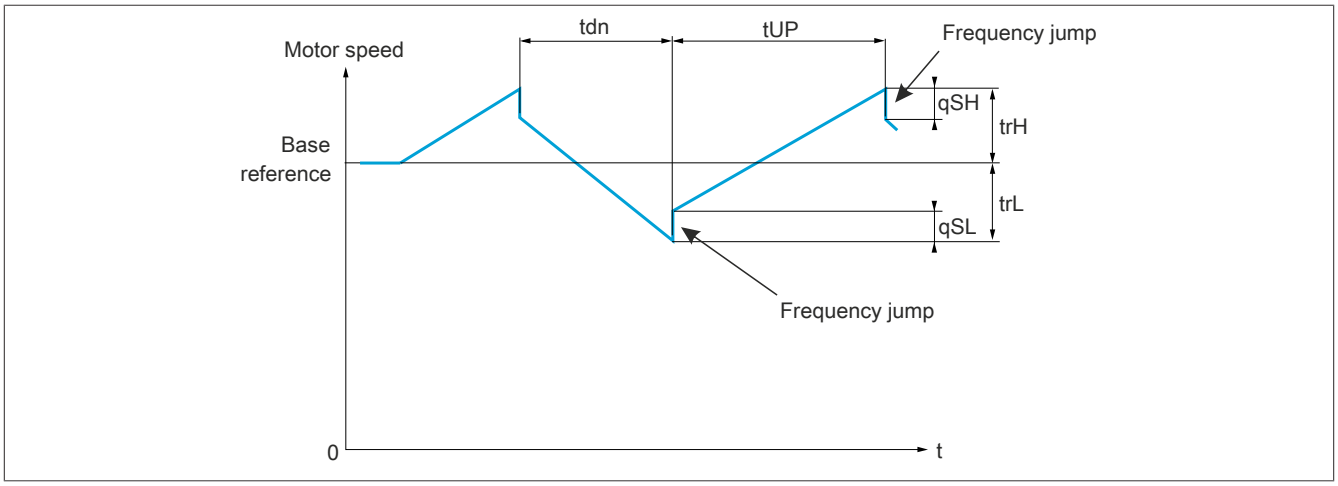

The function starts if the inverter has reached its base setpoint and command "Traverse control" has been enabled.

When command "Traverse control" is disabled, the inverter returns to its base setpoint, following the ramp determined by function "Traverse control". The function then stops, as soon as it has returned to this reference.

Bit 15 of word LRS1 is at 1 while the function is active.

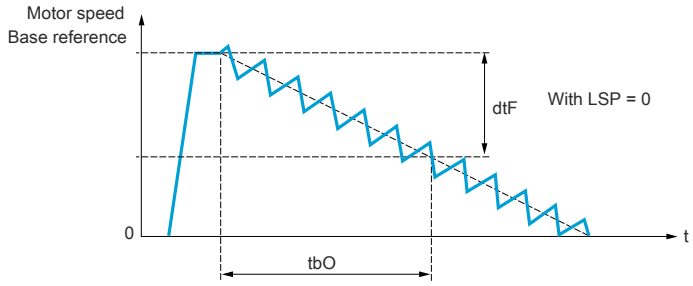
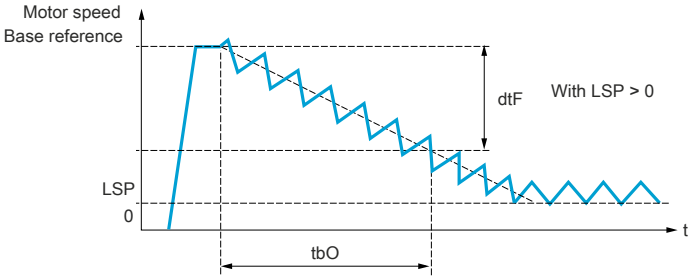
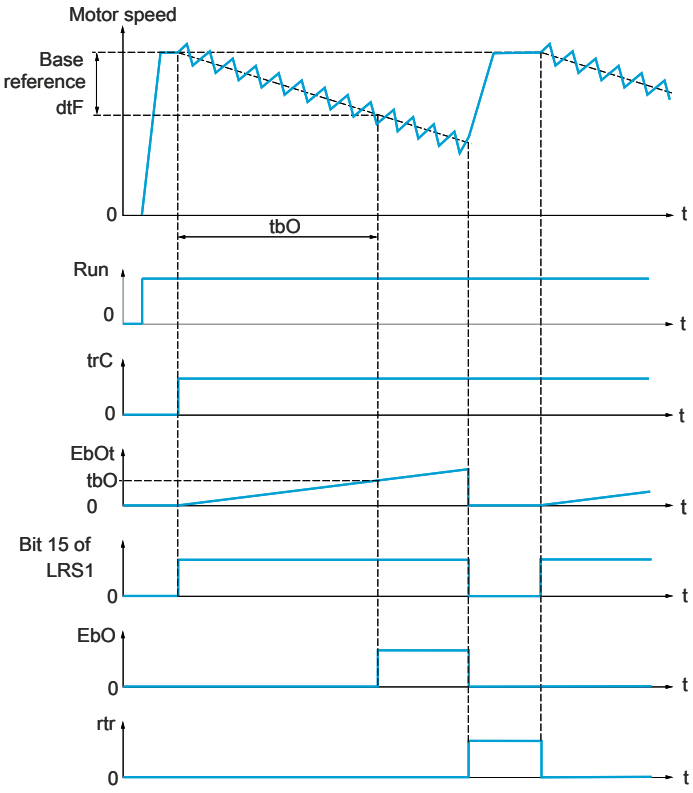
### Function parameters

These define the cycle of frequency variations around the base reference, as shown in the figure below:

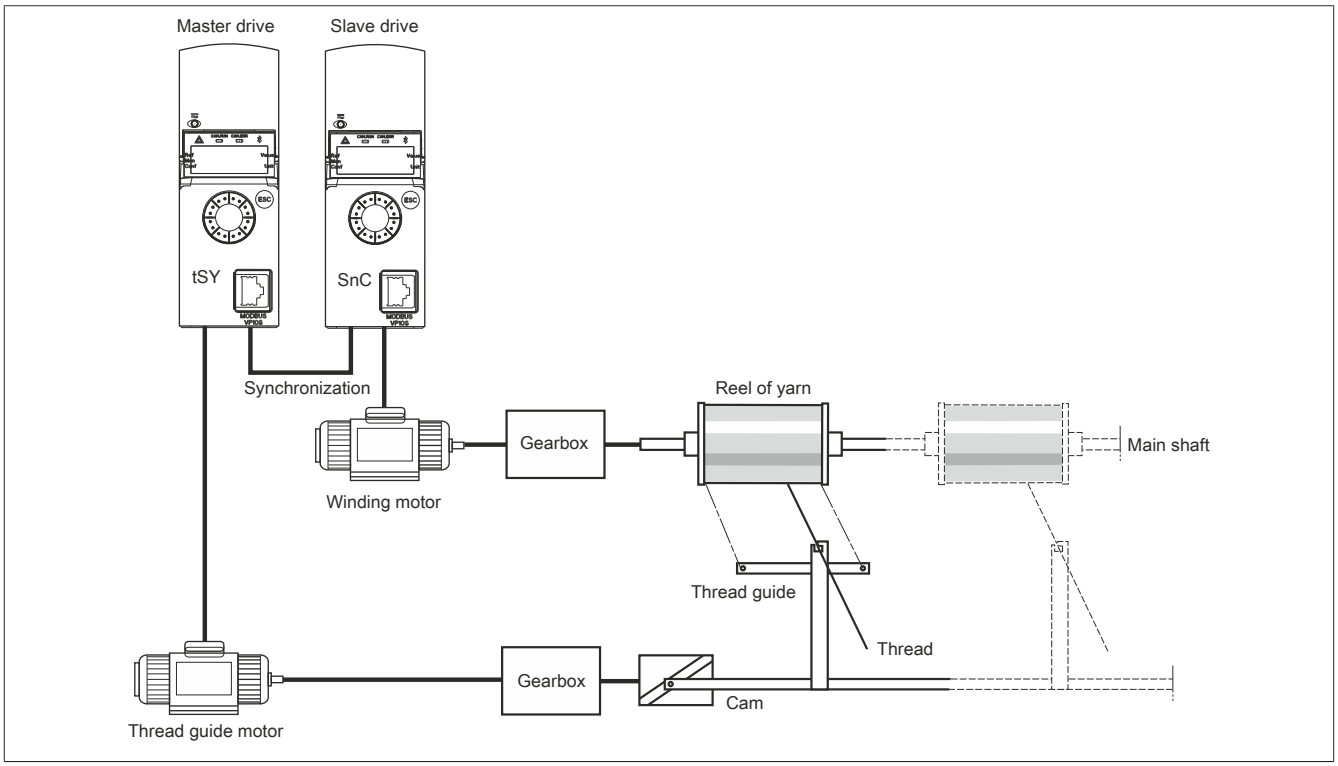



| | |
|---|---|
| trC | **[Yarn control]**(trC): Assignment of command "Traverse control" to a logic input or to a communication bus control word bit. |
| trH | **[Traverse freq. high]**(trH): In hertz |
| trL | **[Traverse freq. low]**(trL): In hertz |
| qSH | **[Quick step High]**(qSH): In hertz |
| qSL | **[Quick step Low]**(qSL): In hertz |
| tUP | **[Traverse ctrl. accel.]**(tUP): In seconds |
| tdn | **[Traverse ctrl. decel]**(tdn): In seconds |

## Reel parameters:

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tr0- | |
|---|---|
| **Code** | **Name/Description** |
| tr0- | **[TRAVERSE CONTROL]** |
| tbO | **[Reel time]**(tbO): Time to rewind a reel in minutes.<br>This parameter displays the end of the rewinding. If the operating time in mode "Traverse control" via control command **[Yarn control]**(trC) reaches the value of **[Reel time]**(tbO), the logic output or one of the relays changes to state 1 if the corresponding function has been assigned to **[End reel]**(EbO).<br>Operating timeEbOt in mode "Traverse control" can be monitored online via a communication bus. |
| dtF | **[Decrease ref. speed]**(dtF): Reduction of the basic setpoint.<br>In certain cases, the base reference must be reduced as the reel increases in size. Value **[Decrease ref. speed]**(dtF) corresponds to time **[Reel time]**(tbO). Once this time has elapsed, the reference continues to fall, following the same ramp. If low speed **[Low speed]**(LSP) is set to 0 and the frequency of 0 Hz has been reached, the inverter will stop and must be switched on again via a new move command.<br>If low speed **[Low speed]**(LSP) is not equal to 0, function "Traverse control" continues to execute at above **[Low speed]**(LSP).<br>  <br>  |
| rtr | **[Init. traverse ctrl]**: Reinitialization of "Traverse control".<br>This control command can be assigned to a logic input or to a bit of a communication bus's control word. It sets the alarm EbO and the operating time EbOt back to zero and initializes the reference again with the basic reference. As long as rtr remains set to1, function "Traverse control" will be locked and the frequency will remain the same as the base setpoint.<br>This control command is used especially when changing reels.<br>  |

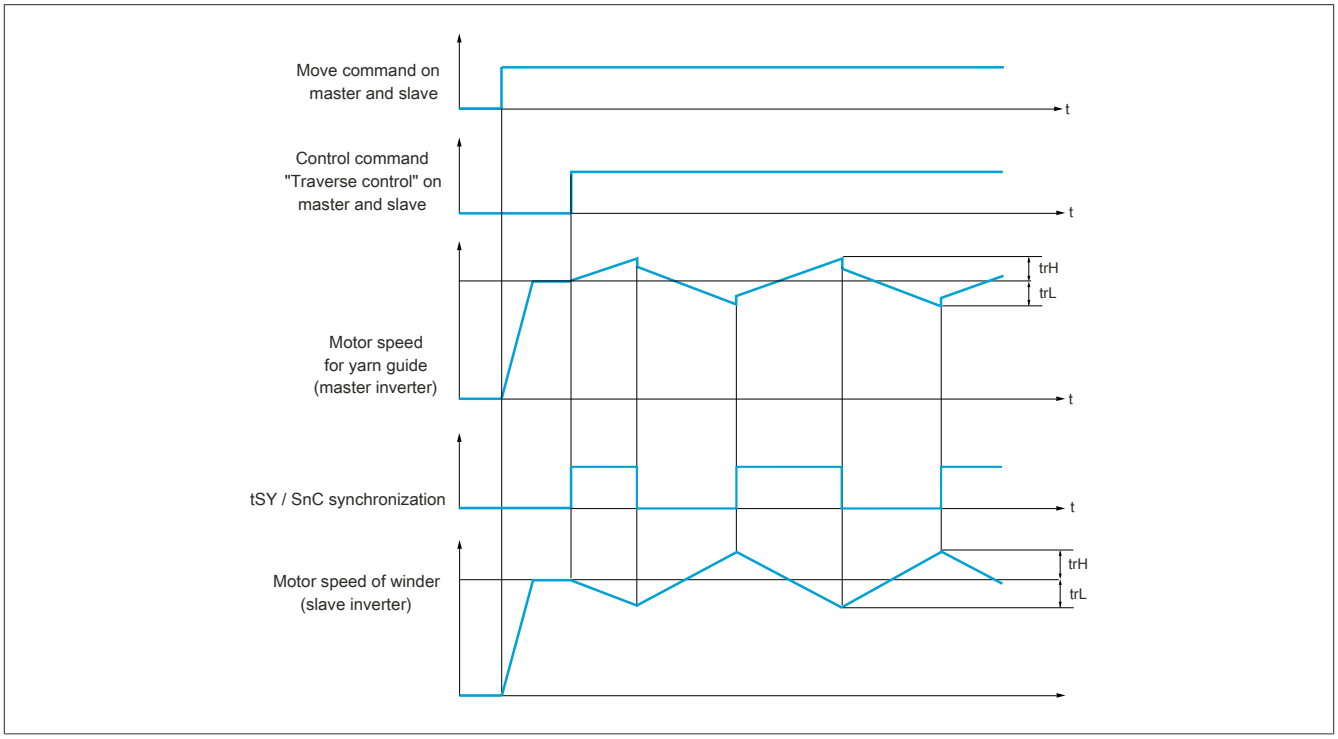
## Counter wobble



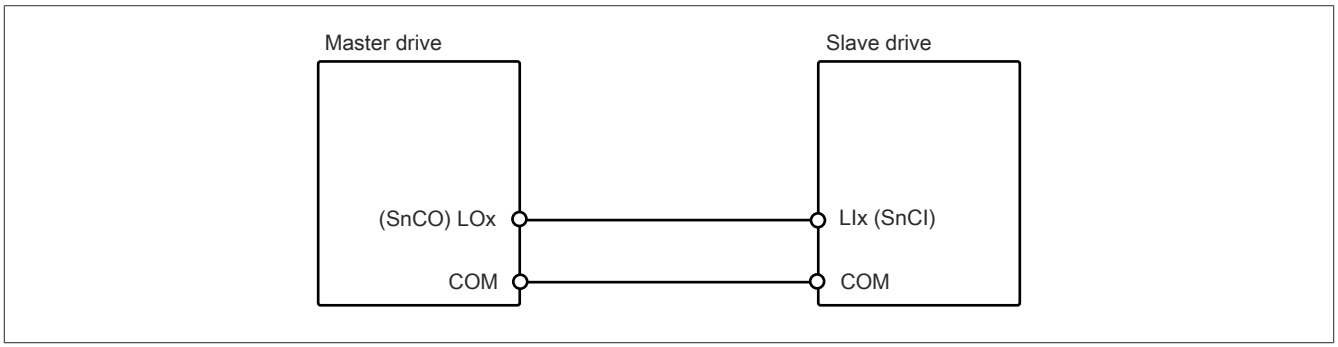

Function "Counter wobble" is used in some applications to attain a constant voltage of the yarn since function "Traverse control" causes strong frequency fluctuations in the motor of the thread guide ([Traverse freq. high](trH) and [Traverse freq. low](trL).).

Two motors must be used (one master and one slave).

The master controls the speed of the yarn guide; the slave controls the winding speed. The function returns a speed profile to the slave in the opposite direction to the master. This means that synchronization is then required using one of the master's logic outputs and one of the slave's logic inputs.



## Connection of synchronization inputs/outputs




The starting conditions for the function are:

- Base frequencies reached on both inverters
- Input [Yarn control](trC) is enabled
- Synchronization signal present

> **Note:**
>
> **Parameters [Quick step High](qSH) and [Quick step Low](qSL) should generally be left set to zero.**

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tr0- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tr0- | [TRAVERSE CONTROL]<br>**Note:**<br>**This function cannot be used with certain other functions.** | | |
| trC | [Yarn control]<br>The "traverse control" cycle starts in state 1 of the assigned input or bit and stops in state 0.<br>nO [No](nO): Function not active. The other parameters are then not accessible.<br>LI1 [LI1](LI1): Logic input LI1<br>... [...](...): See the assignment conditions. | | [No](nO) |
| trH<br>(1) | [Traverse freq. high]<br>Traverse frequency high. | 0 to 10 Hz | 4 Hz |
| trL<br>(1) | [Traverse freq. low]<br>Traverse frequency low. | 0 to 10 Hz | 4 Hz |
| qSH<br>(1) | [Quick step High]<br>High quick step. | 0 to [Traverse freq. high](trH) | 0 Hz |
| qSL<br>(1) | [Quick step Low]<br>Low quick step. | 0 to [Traverse freq. low](trL) | 0 Hz |
| tUP | [Traverse ctrl. accel.]<br>Traverse control startup time. | 0.1 to 999.9 s | 4 s |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > tr0- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tdn | **[Traverse ctrl. decel]**<br>Traverse control deceleration. | 0.1 to 999.9 s | 4 s |
| tbO | **[Reel time]**<br>Time needed to process a reel. | 0 to 9,999 min | 0 min |
| EbO | **[End reel]**<br>The assigned output or relay changes to state 1 if the operating time in mode "Traverse control" has reached **[Reel time]**(tbO). | | **[No]**(nO) |
| nO | **[No]**(nO): Not assigned | | |
| LO1 | **[LO1]**(LO1): Logic output LO1 | | |
| r2 | **[R2]**(r2): Relay R2 | | |
| dO1 | **[DO1]**(dO1): Analog output AO, which can be used as a logic output. Selection is possible if **[AO1 assignment]**(AO1) is set to **[No]**(nO). | | |
| SnC | **[Counter wobble]**<br>Synchronization input.<br>Only to be configured on the inverter for the winder (slave). | | **[No]**(nO) |
| nO | **[No]**(nO): Function not active. The other parameters are then not accessible. | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | **[...]**(...): See the assignment conditions. | | |
| tSY | **[Sync. wobble]**<br>Synchronization output.<br>To be configured on the yarn guide inverter (master) only. | | **[No]**(nO) |
| nO | **[No]**(nO): Function not assigned | | |
| LO1 | **[LO1]**(LO1) | | |
| r2 | **[R2]**(r2) | | |
| dO1 | **[DO1]**(dO1): Analog output AO, which can be used as a logic output. Selection is possible if **[AO1 assignment]**(AO1) is set to **[No]**(nO). | | |
| dtF | **[Decrease ref. speed]**<br>Decrease in the base reference during the traverse control cycle. | 0 to 599 Hz | 0 Hz |
| rtr | **[Init. traverse ctrl]**<br>If the state of the assigned input or bit changes to 1, the operating time in mode "Traverse control" as well as **[Decrease ref. speed]**(dtF) are both set to zero. | | **[No]**(nO) |
| nO | **[No]**(nO): Function not assigned | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | **[...]**(...): See the assignment conditions. | | |

(1) This parameter can also be accessed via menu **[SETTINGS]**(SEt-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.6.27 [HSP SWITCHING] (CHS-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > CHS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CHS- | **[HSP SWITCHING]** | | |
| SH2 | **[2 High speed]**<br>HSP switchover.<br><br>nO: **[No]**(nO): Function not assigned<br>FtA: **[Freq. Th. attained]**(FtA): Frequency threshold reached<br>F2A: **[Freq. Th. 2 attain]**(F2A): Frequency threshold 2 reached<br>LI1: **[LI1]**(LI1): Logic input LI1<br>...: **[...]**(...): See the assignment conditions. | | **[No]**(nO) |
| SH4 | **[4 High speed]**<br>HSP switchover.<br><br>**Note:**<br>**In order to obtain 4 HSP values, [2 High speed](SH2) must also be configured.**<br><br>Identical to **[2 High speed]**(SH2). | | **[No]**(nO) |
| HSP | **[High speed]**<br>Motor speed with maximum setpoint, setting from **[Low speed]**(LSP) to **[Max frequency]**(tFr).<br>The factory setting changes to 60 Hz if **[[Standard mot. freq]**(bFr) is set to **[60 Hz NEMA]**(60). | 0 or (LSP) to 599 Hz or (TFR) | 50 Hz (if (BFR) = 50 Hz) or 60 Hz (if (BFR) = 60 Hz) |
| HSP2 | **[High speed 2]**<br>Available if **[2 High speed]**(SH2) has not been set to**[No]**(nO).<br><br>Identical to**[High speed]**(HSP). | 0 to 599 Hz | 50 Hz |
| HSP3 | **[High speed 3]**<br>Available if **[4 High speed]**(SH4) has not been set to**[No]**(nO).<br><br>Identical to**[High speed]**(HSP). | 0 to 599 Hz | 50 Hz |
| HSP4 | **[High speed 4]**<br>Available if **[4 High speed]**(SH4) has not been set to**[No]**(nO).<br><br>Identical to**[High speed]**(HSP). | 0 to 599 Hz | 50 Hz |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.6.28 [DC BUS] (dCC-)

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > dCC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| dCC- | **[DC BUS]** | | |
| dCCM | **[DC bus coupling]**<br>DC bus chaining configuration<br><br>nO: **[No]**(nO): Not assigned<br>MAIn: **[Bus & Main]**(MAIn): The inverter is supplied by the DC bus and via the mains. | | **[No]**(nO) |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > dCC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| bUS | [Only Bus](bUS): The inverter is supplied by the Only Bus. Mains supply not wired.<br><br>**Danger!**<br>**MONITORING OF GROUND SHORT CIRCUIT DISABLED, NO ERROR DETECTION**<br>**If setting [Bus & Main](MAIn) is selected for this parameter, ground short-circuit monitoring will be disabled.**<br>• **Do not use this parameter unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Implement alternative functions for monitoring ground short-circuit errors that do not result in the triggering of an automated error response from the inverter. Instead ensure an appropriate equivalent response of a different type in accordance with all applicable regulations and standards including risk assessment considerations.**<br>• **The system must be started up and tested with ground short-circuit monitoring enabled.**<br>• **When commissioning, perform tests and simulations in a controlled environment under controlled conditions to test whether the inverter and the system are functioning as expected.**<br>**Failure to follow these instructions will result in death or serious injury.** | | |
| dCCC | [DC-Bus compat.]<br>Not applicable. | | Inverter |
| IPL<br>★ | [Input phase loss]<br>Inverter behavior when an input phase failure error is detected.<br>This parameter is not available for inverter sizes 8I66S200xxx.00-000.<br>Visible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](Epr) and [DC bus coupling](dCCM) (see above) is set to [No](nO).<br><br>nO [Ignore](nO): The detected error is ignored.<br>YES [Freewheel](YES): Detected error with freewheel stop<br><br>[Input phase loss](IPL) is forced to [Ignore](nO) if [DC-Bus chaining](dCCM) is set to [Only Bus](bUS).<br>See [Input phase loss](IPL) in section "Programming" (DRI- > CONF > FULL > FLT- > IPL-). | | According to inverter performance |
| SCL3<br><br>★ | [Ground short-circuit error]<br>Behavior in the event of a direct ground short-circuit being detected.<br>Access for inverter sizes 4 and 5 (8I66T600550.00-000 to 8I66T601500.00-000).<br>Visible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](Epr) and [DC bus coupling](dCCM) (see above) is set to [No](nO).<br><br>nO [Ignore](nO): The detected error is ignored.<br>YES [Freewheel](YES): Detected error with freewheel stop<br><br>[Ground short circuit](SCL3) is forced to [Ignore](nO) if [DC BUS](dCCM) (see above) is set to [Bus & Main](MAIn).<br><br>**Danger!**<br>**MONITORING OF GROUND SHORT CIRCUIT DISABLED, NO ERROR DETECTION**<br>**If setting [Ignore](No) is set for this parameter, ground short-circuit monitoring is disabled.**<br>• **Do not use this parameter unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Implement alternative functions for monitoring ground short-circuit errors that do not result in the triggering of an automated error response from the inverter. Instead ensure an appropriate equivalent response of a different type in accordance with all applicable regulations and standards including risk assessment considerations.**<br>• **The system must be started up and tested with ground short-circuit monitoring enabled.**<br>• **When commissioning, perform tests and simulations in a controlled environment under controlled conditions to test whether the inverter and the system are functioning as expected.**<br>**Failure to follow these instructions can result in death or serious injury.** | | [Freewheel](YES) |

| The parameters described on this page are accessed by: DRI- > COnF > FULL > FUn- > dCC- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| UrES | **[Mains voltage]** | In accordance with the nominal inverter voltage | In accordance with the nominal inverter voltage |
| | Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr) and **[DC bus coupling]**(dCCM) (see above) is set to **[No]**(nO). Rated voltage of the line supply in V.<br><br>For 8I66x20xxxx.00-000: | | |
| 200 | **[200V ac]**(200): 200 volts AC | | |
| 220 | **[220V ac]**(220): 220 volts AC | | |
| 230 | **[230V ac]**(230): 230 volts AC | | |
| 240 | **[240V ac]**(240): 240 volts AC (factory setting) | | |
| | For 8I66T40xxxx.00-000: | | |
| 380 | **[380V ac]**(380): 380 volts AC | | |
| 400 | **[400V ac]**(400): 400 volts AC | | |
| 440 | **[440Vac]**(440): 440 volts AC | | |
| 460 | **[460V ac]**(460): 460 volts AC | | |
| 500 | **[500V ac]**(500): 500 volts AC (factory setting) | | |
| | For 8I66T60xxxx.00-000: | | |
| 525 | **[525Vac]**(525): 525 volts AC | | |
| 600 | **[600Vac]**(600): 600 volts AC (factory setting) | | |
| USL | **[Undervoltage level]** | See table. | See table. |

Setting the trigger level for the undervoltage error in V. Displayed when **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr).
If DC chaining has been enabled: **[DC-Bus chaining]**(dCCM) = **[Bus & Main]** (MAIn) or **[Only Bus]** (bUS)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | 100 Vdc | 141 Vdc | 141 Vdc |
| 8I66T4xxxxx.00-000 | 190 Vdc | 276 Vdc | 276 Vdc |
| 8I66T6xxxxx.00-000 | 266 Vdc | 304 Vdc | 304 Vdc |

If DC chaining has not been enabled: **[DC bus coupling]**(dCCM) = **[No]** (nO)

| ACOPOSinverter P66 | [Mains voltage] (UrES) | Setting range | | |
|---|---|---|---|---|
| | | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | [200V ac] (200) | 100 Vdc | 141 Vdc | 141 Vdc |
| | [220V ac] (220) | 120 Vdc | | |
| | [230V ac] (230) | 131 Vdc | | |
| | [240V ac] (240) | 141 Vdc | | |
| 8I66T4xxxxx.00-000 | [380V ac] (380) | 190 Vdc | 276 Vdc | 276 Vdc |
| | [400V ac] (400) | 204 Vdc | | |
| | [440Vac] (440) | 233 Vdc | | |
| | [460V ac] (460) | 247 Vdc | | |
| | [500V ac] (500) | 276 Vdc | | |
| 8I66T6xxxxx.00-000 | [525Vac] (525) | 266 Vdc | 304 Vdc | 304 Vdc |
| | [600Vac] (600) | 304 Vdc | | |

This parameter is also visible in (DRI > CONF > FULL > FLT- > USB-).

| | | | |
|---|---|---|---|
| Vbr | **[Braking level]** | See table. | See table. |

Braking transistor command level. Visible if **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr).
If DC chaining has been enabled: **[DC-Bus chaining]**(dCCM) = **[Bus & Main]** (MAIn) or **[Only Bus]** (bUS):

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | 395 Vdc | 395 Vdc | 395 Vdc |
| 8I66T4xxxxx.00-000 | 820 Vdc | 820 Vdc | 820 Vdc |
| 8I66T6xxxxx.00-000 | 995 Vdc | 995 Vdc | 995 Vdc |

If DC chaining has not been enabled: **[DC bus coupling]**(dCCM) = **[No]** (nO):

| ACOPOSinverter P66 | [Mains voltage] (UrES) | Setting range | | |
|---|---|---|---|---|
| | | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | [200V ac] (200) | 335 Vdc | 395 Vdc | 395 Vdc |
| | [220V ac] (220) | 365 Vdc | | |
| | [230V ac] (230) | 380 Vdc | | |
| | [240V ac] (240) | 395 Vdc | | |
| 8I66T4xxxxx.00-000 | [380V ac] (380) | 698 Vdc | 820 Vdc | 820 Vdc |
| | [400V ac] (400) | 718 Vdc | | |
| | [440Vac] (440) | 759 Vdc | | |
| | [460V ac] (460) | 779 Vdc | | |
| | [500V ac] (500) | 820 Vdc | | |
| 8I66T6xxxxx.00-000 | [525Vac] (525) | 941 Vdc | 995 Vdc | 995 Vdc |
| | [600Vac] (600) | 995 Vdc | | |

This parameter is also visible in (DRI- > CONF > FULL > DRC-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

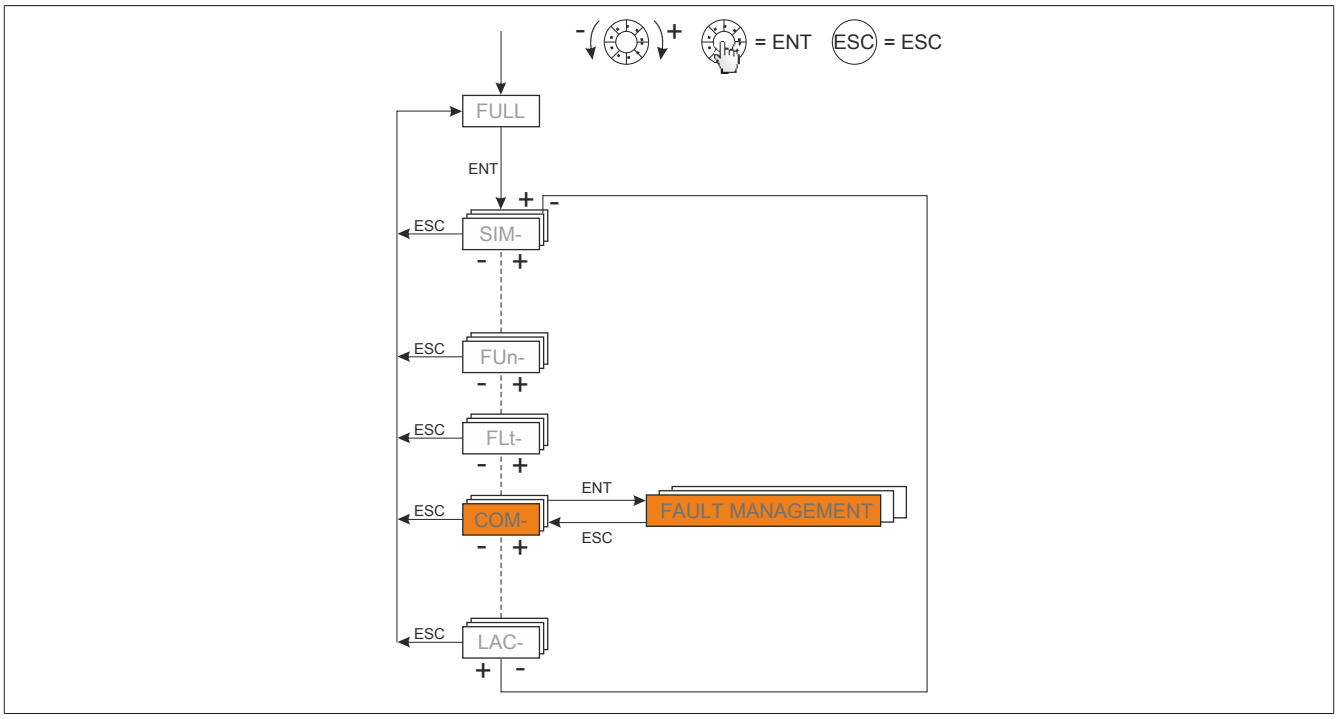
### 5.2.3.6.7 [FAULT MANAGEMENT] FLt-

**With integrated display terminal:**

Overview of functions:

| Code | Name |
|---|---|
| PtC | [PTC MANAGEMENT] |
| rSt | [FAULT RESET] |
| Atr | [AUTOMATIC RESTART] |
| AlS | [AUTOMATIC RESTART] |
| FLr | [CATCH ON THE FLY] |
| tHt | [MOTOR THERMAL PROT.] |
| OPL | [Output Phase Loss] |
| IPL | [Input phase loss] |
| OHL | [DRIVE OVERHEAT] |
| SAt | [THERMAL ALARM STOP] |
| EtF | [EXTERNAL FAULT] |
| USb | [UNDERVOLTAGE MGT] |
| tIt | [IGBT test] |
| LFL | [4-20 mA LOSS] |
| InH | [FAULT INHIBITION] |
| CLL | [COM. FAULT MANAGEMENT] |
| Sdd | [ENCODER FAULT] |
| tId | [TORQUE/CURRENT LIM .] |
| FqF | [FREQUENCY METER] |
| dLd | [DYNAMIC LOAD DETECT.] |
| tnF | [AUTO TUNING FAULT] |
| PPI | [CARDS PAIRING] |
| ULd | [PROCESS UNDERLOAD] |
| OLd | [PROCESS OVERLOAD] |
| LFF | [FALLBACK SPEED] |
| FSt | [FAST STOP] |
| dCI | [DC Injection] |

From menu (ConF)




The parameters of menu [FAULT MANAGEMENT](FLt-) can only be changed during standstill and without a move command. The parameters with an arrow symbol in the "Code" column are exceptions to this rule. These parameters can be changed during operation and in stop mode.

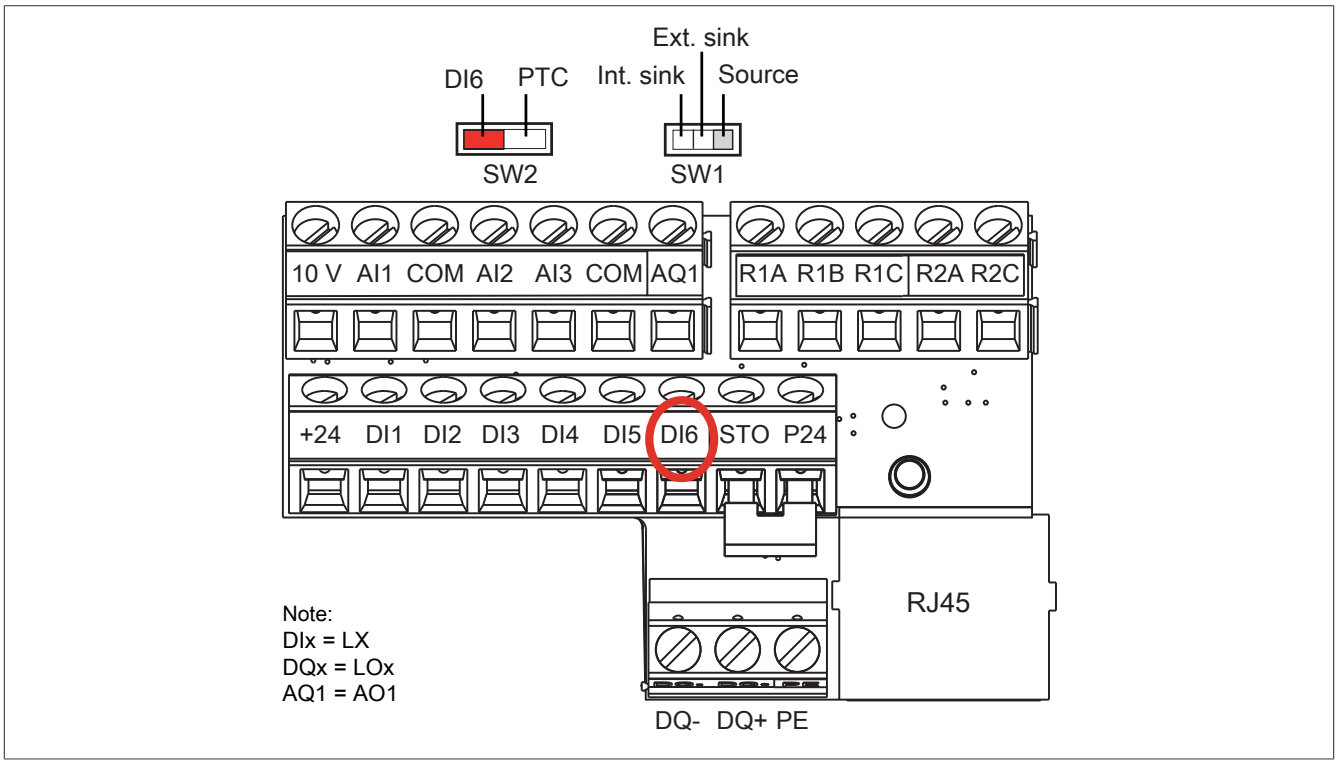
### 5.2.3.6.7.1 [PTC MANAGEMENT] (PtC-)

The inverter can process a set of PTC sensors for motor protection. One PTC sensor at logic input LI6. It is enabled via switch "SW2" on the control card.

The PTC sensor is monitored continuously for the following errors:

- Overtemperature on the motor
- Sensor break fault
- Sensor short-circuit fault

Protection via PTC probes does not disable protection via $I^2t$ calculation performed by the inverter. The two types of protection can be combined.




Contrary to the typical definition of sink and source, the following statements apply to this product:

Sink: The digital inputs need a voltage sink, i.e. the current flows out of the inputs and outputs.

Source: The digital inputs need a voltage source, i.e. the current flows into the inputs and outputs.

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > PtC- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| PtC- | **[PTC MANAGEMENT]** | |
| PtCL | **[LI6 = PTC probe]**<br>PTC sensor configuration is active only when switch SW2 is set to PTC. | **[No]**(nO) |
| nO | **[No]**(nO): Not used | |
| AS | **[Always]**(AS): The PTC sensors are monitored permanently, even if the power unit is not connected; provided the controller unit remains connected to the power supply. | |
| rdS | **[Boot]**(rdS): The PTC sensors are monitored while the inverter power unit is connected. | |
| rS | **[Motor on]**(rS): The PTC sensors are monitored while the motor is switched on. | |

### 5.2.3.6.7.2 [FAULT RESET] (rSt-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > rSt- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| rSt- | [FAULT RESET] | |
| rSF | [FAULT RESET] | [No](nO) |
| | The error is reset if the assigned input or bit changes to 1, provided the cause of the error has been resolved.<br>The STOP/RESET button on the graphic display terminal performs the same function.<br>The following detected errors can be deleted manually: ASF, brF, bLF, CnF, COF, dLF, EPF1, EPF2, FbES, FCF2, InF9, InFA, InFb, LCF, LFF3, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtFL, PHF, PtFL, SCF4, SCF5, SLF1, SLF2, SLF3, SOF, SPF, SSF, tJF, tnF and ULF.<br>**Note:**<br>**If [Extended Fault reset](HrFC) is set to [Yes](YES), the following detected errors can also be acknowledged manually: OCF, SCF1 and SCF3.**<br>If [Profile] (CHCF) is set to [Not separ.](SIM) or [Separate] (SEP), parameters [CD11] (Cd11) to [CD15] (Cd15), [C111] (C111) to [C115] (C115), [C211] (C211) to [C215] (C215) and [C311] (C311) to [C315] (C315) are not available. | |
| nO | [No](nO): Function not active | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | [...](...): See Assignment conditions. | |
| rPA | [Product reset assig.] | [No](nO) |
| | The restart function performs an error reset and then restarts the inverter. During this restart, the inverter runs through the same steps as if it were switched off and then switched on again. Depending on the wiring and configuration of the inverter, this can result in sudden, unexpected operation. The restart function can be assigned to a digital input.<br>**Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**The restart function executes an error reset and restarts the inverter.**<br>**Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>This parameter can only be changed if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr).<br>Inverter reinitialization via logic input. Can be used to reset all faults without having to disconnect the inverter from the power supply. The frequency inverter is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The inverter can only be reinitialized when locked.<br>To assign the reinitialization, press and hold the ENT key for 2 seconds. | |
| nO | [No](nO): Function not active | |
| LI1 | [LI1](LI1): Logic input LI1 | |
| ... | ... | |
| LI6 | [LI6](LI6): Logic input LI6 | |
| LAI1 | [LAI1](LAI1): Logic input AI1 | |
| LAI2 | [LAI2](LAI2): Logic input AI2 | |
| rP | [Product reset] | [No](nO) |
| | The restart function performs a fault reset and then restarts the inverter. During this restart, the inverter runs through the same steps as if it were switched off and then switched on again. Depending on the wiring and configuration of the inverter, the restart can also be triggered via a digital input (see [Product reset assig.] (rPA) 391).<br>**Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>**The restart function executes an error reset and restarts the inverter.**<br>**Make sure that enabling this function does not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>This parameter is only accessible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr).<br>Inverter reinitialization. Can be used to reset all faults without having to disconnect the inverter from the power supply. | |
| nO | [No](nO): Function not active | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > rSt- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| YES | [YES](YES): Reinitialization. The ENT button must be pressed for two seconds. The parameter changes automatically to [No](nO) as soon as the process is complete. The inverter can only be reinitialized when locked. | |
| HrFC | **[Extended Fault reset]** | [No](nO) |
| | This parameter is only accessible if [3.1 ACCESS LEVEL](LAC) is set to [Expert](EPr).<br><br>Can be used in order to select access level [Fault reset](rSF). It allows detected errors to be reset without switching off the inverter. | |
| nO | [No](nO): Function not active | |
| YES | [YES](YES): Function active | |

**Note:**

**If [Extended Fault reset](HrFC) is set to [Yes](YES), the following detected errors can also be acknowledged manually: OCF, SCF1 and SCF3.**

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.7.3 [AUTOMATIC RESTART] (Atr-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > Atr- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| Atr- | **[AUTOMATIC RESTART]** | |
| Atr<br>2 s | **[Automatic restart]**<br>If the cause of the error that triggered the transition to error state is resolved while this function is active, the inverter reverts to normal operation. For the duration that automatic error reset attempts are performed, output signal "Operating state fault" will not be available. If these error reset attempts are unsuccessful, the inverter remains in operating state "Fault" and output signal "Fault" is enabled.<br> <br>**Danger!**<br>**UNEXPECTED OPERATION OF THE EQUIPMENT**<br>• **Make sure that enabling this function does not result in unsafe states.**<br>• **Check whether a safety risk is posed by the fact that the response to errors in operating state is not available when this function is enabled.**<br>**Failure to follow these instructions can result in death or serious injury.**<br>The inverter's failure notification relay remains enabled for as long as the function is active. The frequency reference and the direction of operation must be maintained.<br>Use the 2 wire control ([2/3 wire control](tCC) = [2 wire control](2C) and [Type 2 wire](tCt) = [Level](LEL)).<br>If the inverter still does not restart after configurable time interval tAr has elapsed, the process is ended and the inverter remains locked until it is switched off and then switched back on again.<br>nO: [No](nO): Function not active<br>YES: [YES](YES): Automatic restart after locking due to a fault in case this fault has been resolved and the other operating conditions are conducive to the inverter restarting. The inverter is restarted by means of a series of automatic attempts in increasing intervals of time: 1 s, 5 s, 10 s, after that,1 minute for all subsequent attempts. | [No](nO) |
| tAr | **[Max. restart time]**<br>This parameter is accessible if [Automatic restart](Atr) is set to [Yes](YES). This parameter can be used to limit the number of consecutive restarts in the event of a recurring fault.<br>5: [5 min](5): 5 minutes<br>10: [10 min](10): 10 minutes<br>30: [30 min](30): 30 minutes<br>1h: [1 hour](1h): 1 hour<br>2h: [2 hours](2h): 2 hours<br>3h: [3 hours](3h): 3 hours<br>Ct: [continuous](Ct): Continuous | [5 min](5) |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.7.4 [AUTOMATIC RESTART] (ALS-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > ALS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ALS- | **[AUTOMATIC RESTART]** | | |
| Ctd<br>(1) | **[Current threshold]**<br>Threshold value of the motor current. | 0 to 65535<br>or 1.5*INV (1) | INV |
| Ftd | **[Freq. threshold]**<br>Threshold value of the output frequency. | 0 to 599 Hz | 50 Hz |
| F2d | **[Freq. threshold 2]**<br>Threshold value of the output frequency. | 0 to 599 Hz | 50 Hz |
| ttH | **[High torque thd.]**<br>Frequency threshold value for high torque. | -300 to 300% | 100% |
| ttL | **[Low torque thd.]**<br>Frequency threshold value for low torque. | -300 to 300% | 50% |
| FqL | **[Pulse warning thd.]**<br>Frequency level.<br>Available if [Frequency meter](FqF) is not equal to [No](nO). | 0 to 20,000 Hz | 0 Hz |

(1) Corresponding to the nominal current of the inverter specified on the nameplate.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.5 [CATCH ON THE FLY] (FLr-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > FLr- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| FLr- | [CATCH ON THE FLY]<br>**Note:**<br>**This function cannot be used with certain other functions.** | |
| FLr | [Catch on the fly]<br>Used to enable a smooth restart if the run command is maintained after the following events:<br>• Mains supply failure or disconnection.<br>• Reset of current fault or automatic restart<br>• Freewheel stop<br>The frequency preset by the inverter is applied again, starting at the estimated speed of the motor at the time of the restart, and then increasing until the frequency setpoint has been reached.<br>This function requires 2-wire level control.<br>When the function is active, it intervenes each time a move command is executed, resulting in a slight current delay (0.5 s max.).<br>[Catch on the fly](FLr) is forced to [No](nO) if brake logic control [Brake assignment](bLC) is assigned, or if [Auto DC injection](AdC) is set to [continuous](Ct). | [No](nO) |
| nO | [No](nO): Function not active | |
| YES | [YES](YES): Function active | |

### 5.2.3.6.7.6 [MOTOR THERMAL PROT.] (tHt-)

#### Functionality

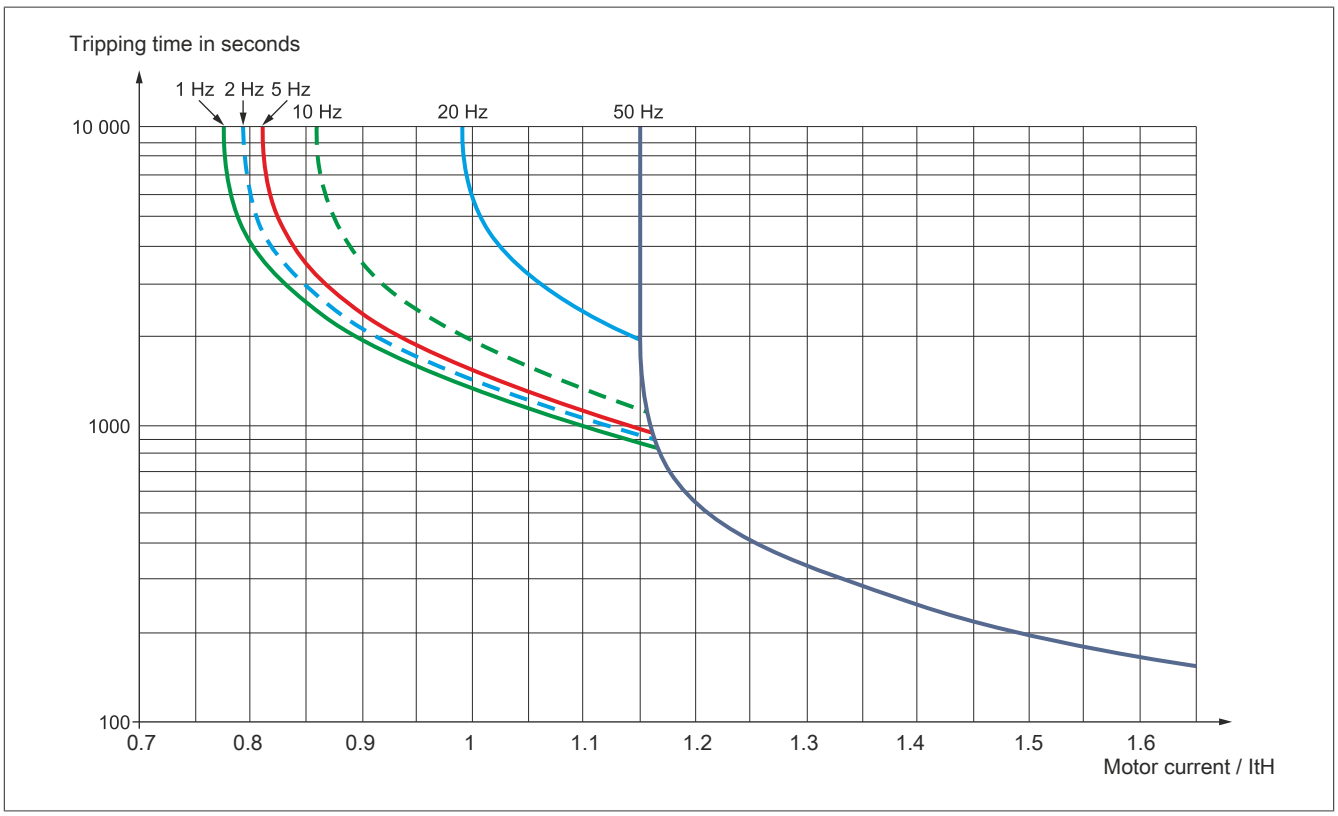
Thermal motor protection based on $I^2t$ calculation.

**Note:**

**The motor thermal state is not saved when the inverter is switched off.**

- Self-cooling motors: The tripping curves depend on the motor frequency.
- Force-cooled motors: Regardless of the motor frequency, only the 50 Hz tripping curve must be observed.

The following characteristic curves show the tripping time in seconds.



## Caution!

**RISK OF DAMAGE TO THE MOTOR**

**External overload protection is required in the following situations:**

- **When the product is switched back on (since the thermal motor state is not saved in any memory)**
- **If power is supplied to multiple motors**
- **If power is supplied to motors with a sizing of less than 0.2 times the nominal current of the inverter**
- **Motor shutdown**

**Failure to observe these instructions can result in damage to the equipment.**

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > tHt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tHt- | [MOTOR THERMAL PROT.] | | |
| tHt | [Motor protect. type] | | [Self cooled](ACL) |
| | **Note:** **A fault trip will occur when the thermal state reaches 118% of the rated state and reactivation will occur when the state falls back below 100%.** | | |
| nO | [No](nO): No protection | | |
| ACL | [Self cooled] (ACL): For self-cooling motors | | |
| FCL | [Force-cool](FCL): For forced-cooled motors | | |
| ttd | [Motor therm. level] | 0 to 118% | 100% |
| | Trip threshold for motor thermal alarm (logic output or relay) | | |
| (1) | | | |
| ttd2 | [Motor2 therm. level] | 0 to 118% | 100% |
| | Trip threshold for motor 2 thermal alarm (logic output or relay) | | |
| ttd3 | [Motor3 therm. level] | 0 to 118% | 100% |
| | Trip threshold for motor 3 thermal alarm (logic output or relay) | | |
| OLL | [Overload fault mgt] | | [Freewheel](YES) |
| | **Caution!** **MOTOR OVERHEATING AND DAMAGE** **Depending on the setting defined for this parameter, the error word is disabled or switching to error operating state is prevented whenever an error is detected.** • **Make sure that the setting defined for this parameter does not result in damage to the device.** • **Implement alternative solutions for the disabled monitoring functions.** **Failure to observe these instructions can result in damage to the equipment.** | | |
| | Type of stop in the event of a motor thermal fault. | | |
| nO | [Ignore](nO): The detected error is ignored. | | |
| YES | [Freewheel](YES): Freewheel | | |
| Stt | [Type of stop](Stt): Stop in accordance with configuration of [Type of stop](Stt) without triggering an error. In this case, the alarm relay does not open and after the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | | |
| LFF | [fallback spd](LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. (2) | | |
| rLS | [Spd maint.](rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. (2) | | |
| rMP | [Ramp stop](rMP): Stopping via ramp | | |
| FSt | [Fast stop](FSt): Fast stop | | |
| dCI | [DC injection] (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | | |
| MtM | [Mot THR memo] | | [No](nO) |
| | The thermal motor state is stored. | | |
| nO | [No](nO): On switch-off, the thermal motor state is not stored. | | |
| YES | [YES](YES): On switch-off, the thermal motor state is stored. | | |

(1) This parameter can also be accessed via menu [SETTINGS](SEt-).
(2) The detected error triggers a motor stop in any case in accordance with B&R ACOPOS management.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.7 [OUTPUT PHASE LOSS] (OPL-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > OPL- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| OPL- | [Output Phase Loss] | | |
| OPL<br>2 s | [Output Phase Loss] | | [YES](YES) |
| | **Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If output phase monitoring is disabled, phase loss and therefore the inadvertent disconnection of cables will not be detected.**<br>**Make sure that the parameter settings do not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.** | | |
| | **Note:**<br>**[Output Phase Loss](OPL) is set to [No](nO) if [Motor control type](Ctt) is set to [Sync. mot.](SYn). For other configuration of parameter [Motor control type](Ctt), [Output Phase Loss](OPL) is forced to [Yes](YES), if the brake logic is configured.** | | |
| nO | [No](nO): Function not active | | |
| YES | [Yes](YES): Triggered if [Output Phase Loss](OPL) with freewheel stop | | |
| OAC | [Output cut](OAC): No fault triggered, but output voltage controlled to prevent overcurrent when the connection with the motor is re-established, catch-on-the-fly function executed too (even if this function has not been configured).<br>The inverter switches to state [Output cut](SOC) once the time set by [OutPh time detect](Odt) has elapsed. The catch-on-the-fly function can be executed as soon as the inverter state switches to [Output cut](SOC). | | |
| Odt | [OutPh time detect] | 0.5 to 10 s | 0.5 s |
| | Delay in taking into account the recorded fault [Output Phase Loss](OPL). | | |

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.7.8 [Input phase loss] (IPL-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > IPL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| IPL- | [Input phase loss] | |
| IPL<br>2 s | [Input phase loss]<br>This parameter is not available for inverter sizes 8Ix6S200xxx.00-000.<br>In this case, there are no factory-preset values available.<br>Factory setting: [Freewheel](YES) for 3-phase inverters 380 to 500 V.<br>In the event of a phase loss, a power derating occurs and the inverter switches to error state [Input phase loss](PHF).<br>If two or three phases are lost, the inverter triggers error [Input phase loss](PHF). | According to inverter performance |
| nO | [Fault ignored](nO): Detected error is ignored | |
| YES | [Freewheel](YES): Error with freewheel stop. | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.7.9 [OUTPUT PHASE LOSS] (OPL-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > OPL- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| OPL- | [Output Phase Loss] | | |
| OPL<br>2 s | [Output Phase Loss] | | [YES](YES) |
| | **Danger!**<br>**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**<br>**If output phase monitoring is disabled, phase loss and therefore the inadvertent disconnection of cables will not be detected.**<br>**Make sure that the parameter settings do not result in unsafe states.**<br>**Failure to follow these instructions can result in death or serious injury.** | | |
| | **Note:**<br>**[Output Phase Loss](OPL) is set to [No](nO) if [Motor control type](Ctt) is set to [Sync. mot.](SYn). For other configuration of parameter [Motor control type](Ctt), [Output Phase Loss](OPL) is forced to [Yes](YES), if the brake logic is configured.** | | |
| nO | [No](nO): Function not active | | |
| YES | [Yes](YES): Triggered if [Output Phase Loss](OPL) with freewheel stop | | |
| OAC | [Output cut](OAC): No fault triggered, but output voltage controlled to prevent overcurrent when the connection with the motor is re-established, catch-on-the-fly function executed too (even if this function has not been configured).<br>The inverter switches to state [Output cut](SOC) once the time set by [OutPh time detect](Odt) has elapsed. The catch-on-the-fly function can be executed as soon as the inverter state switches to [Output cut](SOC). | | |
| Odt | [OutPh time detect] | 0.5 to 10 s | 0.5 s |
| | Delay in taking into account the recorded fault [Output Phase Loss](OPL). | | |

Parameter that can be modified during operation or when stopped.

2 s To change the assignment of this parameter, press the ENT key for 2 seconds.

### 5.2.3.6.7.10 [THERMAL ALARM STOP] (SAt-)

#### Deferred stop on thermal alarm

This function prevents the inverter from stopping between two process steps if the inverter or motor overheats by authorizing operation until the next stop. At the next stop, the inverter is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. Example: A trip threshold set to 80% enables reactivation at 60%.

One thermal state threshold must be defined for the inverter, and one thermal state threshold for the motor(s), which will trip the deferred stop.

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > SAt- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| SAt- | [THERMAL ALARM STOP] | | |
| SAt | [Thermal alarm stop] | | [No](nO) |
| | This function can be used to set a user-specific alarm level for the thermal inverter or motor state. Once this level is reached, the inverter freewheels to a stop. | | |
| nO | [No](nO): Function inactive (in this case, subsequent parameters cannot be accessed) | | |
| YES | [YES](YES): Freewheel stop when inverter or motor thermal alarm triggered | | |
| tHA | [Drv therm. state al] | 0 to 118% | 100% |
| | Thermal state threshold of the inverter tripping a deferred stop. | | |
| ttd | [Motor therm. level] | 0 to 118% | 100% |
| | Thermal state threshold of the motor tripping a deferred stop. | | |
| ttd2 | [Motor2 therm. level] | 0 to 118% | 100% |
| | Threshold value of the thermal state of motor 2 for which a delayed stop has been triggered. | | |
| ttd3 | [Motor3 therm. level] | 0 to 118% | 100% |
| | Threshold value of the thermal state of motor 3 for which a delayed stop has been triggered. | | |

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.7.11 [EXTERNAL FAULT] (EtF-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > EtF- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| EtF- | **[EXTERNAL FAULT]** | |
| EtF | **[External fault ass.]**<br>If the assigned bit is at 0, there is no external fault.<br>If the assigned bit is at 1, there is an external fault.<br>The logic is configurable via **[External fault config]**(LEt) if a logic input is assigned. | **[No]**(nO) |
| nO | **[No]**(nO): Function not active | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions. | |
| LEt | **[External fault config]**<br>Parameter can be accessed if the external fault has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the fault. | **[Active high]**(HIG) |
| LO | **[Active low]**(LO): Fault on falling edge (change from 1 to 0) of the assigned input. | |
| HIG | **[Active high]**(HIG): Fault on rising edge (change from 0 to 1) of the assigned input. | |
| EPL | **[External fault mgt]**<br>Type of stop in the event of an external fault. | **[Freewheel]**(YES) |
| nO | **[Fault ignored]**(nO): External error ignored | |
| YES | **[Freewheel]**(YES): Freewheel | |
| Stt | **[In accordance with STT]**(Stt): Stop in accordance with configuration of **[Type of stop]**(Stt) without triggering an error. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | |
| LFF | **[fallback spd]**(LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. (1) | |
| rLS | **[Spd maint.]**(rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. (1) | |
| rMP | **[Ramp stop]**(rMP): Stopping via ramp | |
| FSt | **[Fast stop]**(FSt): Fast stop | |
| dCI | **[DC injection]** (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | |

(1) Since the detected fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

## 5.2.3.6.7.12 [UNDERVOLTAGE MGT] (USb-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > USb- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| USb- | **[UNDERVOLTAGE MGT]** | | |
| USb | **[UnderV. fault mgt]** | | **[Flt&R1open]**(0) |
| | Behavior of the inverter in the event of an undervoltage. | | |
| 0 | **[Flt&R1open]**(0): The inverter triggers an error and the external error signal is triggered (the error relay assigned to **[No fault]**(FLt) is opened). | | |
| 1 | **[Flt&R1close]**(1): The inverter triggers an error, but the external error signal is not triggered (the error relay assigned to **[No fault]**(FLt) remains closed). | | |
| 2 | **[Alarm]**(2): Alarm and error relay remain closed. The alarm can be assigned to a logic output or a relay. | | |
| UrES | **[Mains voltage]** | According to nominal voltage | According to nominal voltage |
| | Rated voltage of the line supply in V.<br>For 8I66x20xxxx.00-000: | | |
| 200 | **[200V ac]**(200): 200 volts AC | | |
| 220 | **[220V ac]**(220): 220 volts AC | | |
| 230 | **[230V ac]**(230): 230 volts AC | | |
| 240 | **[240V ac]**(240): 240 volts AC (factory setting) | | |
| | For 8I66T40xxxx.00-000: | | |
| 380 | **[380V ac]**(380): 380 volts AC | | |
| 400 | **[400V ac]**(400): 400 volts AC | | |
| 440 | **[440Vac]**(440): 440 volts AC | | |
| 460 | **[460V ac]**(460): 460 volts AC | | |
| 500 | **[500V ac]**(500): 500 volts AC (factory setting) | | |
| | For 8I66T60xxxx.00-000: | | |
| 525 | **[525Vac]**(460): 525 volts AC | | |
| 600 | **[600Vac]**(460): 600 volts AC (factory setting) | | |
| USL | **[Undervoltage level]** | See table. | See table. |

Setting the trigger level for the undervoltage error in V.
Displayed when **[3.1 ACCESS LEVEL]**(LAC) is set to **[Expert]**(Epr). The setting range is defined in the following table:
If DC chaining has been enabled: **[DC-Bus chaining]**(dCCM) = **[Bus & Main]** (MAIn) or **[Only Bus]** (bUS)

| ACOPOSinverter P66 | Setting range | | |
|---|---|---|---|
| | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | 100 Vdc | 141 Vdc | 141 Vdc |
| 8I66T4xxxxx.00-000 | 190 Vdc | 276 Vdc | 276 Vdc |
| 8I66T6xxxxx.00-000 | 266 Vdc | 304 Vdc | 304 Vdc |

If DC chaining has not been enabled: **[DC bus coupling]**(dCCM) = **[No]** (nO)

| ACOPOSinverter P66 | [Mains voltage] (UrES) | Setting range | | |
|---|---|---|---|---|
| | | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | [200V ac] (200) | 100 Vdc | 141 Vdc | 141 Vdc |
| | [220V ac] (220) | 120 Vdc | | |
| | [230V ac] (230) | 131 Vdc | | |
| | [240V ac] (240) | 141 Vdc | | |
| 8I66T4xxxxx.00-000 | [380V ac] (380) | 190 Vdc | 276 Vdc | 276 Vdc |
| | [400V ac] (400) | 204 Vdc | | |
| | [440Vac] (440) | 233 Vdc | | |
| | [460V ac] (460) | 247 Vdc | | |
| | [500V ac] (500) | 276 Vdc | | |
| 8I66T6xxxxx.00-000 | [525Vac] (525) | 266 Vdc | 304 Vdc | 304 Vdc |
| | [600Vac] (600) | 304 Vdc | | |

This parameter is also visible in (DRI > CONF > FULL > FLT- > USB-).

| | | | |
|---|---|---|---|
| USt | **[Undervolt. time out]** | 0.2 s to 999.9 s | 0.2 s |
| | Time delay for taking undervoltage fault into account. | | |
| StP | **[UnderV. prevention]** | | **[No]**(nO) |
| | Behavior when the undervoltage prevention level is reached. | | |
| nO | **[No]**(nO): No action | | |
| MMS | **[DC Maintain]**(MMS): This stop mode uses the inertia to maintain the DC bus voltage as long as possible. | | |
| rMP | **[Ramp stop]**(rMP): Stop according to a configurable ramp **[Max stop time]**(StM) | | |
| LnF | **[Drive lock]**(LnF): Locking (freewheel stop) without error | | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > USb- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| tSM | **[UnderV. restart tm]** | 1.0 s to 999.9 s | 1.0 s |
| | Time delay before a restart is permitted after a complete standstill for **[UnderV. prevention]**(StP) = **[Ramp stop]**(rMP), if the voltage has reached the normal value. | | |
| UPL | **[Prevention level]** | See table. | See table. |
| | Setting of the level for undervoltage prevention in V. Access is possible if **[UnderV. prevention]**(StP) is not equal to **[No]**(nO). The adjustment range and the factory setting are dependent on the nominal voltage of the inverter as well as on the value of **[Mains voltage]**(UrES). | | |

| ACOPOSinverter P66 | [Mains voltage] (UrES) | Setting range | | |
|---|---|---|---|---|
| | | Min. value | Max. value | Default |
| 8I66S2xxxxx.00-000, 8I66T2xxxxx.00-000 | [200V ac] (200) | 141 Vdc | 163 Vdc | 163 Vdc |
| | [220V ac] (220) | | | |
| | [230V ac] (230) | | | |
| | [240V ac](240) | | | |
| 8I66T4xxxxx.00-000 | [380V ac] (380) | 276 Vdc | 318 Vdc | 318 Vdc |
| | [400V ac] (400) | | | |
| | [440Vac] (440) | | | |
| | [460V ac] (460) | | | |
| | [500V ac](500) | | | |
| 8I66T6xxxxx.00-000 | [525Vac] (525) | 304 Vdc | 368 Vdc | 368 Vdc |
| | [600Vac] (600) | | | |

| | | | |
|---|---|---|---|
| StM | **[Max stop time]** | 0.01 to 60.00 s | 1.00 s |
| | Ramp-up time if **[UnderV. prevention]**(StP) is set to **[Ramp stop]**(rMP). | | |
| tbS | **[DC bus maintain tm]** | 1 to 9,999 s | 9,999 s |
| | Stopping time of the DC bus if **[UnderV. prevention]**(StP) is set to **[DC Maintain]**(MMS). | | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.13 [IGBT test] (tIt-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > tIt- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| tIt- | **[IGBT test]** | |
| Strt | **[IGBT test]** | **[No]**(nO) |
| nO | **[No]**(nO): No test | |
| YES | **[Yes]** (YES): The IGBTs are tested on power-up and every time a move command is sent. These tests cause a slight delay (a few ms). In the event of a fault, the inverter will lock. The following faults can be detected:<br>• Inverter output short circuit (terminals U-V-W): SCF displayed.<br>• IGBT error: xtF, where x indicates the number of the affected IGBT.<br>• IGBT short circuit: x2F, where x indicates the number of the affected IGBT | |

### 5.2.3.6.7.14 [4-20 mA LOSS] (LFL-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > LFL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| LFL- | **[4-20 mA LOSS]** | |
| LFL3 | **[AI3 4-20mA loss]** | **[Fault ignored]**(nO) |
| nO | **[Fault ignored]**(nO): Detected error ignored. This is the only possible configuration if **[AI3 min value]**(CrL3) is less than 3 mA. | |
| YES | **[Freewheel]**(YES): Freewheel | |
| Stt | **[In accordance with STT]**(Stt): Stop in accordance with the configuration of **[Type of stop]**(Stt), with no error triggered. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | |
| LFF | **[fallback spd]**(LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. (1) | |
| rLS | **[Spd maint.]**(rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. (1) | |
| rMP | **[Ramp stop]**(rMP): Stopping via ramp | |
| FSt | **[Fast stop]**(FSt): Fast stop | |
| dCI | **[DC injection]** (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | |

(1) Since the detected fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

### 5.2.3.6.7.15 [FAULT INHIBITION] (InH-)

The parameter is accessible in mode **[Expert]**.

| The parameters described below are accessed as follows: DRI- > COnF > FULL > FLt- > InH- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| InH- | **[FAULT INHIBITION]** | |
| InH | **[Fault inhibit assign.]** | **[No]**(nO) |
| | In rare cases, the monitoring functions of the inverter are not desired as they hamper the application. A typical example would be a smoke extraction fan that is used as part of a fire safety system. For example, in the event of a fire, the fan in a smoke extractor needs to work for as long as possible, even if the permissible ambient temperature of the inverter has been exceeded.<br>With such applications, damage or destruction of the system is acceptable as collateral damage because it prevents other higher-risk damage. For this type of application, a parameter is provided for disabling specific monitoring functions so that automatic error detection and response are no longer active for the device. For disabled monitoring functions, alternative functions must be implemented so that users and/or superordinate control systems can respond appropriately to detected error conditions.<br>If the overheating monitoring function of an inverter that is used in a smoke extraction fan is disabled, the inverter itself can trigger a fire if errors are not detected. For example, an overheating condition can be displayed on a control panel, without the inverter having to be automatically stopped immediately by the integrated monitoring functions.<br><br>**Danger!**<br>**MONITORING FUNCTIONS DISABLED, NO ERROR DETECTION**<br>• **Do not use this parameter unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Implement alternative monitoring functions for disabled monitoring functions that do not trigger any automatic error responses from the inverter. However, you should also enable other types of appropriate, equivalent response in accordance with all applicable regulations and standards as well as risk evaluation considerations.**<br>• **Start the system with monitoring functions enabled and then test it.**<br>• **When commissioning, perform tests and simulations in a controlled environment under controlled conditions to test whether the inverter and the system are functioning as expected.**<br>**Failure to follow these instructions can result in death or serious injury.**<br><br>If the assigned input or bit is at 0, fault monitoring is active. If the assigned input or bit is at 1, fault monitoring is inactive. Active faults are reset on a rising edge (change from 0 to 1) of the assigned input or bit.<br><br>**Note:**<br>**This function does not affect function "Safe Torque Off" or detected errors that would lead to a complete failure.**<br><br>The following errors can be suppressed:<br>AnF, CnF, COF, CrF1, dLF, EnF, EPF1, EPF2, FCF2, InFA, InFb, LFF3, ObF, OHF, OLC, OLF, OPF1, OPF2, OSF, OtFL, PHF, PtFL, SLF1, SLF2, SLF3, SOF, SPF, SSF, tJF, tnF and ULF | |
| nO | **[No]**(nO): Function not active | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | |
| ... | **[...]**(...): See the assignment conditions. | |

Parameter that can be modified during operation or when stopped.

To change the assignment of this parameter, press the ENT key for 2 seconds.

## 5.2.3.6.7.16 [COM. FAULT MANAGEMENT] (CLL-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > CLL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| CLL- | [COM. FAULT MANAGEMENT] | |
| CLL | [Network fault mgt] | [Freewheel](YES) |
| | **Warning!**<br>**LOSS OF CONTROL**<br>**If this parameter is set to [Fault ignored](nO), monitoring of fieldbus module communication is disabled.**<br>• **Do not use this setting unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Only use this setting for tests during commissioning.**<br>• **Make sure that communication monitoring has been re-enabled before completing the commissioning process and performing the final commissioning test.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.** | |
| | Behavior of the inverter in the event of a communication fault with a communication card | |
| nO | [Fault ignored](nO): Detected error is ignored | |
| YES | [Freewheel](YES): Freewheel | |
| Stt | [In accordance with STT](Stt): Stop in accordance with the configuration of [Type of stop](Stt) without error triggering. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | |
| LFF | [fallback spd](LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. [1)] | |
| rLS | [Spd maint.](rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. [1)] | |
| rMP | [Ramp stop](rMP): Stopping via ramp | |
| FSt | [Fast stop](FSt): Fast stop | |
| dCI | [DC injection] (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | |
| COL | [CANopen fault mgt] | [Freewheel](YES) |
| | **Warning!**<br>**LOSS OF CONTROL**<br>**If this parameter is set to [Fault ign.](nO), monitoring of CANopen com. module communication is disabled.**<br>• **Do not use this setting unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Only use this setting for tests during commissioning.**<br>• **Make sure that communication monitoring has been re-enabled before completing the commissioning process and performing the final commissioning test.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.** | |
| | Behavior of the inverter in the event of a communication interruption with the integrated CANopen® module | |
| nO | [Fault ignored](nO): Detected error is ignored | |
| YES | [Freewheel](YES): Freewheel | |
| Stt | [In accordance with STT](Stt): Stop in accordance with configuration of [Type of stop](Stt) without triggering an error. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | |
| LFF | [fallback spd](LFF): Change to fallback speed, which is maintained for as long as the error persists and the move command has not been canceled. [1)] | |
| rLS | [Spd maint.](rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. [1)] | |
| rMP | [Ramp stop](rMP): Stopping via ramp | |
| FSt | [Fast stop](FSt): Fast stop | |
| dCI | [DC injection] (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | |

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > CLL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| SLL | [Modbus fault mgt] | [Freewheel](YES) |
| | **Warning!**<br>**LOSS OF CONTROL**<br>**If this parameter is set to [Fault ign.](nO), monitoring of Modbus module communication is disabled.**<br>• **Do not use this setting unless you have performed a detailed risk assessment in line with all applicable regulations and standards for the device and the application.**<br>• **Only use this setting for tests during commissioning.**<br>• **Make sure that communication monitoring has been re-enabled before completing the commissioning process and performing the final commissioning test.**<br>**Failure to follow these instructions can result in serious injury or death as well as damage to the equipment.** | |
| | Behavior of the inverter in the event of a communication interruption with the integrated Modbus. | |
| nO | [Fault ignored](nO): Detected error is ignored | |
| YES | [Freewheel](YES): Freewheel | |
| Stt | [In accordance with STT](Stt): Stop in accordance with the configuration of [Type of stop](Stt), with no error triggered. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to [2/3 wire control](tCC) and [2 wire type](tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | |
| LFF | [fallback spd](LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. [1] | |
| rLS | [Spd maint.](rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. [1] | |
| rMP | [Ramp stop](rMP): Stopping via ramp | |
| FSt | [Fast stop](FSt): Fast stop | |
| dCI | [DC injection] (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | |

1) Since the detected fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

## 5.2.3.6.7.17 [ENCODER FAULT] (Sdd-)

| The parameters described below are accessed as follows: DRI- > COnF > FULL > FLt- > Sdd- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| Sdd- | [ENCODER FAULT] | | |
| Sdd | [Load slip detection]<br>Enabling load slip detection. | | [YES](YES) |
| nO | [No](nO): Detected error is ignored. | | |
| YES | [YES](YES): Freewheel stop<br>The event is triggered by a comparison of the output frequency with the speed feedback in accordance with the configuration of parameters FAnF, LAnF, dANF and tAnF.<br>In addition, the event is triggered when the move command is received during tAnF and the prefixes of the output frequency and the speed feedback are found to conflict.<br>If an error is detected, the inverter switches to a freewheel stop, and if the brake logic function is configured, the brake command is set to 0. | | |
| FAnF | [ANF Frequency Thd.] | | - |
| ✱ | Displayed if [Encoder usage](EnU) = [Fdbk monit.](SEC). | | |
| LAnF | [Thresh. load slip] | | - |
| ✱ | Displayed if [Encoder usage](EnU) = [Fdbk monit.](SEC). | | |
| dAnF | [ANF Direction check] | | - |
| ✱ | Displayed if [Encoder usage](EnU) = [Fdbk monit.](SEC). | | |
| tAnF | [ANF Frequency Thd.] | | - |
| ✱ | Displayed if [Encoder usage](EnU) = [Fdbk monit.](SEC). | | |

✱ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

## 5.2.3.6.7.18 [TORQUE/CURRENT LIM.] (tId-)

| The parameters described below are accessed as follows: DRI- > COnF > FULL > FLt- > tId- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | | **Factory settings** |
| tId- | **[TORQUE/CURRENT LIM .]** | | |
| SSb | **[Trq/I limit. stop]**<br>Behavior when switching to torque mode or current limiting | | **[Fault ignored]**(nO) |
| nO | **[Fault ignored]**(nO): Detected error is ignored | | |
| YES | **Freewheel]**(YES): Freewheel stop | | |
| Stt | **[In accordance with STT]**(Stt): Stop in accordance with the configuration of **[Type of stop]**(Stt), with no error triggered. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (for example, according to **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt), if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | | |
| LFF | **[fallback spd]**(LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. (1) | | |
| rLS | **[Spd maint.]**(rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. (1) | | |
| rMP | **[Ramp stop]**(rMP): Stopping via ramp | | |
| FSt | **[Fast stop]**(FSt): Fast stop | | |
| dCI | **[DC injection]** (dCI): Stop by DC injection braking. This function type cannot be used in combination with certain other functions. | | |
| StO | **[Trq/I limit. time out]** | 0 to 9,999 ms | 1,000 ms |
| | (If **[Trq/I limit. stop]**(SSb) was configured)<br>Delay for taking into account the SSF limitation. | | |

(1) Since the detected fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

Parameter that can be modified during operation or when stopped.

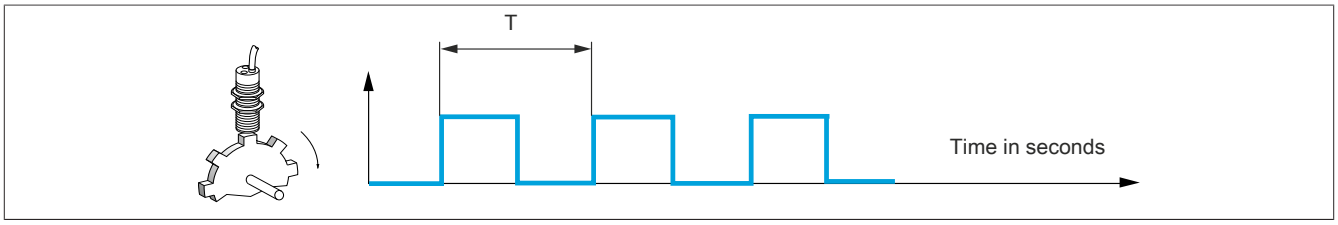
### 5.2.3.6.7.19 [FREQUENCY METER] (FqF-)

**Measurement of motor speed via pulse input.**

This function uses the "pulse input" input and is only applicable if the pulse input is not used for another function.

**Application example**

A notched disk driven by a motor that is connected to a proximity switch can generate a frequency signal proportional to the motor speed.




When applied to the "pulse input" input, this signal provides the following options:

- Measurement and display of the motor speed: Signal frequency = 1/T. This frequency is displayed using parameter **[Pulse in. work. freq.]**(FqS).
- Detection of overspeed; if the measured speed exceeds a predefined threshold value, the inverter will trigger an error.
- Detection of a defective brake; if the brake command is configured. If the speed is not increased fast enough after a brake release command, the inverter will trigger an error. This function enables detection of wear and tear on the brake lining.
- Detection of a speed threshold value, which can be set using **[Pulse warning thd.]**(FqL) and assigned to a relay or logic output.

| The parameters described below are accessed as follows: DRI- > COnF > FULL > FLt- > FqF- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| FqF- | **[FREQUENCY METER]** | | |
| FqF | **[Frequency meter]**<br>Enabling the speed measurement function | | **[No]**(nO) |
| nO<br>YES | **[No]**(nO): Function inactive. All parameters of this function are inaccessible.<br>**[YES]**(YES): Function active. Assignment only possible if input "Pulse input" has not been assigned to another function. | | |
| FqC<br>🔄 | **[Pulse fdbk divisor]**<br>Scaling factor of the "pulse input" input (divisor). The achieved frequency is displayed using parameter **[Pulse in. work. freq.]**(FqS). | 1.0 to 100.0 | 1.0 |
| FqA | **[Overspeed pulse thresh.]**<br>Enabling and setting overspeed monitoring: **[Overspeed]**(SOF). | | **[No]**(nO) |
| nO<br>- | **[No]**(nO): No overspeed monitoring.<br>**1 Hz to 20.00 kHz**: Setting the threshold value for triggering the frequency at the "pulse input" input divided by **[Pulse fdbk divisor]**(FqC). | | |
| tdS | **[Pulse overspd delay]**<br>Delay for taking into account a detected overvoltage error. | 0.0 s to 10.0 s | 0.0 s |
| Fdt | **[Level fr. pulse ctrl]**<br>Enabling and setting "pulse input" input monitoring (speed feedback): **[Speed fdback loss]**(SPF). | | **[No]**(nO) |
| nO<br>- | **[No]**(nO): No speed feedback monitoring<br>**0.1 Hz to 599 Hz**: Setting the frequency threshold value of the motor for triggering the speed feedback error (deviation between the estimated frequency and the measured speed). | | |
| Fqt | **[Pulse thd. wo Run]**<br>Enabling and setting brake monitoring: **[Brake feedback]**(brF).<br>If brake logic **[Brake assignment]**(bLC) is not configured, this parameter is forced to **[No]**(nO). | | **[No]**(nO) |
| nO<br>- | **[No]**(nO): No brake monitoring<br>**1 Hz to 1,000 Hz**: Setting of the motor frequency threshold value. | | |
| tqb | **[Pulse wo Run delay]**<br>Delay for taking into account brake monitoring | 0.0 s to 10.0 s | 0.0 s |

🔄 Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.20 [DYNAMIC LOAD DETECT.] (dLd-)

#### Load variation detection

This detection is only possible with the "high-speed hoisting" function. This function is used to detect whether an obstacle has occurred, triggering a sudden (upward) increase or (downward) decrease in the load.

The detection of a load deviation will result in an error: **[Dynamic load fault]**(dLF). The behavior of the inverter when this error occurs can be configured via parameter **[Dyn. load Mgt.]**(dLb).

Load variation detection can also be assigned to a relay or logic output.

Based on the configuration of the high-speed hoisting, two detection modes are possible:

- "Speed reference" mode:
  **[High speed hoisting optim]**(HSO) = **[Speed ref]**(SSO).
  Detection of torque deviation.
  During high-speed operation, the load is compared to the load measured during the frequency step. The permissible load variation and duration can be configured. If exceeded, the inverter switches to fault mode.
- "Current limitation" mode:
  **[High speed hoisting optim]**(HSO) = **[I limit]**(CSO).
  When hoisting at high operational speeds, a load increase results in a speed reduction. Even if high-speed operation is enabled, the inverter will switch to fault mode if the motor frequency falls below threshold value **[I Limit. frequency]**(SCL). The function only detects an increase in load at the high speed range (up to **[I Limit. frequency]**(SCL)).
  With a reduction, operation continues in accordance with the frequency setpoint.

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > dLd- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| dLd- | **[DYNAMIC LOAD DETECT.]**<br>Load variation detection. This parameter is accessible if **[High speed hoisting optim]**(HSO) is not equal to **[No]**(nO). | | |
| tLd | **[Dynamic load time]**<br>Enabling detection of load variations and setting the delay for taking into account detected error **[Dynamic load fault]**(dLF). | | **[No]**(nO) |
| nO | **[No]**(nO): No detection of variations in load | | |
| - | **0.00 s to 10.00 s**: Setting the delay for taking into account the detected error. | | |
| dLd | **[Dynamic load threshold]**<br>Setting the trigger threshold value for detecting load variations as a percentage of the load measured during the frequency step. | 1 to 100% | 100% |
| dLb | **[Dyn. load Mgt.]**<br>Behavior of the inverter in the event of a load variation fault. | | **[Freewheel]**(YES) |
| nO | **[Fault ignored]**(nO): Detected error is ignored | | |
| YES | **[Freewheel]**(YES): Freewheel | | |
| Stt | **[In accordance with STT]**(Stt): Stop in accordance with the configuration of **[Type of stop]**(Stt), with no error triggered. In this case, the alarm relay does not open and once the fault disappears, the inverter is ready for operation in accordance with the restart conditions of the active command channel (in accordance with **[2/3 wire control]**(tCC) and **[2 wire type]**(tCt) for example, if control is on the terminal side). Configuring an alarm for this fault is recommended (assigned to a logic output, for example) in order to indicate the cause of the stop. | | |
| LFF | **[fallback spd]**(LFF): Change to fallback speed, which is maintained for as long as the fault persists and the move command has not been canceled. (1) | | |
| rLS | **[Spd maint.]**(rLS): The inverter maintains the speed that was applied when the fault occurred, for as long as the fault persists and the move command has not been canceled. (1) | | |
| rMP | **[Ramp stop]**(rMP): Stopping via ramp | | |
| FSt | **[Fast stop]**(FSt): Fast stop | | |

(1) Since the detected fault does not trip a stop in this case, the display of this fault must be assigned to a relay or a logic output.

### 5.2.3.6.7.21 [AUTO TUNING FAULT] (tnF-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > tnF- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| tnF- | [AUTO TUNING FAULT] | |
| tnL | [Autotune fault mgt] | [Freewheel](YES) |
| nO | [Fault ignored](nO): Detected error is ignored | |
| YES | [Freewheel](YES): Freewheel | |

### 5.2.3.6.7.22 [CARDS PAIRING] (PPI-)

The function is only available in mode [Expert](EPr).

This function is used to detect whenever a card has been replaced or the software has been modified in any way.

When a pairing password is entered, the parameters of the cards currently inserted are stored. At each subsequent start, the parameters are checked and if a deviation exists, the inverter locks with the HCF fault. For a restart, the initial situation must be restored or the joining code must be entered again.

The following parameters are verified:

- Card type: For all cards
- Software version: Control card, communication cards
- Serial number: Control card

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > PPI- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| PPI- | [CARDS PAIRING] | | |
| PPI ★ | [Pairing password] | [OFF](OFF) to 9,999 | [OFF](OFF) |
| OFF | The value [OFF](OFF) indicates that the card pairing function is not active. | | |
| - | The value [On](On) indicates that card pairing is enabled and that an access code must be entered in order to unlock the inverter in the event of a pairing error.<br>Once the code has been entered, the inverter is unlocked and the code changes to [ON](On).<br>The PPI code is an unlock code known only to B&R customer support. | | |

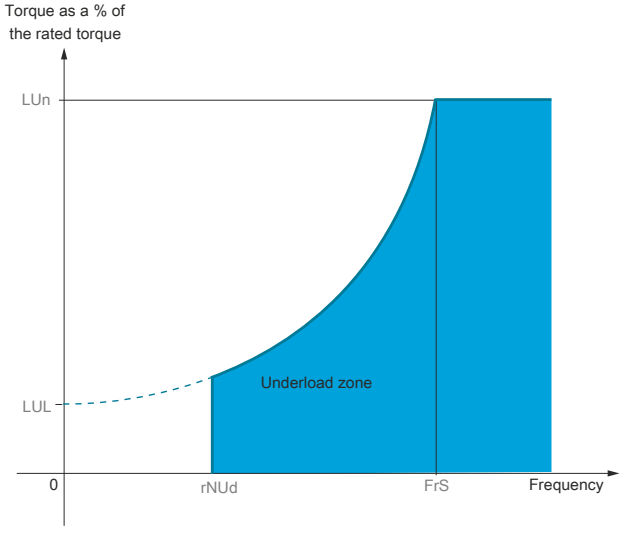
★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.7.23 [Process underload] (ULd-)

#### Underload process fault

A process underload is detected when the next event occurs and remains unresolved for at least the configurable time set in [Unld T. Del. Detect](ULt):

- The motor is in the steady state and the torque is below the underload limit value of parameters ([Unld.Thr.0.Speed](LUL), [Unld.Thr.Nom.Speed](LUn) and [Unld. FreqThr. Det.](rMUd)).
- The motor is in the steady state if the difference between the frequency setpoint and motor frequency falls below configurable threshold value [Hysteresis Freq](Srb).




Between frequency 0 and nominal frequency, the characteristic curve produces the following equation: The underload function for frequencies under

$$Torque = LUL + \frac{(LUn - LUL) \times (frequency)^2}{(ratedfrequency)^2}$$

The underload function is not active for frequencies below [Unld. FreqThr. Det.](rMUd).

In menu [Input/Output](I_O-), a relay or logic output can be assigned to the signal for this fault.

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > ULd- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory setting** |
| ULd- | [Process underload] | | |
| ULt | [Unld T. Del. Detect]<br>Delay for underload detection.<br>If the value is 0, the function is disabled and the other parameters are not available. | 0 to 100 s | 0 s |
| LUn | [Unld.Thr.Nom.Speed]<br>Threshold value for underload when the motor is at nominal frequency ([Nominal Motor Freq](FrS)) as a percentage of the nominal torque. | 20 to 100% | 60% |
| LUL | [Unld.Thr.0.Speed]<br>Threshold value for underload for a frequency of zero, as a percentage of nominal torque. | 0 to [Unld.Thr.Nom.Speed](LUn) | 0% |
| rMUd | [Unld. FreqThr. Det.]<br>Minimum frequency threshold value for underload detection. | 0 to 599 Hz | 0 Hz |
| Srb | [Hysteresis Freq]<br>Maximum deviation between frequency setpoint and motor frequency, defines persistence state. | 0.3 to 599 Hz | 0.3 Hz |
| UdL | [Underload Mangmt.]<br>Behavior when switching to underload detection.<br>nO [Ignore](nO): Ignores the detected fault<br>YES [Freewheel](YES): Freewheel<br>rMP [Ramp stop](rMP): Stopping via ramp<br>FSt [Fast stop](FSt): Fast stop | | [Freewheel](YES) |
| FtU | [UnderV. Restart Tm]<br>This parameter is not available if [Underload Mangmt.](UdL) is set to [Ignore](nO).<br>Permissible minimum time frame between underload detection and automatic restart.<br>To enable automatic restart, the value of [Fault Reset Time](tAr) must exceed the value of this parameter for at least one minute. | 0 to 6 min | 0 min |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.24 [PROCESS OVERLOAD] (OLd-)

#### Overload process error

A process overload is detected when the next event occurs and persists for the configurable time set in [Ovld Time Detect.](tOL):

- The inverter is in mode "Current limiting".
- The motor is in persistence state and the current is above the overload threshold value defined in [Ovld Detection Thr.](LOC).

The motor is in persistence state if the difference between the frequency setpoint and the motor frequency falls below the configurable threshold value (Srb) set in [Hysteresis Freq.Att.](Srb).

A relay or logic output can be assigned to the signal for this error using menu [IN/OUTPUTS](I_O-).

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > OLd- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| OLd- | [PROCESS OVERLOAD] | | |
| tOL | [Ovld Time Detect.]<br>Delay for overload detection.<br>If the value is 0, the function is disabled and the other parameters are not available. | 0 to 100 s | 0 s |
| LOC<br>(1) | [Ovld Detection Thr.]<br>Overload detection threshold value, as a percentage of the motor nominal current [Rated mot. current](nCr). For the function to be executed, this value must be lower than the threshold current. | 70 to 150% | 110% |
| Srb<br>(1) | [Hysteresis Freq.Att.]<br>Maximum deviation between frequency setpoint and motor frequency, defines persistence state. | 0 to 599 Hz | 0.3 Hz |
| OdL<br>(1) | [Ovld.Proces.Mngmt]<br>Behavior on switching to overload detection.<br>nO [Fault ignored](nO): Detected error is ignored<br>YES [Freewheel](YES): Freewheel<br>rMP [Ramp stop](rMP): Stopping via ramp<br>FSt [Fast stop](FSt): Fast stop | | [Freewheel](YES) |
| FtO<br>(1) | [Overload T.B.Rest.]<br>This parameter is not available if [Ovld.Proces.Mngmt](OdL) is set to [Fault ignored](nO).<br>Permissible minimum timeframe between overload detection and automatic restart.<br>To enable automatic restart, the value of [Max. restart time](tAr) must exceed the value of this parameter for at least one minute. | 0 to 6 min | 0 min |

(1) This parameter can also be accessed via menus [SETTINGS](SEt-) and [APPLICATION FUNCT.](FUn-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.7.25 [FALLBACK SPEED] (LFF-)

| The parameters described on this page can be accessed by: DRI- > COnF > FULL > FLt- > LFF- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LFF- | [FALLBACK SPEED] | | |
| LFF | [Fallback speed]<br>Selection of the fallback speed. | 0 to 599 Hz | 0 Hz |

## 5.2.3.6.7.26 [FAST STOP] (FSt-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > Fst- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| FSt- | **[FAST STOP]** | | |
| dCF(1) | **[Ramp divider]** | 0 to 10 | 4 |
| | The enabled ramp ([Deceleration](dEC) or [Deceleration 2](dE2)) is subsequently divided by this coefficient during the stop commands.<br>Value 0 corresponds to a minimum ramp time. | | |

(1) This parameter can also be accessed via menus [SETTINGS](SEt-) and [APPLICATION FUNCT.](FUn-).

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## 5.2.3.6.7.27 [DC BRAKE] (dCI-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > FLt- > dCI- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| dCI- | **[DC Injection]** | | |
| IdC | **[DC inject. level 1]** | 0.1*INV to 1.41*INV (2) | 0.64*INV (2) |
| (1)(3) | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | Level of DC injection braking current activated via logic input or selected as stop mode. | | |
| tdI | **[DC injection time 1]** | 0.1 to 30 s | 0.5 s |
| (1)(3) | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | Maximum duration of current injection [DC inject. level 1](IdC). After this time has elapsed, the direct current change to [DC inject. level 2](IdC2). | | |
| IdC2 | **[DC inject. level 2]** | 0.1*INV to IdC (2) | 0.5*INV (2) |
| (1)(3) | **Note:**<br>**MOTOR OVERHEATING AND DAMAGE**<br>**In order to prevent damage to the motor due to overheating, make sure the connected motor is sized correctly for DC injection braking with regard to influx rate and duration.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | The braking current is activated by the logic input or selected as a stop mode once time span [DC injection time 1](tdI) has expired. | | |
| tdC | **[DC injection time 2]** | 0.1 to 30 s | 0.5 s |
| (1)(3) | **Caution!**<br>**RISK OF DAMAGE TO THE MOTOR**<br>• **Lengthy DC braking can cause overheating and damage to the motor.**<br>• **To protect the motor, lengthy DC braking operations must be avoided.**<br>**Failure to observe these instructions can result in damage to the equipment.** | | |
| | Maximum braking time [DC inject. level 2](IdC2) for the DC injection braking, only selected as stop configuration.<br>This parameter is not available if [Type of stop](Stt) is set to [DC Injection](dCI). | | |

(1) This parameter can also be accessed via menus [SETTINGS](SEt-) and [APPLICATION FUNCT.](FUn-).
(2) Corresponding to the nominal current of the inverter specified on the nameplate.
(3) These settings are independent of function [Auto DC injection](AdC-).

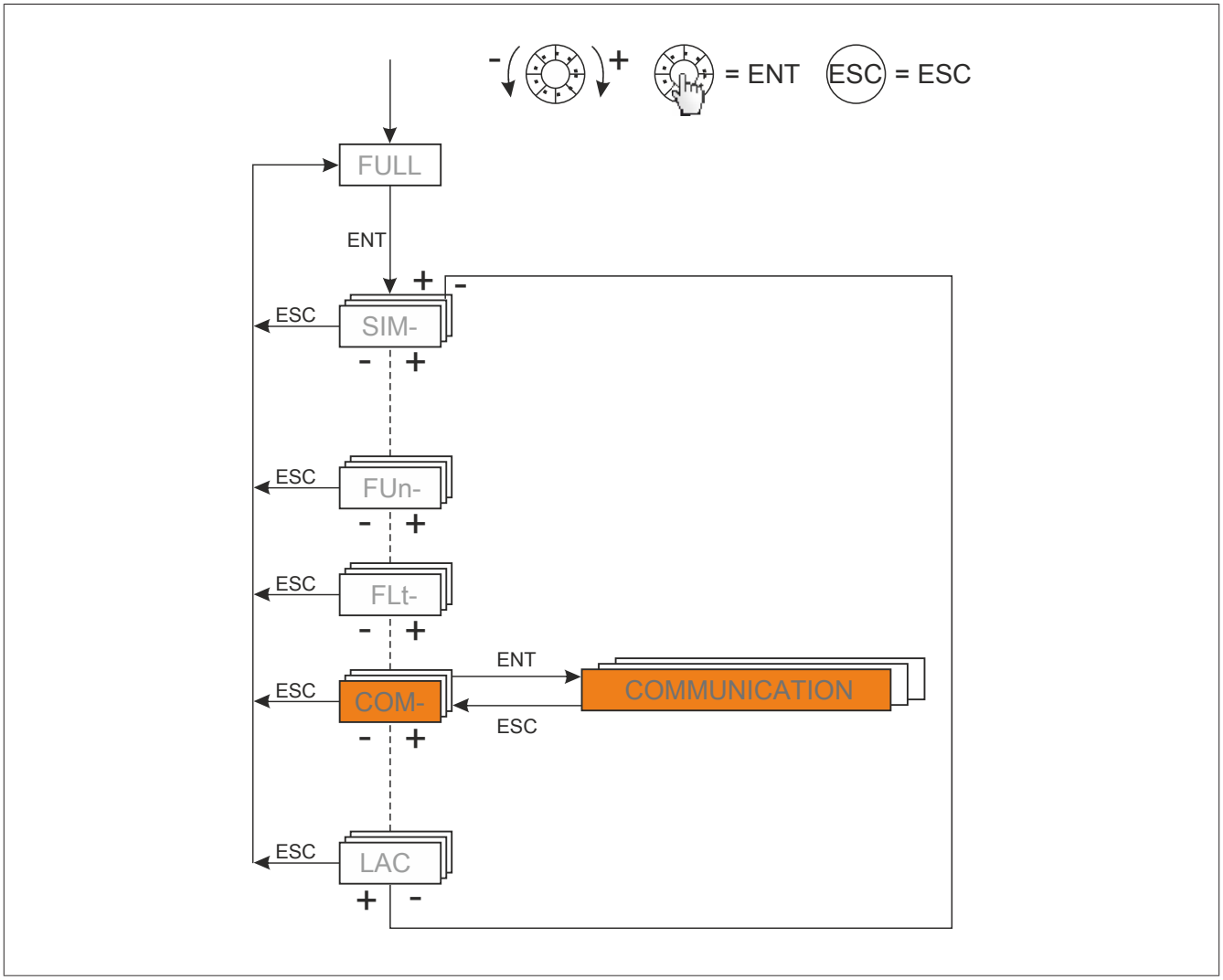
These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

### 5.2.3.6.8 [COMMUNICATION] (COM-)

**With integrated display terminal:**

From menu COnF:




### 5.2.3.6.8.1 [COM. SCANNER INPUT] (ICS-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > ICS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| ICS- | **[COM. SCANNER INPUT]**<br>**[Scan. IN1 address]**(nMA1) to **[Scan. IN4 address 4]**(nMA4) can be used for communication scanner fast tasks. | | |
| nMA1 | **[Scan. IN1 address]**<br>Address of input word 1 | | 3.201 |
| nMA2 | **[Scan. IN2 address]**<br>Address of input word 2 | | 8.604 |
| nMA3 | **[Scan. IN3 address]**<br>Address of input word 3 | | 0 |
| nMA4 | **[Scan. IN4 address]**<br>Address of input word 4 | | 0 |
| nMA5 | **[Scan. IN5 address]**<br>Address of input word 5 | | 0 |
| nMA6 | **[Scan. IN6 address]**<br>Address of input word 6 | | 0 |
| nMA7 | **[Scan. IN7 address]**<br>Address of input word 7 | | 0 |
| nMA8 | **[Scan. IN8 address]**<br>Address of input word 8 | | 0 |

### 5.2.3.6.8.2 [COM SCAN OUTPUT MAP] (OCS-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > OCS- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| OCS- | **[COM SCAN OUTPUT MAP]**<br>**[Scan. IN1 address]**(nCA1) to **[Scan. Out4 address]**(nCA4) can be used for communication scanner fast tasks. | | |
| nCA1 | **[Scan. Out1 address]**<br>Address of output word 1 | | 8.501 |
| nCA2 | **[Scan.Out2 address]**<br>Address of output word 2 | | 8.602 |
| nCA3 | **[Scan.Out3 address]**<br>Address of output word 3 | | 0 |
| nCA4 | **[Scan.Out4 address]**<br>Address of output word 4 | | 0 |
| nCA5 | **[Scan.Out5 address]**<br>Address of output word 5 | | 0 |
| nCA6 | **[Scan.Out6 address]**<br>Address of output word 6 | | 0 |
| nCA7 | **[Scan.Out7 address]**<br>Address of output word 7 | | 0 |
| nCA8 | **[Scan.Out8 address]**<br>Address of output word 8 | | 0 |

### 5.2.3.6.8.3 [MODBUS NETWORK] (Md1-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > Md1- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| Md1- | **[MODBUS NETWORK]** | | |
| Add<br>OFF<br>- | **[Modbus Address]**<br>**[OFF]**(OFF)<br>1 to 247 | **[OFF]**(OFF) to 247 | **[OFF]**(OFF) |
| AMOC<br>★<br>OFF<br>- | **[Modbus add Com. C.]**<br>**[OFF]**(OFF)<br>1 to 247 | **[OFF]**(OFF) to 247 | **[OFF]**(OFF) |
| tbr | **[Modbus baud rate]**<br>4.8 - 9.6 - 19.2 - 38.4 Kbit/s on the integrated operator display terminal.<br>4800, 9600, 19200 or 38400 baud on the graphic display terminal. | | **[19.2 kbps]**(19.2) |
| tFO | **[Modbus format]**<br>1 - 8E1 - 8n1, 8n2 | | **[8-E-1]**(8E1) |
| ttO | **[Time Out]**<br>0.1 to 30 s | 0.1 to 30 s | 10.0 s |
| COM1<br>r0t0<br>r0t1<br>r1t0<br>r1t1 | **[Mdb com stat]**<br>**[r0t0]**(r0t0): Modbus, no data received, no data transferred = Communication inactive<br>**[r0t1]**(r0t1): Modbus, no data received, data transferred<br>**[r1t0]**(r1t0): Modbus, data received, no data transferred<br>**[r1t1]**(r1t1): Modbus, data received, data transferred | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

### 5.2.3.6.8.4 [CANopen com.] (CnO-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > CnO- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CnO- | **[CANopen com.]** | | |
| AdCO<br>OFF<br>- | **[CANopen address]**<br>**[OFF]**(OFF): OFF<br>1 to 127 | **[OFF]**(OFF) to 127 | **[OFF]**(OFF) |
| bdCO<br>50<br>125<br>250<br>500<br>IM | **[CANopen bit rate]**<br>**[50 kbit/s]**(50): 50,000 baud<br>**[125 kbit/s]**(125): 125,000 baud<br>**[250 kbit/s]**(250): 250,000 baud<br>**[500 kbit/s]**(500): 500,000 baud<br>**[1 Mbit/s]**(1M): 1 Mbaud | | **[250 kbps]**(250) |
| ErCO | **[Error code]**<br>Read-only parameter, cannot be modified. | 0 to 5 | - |

## 5.2.3.6.8.5 [COMMUNICATION CARD] (Cbd-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > Cbd- | |
|---|---|
| **Code** | **Name/Description** |
| Cbd- | **[COMMUNICATION CARD]**<br>For specific documentation on the card used, see section "Interfaces". |

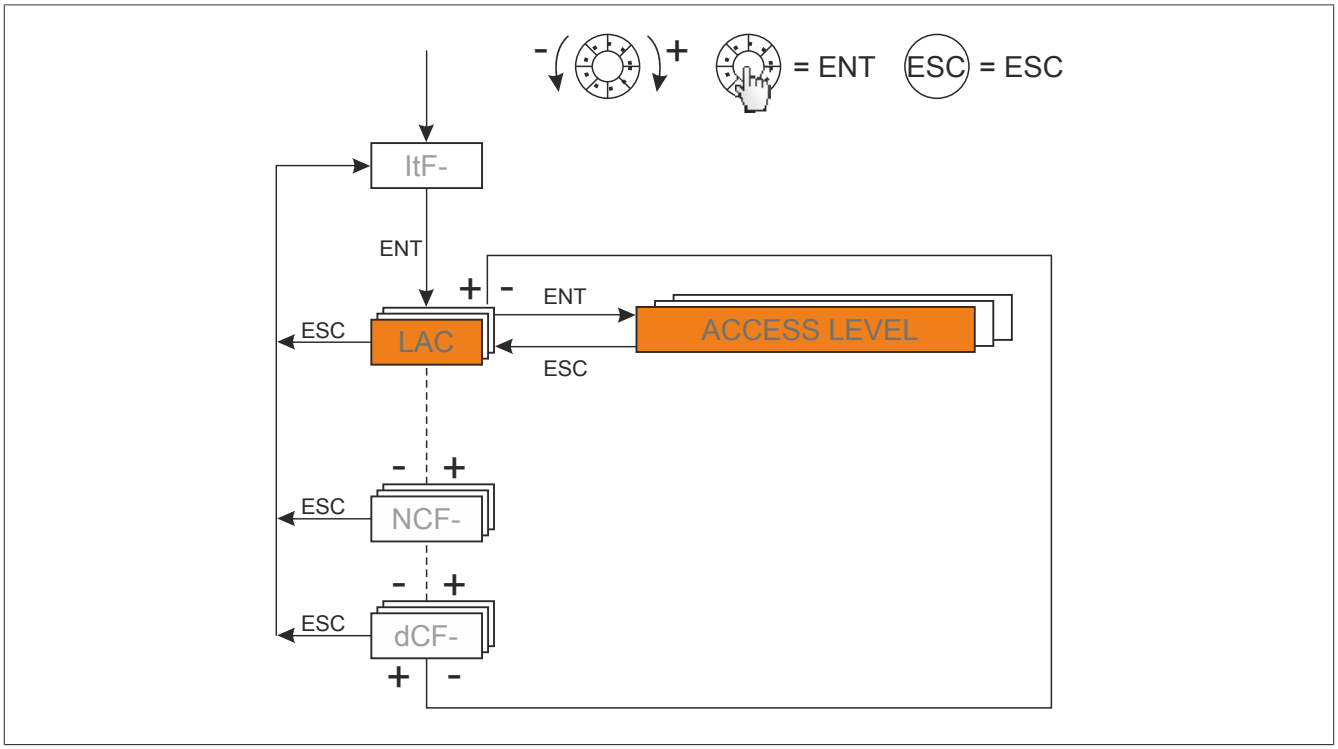
## 5.2.3.6.8.6 [Forced local] (LCF-)

| The parameters described on this page are accessed as follows: DRI- > COnF > FULL > COM- > LCF- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| LCF- | **[Forced local]** | | |
| FLO | **[Forced local assign.]** | | **[No]**(nO) |
| | "Forced local" assignment.<br>Mode "Forced local" is active if the input state is 1.<br>**[Forced local assign.]**(FLO)is forced to **[No]**(nO), if **[Profile]**(CHCF) = **[I/O profile]**(IO) is set. | | |
| nO | **[No]**(nO): Function not active | | |
| LI1 | **[LI1]**(LI1): Logic input LI1 | | |
| ... | ... | | |
| LI6 | **[LI6]**(LI6): Logic input LI6 | | |
| LAI1 | **[LAI1]**(LAI1): Logic input AI1 | | |
| LAI2 | **[LAI2]**(LAI2): Logic input AI2 | | |
| FLOC | **[Forced local Ref.]** | | **[No]**(nO) |
| | "Forced local" setpoint source assignment. | | |
| nO | **[No]**(nO): Not assigned (control via terminals with setpoint of zero). | | |
| AI1 | **[AI1]** (AI1): Analog input | | |
| AI2 | **[AI2]** (AI2): Analog input | | |
| AI3 | **[AI3]** (AI3): Analog input | | |
| LCC | **[HMI]**(LCC): Assignment of setpoint and control to the graphic display terminal or external operator terminal.<br>Setpoint: **[HMI Frequency ref.]**(LFr)<br>Control: Buttons RUN/STOP/FWD/REV. | | |
| PI | **[RP]**(PI): Pulse input | | |
| FLOt | **[Time-out forc. local]** | 0.1 to 30 s | 10.0 s |
| ★ | 0.1 to 30 s.<br>This parameter is accessible if **[Forced local assign.]**(FLO) is not equal to **[No]**(nO).<br>Delay before communication monitoring is resumed on exiting mode "Forced local". | | |

★ These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

## 5.2.4 Interface (ItF)

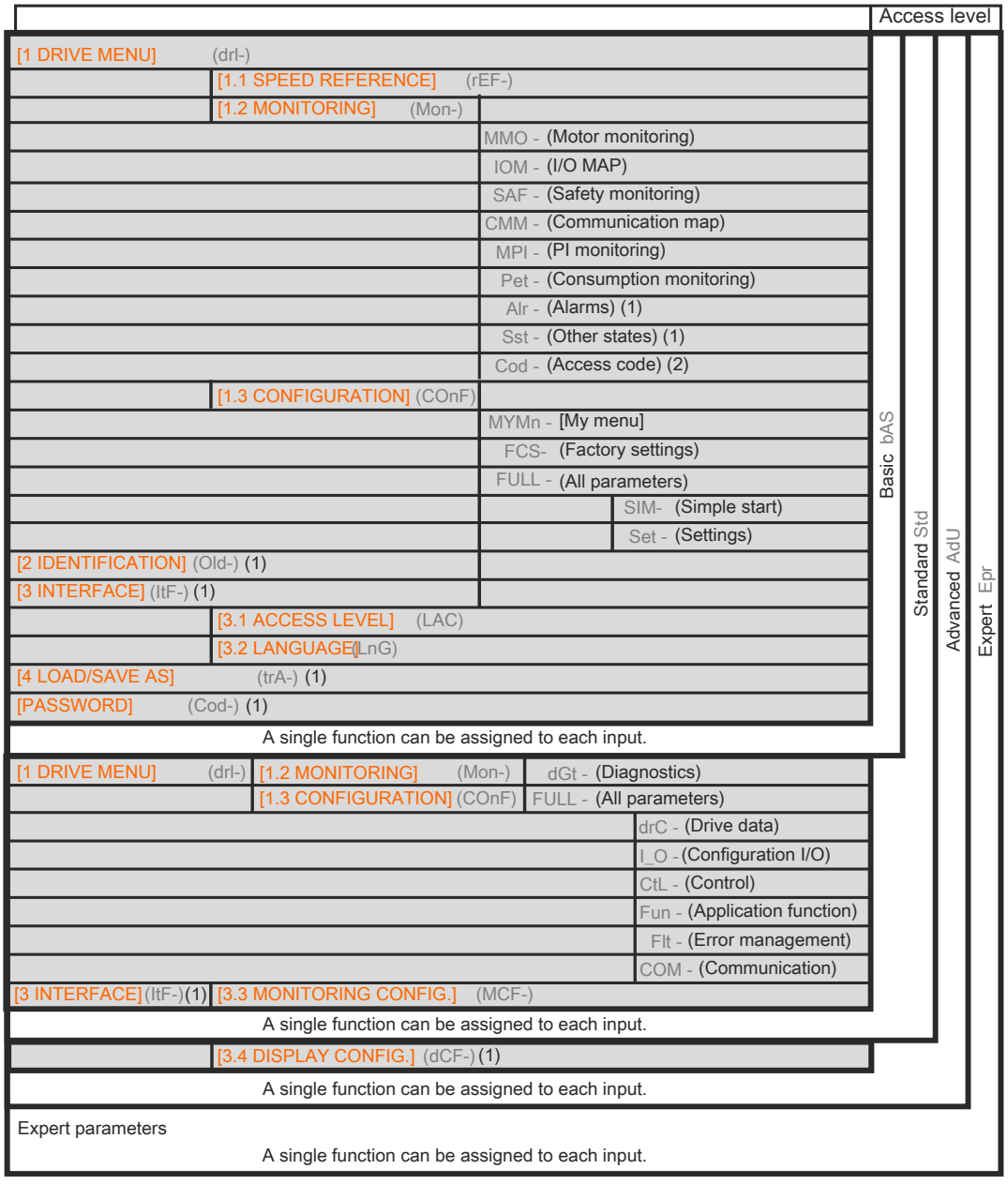
### 5.2.4.1 [3.1 ACCESS LEVEL] (LAC)




| The parameters described on this page are accessed as follows: DRI- > ITF > LAC | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| LAC | [3.1 ACCESS LEVEL] | [Standard](Std) |
| bAS | [Base](bAS): Limited access to menu [SIMPLY START](SIM-), [1.2 MONITORING](MOn-), [SETTINGS](SEt-), [Factory settings](FCS-), [5 PASSWORD](COd) and [3.1 ACCESS LEVEL](LAC-). Only one function can be assigned to each input. | |
| Std | [Standard](Std): Access to all menus of the integrated operator terminal. Only one function can be assigned to each input. | |
| AdU | [Advanced](AdU): Access to all menus of the integrated operator terminal. Several functions can be assigned to each input. | |
| Epr | [Expert](EPr): Access to all menus of the integrated operator terminal. Several functions can be assigned to each input. | |

Parameter that can be modified during operation or when stopped.

## Overview of the menus that can be called from the graphic display terminal / integrated display terminal




(1) Access only possible with graphic display
(2) Access only possible with handheld (7 segment display)

### 5.2.4.2 [3.2 LANGUAGE] (LnG)

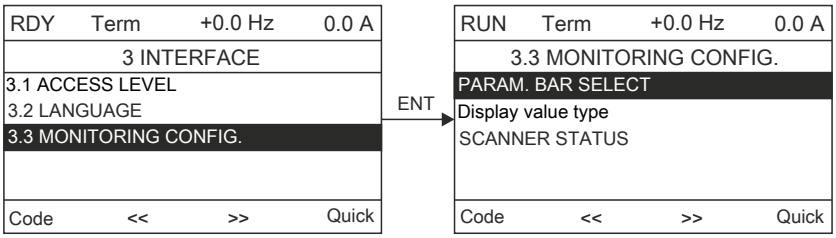
When only one selection is possible, the selected item is indicated by the ✓.
Example: Only one language can be chosen.

| The parameters described on this page are accessed as follows: DRI- > ITF > LnG | | |
|---|---|---|
| **Code** | **Name/Description** | **Clear all** |
| LnG | [3.2 LANGUAGE] | [Language 0](LnG0) |
| | Languages currently available. | |
| LnG0 | [Language 0] (LnG0) | |
| ... | ... | |
| LnG9 | [Language 9](LnG9) | |

Parameter that can be modified during operation or when stopped.

### 5.2.4.3 [3.3 MONITORING CONFIG.] (MCF-)

This menu can only be accessed with the graphic display terminal.




This can be used to configure the information displayed on the graphic display screen during operation.

[PARAM. BAR SELECT]
Selection of 1 to 2 parameters in the upper row
(the first two parameters cannot be changed).

[Display value type]
Selection of the parameters displayed in the center of the screen and the display mode
(digital values or bar graph)

[SCANNER STATUS]
Selection of the displayed words and their format.

| The parameters described on this page are accessed as follows: DRI- > ITF > MCF- | |
|---|---|
| **Code** | **Name/Description** |
| MCF- | **[3.3 MONITORING CONFIG.]** |
| PbS- | **[PARAM. BAR SELECT]**<br>**[AI1Ref]** in V<br>**[AI2Ref]** in V<br>**[AI3Ref]** in mA<br>**[AO1]** in V<br>**[ETA state word]**<br>**[Alarm groups]**<br>**[Frequency ref.]** in Hz: Parameter displayed in the factory setting<br>**[Output frequency]** in Hz<br>**[I motor]**In A: Parameter displayed in the factory setting<br>**[Motor speed]** in rpm<br>**[Motor voltage]** in V<br>**[Motor power]** in W<br>**[Motor torque]** as a %<br>**[Mains voltage]** in V<br>**[Motor thermal state]** as a %<br>**[Drv.thermal state]** as a %<br>**[Consumption]** in watt hours (Wh) or kilowatt hours (kWh) in accordance with the inverter type<br>**[Run time]** in hours (motor duty cycle)<br>**[Elapsed time]** in hours (inverter duty cycle)<br>**[IGBT alarm counter]** in seconds (accumulated overheating alarm time)<br>**[Min. freq time]** in seconds<br>**[PID speed ref.]** as a %<br>**[PID feedback]** as a %<br>**[PID error]** as a %<br>**[PID Output]** in Hz<br>**[Config. active]** CNF0, 1 or 2<br>**[Utilised param. set]** SET1, 2 or 3<br><br>The parameter is selected or deselected using ENT (a ✓ appears next to the parameter when it is selected).<br>1 or 2 parameters can be selected.<br><br>Example:<br><br>PARAM. BAR SELECTED<br>MONITORING<br>--------- ☑<br>--------- ☐<br>--------- ☐<br>--------- ☑ |

## Display value type

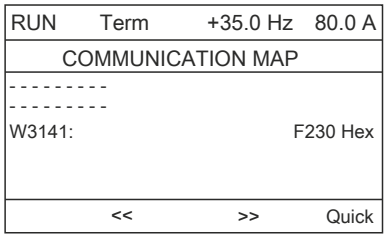
| The parameters described on this page are accessed as follows: DRI- > ITF > MCF- > MSC- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| MSC- | **[Display value type]** | |
| Mdt | **[Display value type]** | **[Digital]**(dEC) |
| | **[Digital]**(dEC)<br>**[Bar graph]**(bAr)<br>**[List]**(LISt) | |
| MPC | **[PARAMETER SELECTION]**<br>**[AI1Ref]** in V<br>**[AI2Ref]** in V<br>**[AI3Ref]** in mA<br>**[AO1]** in V<br>**[ETA state word]**<br>**[Alarm groups]**<br>**[Frequency ref.]** in Hz: Parameter displayed in the factory setting<br>**[Output frequency]** in Hz<br>**[Pulse in. work. freq.]** in A: Parameter displayed in the factory setting<br>**[I motor]** in Hz<br>**[Motor speed]** in rpm<br>**[Motor voltage]** in V<br>**[Motor power]** in W<br>**[Motor torque]** as a %<br>**[Mains voltage]** in V<br>**[Motor thermal state]** as a %<br>**[Drv.thermal state]** as a %<br>**[Consumption]** in watt hours (Wh) or kilowatt hours (kWh) in accordance with the inverter type<br>**[Run time]** in hours (motor duty cycle)<br>**[Elapsed time]** in hours (inverter duty cycle)<br>**[IGBT alarm counter]** in seconds (accumulated overheating alarm time)<br>**[Min. freq time]** in seconds<br>**[PID speed ref.]** as a %<br>**[PID feedback]** as a %<br>**[PID error]** as a %<br>**[PID Output]** in Hz<br><br>Parameters are selected or deselected using ENT (a ✓ appears next to the parameter when it is selected).<br><br>PARAM. BAR SELECTED<br>MONITORING<br>--------- ☑<br>--------- ☐<br>--------- ☐<br>--------- ☑<br><br>Examples:<br><br>Display of two digital values<br>RUN Term +35.0 Hz 80.0 A<br>Motor speed<br>1250 rpm<br>Motor current<br>80 A<br>Quick<br><br>Display of two bar graphs<br>RUN Term +35.0 Hz 80.0 A<br>Min Motor speed Max<br>0 1250 rpm 1500<br>Min Motor current Max<br>0 80 A 150<br>Quick<br><br>Display of a list of five values<br>RUN Term +35.0 Hz 80.0 A<br>1.2 MONITORING<br>Frequency ref.: 50.1 Hz<br>Motor current: 80 A<br>Motor speed: 1250 rpm<br>Motor thermal state: 80%<br>Drv thermal state 80%<br>Quick | |

These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

Parameter that can be modified during operation or when stopped.

## Comm. image.

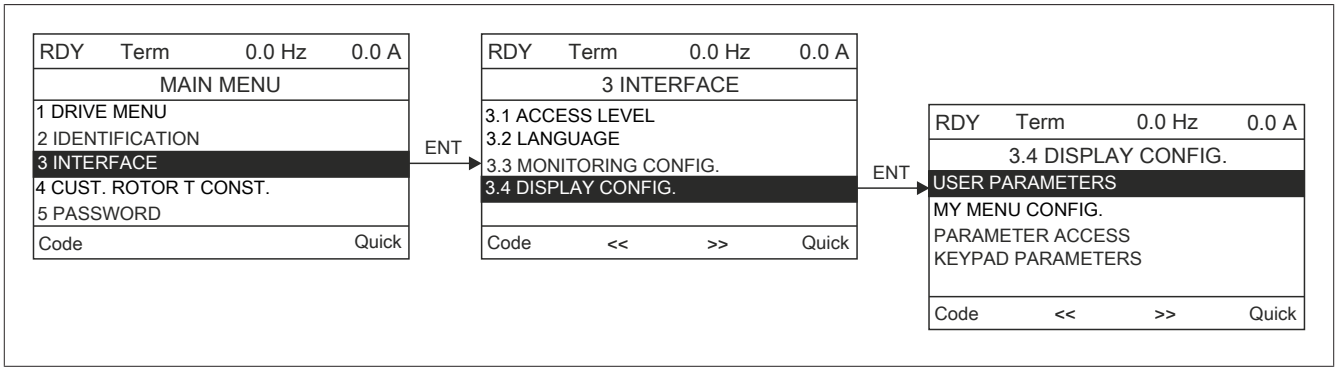
| The parameters described on this page are accessed as follows: DRI- > ITF > MCF- > AdL- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| AdL- | **[COM. MAP CONFIG.]** | |
| IAd1 | **[Word IAd1 1 add. select.]** | 0 |
| | Select the address of the word to be displayed when you press the << and >> keys (F2 and F3) or turn the handwheel. | |
| FAd1 | **[Format word 1]** | **[Hex]**(HE ) |
| | Format of word 1. | |
| HE | **[Hex]**(HE ) | |
| SIG | **[Signed]**(SIG) | |
| nSG | **[Unsigned]**(nSG) | |
| IAd2 | **[Word 2 add. select.]** | 0 |
| | Select the address of the word to be displayed when you press the << and >> keys (F2 and F3) or turn the handwheel. | |
| FAd2 | **[Format word 2]** | **[Hex]**(HE ) |
| | Format of word 2. | |
| HE | **[Hex]**(HE ) | |
| SIG | **[Signed]**(SIG) | |
| nSG | **[Unsigned]**(nSG) | |
| IAd3 | **[Word 3 add. select.]** | 0 |
| | Select the address of the word to be displayed when you press the << and >> keys (F2 and F3) or turn the handwheel. | |
| FAd3 | **[Format word 3]** | **[Hex]**(HE ) |
| | Format of word 3. | |
| HE | **[Hex]**(HE ) | |
| SIG | **[Signed]**(SIG) | |
| nSG | **[Unsigned]**(nSG) | |
| IAd4 | **[Word 4 add. select.]** | 0 |
| | Select the address of the word to be displayed when you press the << and >> keys (F2 and F3) or turn the handwheel. | |
| FAd4 | **[Format word 4]** | **[Hex]**(HE ) |
| | Format of word 4. | |
| HE | **[Hex]**(HE ) | |
| SIG | **[Signed]**(SIG) | |
| nSG | **[Unsigned]**(nSG) | |
| | The selected words can then be displayed in sub-menu **[COMMUNICATION MAP]** of menu **[1.2 MONITORING]**.<br>Example: | |




Parameter that can be modified during operation or when stopped.

### 5.2.4.4 [3.4 DISPLAY CONFIG.] (dCF-)

This menu can only be accessed with the graphic display terminal. It can be used to customize parameters or a menu and to access parameters.

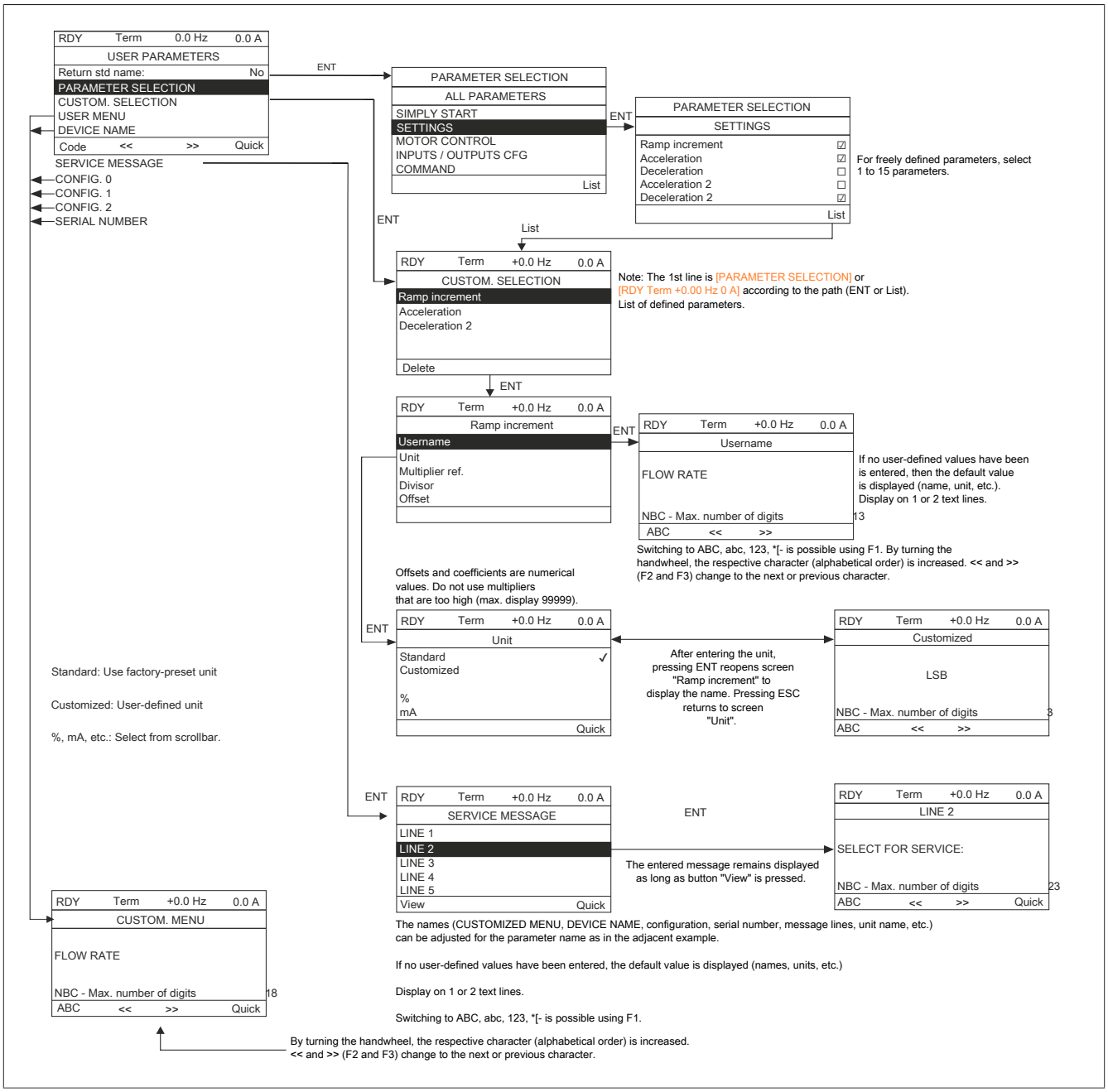



- USER PARAMETERS: Customization of 1 to 15 parameters.
- USER MENU: Creation of a user-defined menu.
- PARAMETER ACCESS: Customization of the visibility and protection mechanisms of menus and parameters.
- KEYPAD PARAMETERS: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal rather than in the inverter).

| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- | |
|---|---|
| **Code** | **Name/Description** |
| dCF- | [3.4 DISPLAY CONFIG.] |

#### User parameters

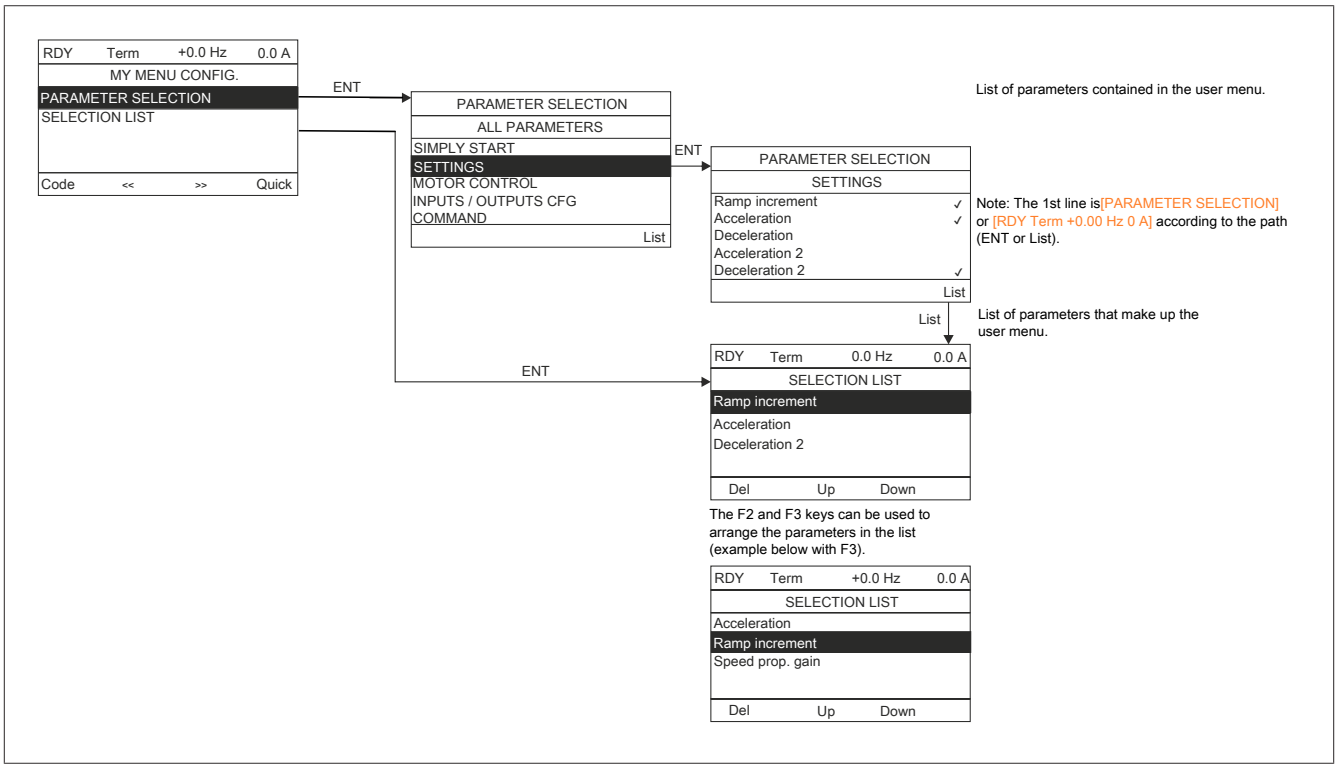
If [Return std name] is set to [YES], the default display is restored but the adjustments are still saved.




| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- > CUP- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| CUP- | **[USER PARAMETERS]** | |
| GSP | **[Return std name]** | **[No]**(nO) |
| | Displaying standard parameters instead of user-defined parameters. | |
| nO | **[No]**(nO) | |
| YES | **[YES]**(YES) | |
| MYMN | **[USER MENU]** | |
| PAn | **[DEVICE NAME]** | |
| SEr- | **[SERVICE MESSAGE]** | |
| SML01 | **[LINE 1]** | |
| SML02 | **[LINE 2]** | |
| SML03 | **[LINE 3]** | |
| SML04 | **[LINE 4]** | |
| SML05 | **[LINE 5]** | |
| CFN01 | **[CONFIG. 0]** | |
| CFN02 | **[CONFIG. 1]** | |
| CFN03 | **[CONFIG. 2]** | |
| PSn | **[SERIAL NUMBER]** | |

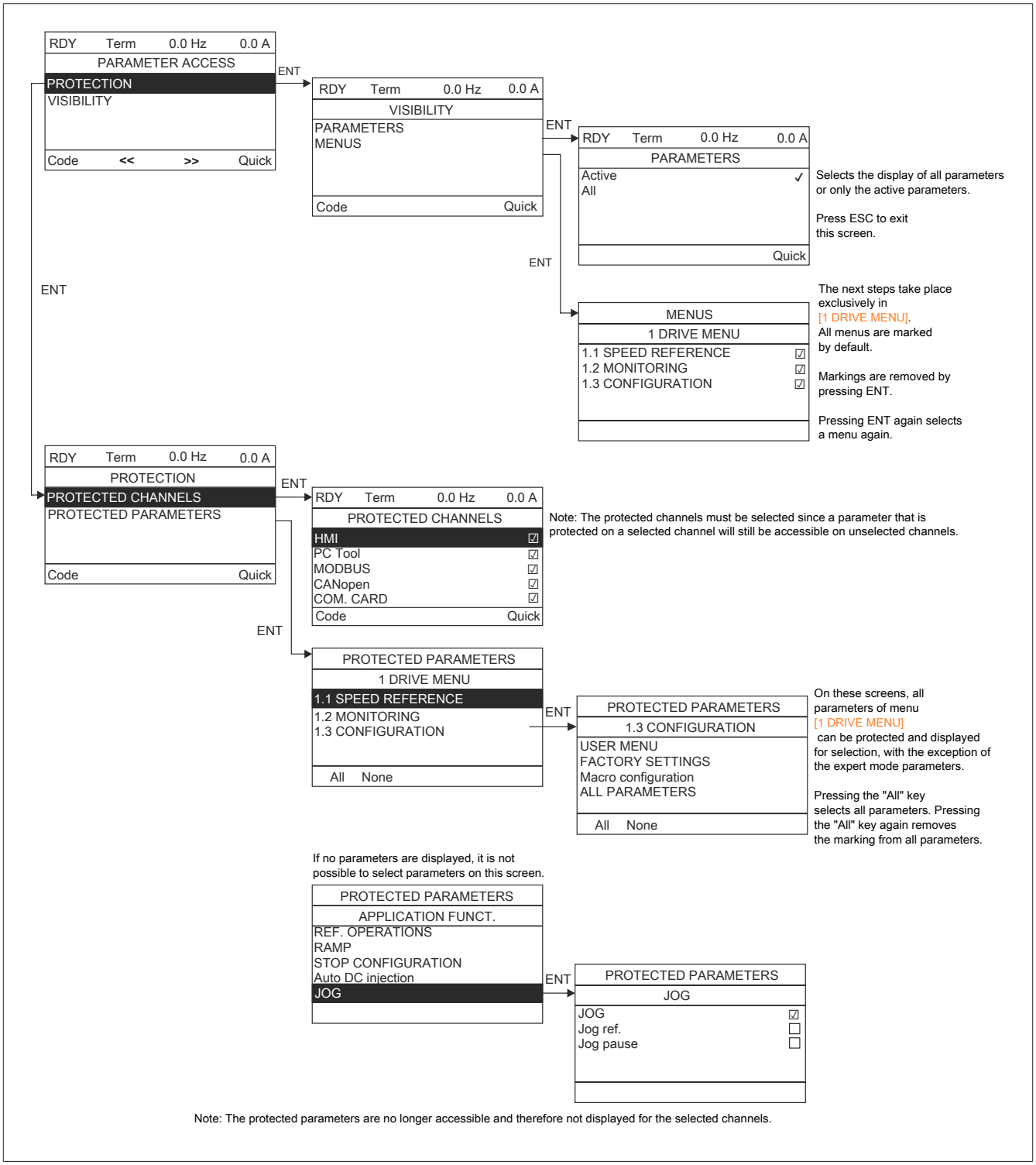
Parameter that can be modified during operation or when stopped.

## My menu config.




| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- > MYC- | |
|---|---|
| **Code** | **Name/Description** |
| MYC- | **[MY MENU CONFIG.]** |

## Parameter access

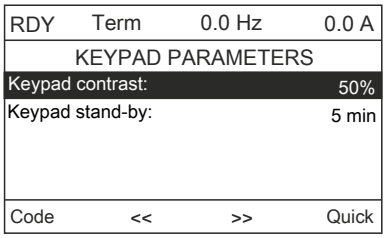



| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- > pAC- | |
|---|---|
| **Code** | **Name/Description** |
| pAC- | [PARAMETER ACCESS] |
| prO- | [PROTECTION] |
| pCd- | [PROTECTED CHANNELS] |
| COn | [HMI](COn): Graphic display terminal or external operator terminal |
| P S | [PC Tool](P S): PC software |
| Mdb | [Modbus](Mdb): Integrated Modbus |
| CAn | [CANopen com.](CAn): Integrated CANopen® |
| nEt | [Com. card] (nEt): Communication card (if used) |

| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- > pAC- > VIS- | | |
|---|---|---|
| **Code** | **Name/Description** | **Factory settings** |
| VIS- | [VISIBILITY] | |
| PVIS | [PARAMETERS] | [Active](ACt) |
| | Parameter display: Active parameters only, or all parameters. | |
| ACt | [Active](ACt) | |
| ALL | [ALL](ALL) | |

Parameter that can be modified during operation or when stopped.

## Terminal parameters

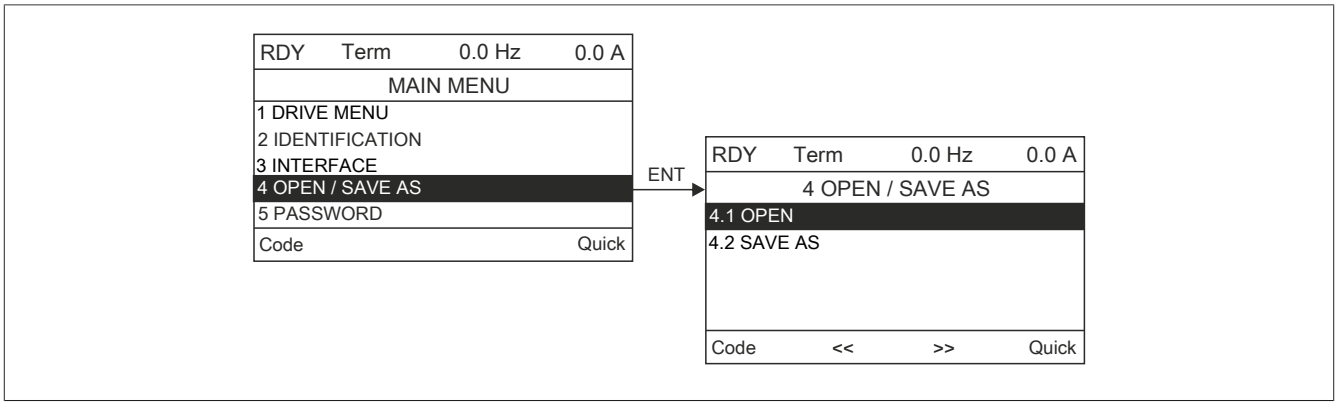



| The parameters described on this page are accessed as follows: DRI- > ITF > dCF- > CnL- | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| CnL- | [KEYPAD PARAMETERS] | | |
| CrSt | [Keypad contrast] | 0 to 100% | 50% |
| | Contrast setting for the keyboard. | | |
| CSbY | [Keypad stand-by] | [No](nO) up to 10 min | 5 min |
| | Delay setting for keyboard standby. | | |
| nO | [No](nO): No | | |

Parameter that can be modified during operation or when stopped.

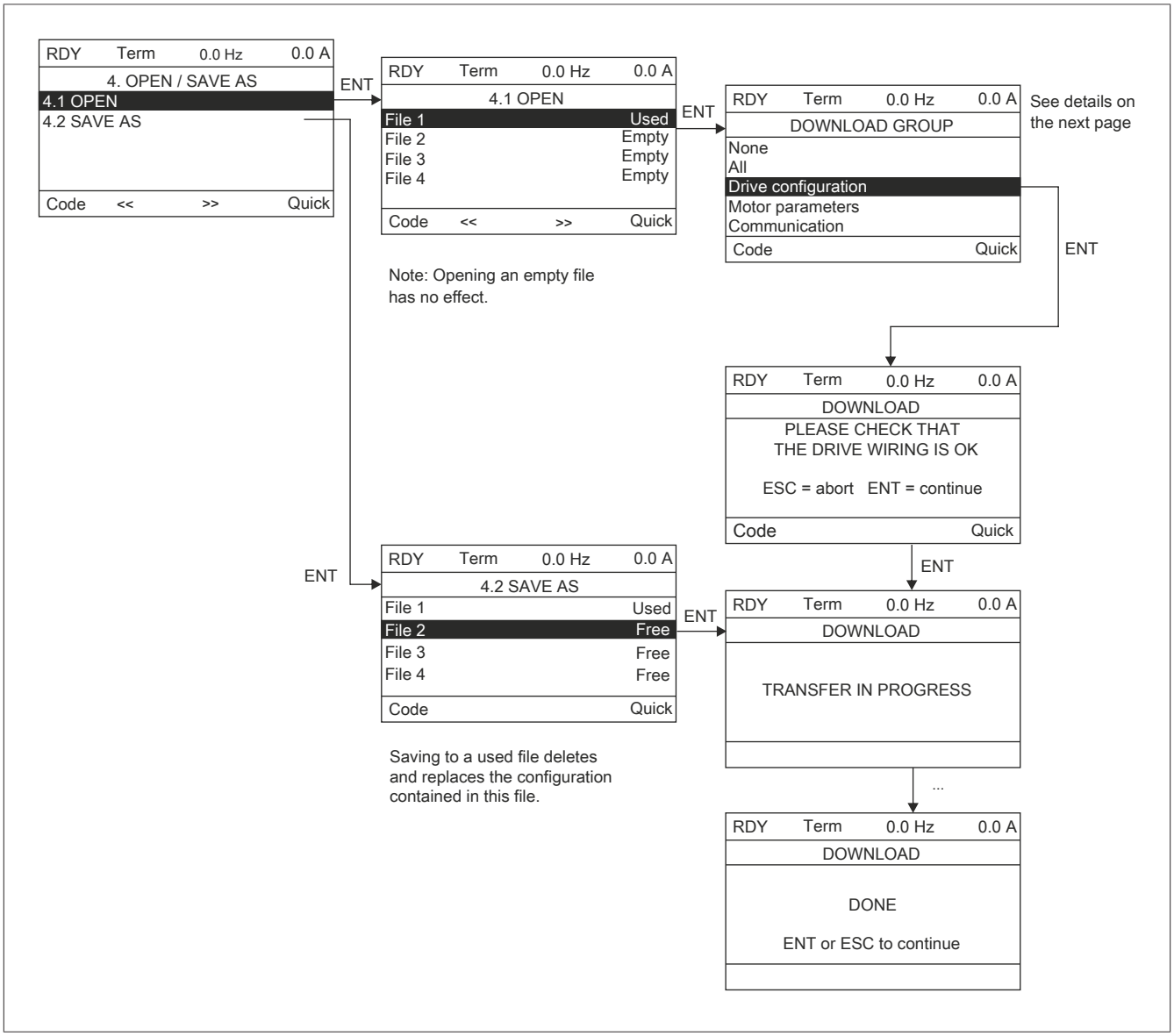
## 5.2.5 Load / Save as (trA)

This menu can only be accessed with the graphic display terminal.




**[4.1 OPEN]**: Load one of the four graphic terminal files into the inverter.

**[4.2 SAVE AS]**: Load the current inverter configuration into the graphic terminal.



Various messages may appear when the download is requested:

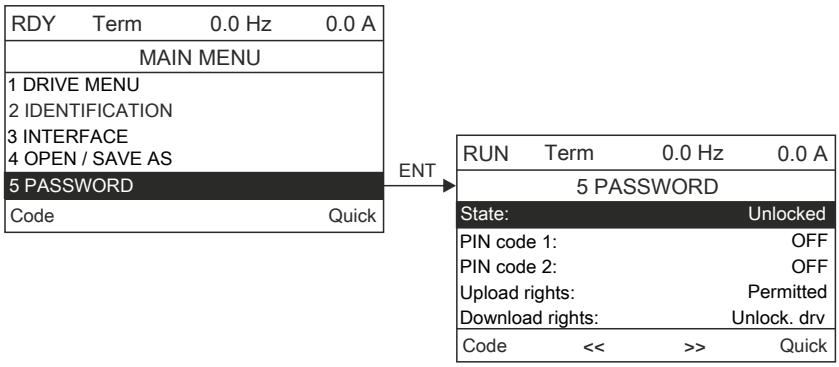
- **[DOWNLOAD IS ACTIVE]**
- **[DOWNLOAD COMPLETE]**
- Error messages if download not possible
- **[Motor parameters are NOT COMPATIBLE. Proceed?]**: In this case the download is possible, but the parameters will be restricted.

### DOWNLOAD GROUP

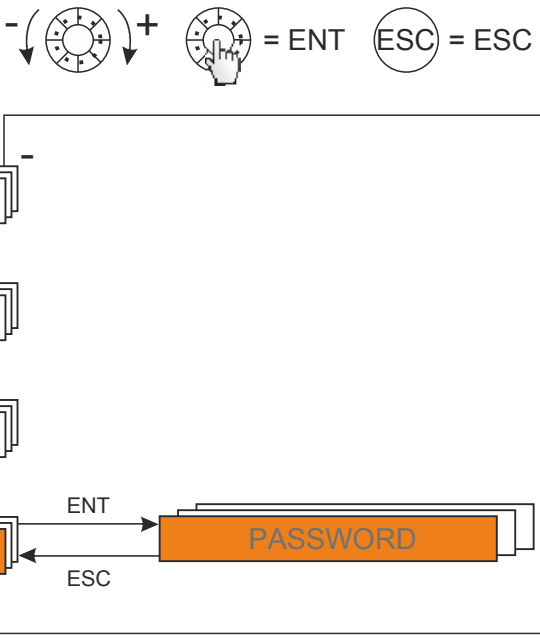
| | | |
|---|---|---|
| [No]: | | No parameters |
| [ALL]: | | All parameters in all menus |
| [Drive configuration] | | The entire menu [1 INVERTER MENU] without [COMMUNICATION] |
| [Motor param]: | [Rated motor volt.](UnS) | In menu [MOTOR CONTROL](drC-) |
| | [Rated motor freq.](FrS) | |
| | [PSI align curr. max](NCr) | |
| | [Rated motor speed](nSP) | |
| | [Motor 1 Cosinus Phi](COS) | |
| | [Rated motor power](nPr) | |
| | [Motor param choice](MPC) | |
| | [Tune selection](StUn) | |
| | [Mot. therm. current](ItH) | |
| | [IR compensation] (UFr) | |
| | [Slip compensation] (SLP) | |
| | [Cust stator resist.](rSA) | |
| | [Lfw](LFA) | |
| | [Cust. rotor t const.](trA) | |
| | [Nominal I sync.] (nCrS) | |
| | [Nom motor spdsync](nSPS) | |
| | [Pole pairs](PPnS) | |
| | [Syn. EMF constant] (PHS) | |
| | [Autotune L d-axis](LdS) | |
| | [INDUCT: Lq axis](LqS) | |
| | [Nominal freq sync.](FrSS) | |
| | [Cust. stator R syn] (rSAS) | |
| | [Motor torque](tqS) | |
| | [Freq. Pkt 1 5Pkt UF](U1) | |
| | [F1](F1) | |
| | [Volt. Pt 2 5Pt UF](U2) | |
| | [Freq Pt 2 5Pt UF](F2) | |
| | [Volt. Pt 3 5Pt UF](U3) | |
| | [Freq Pt 3 5Pt UF](F3) | |
| | [Volt. Pt 4 5Pt UF](U4) | |
| | [Freq Pt 4 5Pt UF](F4) | |
| | [Volt. Pt 5 5Pt UF](U5) | |
| | [Freq Pt 5 5Pt UF](F5) | |
| | [Expert](EPr) | |
| | [Mot. therm. current](ItH) | Menu [SETTINGS](SEt-) |
| [Communication]: | | All parameters of menu [COMMUNICATION] |

## 5.2.6 Access code (COd)

**With graphic display terminal:**

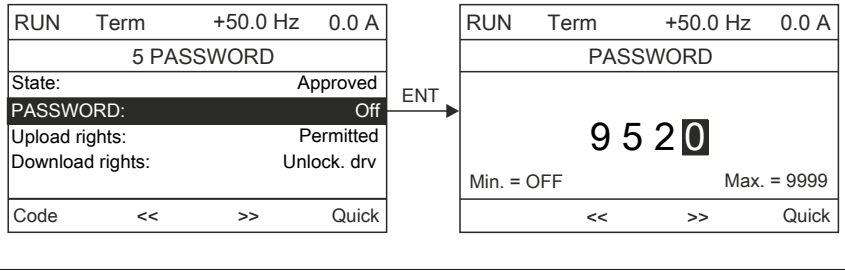



**With integrated display terminal**




Enables the configuration to be protected with an access code or a password to be entered in order to access a protected configuration.

Example using the graphic display terminal:



- The inverter is unlocked when the access codes are set to **[Unlocked]**(OFF) (no access code), or if the correct code has been entered. All menus are visible.
- Before protecting the configuration with an access code, the following is required:
  - Define the **[Upload rights]**(ULr) and **[Download rights]**(dLr)
  - Make a careful note of the code and keep it in a safe place where you will always be able to find it.
- The inverter has two access codes that allow 2 access levels to be set up:
  - Access code PIN 1 is a public unlock code: 6969.
  - Access code PIN 2 is an unlock code known only to B&R Product Support. It can only be accessed in mode **[Expert]**(EPr).
  - Only one access code can be used, PIN1 or PIN2; the second must be set to **[OFF]**(OFF).

## Note:

**When the unlock code is entered, the user access code appears.**

The following items are access-protected:

- Revert to the factory settings (Menu **[FACTORY SETTINGS]**(FCS-).
- The parameters and channels protected via menu **[USER MENU]**(MYMn-) as well as the menu itself.
- User-specific adjustment of the display (menu**[3.4 DISPLAY CONFIG.]**(dCF-)).

| **The parameters described below are accessed as follows: DRI- > COd-** | | | |
|---|---|---|---|
| **Code** | **Name/Description** | **Setting range** | **Factory settings** |
| COd- | **[PASSWORD]** | | |
| CSt | **[State]**<br>Information parameter, cannot be modified. | | **[Unlocked]** (ULC) |
| LC | **[Locked]**(LC): The inverter is locked by an access code. | | |
| ULC | **[Unlocked]**(ULC): The inverter is not locked by an access code. | | |
| COd | **[PASSWORD]**<br>1st access code. The value **[OFF]**(OFF) indicates that no access code has been set to **[Unlocked]**(ULC). The value **[ON]**(On) indicates that the inverter is protected and an access code must be entered in order to unlock it. After the correct code has been entered, it remains on the display and the inverter is unlocked until the next time the power supply is disconnected.<br>Access code PIN 1 is a public unlock code: 6969. | **[OFF]**(OFF) to 9,999 | **[OFF]**(OFF) |
| COd2 | **[PIN code 2]**<br>This parameter can only be activated in mode **[Expert]**(EPr).<br>2nd access code. The value **[OFF]**(OFF) indicates that no access code has been set to **[Unlocked]**(ULC). The value **[ON]**(On) indicates that the inverter is protected and an access code must be entered in order to unlock it. After the correct code has been entered, it remains on the display and the inverter is unlocked until the next time the power supply is disconnected.<br>Access code PIN 2 is an unlock code known only to B&R Product Support.<br><br>If **[PIN code 2]**(COd2) is not set to**[OFF]**(OFF), only menu **[1.2 MONITORING]**(MOn-) is displayed. If **[PIN code 2]**(COd2) is set to**[OFF]**(OFF), all menus are displayed.<br><br>If the display settings in menu **[3.4 DISPLAY CONFIG.]**(dCF-) are changed and **[PIN code 2]**(COd2) is not set to**[OFF]**(OFF), the configured display is retained. If **[PIN code 2]**(COd2) is set to "Off" (inverter unlocked), the display configured in menu **[3.4 DISPLAY CONFIG.]**(dCF-) is retained. | **[OFF]**(OFF) to 9,999 | **[OFF]**(OFF) |
| ULr | **[Upload rights]**<br>Read or copy the current configuration in the inverter. | | **[Permitted]**(ULr0) |
| ULr0 | **[Permitted]**(ULr0): The current configuration of the inverter can be loaded into the graphic terminal or the PC software. | | |
| ULr1 | **[Not allowed]**(ULr1): The current configuration of the inverter can only be loaded into the graphic terminal or the PC software if the inverter is not protected by an access code or if the correct code is entered. | | |
| dLr | **[Download rights]**<br>Writes the current configuration to the inverter or downloads a configuration to the inverter. | | **[Unlock. drv]**(dLr1) |
| dLr0 | **[Locked drv]**(dLr0): A configuration file can only be loaded into the inverter if the inverter is protected by an access code that is the same as the access code for the configuration to be downloaded. | | |
| dLr1 | **[Unlock. drv]**(dLr1): A configuration file can be loaded into the inverter or an existing configuration in the inverter can be modified if the inverter has been unlocked (i.e. access code entered) or is not protected by an access code. | | |
| dLr2 | **[Not allowed]**(dLr2): Download not allowed. | | |
| dLr3 | **[Lock/unlock]**(dLr3): Combination of **[Locked drv]**(dLr0) and **[Unlock. drv]**(dLr1). | | |

# 5.3 Maintenance and diagnostics

## 5.3.1 Maintenance

### Limitation of warranty

The warranty does not apply if the product has been opened by anyone other than B&R service administrators.

### Service

**Caution!**

**RISK OF DAMAGE TO FREQUENCY INVERTER**

**The following recommendations in relation to environmental conditions must be observed (temperature, chemical influences, dust).**

**Failure to observe these instructions can result in damage to the equipment.**

For optimized operation, the following measures are recommended.

| Environment | Affected components: | Measure | Interval |
|---|---|---|---|
| Physical impact on the product | Housing - Control block (LED display) | Perform a visual inspection of the inverter. | At least once a year |
| Corrosion | Terminals - Male connectors - Screws - EMC plate | Inspect, and clean if necessary | |
| Dust | Terminals - Fans - Air vents | | |
| Temperature | In the vicinity of the product | Inspect, and adjust if necessary | |
| Cooling | Fans | Check operation of the fan. | |
| | | Replace the fans. | After three to five years depending on operating conditions. |
| Vibration | Terminal connections | Check whether the terminal screws are tightened based on the recommended tightening torque. | At least once a year |

**Note:**

**Fan operation is dependent on the thermal state of the inverter. It is possible for the inverter to be running but not the fan.**

### Spares and repairs

Maintainable product: Please contact your customer service center.

### Lengthy storage periods

If the inverter has not been switched on for a long time, the capacitors must be fully charged before the motor is started.

### Fan replacement

A new fan can be ordered within the scope of an ACOPOSinverter P66 maintenance agreement. See www.br-automation.com.

After an interruption to the product's power supply, the fans may continue to run for a certain length of time.

**Note:**

**OPERATING FANS**

**Before handling the fans, make sure that they have come to a complete stop.**

**Failure to observe these instructions can result in damage to the equipment.**

**Note:**

**For additional information, see chapter 4.3.3 "Forming DC bus capacitors" on page 115.**

### 5.3.2 Diagnostics and error correction

**Danger!**

**RISK OF ELECTRIC SHOCK, ARC FLASH OR EXPLOSION**

**Before performing the tasks described in this section, read the instructions contained in the "Safety Information" paragraph carefully.**

**Failure to follow these instructions can result in death or serious injury.**

#### 5.3.2.1 Error code

- If the display does not light up, check the power supply to the inverter.
- The assignment of the "Fast stop" or "Freewheel" functions will prevent the inverter starting if the corresponding logic inputs are not powered up. The ACOPOSinverter then displays **[Freewheel]** (nSt) for a freewheel stop and **[Fast stop]** (FSt) for a fast stop. This is normal since these functions are active at zero so that the inverter will be stopped safely if there is a wire break.
- Make sure that the input for move commands is enabled according to the selected control mode (parameter**[2/3 wire control]** (tCC) and **[2 wire type]** (tCt)).
- If an input of the function "limit switch" is assigned and is set to zero, then the inverter can only be started with a run command for the opposite direction.
- If the setpoint or command channel is assigned to a communication bus, the inverter displays the message **[Freewheel]** (nSt) when the power supply is connected and remains in mode stop until the communication bus sends a command.

| Code | Name/Description |
|---|---|
| dGt- | **[DIAGNOSTICS]**<br>This menu can only be accessed with the graphic display terminal. It shows the detected errors and their causes in full-text and can be used for the implementation of tests. |

#### 5.3.2.2 Clearing the fault

In the event of an error being detected, perform the following:

- Disconnect all power supplies, including the power supply to the control section if applicable.
- Lock all power disconnects in the open position.
- Wait 15 minutes to allow the DC bus capacitors to discharge (the inverter LEDs cannot indicate whether there is no more DC bus voltage).
- Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 V.
- If the DC bus capacitors do not discharge fully, contact your local B&R representative. The inverter is not permitted to be repaired or put into operation in this case.
- Determine the cause of the error and resolve the error.
- Reinstate the power supply to the inverter to check whether the error has been resolved.

If the detected error can be reset, the inverter can be reset after the cause has been eliminated as follows:

- You can do this by switching off the inverter until the display disappears completely, then switching it on again.
- Automatically, in the cases described for function **[AUTOMATIC RESTART]** (Atr-).
- Via a logic input or a control bit with assignment to function **[FAULT RESET]** (rSt-).
- By pressing STOP/RESET on the keyboard of the graphic display terminal, if the active channel command is HMI (see **[Cmd channel 1]** (Cd1)).

### 5.3.2.3 Errors that require the power supply to be restarted after elimination of the cause

The cause of the fault must be removed before resetting by turning off and then back on.

Errors ASF, brF, SOF, SPF and tnF can also be corrected locally via a logic input or control bit (parameter **[Fault reset]** (rSF)).

| Error | Name | Probable cause | Correcting errors |
|---|---|---|---|
| AnF | [Load slipping] | • The difference between the output frequency and the speed feedback is not correct. | • Check motor, gain and stability parameters.<br>• Add a braking resistor.<br>• Check the sizing of the motor/inverter/load.<br>• Check the mechanical connection and wiring of the encoder.<br>• Check the parameter setting. |
| ASF | [Angle Error] | • This error occurs during measurement of the phase shift angle if the motor phase has failed or motor induction is too high. | • Check the speed control parameters.<br>• Check the motor phases and the maximum permissible current for the inverter. |
| brF | [Brake feedback] | • The brake feedback contact does not match the brake logic.<br>• The brake does not stop the motor fast enough (detected by measuring the speed on the pulse input). | • Check the feedback circuit path and the brake control circuit.<br>• Check the mechanical state of the brake.<br>• Check the condition of the brake lining. |
| CrF1 | [Precharge] | • Charging relay control error or charging resistor damaged. | • Turn the inverter off and then on again.<br>• Check internal connections.<br>• Contact B&R Product Support. |
| EEF1 | [Control Eeprom] | • Internal memory error, control block. | • Check the environment (electromagnetic compatibility).<br>• Switch the inverter off, then switch back on again, restore factory settings.<br>• Contact B&R Product Support. |
| EEF2 | [Power Eeprom] | • Internal memory fault, power card | |
| FCF1 | [Output contactor closed] | • The output contactor remains closed, even though the conditions for opening the contactor are met. | • Check the contactor and its wiring.<br>• Check the feedback circuit path. |
| HdF | [IGBT desaturation] | • Short circuit or grounding at the inverter output. | • Check the connection cables from the inverter to the motor and the motor insulation. |
| ILF | [Internal com. link] | • Communication between option card and inverter interrupted. | • Check the environment (electromagnetic compatibility).<br>• Check the connections.<br>• Replace the option card.<br>• Contact B&R Product Support. |
| InF1 | [FI size error] | • The power card is different from the saved power card. | • Check the power card reference type. |
| InF2 | [Incompatible PB] | • The power card is incompatible with the control block. | • Check the reference of the power card and its compatibility. |
| InF3 | [Internal serial link] | • Communication between the internal cards interrupted. | • Check internal connections.<br>• Contact B&R Product Support. |
| InF4 | [Internal-mftg zone] | • Internal data inconsistent. | • Recalibrate the inverter (through B&R customer service). |
| InF6 | [Internal - fault option] | • The option installed in the inverter is not recognized. | • Check the option type and compatibility. |
| InF9 | [Internal- I measure] | • The current measurements are not correct. | • Replace the current transmitter or power card.<br>• Contact B&R Product Support. |
| InFA | [Internal-mains circuit] | • The input stage is not operating correctly. | • Contact B&R Product Support. |
| InFb | [Internal- th. sensor] | • The inverter's temperature sensor is not operating correctly. | • Replace the inverter's temperature sensor.<br>• Contact B&R Product Support. |
| InFE | [internal- CPU] | • Internal microprocessor error. | • Switch off and reset.<br>• Contact B&R Product Support. |
| OCF | [Overcurrent] | • Parameters in menus **[SETTINGS]** (SEt-) and **[MOTOR CONTROL]** (drC-) are not correct.<br>• Inertia or load too high.<br>• Mechanical block. | • Check the parameters.<br>• Check the sizing of the motor/inverter/load.<br>• Check the state of the mechanism.<br>• Lower the value set in **[Overcurrent]** (CLI).<br>• Increase the clock frequency. |
| SAFF | [Safety fault] | • Debounce time exceeded.<br>• SS1 trigger threshold value exceed.<br>• Incorrect configuration:<br>• SLS overspeed triggering detected. | • Check the configuration of the safety functions.<br>• Check the information provided in chapter "Safety functions" of the ACOPOSinverter manual.<br>• Contact B&R Product Support. |
| SCF1 | [Motor short circuit] | • Short circuit or grounding at the inverter output. | • Check the connection cables from the inverter to the motor and the motor insulation.<br>• Reduce the clock frequency.<br>• Connect the motor throttles in series.<br>• Check speed control and brake setting.<br>• Increase the **[Time to restart]** (ttr).<br>• Increase the clock frequency. |

| Error | Name | Probable cause | Correcting errors |
|---|---|---|---|
| SCF3 | [Ground short circuit] | • Significant discharge current if several motors are connected in parallel. | • Check the connection cables from the inverter to the motor and the motor insulation.<br>• Reduce the clock frequency.<br>• Connect the motor throttles in series.<br>• Check speed control and brake setting.<br>• Increase the [Time to restart] (ttr).<br>• Reduce the clock frequency. |
| SOF | [Overspeed] | • Instability or driving load too high. | • Check the parameters for motor, gain and stability.<br>• Add braking resistor.<br>• Check the sizing of the motor/inverter/load.<br>• Check the parameter settings for function [FREQUENCY METER] (FqF-) if these are configured. |
| SPF | [Speed fdback loss] | • There is no signal at input "Pulse input" if this is used for speed measurement.<br>• Encoder feedback signal is missing. | • Check the encoder's configuration parameters.<br>• Check the wiring between the encoder and the inverter.<br>• Check the encoder.<br>• Check the cabling on the input and the sensors used. |
| tnF | [Auto-tuning] | • Special motor or motor whose power is not suitable for the inverter.<br>• Motor not connected to the inverter.<br>• Motor not stopped. | • Check that the motor and inverter are compatible.<br>• Check that the motor is detected during autotuning.<br>• If using an output motor contactor, close this during autotuning.<br>• Check that the motor is stopped during autotuning. |

### 5.3.2.4 Errors that can be acknowledged by an automatic restart after the cause is removed.

These errors can also be reset by switching off and then on again or via a logic input or a control bit (parameter **[Fault reset]** (rSF)).

| Error | Name | Probable cause | Correcting errors |
|---|---|---|---|
| bLF | [Brake control] | • Braking stroke current not attained.<br>• Threshold of brake engagement frequency [Brake engage freq.] (bEn) only regulated when the brake logic is assigned. | • Check the inverter/motor connection.<br>• Check the motor windings.<br>• Check settings [Brake release I FW] (Ibr) and [Brake release I Rev] (Ird).<br>• Use the recommended settings for [Brake engage freq.] (bEn). |
| CnF | [Com. card] | • Communication interruption at communication card | • Check the environment (electromagnetic compatibility).<br>• Check the wiring.<br>• Check timeout.<br>• Replace the option card.<br>• Contact B&R Product Support. |
| COF | [CANopen com.] | • Communication interruption on the CANopen® bus. | • Check the communication bus.<br>• Check timeout. |
| EPF1 | [extFlt LI/Bit] | • Error triggered by an external device, depending on the user. | • Check the device that caused the error and switch it on again. |
| EPF2 | [External fault com.] | • Fault triggered by a communication network | • Check the device that caused the error and switch it on again. |
| FCF2 | [Out. contact. open.] | • The output contactor remains open although the closing conditions have been met. | • Check the contactor and its wiring.<br>• Check the feedback circuit path. |
| LCF | [Line contactor] | • The inverter is not switched on, although the [Mains V. time out] (LCt) has expired. | • Check the contactor and its wiring.<br>• Check timeout.<br>• Check the connection to power supply/contactor/inverter. |
| LFF3 | [AI3 4-20mA loss] | • Loss of the 4-20 mA reference on analog input AI3. | • Check the connection on the analog inputs. |
| ObF | [Overbraking] | • Excessive braking or driving load.<br>• Mains voltage too high. | • Increase deceleration.<br>• If necessary install a braking resistor.<br>• Activate function [Dec ramp adapt.] (brA) if it is compatible with the application.<br>• Check the mains voltage. |
| OCF | [Overcurrent] | • Parameters in menu [SETTINGS] (SEt-) and [MOTOR CONTROL] (drC-) are incorrect.<br>• Inertia or load too high.<br>• Mechanical locking mechanism. | • Check the parameters.<br>• Check the size of the motor/drive/load.<br>• Check the state of the mechanism.<br>• Reduce the [Current Limit] (CLI).<br>• Increase the switching frequency. |
| OHF | [Drive overheat] | • Inverter temperature too high. | • Check the motor load, inverter ventilation and ambient temperature. Allow the inverter to cool before switching it on again. |
| OLC | [Process overload error] | • Process overload | • Check and eliminate the cause of the overload.<br>• Check the parameters of function [PROCESS OVERLOAD] (OLd-). |
| OLF | [Motor overload] | • Triggered by excessive motor current. | • Check the setting of the motor thermal protection, check the motor load. Allow the motor to cool before switching it on again. |
| OPF1 | [1 output phase loss] | • Loss of one phase at inverter output. | • Check the connections between the inverter and the motor. |
| OPF2 | [3out ph loss] | • Motor not connected or motor power too low.<br>• Motor contactor open.<br>• Instantaneous instability in the motor current. | • Check the connections between the inverter and the motor.<br>• If using a motor contactor, set parameter [Output Phase Loss] (OPL) to [Output cut] (OAC).<br>• Test to carry out if the motor power is too low or if the motor is not found: In the factory settings, check whether output phase losses detection is enabled [Output Phase Loss] (OPL) = [YES] (YES). If the inverter should be tested or maintenance tasks performed without using a motor suitable for the inverter model (especially for high-power drives), the function for detecting the motor phase must be disabled: [Output Phase Loss] (OPL) = [No] (nO).<br>• Check and optimize the following parameters: [IR compensation] (UFr), [Rated motor volt.] (UnS) and [Rated motor volt.] (nCr) and execute [Auto-tuning] (tUn). |
| OSF | [Mains overvoltage] | • Mains voltage too high.<br>• Fault in the mains. | • Check the mains voltage. |
| OtFL | [LI6=PTC overhead fault] | • Overheating of PTC probes detected on input LI6. | • Check load and rating of the motor.<br>• Check the ventilation of the motor.<br>• Allow the motor to cool before switching it on again.<br>• Check the type and state of the PTC probe. |
| PtFL | [LI6=PTC overheat] | • PTC probes on input LI6 open or short-circuited. | • Check PTC probes and their motor/inverter/wiring |

| Error | Name | Probable cause | Correcting errors |
|---|---|---|---|
| SCF1 | [Motor short circuit] | • Short circuit or grounding at the inverter output. | • Check the cables that connect the inverter to the motor. Check the motor insulation.<br>• Reduce the switching frequency.<br>• Connect the chokes in series with the motor.<br>• Check the settings for the speed control circuit and the brake.<br>• Increase the [Time to restart] (ttr).<br>• Increase the switching frequency. |
| SCF3 | [Ground short circuit] | • Significant ground leakage current at the inverter output when multiple motors are connected in parallel. | • Check the cables that connect the inverter to the motor. Check the motor insulation.<br>• Reduce the switching frequency.<br>• Connect the chokes in series with the motor.<br>• Check the settings for the speed control circuit and the brake.<br>• Increase the [Time to restart] (ttr).<br>• Increase the switching frequency. |
| SCF4 | [IGBT short circuit] | • Power component fault. | • Contact B&R Product Support. |
| SCF5 | [Motor short circuit] | • Short circuit on the inverter output. | • Check the connection cables from the inverter to the motor and the motor insulation.<br>• Contact B&R Product Support. |
| SLF1 | [Modbus com.] | • Communication interruption on Modbus. | • Check the communication bus.<br>• Check timeout. |
| SLF2 | [PC com.] | • Communication interruption with PC software. | • Check the PC software connection cable.<br>• Check timeout. |
| SLF3 | [HMI com.] | • Communication error with the graphic display terminal. | • Check the terminal connection.<br>• Check timeout. |
| SSF | [Torque/current lim] | • Change to torque limiting. | • Check for the possible presence of a mechanical problem.<br>• Check the parameters of [TORQUE LIMITATION] (tOL-) and the parameters of [TORQUE OR I LIM. DETECT] (tId-). |
| tJF | [IGBT overheat] | • Overheating of the inverter. | • Check the load/motor/inverter sizing.<br>• Reduce the clock frequency.<br>• Allow the motor to cool before switching it on again. |
| tnF | [Auto-tuning] | • Special motor or motor whose power is not suitable for the inverter.<br>• Motor is not connected to the inverter.<br>• Motor not stopped. | • Check the compatibility of motor/inverter.<br>• Check the availability of the motor during autotuning.<br>• If you are using an output contactor, close this during autotuning.<br>• Check if the motor is stopped during the tuning operation. |
| ULF | [Proc. underload Flt] | • Process underload | • Check and eliminate the cause of the underload.<br>• The parameters of function [PROCESS UNDERLOAD] (Uld-). |

### 5.3.2.5 Errors that are acknowledged immediately once the cause of the error has been eliminated

| Error | Name | Probable cause | Correcting errors |
|---|---|---|---|
| CFF | [Incorrect config.] | • Option card was changed or removed.<br>• Control block was replaced by a control block that was configured for a different inverter type.<br>• The current configuration is not inconsistent. | • Check that there are no card errors.<br>• In the event of the option card being changed/removed deliberately, see the remarks below.<br>• Check that there are no card errors.<br>• In the event of the control block being changed deliberately, see the remarks below.<br>• Restore the factory settings or the backup configuration (if valid). |
| CFI<br>CFI2 | [Invalid config.] | • Invalid configuration. The configuration loaded via the bus or the communication network is inconsistent. | • Check the last loaded configuration.<br>• Load a compatible configuration. |
| CSF | [Ch. Sw. fault] | • Switchover to invalid channels. | • Check the function parameters. |
| dLF | [Dynamic load fault] | • Abnormal load variation. | • Check that the load is not blocked by an obstacle.<br>• Restart by resetting the move command. |
| HCF | [Cards pairing] | • Function [CARDS PAIRING] (PPI-) was configured and an inverter card was changed. | • In the event of a card error, reinsert the original card.<br>• Confirm the configuration by entering [Pairing password] (PPI) if the card has been intentionally changed. |
| PHF | [Input phase loss] | • Inverter incorrectly supplied or a fuse blown.<br>• Phase failure.<br>• Use of a three-phase ACOPOSinverter with single-phase mains.<br>• Unbalanced load. This protective function is effective only under load. | • Check the power connection and the fuses.<br>• Use a 3-phase line supply.<br>• Use [Input phase loss] (IPL) = [No] (nO) to disable the error. |
| USF | [Undervoltage] | • Mains voltage too low.<br>• Temporary voltage drop. | • Check the voltage and the parameters of [UNDERVOLTAGE MGT] (USb-). |

### 5.3.2.6 Option card changed or removed

If the option card is deleted or replaced by another, the inverter locks in error mode [Incorrect config.] (CFF) when switching on. If the card was intentionally replaced or removed, the error can be cleared by pressing ENT twice. This causes all factory settings for the card-specific parameter groups to be restored. These are:

**Card replaced by a card of the same type**

- Communication cards: Only the parameters that are specific to communication cards

### 5.3.2.7 Changing the control unit

If a control block is replaced by a control block that has been configured in another type of inverter, the inverter locks in error mode [Incorrect config.] (CFF) when switching on. If the control block was intentionally replaced, the error can be cleared by pressing ENT twice, which **results in the restoration of all factory settings**.

### 5.3.2.8 Error that are displayed on the external operator terminal

| Code | Name | Description |
|---|---|---|
| InIt | [Init] | The microcontroller is initiated.<br>The communication configuration is searched for. |
| COM.E[1)] | [Communication error] | Timeout error (50 ms).<br>This message is displayed after 20 communication attempts. |
| A-17[1)] | [Alarm button] | A key was pressed for longer than 10 seconds.<br>The connection to the keypad was interrupted.<br>Press any key to enable the keypad again. |
| CLr[1)] | [Acknowl. confirmation error] | This error is displayed when you press STOP once when the active command channel is the external operator terminal. |
| dEU.E[1)] | [Drive disparity] | The brand of the inverter does not match the external operator terminal. |
| rOM.E[1)] | [RAM anomaly] | A deviation in the ROM of the external operator terminal was detected during checksum calculation. |
| rAM.E[1)] | [RAM anomaly] | A RAM deviation of the external operator terminal was detected. |
| CPU.E[1)] | [Other detected faults] | Other errors. |

1) Flashes

# 6 The drive in ACPi SafeConfigurator

ACPi SafeConfigurator is software that is used independently of Automation Studio. The software can be used to configure drives or to monitor selected parameters.

The software tool is based on a manufacturer-independent concept in which device-specific DTM files are combined and used with the aid of a preferred FDTcontainer.

The following explanations and screenshots were made using the DTM files contained in the software package and the FDTcontainer from the M&M company.

## 6.1 Automation Studio and ACPi SafeConfigurator

ACPi SafeConfigurator is required to enable the drive's safety functions (STO, SS1, SLS, SMS and GDL). It is intended as a supplementary configuration tool since all non-safety-related parameters can be defined from Automation Studio.

### Note:

**Using tab "Parameter", ACPi SafeConfigurator offers the possibility to read out and adjust the current set of non-safety-related parameters. This means that it is also possible to configure the non-safety-related parameters of the drive. However, there are widely branched dependencies between the individual drive parameters that are currently only taken into account in the module configuration in Automation Studio. To avoid CFI errors, which are very difficult to correct, B&R recommends defining the desired settings in the module configuration in Automation Studio and downloading them to the PLC with the overall project.**

## 6.2 Additionally required hardware

A USB-to-RS485 converter is required for using ACPi SafeConfigurator. For this purpose, B&R offers accessory ACOPOSinverter USB Modbus universal cable 8I0XC001.003-1.

8I0XC001.003-1 offers a USB connector (type A, USB 2.0) to connect to a PC and an RJ45 connector to connect to the ACOPOSinverter.

### Information:

**When connecting cable 8I0XC001.003-1 to a PC, make sure that the cable is connected directly to the PC. Using USB hubs (e.g. integrated into a monitor) can lead to impermissible delay times and unstable communication between the PC and ACOPOSinverter.**

**When connecting cable 8I0XC001.003-1 to the ACOPOSinverter, use the RJ45 female connector for Modbus communication. This is located on the front of the drive or on the terminal block circuit board (ACOPOSinverter P66). RJ45 female connectors arranged in pairs, e.g. for communication in a POWERLINK network, cannot be used for this purpose.**

## 6.3 Additionally required software

After connecting cable 8I0XC001.003-1 to the PC, a Windows device driver is necessary. This can be located online and installed automatically. If the PC must be operated while disconnected from the Internet, the enclosed installation routine can be used.

### Information:

**In addition to the device driver, a Windows service called "NetAccess service" is installed and enabled. This Windows service is required during online communication between ACPi SafeConfigurator and the ACOPOSinverter.**

To establish an online connection between ACPi SafeConfigurator and the ACOPOSinverter, the following software components are required on the PC:

- An FDTcontainer (e.g. M&M FDTcontainer version 4)
- Component "Modbus SL Comm DTM" of ModbusDTMlibrary
- The P66_P76DTMlibrary

## 6.4 Establishing connection

The following steps are necessary for establishing an online connection between ACPi SafeConfigurator and an ACOPOSinverter:

Initial situation:

1) Cable 8I0XC001.003-1 is connected to the PC (without USB hub).
2) The Windows Device Manager displays the following components:
   a) USB controller called "TSX C USB 485"

   b) COM & LPT interface named "TSX C USB 485 (COMx)"

3) Cable 8I0XC001.003-1 is connected to the correct RJ45 female connector of the ACOPOSinverter.
4) An FDTcontainer was successfully installed.
5) The required DTMlibraries were successfully installed:
   a) ModbusDTMlibrary (at least "Modbus SL Comm DTM")
   b) P66_P76DTMlibrary

### 6.4.1 Creating a project

To create a project, the FDTcontainer must first be opened and the device catalog updated if necessary. A new/empty project can be created and saved at the desired location with the desired name.

### 6.4.2 Project setup

The FDTcontainer provides a network view and a device catalog. When comparing the elements of the FDT-container with those in B&R Automation Studio, the network view can be seen as a kind of hardware tree.

To represent the hardware situation in the FDTcontainer, the DTM files for cable 8I0XC001.003-1 and the connected ACOPOSinverter must be added.

If multiple ACOPOSinverter devices with different configuration information are used, component "ACPi P66_P76" can be defined multiple times in the FDTcontainer network. This allows various hardware combinations to be stored in one project.

**Information:**

**The communication between the ACOPOSinverter and ACPi SafeConfigurator is based on the concept of point-to-point connection; this means that each 8I0XC001.003-1 cable can only communicate with one ACOPOSinverter.**

**The possibility to add component "ACPi P66_P76" multiple times after component "Modbus serial communication DTM" has no relation to the real hardware arrangement.**

### 6.4.3 Cable 8I0XC001.003-1

Component "Modbus serial communication DTM" from the device catalog must be added to the network and configured to the COM interface that is displayed in the Windows Device Manager for the "TSX C USB 485 (COMx)". Press "OK" to confirm the change.

### 6.4.4 The ACOPOSinverter

After component "ACPi P66_P76" has been selected from the device catalog, it is arranged in the network behind component "Modbus serial communication DTM".

To configure component "ACPi P66_P76", the data required from the drive being used can be entered manually or read directly from the ACOPOSinverter (see "Step 1 - Connect and disconnect" on page 441).

If information will be entered manually, the configuration of component "ACPi P66_P76" must be opened; the type and performance class of the drive and the current software version of the "option board" communication card used must be specified.

### 6.4.5 Connect and go online

When using ACPi SafeConfigurator, a distinction must be made between the operating elements of the FDTcontainer and the user interfaces of the device-specific DTMs. A synchronized online connection between PC and ACOPOSinverter is established in two steps.

#### 6.4.5.1 Step 1 - Connect and disconnect

To establish a connection in the first step, action "Connect and disconnect FDTcontainer" is necessary. These connections are pure virtual and only serve to manage the defined configurations in the network view (enable/disable). The virtual connections between the FDTcontainer and an "ACPi P66_P76" network component are required for a synchronized online communication later on.

**Information:**

**If component "ACPi P66_P76" is arranged multiple times in the network, multiple virtual connections can also be established.**

**Synchronized online communication is necessary for the actual exchange of data. This is based on the principle of the point-to-point connection.**

**Reading the ACOPOSinverter configuration data**

The necessary configuration data of component "ACPi P66_P76" can be read directly from a connected ACOPOSinverter. Function "Load from device" is used for this.

**Information:**

**The required virtual connection is automatically established during this action and is retained after the reading process has been completed.**

To execute this action successfully, the following conditions must be met:

1) Cable 8I0XC001.003-1 must be connected to the PC and the ACOPOSinverter.
2) Component "Modbus serial communication DTM" must be configured to the correct COM interface.
3) Component "ACPi P66_P76" must be added to the network once again. The configuration must be indefinite (i.e. it is not permitted to be changed in advance).

#### 6.4.5.2 Step 2 - Establish synchronized online communication

When the configuration of the components in the FDTcontainer network is completed and a virtual connection to the desired component "ACPi P66_P76" exists, a synchronized online communication to the ACOPOSinverter can be established.

In contrast to virtual connections, which are used exclusively for administration on the PC, synchronized online communication involves the exchange of information between the PC and ACOPOSinverter. Note that cable 8I0XC001.003-1 is designed for point-to-point connections, so you cannot connect multiple ACOPOSinverter devices to the PC at the same time.

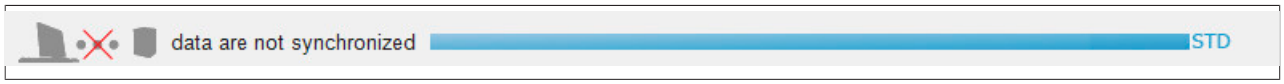
**Information:**

**To avoid mistakes and simplify work in the FDTcontainer from M&M, B&R recommends hiding the FDTcontainer buttons from this point on. The arrow icon at the top right can be used to hide categories "Device", "Topology" and "View".**

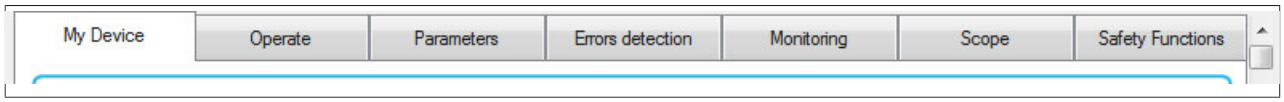
To establish the synchronized online communication, the configuration of component "ACPi P66_P76" must be opened. Regardless of which FDTcontainer is used, the following components should be displayed:

1) Header with device-specific user interfaces

2) Status bar




3) Operating tabs



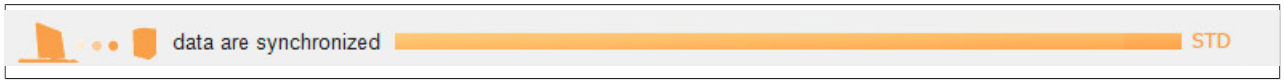

4) Footer

It must be checked whether the information on tab "My Device" matches the hardware arrangement. If the information is incorrect, button "Modify" must be selected. "Device names" can be assigned here, which is strongly recommended for projects with multiple instances of component "ACPi P66_P76".

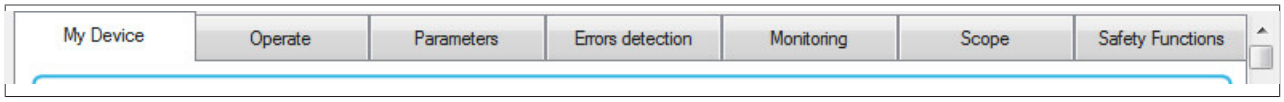
If all entries are correct in tab "My device", the synchronization symbol in the device-specific user interface can be selected. The view should change as follows:

1) Header with device-specific user interfaces

2) Status bar




3) Operating tabs




4) Footer

## 6.5 Configuring the ACOPOSinverter using ACPi SafeConfigurator

The ACOPOSinverter can be fully or partially configured using ACPi SafeConfigurator.

In the partial configuration, only safety functions STO, SS1, SLS, SMS or GDL are defined and enabled in Automation Studio in addition to the configuration. The full configuration is intended for autonomous operation of the ACOPOSinverter, i.e. without a PLC.

### 6.5.1 Partial configuration

Tab "Safety functions" can be used to configure the safety functions. The configuration of these parameters via ACPi SafeConfigurator is compatible with the configuration options in Automation Studio and can therefore be used as a supplement.

For additional information, see chapter "Safety functions" on page 514.

### 6.5.2 Full configuration

Tab "Parameters" can be used for the full configuration of the ACOPOSinverter without safety functions. The arrangement of configuration parameters corresponds to the menu navigation on ACOPOSinverter graphic display 8I0XD301.300-1.

For additional information, see chapter "The drive" on page 177.

**Notice!**

**Adjusting configuration parameters using ACPi SafeConfigurator is intended for autonomous operation of the ACOPOSinverter, i.e. without a PLC. Adjusting configuration parameters using ACPi SafeConfigurator can result in a disturbance in communication with the PLC afterwards.**

ACOPOSinverter drives were originally developed for operation without a PLC. Using tab "Parameters" is intended for this use case only.

**Information:**

**Using tab "Parameters" to adjust the configuration and then use it on a PLC requires considerable detailed knowledge of the device and is not part of the descriptions from B&R.**

## 6.6 Monitoring drive parameters

Tabs "Operate", "Error detections", "Monitoring" and "Scope" offer various ways to monitor or record the current status of a synchronized drive.

### 6.6.1 Tab "Operate"

Tab "Operate" displays selected status information and lists basic adjustable configuration parameters.

**Notice!**

**Adjusting configuration parameters using ACPi SafeConfigurator is intended for autonomous operation of the ACOPOSinverter, i.e. without a PLC.**
**Adjusting configuration parameters using ACPi SafeConfigurator can result in a disturbance in communication with the PLC afterwards.**

### 6.6.2 Tab "Monitoring"

Tab "Monitoring" prepares the status information of tab "Operate" in a different way. The respective parameters can be selected on the left side and placed on the workspace.

In addition, the current status information of the safety functions in tab "Safety functions" can be displayed.

### 6.6.3 Tab "Scope"

Tab "Scope" allows the history of selected process parameters to be recorded.

**Information:**

**Process data recording can be controlled via tab "Scope". This requires a stable online connection between ACOPOSinverter and device-specific DTM since the data is collected directly on the ACOPOSinverter.**
**B&R strongly recommends saving the project in the FDTcontainer before using tab "Scope".**

In section "Settings", tab "Scope" also offers the possibility to adjust individual configuration parameters.

**Notice!**

**Adjusting configuration parameters using ACPi SafeConfigurator is intended for autonomous operation of the ACOPOSinverter, i.e. without a PLC.**

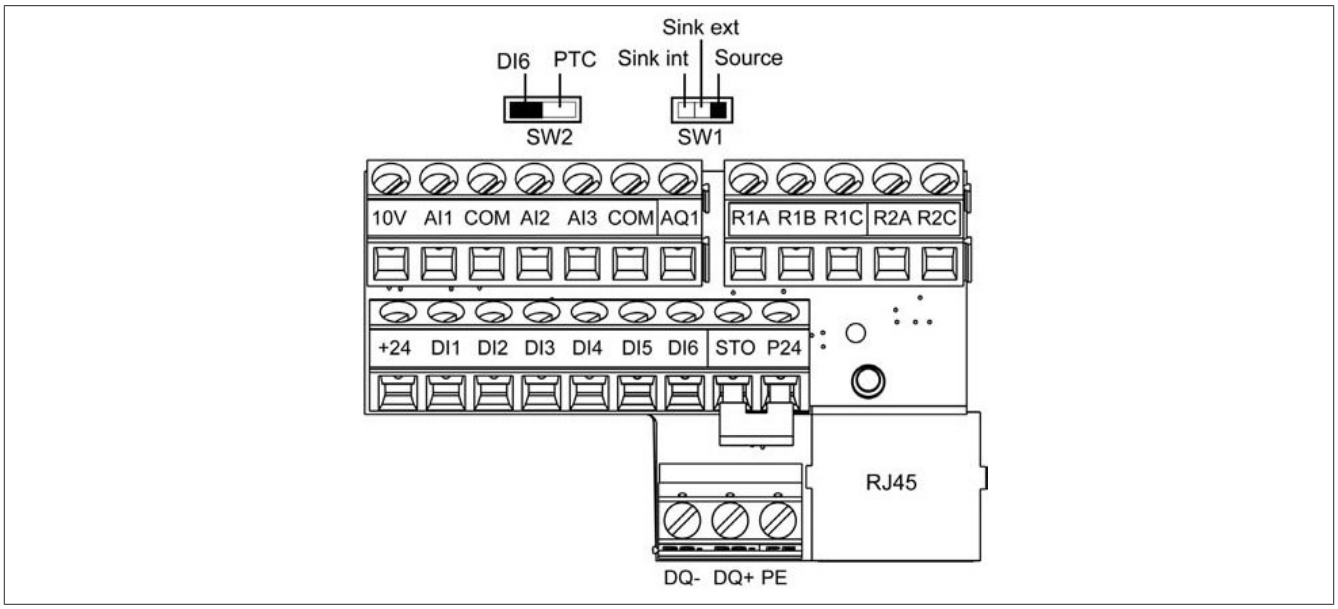
**Adjusting configuration parameters using ACPi SafeConfigurator can result in a disturbance in communication with the PLC afterwards.**

# 7 Interfaces

## 7.1 CANopen

### 7.1.1 Overview

#### Connection characteristics




Cable cross sections and tightening torque

| Control terminals | Cable cross section for relay output | | Cross section for various cables | | Tightening torque |
|---|---|---|---|---|---|
| | Min.[1] | Max. | Min.[1] | Max. | |
| | mm² (AWG) | mm² (AWG) | mm² (AWG) | mm² (AWG) | Nm (lb.in) |
| All terminals | 0.75 (18) | 1.5 (16) | 0.5 (20) | 1.5 (16) | 0.5 (4.4) |

1) The value corresponds to the minimum permitted cross section for the terminal.

> **Note:**
>
> **Electrical data for the control terminals** see "Electrical data for the control terminals" on page 164.

For the RJ45 pinout see "Electrical installation" on page 454.

#### RJ45 communication port

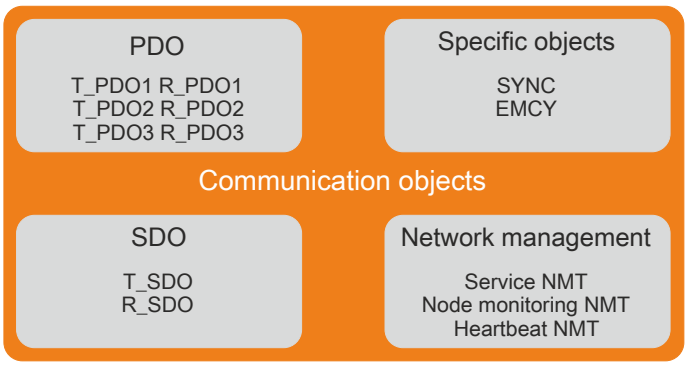
Connection options:

- PC with ACPi SafeConfigurator
- External graphic display terminal via Modbus serial cable
- Modbus or CANopen network

> **Note:**
>
> **Before connecting the RJ45 cable to the product, the cable should be inspected for damage. Connecting a damaged cable may cause the power supply to the controller to fail.**

### Software

CANopen manages the communication between the network devices using objects and object dictionaries. A network device can use process data objects (PDO) and service data objects (SDO) in order to request the object data in the object dictionary of another device and, if allowed, write back modified values.




- PDOs (process data objects) for real-time transfer of process data
- SDOs (service data objects) for read and write access to the object dictionary
- Objects for controlling CAN messages:
  - SYNC object (synchronization object) for synchronizing network devices
  - EMCY object (emergency object) for reporting errors from devices or peripheral devices
- Network management services
  - Service NMT for initialization and network control (NMT: Network management).
  - Node monitoring NMT for monitoring network devices
  - Heartbeat NMT for monitoring network devices

## 7.1.2 Basic information

### 7.1.2.1 Object dictionary

#### Description

Each CANopen device maintains an object dictionary containing the objects needed for communication.

#### Index and subindex

The objects in the object dictionary are addressed by a 16-bit index. For each object, one or more 8-bit subindex entries indicate individual data fields in the object. The index and subindex are displayed in hexadecimal notation.

The following table contains the index and subindex entries based on the object ramps example (203 hex).

| Index | Subindex | Name | Explanation |
|---|---|---|---|
| 203C hex | 00 hex | - | Number of entries |
| 203C hex | 01 hex | ACC | Acceleration time |
| 203C hex | 02 hex | DEC | Delay time |

### Object dictionary description

The description of the object dictionary consists of several sections:

- Communication profile range
- RPDO
- TPDO
- Manufacturer-specific
- Application profile (CiA402)

| Index (hex) | Object |
|---|---|
| 0000 | Not used |
| 0001 to 001F | Static data types |
| 0020 to 003F | Complex data types |
| 0040 to 005F | Not used (manufacturer-specific complex data types) |
| 0060 to 007F | Device profile-specific static data types |
| 0080 to 009F | Device profile-specific complex data types |
| 00A0 to 0FFF | Reserved for further use |
| 1000 to 1FFF | Communication profile range |
| 2000 to 5FFF | ACOPOSinverter-specific profile range |
| 6000 to 9FFF | Standardized device profile range |
| A000 to FFFF | Reserved for further use |

## 7.1.2.2 Identification communication object

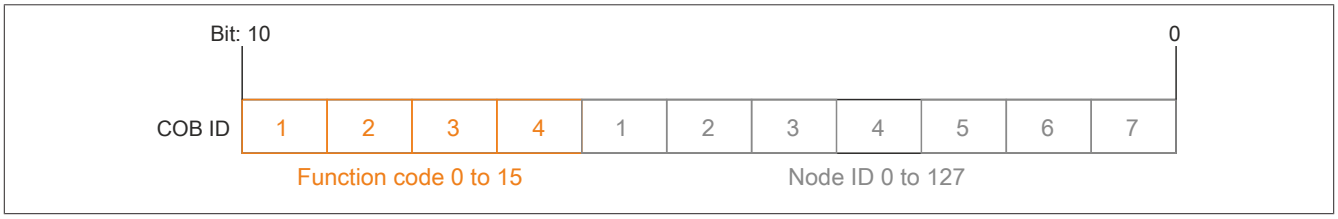
### Description

The COB ID (communication object detection) has two tasks in relation to communication object detection control:

- Bus arbitration: Specification of the transfer priorities
- Identification of the communication objects

An 11-bit COB identifier in accordance with specification CAN 3.0 A is defined for CAN communication. It consists of two parts:

- Functional code, 4 bit
- Node address (bridge ID), 7 bit




### Function code

The functional code classifies the communication objects. Since the bits of the function code in a COB ID are more important, it also controls the transfer priorities: objects with a low functional code are sent with a higher priority. For example: In the case of simultaneous bus access, an object with functional code 1 is sent before an object with functional code 3.

### Node address

Each network device is configured before it can be used on the network. The device is assigned to a unique 7-bit node address (node ID) between 1 (01 hex) and 127 (7F hex). Device address 0 is reserved for broadcast transfers, which are used for simultaneous transfer to all available devices.

### COB IDs of the communication objects

The following table shows the COB IDs of the communication objects with the factory settings.

| Communication object | Function code | Node address, node ID [1 to 127] | COB ID decimal point (hexadecimal) |
|---|---|---|---|
| Service network management (NMT) | 0000 | 0000000 | 0 (0 hex) |
| Synchronization service (SYNC) | 0001 | 0000000 | 128 (80 hex) |
| Emergency service (EMCY) | 0001 | xxxxxxx | 128 (80 hex) + Node ID |
| Transmit PDO1 (TPDO1) | 0011 | xxxxxxx | 384 (180 hex) + Node ID |
| Received PD01 (RPDO1) | 0100 | xxxxxxx | 512 (200 hex) + Node ID |
| Transmit PDO2 (TPDO2) | 0101 | xxxxxxx | 640 (280 hex) + Node ID |
| Received PDO2 (RPDO2) | 0110 | xxxxxxx | 768 (300 hex) + Node ID |
| Transmit PDO3 (TPDO3) | 0111 | xxxxxxx | 896 (380 hex) + Node ID |
| Received PDO3 (RPDO3) | 1000 | xxxxxxx | 1024 (400 hex) + Node ID |
| Transmit SDO (TSDO) | 1011 | xxxxxxx | 1408 (580 hex) + Node ID |
| Received SDO (RSDO) | 1100 | xxxxxxx | 1536 (600 hex) + Node ID |
| NMT error control (node monitoring, heartbeat) | 1110 | xxxxxxx | 1792 (700 hex) + Node ID |

## 7.1.2.3 Communication service data

### Description

Service data objects (SDO) can be used to access the entries in an object dictionary using the index and the subindex. The values of the objects can be read, and if permitted, also written.

Each network device has at least one SDO server in order to respond to read and write requests from various devices. The TSDO of a client SDO is used for sending data exchange requests; the RSDO is used to receive them.

The data frame of an SDO consists of 8 bytes. SDOs have a higher COB ID than PDOs and are therefore given lower priority when transferred by the CAN bus.

### Example of a read request

This example explains how acceleration parameter **[Acceleration]** (ACC) for an ACOPOSinverter is written to CANopen address 4 (COB ID = 580 hex +Node ID or 600 hex + Node ID). The index/subindex value of this parameter is 203C/02 hex. The values are specified in hexadecimal.

**Read request:** Master > Inverter

| | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|---|
| COB ID | Request code | Object index | | Subindex | Request data | | | |
| 604 | 40 | 3C | 20 | 02 | 00 | 00 | 00 | 00 |

**Read response:** Master < Inverter

| | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|---|
| COB ID | Request code | Object index | | Subindex | Request data | | | |
| 584 | 4B | 3C | 20 | 02 | E8 | 03 | 00 | 00 |

The value read from the parameter corresponds to 1000 (03E8 hex), which is equivalent to acceleration **[Acceleration]** (ACC) of 100 s since the unit set for this parameter is 0.1 s.

### Example of a write request

This example explains how the value 100 s in acceleration parameter [Acceleration] (ACC) for an ACOPOSinverter is written to CANopen address 4 (COB ID 580 hex + Node ID or 600 hex + Node ID). The index/subindex value of this parameter is 203C/02 hex. The values are specified in hexadecimal.

The request code is 2B hex for an item of 2 bytes in length.

**Write response:** Master > Inverter

| | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|---|
| COB ID | Request code | Object index | | Subindex | Request data | | | |
| 604 | 2 B | 3C | 20 | 02 | E8 | 03 | 00 | 00 |

The request data field specifies value 03E8 hex as written value 1000, which is equivalent to acceleration [Acceleration] (ACC) of 100 s, since the unit set for the parameter is 0.1 s.

**Write response:** Master < Inverter

| | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|---|
| COB ID | Request code | Object index | | Subindex | Request data | | | |
| 584 | 60 | 3C | 20 | 02 | 00 | 00 | 00 | 00 |

### Code requests and code responses

The SDO request code varies according to the specific scenario, which is described in detail in the following table:

| Request code | Description of the command | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|
| 23 hex | Write 4 bytes in data length (e.g. UNSIGNED32) | Bit 7 to 0 | Bit 15 to 8 | Bit 23 to 16 | Bit 31 to 24 |
| 2B hex | Write 2 bytes in data length (e.g. UNSIGNED16) | Bit 7 to 0 | Bit 15 to 8 | 00 hex | 00 hex |
| 2F hex | Write 1 byte in data length (e.g. UNSIGNED8) | Bit 7 to 0 | 00 hex | 00 hex | 00 hex |
| 40 hex | Read 1, byte, 2 bytes or 4 bytes in data length | 00 hex | 00 hex | 00 hex | 00 hex |
| 80 hex | Cancel current SDO command | 00 hex | 00 hex | 00 hex | 00 hex |

The SDO response codes correspond to the request codes and are described in detail in the following table:

| Request code | Description of the command | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|
| 43 hex | Read 4 bytes in data length (response to 40 hex request code) | Bit 7 to 0 | Bit 15 to 8 | Bit 23 to 16 | Bit 31 to 24 |
| 4 B hex | Read 2 bytes in data length (response to 40 hex request code) | Bit 7 to 0 | Bit 15 to 8 | 00 hex | 00 hex |
| 4F hex | Read 1 byte in data length (response to 40 hex request code) | Bit 7 to 0 | 00 hex | 00 hex | 00 hex |
| 60 hex | Write 1 byte, 2 bytes or 4 bytes in data length (response to 23 hex, 2B hex or 2F hex request codes) | 00 hex | 00 hex | 00 hex | 00 hex |
| 80 hex | Error: Send cancellation code [1)] | 00 hex | 00 hex | 00 hex | 00 hex |

1) The response data (4 to 7 bytes) corresponds to a 32-bit cancellation code, which is described below.

### Cancellation codes

The following table describes the possible cancellation codes that can be used during a data exchange with the product.

| Abort code | Description |
|---|---|
| 0503 0000 hex | Segmented transfer: The toggle bit is not switched |
| 0504 0001 hex | Command specifier (CS) is invalid or unknown |
| 0601 0000 hex | Access to the object is not possible |
| 0601 0002 hex | Attempt made to execute a write request to a write-protected parameter |
| 0602 0000 hex | Object does not exist in the object dictionary |
| 0604 0041 hex | PDO object assignment: The object cannot be assigned to the PDO; this error is triggered if parameters 1600 hex, 1602 hex, 1A00 hex, 1A01 hex and 1A02 hex are written to (PDO1, PDO2 and PDO3 assignments) |
| 0604 0042 hex | PDO object assignment: The number and/or length of the parameters that are to be assigned exceed the maximum PDO length |
| 0609 0011 hex | The subindex of the sent object in the request does not exist in the object dictionary. |
| 0609 0030 hex | Outside of the parameter values (for write request, only) |
| 0609 0031 hex | Written parameter value too high |
| 0800 0000 hex | General error triggered |

## Note:

**The cancellation codes listed in the table were written in accordance with standard convention and therefore must be inverted in the event of a byte-based display for "bytes 4 to 7" (e.g. 0609 0030 hex becomes byte 4: 30 hex, byte 5: 00 hex, byte 6: 09 hex, byte 7: 06 hex).**

### 7.1.2.4 Communication process data

#### Description

Process data objects (PDO) are used for the real-time exchange of process data, such as current and reference values or the operational readiness of the device. The transfer is carried out quickly since the data is sent without management data and confirmation from the recipient of the data transfer is not required. Each PDO can be enabled or disabled independently using the 31 bit (valid bit) in subindex 01 hex of the corresponding communication object.

#### PDO1 details

The first PDO is compatible with the PDO1 of the CiA402 speed mode as standard. It is asynchronous and contains two items of data: the control word (6040 hex, CMD) and the target speed (6042 hex, LFRD) for the output (from inverter to master), and the state word (6041 hex, ETA) and the control effort (6044 hex, RFRD) for the input (from device to master).

#### PDO2 details

The second PDO set (PDO2) is disabled as standard and is fully configurable (from one to four user-selected words). It is reserved for adjustments and additional controls as well as monitoring functions.

#### PDO3 details

The third PDO set (PDO3) is reserved. It is disabled as standard and cannot be configured. It contains the following:

- RPDO3 (receive), contains four output words (from master to device) for communication scanner NC1 to NC4
- TPDO3 (transmit), contains four input words (from device to master) for communication scanner NM1 to NM4

#### Transfer mode

The three PDOs are asynchronous as standard, although the transfer mode can be reconfigured by the user for each PDO in line with the requirements:

- Asynchronous mode (255): The transmit PDO is only sent if the value of the data changes. In this mode, the **inhibit time** and **event timer** can be modified in order to adjust the PDO transfer sequence in the bus.
- Cyclical synchronous mode (1 to 240): The transmit PDO is sent each time a synchronized object (SYNC) is received, or if a pre-configured number of synchronized objects (from 1 to 240) is received.
- Acyclical synchronous mode (0): The transmit PDO is sent each time the value of the data changes, but only during the synchronized window authorized by the next synchronization object (SYNC).

#### Synchronization object

The synchronization object (SYNC) is sent cyclically by the CANopen master. It does not contain any data and its frame is restricted to its COB identifier (080 hex). The role of this object is to allow synchronous communication mode for CANopen slaves.

### 7.1.2.5 Network management service

#### Description

Network management (NMT) is a part of the CANopen communication profile. It is used to initialize the network and the network devices as well as to start, stop and monitor the network devices during operation in the network.

NMT services can be divided into the following groups:

- Services for device control, in order to initialize devices for CANopen communication and to monitor the behavior of the devices when operating on the network.
- Service for connection monitoring in order to check the network state of a network device.

### Network management of the state machine

The CANopen NMT slave device operates a state machine that automatically changes all devices to pre-operational state after switch-on and internal initialization. In this state, the nodes can be configured and parameterized via SDOs. PDO communication is not allowed.

The NMT master device can switch all nodes or just one individual node to operational state and vice-versa. PDO transfer is allowed in operational state. If a device is switched to stop state, PDO and SDO communication is forced to terminate. Furthermore, this state can be used to achieve specific application behavior.

In operating state, all communication objects are active. The object dictionary can be accessed via SDO.

### NMT message description

The NTM services for device control are sent as unconfirmed messages with COB ID 0. They always have the highest priority in a CAN bus.

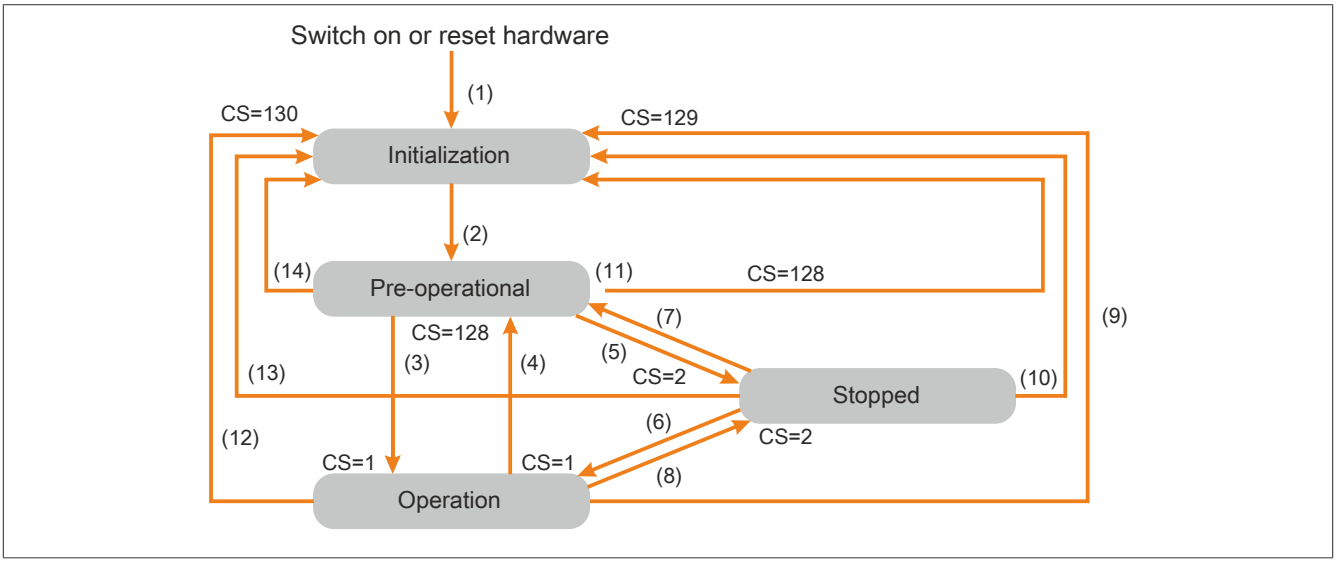
| COB ID | Byte 0 | Byte 1 |
|---|---|---|
| 0 (000 hex) | Command specifier (CS) | Node ID [1] |

1) If the node ID is zero, the command specifier is sent to all CANopen slaves.

The following table contains the command communication symbol that is used for the NMT state machine.

| Command specifier (CS) | Explanation |
|---|---|
| 1 (01 hex) | Start_Remote_Node |
| 2 (02 hex) | Stop_Remote_Node |
| 128 (80 hex) | Enter_Pre-Operational_State |
| 129 (81 hex) | Reset_Node |
| 130 (82 hex) | Reset_Communication |

### NMT state diagram




| Transition | Description |
|---|---|
| (1) | During switch on, the node automatically changes to initialization state |
| (2) | As soon as initialization has completed, pre-operational state is enabled automatically |
| (3), (6) | Start_Remote_Node |
| (4), (7) | Enter_Pre-Operational_State |
| (5), (8) | Stop_Remote_Node |
| (9), (10), (11) | Reset_Node |
| (12), (13), (14) | Reset_Communication |

Depending on the communication state of the device, the following services are available:

| | Initialization | Pre-operational | Operation | Stopped |
|---|---|---|---|---|
| PDO | | | x | |
| SDO | | x | x | |
| Synchronization (SYNC) | | x | x | |
| Emergency (EMCY) | | x | x | |
| Boot service | x | | x | |
| Network management (NMT) | | x | x | x |

In pre-operational state, the master can only execute SDOs

In operational state, the master can execute SDOs and PDOs. The device can only be controlled if the user has selected CANopen as the command channel.

In stop mode, the master cannot execute SDOs or PDOs.

If an error is detected and can be reset, the device must be in state "NMT operation", so that the PDO containing check word "CMD" can reset the device using command **Fault Reset Bit**.

### Node monitoring service

For communication monitoring, either the node monitoring service described here or the heartbeat service described further below can be used. Only one of these two services can be active at any one time. The node monitoring service on the ACOPOSinverter is disabled by default.

The master scans the device at regular intervals (**Life Time**) by sending a "Remote transfer request" (RTR). The "actual time" is calculated by multiplying the **Guard Time** and the **Life Time Factor**.

As soon as **Life Time** has expired and the device has not received an RTR, the following occurs:

- A **Life Guarding** error is triggered.
- An emergency telegram (**EMCY**) is sent.

**Node monitoring frame description**

| COB ID | Byte 0 | |
|---|---|---|
| 1792 (700 hex) + Node ID | Bit 7 | Bit 6 to 0 |
| | Switch bit | Node status |

The device indicates its NMT state by means of the "NMT information field", which is described here:

Bit 6 to 0 (node status): The current NMT state of the device:

- Initialization (00 hex)
- Stopped (04 hex)
- Operation (05 hex)
- Pre-operational (7F hex)

Bit 7 (switch bit): The value of this bit must change from one device response to the next. The value of the switch bit for the first response after the node monitoring service has been enabled is zero. This bit can only be reset by sending command **Reset_Communication** to the device. If a response is received with the same switch bit value as the previous one, the new response is treated as if it had not be received.

**Heartbeat service**

If the node monitoring service described above is not enabled, the heartbeat service can be used to monitor communication with any other node that supports this service.

The heartbeat service is disabled as standard on the ACOPOSinverter.

Each **Heartbeat Producer** sends heartbeat messages at regular intervals (**Producer Heartbeat Time**).

All **Heartbeat Consumers** check that they receive these messages in a shorter timeframe than **Consumer Heartbeat Time**.

The **Producer Heartbeat Time** must be shorter than **Consumer Heartbeat Time**. If the device is configured as a consumer with a time period that is equivalent to **Consumer Heartbeat Time** and that has not expired by the time a **heartbeat message** is received, the device will trigger a **heartbeat event** and send an emergency telegram (**EMCY**).

**Heartbeat frame description**

| COB ID | Byte 0 | |
|---|---|---|
| 1792 (700 hex) + Node ID | Bit 7 | Bit 6 to 0 |
| | Reserved | Heartbeat production state |

The **Heartbeat message**, which is sent from the device, contains field **Heartbeat Producer state** (byte 0), which we will describe here:

Bit 6-0: Heartbeat production state: Current NMT state of the device:

- Initialization (00 hex)
- Stopped (04 hex)
- Ready for operation (05 hex)
- Pre-operational (7F hex)

Bit 7 (switch-bit): Reserved: This bit corresponds to 0

**Emergency object**

Every time an error is detected or eliminated, an emergency object (**EMCY**) is sent from the device to another CANopen device with higher priority. This is especially the case for detected errors of type **Heartbeat of Life Guard**. An error object is never repeated.

| COB ID | Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Byte 7 |
|---|---|---|---|---|---|---|---|---|
| 128 (80 hex) + node ID | Error code [Errd] | | Error register | 0 | 0 | 0 | 0 | 0 |
| | LSB | MSB | Bit 0 = 0 (not an error) or 1 (error) | - | - | - | - | - |

Error code "Errd" and its possible values are described in the communication parameter file.

## 7.1.3 Hardware setup

### 7.1.3.1 Firmware and description

#### Compatibility

If the ACOPOSinverter should be operated on a CAN network, a hardware description file of type .eds can be used. This is available as a ZIP archive at www.br-automation.com.

The frequency inverter logs in to the CAN network with the following specifications:

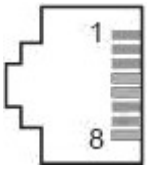
- Device name: 8I66S200018 (equipment number)
- Supplier ID: 0x0200005A
- Product code: 320

**Information:**

**The name of *.eds files contains information about the associated firmware version, e.g. SEATV320_020934E.eds corresponds to firmware V02.09 IE 34.**

### 7.1.3.2 Electrical installation

#### Pinout RJ45




| Pin | Name | Information |
|---|---|---|
| 1 | CAN | CAN HIGH |
| 2 | CAN | CAN LOW |
| 3 | CAN | CAN GND |
| 4 | EIA-485 (RS-485) | Data (for Modbus communication) |
| 5 | EIA-485 (RS-485) | Data\ (for Modbus communication) |
| 6 | Reserved | n.c. |
| 7 | Power supply | 10 VDC (e.g. for handheld, 8I0XD301.300-1) |
| 8 | Power supply and EIA-485 (RS-485) | GND (10 V power supply or serial signal) |

n.c. Not connected

#### Cable specifications and maximum bus length

The following table contains information about the maximum length:

| Data transfer speed Kbit/s | Maximum bus length m (ft) |
|---|---|
| 50 | 1000 (3280) |
| 125 | 500 (1640) |
| 250 | 250 (820) |
| 500 | 100 (328) |
| 1000 | 20 (65) |

Reference potential CAN_GND and the shield connection (connector housing) are galvanically separate.

- Maintain galvanic separation in order to prevent ground looping by the CAN bus.
- Use potential compensation conductors.
- Use prefabricated cables to reduce the writing of errors.
- Make sure that the wiring, cables and associated interfaces comply with PELV requirements.

#### Terminating resistor

Terminating resistors must be placed at either end of a CAN bus line. A 120 Ω terminating resistor is used between CAN_L and CAN_H for this purpose.

### 7.1.3.3 Cable routing

#### Installation topology

The following image shows the connection of several devices equipped with CANopen.

### 7.1.3.4 Bus termination

#### Introduction

Both ends of a CAN bus line must be terminated. A 120 Ω terminating resistor between CAN_L and CAN_H is used for this purpose. According to CANopen, there are several possible solutions (see "Accessories" on page 580).

## 7.1.4 Software setup

### 7.1.4.1 Basic settings

#### Configuring the communication parameters

**Overview**

The parameters are described in reference to the graphic end device. These settings can also be used in combination with the commissioning software.

**Access**

The parameters are accessible from menu **[COMMUNICATION]** (COM), **[CANopen com.]** (CnO-).

#### [CANopen address] (AdCo)

This parameter defines the address of the device on the network. This parameter is accepted after the switch-on/switch-off cycle.

**Access**

It is a read/write parameter. The parameter number is 6051 via Modbus access.

**Possible settings**

The following table shows the parameter settings:

| Settings | Code | Value | Description |
|---|---|---|---|
| [OFF] | (oFF) | 0 | CANopen address not assigned |
| [1 to 127] | (1 to 127) | 1 to 127 | CANopen address assigned<br>**Factory setting:** Off |

#### [CANopen bit rate] (bdCO)

This parameter defines the baud rate that is used to transfer the data. This parameter is accepted after the switch-on/switch-off cycle.

**Access**

It is a read/write parameter. The parameter number is 6053 via Modbus access.

**Possible settings**

The following table shows the parameter settings:

| Settings | Code | Value | Description |
|---|---|---|---|
| [50 kbps] | (50) | 38 | The baud rate is set to 50 kbit/s. |
| [125 kbps] | (125) | 52 | The baud rate is set to 125 kbit/s. |
| [250 kbps] | (250) | 60 | The baud rate is set to 250 kbit/s. |
| [500 kbps] | (500) | 68 | The baud rate is set to 500 kbit/s. |
| [1 Mbps] | (1M) | 76 | The baud rate is set to 1 Mbit/s.<br>**Factory setting:** 250 kbit/s |

#### [Error code] (ErCO)

This parameter indicates the last detected active CANopen error.

**Access**

It is a write-protected parameter. The parameter number is 6056 via Modbus access.

**Possible settings**

The following table shows the possible parameter settings.

| Settings | Code | Value | Description |
|---|---|---|---|
| [0] | (0) | 0 | No errors detected since CANopen communication last started. |
| [1] | (1) | 1 | Bus off or CANopen overflow. |
| [2] | (2) | 2 | Node monitoring error, which requires a return to NMT initialization state. |
| [3] | (3) | 3 | CANopen overflow. |
| [4] | (4) | 4 | Heartbeat error, which requires a return to NMT initialization state. |
| [5] | (5) | 5 | NMT specifies a diagram error. |

**Note:**

**If the motor is running, and a change is made to the NMT state, a [CANopen com.] (COF) is triggered.**

#### 7.1.4.2 Profile

##### 7.1.4.2.1 Defining a profile

**Profile types**

There are 3 types of profile:

- Communication profiles
- Function profiles
- Application profiles

**Communication profile**

A communication profile describes the characteristics of a bus or a network:

- Cables
- Connectors
- Electrical characteristics
- Access protocol
- Addressing system
- Periodical
- Replacement service
- Messaging service
- …

A communication profile is unique to each fieldbus type (such as Modbus, PROFIBUS DP, etc.) and is used by various device types.

**Functional profile**

A functional profile describes the behavior of a device type:

- Functions
- Parameter (e.g. name, format, unit, type, etc.)
- Periodical I/O variables
- State diagram
- …

A functional profile is common to all members of a device family (e.g. frequency inverter, encoder, I/O module, displays, etc.).

They may have common or similar parts. The standardized (IEC 61800-7) functional profiles for variable-speed inverters are as follows:

- CiA402
- PROFIDRIVE
- CIP AC drive

CiA402 device profile for inverter and movement control represents the next development of this standard and now forms part of the IEC 61800-7 standard.

**Application profile**

Application profiles define the services that are provided by devices of a machine. For example, CiA DSP 417-2 V 1.01 part 2: CANopen application profiles for lift control systems - Virtual device definitions.

**Interoperability**

The goal of communication and functional profiles is to achieve an interoperability of devices connected via fieldbus.

#### 7.1.4.2.2 Functional profiles supported by the inverter

**I/O profile**

Use of the I/O profile simplifies PLC programming.

The I/O profile reflects the use of end-device bars for control purposes in that one bit is used to control one function.

The I/O profile for the inverter can also be used to control the inverter via field bus. The inverter starts up as soon as command **run** has been sent. 15 bits of the control word (bits 1 to 15) can be assigned to a specific function.

The profiles can be developed to allow simultaneous control of the inverter using the following:

- The end device
- The Modbus control word
- The fieldbus module control word

The I/O profile is supported by the inverter itself and thus by all communication ports.

**CiA402 profile**

The inverter only starts up after a command sequence.

The control word is standardized.

5 bits of the control words (bits 11 to 15) can be assigned to a function.

The CiA402 profile is supported by the inverter itself and thus by all communication ports.

The inverter supports mode **velocity** of the CiA402 profile.

In the CiA402 profile, there are two modes that are specific to the inverter, characterize commands and refer to the value management:

- **[Separate]** (SEP)
- **[Not separ.]** (SIM)

### 7.1.4.2.3 Function description

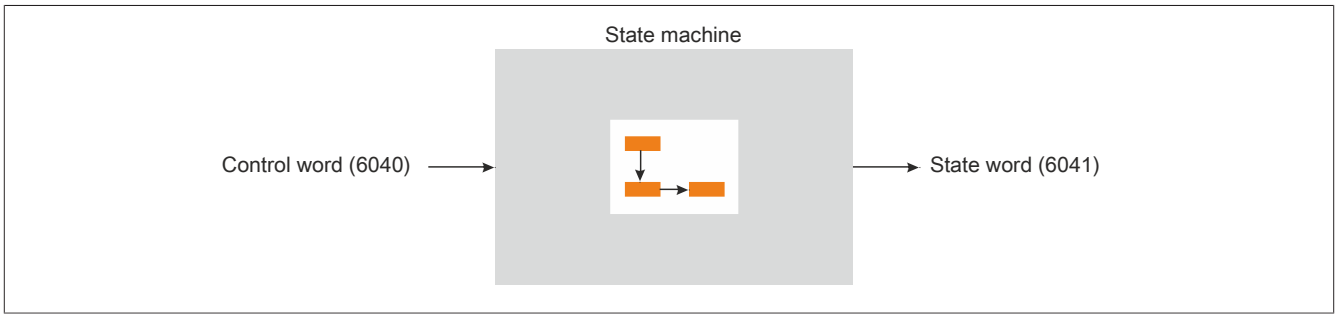
#### Introduction

The inverter operation state consists of two main functions, which are described in the diagrams below.

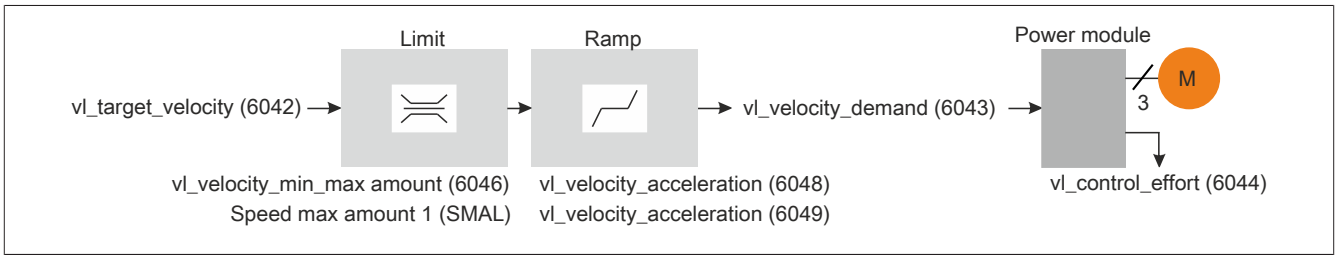
#### CiA402

The main parameters are shown with their CiA402 names and their CiA402/Drivecom index (the values in the brackets are the CANopen addresses of the parameters).

The following figure shows the control diagram for the inverter operation state:



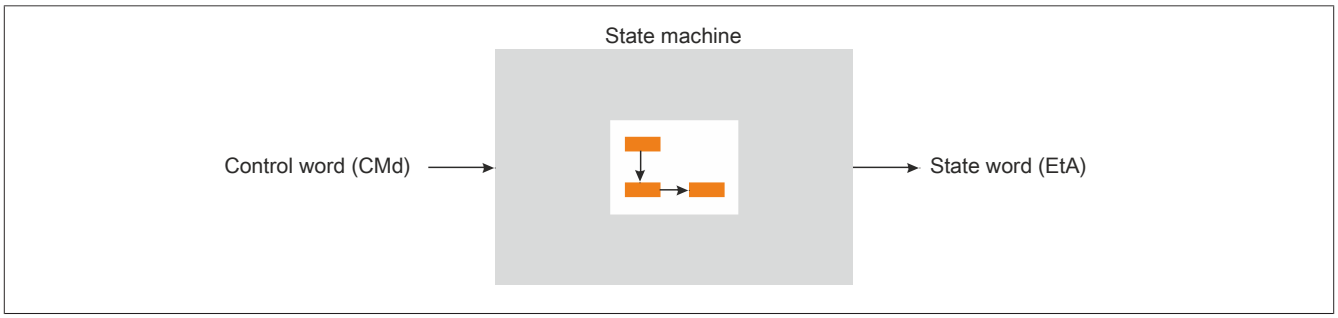

A simplified diagram illustrating speed control in mode **Velocity**:



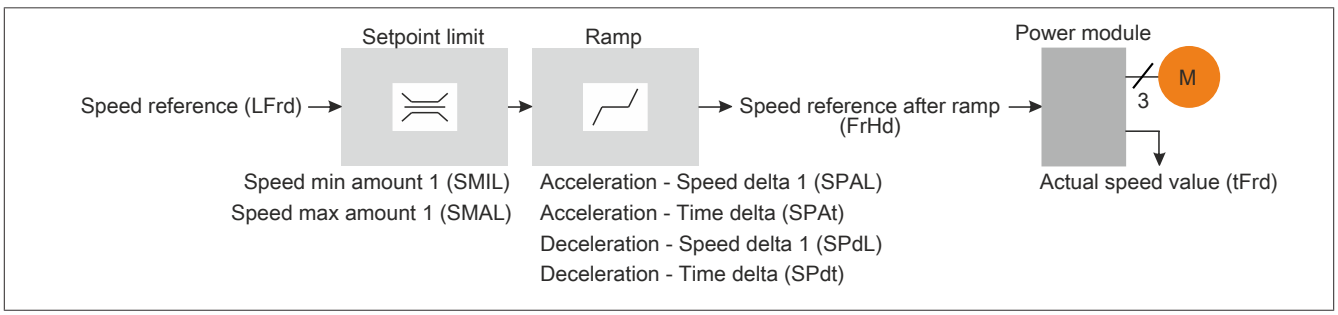

#### ACOPOSinverter

For the ACOPOSinverter, the corresponding diagrams are as follows:

The following figure shows the control diagram for the inverter operation state:




A simplified diagram illustrating speed control in mode Velocity:



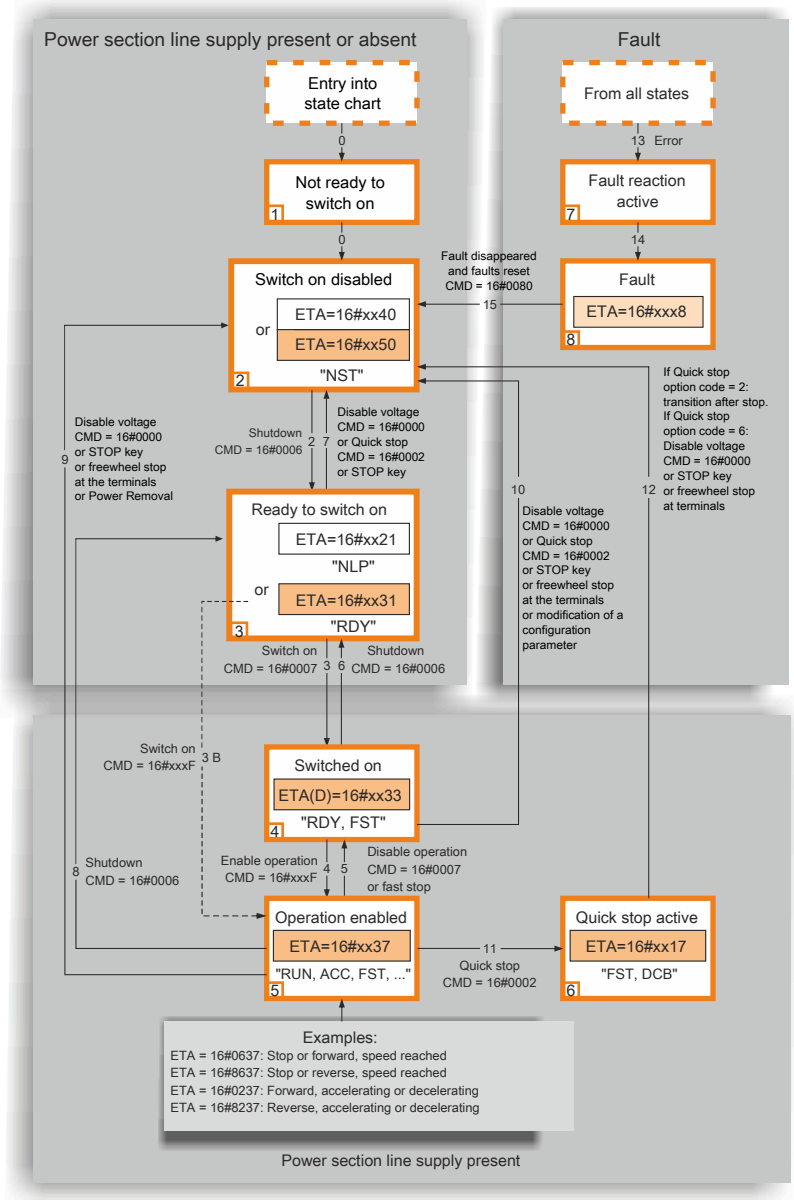
### 7.1.4.2.4 CIA402 operating state diagram

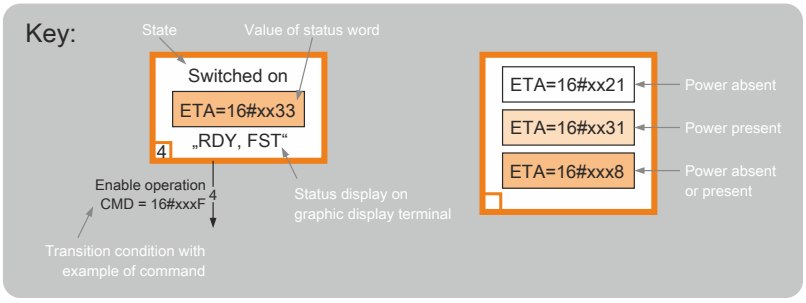
#### State diagram

Once an operating mode has been enabled and started, the product runs through several operating states.

The state diagram (state machine) shows the relationship between the operating state and the state transition. The operating states are monitored internally and influenced by the monitoring function.

The following diagram shows the CIA402 state diagram:



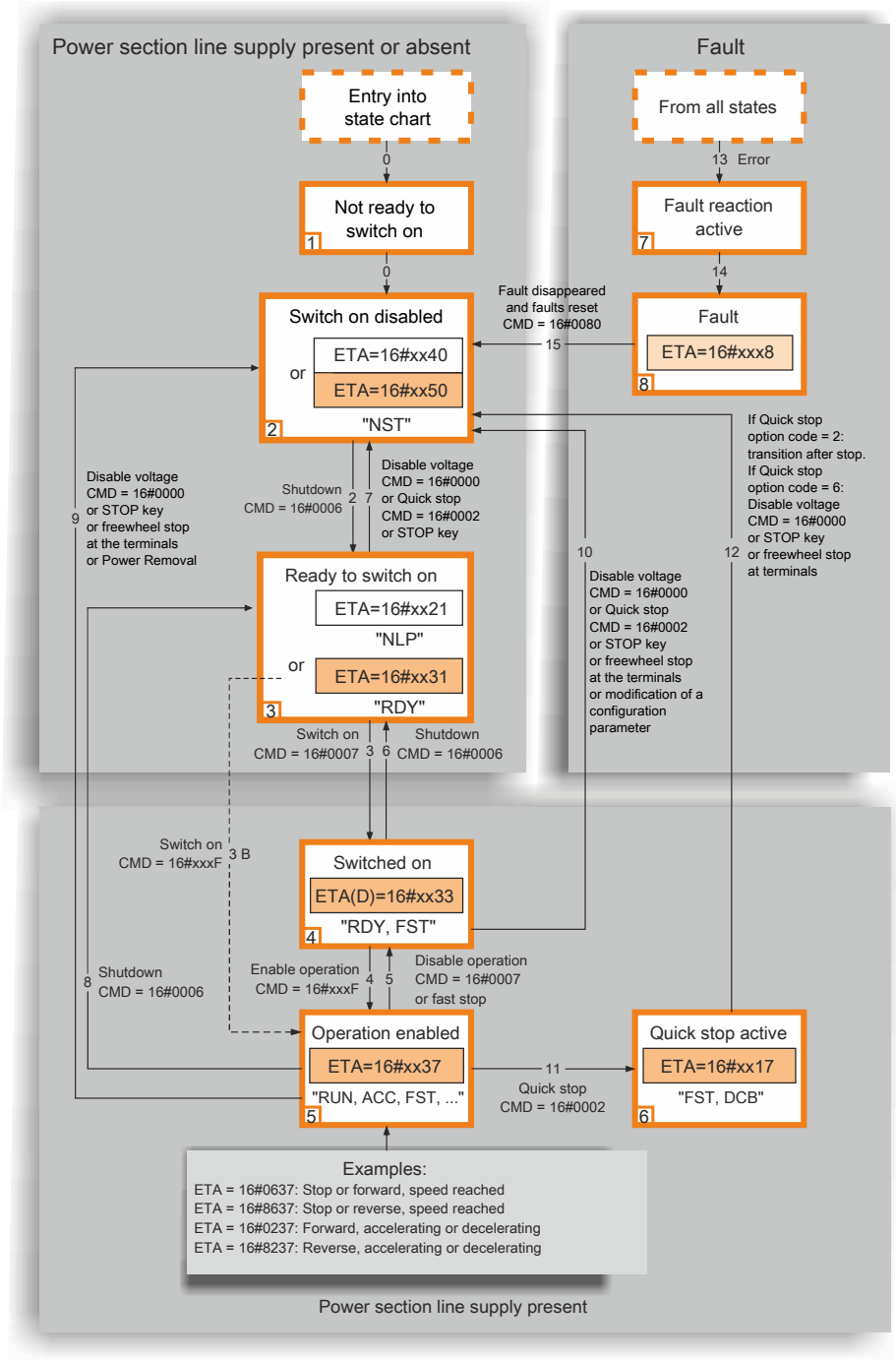



### 7.1.4.2.5 Description of the operating state

#### Inverter operating state

The operating state of the inverter changes according to whether control word **[CMD value]** (CMd) is sent or the occurrence of an event (detection of an error, for example).

The inverter operating state can be identified by the value of state word **[ETA state word]** (EtA).



Each state represents an internal reaction for the frequency inverter. The state is changed per the transmitted (CMD(D)) control word or an internal activity (e.g. error). State is identified using the value for state word (ETA(D)).

1) Not ready to start
Start initialization
   - Transition state not visible for communication network.
2) Start not possible
The frequency inverter is not active.
   - An AC power supply for the power unit is not necessary for an external controller.
   - An external controller with line contactor does not control the contactor.
   - The frequency inverter is locked and the motor cannot be supplied with power.
   - The configuration and setting parameters can be configured.
3) Ready to start
Wait for power supply for the power unit.
   - An AC power supply for the power unit is not necessary for an external controller. The system requires this state in order to switch to state 4 - "Start".
   - An external controller with line contactor does not control the contactor.
   - The frequency inverter is locked and the motor cannot be supplied with power.
   - The configuration and setting parameters can be configured.

**Caution!**

**DS402 describes the high voltage power supply of the frequency inverter in state 3 - "Ready for start". There is a difference here between DS402 and the frequency inverter description.**

4) Start
Although the frequency inverter is supplied by AC power, it is in a steady state.
   - A power unit supply is necessary for an external controller.
   - An external controller with line contactor does not control the contactor.
   - The frequency inverter is locked and the motor cannot be supplied with power.
   - The supply stage for the inverter is ready for operation, but the voltage has not been applied at the output.
   - The setting parameters can be configured.
   - Modifying the configuration parameter resets the frequency inverter to state 2 - "Start not possible".
5) Run
The frequency inverter is in operation.
   - A power unit supply is necessary for an external controller.
   - An external controller with line contactor controls the contactor.
   - The frequency inverter is unlocked and the motor is supplied.
   - The inverter functions are enabled and the motor terminals are supplied with voltage.
   - In the event of a frequency inverter with open-ended control loop and setpoint zero or a stop command, the power supply to the motor and torque will be switched off.
   - **[Auto-tuning]** (tun) requires a power feed to the motor. The frequency inverter must be in state 5 - "In operation" for this purpose.
   - The setting parameters can be configured.
   - The configuration parameters cannot be configured.

## Information:

**The channel must be valid for transition from state 4 - "Start" to state 5 - "In operation". If the channel is contained within a command or setpoint, the transition to state 4 - "Start" can only take place if the setpoint has been received for the first time. The reaction of the frequency inverter to command "Deactivate operation" is dependent on the value of parameter [Disable Output Trigger Definition] (dotd):**

- **If parameter [Disable Output Trigger Definition] (dotd) is in state 0, the inverter changes to state 4 - "Start" and stops in freewheel stop.**
- **If parameter [Disable Output Trigger Definition] (dotd) is in state 1, the frequency inverter stops at the ramp and switches to state 4 - "Start".**

6) Quick stop active
Emergency stop
   - The frequency inverter performs a quick stop. Following a quick stop, a restart is only possible if a switch to state 2 - "Start not possible" is implemented.
   - During quick stop, the frequency inverter is locked and the motor is supplied with power.
   - The configuration parameters cannot be configured.

## Information:

**The condition for transition from status 6 - "Quick stop active" to status 2 - "Startup not possible" depends on the value of parameter [[Disable output quick stop] (qStd):**

- **If parameter [Disable Output Quick Stop] (qStd) is in state 2, the inverter stops at the quick stop ramp and changes to state 2 - "Start not possible".**
- **If parameter [Disable output quick stop] (qStd) is in state 6, the inverter stops according to the quick stop ramp and then remains in status 6 – "Quick stop active" until the following happens:**
  - **Command "Switch off voltage" is received.**
  - **STOP button is pressed.**
  - **Command "Freewheel stop" has been received via the operator terminal.**

7) Error monitoring active
Transition state in which the frequency inverter performs an action in accordance with a type of error.
   - Frequency inverter function is enabled or disabled as per the response type configured in the error management parameter.

8) Error
Frequency inverter faulty.
   - The frequency inverter is locked and the motor cannot be supplied with power.

| Status | Power unit power supply for external controller | Power supply for motor | Modification of configuration parameter |
|---|---|---|---|
| 1 - Not ready to start | Not required | No | Yes |
| 2 - Start not possible | Not required | No | Yes |
| 3 - Ready to start | Not required | No | Yes |
| 4 - Start | Required | No | Yes, back to state 2 - "Start not possible" |
| 5 - Operational | Required | Yes, except for open-control loop and setpoint zero or stop command. | No |
| 6 - Fast stop active | Required | Yes, during quick stop | No |
| 7 - Error monitoring active | Dependent on fault management configuration | Dependent on fault management configuration | - |
| 8 - Error | Not required | No | Yes |

| Bit 7 | Bit 6 | Bit 5 | Bit 4 |
|---|---|---|---|
| Warning | Start not possible | Fast stop | Power supply possible |
| Alarm | Power supply for power unit not possible | Emergency stop | Power supply for power unit |

| Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|
| Error | Run | Start | Ready to start |
| Error | Run | Ready | Wait for power supply for power unit |

| Bit 15 | Bit 14 | Bit 13 | Bit 12 |
|---|---|---|---|
| Direction of rotation | Stop by pressing STOP | Reserved (0) | Reserved (0) |

| Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|
| Internal limit enabled | Target reached | External | Reserved (0) |
| Setpoint outside limit | Setpoint reached | Command or setpoint via network | |

| Status | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | ETA covered by 16#006F[1)] |
|---|---|---|---|---|---|---|---|---|
| | Start not possible | Fast stop | Power supply | Error | Run | Start | Ready to start | |
| 1 - Not ready to start | 0 | x | x | 0 | 0 | 0 | 0 | - |
| 2 - Start not possible | 1 | x | x | 0 | 0 | 0 | 0 | 16#0040 |
| 3 - Ready to start | 0 | 1 | x | 0 | 0 | 0 | 1 | 16#0021 |
| 4 - Start | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 16#0023 |
| 5 - Operational | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 16#0027 |
| 6 - Fast stop active | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 16#0007 |
| 7 - Error monitoring active | 0 | x | x | 1 | 1 | 1 | 1 | - |
| 8 - Error | 0 | x | x | 1 | 0 | 0 | 0 | 16#0008[2)] or 16#0028 |

1) This mask can be used by program PLC for testing diagram state.
2) Fault after state 6 - "Quick stop active".
x In this state, the value of the bit is 0 or 1.

| Bit 7 | Bit 6 | Bit 5 | Bit 4 |
|---|---|---|---|
| Error reset<br>0 to 1 transition = Error reset (once reason for error no longer active) | Reserved (0) | Reserved (0) | Reserved (0) |

| Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|
| Run | Fast stop | Power supply | Authorization via AC supply voltage |
| Run command | Emergency stop | Authorization via AC supply voltage | Contactor control |

| Bit 15 | Bit 14 | Bit 13 | Bit 12 |
|---|---|---|---|
| Assignment | Assignment | Assignment | Assignment |

| Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|
| Default, direction of rotation command | Reserved (0) | Reserved (0) | Halt |
| 0 = Forward direction queried, 1= Reverse direction queried | | | Halt |

| Command | Transition address | Final state | Bit 7 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | Sample value |
|---|---|---|---|---|---|---|---|---|
| | | | Error reset | Run | Fast stop | Run | Start | |
| Shutdown | 2, 6, 8 | 3 - Ready to start | x | x | 1 | 1 | 0 | 16#0006 |
| Start | 3 | 4 - Start | x | x | 1 | 1 | 1 | 16#0007 |
| Run | 4 | 5 - Operational | x | 1 | 1 | 1 | 1 | 16#000F |
| Not in operation | 5 | 4 - Start | x | 0 | 1 | 1 | 1 | 16#0007 |
| No power supply | 7, 9, 10, 12 | 2 - Start not possible | x | x | x | 0 | x | 16#0000 |
| Fast stop | 11 | 6 - Fast stop active | x | x | 0 | 1 | x | 16#0002 |
| | 7, 10 | 2 - Start not possible | | | | | | |
| Error reset | 15 | 2 - Start not possible | 0 > 1 | x | x | x | x | 16#0080 |

x Value not relevant for this command.
0>1 Command on rising edge.

If CTMD(D) bit 8 in state "True":
The stop command is triggered:
The stop command interrupts the current flow without exiting state 5 - "In operation". The stop is performed in accordance with the ramp defined by parameter STT. Despite the setting for parameter STT, the frequency inverter remains in state 5 - "In operation".
In the event of a frequency inverter with open-ended control loop and setpoint zero or a stop command, the power supply to the motor and torque will be switched off.

If CTMD(D) bit 1 in state "True":
Stop command "High-speed" results in a change to state 4 - "Start".

CMD(D) is reset (CMD(D) = 0):
Stop command "Freewheel" results in a change to state 2 - "Start not possible".

#### 7.1.4.2.6 Summary

| Status | Power unit power supply for external controller | Power supply for motor | Modification of configuration parameter |
|---|---|---|---|
| 1 - Not ready to start | Not required | No | Yes |
| 2 - Start not possible | Not required | No | Yes |
| 3 - Ready to start | Not required | No | Yes |
| 4 - Start | Required | No | Yes, back to state 2 - "Start not possible" |
| 5 - Operational | Required | Yes, except for open-control loop and setpoint zero or stop command. | No |
| 6 - Fast stop active | Required | Yes, during quick stop | No |
| 7 - Error monitoring active | Dependent on fault management configuration | Dependent on fault management configuration | - |
| 8 - Error | Not required | No | Yes |

**Note:**

- **In configuration parameter files, configuration parameters are described as R/WS access parameters. Other parameters can be accessed regardless of the operating state.**
- **A setting parameter can be accessed on the inverter in any operating state.**

#### 7.1.4.2.7 CMd command register

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| Error reset | Reserved (=0) | Reserved (=0) | Reserved (=0) | Operational | Fast stop | Power supply | Start |
| 0 to 1 transition = Error reset (once reason for error no longer active) | | | | 1 = Run command | 0 = Fast stop active | Authorization via AC supply voltage | Line contactor control |

| Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|
| Assigned on a manufacturer-specific basis | Assigned on a manufacturer-specific basis | Assigned on a manufacturer-specific basis | Assigned on a manufacturer-specific basis | Manufacturer-specific | Reserved (=0) | Reserved (=0) | Halt |
| | | | | 0 = Forward direction requested, 1= Reverse direction requested | | | Halt |

For a description of the operating state, see "Description of the operating state" on page 461

#### 7.1.4.2.8 Stop commands

##### Stop command

The Stop command can be used to interrupt a movement without having to exit state 5 - "Operational". The stop is executed in accordance with parameter **[Type of stop]** (Stt).

If command **Stop** is active, the motor is not supplied with power and there is no torque output.

Independently of the assignment of **[Type of stop]** (Stt), inverter parameters **[Fast stop]** (FSt), **[Ramp stop]** (rMP), **[Freewheel]** (nSt) and **[DC Injection]** (dCi) remain in state 5 - "Operational".

##### Fast stop command

Sending a fast stop command to the terminals or using a bit in the control word assigned to **Fast Stop** will prompt a change to state 4 - "Start".

##### Freewheel command

Command **Freewheel stop**, which uses a digital input in the end device or a bit in the control word assigned to **Freewheel stop**, will prompt a change to operating state 2 - "Start not possible".

### 7.1.4.2.9 Assignment of control word bits

#### Functional code

With the CiA402 profile, the fixed assignment of a functional input is possible using the following codes:

| Bit | CANopen |
|---|---|
| Bit 11 | C211 |
| Bit 12 | C212 |
| Bit 13 | C213 |
| Bit 14 | C214 |
| Bit 15 | X215 |

For example, to assign DC injection braking to CANopen bit 13, simply configure parameter **[DC Injection]** (dCI) to the value **[C213]** (C213).

Bit 11 is assigned to operational direction command **[Reverse assign.]** (rrS) as standard.

### 7.1.4.2.10 [ETA state word] (ETA)

| Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|
| Warning | Switch-on disabled | Fast stop | Power voltage enabled | Error | Operation enabled | Switched on | Ready to be switched on |
| A warning is active | Power stage disabled | 0 = Fast stop is active | Power stage is present | Error detected | Running | Ready | 1 = Waiting for power supply |

| Bit 15 | Bit 14 | Bit 13 | Bit 12 | Bit 11 | Bit 10 | Bit 9 | Bit 8 |
|---|---|---|---|---|---|---|---|
| Manufacturer-specific direction of rotation | Manufacturer-specific stop via STOP button | Reserved (=0) | Reserved (=0) | Internal limit active | Target reached | Remote operation | Reserved (=0) |
| | | | | Reference value outside limit | Reference value reached | Command or reference value via fieldbus | |

| Operating state | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 | ETA covered by 006F H[1] |
|---|---|---|---|---|---|---|---|---|
| | Start not possible | Fast stop | Power supply | Error | Operational | Started | Ready to start | |
| 1 - Not ready to start | 0 | x | x | 0 | 0 | 0 | 0 | - |
| 2 - Start not possible | 1 | x | x | 0 | 0 | 0 | 0 | 0040 hex |
| 3 - Ready to start | 0 | 1 | x | 0 | 0 | 0 | 1 | 0021 hex |
| 4 - Start | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0023 hex |
| 5 - Operational | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0027 hex |
| 6 - Fast stop active | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0007 hex |
| 7 - Error monitoring active | 0 | x | x | 1 | 1 | 1 | 1 | 002F hex |
| 8 - Error | 0 | x | x | 1 | 0 | 0 | 0 | 0008 hex[2] to 0028 hex |

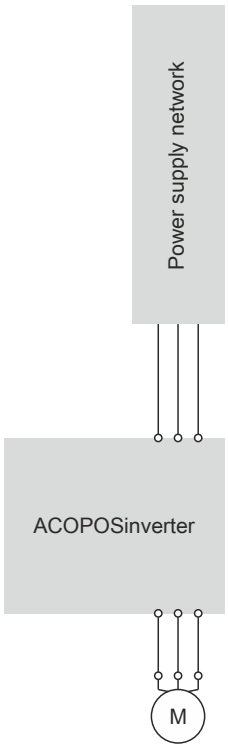
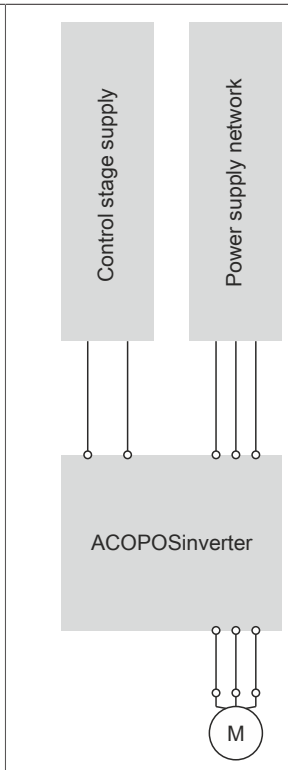
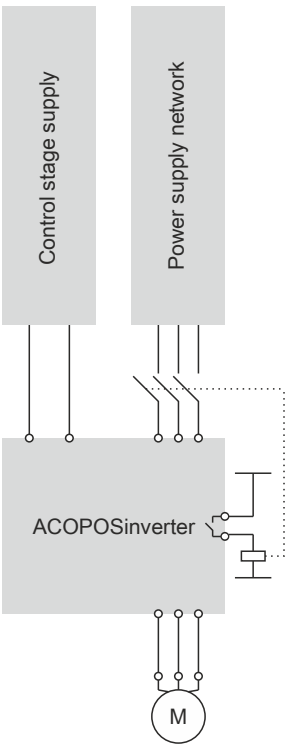
1) This coverage can be used by the PLC program to test the diagram state.
2) Errors resulting from operating state 6 - "Fast stop active" detected.
x In this state, the value of the bit can be 0 or 1.

### 7.1.4.2.11 Start sequence

#### Description

The command sequence in the state diagram depends on how the inverter is supplied with power.

There are three possible scenarios:

| | | | |
|---|---|---|---|
| |  |  |  |
| **Power supply network** | Direct | Direct | Line contactor controlled by the inverter |
| **Control stage supply** | Not separate[1)] | Separate | Separate |

1) The power stage supplies the control stage.

### 7.1.4.2.12 Sequence for an inverter driven by the power supply network

**Description**

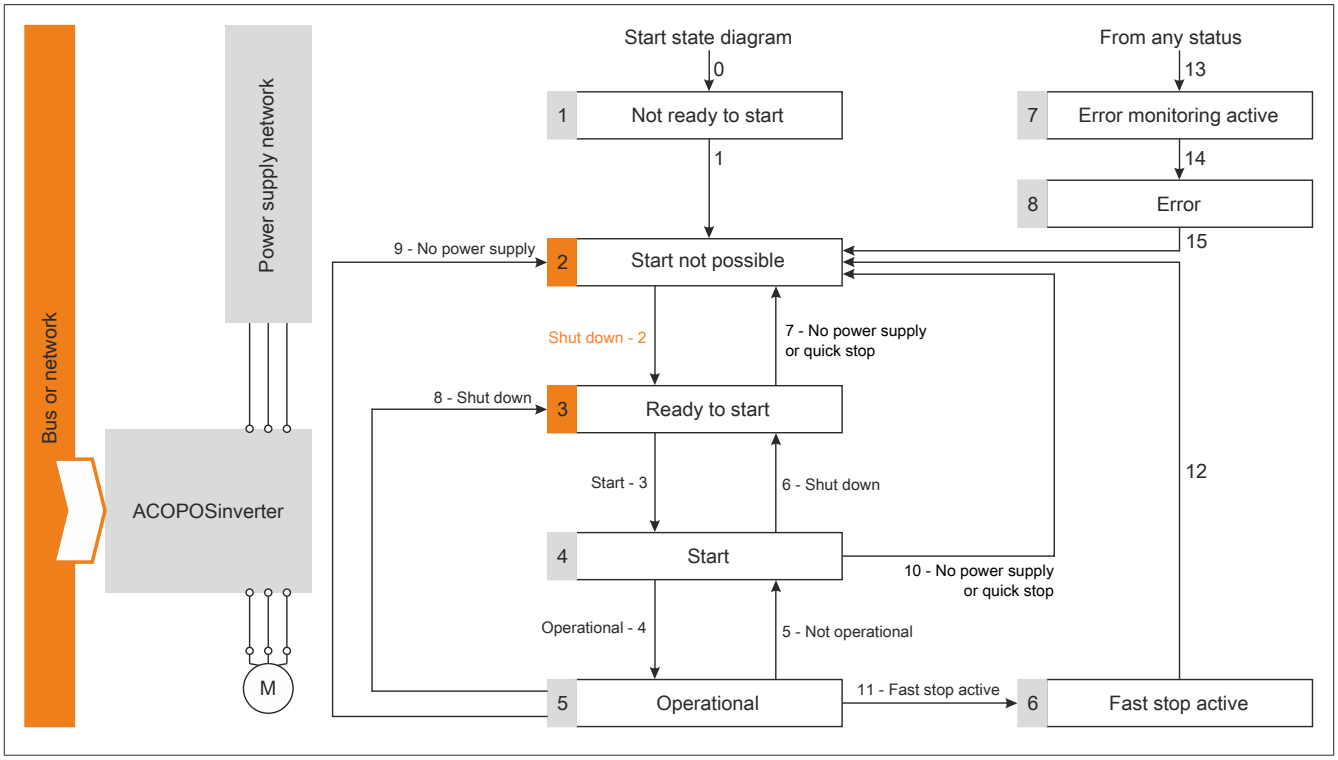
Both the performance and control stages are driven by the power supply network.

If the control stage is supplied with power, the power stage must also be supplied with power.

The following sequence must be applied:

**Step 1**

Apply command 2 - "Start not possible".



**Step 2**

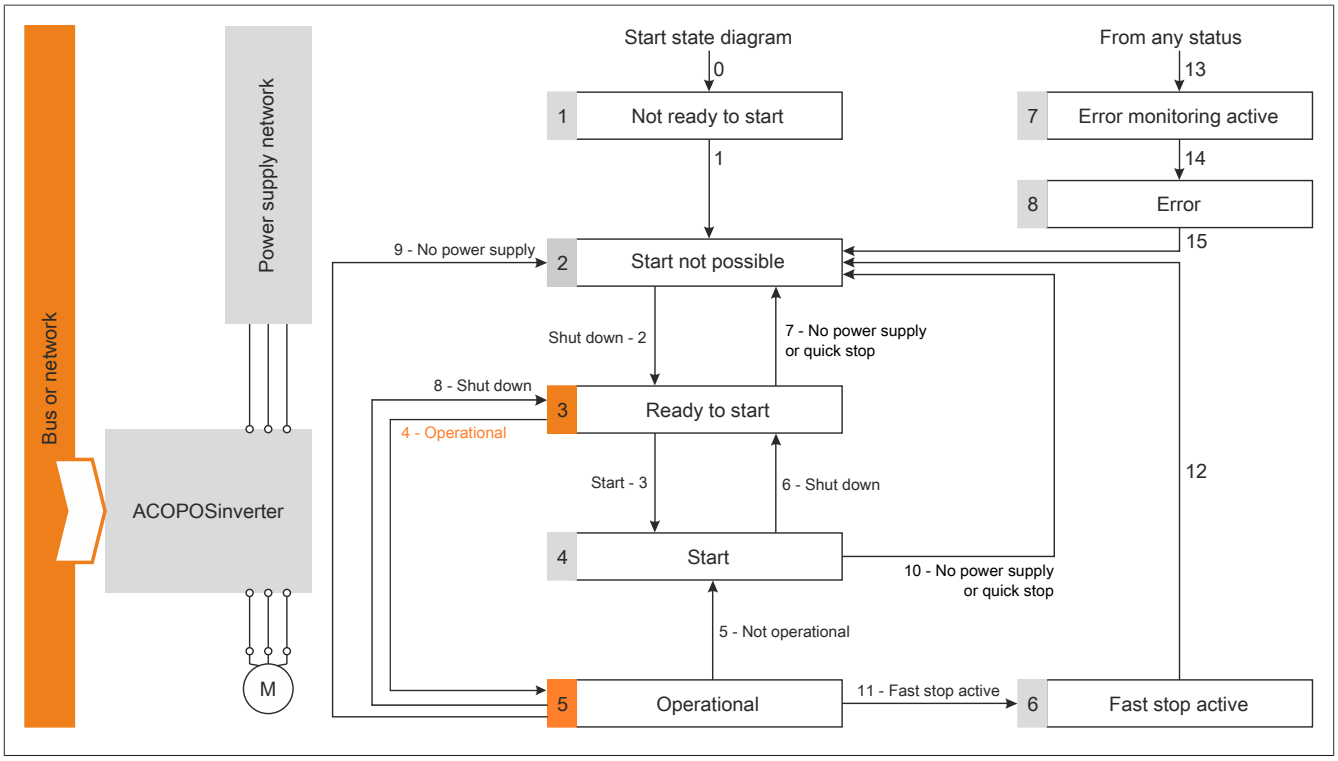
Check that the inverter is in operating state 2 - "Start not possible".

Then apply command 4 - "Start".

The motor can be controlled (send a reference value not equal to zero).

## Note:

**It is possible, although not necessary, to apply command 3 - "Ready to start" followed by command 4 - "Start" in order to successfully switch to operating states 3 - "Ready to start", 4 - "Start" and then 5 - "Operational". Command 4 - "Start" is sufficient.**



### 7.1.4.2.13 Sequence for an inverter with a separate control stage

**Description**

The power and control stages are supplied with power separately.

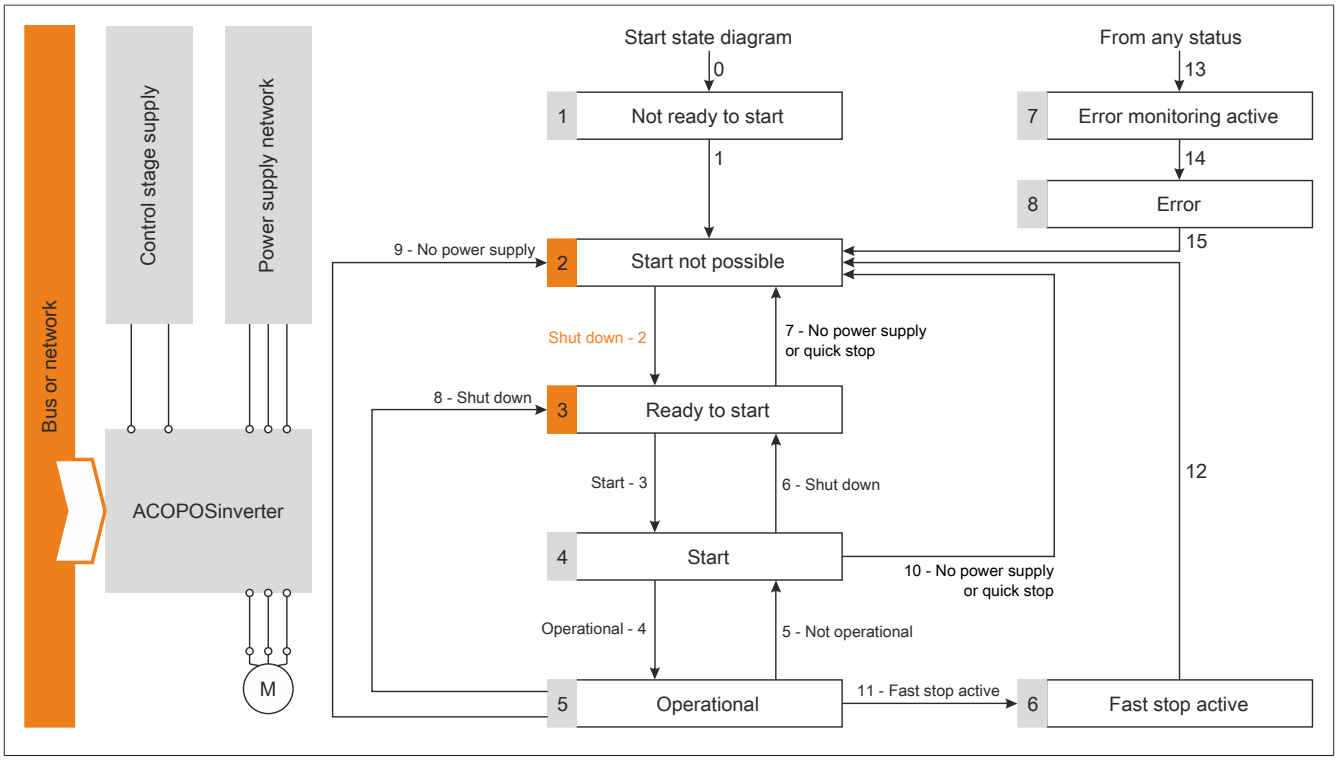
If the control stage is supplied with power, the power stage must also be supplied with power.

The following sequence must be applied:

**Step 1**

The power supply network is definitely available.

Apply command 2 - "Startup not possible".



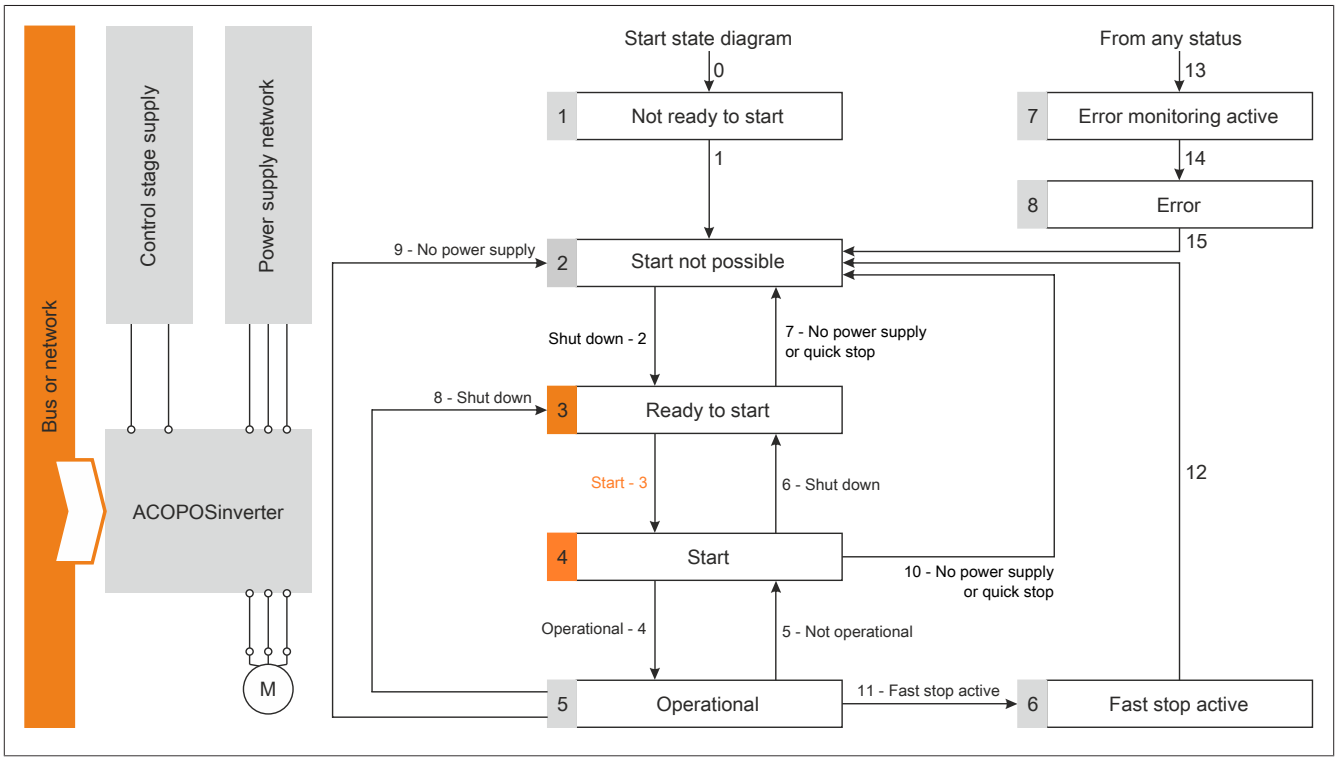
### Step 2

Check that the inverter is in operating state 3 - "Ready to start".

Check that the power supply network is available (**Voltage enabled** of state word).

| Power supply network | Graphics display | State word |
|---|---|---|
| Not available | nLP | 21 hex |
| Available | rdY | 31 hex |

Apply command 3 - "Ready to start".



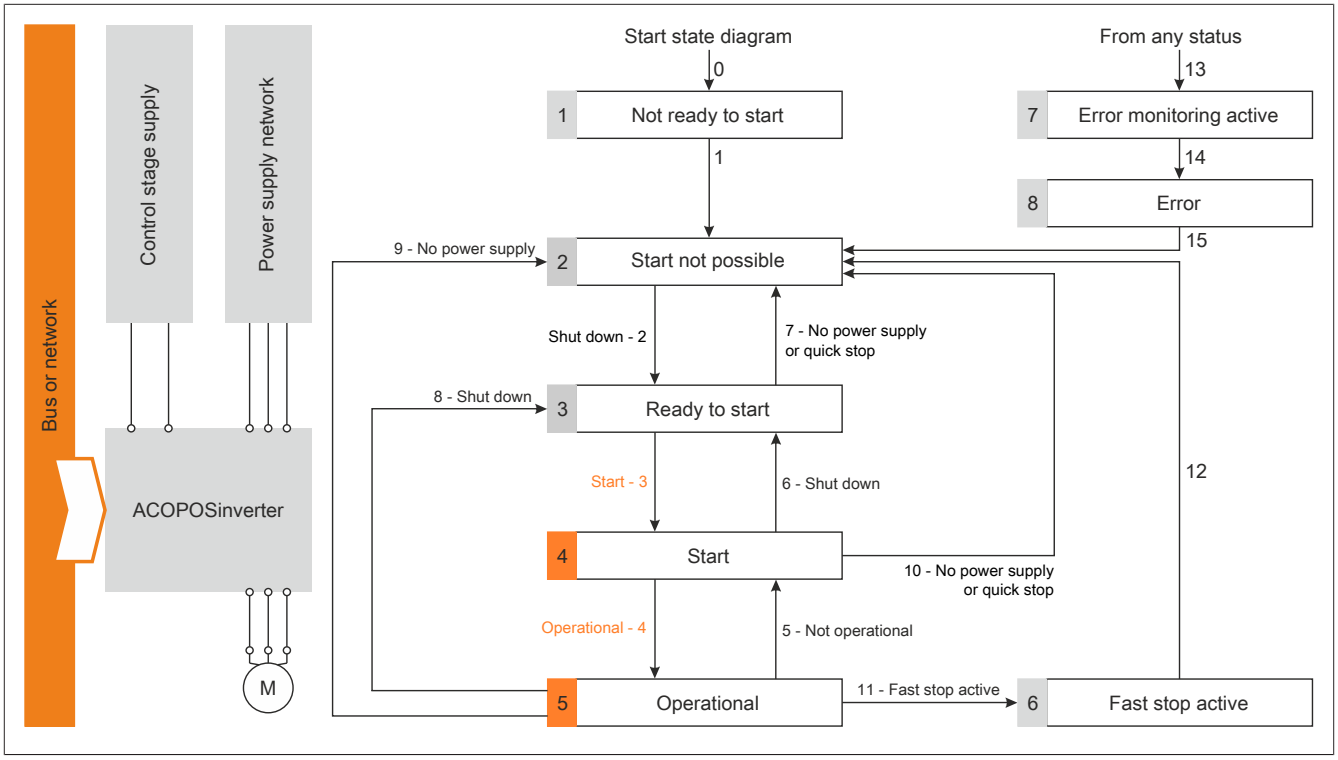
### Step 3

Check that the inverter is in operating state 4 - "Start".

Apply command 5 - "Operational".

The motor can be controlled (send a reference value not equal to zero).

If the power supply network is still not available in operating state 4 "Start" after delay **[Mains V. time out]** (LCt), the inverter triggers an error **[Line contactor]** (LCF).



### 7.1.4.2.14 Sequence for an inverter with line contactor control

#### Description

The power and control stages are supplied with power separately.

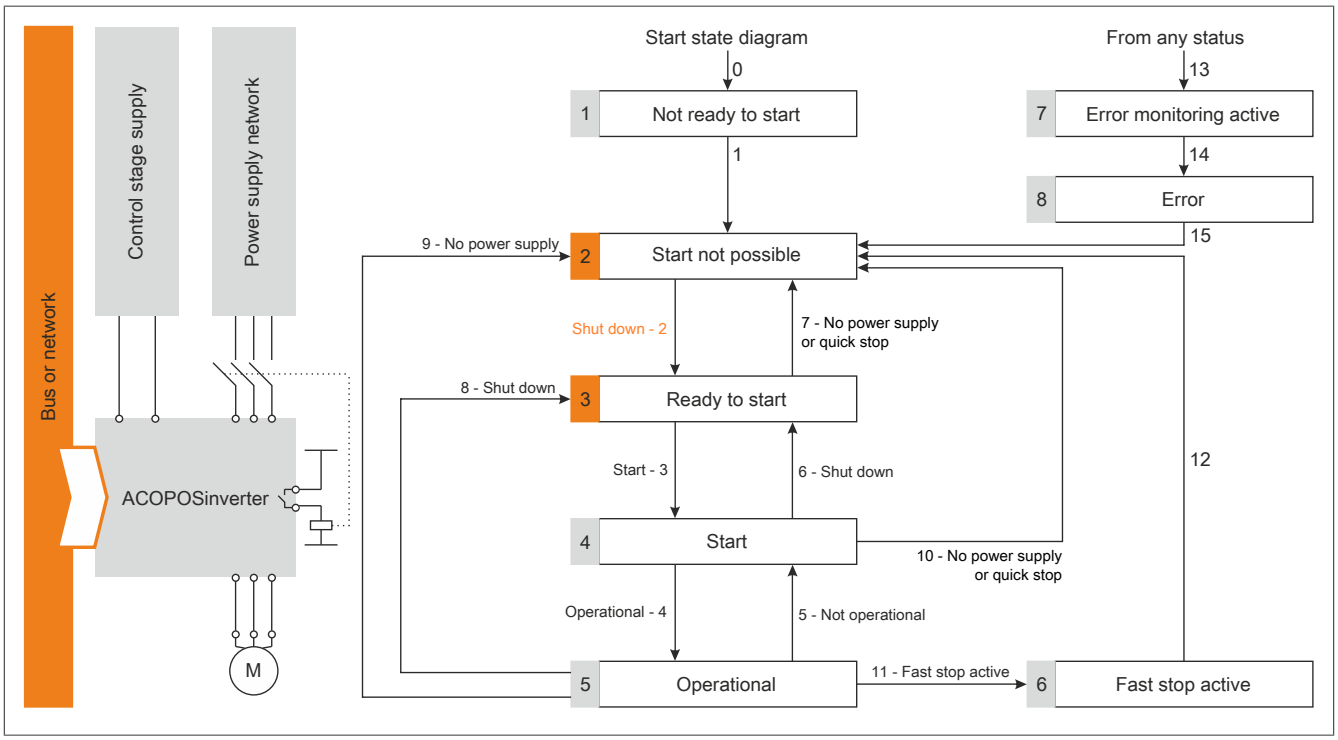
If the control stage is supplied with power, the power stage does not need to be supplied with power also. The inverter controls the line contactor.

The following sequence must be applied:

#### Step 1

The power supply network is not available since the line contactor is not controlled.

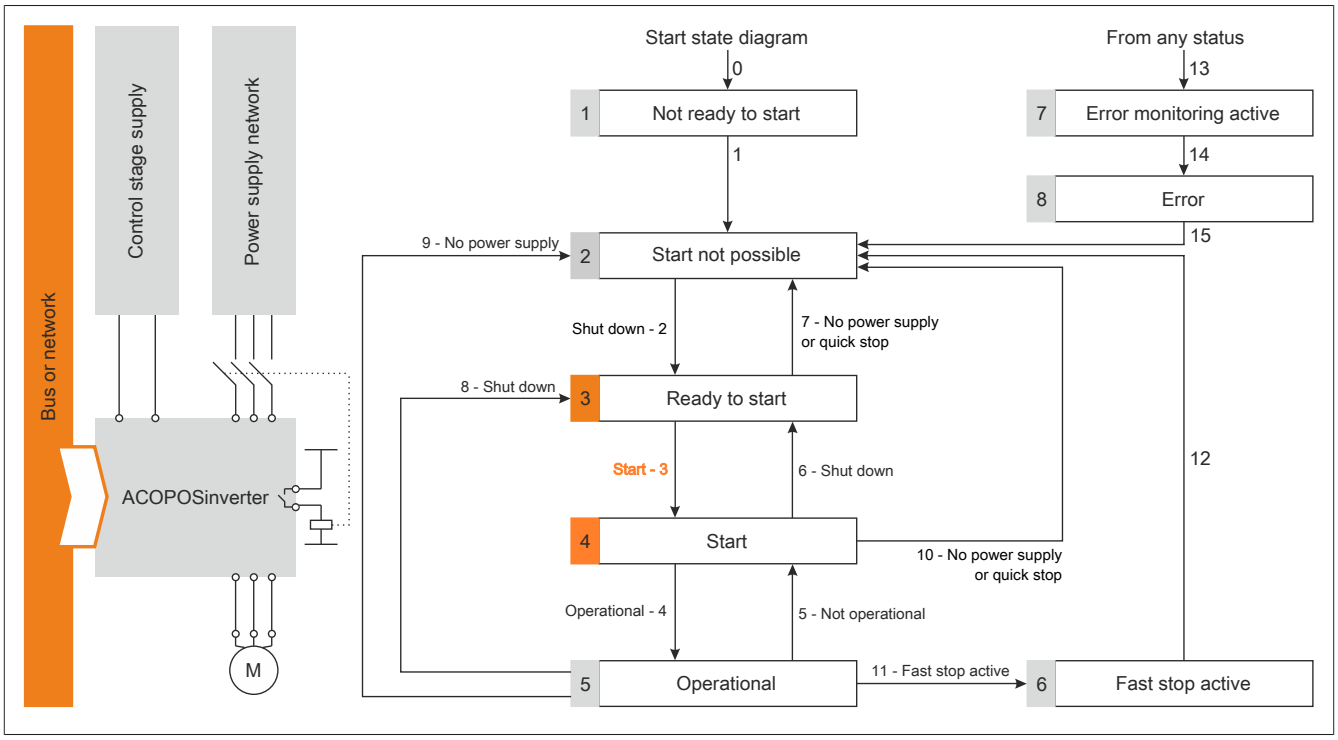
Apply command 2 - "Start not possible".



### Step 2

Check that the inverter is in operating state 3 - "Ready to start".

Apply command 3 - "Ready to start", which closes the line contactor and safeguards the power supply to the frequency inverter.



## 7.1.5 Operation

### 7.1.5.1 Operating status

#### Configuring communication error responses

The response of the inverter in the event of a CANopen communication interruption can be configured.

A configuration can be defined using display end-devices and menu **[FAULT MANAGEMENT]** (FLt), sub-menu **[COM. FAULT MANAGEMENT]** (CLL), parameter **[CANopen fault mgt]** (COL).

The values of parameter **[CANopen fault mgt]** (COL), which triggers a transition to operating state error **[CANopen com.]** (COF), are as follows:

| Value | Description |
|---|---|
| **[Freewheel]** (YES) | Freewheel stop (factory setting) |
| **[Ramp stop]** (rMP) | Stop on a ramp |
| **[Fast stop]** (FSt) | Fast stop |
| **[DC Injection]** (dCI) | DC injection stop |

The values of parameters **[CANopen fault mgt]** (COL), which does not trigger a transition to an operating state error, are as follows:

| Value | Description |
|---|---|
| **[ign fault]** (nO) | The detected error was ignored. |
| **[STOP CONFIGURATION]** (Stt) | Stop in accordance with the configuration of **[Normal stop]** (Stt). |
| **[fallback spd]** (LFF) | Switch to reduced speed if the detected error persists and the run command has not been canceled. |
| **[Spd maint.]** (rLS) | The inverter maintains the speed applied at the time the error was detected as long as the detected error persists and the run command has not been canceled. |

The reverse direction of rotation can be configured in menu **[FAULT MANAGEMENT]** (FLt-) / **[FALLBACK SPEED]** (LFF) using parameter **[Fallback speed]** (LFF).

**Warning!**

**LOSS OF CONTROL**

**If this parameter is set to (nO), CANopen communication monitoring is disabled.**

- **Do not use this setting unless you have performed a detailed risk assessment, taking into account all applicable regulations and standards for the device and the application.**
- **Only use this setting for tests performed during the installation.**
- **Check that the communication monitoring has been re-enabled before completing the installation procedure and performing the final installation test.**

**Failure to follow these instructions can result in death or serious injury.**

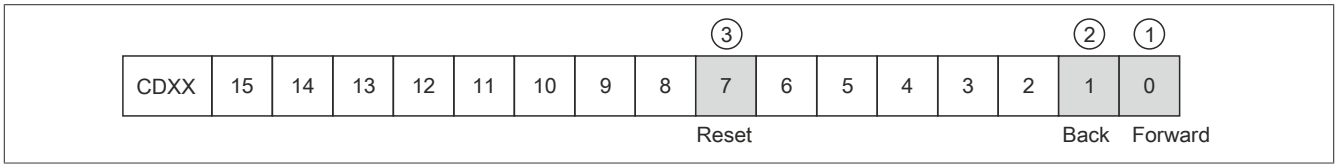
### 7.1.5.2 Operating mode

#### Configuring the control channel

This section uses three examples to explain how the inverter can be configured to allow operation of a communication network.

- I/O mode - A simple command word (based on forward, backward and reset of binary commands).
- Combined mode (with native CiA402 profile) - Reference value and command word taken from the communication network
- Separate mode (with native CiA402 profile) - Reference and control word taken from separate sources. For example, the control word (in CiA402) is taken from the communication network and the reference value is taken from the HMI.

#### Configuring the inverter for operation with the I/O profile




(1) **[INPUTS / OUTPUTS CFG]** (I_O-), **[Forward]** (Frd) assigned to **[CMD value]** (CMd) bit 0

(2) **[INPUTS / OUTPUTS CFG]** (I_O-), **[Reverse assign.]** (rrS) assigned to **[CMD value]** (CMd) bit 1

(3) **[FAULT MANAGEMENT]** (FLt-), **[FAULT RESET]** (rSt), **[Fault reset]** (rSF) assigned to **[CMD value]** (CMd) bit 7

The settings are as follows:

| Code | Channel setting |
|---|---|
| [Ref.1 channel] (Fr1) | [HMI] (LCC) |
| [Profile] (CHCF) | [I/O profile] (IO) |
| [Cmd switching] (CCS) | [ch1 active] (Cd1) |
| [ch1 active] (Cd1) | [CANopen com.] (CAn) |

The command word bits can now be configured. To configure these, use menu **[INPUTS / OUTPUTS CFG]** (I_O-):

| Code | Channel setting |
|---|---|
| [Reverse assign.] (rrS) | [CD01] (Cd01) |

In menu **[FAULT MANAGEMENT]** (FLt-), configure sub-menu **[FAULT RESET]** (rSt):

| Code | Channel setting |
|---|---|
| [Fault reset] (rSF) | [CD07] (Cd07) |

#### Configuring the inverter for operation with the CiA402 profile in combined mode

This paragraph describes how to configure the settings for an inverter that is controlled in CiA402 mode. The example focuses on non-separate mode. Additional modes are described in detail in section "The drive" on page 177.

In menu **[COMMAND]** (CtL-):

- **[Ref.1 channel]** (Fr1) is set according to the specific communication source, as listed in the following table:

  | Source of control | Channel setting |
  |---|---|
  | CANopen | [CANopen com.] (CAn) |

- **[Ref. 2 switching]** (rFC) is set to standard value **[Ref.1 channel]** (Fr1).
- **[Profile]** (CHCF): Specifies whether the inverter works in combined mode (reference and command from same channel).

For the current example, **[Profile]** (CHCF) is set to **[Not separ.]** (SIM), since reference and control both originate from the communication network.

| Profile | Channel setting |
|---|---|
| Combined CiA402 mode | [Not separ.] (SIM) |
| Separate CiA402 mode | [Separate] (SEP) |
| I/O profile | [I/O profile] (IO) |

### Configuring the inverter for operation with the CiA402 profile in separate mode

Since the combinations can vary, a list of possible settings is available in section "The drive" on page 177.

For example:

The inverter is controlled by the communication source (CANopen); the reference value is set, however. The check word is taken from the controller and is written in accordance with the CiA402 profile.

The settings are as shown in the table:

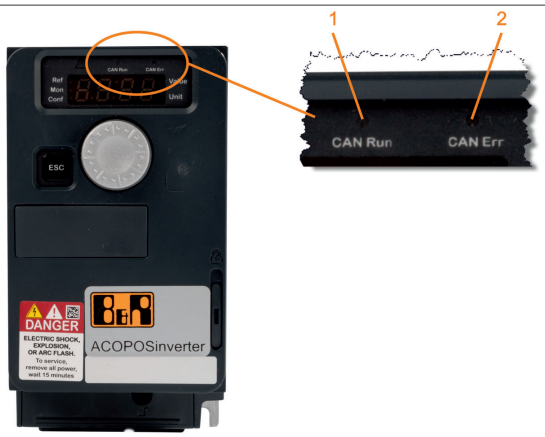
| Code | Channel setting |
|---|---|
| [Ref.1 channel] (Fr1) | [HMI] (LCC) |
| [Profile] (CHCF) | [Separate] (SEP) |
| [ch1 active] (Cd1) | [CANopen com.] (CAn) |
| [Ref. 2 switching] (rFC) | [Ref.1 channel] (Fr1) |
| [Cmd switching] (CCS) | [ch1 active] (Cd1) |

## 7.1.6 Diagnostics and error correction

### 7.1.6.1 State LED fieldbus

#### LED indicators

The following image describes the LED states for the module:




#### LED description

| Object | LED | Description |
|---|---|---|
| 1 | CAN_RUN | CANopen state |
| 2 | CAN_ERR | CANopen error |

#### CANopen state

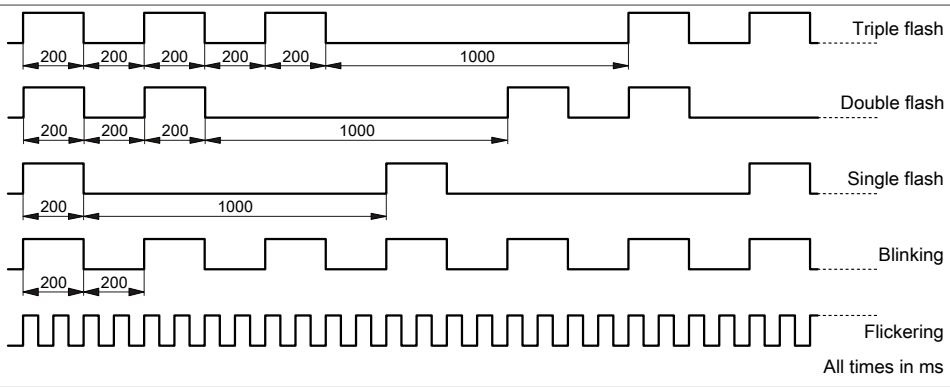
This LED indicates the CANopen state.

| Color & state | Description |
|---|---|
| Off | The CANopen controller is in the **OFF** state. |
| Green, single flash | The ACOPOSinverter is in the **STOPPED** state. |
| Green, blinking | The ACOPOSinverter is in the **PRE-OPERATIONAL** state. |
| Green, on | The ACOPOSinverter is in the **OPERATIONAL** state. |

#### Error status

This LED indicates the CANopen error state:

| Color & state | Description |
|---|---|
| Off | No detected error reported. |
| Red, single flash | Detected error reported by the ACOPOSinverter CANopen controller (Example: Too many frame errors detected). |
| Red, double flash | Detected error caused by the occurrence of a node-protection or heartbeat event. |
| Red, on | The CANopen controller is in the Bus **OFF** state. |




#### NMT diagram

Parameter **[CANopen NMT state]** (nMtS) (logical address 6057, CANopen index/subindex 201E hex/3a) indicates the NMT diagram state. The various possible values are **[Boost]** (bOO), **[Stop]**(StOP), **[Operation]** and **[Pre-op]** (preparing).

This parameter can be accessed from menu **[MONITORING]** (MOn-) → **[COMMUNICATION MAP]** (CMM-) → **[CANopen MAP]** (CnM-).

### PDO counter

Parameters[Number of RX PDO] (nbrp) and [Number of TX PDO] (nbtp) indicate the number of received PDOs and the number of PDOs transmitted by the inverter (all PDO sets - PDO1, PDO2 and PDO3 - combined).

The values of the counters are reset to zero as soon as they reach 65535.

This parameter can be accessed from menu [MONITORING] (MOn-) → [COMMUNICATION MAP] (CMM-) → [CANopen MAP] (CnM-).

### Last CANopen error detection

Parameter [Error code] (ErCO) (index/subindex 201E hex/39) indicates the last CANopen detected error and retains its value until the last detected error has been deleted.

This parameter can be accessed as follows:

- From menu [MONITORING] (MOn-) → [COMMUNICATION MAP] (CMM-) → [CANopen MAP] (CnM-)
- From menu [ALL] (Full) → [COMMUNICATION] (COM-) →[CANopen com.] (CnO-).

The possible values are shown below:

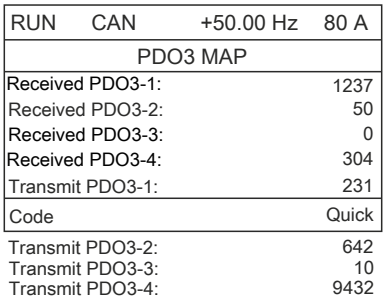
| Display | Description |
|---|---|
| [0] | No errors have been detected since the CANopen communication started. |
| [1] | Bus off or CANopen overflow. |
| [2] | Node protection error requires a return to NMT initialization state. |
| [3] | CANopen overflow (possible alternative values: 32, 64 and 128). |
| [4] | Heartbeat error requires a return to NMT initialization state. |
| [5] | NMT state diagram error. |

### PDO value display

The values of the assigned parameters in PDOs can be displayed using sub-menus [PDO1 IMAGE] (PO1-), [PDO2 IMAGE] (PO2-) and [PDO3 IMAGE] (PO3-).

These sub-menus are accessible from menu [MONITORING] (MOn-) → [COMMUNICATION MAP] (CMM-) → [CANopen MAP] (CnM-).

The following image shows the content of sub-menu [PDO3 IMAGE] (PO3-):




## Note:

**On each of these screenshots, and for each transmitted or received PDO, only the words in the [Transmit PDOx-x] or [Received PDOx-x] transmitted or received in the CANopen bus are displayed. This means that in PDO2, which contain only 4 data bytes, (RP21 and RP22), fields [Received PDO2-3] and [Received PDO2-4] are not displayed, for example.**

### 7.1.6.2 Connection for fieldbus mode

If the product cannot be addressed via fieldbus, start by checking the connections. The operating instructions contain the technical data for the device and information about network and device installation. Check the following:

- Power connections to the device
- Fieldbus cable and fieldbus wiring
- Network connections to the device

### 7.1.6.3 Monitoring of the communication channel

#### Command and reference channels

All inverter and reference parameters are managed on a channel-specific basis.

| Parameter name | Parameter code | | | |
|---|---|---|---|---|
| | Taken into account by the inverter | Modbus serial | CANopen | Fieldbus module |
| Control word | CMd | CMd1 | CMd2 | CMd3 |
| Extended control word | CMI | CMI1 | CMI2 | CMI3 |
| Reference speed (rpm) | LFrd | LFd1 | LFd2 | LFd3 |
| Reference frequency (0.1 Hz) | LFr | LFr1 | LFr2 | LFr3 |
| Reference for torque control mode (0.1% of the normal torque) | LFr | LFr1 | LFr2 | LFr3 |
| Reference value supplied by PI controller | PiSP | Pir1 | Pir2 | Pir3 |
| Reference value supplied by analog multiplier function | MFr | MFr1 | MFr2 | MFr3 |

### Monitoring of the communication channels

Communication channels are monitored if they are involved in one of the following parameters:

- Control word **[CMD value]** (CMd) from the active command channel
- The control word that contains the switch command (bit configured to**[Cmd switching]** (CCS))
- The control word that contains the switch for reference value 1‘1B (bit configured to **[Ref 1B switching]** (rCb))
- The control word that contains the switch for reference value 1'2 (bit configured to **[Ref. 2 switching]** (rFC))
- The reference frequency or reference speed (**[HMI Frequency ref.]** (LFr) or (LFRD): Nominal speed value of the active channel for the reference value)
- Reference frequency or reference speed totaled (**[HMI Frequency ref.]** (LFr) or (LFRD): Nominal speed value) 2 (assigned to **[Summing ref. 2]** (SA2))
- Reference frequency or reference speed totaled (**[HMI Frequency ref.]** (LFr) or (LFRD): Nominal speed value) 3 (assigned to **[Summing ref. 3]** (SA3))
- Reference frequency or reference speed subtraction (**[HMI Frequency ref.]** (LFr) or (LFRD): Nominal speed value) 2 (assigned to**[Subtract. ref. 2]** (dA2))
- Reference frequency or reference speed subtraction (**[HMI Frequency ref.]** (LFr) or (LFRD): Nominal speed value) 3 (assigned to**[SubParam3]** (dA3))
- The reference value provided by the PID controller (PISP)
- The PID controller feedback (**[AIV1 assignment]** (AIV1))
- The multiplication coefficient of the reference values (**[Multiplying coeff.]** (MFr)) 2 (assigned to **[Multiplier ref. 2]** (MA2))
- The multiplication coefficient of the reference values (**[Multiplying coeff.]** (MFr)) 3 (assigned to **[Ref. multi 3]** (MA3))

As soon as one of these parameters has been written to a communication channel, it enables monitoring for this channel.

If a communication warning has been sent by a monitored port or fieldbus module (in coordination with the protocol criterion), the inverter triggers a communication interruption.

The inverter responds in accordance with the communication interruption configuration (operating state error, maintenance, return, etc.).

If a communication warning appears for a channel that is not monitored, the inverter does not trigger any communication interruption.

### Enabling communication channels

A communication channel is enabled if all parameters involved have been written at least once. The converter cannot start until all channels involved in the command and reference value have been enabled.

For example:
An inverter in the DSP402 profile is connected to an active communication channel.
In order to change from state 4 - "Start" to state 5 - "Operational", it is mandatory for the reference value and the command to be written at least once.

A communication channel is disabled in the following cases:

- In the event of a communication warning
- In mode **forced local**

> **Note:**
>
> **When mode forced local ends:**
>
> - **Commands run, the direction and the local reference value set via forced local are copied to the active channels by the inverter (retained).**
> - **Monitoring of the active channels for the command and reference values is performed after time delay [Time-out forc. local] (FLOt).**
> - **Inverter control is not effective until the inverter has received the reference and the command from the active channel.**

## 7.1.6.4 Diagnostics control signal

### Introduction

On the graphic display terminal, sub-menu **[MONITORING]** (MON-), **[COMMUNICATION MAP]** (CMM-) can be used to display the control signal diagnostics information for the inverter and controller:

- Active command channel**[Command channel]** (CMdC)
- Value of control word **[Cmd value]** (CMd) of active command channel **[Command channel]** (CMdC)
- Active reference frequency channel **[Channel ref. active]** (rFCC)
- Value of reference frequency **[Frequency ref.]** (FrH) of active target channel **[Channel ref. active]** (rFCC)
- Value of operating state word **[ETA state word]** (EtA)
- Specific data for all available fieldbuses is available in the dedicated sub-menu.
- In sub-menu**[CMD word image]** (CWI): Control words for all channels
- In sub-menu **[Freq. ref. word map]** (rWI): Reference frequency values produced by all channels

### Control word display

Parameter **[Command channel]** (CMdC) displays the active communication channel.

Parameter **[Cmd value]** (CMd) indicates the hexadecimal value of control word (CMD), which is used to control the inverter.

Sub-menu **[CMD word image]** (CWI), parameter **[CANopen cmd.]** (CMd2), are used to display the hexadecimal value of the CANopen control word.

### Reference frequency display

Parameter **[Channel ref. active]** (rFCC) displays the active channel for the reference frequency.

Parameter **[HMI Frequency ref.]** (LFr) displays the value (in 0.1 Hz units) for the reference frequency used for controlling the inverter.

Submenu **[FREQ. REF. WORD MAP]** (rWI), parameter **[CANopen ref.]** (LFr2), are used to display the value (in 0.1 Hz units) of the CANopen reference frequency.

### Operating state word display

Parameter **[ETA state word]** (EtA) indicates the value of operating state word (ETA).

The table contains the bit details of parameter **[ETA state word]** (ETA):

| Bit | Description |
|---|---|
| DRIVECOM | Control word |
| Bit0 = 1 | Ready to be switched on |
| Bit1 = 1 | Switched on |
| Bit2 = 1 | Operation enabled |
| Bit3 = 1 | Operating state error |
| Bit4 = 1 | Power stage |
| Bit5 = 0 | Fast stop |
| Bit6 = 1 | Switch-on disabled |
| Bit7 = 1 | Warning |
| Bit8 = 1 | DRIVECOM reserved |
| Bit9 = 0 | Forced local mode is executed. |
| Bit10 = 1 | Reference value reached (long-term state) |
| Bit11 = 1 | Reference value exceeded (< LSP or > HSP) |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 = 1 | Stop forced using key **STOP** |
| Bit15= 0 | Motor rotation in forward direction (or stopped) |

## 7.1.7 Object overview

### 7.1.7.1 Communication profile range

### Communication objects

The table contains the communication objects supported by the inverter:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1000 hex | 00 hex | Write-protected | Unsigned32 | 00410192 hex | Inverter type:<br>Bit 16 to 23 = Inverter mode type<br>Bit 00 to 15 = Inverter profile number (402) |
| 1001 hex | 00 hex | Write-protected | Unsigned8 | 00 hex | Detected error register: Detected errors (1) or undetected errors (0) |
| 1003 hex | 00 hex | Write-protected | Unsigned32 | 00000005 hex | Number of detected errors:<br>No detected errors (0) or one or more detected errors (>0) in object 16#1003, only the value 0 can be written |
| | 01 hex | Write-protected | Unsigned32 | 00000000 hex | Standard detected error field:<br>Bit 16 to 31 = Additional information (every 0 s)<br>Bit 00 to 15 = Error code (Errd) |
| 1005 hex | 00 hex | Read/Write | Unsigned32 | 00000080 hex | COB ID SYNC MESSAGE |
| 1008 hex | 00 hex | Write-protected | Visible character string | ACOPOSinverter | Inverter name |
| 100C hex | 00 hex | Read/Write | Unsigned16 | 0000 hex | Protective interval:<br>The node protection protocol is inhibited as standard; the unit of this object is 1 ms |
| 100D hex | 00 hex | Read/Write | Unsigned16 | 0000 hex | Lifetime factor:<br>Multiplier applied to **Guard Time** in order to obtain **Life Time** |
| 1010 hex | 00 hex | Write-protected | Unsigned32 | 0002 hex | Saving parameters:<br>Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 0000 hex | Saving parameters:<br>Save all parameters |
| | 02 hex | Read/Write | Unsigned32 | 0000 hex | Saving parameters:<br>Save communication parameters |
| 1011 hex | 00 hex | Write-protected | Unsigned8 | 00002 hex | Restore standard parameters:<br>Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 0000 hex | Restore standard parameters:<br>Restore all parameters |
| | 02 hex | Read/Write | Unsigned32 | 0000 hex | Restore standard parameters:<br>Restore COM parameters |
| 1014 hex | 00 hex | Write-protected | Unsigned32 | 00000080 hex + Node number | COB ID emergency message:<br>COB ID used for EMCY service |
| 1016 hex | 00 hex | Write-protected | Unsigned8 | 01 hex | Consumer heartbeat time - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 00000000 hex | Consumer heartbeat time:<br>Bits 16 to 23 = Manufacturer node number<br>Bits 00 to 15 = Heartbeat time (unit = 1 ms) |
| 1017 hex | 00 hex | Read/Write | Unsigned32 | 00000000 hex | Manufacturer heartbeat time |

### 7.1.7.2 SDO server parameter

#### Communication object

The table contains the communication objects that will be used for the SDO inverter:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1200 hex | 00 hex | Write-protected | Unsigned8 | 02 hex | SDO server - Number of entries |
| | 01 hex | Write-protected | Unsigned32 | 00000600 hex + Node number | SDO server - COB ID Client → Frequency inverter (received) |
| | 02 hex | Write-protected | Unsigned32 | 00000580 hex + Node number | SDO server - COB ID Client ← Frequency inverter (transferred) |

### 7.1.7.3 PDO parameter received

#### Communication objects

The table contains the communication objects that will be used for configuring the inverter's received PDOs:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1400 hex | 00 hex | Write-protected | Unsigned8 | 02 hex | Received PDO1 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 00000200 hex + Node number | Received PDO1 - COB ID |
| | 02 hex | Read/Write | Unsigned32 | 000000FF hex | Received PDO1 - Communication type: Standard value: Event-controlled |
| 1401 hex | 00 hex | Write-protected | Unsigned8 | 02 hex | Received PDO2 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 80000300 hex + Node number | Received PDO2 - COB ID |
| | 02 hex | Read/Write | Unsigned32 | 000000FF hex | Received PDO2 - Communication type: Standard value: Event-controlled |
| 1402 hex | 00 hex | Write-protected | Unsigned8 | 02 hex | Receive PDO3 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 80000400 hex + Node number | Receive PDO3 - COB ID |
| | 02 hex | Read/Write | Unsigned32 | 000000FF hex | Received PDO3 - Transmission type: Standard value: Event-controlled |

### 7.1.7.4 PDO1, PDO2 and PDO3 mapping received

#### Communication objects

The table contains the communication objects that will be used for mapping the inverter's PDOs:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1600 hex | 00 hex | Read/Write | Unsigned8 | 02 hex | Received mapping objects - Number of mapped objects: 0 to 4 objects can be mapped for this PDO |
| | 01 hex | Read/Write | Unsigned32 | 60400010 hex | Received PDO1 mapping - First mapped object: Control word CMDD (6040 hex) |
| | 02 hex | Read/Write | Unsigned32 | 60420010 hex | Received PDO1 mapping - Second mapped object: Speed reference LFRD (6042 hex) |
| | 03 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO1 mapping: No third mapped object |
| | 04 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO1 mapping: No fourth mapped object |
| 1601 hex | 00 hex | Read/Write | Unsigned8 | 00 hex | Received PDO2 mapping - Number of mapped objects: 0 to 4 objects can be mapped for this PDO |
| | 01 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO2 mapping: No first mapped object |
| | 02 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO2 mapping: No second mapped object |
| | 03 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO2 mapping: No third mapped object |
| | 04 hex | Read/Write | Unsigned32 | 00000000 hex | Received PDO2 mapping: No fourth mapped object |
| 1602 hex | 00 hex | Write-protected | Unsigned8 | 04 hex | Received PDO3 mapping - Number of mapped objects: 0 to 4 objects can be mapped for this PDO |
| | 01 hex | Write-protected | Unsigned32 | 20613E10 hex | Received PDO3 mapping - First mapped object: **[Com Scan Out1 val.]** (nC1) |
| | 02 hex | Write-protected | Unsigned32 | 20613F10 hex | Received PDO3 mapping - Second mapped object: **[Com Scan Out2 val.]** (nC2) |
| | 03 hex | Write-protected | Unsigned32 | 20614010 hex | Received PDO3 mapping - Third mapped object: **[Com Scan Out3 val.]** (nC3) |
| | 04 hex | Write-protected | Unsigned32 | 20614110 hex | Received PDO3 mapping - Fourth mapped object: **[Com Scan Out4 val.]** (nC4) |

### 7.1.7.5 Transmit PDO parameter

#### Communication objects

The table contains the communication objects that will be used for configuring the inverter's transmitted PDOs:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1800 hex | 00 hex | Write-protected | Unsigned8 | 05 hex | Transmitted PDO1 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 00000180 hex + Node number | Transmitted PDO1 - COB ID |
| | 02 hex | Read/Write | Unsigned8 | FF hex | Transmitted PDO1 - Transmission type:<br>Three modes are available for this PDO: **Asynchronous** (255), **synchronously cyclic** (1-240) and **synchronously acyclic** (0) |
| | 03 hex | Read/Write | Unsigned16 | 300 | Transmitted PDO1 - Inhibition period:<br>Minimum time between two transmissions: Unit = 100 ms |
| | 04 hex | Read/Write | Unsigned8 | - | Transmitted PDO1 - Reserved |
| | 05 hex | Read/Write | Unsigned16 | 1000 | Transmitted PDO1 - Event timer:<br>In **asynchronous** mode, this object sets a minimum transmission speed for this PDO; Unit = 1 ms |
| 1801 hex | 00 hex | Write-protected | Unsigned8 | 05 hex | Transmitted PDO2 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 80000280 hex + Node number | Transmitted PDO2 - COB ID |
| | 02 hex | Read/Write | Unsigned8 | FF hex | Transmitted PDO2 - Transmission type:<br>Three modes are available for this PDO: **Asynchronous** (255), **synchronously cyclic** (1-240) and **synchronously acyclic** (0) |
| | 03 hex | Read/Write | Unsigned16 | 300 | Transmitted PDO2 - Inhibition period:<br>Minimum time between two transmissions; Unit = 100 ms |
| | 04 hex | Read/Write | Unsigned8 | - | Transmitted PDO2 - Reserved |
| | 05 hex | Read/Write | Unsigned16 | 1000 | Transmitted PDO2 - Event timer:<br>In **asynchronous** mode, this object sets a minimum transmission speed for this PDO; Unit = 1 ms |
| 1802 | 00 hex | Write-protected | Unsigned8 | 05 hex | Transmitted PDO3 - Number of entries |
| | 01 hex | Read/Write | Unsigned32 | 80000380 hex + Node number | Transmitted PDO3 - COB ID |
| | 02 hex | Read/Write | Unsigned8 | FF hex | Transmitted PDO3 - Transmission type:<br>Three modes are available for this PDO: **Asynchronous** (255), **synchronously cyclic** (1-240) and **synchronously acyclic** (0) |
| | 03 hex | Read/Write | Unsigned16 | 30 | Transmitted PDO3 - Inhibition period:<br>Minimum time between two transmissions; Unit = 1 ms |
| | 04 hex | Read/Write | Unsigned8 | - | Transmitted PDO3 - Reserved |
| | 05 hex | Read/Write | Unsigned16 | 1000 | Transmitted PDO3 - Event timer:<br>In **asynchronous** mode, this object sets a minimum transmission speed for this PDO; Unit = 1 ms |

### 7.1.7.6 Send PDO1, PDO2 and PDO3 mapping

#### Communication object

The table contains the communication objects that will be used for mapping the PDOs on the inverter:

| Index | Subindex | Access | Type | Default value | Description |
|---|---|---|---|---|---|
| 1A00 hex | 00 hex | Read/Write | Unsigned8 | 02 hex | Transmitted PD01 mapping - Number of mapped objects |
| | 01 hex | Read/Write | Unsigned32 | 60410010 hex | Transmitted PDO1 mapping - First mapped object:<br>**[ETA state word]** (ETA) (6041 hex) |
| | 02 hex | Read/Write | Unsigned32 | 60440010 hex | Transmitted PDO1 mapping - Second mapped object: Control effort (rFRD) (6044 hex) |
| | 03 hex | Read/Write | Unsigned32 | 00000000 hex | Transmitted PDO1 mapping: No third mapped object |
| | 04 hex | Read/Write | Unsigned32 | 00000000 hex | Transmitted PDO1 mapping: No fourth mapped object |
| 1A01 hex | 00 hex | Read/Write | Unsigned8 | 00 hex | Transmitted PDO2 mapping - Number of mapped objects |
| | 01 hex | Read/Write | Unsigned32 | 00000000 hex | Not mapped |
| | 02 hex | Read/Write | Unsigned32 | 00000000 hex | Not mapped |
| | 03 hex | Read/Write | Unsigned32 | 00000000 hex | Not mapped |
| | 04 hex | Read/Write | Unsigned32 | 00000000 hex | Not mapped |
| 1A02 hex | 00 hex | Write-protected | Unsigned8 | 04 hex | Transmitted PDO3 mapping - Number of mapped objects |
| | 01 hex | Write-protected | Unsigned32 | 20612A10 hex | Transmitted PDO3 mapping - First mapped object:<br>**[Com Scan In1 val.]** (nM1) |
| | 02 hex | Write-protected | Unsigned32 | 20612B10 hex | Transmitted PDO3 mapping - Second mapped object:<br>**[Com Scan In2 val.]** (nM2) |
| | 03 hex | Write-protected | Unsigned32 | 20612C10 hex | Transmitted PDO3 mapping - Third mapped object:<br>**[Com Scan In3 val.]** (nM3) |
| | 04 hex | Write-protected | Unsigned32 | 20612D10 hex | Transmitted PDO3 mapping - Fourth mapped object:<br>**[Com Scan In4 val.]** (nM4) |

#### 7.1.7.7 Vendor-specific area

ACOPOSinverter parameters are based on and also documented with their CANopen address.

**Note:**

**You can find the CANopen addresses in the communication parameters Excel table ACOPOSinverter - Communication Parameters.**

#### 7.1.7.8 Application profile range

**Standardized objects**

The table contains the standardized objects in accordance with speed mode profile CiA402, which is supported by the inverter:

| Index | Description | |
|---|---|---|
| 603F hex | Error code | |
| 6040 hex | Control word | |
| 6041 hex | Status word | |
| 6042 hex | Target speed | |
| 6043 hex | Speed demand | |
| 6044 hex | Control effort | |
| 6046 hex | 01 hex | Speed minimum height |
| | 02 hex | Speed maximum height |
| 6048 hex | Speed acceleration | |
| | 01 hex | Delta speed |
| | 02 hex | Delta time |
| 604 B hex | Setpoint factor | |
| | 01 hex | Setpoint factor counter |
| | 02 hex | Setpoint factor denominator |
| 605A hex | Quick stop option code | |
| 605C hex | Option code disabled | |
| 6060 hex | Types of operation | |
| 6061 hex | Types of operation displays | |
| 6077 hex | Torque current value | |
| 6502 hex | Supported device types | |

## 7.2 X2X Link

### 7.2.1 General information

This product is a plug-in interface for the ACOPOSinverter P66. The communication card enables access to the drive parameters via the X2X Link bus. One input and one output have each been implemented for X2X. A shield connection and shield grounding are provided.

- Automatic firmware update via AS
- Power supply of interface card via inverter
- Requires freely pre-assembled X2X cable

**Information:**

**The interface between the frequency inverter and the plug-on interface is not hot-pluggable, i.e. the plug-on interface must be installed in a voltage-free state.**

## 7.2.2 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Interface modules** | |
| 8I0IF109.400-1 | 2x X2X Link interface, interface module for ACOPOSinverter P66. | |
| | **Optional accessories** | |
| | **Terminal blocks** | |
| 8TB2104.2010-00 | 4-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2104.2210-00 | 4-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2010-00 | 8-pin screw clamp terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| 8TB2108.2210-00 | 8-pin push-in terminal block, 1-row, pitch: 5.08 mm, label 1: Numbered consecutively | |
| | **X2X Link Cable** | |
| X67CA0X99.1000 | Cable for custom assembly, 100 m | |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | |

Table 43: 8I0IF109.400-1 - Order data

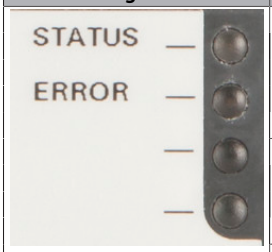
## 7.2.3 Technical data

| Order number | 8I0IF109.400-1 |
|---|---|
| **Short description** | |
| Bus receiver | X2X Link bus receiver |
| **General information** | |
| B&R ID code | 0xF259 |
| Status indicators | Operating state, module status |
| Diagnostics | |
| Module run/error | Yes, using LED status indicator and software |
| Overload | Yes, using LED status indicator and software |
| Power consumption | |
| External I/O | 500 mW |
| Additional power dissipation caused by actuators (resistive) [W] | - |
| Electrical isolation | |
| X2X Link - Frequency inverter | Yes |
| Certifications | |
| CE | Yes |
| UKCA | Yes |
| **Operating conditions** | |
| Mounting orientation | |
| Vertical | Yes |
| Installation elevation above sea level | |
| 0 to 2000 m | No limitation |
| >2000 m | Reduction of ambient temperature by 0.5°C per 100 m |
| Degree of protection per EN 60529 | IP20 |
| **Ambient conditions** | |
| Temperature | |
| Operation | -10 to 60°C |
| Storage | -40 to 85°C |
| Transport | -40 to 85°C |
| Relative humidity | |
| Operation | 5 to 95%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |
| **Mechanical properties** | |
| Note | Terminal blocks must be ordered separately.<br>2x 8TB2104.2010-00 (corresponds to 0TB704.9) or<br>2x 8TB2104.2210-00 (corresponds to 0TB704.91) or<br>1x 8TB2108.2010-00 or<br>1x 8TB2108.2210-00 |

Table 44: 8I0IF109.400-1 - Technical data

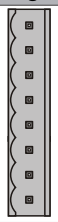
## 7.2.4 LED status indicators

For a description of different operating modes, see section "Additional information - Diagnostic LEDs" of the X20 system user's manual.

| Figure | LED | Color | Status | Description |
|---|---|---|---|---|
|  | STATUS | Green | Off | No power to module |
| | | | Single flash | Mode RESET[1)] |
| | | | Double flash | Mode BOOT[1)] (during firmware update) |
| | | | Blinking | Mode PREOPERATIONAL[1)] |
| | | | On | Mode RUN[1)] |
| | ERROR | Red | Off | Module not supplied with power or everything OK |
| | | | Single flash | Cyclic data scanner on frequency inverter not running |
| | | | Double flash | Power supply below the warning level of 20.4 V |
| | | | Triple flash | No communication with the frequency inverter |
| | STATUS + ERROR | Solid red / Single green flash | | Invalid firmware |

1) The operating states are described in Automation Help under "Real-time operating system - Method of operation - Operating states".

## 7.2.5 Pinout

| Figure | Terminal | Description |
|---|---|---|
|  | 1 | X2X |
| | 2 | GND |
| | 3 | X2X\ |
| | 4 | Shield |
| | 5 | X2X |
| | 6 | GND |
| | 7 | X2X\ |
| | 8 | Shield |

## 7.2.6 Register description

### 7.2.6.1 System requirements

To use the full integration of ACOPOSinverter in Automation Studio, the following minimum versions are required:

- Automation Studio 4.3.5
- Automation Runtime D4.10

Function model "Motion configuration" and the associated integration in mapp Motion and mapp Cockpit additionally require Technology Package:

- mapp Motion 5.8.2

To use the full integration of ACOPOSinverter in APROL, the following minimum version is required:

- APROL R4.2-06

### 7.2.6.2 General data points

In addition to the registers described in the register description, the module has additional general data points. These are not module-specific but contain general information such as serial number or hardware variant.

General data points are described in section "Additional information - General data points" of the X20 system user's manual.

### 7.2.6.3 Overview of registers for the communication card (X2X)

#### 7.2.6.3.1 Overview of registers

| Register | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|
| | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 1 | Status of the module | USINT | • | | | |
| | UnderVoltage | Bit 0 | | | | |
| | ComIntStart | Bit 4 | | | | |
| | ComIntReady | Bit 5 | | | | |
| | ComIntErrorGen | Bit 6 | | | | |
| | ComIntErrorCyc | Bit 7 | | | | |
| 2 | SupplyVoltage | UINT | • | | | |
| 20 | ACPi_ModuleID | UINT | • | | | |
| 28 | ACPi_SerialNumber | UDINT | • | | | |

#### 7.2.6.3.2 Status of the module

This register monitors the module status.

| Bit | Name | Value | Information |
|---|---|---|---|
| 0 | UnderVoltage | 0 | Power supply above the warning level of 20.4 V. |
| | | 1 | Power supply below the warning level of 20.4 V. |
| 4 | ComIntStart | 0 | No communication to the frequency inverter. |
| | | 1 | Communication to the frequency inverter. |
| 5 | ComIntReady | 0 | Cyclic data scanner on frequency inverter not running. |
| | | 1 | Cyclic data scanner on frequency inverter running. |
| 6 | ComIntErrorGen | 0 | Communication to the frequency inverter. |
| | | 1 | No communication to the frequency inverter. |
| 7 | ComIntErrorCyc | 0 | Cyclic data scanner on frequency inverter running. |
| | | 1 | Cyclic data scanner on frequency inverter not running. |
| 8 to 15 | Reserved | 0 | |

#### 7.2.6.3.3 Bus power supply current

Name:
SupplyVoltage

This register indicates the measured supply voltage with a resolution of 0.1 V.

### 7.2.6.4 Overview of registers for the ACOPOSinverter

#### 7.2.6.4.1 Basic values of drive

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 3009 | 2009 | PRT_Input | UINT | | • | | |
| 3011 | 2011 | NCV_Input | UINT | | • | | |
| 3012 | 2012 | VCAL_Input | UINT | | • | | |
| 3013 | 2013 | NCVI_Input | UINT | | • | | |
| 3014 | 2014 | VCAI_Input | UINT | | • | | |
| 3016 | 2016 | IMAX_Input | UINT | | • | | |
| 3017 | 2017 | INV_Input | UINT | | • | | |
| 3018 | 2018 | VMAX_Input | UINT | | • | | |

#### 7.2.6.4.2 Terminal block inputs/outputs

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 5232 | 3132 | AI1R_Input | INT | • | • | | |
| 5233 | 3133 | AI2R_Input | INT | • | • | | |
| 5234 | 3134 | AI3R_Input | INT | • | • | | |
| 5202 | 3102 | IL1R_Input | UINT | • | • | | |
| 5202 | 3102 | Status of the digital inputs | USINT | • | | | |
| | | IL1R_Input_LI1 | Bit 0 | | | | |
| | | IL1R_Input_LI2 | Bit 1 | | | | |
| | | IL1R_Input_LI3 | Bit 2 | | | | |
| | | IL1R_Input_LI4 | Bit 3 | | | | |
| | | IL1R_Input_LI5 | Bit 4 | | | | |
| | | IL1R_Input_LI6 | Bit 5 | | | | |
| | | IL1R_Input_LAI1 | Bit 6 | | | | |
| | | IL1R_Input_LAI2 | Bit 7 | | | | |
| 13308 | 7158 | HSC_Input | UINT | • | • | | |
| 13305 | 7155 | PIFR_Input | INT | • | • | | |
| 13307 | 7157 | PFRC_Input | UINT | | • | | |
| 14603 | 7803 | FQS_Input | UINT | • | • | | |
| 5261 | 1281 | AO1R_Output | UINT | | | • | |
| 5251 | 1280 | AO1I_Input | UINT | • | • | | |
| 5212 | 3112 | Configuration of digital outputs | UINT | | | • | |
| | | OL1R_Output_R1 | Bit 0 | | | | |
| | | OL1R_Output_R2 | Bit 1 | | | | |
| | | OL1R_Output_LO1 | Bit 8 | | | | |
| 5211 | 3111 | OL1I_Input | UINT | | • | | |
| 5211 | 3111 | OL1I_Input | UINT | • | | | |
| | | OL1I_Input_R1 | Bit 0 | | | | |
| | | OL1I_Input_R2 | Bit 1 | | | | |
| | | OL1I_Input_LO1 | Bit 8 | | | | |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclic | Acyclic | Cyclic | Acyclic |
| **Configuration of the analog inputs** | | | | | | | | |
| 4402 | 2702 | AI1T_Input | AI1T_Output | UINT | | • | | • |
| 4403 | 2703 | AI2T_Input | AI2T_Output | UINT | | • | | • |
| 4404 | 2704 | AI3T_Input | AI3T_Output | UINT | | • | | • |
| 4412 | 2712 | UIL1_Input | UIL1_Output | UINT | | • | | • |
| 4413 | 2713 | UIL2_Input | UIL2_Output | UINT | | • | | • |
| 4422 | 2722 | UIH1_Input | UIH1_Output | UINT | | • | | • |
| 4423 | 2723 | UIH2_Input | UIH2_Output | UINT | | • | | • |
| 4434 | 2734 | CRL3_Input | CRL3_Output | UINT | | • | | • |
| 4444 | 2744 | CRH3_Input | CRH3_Output | UINT | | • | | • |
| 4452 | 8894 | AI1F_Input | AI1F_Output | UINT | | • | | • |
| 4453 | 8895 | AI2F_Input | AI2F_Output | UINT | | • | | • |
| 4454 | 8896 | AI3F_Input | AI3F_Output | UINT | | • | | • |
| 4462 | 8904 | AI1E_Input | AI1E_Output | UINT | | • | | • |
| 4463 | 8905 | AI2E_Input | AI2E_Output | UINT | | • | | • |
| 4464 | 8906 | AI3E_Input | AI3E_Output | UINT | | • | | • |
| 4472 | 8914 | AI1S_Input | AI1S_Output | UINT | | • | | • |
| 4473 | 8915 | AI2S_Input | AI2S_Output | UINT | | • | | • |
| 4474 | 8916 | AI3S_Input | AI3S_Output | UINT | | • | | • |
| 4482 | 8924 | AI1L_Input | AI1L_Output | UINT | | • | | • |
| 4483 | 8925 | AI2L_Input | AI2L_Output | UINT | | • | | • |
| 4484 | 8926 | AI3L_Input | AI3L_Output | UINT | | • | | • |
| 5284 | 9326 | AIC2_Input | AIC2_Output | UINT | | • | | • |
| **Configuration of the analog outputs** | | | | | | | | |
| 4601 | 2801 | AO1T_Input | AO1T_Output | UINT | | • | | • |
| 4611 | 2811 | AO1F_Input | AO1F_Output | UINT | | • | | • |
| 4621 | 2821 | UOL1_Input | UOL1_Output | UINT | | • | | • |
| 4631 | 2831 | UOH1_Input | UOH1_Output | UINT | | • | | • |
| 4641 | 2841 | AOL1_Input | AOL1_Output | UINT | | • | | • |
| 4651 | 8993 | AOH1_Input | AOH1_Output | UINT | | • | | • |
| 4661 | 9003 | ASL1_Input | ASL1_Output | UINT | | • | | • |
| 4671 | 9013 | ASH1_Input | ASH1_Output | UINT | | • | | • |
| 4293 | 8835 | AOF1_Input | AOF1_Output | UINT | | • | | • |
| 4261 | 8803 | DO1S_Input | DO1S_Output | UINT | | • | | • |
| 4271 | 8813 | DO1H_Input | DO1H_Output | UINT | | • | | • |
| 4281 | 8823 | DO1D_Input | DO1D_Output | UINT | | • | | • |
| **Configuration of the digital inputs** | | | | | | | | |
| 4001 | 2501 | L1D_Input | L1D_Output | UINT | | • | | • |
| 4002 | 2502 | L2D_Input | L2D_Output | UINT | | • | | • |
| 4003 | 2503 | L3D_Input | L3D_Output | UINT | | • | | • |
| 4004 | 2504 | L4D_Input | L4D_Output | UINT | | • | | • |
| 4005 | 2505 | L5D_Input | L5D_Output | UINT | | • | | • |
| 4006 | 2506 | L6D_Input | L6D_Output | UINT | | • | | • |
| 4021 | 2521 | LA1D_Input | LA1D_Output | UINT | | • | | • |
| 4022 | 2522 | LA2D_Input | LA2D_Output | UINT | | • | | • |
| **Configuration of the digital outputs** | | | | | | | | |
| 4201 | 2601 | R1S_Input | R1S_Output | UINT | | • | | • |
| 4202 | 2602 | R2S_Input | R2S_Output | UINT | | • | | • |
| 4209 | 2609 | LO1S_Input | LO1S_Output | UINT | | • | | • |
| 4221 | 2621 | R1H_Input | R1H_Output | UINT | | • | | • |
| 4222 | 2622 | R2H_Input | R2H_Output | UINT | | • | | • |
| 4229 | 2629 | LO1H_Input | LO1H_Output | UINT | | • | | • |
| 4241 | 2641 | R1D_Input | R1D_Output | UINT | | • | | • |
| 4242 | 2642 | R2D_Input | R2D_Output | UINT | | • | | • |
| 4249 | 2649 | LO1D_Input | LO1D_Output | UINT | | • | | • |
| 4290 | 8832 | R1F_Input | R1F_Output | UINT | | • | | • |
| 4291 | 8833 | R2F_Input | R2F_Output | UINT | | • | | • |
| 4292 | 8834 | LO1F_Input | LO1F_Output | UINT | | • | | • |
| 5001 | 3001 | R1_Input | R1_Output | UINT | | • | | • |
| 5002 | 3002 | R2_Input | R2_Output | UINT | | • | | • |
| 5009 | 3009 | LO1_Input | LO1_Output | UINT | | • | | • |
| 5021 | 3021 | AO1_Input | AO1_Output | UINT | | • | | • |
| 5031 | 3031 | DO1_Input | DO1_Output | UINT | | • | | • |
| **Additional signals (derived from digital input LI5)** | | | | | | | | |
| 13302 | 7152 | PIL_Input | PIL_Output | UINT | | • | | • |
| 13303 | 7153 | PFR_Input | PFR_Output | UINT | | • | | • |
| 13304 | 7154 | PFI_Input | PFI_Output | UINT | | • | | • |
| 13306 | 7156 | PFRI_Input | PFRI_Output | UINT | | • | | • |
| 14601 | 7801 | FQF_Input | FQF_Output | UINT | | • | | • |
| 14602 | 7802 | FQC_Input | FQC_Output | UINT | | • | | • |
| 14604 | 7804 | FQA_Input | FQA_Output | UINT | | • | | • |
| 14605 | 7805 | TDS_Input | TDS_Output | UINT | | • | | • |
| 14606 | 7806 | FDT_Input | FDT_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 14607 | 7807 | FQT_Input | FQT_Output | UINT | | • | | • |
| 14608 | 7808 | TQB_Input | TQB_Output | UINT | | • | | • |
| 14609 | 7809 | FQL_Input | FQL_Output | UINT | | • | | • |
| **Additional signals (derived from digital input LI6)** | | | | | | | | |
| 13203 | 7103 | PTCL_Input | PTCL_Output | UINT | | • | | • |

### 7.2.6.4.3 Communication (with setpoint in rpm)

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | Cyclical | Cyclical | Acyclic | Cyclical | Acyclic |
| **Optional status responses** | | | | | | | |
| 3240 | 2140 | HMIS_Input | UINT | • | • | | |
| 7121 | 4071 | LFT_Input | UINT | • | • | | |
| 3206 | 2106 | ETI_Input | UINT | • | • | | |
| 3209 | 2109 | THD_Input | UINT | • | • | | |
| 9630 | 5330 | THR_Input | UINT | • | • | | |
| 13205 | 7105 | PTCI_Input | UINT | • | • | | |
| 64034 | 1288 | ALGR_Input | UINT | • | • | | |
| 15322 | 8172 | STOS_Input | UINT | • | | | |
| 15315 | 8165 | SS1S_Input | UINT | • | | | |
| 15304 | 8154 | SLSS_Input | UINT | • | | | |
| 15383 | 1290 | SMSS_Input | UINT | • | | | |
| 15393 | 1289 | GDLS_Input | UINT | • | | | |
| 3699 | 8541 | INF6_Input | UINT | | • | | |
| 11980 | 12672 | RPE_Input | INT | | • | | |
| 11981 | 12673 | RPF_Input | UINT | | • | | |
| 11982 | 12674 | RPC_Input | UINT | | • | | |
| 11983 | 12675 | RPO_Input | INT | | • | | |
| **State and command register (default)** | | | | | | | |
| 8603 | 4803 | ETAD_Input | UINT | | • | | |
| 8603 | 4803 | ETAD_Input | UINT | • | | | |
| | | ETAD_Input_rtso | Bit 0 | | | | |
| | | ETAD_Input_so | Bit 1 | | | | |
| | | ETAD_Input_oe | Bit 2 | | | | |
| | | ETAD_Input_f | Bit 3 | | | | |
| | | ETAD_Input_ve | Bit 4 | | | | |
| | | ETAD_Input_qs | Bit 5 | | | | |
| | | ETAD_Input_sod | Bit 6 | | | | |
| | | ETAD_Input_w | Bit 7 | | | | |
| | | ETAD_Input_rm | Bit 9 | | | | |
| | | ETAD_Input_tr | Bit 10 | | | | |
| | | ETAD_Input_ila | Bit 11 | | | | |
| | | ETAD_Input_ms14 | Bit 14 | | | | |
| | | ETAD_Input_ms15 | Bit 15 | | | | |
| 8606 | 4806 | ERRD_Input | UINT | • | • | | |
| 8504 | 4754 | CMI_Output | UINT | | • | | • |
| 8601 | 4801 | CMDD_Output | UINT | | • | • | |
| 8602 | 4802 | LFRD_Output | INT | | • | • | |
| 8641 | 4841 | FROD_Input | INT | • | • | | |
| 8604 | 4804 | RFRD_Input | INT | • | • | | |
| **Optional responses and additional setpoints** | | | | | | | |
| 3205 | 2105 | OTR_Input | INT | • | • | | |
| 3205 | 2105 | OTRN_Input | INT | • | • | | |
| 5281 | 1282 | AIV1_Output | UINT | | • | • | |
| 5283 | 1283 | AIV2_Output | INT | | • | • | |
| 8503 | 4753 | PISP_Output | UINT | | • | • | |
| 8605 | 4805 | FRHD_Input | INT | • | • | | |
| 3203 | 2103 | FRH_Input | INT | • | • | | |
| 9021 | 5021 | FRO_Input | INT | • | • | | |
| 3202 | 2102 | RFR_Input | INT | • | • | | |
| 3208 | 2108 | UOP_Input | UINT | • | • | | |
| 3204 | 2104 | LCR_Input | UINT | • | • | | |
| 3211 | 2111 | OPR_Input | INT | • | • | | |
| 3217 | 2117 | SLC_Input | INT | • | • | | |
| 3207 | 2107 | ULN_Input | UINT | • | • | | |
| 9645 | 5345 | SMOT_Input | UINT | | • | | |
| 9609 | 5309 | TUS_Input | UINT | | • | | |
| 9676 | 11518 | RDAE_Input | INT | | • | | |
| 13927 | 7477 | ASOD_Input | UINT | | • | | |
| 9634 | 5334 | I2TM_Input | UINT | | • | | |
| 3120 | 2070 | RPR_Output | UINT | | | | • |

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | Cyclical | Cyclical | Acyclic | Cyclical | Acyclic |
| 3230 | 2130 | APH_Input | UINT | | • | | |
| 3231 | 2131 | RTH_Input | UINT | | • | | |
| 3232 | 2132 | RTHI_Input | UINT | | • | | |
| 3233 | 2133 | PTH_Input | UINT | | • | | |
| 3234 | 2134 | UNT_Input | UINT | | • | | |
| **Error history** | | | | | | | |
| 7393 | 10385 | FNB_Input | UINT | | • | | |
| 7200 + Index | 4100 + Index | **LFT:** DP0_Input<br>DP[0…8]_Input | UINT | | • | | |
| 7210 + Index | 4110 + Index | **ETAD:** EP0_Input<br>EP[0…8]_Input | UINT | | • | | |
| 7220 + Index | 4120 + Index | **ETI:** IP0_Input<br>IP[0…8]_Input | UINT | | • | | |
| 7230 + Index | 4130 + Index | **CMDD:** CMP0_Input<br>CMP[0…8]_Input | UINT | | • | | |
| 7240 + Index | 4140 + Index | **LCR:** LCP0_Input<br>LCP[0…8]_Input | INT | | • | | |
| 7250 + Index | 10292 + Index | **RFR:** RFP0_Input<br>RFP[0…8]_Input | INT | | • | | |
| 7260 + Index | 10302 + Index | **RTHI:** RTP0_Input<br>RTP[0…8]_Input | UINT | | • | | |
| 7270 + Index | 10312 + Index | **ULN:** ULP0_Input<br>ULP[0…8]_Input | UINT | | • | | |
| 7280 + Index | 10322 + Index | **THR:** THP0_Input<br>THP[0…8]_Input | UINT | | • | | |
| 7320 + Index | 4170 + Index | **HMIS:** HS0_Input<br>HS[0…8]_Input | UINT | | • | | |
| 7330 + Index | 4180 + Index | **OTR:** OTP0_Input<br>OTP[0…8]_Input | INT | | • | | |
| 7340 + Index | 4190 + Index | **THD:** TDP0_Input<br>TDP[0…8]_Input | UINT | | • | | |

## 7.2.6.4.4 Communication (with setpoint in Hz)

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **Optional status responses** | | | | | | | |
| 3240 | 2140 | HMIS_Input | UINT | • | • | | |
| 7121 | 4071 | LFT_Input | UINT | • | • | | |
| 3206 | 2106 | ETI_Input | UINT | • | • | | |
| 3209 | 2109 | THD_Input | UINT | • | • | | |
| 9630 | 5330 | THR_Input | UINT | • | • | | |
| 13205 | 7105 | PTCI_Input | UINT | • | • | | |
| 64034 | 1288 | ALGR_Input | UINT | • | • | | |
| 15322 | 8172 | STOS_Input | UINT | • | | | |
| 15315 | 8165 | SS1S_Input | UINT | • | | | |
| 15304 | 8154 | SLSS_Input | UINT | • | | | |
| 15383 | 1290 | SMSS_Input | UINT | • | | | |
| 15393 | 1289 | GDLS_Input | UINT | • | | | |
| 3699 | 8541 | INF6_Input | UINT | | • | | |
| 11980 | 12672 | RPE_Input | INT | | • | | |
| 11981 | 12673 | RPF_Input | UINT | | • | | |
| 11982 | 12674 | RPC_Input | UINT | | • | | |
| 11983 | 12675 | RPO_Input | INT | | • | | |
| **State and command register (default)** | | | | | | | |
| 8603 | 4803 | ETAD_Input | UINT | | • | | |
| 8603 | 4803 | ETAD_Input | UINT | • | | | |
| | | ETAD_Input_rtso | Bit 0 | | | | |
| | | ETAD_Input_so | Bit 1 | | | | |
| | | ETAD_Input_oe | Bit 2 | | | | |
| | | ETAD_Input_f | Bit 3 | | | | |
| | | ETAD_Input_ve | Bit 4 | | | | |
| | | ETAD_Input_qs | Bit 5 | | | | |
| | | ETAD_Input_sod | Bit 6 | | | | |
| | | ETAD_Input_w | Bit 7 | | | | |
| | | ETAD_Input_rm | Bit 9 | | | | |
| | | ETAD_Input_tr | Bit 10 | | | | |
| | | ETAD_Input_ila | Bit 11 | | | | |
| | | ETAD_Input_ms14 | Bit 14 | | | | |
| | | ETAD_Input_ms15 | Bit 15 | | | | |
| 8606 | 4806 | ERRD_Input | UINT | • | • | | |
| 8504 | 4754 | CMI_Output | UINT | | | | • |
| 8601 | 4801 | CMDD_Output | UINT | | • | • | |

| Modbus | X2X | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 8502 | 4752 | LFR_Output | INT | | • | • | |
| 9021 | 5021 | FRO_Input | INT | • | • | | |
| 3202 | 2102 | RFR_Input | INT | • | • | | |
| **Optional responses and additional setpoints** | | | | | | | |
| 3205 | 2105 | OTR_Input | INT | • | • | | |
| 3205 | 2105 | OTRN_Input | INT | • | • | | |
| 5281 | 1282 | AIV1_Output | UINT | | • | • | |
| 5283 | 1283 | AIV2_Output | INT | | • | • | |
| 8503 | 4753 | PISP_Output | UINT | | • | • | |
| 3203 | 2103 | FRH_Input | INT | • | • | | |
| 8605 | 4805 | FRHD_Input | INT | • | • | | |
| 8641 | 4841 | FROD_Input | INT | • | • | | |
| 8604 | 4804 | RFRD_Input | INT | • | • | | |
| 3208 | 2108 | UOP_Input | UINT | • | • | | |
| 3204 | 2104 | LCR_Input | UINT | • | • | | |
| 3211 | 2111 | OPR_Input | INT | • | • | | |
| 3217 | 2117 | SLC_Input | INT | • | • | | |
| 3207 | 2107 | ULN_Input | UINT | • | • | | |
| 9645 | 5345 | SMOT_Input | UINT | | • | | |
| 9609 | 5309 | TUS_Input | UINT | | • | | |
| 9676 | 11518 | RDAE_Input | INT | | • | | |
| 13927 | 7477 | ASOD_Input | UINT | | • | | |
| 9634 | 5334 | I2TM_Input | UINT | | • | | |
| 3120 | 2070 | RPR_Output | UINT | | | | • |
| 3230 | 2130 | APH_Input | UINT | | • | | |
| 3231 | 2131 | RTH_Input | UINT | | • | | |
| 3232 | 2132 | RTHI_Input | UINT | | • | | |
| 3233 | 2133 | PTH_Input | UINT | | • | | |
| 3234 | 2134 | UNT_Input | UINT | | • | | |
| **Error history** | | | | | | | |
| 7393 | 10385 | FNB_Input | UINT | | • | | |
| 7200 + Index | 4100 + Index | **LFT:** DP0_Input DP[0…8]_Input | UINT | | • | | |
| 7210 + Index | 4110 + Index | **ETAD:** EP0_Input EP[0…8]_Input | UINT | | • | | |
| 7220 + Index | 4120 + Index | **ETI:** IP0_Input IP[0…8]_Input | UINT | | • | | |
| 7230 + Index | 4130 + Index | **CMDD:** CMP0_Input CMP[0…8]_Input | UINT | | • | | |
| 7240 + Index | 4140 + Index | **LCR:** LCP0_Input LCP[0…8]_Input | INT | | • | | |
| 7250 + Index | 10292 + Index | **RFR:** RFP0_Input RFP[0…8]_Input | INT | | • | | |
| 7260 + Index | 10302 + Index | **RTHI:** RTP0_Input RTP[0…8]_Input | UINT | | • | | |
| 7270 + Index | 10312 + Index | **ULN:** ULP0_Input ULP[0…8]_Input | UINT | | • | | |
| 7280 + Index | 10322 + Index | **THR:** THP0_Input THP[0…8]_Input | UINT | | • | | |
| 7320 + Index | 4170 + Index | **HMIS:** HS0_Input HS[0…8]_Input | UINT | | • | | |
| 7330 + Index | 4180 + Index | **OTR:** OTP0_Input OTP[0…8]_Input | INT | | • | | |
| 7340 + Index | 4190 + Index | **THD:** TDP0_Input TDP[0…8]_Input | UINT | | • | | |

## 7.2.6.4.5 Configuration

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **General** | | | | | | | | |
| 3015 | 2015 | BFR_Input | BFR_Output | UINT | | • | | • |
| 3052 | 8194 | CFG_Input | CFG_Output | UINT | | • | | • |
| 3022 | 2022 | FRY_Input | FRY_Output | UINT | | • | | • |
| 3006 | 2006 | LAC_Input | LAC_Output | UINT | | • | | • |
| **Nameplate (induction motor)** | | | | | | | | |
| 9601 | 5301 | UNS_Input | UNS_Output | UINT | | • | | • |
| 9602 | 5302 | FRS_Input | FRS_Output | UINT | | • | | • |
| 9603 | 5303 | NCR_Input | NCR_Output | UINT | | • | | • |
| 9604 | 5304 | NSP_Input | NSP_Output | UINT | | • | | • |
| 9614 | 5314 | MPC_Input | MPC_Output | UINT | | • | | • |
| 9606 | 5306 | COS_Input | COS_Output | UINT | | • | | • |
| 9613 | 5313 | NPR_Input | NPR_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **Nameplate (SYN motor)** | | | | | | | | |
| 13925 | 7475 | AST_Input | AST_Output | UINT | | • | | • |
| 9670 | 11512 | NCRS_Input | NCRS_Output | UINT | | • | | • |
| 9671 | 11513 | NSPS_Input | NSPS_Output | UINT | | • | | • |
| 9684 | 11526 | TQS_Input | TQS_Output | UINT | | • | | • |
| 9672 | 11514 | PPNS_Input | PPNS_Output | UINT | | • | | • |
| **Tuning settings** | | | | | | | | |
| 9608 | 5308 | TUN_Input | TUN_Output | UINT | | • | | • |
| 9617 | 5317 | STUN_Input | STUN_Output | UINT | | • | | • |
| 9610 | 5310 | TUL_Input | TUL_Output | UINT | | • | | • |
| **Tuning results (induction motor)** | | | | | | | | |
| 9642 | 5342 | RSA_Input | RSA_Output | UINT | | • | | • |
| 9652 | 11494 | IDA_Input | IDA_Output | UINT | | • | | • |
| 9662 | 11504 | LFA_Input | LFA_Output | UINT | | • | | • |
| 9667 | 11509 | TRA_Input | TRA_Output | UINT | | • | | • |
| **Tuning results (SYN motor)** | | | | | | | | |
| 9673 | 11515 | PHS_Input | PHS_Output | UINT | | • | | • |
| 9674 | 11516 | LDS_Input | LDS_Output | UINT | | • | | • |
| 9675 | 11517 | LQS_Input | LQS_Output | UINT | | • | | • |
| 9682 | 11524 | RSAS_Input | RSAS_Output | UINT | | • | | • |
| **Premagnetization** | | | | | | | | |
| 13901 | 7451 | FLI_Input | FLI_Output | UINT | | • | | • |
| 13902 | 7452 | FLU_Input | FLU_Output | UINT | | • | | • |
| 13910 | 7460 | BOA_Input | BOA_Output | UINT | | • | | • |
| 13911 | 7461 | FAB_Input | FAB_Output | UINT | | • | | • |
| 13912 | 7462 | BOO_Input | BOO_Output | INT | | • | | • |
| **High frequency injection for synchronous motor** | | | | | | | | |
| 15600 | 14592 | HFI_Input | HFI_Output | UINT | | • | | • |
| 15601 | 14593 | FRI_Input | FRI_Output | UINT | | • | | • |
| 15602 | 14594 | HIR_Input | HIR_Output | UINT | | • | | • |
| 15603 | 14595 | SPB_Input | SPB_Output | UINT | | • | | • |
| 15604 | 14596 | SPF_Input | SPF_Output | UINT | | • | | • |
| 15605 | 14597 | ILR_Input | ILR_Output | UINT | | • | | • |
| 15606 | 14598 | SIR_Input | SIR_Output | UINT | | • | | • |
| 15607 | 14598 | MCR_Input | SIR_Output | UINT | | • | | • |
| 15608 | 14600 | PEC_Input | PEC_Output | UINT | | • | | • |
| **Access** | | | | | | | | |
| 8401 | 4701 | CHCF_Input | CHCF_Output | UINT | | • | | • |
| 8402 | 4702 | COP_Input | COP_Output | UINT | | • | | • |
| 8403 | 4703 | CSB_Input | CSB_Output | UINT | | • | | • |
| 8411 | 4711 | RFC_Input | RFC_Output | UINT | | • | | • |
| 8412 | 4712 | RCB_Input | RCB_Output | UINT | | • | | • |
| 8413 | 4713 | FR1_Input | FR1_Output | UINT | | • | | • |
| 8414 | 4714 | FR2_Input | FR2_Output | UINT | | • | | • |
| 8415 | 4715 | FR1B_Input | FR1B_Output | UINT | | • | | • |
| 8421 | 4721 | CCS_Input | CCS_Output | UINT | | • | | • |
| 8423 | 4723 | CD1_Input | CD1_Output | UINT | | • | | • |
| 8424 | 4724 | CD2_Input | CD2_Output | UINT | | • | | • |
| 11101 | 6051 | TCC_Input | TCC_Output | UINT | | • | | • |
| 11102 | 6052 | TCT_Input | TCT_Output | UINT | | • | | • |
| 11103 | 6053 | RUN_Input | RUN_Output | UINT | | • | | • |
| 11104 | 6054 | FRD_Input | FRD_Output | UINT | | • | | • |
| 11105 | 6055 | RRS_Input | RRS_Output | UINT | | • | | • |
| **DC bus circuit** | | | | | | | | |
| 13801 | 7401 | URES_Input | URES_Output | UINT | | • | | • |
| 13802 | 7402 | USL_Input | USL_Output | UINT | | • | | • |
| 13803 | 7403 | USB_Input | USB_Output | UINT | | • | | • |
| 13804 | 7404 | UST_Input | UST_Output | UINT | | • | | • |
| 13811 | 7411 | UPL_Input | UPL_Output | UINT | | • | | • |
| 13812 | 7412 | TBS_Input | TBS_Output | UINT | | • | | • |
| 13813 | 7413 | TSM_Input | TSM_Output | UINT | | • | | • |
| 13814 | 7414 | STM_Input | STM_Output | UINT | | • | | • |
| 13850 | 13592 | DCCM_Input | DCCM_Output | UINT | | • | | • |
| 13851 | 13593 | DCCC_Input | DCCC_Output | UINT | | • | | • |
| 14101 | 7551 | UBR_Input | UBR_Output | UINT | | • | | • |
| **PWM management** | | | | | | | | |
| 12601 | 6801 | SVL_Input | SVL_Output | UINT | | • | | • |
| 12602 | 6802 | SOP_Input | SOP_Output | UINT | | • | | • |
| **General current/torque limiting** | | | | | | | | |
| 9201 | 5101 | CLI_Input | CLI_Output | UINT | | • | | • |
| 9202 | 5102 | LC2_Input | LC2_Output | UINT | | • | | • |
| 9203 | 5103 | CL2_Input | CL2_Output | UINT | | • | | • |
| 9210 | 5110 | TLA_Input | TLA_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 9211 | 5111 | TLIM_Input | TLIM_Output | UINT | | • | | • |
| 9212 | 5112 | TLIG_Input | TLIG_Output | UINT | | • | | • |
| 9213 | 5113 | TLC_Input | TLC_Output | UINT | | • | | • |
| 9214 | 5114 | TAA_Input | TAA_Output | UINT | | • | | • |
| 9215 | 5115 | INTP_Input | INTP_Output | UINT | | • | | • |
| 9240 | 5140 | SSB_Input | SSB_Output | UINT | | • | | • |
| 9241 | 5141 | STO_Input | STO_Output | UINT | | • | | • |
| 9260 | 11302 | INT_Input | INT_Output | UINT | | • | | • |
| **Motor management** | | | | | | | | |
| 9607 | 5307 | CTT_Input | CTT_Output | UINT | | • | | • |
| 9611 | 5311 | OPL_Input | OPL_Output | UINT | | • | | • |
| 9612 | 5312 | THT_Input | THT_Output | UINT | | • | | • |
| 9615 | 5315 | AUT_Input | AUT_Output | UINT | | • | | • |
| 9616 | 5316 | MTM_Input | MTM_Output | UINT | | • | | • |
| 9619 | 5319 | TUNU_Input | TUNU_Output | UINT | | • | | • |
| 9622 | 5322 | ITH_Input | ITH_Output | UINT | | • | | • |
| 9623 | 5323 | UFR_Input | UFR_Output | UINT | | • | | • |
| 9624 | 5324 | PFL_Input | PFL_Output | UINT | | • | | • |
| 9625 | 5325 | SLP_Input | SLP_Output | UINT | | • | | • |
| 9629 | 5329 | SPGU_Input | SPGU_Output | UINT | | • | | • |
| 9631 | 5331 | I2TA_Input | I2TA_Output | UINT | | • | | • |
| 9632 | 5332 | I2TI_Input | I2TI_Output | UINT | | • | | • |
| 9633 | 5333 | I2TT_Input | I2TT_Output | UINT | | • | | • |
| 12403 | 6703 | U1_Input | U1_Output | UINT | | • | | • |
| 12404 | 6704 | F1_Input | F1_Output | UINT | | • | | • |
| 12405 | 6705 | U2_Input | U2_Output | UINT | | • | | • |
| 12406 | 6706 | F2_Input | F2_Output | UINT | | • | | • |
| 12407 | 6707 | U3_Input | U3_Output | UINT | | • | | • |
| 12408 | 6708 | F3_Input | F3_Output | UINT | | • | | • |
| 12409 | 6709 | U4_Input | U4_Output | UINT | | • | | • |
| 12410 | 6710 | F4_Input | F4_Output | UINT | | • | | • |
| 12411 | 6711 | U5_Input | U5_Output | UINT | | • | | • |
| 12412 | 6712 | F5_Input | F5_Output | UINT | | • | | • |
| 9103 | 5053 | SPG_Input | SPG_Output | UINT | | • | | • |
| 9104 | 5054 | SIT_Input | SIT_Output | UINT | | • | | • |
| 9105 | 5055 | SFC_Input | SFC_Output | UINT | | • | | • |
| 9115 | 5065 | FFH_Input | FFH_Output | UINT | | • | | • |
| 9116 | 5066 | CRTF_Input | CRTF_Output | UINT | | • | | • |
| **Axis management** | | | | | | | | |
| 3101 | 2051 | SFT_Input | SFT_Output | UINT | | • | | • |
| 3102 | 2052 | SFR_Input | SFR_Output | UINT | | • | | • |
| 3103 | 2053 | TFR_Input | TFR_Output | UINT | | • | | • |
| 3104 | 2054 | HSP_Input | HSP_Output | UINT | | • | | • |
| 15101 | 8051 | SH2_Input | SH2_Output | UINT | | • | | • |
| 15102 | 8052 | SH4_Input | SH4_Output | UINT | | • | | • |
| 15110 | 8060 | HSP2_Input | HSP2_Output | UINT | | • | | • |
| 15111 | 8061 | HSP3_Input | HSP3_Output | UINT | | • | | • |
| 15112 | 8062 | HSP4_Input | HSP4_Output | UINT | | • | | • |
| 3105 | 2055 | LSP_Input | LSP_Output | UINT | | • | | • |
| 11701 | 6351 | TLS_Input | TLS_Output | UINT | | • | | • |
| 3106 | 2056 | BSP_Input | BSP_Output | UINT | | • | | • |
| 3107 | 2057 | NRD_Input | NRD_Output | UINT | | • | | • |
| 3108 | 2058 | RIN_Input | RIN_Output | UINT | | • | | • |
| **Resonant frequency** | | | | | | | | |
| 11301 | 6151 | JPF_Input | JPF_Output | UINT | | • | | • |
| 11302 | 6152 | JF2_Input | JF2_Output | UINT | | • | | • |
| 11303 | 6153 | JF3_Input | JF3_Output | UINT | | • | | • |
| 11311 | 6161 | JFH_Input | JFH_Output | UINT | | • | | • |
| **Speed adjustment (ramps)** | | | | | | | | |
| 9001 | 5001 | ACC_Input | ACC_Output | UINT | | • | | • |
| 9002 | 5002 | DEC_Input | DEC_Output | UINT | | • | | • |
| 9003 | 5003 | BRA_Input | BRA_Output | UINT | | • | | • |
| 9004 | 5004 | RPT_Input | RPT_Output | UINT | | • | | • |
| 9005 | 5005 | TA1_Input | TA1_Output | UINT | | • | | • |
| 9006 | 5006 | TA2_Input | TA2_Output | UINT | | • | | • |
| 9007 | 5007 | TA3_Input | TA3_Output | UINT | | • | | • |
| 9008 | 5008 | TA4_Input | TA4_Output | UINT | | • | | • |
| 9010 | 5010 | RPS_Input | RPS_Output | UINT | | • | | • |
| 9011 | 5011 | FRT_Input | FRT_Output | UINT | | • | | • |
| 9012 | 5012 | AC2_Input | AC2_Output | UINT | | • | | • |
| 9013 | 5013 | DE2_Input | DE2_Output | UINT | | • | | • |
| 9020 | 5020 | INR_Input | INR_Output | UINT | | • | | • |
| 8651 | 10993 | QSTD_Input | QSTD_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 8652 | 10994 | DOTD_Input | DOTD_Output | UINT | | • | | • |
| 11201 | 6101 | STT_Input | STT_Output | UINT | | • | | • |
| 11202 | 6102 | NST_Input | NST_Output | UINT | | • | | • |
| 11204 | 6104 | FST_Input | FST_Output | UINT | | • | | • |
| 11220 | 6120 | FFT_Input | FFT_Output | UINT | | • | | • |
| 11230 | 6130 | DCF_Input | DCF_Output | UINT | | • | | • |
| **Load management** | | | | | | | | |
| 14401 | 7701 | SRB_Input | SRB_Output | UINT | | • | | • |
| 14411 | 7711 | ULT_Input | ULT_Output | UINT | | • | | • |
| 14412 | 7712 | UDL_Input | UDL_Output | UINT | | • | | • |
| 14413 | 7713 | FTU_Input | FTU_Output | UINT | | • | | • |
| 14414 | 7714 | RMUD_Input | RMUD_Output | UINT | | • | | • |
| 14415 | 7715 | LUL_Input | LUL_Output | UINT | | • | | • |
| 14416 | 7716 | LUN_Input | LUN_Output | UINT | | • | | • |
| 14421 | 7721 | TOL_Input | TOL_Output | UINT | | • | | • |
| 14422 | 7722 | ODL_Input | ODL_Output | UINT | | • | | • |
| 14423 | 7723 | FTO_Input | FTO_Output | UINT | | • | | • |
| 14425 | 7725 | LOC_Input | LOC_Output | UINT | | • | | • |
| **Brake controller (DCI)** | | | | | | | | |
| 11203 | 6103 | DCI_Input | DCI_Output | UINT | | • | | • |
| 11210 | 6110 | IDC_Input | IDC_Output | UINT | | • | | • |
| 11211 | 6111 | TDC_Input | TDC_Output | UINT | | • | | • |
| 11212 | 6112 | IDC2_Input | IDC2_Output | UINT | | • | | • |
| 11213 | 6113 | TDI_Input | TDI_Output | UINT | | • | | • |
| 10401 | 5701 | ADC_Input | ADC_Output | UINT | | • | | • |
| 10402 | 5702 | TDC1_Input | TDC1_Output | UINT | | • | | • |
| 10403 | 5703 | SDC1_Input | SDC1_Output | UINT | | • | | • |
| 10404 | 5704 | TDC2_Input | TDC2_Output | UINT | | • | | • |
| 10405 | 5705 | SDC2_Input | SDC2_Output | UINT | | • | | • |
| 10499 | 11941 | TAFI_Input | TAFI_Output | UINT | | • | | • |
| **Brake controller (BLC)** | | | | | | | | |
| 10001 | 5501 | BLC_Input | BLC_Output | UINT | | • | | • |
| 10003 | 5503 | BEN_Input | BEN_Output | INT | | • | | • |
| 10004 | 5504 | BRT_Input | BRT_Output | UINT | | • | | • |
| 10005 | 5505 | BET_Input | BET_Output | UINT | | • | | • |
| 10006 | 5506 | IBR_Input | IBR_Output | UINT | | • | | • |
| 10007 | 5507 | BIP_Input | BIP_Output | UINT | | • | | • |
| 10008 | 5508 | BST_Input | BST_Output | UINT | | • | | • |
| 10009 | 5509 | BCI_Input | BCI_Output | UINT | | • | | • |
| 10010 | 5510 | TBE_Input | TBE_Output | UINT | | • | | • |
| 10011 | 5511 | IRD_Input | IRD_Output | UINT | | • | | • |
| 10012 | 5512 | BIR_Input | BIR_Output | INT | | • | | • |
| 10013 | 5513 | JDC_Input | JDC_Output | INT | | • | | • |
| 10015 | 5515 | BRR_Input | BRR_Output | UINT | | • | | • |
| 10020 | 5520 | BED_Input | BED_Output | UINT | | • | | • |
| 10022 | 5522 | TTR_Input | TTR_Input | UINT | | • | | • |
| 10050 | 11692 | BRH_Input | BRH_Output | UINT | | • | | • |
| 10070 | 11712 | PES_Input | PES_Output | UINT | | • | | • |
| 10071 | 11713 | LP1_Input | LP1_Output | UINT | | • | | • |
| 10072 | 11714 | CP1_Input | CP1_Output | INT | | • | | • |
| 10073 | 11715 | LP2_Input | LP2_Output | UINT | | • | | • |
| 10074 | 11716 | CP2_Input | CP2_Output | INT | | • | | • |
| 10075 | 11717 | IBRA_Input | IBRA_Output | UINT | | • | | • |
| **Line contactor control** | | | | | | | | |
| 13601 | 7301 | LES_Input | LES_Output | UINT | | • | | • |
| 13602 | 7302 | LLC_Input | LLC_Output | UINT | | • | | • |
| 13603 | 7303 | LCT_Input | LCT_Output | UINT | | • | | • |
| **Motor contactor control** | | | | | | | | |
| 13101 | 7051 | DBS_Input | DBS_Output | UINT | | • | | • |
| 13102 | 7052 | DAS_Input | DAS_Output | UINT | | • | | • |
| 13103 | 7053 | RCA_Input | RCA_Output | UINT | | • | | • |
| 13104 | 7054 | OCC_Input | OCC_Output | UINT | | • | | • |
| **Error behavior** | | | | | | | | |
| 7002 | 4002 | IPL_Input | IPL_Output | UINT | | • | | • |
| 7004 | 4004 | STP_Input | STP_Output | UINT | | • | | • |
| 7005 | 4005 | SDD_Input | SDD_Output | UINT | | • | | • |
| 7006 | 4006 | EPL_Input | EPL_Output | UINT | | • | | • |
| 7008 | 4008 | OHL_Input | OHL_Output | UINT | | • | | • |
| 7009 | 4009 | OLL_Input | OLL_Output | UINT | | • | | • |
| 7010 | 4010 | SLL_Input | SLL_Output | UINT | | • | | • |
| 7011 | 4011 | COL_Input | COL_Output | UINT | | • | | • |
| 7012 | 4012 | TNL_Input | TNL_Output | UINT | | • | | • |
| 7013 | 4013 | LFL3_Input | LFL3_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 7015 | 4015 | CLL_Input | CLL_Output | UINT | | • | | • |
| 7018 | 4018 | SCL3_Input | SCL3_Output | UINT | | • | | • |
| 7020 | 4020 | DCFF_Input | DCFF_Output | UINT | | • | | • |
| 7080 | 10222 | LFF_Input | LFF_Output | UINT | | • | | • |
| 7081 | 10223 | ODT_Input | ODT_Output | UINT | | • | | • |
| 7090 | 10232 | LET_Input | LET_Output | UINT | | • | | • |
| **Error diagnostics** | | | | | | | | |
| 3112 | 2062 | STRT_Input | STRT_Output | UINT | | • | | • |
| 3121 | 2071 | RFLT_Input | RFLT_Output | UINT | | • | | • |
| 3130 | 2080 | FFM_Input | FFM_Output | UINT | | • | | • |
| 7122 | 4072 | ATR_Input | ATR_Output | UINT | | • | | • |
| 7123 | 4073 | TAR_Input | TAR_Output | UINT | | • | | • |
| 7124 | 4074 | RSF_Input | RSF_Output | UINT | | • | | • |
| 7125 | 4075 | INH_Input | INH_Output | UINT | | • | | • |
| 7128 | 4078 | RP_Input | RP_Output | UINT | | • | | • |
| 7129 | 4079 | RPA_Input | RPA_Output | UINT | | • | | • |
| 7130 | 4080 | CIC_Input | CIC_Output | UINT | | • | | • |
| 7131 | 4081 | ETF_Input | ETF_Output | UINT | | • | | • |
| 7132 | 4082 | CNF_Input | CNF_Output | UINT | | • | | • |
| 7134 | 4084 | ILF1_Input | ILF1_Output | UINT | | • | | • |
| 7150 | 10242 | HRFC_Input | HRFC_Output | UINT | | • | | • |
| **User-defined threshold values** | | | | | | | | |
| 11001 | 6001 | CTD_Input | CTD_Output | UINT | | • | | • |
| 11002 | 6002 | TTD_Input | TTD_Output | UINT | | • | | • |
| 11003 | 6003 | FTD_Input | FTD_Output | UINT | | • | | • |
| 11004 | 6004 | F2D_Input | F2D_Output | UINT | | • | | • |
| 11006 | 6006 | TTD2_Input | TTD2_Output | UINT | | • | | • |
| 11007 | 6007 | TTD3_Input | TTD3_Output | UINT | | • | | • |
| 11009 | 6009 | THA_Input | THA_Output | UINT | | • | | • |
| 11015 | 6015 | TTL_Input | TTL_Output | INT | | • | | • |
| 11016 | 6016 | TTH_Input | TTH_Output | INT | | • | | • |
| 11021 | 6021 | SAT_Input | SAT_Output | UINT | | • | | • |
| **User-defined alarm groups** | | | | | | | | |
| 12801 | 6901 | GA11_Input | GA11_Output | UINT | | • | | • |
| 12802 | 6902 | GA12_Input | GA12_Output | UINT | | • | | • |
| 12803 | 6903 | GA21_Input | GA21_Output | UINT | | • | | • |
| 12804 | 6904 | GA22_Input | GA22_Output | UINT | | • | | • |
| 12805 | 6905 | GA31_Input | GA31_Output | UINT | | • | | • |
| 12806 | 6906 | GA32_Input | GA32_Output | UINT | | • | | • |
| 12807 | 6907 | GA13_Input | GA13_Output | UINT | | • | | • |
| 12808 | 6908 | GA23_Input | GA23_Output | UINT | | • | | • |
| 12809 | 6909 | GA33_Input | GA33_Output | UINT | | • | | • |
| **Handheld settings** | | | | | | | | |
| 64002 | 14601 | PST_Input | PST_Output | UINT | | • | | • |
| 64035 | 14602 | PVIS_Input | PVIS_Output | UINT | | • | | • |
| **Display settings** | | | | | | | | |
| 12001 | 6501 | SDS_Input | SDS_Output | UINT | | • | | • |
| **Special function: "Limit switch"** | | | | | | | | |
| 12501 | 6751 | SAF_Input | SAF_Output | UINT | | • | | • |
| 12502 | 6752 | SAR_Input | SAR_Output | UINT | | • | | • |
| 12503 | 6753 | DAF_Input | DAF_Output | UINT | | • | | • |
| 12504 | 6754 | DAR_Input | DAR_Output | UINT | | • | | • |
| 12505 | 6755 | DSF_Input | DSF_Output | UINT | | • | | • |
| 12506 | 6756 | PAS_Input | PAS_Output | UINT | | • | | • |
| 12507 | 6757 | CLS_Input | CLS_Output | UINT | | • | | • |
| 12508 | 6758 | SAL_Input | SAL_Output | UINT | | • | | • |
| 12509 | 6759 | DAL_Input | DAL_Output | UINT | | • | | • |
| 12511 | 6761 | NLS_Input | NLS_Output | UINT | | • | | • |
| 12521 | 6771 | STD_Input | STD_Output | UINT | | • | | • |
| 12522 | 6772 | SFD_Input | SFD_Output | UINT | | • | | • |
| 12523 | 6773 | MSTP_Input | MSTP_Output | UINT | | • | | • |
| 12524 | 6774 | PRST_Input | PRST_Output | UINT | | • | | • |
| **Special function: "PID controller"** | | | | | | | | |
| 11901 | 6451 | PIF_Input | PIF_Output | UINT | | • | | • |
| 11904 | 6454 | PIF1_Input | PIF1_Output | UINT | | • | | • |
| 11905 | 6455 | PIF2_Input | PIF2_Output | UINT | | • | | • |
| 11906 | 6456 | PIP1_Input | PIP1_Output | UINT | | • | | • |
| 11907 | 6457 | PIP2_Input | PIP2_Output | UINT | | • | | • |
| 11908 | 6458 | PII_Input | PII_Output | UINT | | • | | • |
| 11909 | 6459 | PR2_Input | PR2_Output | UINT | | • | | • |
| 11910 | 6460 | PR4_Input | PR4_Output | UINT | | • | | • |
| 11920 | 6470 | RPI_Input | RPI_Output | UINT | | • | | • |
| 11921 | 6471 | RP2_Input | RP2_Output | UINT | | • | | • |

| Modbus | X2X | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Address" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 11922 | 6472 | RP3_Input | RP3_Output | UINT | | • | | • |
| 11923 | 6473 | RP4_Input | RP4_Output | UINT | | • | | • |
| 11940 | 6490 | PIC_Input | PIC_Output | UINT | | • | | • |
| 11941 | 6491 | RPG_Input | RPG_Output | UINT | | • | | • |
| 11942 | 6492 | RIG_Input | RIG_Output | UINT | | • | | • |
| 11943 | 6493 | RDG_Input | RDG_Output | UINT | | • | | • |
| 11944 | 6494 | PIS_Input | PIS_Output | UINT | | • | | • |
| 11950 | 12642 | FPI_Input | FPI_Output | UINT | | • | | • |
| 11951 | 12643 | PSR_Input | PSR_Output | UINT | | • | | • |
| 11952 | 12644 | POL_Input | POL_Output | INT | | • | | • |
| 11953 | 12645 | POH_Input | POH_Output | INT | | • | | • |
| 11954 | 12646 | PIM_Input | PIM_Output | UINT | | • | | • |
| 11960 | 12652 | RSL_Input | RSL_Output | UINT | | • | | • |
| 11961 | 12653 | PAL_Input | PAL_Output | UINT | | • | | • |
| 11962 | 12654 | PAH_Input | PAH_Output | UINT | | • | | • |
| 11963 | 12655 | PER_Input | PER_Output | UINT | | • | | • |
| 11970 | 12662 | PAU_Input | PAU_Output | UINT | | • | | • |
| 11984 | 12676 | PRP_Input | PRP_Output | UINT | | • | | • |

#### 7.2.6.5 Minimum cycle time

The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

| Minimum cycle time |
|---|
| 400 µs |

### 7.2.7 Manufacturer-specific area

ACOPOSinverter parameters are based on their X2X Link address and are also documented with these.

**Note:**

**You can find the X2X Link addresses in the communication parameters Excel table ACOPOSinverter - Communication Parameters.**

# 7.3 POWERLINK

## 7.3.1 General information

This product is a plug-in interface for the ACOPOSinverter. The communication card enables access to the drive parameters via POWERLINK. Next to the two connections for network cables there is a separate terminal to ensure a contact to the PE of the drive.

- POWERLINK V2 for real-time Ethernet communication
- Firmware update via fieldbus
- Integrated hub for efficient cabling
- PollResponse Chaining
- Dynamic node allocation (DNA)

**Information:**

**The interface between the frequency inverter and the plug-on interface is not hot-pluggable, i.e. the plug-on interface must be installed in a voltage-free state.**

## 7.3.2 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Interface modules** | |
| 8I0IF108.400-3 | 2x POWERLINK interface, POWERLINK V2, interface module for ACOPOSinverter P66. | |

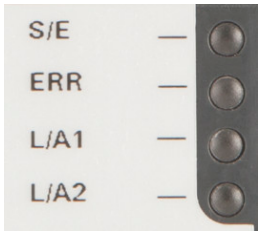
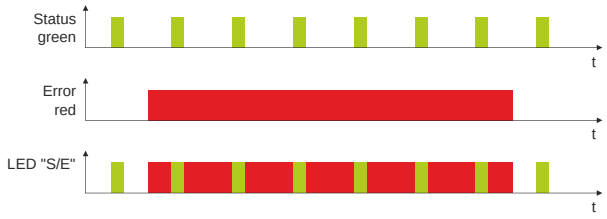
Table 45: 8I0IF108.400-3 - Order data

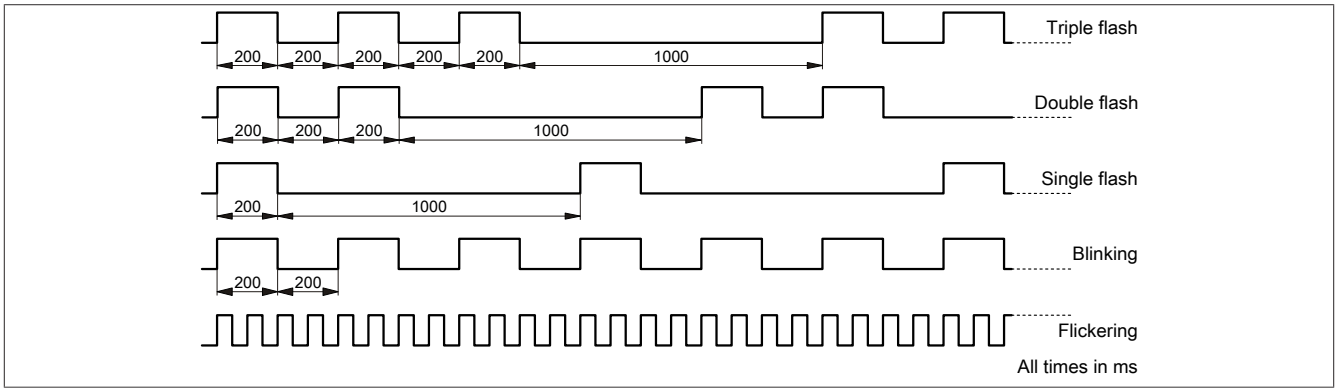
## 7.3.3 Technical data

| Order number | 8I0IF108.400-3 |
|---|---|
| **Short description** | |
| Communication module | POWERLINK V2 controlled node |
| **General information** | |
| B&R ID code | 0xF25B |
| Status indicators | Module status, bus function |
| Diagnostics | |
| Module status | Yes, using LED status indicator and software |
| Bus function | Yes, using LED status indicator and software |
| Certifications | |
| CE | Yes |
| UKCA | Yes |
| **Interfaces** | |
| Fieldbus | POWERLINK V2 controlled node |
| Variant | 2x shielded RJ45 (hub) |
| Line length | Max. 100 m between 2 stations (segment length) |
| Transfer rate | 100 Mbit/s |
| Transfer | |
| Physical layer | 100BASE-TX |
| Half-duplex | Yes |
| Full-duplex | No |
| Autonegotiation | Yes |
| Auto-MDI/MDIX | Yes |
| Hub propagation delay | 0.96 to 1 µs |
| **Operating conditions** | |
| Mounting orientation | |
| Horizontal | Yes |
| Vertical | Yes |
| Installation elevation above sea level | |
| 0 to 2000 m | No limitation |
| >2000 m | Reduction of ambient temperature by 0.5°C per 100 m |
| Degree of protection per EN 60529 | IP20 |
| **Ambient conditions** | |
| Temperature | |
| Operation | -10 to 60°C |
| Storage | -25 to 70°C |
| Transport | -25 to 70°C |
| Relative humidity | |
| Operation | 5 to 95%, non-condensing |
| Storage | 5 to 95%, non-condensing |
| Transport | 5 to 95%, non-condensing |

Table 46: 8I0IF108.400-3 - Technical data

## 7.3.4 LED status indicators

| Figure | LED | Color | Status | Description |
|---|---|---|---|---|
|  | S/E | Green | Off | No power supply or mode NOT_ACTIVE.<br>The controlled node (CN) is either not supplied with power or it is in state NOT_ACTIVE. The CN waits in this state for about 5 s after a restart. Communication is not possible with the CN. If no POWERLINK communication is detected during these 5 s, the CN changes to state BASIC_ETHERNET (flickering).<br>If POWERLINK communication is detected before this time expires, however, the CN immediately changes to state PRE_OPERATIONAL_1. |
| | | | Flickering | Mode BASIC_ETHERNET.<br>The CN has not detected any POWERLINK communication. In this state, it is possible to communicate directly with the CN (e.g. with UDP, IP).<br>If POWERLINK communication is detected in this state, the CN enters state PRE_OPERATIONAL_1. |
| | | | Single flash | Mode PRE_OPERATIONAL_1.<br>When operating on a POWERLINK V1 manager, the CN immediately changes to state PRE_OPERATIONAL_2.<br>When operating on a POWERLINK V2 manager, the CN waits until an SoC frame is received and then changes to state PRE_OPERATIONAL_2. |
| | | | Double flash | Mode PRE_OPERATIONAL_2.<br>The CN is normally configured by the manager in this state. It is then switched to state READY_TO_OPERATE by command (POWERLINK V2) or by setting flag "Data valid" in the output data (POWERLINK V1). |
| | | | Triple flash | Mode READY_TO_OPERATE.<br>In a POWERLINK V1 network, the CN switches to state OPERATIONAL automatically as soon as input data is present.<br>In a POWERLINK V2 network, the manager switches to state OPERATIONAL by command. |
| | | | On | Mode OPERATIONAL.<br>PDO mapping is active and cyclic data is evaluated. |
| | | | Blinking | Mode STOPPED.<br>Output data is not being output, and no input data is being provided. It is only possible to switch to or leave this state after the manager has given the appropriate command. |
| | | Red | On | The controlled node (CN) is in an error state (failed Ethernet frames, increased number of collisions on the network, etc.).<br>If an error occurs in the following states, the red LED is superimposed by the green flashing LED:<br>• PRE_OPERATIONAL_1<br>• PRE_OPERATIONAL_2<br>• READY_TO_OPERATE<br>  <br>Note:<br>• Several red blinking signals are displayed immediately after the device is switched on. This is not an error, however.<br>• The LED lights up red for CNs with set physical node number 0 that have not yet been assigned a node number via dynamic node allocation (DNA). |
| | L/A IFx | Green | On | The link to the remote station is established. |
| | | | Blinking | The link to the remote station is established, and Ethernet activity is taking place on the bus. |
| | E | Red | On | Fault of a critical module (RAM, flash memory, hardware or internal communication error) occurred. |



### 7.3.4.1 System stop error codes

A system stop error can occur due to incorrect configuration or defective hardware.

The error code is indicated by LED "S/E" blinking red. The blinking signal of the error code consists of 4 switch-on phases with short (150 ms) or long (600 ms) duration. The error code is repeated every 2 seconds.

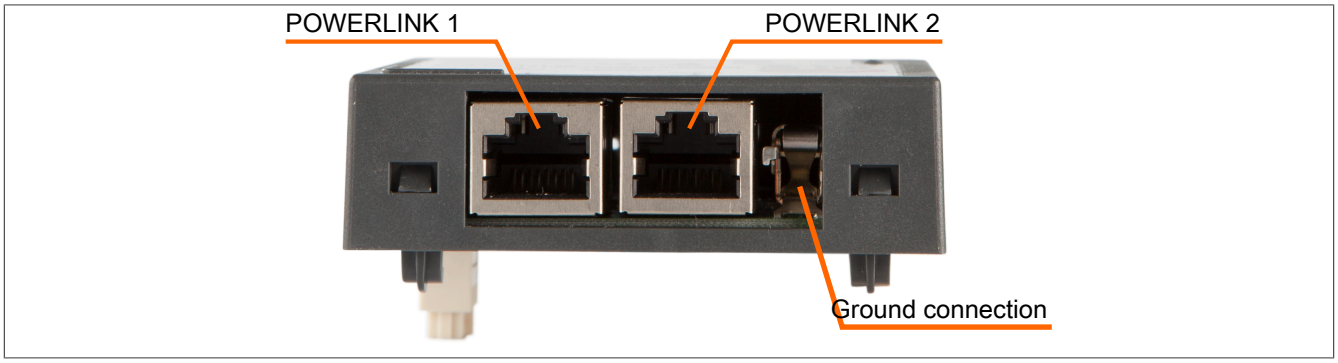
| Error description | Error code indicated by red "Status" LED | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RAM error:<br>The module is defective and must be replaced. | • | • | • | - | Pause | • | • | • | - | Pause |
| Bus error:<br>The module or a system component is defective and must be replaced. | - | • | • | • | Pause | - | • | • | • | Pause |

**Information:**

**The module does not support hot plugging.**

Table 47: Status/Error ("S/E") LED - System stop error codes

## 7.3.5 Operating and connection elements




The communication card is locked onto the front cover of the drive. To enable error-free operation, the front cover must be locked beforehand and then the ground fault contact must be connected to the drive (see also section Wiring of the POWERLINK interface card).

## 7.3.6 POWERLINK node number

The station numbers in the range 0x01 (1) to 0xEF (239) can be entered directly via the optional operator terminal or the dial on the device. The value 0x00 (0) is assigned ex works. This setting means that the station number is determined automatically via DNA (dynamic node allocation).

Parameters are called as follows:

**[DRIVE MENU]**(DRI),

**[CONFIGURATION]**(CONF-),

**[FULL]**(FULL-),

**[COMMUNICATION]**(COM-),

**[COMMUNICATION CARD]**(Cbd-):

| Code | Name/Description | Setting range | Factory settings |
|---|---|---|---|
| (ADRC) | [Address] | 0 to 239 | 0 |

### 7.3.7 Dynamic node allocation (DNA)

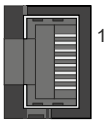
Bus controller POWERLINK offers the option of receiving dynamically assigned node numbers.

This has the following advantages:

- No setting of the node number switch
- Easier installation
- Reduced error sources

For information regarding configuration as well as an example, see Automation Help → Communication → POWERLINK → General information → Dynamic node allocation (DNA).

### 7.3.8 Ethernet interface

| Interface | Pinout | | |
|---|---|---|---|
| | Pin | Ethernet | |
|  Shielded RJ45 | 1 | RXD | Receive data |
| | 2 | RXD\ | Receive data\ |
| | 3 | TXD | Transmit data |
| | 4 | Termination | |
| | 5 | Termination | |
| | 6 | TXD\ | Transmit data\ |
| | 7 | Termination | |
| | 8 | Termination | |

### 7.3.9 SG4

The communication module comes with preinstalled firmware. The firmware is also part of the hardware upgrade.

If the hardware upgrade currently used in Automation Studio contains a different firmware version, this will be loaded to the communication module during project download.

## 7.3.10 Register description

### 7.3.10.1 System requirements

To use the full integration of ACOPOSinverter in Automation Studio, the following minimum versions are required:

- Automation Studio 4.3.5
- Automation Runtime D4.10

Function model "Motion configuration" and the associated integration in mapp Motion and mapp Cockpit additionally require Technology Package:

- mapp Motion 5.8.2

To use the full integration of ACOPOSinverter in APROL, the following minimum version is required:

- APROL R4.2-06

### 7.3.10.2 Basic values of drive

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 3009 | 0x2000 | 0x0A | PRT_Input | UINT | | • | | |
| 3011 | 0x2000 | 0x0C | NCV_Input | UINT | | • | | |
| 3012 | 0x2000 | 0x0D | VCAL_Input | UINT | | • | | |
| 3013 | 0x2000 | 0x0E | NCVI_Input | UINT | | • | | |
| 3016 | 0x2000 | 0x11 | IMAX_Input | UINT | | • | | |
| 3017 | 0x2000 | 0x12 | INV_Input | UINT | | • | | |
| 3018 | 0x2000 | 0x13 | VMAX_Input | UINT | | • | | |

### 7.3.10.3 Terminal block inputs/outputs

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 5232 | 0x2016 | 0x21 | AI1R_Input | INT | • | • | | |
| 5233 | 0x2016 | 0x22 | AI2R_Input | INT | • | • | | |
| 5234 | 0x2016 | 0x23 | AI3R_Input | INT | • | • | | |
| 5202 | 0x2016 | 0x03 | IL1R_Input | UINT | • | • | | |
| 5202 | 0x2016 | 0x03 | Status of the digital inputs | USINT | • | | | |
| | | | IL1R_Input_LI1 | Bit 0 | | | | |
| | | | IL1R_Input_LI2 | Bit 1 | | | | |
| | | | IL1R_Input_LI3 | Bit 2 | | | | |
| | | | IL1R_Input_LI4 | Bit 3 | | | | |
| | | | IL1R_Input_LI5 | Bit 4 | | | | |
| | | | IL1R_Input_LI6 | Bit 5 | | | | |
| | | | IL1R_Input_LAI1 | Bit 6 | | | | |
| | | | IL1R_Input_LAI2 | Bit 7 | | | | |
| 13308 | 0x2067 | 0x09 | HSC_Input | UINT | • | • | | |
| 13305 | 0x2067 | 0x06 | PIFR_Input | INT | • | • | | |
| 13307 | 0x2067 | 0x08 | PFRC_Input | UINT | | • | | |
| 14603 | 0x2074 | 0x04 | FQS_Input | UINT | • | • | | |
| 5261 | 0x2016 | 0x3E | AO1R_Output | UINT | | | • | |
| 5251 | 0x2016 | 0x34 | AO1I_Input | UINT | • | • | | |
| 5212 | 0x2016 | 0x0D | Configuration of digital outputs | UINT | | | • | |
| | | | OL1R_Output_R1 | Bit 0 | | | | |
| | | | OL1R_Output_R2 | Bit 1 | | | | |
| | | | OL1R_Output_LO1 | Bit 8 | | | | |
| 5211 | 0x2016 | 0x0C | OL1I_Input | UINT | | • | | |
| 5211 | 0x2016 | 0x0C | OL1I_Input | UINT | • | | | |
| | | | OL1I_Input_R1 | Bit 0 | | | | |
| | | | OL1I_Input_R2 | Bit 1 | | | | |
| | | | OL1I_Input_LO1 | Bit 8 | | | | |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | | Cyclic | Acyclic | Cyclic | Acyclic |
| **Configuration of the analog inputs** | | | | | | | | | |
| 4402 | 0x200E | 0x03 | AI1T_Input | AI1T_Output | UINT | | • | | • |
| 4403 | 0x200E | 0x04 | AI2T_Input | AI2T_Output | UINT | | • | | • |
| 4404 | 0x200E | 0x05 | AI3T_Input | AI3T_Output | UINT | | • | | • |
| 4412 | 0x200E | 0x0D | UIL1_Input | UIL1_Output | UINT | | • | | • |
| 4413 | 0x200E | 0x0E | UIL2_Input | UIL2_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 4422 | 0x200E | 0x17 | UIH1_Input | UIH1_Output | UINT | | • | | • |
| 4423 | 0x200E | 0x18 | UIH2_Input | UIH2_Output | UINT | | • | | • |
| 4434 | 0x200E | 0x23 | CRL3_Input | CRL3_Output | UINT | | • | | • |
| 4444 | 0x200E | 0x2D | CRH3_Input | CRH3_Output | UINT | | • | | • |
| 4452 | 0x200E | 0x35 | AI1F_Input | AI1F_Output | UINT | | • | | • |
| 4453 | 0x200E | 0x36 | AI2F_Input | AI2F_Output | UINT | | • | | • |
| 4454 | 0x200E | 0x37 | AI3F_Input | AI3F_Output | UINT | | • | | • |
| 4462 | 0x200E | 0x3F | AI1E_Input | AI1E_Output | UINT | | • | | • |
| 4463 | 0x200E | 0x40 | AI2E_Input | AI2E_Output | UINT | | • | | • |
| 4464 | 0x200E | 0x41 | AI3E_Input | AI3E_Output | UINT | | • | | • |
| 4472 | 0x200E | 0x49 | AI1S_Input | AI1S_Output | UINT | | • | | • |
| 4473 | 0x200E | 0x4A | AI2S_Input | AI2S_Output | UINT | | • | | • |
| 4474 | 0x200E | 0x4B | AI3S_Input | AI3S_Output | UINT | | • | | • |
| 4482 | 0x200E | 0x53 | AI1L_Input | AI1L_Output | UINT | | • | | • |
| 4483 | 0x200E | 0x54 | AI2L_Input | AI2L_Output | UINT | | • | | • |
| 4484 | 0x200E | 0x55 | AI3L_Input | AI3L_Output | UINT | | • | | • |
| 5284 | 0x2016 | 0x55 | AIC2_Input | AIC2_Output | UINT | | • | | • |
| **Configuration of analog outputs** | | | | | | | | | |
| 4601 | 0x2010 | 0x02 | AO1T_Input | AO1T_Output | UINT | | • | | • |
| 4611 | 0x2010 | 0x0C | AO1F_Input | AO1F_Output | UINT | | • | | • |
| 4621 | 0x2010 | 0x16 | UOL1_Input | UOL1_Output | UINT | | • | | • |
| 4631 | 0x2010 | 0x20 | UOH1_Input | UOH1_Output | UINT | | • | | • |
| 4641 | 0x2010 | 0x2A | AOL1_Input | AOL1_Output | UINT | | • | | • |
| 4651 | 0x2010 | 0x34 | AOH1_Input | AOH1_Output | UINT | | • | | • |
| 4661 | 0x2010 | 0x3E | ASL1_Input | ASL1_Output | UINT | | • | | • |
| 4671 | 0x2010 | 0x48 | ASH1_Input | ASH1_Output | UINT | | • | | • |
| 4293 | 0x200C | 0x5E | AOF1_Input | AOF1_Output | UINT | | • | | • |
| 4261 | 0x200C | 0x3E | DO1S_Input | DO1S_Output | UINT | | • | | • |
| 4271 | 0x200C | 0x48 | DO1H_Input | DO1H_Output | UINT | | • | | • |
| 4281 | 0x200C | 0x52 | DO1D_Input | DO1D_Output | UINT | | • | | • |
| **Configuration of digital inputs** | | | | | | | | | |
| 4001 | 0x200A | 0x02 | L1D_Input | L1D_Output | UINT | | • | | • |
| 4002 | 0x200A | 0x03 | L2D_Input | L2D_Output | UINT | | • | | • |
| 4003 | 0x200A | 0x04 | L3D_Input | L3D_Output | UINT | | • | | • |
| 4004 | 0x200A | 0x05 | L4D_Input | L4D_Output | UINT | | • | | • |
| 4005 | 0x200A | 0x06 | L5D_Input | L5D_Output | UINT | | • | | • |
| 4006 | 0x200A | 0x07 | L6D_Input | L6D_Output | UINT | | • | | • |
| 4021 | 0x200A | 0x16 | LA1D_Input | LA1D_Output | UINT | | • | | • |
| 4022 | 0x200A | 0x17 | LA2D_Input | LA2D_Output | UINT | | • | | • |
| **Configuration of digital outputs** | | | | | | | | | |
| 4201 | 0x200C | 0x02 | R1S_Input | R1S_Output | UINT | | • | | • |
| 4202 | 0x200C | 0x03 | R2S_Input | R2S_Output | UINT | | • | | • |
| 4209 | 0x200C | 0x0A | LO1S_Input | LO1S_Output | UINT | | • | | • |
| 4221 | 0x200C | 0x16 | R1H_Input | R1H_Output | UINT | | • | | • |
| 4222 | 0x200C | 0x17 | R2H_Input | R2H_Output | UINT | | • | | • |
| 4229 | 0x200C | 0x1E | LO1H_Input | LO1H_Output | UINT | | • | | • |
| 4241 | 0x200C | 0x2A | R1D_Input | R1D_Output | UINT | | • | | • |
| 4242 | 0x200C | 0x2B | R2D_Input | R2D_Output | UINT | | • | | • |
| 4249 | 0x200C | 0x32 | LO1D_Input | LO1D_Output | UINT | | • | | • |
| 4290 | 0x200C | 0x5B | R1F_Input | R1F_Output | UINT | | • | | • |
| 4291 | 0x200C | 0x5C | R2F_Input | R2F_Output | UINT | | • | | • |
| 4292 | 0x200C | 0x5D | LO1F_Input | LO1F_Output | UINT | | • | | • |
| 5001 | 0x2014 | 0x02 | R1_Input | R1_Output | UINT | | • | | • |
| 5002 | 0x2014 | 0x03 | R2_Input | R2_Output | UINT | | • | | • |
| 5009 | 0x2014 | 0x0A | LO1_Input | LO1_Output | UINT | | • | | • |
| 5021 | 0x2014 | 0x16 | AO1_Input | AO1_Output | UINT | | • | | • |
| 5031 | 0x2014 | 0x20 | DO1_Input | DO1_Output | UINT | | • | | • |
| **Additional signals (derived from digital input LI5)** | | | | | | | | | |
| 13302 | 0x2067 | 0x03 | PIL_Input | PIL_Output | UINT | | • | | • |
| 13303 | 0x2067 | 0x04 | PFR_Input | PFR_Output | UINT | | • | | • |
| 13304 | 0x2067 | 0x05 | PFI_Input | PFI_Output | UINT | | • | | • |
| 13306 | 0x2067 | 0x07 | PFRI_Input | PFRI_Output | UINT | | • | | • |
| 14601 | 0x2074 | 0x02 | FQF_Input | FQF_Output | UINT | | • | | • |
| 14602 | 0x2074 | 0x03 | FQC_Input | FQC_Output | UINT | | • | | • |
| 14604 | 0x2074 | 0x05 | FQA_Input | FQA_Output | UINT | | • | | • |
| 14605 | 0x2074 | 0x06 | TDS_Input | TDS_Output | UINT | | • | | • |
| 14606 | 0x2074 | 0x07 | FDT_Input | FDT_Output | UINT | | • | | • |
| 14607 | 0x2074 | 0x08 | FQT_Input | FQT_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | | Cyclic | Acyclic | Cyclic | Acyclic |
| 14608 | 0x2074 | 0x09 | TQB_Input | TQB_Output | UINT | | • | | • |
| 14609 | 0x2074 | 0x0A | FQL_Input | FQL_Output | UINT | | • | | • |
| **Additional signals (derived from digital input LI6)** | | | | | | | | | |
| 13203 | 0x2066 | 0x04 | PTCL_Input | PTCL_Output | UINT | | • | | • |

## 7.3.10.4 Communication (with setpoint in rpm)

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **Optional status responses** | | | | | | | | |
| 3240 | 0x2002 | 0x29 | HMIS_Input | UINT | • | • | | |
| 7121 | 0x2029 | 0x16 | LFT_Input | UINT | • | • | | |
| 3206 | 0x2002 | 0x07 | ETI_Input | UINT | • | • | | |
| 3209 | 0x2002 | 0x0A | THD_Input | UINT | • | • | | |
| 9630 | 0x2042 | 0x1F | THR_Input | UINT | • | • | | |
| 13205 | 0x2066 | 0x06 | PTCI_Input | UINT | • | • | | |
| 64034 | 0x2262 | 0x23 | ALGR_Input | UINT | • | • | | |
| 15322 | 0x207B | 0x17 | STOS_Input | UINT | • | | | |
| 15315 | 0x207B | 0x10 | SS1S_Input | UINT | • | | | |
| 15304 | 0x207B | 0x05 | SLSS_Input | UINT | • | | | |
| 15383 | 0x207B | 0x55 | SMSS_Input | UINT | • | | | |
| 15393 | 0x207B | 0x5E | GDLS_Input | UINT | • | | | |
| 3699 | 0x2006 | 0x64 | INF6_Input | UINT | | • | | |
| 11980 | 0x2059 | 0x51 | RPE_Input | INT | | • | | |
| 11981 | 0x2059 | 0x52 | RPF_Input | UINT | | • | | |
| 11982 | 0x2059 | 0x53 | RPC_Input | UINT | | • | | |
| 11983 | 0x2059 | 0x54 | RPO_Input | INT | | • | | |
| **State and command register (default)** | | | | | | | | |
| 8603 | 0x2038 | 0x04 | ETAD_Input | UINT | | • | | |
| 8603 | 0x2038 | 0x04 | ETAD_Input | UINT | • | | | |
| | | | ETAD_Input_rtso | Bit 0 | | | | |
| | | | ETAD_Input_so | Bit 1 | | | | |
| | | | ETAD_Input_oe | Bit 2 | | | | |
| | | | ETAD_Input_f | Bit 3 | | | | |
| | | | ETAD_Input_ve | Bit 4 | | | | |
| | | | ETAD_Input_qs | Bit 5 | | | | |
| | | | ETAD_Input_sod | Bit 6 | | | | |
| | | | ETAD_Input_w | Bit 7 | | | | |
| | | | ETAD_Input_rm | Bit 9 | | | | |
| | | | ETAD_Input_tr | Bit 10 | | | | |
| | | | ETAD_Input_ila | Bit 11 | | | | |
| | | | ETAD_Input_ms14 | Bit 14 | | | | |
| | | | ETAD_Input_ms15 | Bit 15 | | | | |
| 8606 | 0x2038 | 0x07 | ERRD_Input | UINT | • | • | | |
| 8504 | 0x2037 | 0x05 | CMI_Output | UINT | | | | • |
| 8601 | 0x2038 | 0x02 | CMDD_Output | UINT | | • | • | |
| 8602 | 0x2038 | 0x03 | LFRD_Output | INT | | • | • | |
| 8641 | 0x2038 | 0x2A | FROD_Input | INT | • | • | | |
| 8604 | 0x2038 | 0x05 | RFRD_Input | INT | • | • | | |
| **Optional responses and additional setpoints** | | | | | | | | |
| 3205 | 0x2002 | 0x06 | OTR_Input | INT | • | • | | |
| 3205 | 0x2002 | 0x06 | OTRN_Input | INT | • | • | | |
| 5281 | 0x2016 | 0x52 | AIV1_Output | UINT | | • | • | |
| 5283 | 0x2016 | 0x54 | AIV2_Output | INT | | • | • | |
| 8503 | 0x2037 | 0x04 | PISP_Output | UINT | | • | • | |
| 8605 | 0x2038 | 0x06 | FRHD_Input | INT | • | • | | |
| 3203 | 0x2002 | 0x04 | FRH_Input | INT | • | • | | |
| 9021 | 0x203C | 0x16 | FRO_Input | INT | • | • | | |
| 3202 | 0x2002 | 0x03 | RFR_Input | INT | • | • | | |
| 3208 | 0x2002 | 0x09 | UOP_Input | UINT | • | • | | |
| 3204 | 0x2002 | 0x05 | LCR_Input | UINT | • | • | | |
| 3211 | 0x2002 | 0x0C | OPR_Input | INT | • | • | | |
| 3217 | 0x2002 | 0x12 | SLC_Input | INT | • | • | | |
| 3207 | 0x2002 | 0x08 | ULN_Input | UINT | • | • | | |
| 9645 | 0x2042 | 0x2E | SMOT_Input | UINT | | • | | |
| 9609 | 0x2042 | 0x0A | TUS_Input | UINT | | • | | |
| 9676 | 0x2042 | 0x4D | RDAE_Input | INT | | • | | |
| 13927 | 0x206D | 0x1C | ASOD_Input | UINT | | • | | |
| 9634 | 0x2042 | 0x23 | I2TM_Input | UINT | | • | | |
| 3120 | 0x2001 | 0x15 | RPR_Output | UINT | | | | • |
| 3230 | 0x2002 | 0x1F | APH_Input | UINT | | • | | |

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 3231 | 0x2002 | 0x20 | RTH_Input | UINT | | • | | |
| 3232 | 0x2002 | 0x21 | RTHI_Input | UINT | | • | | |
| 3233 | 0x2002 | 0x22 | PTH_Input | UINT | | • | | |
| 3234 | 0x2002 | 0x23 | UNT_Input | UINT | | • | | |
| **Error history** | | | | | | | | |
| 7393 | 0x202B | 0x5E | FNB_Input | UINT | | • | | |
| 7200 + Index | 0x202A | 0x01 + Index | **LFT:** DP0_Input DP[0…8]_Input | UINT | | • | | |
| 7210 + Index | 0x202A | 0x0B + Index | **ETAD:** EP0_Input EP[0…8]_Input | UINT | | • | | |
| 7220 + Index | 0x202A | 0x15 + Index | **ETI:** IP0_Input IP[0…8]_Input | UINT | | • | | |
| 7230 + Index | 0x202A | 0x1F + Index | **CMDD:** CMP0_Input CMP[0…8]_Input | UINT | | • | | |
| 7240 + Index | 0x202A | 0x29 + Index | **LCR:** LCP0_Input LCP[0…8]_Input | INT | | • | | |
| 7250 + Index | 0x202A | 0x33 + Index | **RFR:** RFP0_Input RFP[0…8]_Input | INT | | • | | |
| 7260 + Index | 0x202A | 0x3D + Index | **RTHI:** RTP0_Input RTP[0…8]_Input | UINT | | • | | |
| 7270 + Index | 0x202A | 0x47 + Index | **ULN:** ULP0_Input ULP[0…8]_Input | UINT | | • | | |
| 7280 + Index | 0x202A | 0x51 + Index | **THR:** THP0_Input THP[0…8]_Input | UINT | | • | | |
| 7320 + Index | 0x202B | 0x15 + Index | **HMIS:** HS0_Input HS[0…8]_Input | UINT | | • | | |
| 7330 + Index | 0x202B | 0x1F + Index | **OTR:** OTP0_Input OTP[0…8]_Input | INT | | • | | |
| 7340 + Index | 0x202B | 0x29 + Index | **THD:** TDP0_Input TDP[0…8]_Input | UINT | | • | | |

### 7.3.10.5 Communication (with setpoint in Hz)

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **Optional status responses** | | | | | | | | |
| 3240 | 0x2002 | 0x29 | HMIS_Input | UINT | • | • | | |
| 7121 | 0x2029 | 0x16 | LFT_Input | UINT | • | • | | |
| 3206 | 0x2002 | 0x07 | ETI_Input | UINT | • | • | | |
| 3209 | 0x2002 | 0x0A | THD_Input | UINT | • | • | | |
| 9630 | 0x2042 | 0x1F | THR_Input | UINT | • | • | | |
| 13205 | 0x2066 | 0x06 | PTCI_Input | UINT | • | • | | |
| 64034 | 0x2262 | 0x23 | ALGR_Input | UINT | • | • | | |
| 15322 | 0x207B | 0x17 | STOS_Input | UINT | • | | | |
| 15315 | 0x207B | 0x10 | SS1S_Input | UINT | • | | | |
| 15304 | 0x207B | 0x05 | SLSS_Input | UINT | • | | | |
| 15383 | 0x207B | 0x55 | SMSS_Input | UINT | • | | | |
| 15393 | 0x207B | 0x5E | GDLS_Input | UINT | • | | | |
| 3699 | 0x2006 | 0x64 | INF6_Input | UINT | | • | | |
| 11980 | 0x2059 | 0x51 | RPE_Input | INT | | • | | |
| 11981 | 0x2059 | 0x52 | RPF_Input | UINT | | • | | |
| 11982 | 0x2059 | 0x53 | RPC_Input | UINT | | • | | |
| 11983 | 0x2059 | 0x54 | RPO_Input | INT | | • | | |
| **State and command register (default)** | | | | | | | | |
| 8603 | 0x2038 | 0x04 | ETAD_Input | UINT | | • | | |
| 8603 | 0x2038 | 0x04 | ETAD_Input | UINT | • | | | |
| | | | ETAD_Input_rtso | Bit 0 | | | | |
| | | | ETAD_Input_so | Bit 1 | | | | |
| | | | ETAD_Input_oe | Bit 2 | | | | |
| | | | ETAD_Input_f | Bit 3 | | | | |
| | | | ETAD_Input_ve | Bit 4 | | | | |
| | | | ETAD_Input_qs | Bit 5 | | | | |
| | | | ETAD_Input_sod | Bit 6 | | | | |
| | | | ETAD_Input_w | Bit 7 | | | | |
| | | | ETAD_Input_rm | Bit 9 | | | | |
| | | | ETAD_Input_tr | Bit 10 | | | | |
| | | | ETAD_Input_ila | Bit 11 | | | | |
| | | | ETAD_Input_ms14 | Bit 14 | | | | |
| | | | ETAD_Input_ms15 | Bit 15 | | | | |
| 8606 | 0x2038 | 0x07 | ERRD_Input | UINT | • | • | | |
| 8504 | 0x2037 | 0x05 | CMI_Output | UINT | | | | • |
| 8601 | 0x2038 | 0x02 | CMDD_Output | UINT | | • | • | |
| 8502 | 0x2037 | 0x03 | LFR_Output | INT | | • | • | |

| Modbus | POWERLINK, CAN | | Name | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 9021 | 0x203C | 0x16 | FRO_Input | INT | • | • | | |
| 3202 | 0x2002 | 0x03 | RFR_Input | INT | • | • | | |
| **Optional responses and additional setpoints** | | | | | | | | |
| 3205 | 0x2002 | 0x06 | OTR_Input | INT | • | • | | |
| 3205 | 0x2002 | 0x06 | OTRN_Input | INT | • | • | | |
| 5281 | 0x2016 | 0x52 | AIV1_Output | UINT | | • | • | |
| 5283 | 0x2016 | 0x54 | AIV2_Output | INT | | • | • | |
| 8503 | 0x2037 | 0x04 | PISP_Output | UINT | | • | • | |
| 3203 | 0x2002 | 0x04 | FRH_Input | INT | • | • | | |
| 8605 | 0x2038 | 0x06 | FRHD_Input | INT | • | • | | |
| 8641 | 0x2038 | 0x2A | FROD_Input | INT | • | • | | |
| 8604 | 0x2038 | 0x05 | RFRD_Input | INT | • | • | | |
| 3208 | 0x2002 | 0x09 | UOP_Input | UINT | • | • | | |
| 3204 | 0x2002 | 0x05 | LCR_Input | UINT | • | • | | |
| 3211 | 0x2002 | 0x0C | OPR_Input | INT | • | • | | |
| 3217 | 0x2002 | 0x12 | SLC_Input | INT | • | • | | |
| 3207 | 0x2002 | 0x08 | ULN_Input | UINT | • | • | | |
| 9645 | 0x2042 | 0x2E | SMOT_Input | UINT | | • | | |
| 9609 | 0x2042 | 0x0A | TUS_Input | UINT | | • | | |
| 9676 | 0x2042 | 0x4D | RDAE_Input | INT | | • | | |
| 13927 | 0x206D | 0x1C | ASOD_Input | UINT | | • | | |
| 9634 | 0x2042 | 0x23 | I2TM_Input | UINT | | • | | |
| 3120 | 0x2001 | 0x15 | RPR_Output | UINT | | | | • |
| 3230 | 0x2002 | 0x1F | APH_Input | UINT | | • | | |
| 3231 | 0x2002 | 0x20 | RTH_Input | UINT | | • | | |
| 3232 | 0x2002 | 0x21 | RTHI_Input | UINT | | • | | |
| 3233 | 0x2002 | 0x22 | PTH_Input | UINT | | • | | |
| 3234 | 0x2002 | 0x23 | UNT_Input | UINT | | • | | |
| **Error history** | | | | | | | | |
| 7393 | 0x202B | 0x5E | FNB_Input | UINT | | • | | |
| 7200 + Index | 0x202A | 0x01 + Index | **LFT:** DP0_Input DP[0…8]_Input | UINT | | • | | |
| 7210 + Index | 0x202A | 0x0B + Index | **ETAD:** EP0_Input EP[0…8]_Input | UINT | | • | | |
| 7220 + Index | 0x202A | 0x15 + Index | **ETI:** IP0_Input IP[0…8]_Input | UINT | | • | | |
| 7230 + Index | 0x202A | 0x1F + Index | **CMDD:** CMP0_Input CMP[0…8]_Input | UINT | | • | | |
| 7240 + Index | 0x202A | 0x29 + Index | **LCR:** LCP0_Input LCP[0…8]_Input | INT | | • | | |
| 7250 + Index | 0x202A | 0x33 + Index | **RFR:** RFP0_Input RFP[0…8]_Input | INT | | • | | |
| 7260 + Index | 0x202A | 0x3D + Index | **RTHI:** RTP0_Input RTP[0…8]_Input | UINT | | • | | |
| 7270 + Index | 0x202A | 0x47 + Index | **ULN:** ULP0_Input ULP[0…8]_Input | UINT | | • | | |
| 7280 + Index | 0x202A | 0x51 + Index | **THR:** THP0_Input THP[0…8]_Input | UINT | | • | | |
| 7320 + Index | 0x202B | 0x15 + Index | **HMIS:** HS0_Input HS[0…8]_Input | UINT | | • | | |
| 7330 + Index | 0x202B | 0x1F + Index | **OTR:** OTP0_Input OTP[0…8]_Input | INT | | • | | |
| 7340 + Index | 0x202B | 0x29 + Index | **THD:** TDP0_Input TDP[0…8]_Input | UINT | | • | | |

## 7.3.10.6 Configuration

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Subindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **General** | | | | | | | | | |
| 3015 | 0x2000 | 0x10 | BFR_Input | BFR_Output | UINT | | • | | • |
| 3052 | 0x2000 | 0x35 | CFG_Input | CFG_Output | UINT | | • | | • |
| 3022 | 0x2000 | 0x17 | FRY_Input | FRY_Output | UINT | | • | | • |
| 3006 | 0x2000 | 0x07 | LAC_Input | LAC_Output | UINT | | • | | • |
| **Nameplate (induction motor)** | | | | | | | | | |
| 9601 | 0x2042 | 0x02 | UNS_Input | UNS_Output | UINT | | • | | • |
| 9602 | 0x2042 | 0x03 | FRS_Input | FRS_Output | UINT | | • | | • |
| 9603 | 0x2042 | 0x04 | NCR_Input | NCR_Output | UINT | | • | | • |
| 9604 | 0x2042 | 0x05 | NSP_Input | NSP_Output | UINT | | • | | • |
| 9614 | 0x2042 | 0x0F | MPC_Input | MPC_Output | UINT | | • | | • |
| 9606 | 0x2042 | 0x07 | COS_Input | COS_Output | UINT | | • | | • |
| 9613 | 0x2042 | 0x0E | NPR_Input | NPR_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Su-bindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| **Nameplate (SYN motor)** | | | | | | | | | |
| 13925 | 0x206D | 0x1A | AST_Input | AST_Output | UINT | | • | | • |
| 9670 | 0x2042 | 0x47 | NCRS_Input | NCRS_Output | UINT | | • | | • |
| 9671 | 0x2042 | 0x48 | NSPS_Input | NSPS_Output | UINT | | • | | • |
| 9684 | 0x2042 | 0x55 | TQS_Input | TQS_Output | UINT | | • | | • |
| 9672 | 0x2042 | 0x49 | PPNS_Input | PPNS_Output | UINT | | • | | • |
| **Tuning settings** | | | | | | | | | |
| 9608 | 0x2042 | 0x09 | TUN_Input | TUN_Output | UINT | | • | | • |
| 9617 | 0x2042 | 0x12 | STUN_Input | STUN_Output | UINT | | • | | • |
| 9610 | 0x2042 | 0x0B | TUL_Input | TUL_Output | UINT | | • | | • |
| **Tuning results (induction motor)** | | | | | | | | | |
| 9642 | 0x2042 | 0x2B | RSA_Input | RSA_Output | UINT | | • | | • |
| 9652 | 0x2042 | 0x35 | IDA_Input | IDA_Output | UINT | | • | | • |
| 9662 | 0x2042 | 0x3F | LFA_Input | LFA_Output | UINT | | • | | • |
| 9667 | 0x2042 | 0x44 | TRA_Input | TRA_Output | UINT | | • | | • |
| **Tuning results (SYN motor)** | | | | | | | | | |
| 9673 | 0x2042 | 0x4A | PHS_Input | PHS_Output | UINT | | • | | • |
| 9674 | 0x2042 | 0x4B | LDS_Input | LDS_Output | UINT | | • | | • |
| 9675 | 0x2042 | 0x4C | LQS_Input | LQS_Output | UINT | | • | | • |
| 9682 | 0x2042 | 0x53 | RSAS_Input | RSAS_Output | UINT | | • | | • |
| **Premagnetization** | | | | | | | | | |
| 13901 | 0x206D | 0x02 | FLI_Input | FLI_Output | UINT | | • | | • |
| 13902 | 0x206D | 0x03 | FLU_Input | FLU_Output | UINT | | • | | • |
| 13910 | 0x206D | 0x0B | BOA_Input | BOA_Output | UINT | | • | | • |
| 13911 | 0x206D | 0x0C | FAB_Input | FAB_Output | UINT | | • | | • |
| 13912 | 0x206D | 0x0D | BOO_Input | BOO_Output | INT | | • | | • |
| **High frequency supply for synchronous motors** | | | | | | | | | |
| 15600 | 0x207E | 0x01 | HFI_Input | HFI_Output | UINT | | • | | • |
| 15601 | 0x207E | 0x02 | FRI_Input | FRI_Output | UINT | | • | | • |
| 15602 | 0x207E | 0x03 | HIR_Input | HIR_Output | UINT | | • | | • |
| 15603 | 0x207E | 0x04 | SPB_Input | SPB_Output | UINT | | • | | • |
| 15604 | 0x207E | 0x05 | SPF_Input | SPF_Output | UINT | | • | | • |
| 15605 | 0x207E | 0x06 | ILR_Input | ILR_Output | UINT | | • | | • |
| 15606 | 0x207E | 0x07 | SIR_Input | SIR_Output | UINT | | • | | • |
| 15607 | 0x207E | 0x08 | MCR_Input | SIR_Output | UINT | | • | | • |
| 15608 | 0x207E | 0x09 | PEC_Input | PEC_Output | UINT | | • | | • |
| **Access** | | | | | | | | | |
| 8401 | 0x2036 | 0x02 | CHCF_Input | CHCF_Output | UINT | | • | | • |
| 8402 | 0x2036 | 0x03 | COP_Input | COP_Output | UINT | | • | | • |
| 8403 | 0x2036 | 0x04 | CSB_Input | CSB_Output | UINT | | • | | • |
| 8411 | 0x2036 | 0x0C | RFC_Input | RFC_Output | UINT | | • | | • |
| 8412 | 0x2036 | 0x0D | RCB_Input | RCB_Output | UINT | | • | | • |
| 8413 | 0x2036 | 0x0E | FR1_Input | FR1_Output | UINT | | • | | • |
| 8414 | 0x2036 | 0x0F | FR2_Input | FR2_Output | UINT | | • | | • |
| 8415 | 0x2036 | 0x10 | FR1B_Input | FR1B_Output | UINT | | • | | • |
| 8421 | 0x2036 | 0x16 | CCS_Input | CCS_Output | UINT | | • | | • |
| 8423 | 0x2036 | 0x18 | CD1_Input | CD1_Output | UINT | | • | | • |
| 8424 | 0x2036 | 0x19 | CD2_Input | CD2_Output | UINT | | • | | • |
| 11101 | 0x2051 | 0x02 | TCC_Input | TCC_Output | UINT | | • | | • |
| 11102 | 0x2051 | 0x03 | TCT_Input | TCT_Output | UINT | | • | | • |
| 11103 | 0x2051 | 0x04 | RUN_Input | RUN_Output | UINT | | • | | • |
| 11104 | 0x2051 | 0x05 | FRD_Input | FRD_Output | UINT | | • | | • |
| 11105 | 0x2051 | 0x06 | RRS_Input | RRS_Output | UINT | | • | | • |
| **DC bus circuit** | | | | | | | | | |
| 13801 | 0x206C | 0x02 | URES_Input | URES_Output | UINT | | • | | • |
| 13802 | 0x206C | 0x03 | USL_Input | USL_Output | UINT | | • | | • |
| 13803 | 0x206C | 0x04 | USB_Input | USB_Output | UINT | | • | | • |
| 13804 | 0x206C | 0x05 | UST_Input | UST_Output | UINT | | • | | • |
| 13811 | 0x206C | 0x0C | UPL_Input | UPL_Output | UINT | | • | | • |
| 13812 | 0x206C | 0x0D | TBS_Input | TBS_Output | UINT | | • | | • |
| 13813 | 0x206C | 0x0E | TSM_Input | TSM_Output | UINT | | • | | • |
| 13814 | 0x206C | 0x0F | STM_Input | STM_Output | UINT | | • | | • |
| 13850 | 0x206C | 0x33 | DCCM_Input | DCCM_Output | UINT | | • | | • |
| 13851 | 0x206C | 0x34 | DCCC_Input | DCCC_Output | UINT | | • | | • |
| 14101 | 0x206F | 0x02 | VBR_Input | VBR_Output | UINT | | • | | • |
| **PWM management** | | | | | | | | | |
| 12601 | 0x2060 | 0x02 | SVL_Input | SVL_Output | UINT | | • | | • |
| 12602 | 0x2060 | 0x03 | SOP_Input | SOP_Output | UINT | | • | | • |
| **General current/torque limiting** | | | | | | | | | |
| 9201 | 0x203E | 0x02 | CLI_Input | CLI_Output | UINT | | • | | • |
| 9202 | 0x203E | 0x03 | LC2_Input | LC2_Output | UINT | | • | | • |
| 9203 | 0x203E | 0x04 | CL2_Input | CL2_Output | UINT | | • | | • |
| 9210 | 0x203E | 0x0B | TLA_Input | TLA_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Su-bindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 9211 | 0x203E | 0x0C | TLIM_Input | TLIM_Output | UINT | | • | | • |
| 9212 | 0x203E | 0x0D | TLIG_Input | TLIG_Output | UINT | | • | | • |
| 9213 | 0x203E | 0x0E | TLC_Input | TLC_Output | UINT | | • | | • |
| 9214 | 0x203E | 0x0F | TAA_Input | TAA_Output | UINT | | • | | • |
| 9215 | 0x203E | 0x10 | INTP_Input | INTP_Output | UINT | | • | | • |
| 9240 | 0x203E | 0x29 | SSB_Input | SSB_Output | UINT | | • | | • |
| 9241 | 0x203E | 0x2A | STO_Input | STO_Output | UINT | | • | | • |
| 9260 | 0x203E | 0x3D | INT_Input | INT_Output | UINT | | • | | • |
| **Motor management** | | | | | | | | | |
| 9607 | 0x2042 | 0x08 | CTT_Input | CTT_Output | UINT | | • | | • |
| 9611 | 0x2042 | 0x0C | OPL_Input | OPL_Output | UINT | | • | | • |
| 9612 | 0x2042 | 0x0D | THT_Input | THT_Output | UINT | | • | | • |
| 9615 | 0x2042 | 0x10 | AUT_Input | AUT_Output | UINT | | • | | • |
| 9616 | 0x2042 | 0x11 | MTM_Input | MTM_Output | UINT | | • | | • |
| 9619 | 0x2042 | 0x14 | TUNU_Input | TUNU_Output | UINT | | • | | • |
| 9622 | 0x2042 | 0x17 | ITH_Input | ITH_Output | UINT | | • | | • |
| 9623 | 0x2042 | 0x18 | UFR_Input | UFR_Output | UINT | | • | | • |
| 9624 | 0x2042 | 0x19 | PFL_Input | PFL_Output | UINT | | • | | • |
| 9625 | 0x2042 | 0x1A | SLP_Input | SLP_Output | UINT | | • | | • |
| 9629 | 0x2042 | 0x1E | SPGU_Input | SPGU_Output | UINT | | • | | • |
| 9631 | 0x2042 | 0x20 | I2TA_Input | I2TA_Output | UINT | | • | | • |
| 9632 | 0x2042 | 0x21 | I2TI_Input | I2TI_Output | UINT | | • | | • |
| 9633 | 0x2042 | 0x22 | I2TT_Input | I2TT_Output | UINT | | • | | • |
| 12403 | 0x205E | 0x04 | U1_Input | U1_Output | UINT | | • | | • |
| 12404 | 0x205E | 0x05 | F1_Input | F1_Output | UINT | | • | | • |
| 12405 | 0x205E | 0x06 | U2_Input | U2_Output | UINT | | • | | • |
| 12406 | 0x205E | 0x07 | F2_Input | F2_Output | UINT | | • | | • |
| 12407 | 0x205E | 0x08 | U3_Input | U3_Output | UINT | | • | | • |
| 12408 | 0x205E | 0x09 | F3_Input | F3_Output | UINT | | • | | • |
| 12409 | 0x205E | 0x0A | U4_Input | U4_Output | UINT | | • | | • |
| 12410 | 0x205E | 0x0B | F4_Input | F4_Output | UINT | | • | | • |
| 12411 | 0x205E | 0x0C | U5_Input | U5_Output | UINT | | • | | • |
| 12412 | 0x205E | 0x0D | F5_Input | F5_Output | UINT | | • | | • |
| 9103 | 0x203D | 0x04 | SPG_Input | SPG_Output | UINT | | • | | • |
| 9104 | 0x203D | 0x05 | SIT_Input | SIT_Output | UINT | | • | | • |
| 9105 | 0x203D | 0x06 | SFC_Input | SFC_Output | UINT | | • | | • |
| 9115 | 0x203D | 0x10 | FFH_Input | FFH_Output | UINT | | • | | • |
| 9116 | 0x203D | 0x11 | CRTF_Input | CRTF_Output | UINT | | • | | • |
| **Axis management** | | | | | | | | | |
| 3101 | 0x2001 | 0x02 | SFT_Input | SFT_Output | UINT | | • | | • |
| 3102 | 0x2001 | 0x03 | SFR_Input | SFR_Output | UINT | | • | | • |
| 3104 | 0x2001 | 0x05 | HSP_Input | HSP_Output | UINT | | • | | • |
| 15101 | 0x2079 | 0x02 | SH2_Input | SH2_Output | UINT | | • | | • |
| 15102 | 0x2079 | 0x03 | SH4_Input | SH4_Output | UINT | | • | | • |
| 15110 | 0x2079 | 0x0B | HSP2_Input | HSP2_Output | UINT | | • | | • |
| 15111 | 0x2079 | 0x0C | HSP3_Input | HSP3_Output | UINT | | • | | • |
| 15112 | 0x2079 | 0x0D | HSP4_Input | HSP4_Output | UINT | | • | | • |
| 3105 | 0x2001 | 0x06 | LSP_Input | LSP_Output | UINT | | • | | • |
| 11701 | 0x2057 | 0x02 | TLS_Input | TLS_Output | UINT | | • | | • |
| 3106 | 0x2001 | 0x07 | BSP_Input | BSP_Output | UINT | | • | | • |
| 3107 | 0x2001 | 0x08 | NRD_Input | NRD_Output | UINT | | • | | • |
| 3108 | 0x2001 | 0x09 | RIN_Input | RIN_Output | UINT | | • | | • |
| **Resonant frequency** | | | | | | | | | |
| 11301 | 0x2053 | 0x02 | JPF_Input | JPF_Output | UINT | | • | | • |
| 11302 | 0x2053 | 0x03 | JF2_Input | JF2_Output | UINT | | • | | • |
| 11303 | 0x2053 | 0x04 | JF3_Input | JF3_Output | UINT | | • | | • |
| 11311 | 0x2053 | 0x0C | JFH_Input | JFH_Output | UINT | | • | | • |
| **Speed adjustment (ramps)** | | | | | | | | | |
| 9001 | 0x203C | 0x02 | ACC_Input | ACC_Output | UINT | | • | | • |
| 9002 | 0x203C | 0x03 | DEC_Input | DEC_Output | UINT | | • | | • |
| 9003 | 0x203C | 0x04 | BRA_Input | BRA_Output | UINT | | • | | • |
| 9004 | 0x203C | 0x05 | RPT_Input | RPT_Output | UINT | | • | | • |
| 9005 | 0x203C | 0x06 | TA1_Input | TA1_Output | UINT | | • | | • |
| 9006 | 0x203C | 0x07 | TA2_Input | TA2_Output | UINT | | • | | • |
| 9007 | 0x203C | 0x08 | TA3_Input | TA3_Output | UINT | | • | | • |
| 9008 | 0x203C | 0x09 | TA4_Input | TA4_Output | UINT | | • | | • |
| 9010 | 0x203C | 0x0B | RPS_Input | RPS_Output | UINT | | • | | • |
| 9011 | 0x203C | 0x0C | FRT_Input | FRT_Output | UINT | | • | | • |
| 9012 | 0x203C | 0x0D | AC2_Input | AC2_Output | UINT | | • | | • |
| 9013 | 0x203C | 0x0E | DE2_Input | DE2_Output | UINT | | • | | • |
| 9020 | 0x203C | 0x15 | INR_Input | INR_Output | UINT | | • | | • |
| 8651 | 0x2038 | 0x34 | QSTD_Input | QSTD_Output | UINT | | • | | • |
| 8652 | 0x2038 | 0x35 | DOTD_Input | DOTD_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Sub-bindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 11201 | 0x2052 | 0x02 | STT_Input | STT_Output | UINT | | • | | • |
| 11202 | 0x2052 | 0x03 | NST_Input | NST_Output | UINT | | • | | • |
| 11204 | 0x2052 | 0x05 | FST_Input | FST_Output | UINT | | • | | • |
| 11220 | 0x2052 | 0x15 | FFT_Input | FFT_Output | UINT | | • | | • |
| 11230 | 0x2052 | 0x1F | DCF_Input | DCF_Output | UINT | | • | | • |
| **Load management** | | | | | | | | | |
| 14401 | 0x2072 | 0x02 | SRB_Input | SRB_Output | UINT | | • | | • |
| 14411 | 0x2072 | 0x0C | ULT_Input | ULT_Output | UINT | | • | | • |
| 14412 | 0x2072 | 0x0D | UDL_Input | UDL_Output | UINT | | • | | • |
| 14413 | 0x2072 | 0x0E | FTU_Input | FTU_Output | UINT | | • | | • |
| 14414 | 0x2072 | 0x0F | RMUD_Input | RMUD_Output | UINT | | • | | • |
| 14415 | 0x2072 | 0x10 | LUL_Input | LUL_Output | UINT | | • | | • |
| 14416 | 0x2072 | 0x11 | LUN_Input | LUN_Output | UINT | | • | | • |
| 14421 | 0x2072 | 0x16 | TOL_Input | TOL_Output | UINT | | • | | • |
| 14422 | 0x2072 | 0x17 | ODL_Input | ODL_Output | UINT | | • | | • |
| 14423 | 0x2072 | 0x18 | FTO_Input | FTO_Output | UINT | | • | | • |
| 14425 | 0x2072 | 0x1A | LOC_Input | LOC_Output | UINT | | • | | • |
| **Brake controller (DCI)** | | | | | | | | | |
| 11203 | 0x2052 | 0x04 | DCI_Input | DCI_Output | UINT | | • | | • |
| 11210 | 0x2052 | 0x0B | IDC_Input | IDC_Output | UINT | | • | | • |
| 11211 | 0x2052 | 0x0C | TDC_Input | TDC_Output | UINT | | • | | • |
| 11212 | 0x2052 | 0x0D | IDC2_Input | IDC2_Output | UINT | | • | | • |
| 11213 | 0x2052 | 0x0E | TDI_Input | TDI_Output | UINT | | • | | • |
| 10401 | 0x204A | 0x02 | ADC_Input | ADC_Output | UINT | | • | | • |
| 10402 | 0x204A | 0x03 | TDC1_Input | TDC1_Output | UINT | | • | | • |
| 10403 | 0x204A | 0x04 | SDC1_Input | SDC1_Output | UINT | | • | | • |
| 10404 | 0x204A | 0x05 | TDC2_Input | TDC2_Output | UINT | | • | | • |
| 10405 | 0x204A | 0x06 | SDC2_Input | SDC2_Output | UINT | | • | | • |
| 10499 | 0x204A | 0x64 | TAFI_Input | TAFI_Output | UINT | | • | | • |
| **Brake controller (BLC)** | | | | | | | | | |
| 10001 | 0x2046 | 0x02 | BLC_Input | BLC_Output | UINT | | • | | • |
| 10003 | 0x2046 | 0x04 | BEN_Input | BEN_Output | INT | | • | | • |
| 10004 | 0x2046 | 0x05 | BRT_Input | BRT_Output | UINT | | • | | • |
| 10005 | 0x2046 | 0x06 | BET_Input | BET_Output | UINT | | • | | • |
| 10006 | 0x2046 | 0x07 | IBR_Input | IBR_Output | UINT | | • | | • |
| 10007 | 0x2046 | 0x08 | BIP_Input | BIP_Output | UINT | | • | | • |
| 10008 | 0x2046 | 0x09 | BST_Input | BST_Output | UINT | | • | | • |
| 10009 | 0x2046 | 0x0A | BCI_Input | BCI_Output | UINT | | • | | • |
| 10010 | 0x2046 | 0x0B | TBE_Input | TBE_Output | UINT | | • | | • |
| 10011 | 0x2046 | 0x0C | IRD_Input | IRD_Output | UINT | | • | | • |
| 10012 | 0x2046 | 0x0D | BIR_Input | BIR_Output | INT | | • | | • |
| 10013 | 0x2046 | 0x0E | JDC_Input | JDC_Output | INT | | • | | • |
| 10015 | 0x2046 | 0x10 | BRR_Input | BRR_Output | UINT | | • | | • |
| 10020 | 0x2046 | 0x15 | BED_Input | BED_Output | UINT | | • | | • |
| 10022 | 0x2046 | 0x17 | TTR_Input | TTR_Input | UINT | | • | | • |
| 10050 | 0x2046 | 0x33 | BRH_Input | BRH_Output | UINT | | • | | • |
| 10070 | 0x2046 | 0x47 | PES_Input | PES_Output | UINT | | • | | • |
| 10071 | 0x2046 | 0x48 | LP1_Input | LP1_Output | UINT | | • | | • |
| 10072 | 0x2046 | 0x49 | CP1_Input | CP1_Output | INT | | • | | • |
| 10073 | 0x2046 | 0x4A | LP2_Input | LP2_Output | UINT | | • | | • |
| 10074 | 0x2046 | 0x4B | CP2_Input | CP2_Output | INT | | • | | • |
| 10075 | 0x2046 | 0x4C | IBRA_Input | IBRA_Output | UINT | | • | | • |
| **Line contactor control** | | | | | | | | | |
| 13601 | 0x206A | 0x02 | LES_Input | LES_Output | UINT | | • | | • |
| 13602 | 0x206A | 0x03 | LLC_Input | LLC_Output | UINT | | • | | • |
| 13603 | 0x206A | 0x04 | LCT_Input | LCT_Output | UINT | | • | | • |
| **Motor contactor control** | | | | | | | | | |
| 13101 | 0x2065 | 0x02 | DBS_Input | DBS_Output | UINT | | • | | • |
| 13102 | 0x2065 | 0x03 | DAS_Input | DAS_Output | UINT | | • | | • |
| 13103 | 0x2065 | 0x04 | RCA_Input | RCA_Output | UINT | | • | | • |
| 13104 | 0x2065 | 0x05 | OCC_Input | OCC_Output | UINT | | • | | • |
| **Error behavior** | | | | | | | | | |
| 7002 | 0x2028 | 0x03 | IPL_Input | IPL_Output | UINT | | • | | • |
| 7004 | 0x2028 | 0x05 | STP_Input | STP_Output | UINT | | • | | • |
| 7005 | 0x2028 | 0x06 | SDD_Input | SDD_Output | UINT | | • | | • |
| 7006 | 0x2028 | 0x07 | EPL_Input | EPL_Output | UINT | | • | | • |
| 7008 | 0x2028 | 0x09 | OHL_Input | OHL_Output | UINT | | • | | • |
| 7009 | 0x2028 | 0x0A | OLL_Input | OLL_Output | UINT | | • | | • |
| 7010 | 0x2028 | 0x0B | SLL_Input | SLL_Output | UINT | | • | | • |
| 7011 | 0x2028 | 0x0C | COL_Input | COL_Output | UINT | | • | | • |
| 7012 | 0x2028 | 0x0D | TNL_Input | TNL_Output | UINT | | • | | • |
| 7013 | 0x2028 | 0x0E | LFL3_Input | LFL3_Output | UINT | | • | | • |
| 7015 | 0x2028 | 0x10 | CLL_Input | CLL_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Su-bindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 7018 | 0x2028 | 0x13 | SCL3_Input | SCL3_Output | UINT | | • | | • |
| 7020 | 0x2028 | 0x15 | DCFF_Input | DCFF_Output | UINT | | • | | • |
| 7080 | 0x2028 | 0x51 | LFF_Input | LFF_Output | UINT | | • | | • |
| 7081 | 0x2028 | 0x52 | ODT_Input | ODT_Output | UINT | | • | | • |
| 7090 | 0x2028 | 0x5B | LET_Input | LET_Output | UINT | | • | | • |
| **Error diagnostics** | | | | | | | | | |
| 3112 | 0x2001 | 0x0D | STRT_Input | STRT_Output | UINT | | • | | • |
| 3121 | 0x2001 | 0x16 | RFLT_Input | RFLT_Output | UINT | | • | | • |
| 3130 | 0x2001 | 0x1F | FFM_Input | FFM_Output | UINT | | • | | • |
| 7122 | 0x2029 | 0x17 | ATR_Input | ATR_Output | UINT | | • | | • |
| 7123 | 0x2029 | 0x18 | TAR_Input | TAR_Output | UINT | | • | | • |
| 7124 | 0x2029 | 0x19 | RSF_Input | RSF_Output | UINT | | • | | • |
| 7125 | 0x2029 | 0x1A | INH_Input | INH_Output | UINT | | • | | • |
| 7128 | 0x2029 | 0x1D | RP_Input | RP_Output | UINT | | • | | • |
| 7129 | 0x2029 | 0x1E | RPA_Input | RPA_Output | UINT | | • | | • |
| 7130 | 0x2029 | 0x1F | CIC_Input | CIC_Output | UINT | | • | | • |
| 7131 | 0x2029 | 0x20 | ETF_Input | ETF_Output | UINT | | • | | • |
| 7132 | 0x2029 | 0x21 | CNF_Input | CNF_Output | UINT | | • | | • |
| 7134 | 0x2029 | 0x23 | ILF1_Input | ILF1_Output | UINT | | • | | • |
| 7150 | 0x2029 | 0x33 | HRFC_Input | HRFC_Output | UINT | | • | | • |
| **User-defined threshold values** | | | | | | | | | |
| 11001 | 0x2050 | 0x02 | CTD_Input | CTD_Output | UINT | | • | | • |
| 11002 | 0x2050 | 0x03 | TTD_Input | TTD_Output | UINT | | • | | • |
| 11003 | 0x2050 | 0x04 | FTD_Input | FTD_Output | UINT | | • | | • |
| 11004 | 0x2050 | 0x05 | F2D_Input | F2D_Output | UINT | | • | | • |
| 11006 | 0x2050 | 0x07 | TTD2_Input | TTD2_Output | UINT | | • | | • |
| 11007 | 0x2050 | 0x08 | TTD3_Input | TTD3_Output | UINT | | • | | • |
| 11009 | 0x2050 | 0x0A | THA_Input | THA_Output | UINT | | • | | • |
| 11015 | 0x2050 | 0x10 | TTL_Input | TTL_Output | INT | | • | | • |
| 11016 | 0x2050 | 0x11 | TTH_Input | TTH_Output | INT | | • | | • |
| 11021 | 0x2050 | 0x16 | SAT_Input | SAT_Output | UINT | | • | | • |
| **User def. alarm groups** | | | | | | | | | |
| 12801 | 0x2062 | 0x02 | GA11_Input | GA11_Output | UINT | | • | | • |
| 12802 | 0x2062 | 0x03 | GA12_Input | GA12_Output | UINT | | • | | • |
| 12803 | 0x2062 | 0x04 | GA21_Input | GA21_Output | UINT | | • | | • |
| 12804 | 0x2062 | 0x05 | GA22_Input | GA22_Output | UINT | | • | | • |
| 12805 | 0x2062 | 0x06 | GA31_Input | GA31_Output | UINT | | • | | • |
| 12806 | 0x2062 | 0x07 | GA32_Input | GA32_Output | UINT | | • | | • |
| 12807 | 0x2062 | 0x08 | GA13_Input | GA13_Output | UINT | | • | | • |
| 12808 | 0x2062 | 0x09 | GA23_Input | GA23_Output | UINT | | • | | • |
| 12809 | 0x2062 | 0x0A | GA33_Input | GA33_Output | UINT | | • | | • |
| **Handheld settings** | | | | | | | | | |
| 64002 | 0x2262 | 0x03 | PST_Input | PST_Output | UINT | | • | | • |
| 64035 | 0x2262 | 0x24 | PVIS_Input | PVIS_Output | UINT | | • | | • |
| **Display settings** | | | | | | | | | |
| 12001 | 0x205A | 0x02 | SDS_Input | SDS_Output | UINT | | • | | • |
| **Special function: "Limit switch"** | | | | | | | | | |
| 12501 | 0x205F | 0x02 | SAF_Input | SAF_Output | UINT | | • | | • |
| 12502 | 0x205F | 0x03 | SAR_Input | SAR_Output | UINT | | • | | • |
| 12503 | 0x205F | 0x04 | DAF_Input | DAF_Output | UINT | | • | | • |
| 12504 | 0x205F | 0x05 | DAR_Input | DAR_Output | UINT | | • | | • |
| 12505 | 0x205F | 0x06 | DSF_Input | DSF_Output | UINT | | • | | • |
| 12506 | 0x205F | 0x07 | PAS_Input | PAS_Output | UINT | | • | | • |
| 12507 | 0x205F | 0x08 | CLS_Input | CLS_Output | UINT | | • | | • |
| 12508 | 0x205F | 0x09 | SAL_Input | SAL_Output | UINT | | • | | • |
| 12509 | 0x205F | 0x0A | DAL_Input | DAL_Output | UINT | | • | | • |
| 12511 | 0x205F | 0x0C | NLS_Input | NLS_Output | UINT | | • | | • |
| 12521 | 0x205F | 0x16 | STD_Input | STD_Output | UINT | | • | | • |
| 12522 | 0x205F | 0x17 | SFD_Input | SFD_Output | UINT | | • | | • |
| 12523 | 0x205F | 0x18 | MSTP_Input | MSTP_Output | UINT | | • | | • |
| 12524 | 0x205F | 0x19 | PRST_Input | PRST_Output | UINT | | • | | • |
| **Special function: "PID controller"** | | | | | | | | | |
| 11901 | 0x2059 | 0x02 | PIF_Input | PIF_Output | UINT | | • | | • |
| 11904 | 0x2059 | 0x05 | PIF1_Input | PIF1_Output | UINT | | • | | • |
| 11905 | 0x2059 | 0x06 | PIF2_Input | PIF2_Output | UINT | | • | | • |
| 11906 | 0x2059 | 0x07 | PIP1_Input | PIP1_Output | UINT | | • | | • |
| 11907 | 0x2059 | 0x08 | PIP2_Input | PIP2_Output | UINT | | • | | • |
| 11908 | 0x2059 | 0x09 | PII_Input | PII_Output | UINT | | • | | • |
| 11909 | 0x2059 | 0x0A | PR2_Input | PR2_Output | UINT | | • | | • |
| 11910 | 0x2059 | 0x0B | PR4_Input | PR4_Output | UINT | | • | | • |
| 11920 | 0x2059 | 0x15 | RPI_Input | RPI_Output | UINT | | • | | • |
| 11921 | 0x2059 | 0x16 | RP2_Input | RP2_Output | UINT | | • | | • |
| 11922 | 0x2059 | 0x17 | RP3_Input | RP3_Output | UINT | | • | | • |

| Modbus | POWERLINK, CAN | | Name | | Data type | Read | | Write | |
|---|---|---|---|---|---|---|---|---|---|
| "ADL" | "Index" | "Su-bindex" | | | | Cyclical | Acyclic | Cyclical | Acyclic |
| 11923 | 0x2059 | 0x18 | RP4_Input | RP4_Output | UINT | | • | | • |
| 11940 | 0x2059 | 0x29 | PIC_Input | PIC_Output | UINT | | • | | • |
| 11941 | 0x2059 | 0x2A | RPG_Input | RPG_Output | UINT | | • | | • |
| 11942 | 0x2059 | 0x2B | RIG_Input | RIG_Output | UINT | | • | | • |
| 11943 | 0x2059 | 0x2C | RDG_Input | RDG_Output | UINT | | • | | • |
| 11944 | 0x2059 | 0x2D | PIS_Input | PIS_Output | UINT | | • | | • |
| 11950 | 0x2059 | 0x33 | FPI_Input | FPI_Output | UINT | | • | | • |
| 11951 | 0x2059 | 0x34 | PSR_Input | PSR_Output | UINT | | • | | • |
| 11952 | 0x2059 | 0x35 | POL_Input | POL_Output | INT | | • | | • |
| 11953 | 0x2059 | 0x36 | POH_Input | POH_Output | INT | | • | | • |
| 11954 | 0x2059 | 0x37 | PIM_Input | PIM_Output | UINT | | • | | • |
| 11960 | 0x2059 | 0x3D | RSL_Input | RSL_Output | UINT | | • | | • |
| 11961 | 0x2059 | 0x3E | PAL_Input | PAL_Output | UINT | | • | | • |
| 11962 | 0x2059 | 0x3F | PAH_Input | PAH_Output | UINT | | • | | • |
| 11963 | 0x2059 | 0x40 | PER_Input | PER_Output | UINT | | • | | • |
| 11970 | 0x2059 | 0x47 | PAU_Input | PAU_Output | UINT | | • | | • |
| 11984 | 0x2059 | 0x55 | PRP_Input | PRP_Output | UINT | | • | | • |

#### 7.3.10.7 Minimum cycle time

The minimum cycle time specifies how far the bus cycle can be reduced without communication errors occurring. It is important to note that very fast cycles reduce the idle time available for handling monitoring, diagnostics and acyclic commands.

| Minimum cycle time |
|---|
| 400 µs |

### 7.3.11 Manufacturer-specific area

ACOPOSinverter parameters are based on their POWERLINK address and are also documented with these.

**Note:**

**You can find the POWERLINK addresses in the communication parameters Excel table ACOPOSinverter - Communication Parameters.**

# 8 Safety functions

## 8.1 General information

### 8.1.1 Introduction

#### Overview

The safety functions integrated into the ACOPOSinverter are designed to ensure that the installation is maintained in a safe state and to prevent the occurrence of dangerous states. In some cases, further safety-related systems separate from the frequency inverter (e.g. a mechanical brake) may be necessary to maintain the safe state after the power supply has been interrupted.
The safety functions are configured using ACPi SafeConfigurator.
Integrated safety functions provide the following advantages:

- Additional safety functions that comply with standards
- No external safety equipment required
- Reduced wiring and space requirements
- Reduced costs

The ACOPOSinverter frequency inverters meet the requirements of the standards for the implementation of safety functions.

#### Safety functions in accordance with IEC 61800-5-2

Definitions

| Abbreviation | Description |
|---|---|
| STO | **Safe torque off**<br>No power that could result in a rotation or exertion of force is transferred to the motor. |
| SLS | **Safe limited speed**<br>The SLS function prevents the motor speed from exceeding the defined limit. If the motor speed exceeds the defined limit, the STO safety function is activated. |
| SS1 | **Safe stop 1**<br>• Initiates and monitors the motor deceleration rate within defined limits in order to stop the motor.<br>• Introduces function "Safe stop" if the motor speed falls below the specified limit value. |

#### Safety functions not in accordance with IEC 61800-5-2

Definitions

| Abbreviation | Description |
|---|---|
| SMS | **Safe maximum speed**<br>The SMS function prevents the motor speed from exceeding the defined limit. If the motor speed exceeds the defined limit, the STO safety function is activated. The SMS function can only be activated or deactivated using the commissioning software. When the function is deactivated , it continuously monitors the stator frequency irrespective of the operating mode. |
| GDL | **Safety door lock**<br>The GDL function enables the safety door to be unlocked when the motor is switched off. |

#### Writing conventions

The menus of the graphic display terminal are displayed in brackets.
The menus of the integrated 7-character segment display are displayed in parentheses.
The parameter names are displayed in brackets on the graphic display terminal.
The parameter codes are displayed in parentheses on the integrated 7-segment display.

#### Connection examples

**Note:**

**For connection examples for the ACOPOSinverter and the safety modules, see the "Integrated safety technology user's manual" – mapp Safety:**

- **Connection examples**

## Warning!

**The parallel connection/wiring of STO inputs of several inverters is not permitted.**

**Configuration no. 1:**

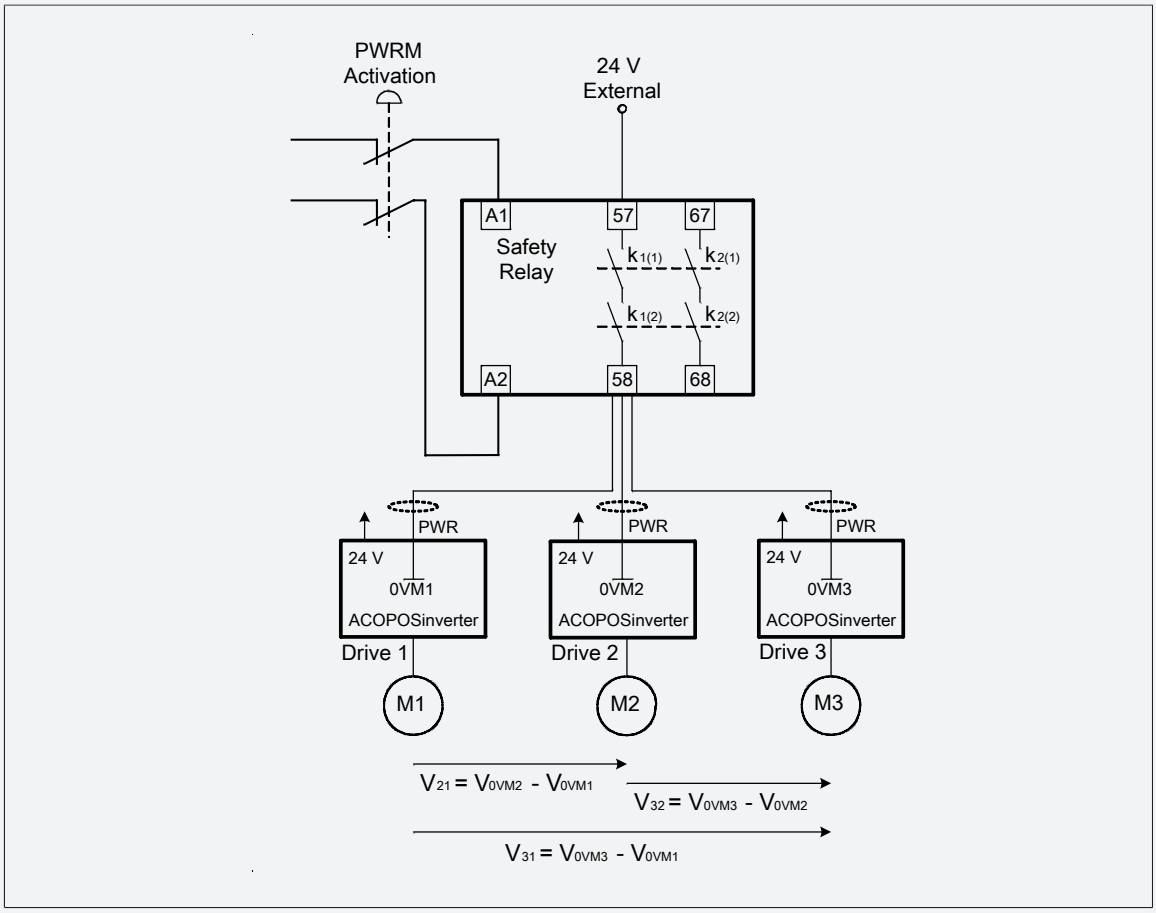
**Only one safety contact of the external 24 V power supply is used to activate the power removal safety functions (PWRM activation) on the ACOPOSinverter.**

**Task: As shown in configuration 1, after the PWRM safety circuit has been triggered, the voltage on the STO inputs is removed, switching off the power supply for motors M1, M2 and M3 via the STO function.**

**Assessment: Due to electromagnetic phenomena, unintended potential differences may occur between the reference potentials of the STO inputs (0VMx). Depending on the cabling/structure of the cabling system, the potential differences (V21, V31, V32) can become so large that the intended safety function can no longer be ensured.**

**Result: The failure of the safety functions results in a dangerous fault that is not detected by the internal diagnostic functions in the inverters. The configuration 1 wiring diagram is not permitted when using power removal safety functions (PWRM activation).**

**Note: The wiring as shown in configuration 1 is not permitted even when using the internal 24 V power supply of the inverters with the safety relay.**



## 8.1.2 Certifications

### EC declaration of conformity

The EC declaration of conformity for the EMC Directive is available at www.br-automation.com.

### Certification for functional safety

The integrated safety functions are compatible and certified with the following guideline: : IEC 61800-5-2 Ed. 1 "Adjustable speed electrical power frequency inverter systems - Part 5-2: Safety requirements - Functional safety".

As a product standard, IEC 61800-5-2 sets forth safety-related aspects for power drive systems with integrated safety functions (PDS (SR)) within the framework laid out in the IEC 61508 Ed. 2.

The compliance of the safety functions listed in this guide with the IEC 61800-5-2 standard simplifies the integration of a PDS (SR) (power drive system suitable for safety-related applications) into a safety-related control system using the principles of IEC 61508 or IEC 13849-1 as well as of IEC 62061 for process systems and machines.

The defined safety functions are the following:

- SIL 2 and SIL 3 capability in compliance with standards IEC 61800-5-2 and IEC 61508 Ed. 2
- Fulfillment of performance level "d" and "e" in compliance with IEC 13849-1
- Compliance with category 3 and 4 of European standard IEC 13849-1 (EN 954-1)

See also "Capability characteristics of safety functions" on page 550.

The operating mode with safety requirement is tested in high demand or continuous operation in accordance with standard IEC 61800-5-2.

The certificate for functional safety is available at www.br-automation.com.

## 8.1.3 Basic information

### Functional safety

Automation and safety technology are two areas that in the past were completely separated from one another but have recently become more and more integrated.

The development and installation of complex automation solutions is considerably simplified through the use of integrated safety functions.

The requirements in terms of safety technology generally depend on the application.

The requirement level is determined by the potential risks and hazards of the specific application.

### Standard IEC 61508

Standard IEC 61508 "Functional safety of electrical / electronic / programmable safety-related systems" provides coverage for safety-related functionality.

Instead of an individual component, an entire chain of functions (e.g. ranging from a sensor through to the logical processing units and the actuator) is considered a single unit.

This functional chain must meet the requirements of the specific safety integrity level as a whole.

Such a basis allows systems and components to be developed that can be used in various safety applications with comparable levels of risk.

### SIL - Safety integrity level

Standard IEC 61508 defines four safety integrity levels (SIL) for safety functions.

SIL 1 is the lowest level, SIL 4 the highest.

A hazard and risk analysis forms the basis for determining the required safety integrity level.

This analysis is used to determine whether the respective chain of functions can be viewed as a safety function and which potential hazards must be covered.

### PFH - Probability of a dangerous failure per hour

To maintain the safety function, standard IEC 61508 prescribes measures that vary depending on the required safety integrity level and are intended to avoid and control the errors determined.

All components of a safety function must undergo a probability assessment to determine the effectiveness of the measures to control the errors determined.

This assessment makes a decision based on the PFH (average frequency of a dangerous failure per hour) of a safety system.

This is the probability of a dangerous failure occurring in a safety system with the result that the safety function cannot be executed properly.

Depending on the SIL, the PFH value for the entire safety system is not permitted to exceed certain values.

The individual PFH values of a function chain are added together. The result is not permitted to exceed the maximum values defined in the standard.

| Performance level | Average frequency of a dangerous failure per hour (PFH) in high demand or continuous operation |
|---|---|
| 4 | $\geq 10^{-9}$ to $<10^{-8}$ |
| 3 | $\geq 10^{-8}$ to $<10^{-7}$ |
| 2 | $\geq 10^{-7}$ to $<10^{-6}$ |
| 1 | $\geq 10^{-6}$ to $<10^{-5}$ |

### PL - Performance Level

ISO standard 13849-1 defines five performance levels (PL) for safety functions.

"a" is the lowest and "e" is the highest level.

The five levels (a, b, c, d and e) correspond to the various values of the average probability of a dangerous failure.

| Performance level | Probability of a dangerous failure per hour |
|---|---|
| e | $\geq 10^{-8}$ to $<10^{-7}$ |
| d | $\geq 10^{-7}$ to $<10^{-6}$ |
| c | $\geq 10^{-6}$ to $<3x10^{-6}$ |
| b | $\geq 3x10^{-6}$ to $<10^{-5}$ |
| a | $\geq 10^{-5}$ to $<10^{-4}$ |

### HFT - Hardware fault tolerance and SFF - Safe failure fraction

Depending on the applicable SIL for the safety system, standard IEC 61508 stipulates a specific hardware detected fault tolerance (HFT) in connection with a special safe failure fraction (SFF).

The hardware fault tolerance describes the system's ability to execute the required safety function despite the fact that one or more hardware faults have been detected.

The safe failure fraction (SFF) is defined as the rate of safe failures and of detected dangerous states relative to the total failure rate of the system.

$$SFF = \frac{\Sigma\lambda_S + \Sigma\lambda_{Dd}}{\Sigma\lambda_S + \Sigma\lambda_{Dd} + \Sigma\lambda_{Du}}$$

Per IEC 61508, the maximum achievable safety integrity level of a system is partially determined by the hardware fault tolerance (HFT) and safe failure fraction (SFF) of the system.

Standard IEC 61508 distinguishes between two types of subsystems (type A subsystem, type B subsystem).

The specification of these types is based on criteria set forth by the standard for safety-related components.

| SFF | HFT for type A subsystem | | | HFT for type B subsystem | | |
|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 0 | 1 | 2 |
| <60% | SIL 1 | SIL 2 | SIL 3 | - | SIL 1 | SIL 2 |
| 60% to < 90% | SIL 2 | SIL 3 | SIL 4 | SIL 1 | SIL 2 | SIL 3 |
| 60% to <99% | SIL 3 | SIL 4 | SIL 4 | SIL 2 | SIL 3 | SIL 4 |
| ≥99% | SIL 3 | SIL 4 | SIL 4 | SIL 3 | SIL 4 | SIL 4 |

### PFD - Probability of dangerous failure on demand

Standard IEC 61508 defines the SIL using requirements that are divided into two main categories: hardware safety integrity and systematic safety integrity. A device or system must meet the requirements of both categories in order to attain a specified SIL.

The SIL requirements for the hardware safety integrity are based on a probability analysis of the device. In order to attain a specified SIL, the device must comply with the specifications regarding the maximum probability of dangerous failure and the minimum safe failure fraction. The concept of a dangerous failure must be strictly defined for the relevant system. This normally takes place in the form of restrictive requirements, the integrity of which is checked during the entire system development. The required target values vary depending on the probability of a requirement, on the complexity of the device(s) and on the redundancy type used.

The PFD values (probability of dangerous failure on demand) and the RRF values (risk reduction factor) in low-demand operation for various SILs are defined as follows in standard IEC 61508:

| SIL | PFD | PFD (performance) | RRF |
|---|---|---|---|
| 1 | 0.1 to 0.01 | $10^{-1}$ to $10^{-2}$ | 10 to 100 |
| 2 | 0.01 to 0.001 | $10^{-2}$ to $10^{-3}$ | 100 to 1000 |
| 3 | 0.001 to 0.0001 | $10^{-3}$ to $10^{-4}$ | 1000 to 10,000 |
| 4 | 0.0001 to 0.00001 | $10^{-4}$ to $10^{-5}$ | 10,000 to 100,000 |

The following values are valid for high demand or continuous operation:

| SIL | PFH | PFH (performance) | RRF |
|---|---|---|---|
| 1 | 0.00001 to 0.000001 | $10^{-5}$ to $10^{-6}$ | 100,000 to 1,000,000 |
| 2 | 0.000001 to 0.0000001 | $10^{-6}$ to $10^{-7}$ | 1,000,000 to 10,000,000 |
| 3 | 0.0000001 to 0.00000001 | $10^{-7}$ to $10^{-8}$ | 10,000,000 to 100,000,000 |
| 4 | 0.00000001 to 0.000000001 | $10^{-8}$ to $10^{-9}$ | 100,000,000 to 1,000,0000,000 |

The dangers of a control system must be identified and assessed within the scope of a risk analysis. These risks must continue to be reduced until their overall contribution to the danger is considered acceptable. The permissible level of these risks is specified as a safety requirement in the form of a target value for the "probability of a dangerous failure in a specified time frame": a discrete SIL.

### Error avoidance measures

Systematic errors and faults in the specification, hardware and software, as well as errors and faults detected during the operation and maintenance of the safety system must be avoided to the maximum degree possible. In order that these requirements are complied with, standard IEC 61508 specifies a series of error avoidance measures that must be implemented depending on the required SIL. These error avoidance measures must cover the entire service life of the safety system, i.e. from development of the system right through until it is taken out of commission.

## 8.2 Description

### 8.2.1 Safety function "Safe Torque Off " (STO)

#### Overview

Safety function STO (Safe Torque Off) does not place the DC bus in standby mode. Safety function STO only places the motor in standby mode. The DC bus voltage and the mains voltage for the drive are still present.

**Danger!**

**RISK OF ELECTRIC SHOCK**

- **Do not use safety function STO for purposes other than its intended function.**
- **Use a suitable switch that belongs to the circuit of safety function STO to disconnect the drive from the mains voltage supply.**

**Failure to follow these instructions will result in death or serious injury.**

When safety function STO is triggered, the performance level is disabled immediately. In the case of vertical applications or external forces that act on the drive shaft, additional measures may need to be taken in certain circumstances to stop the motor and keep it stopped when safety function STO is being used, e.g. by applying the service brake.

**Warning!**

**INADEQUATE DECLARATION OR UNINTENDED SYSTEM OPERATION**

- **Make sure that the use of function STO does not lead to unsafe conditions.**
- **If your operation requires stoppage, ensure that the motor comes to a safe stop when function STO is used.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

This function places the motor in a state without torque and/or prevents an unexpected startup of the motor.

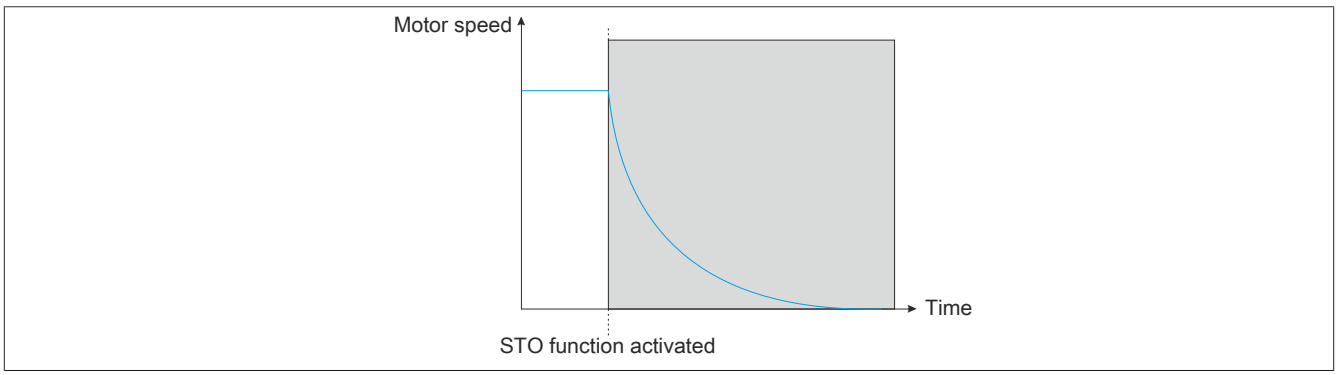
Function "Safe Torque Off" (STO) serves to effectively prevent an unexpected start-up of the motor. This ensures a safe shutdown, as only the power transfer to the motor is interrupted while the main circuits of the frequency inverter continue to be supplied with power.

The principles and requirements for avoiding an unexpected startup of the motor are described in standard EN 1037:1995+A1 (German version: DIN EN 1037:2008-11).

Logic input STO is assigned to this safety function and cannot be changed.

If the triggering of safety function STO requires a dual-channel control, the function can also be activated using the safety-related logic inputs.

Safety function STO is configured using the commissioning software. The state of safety function STO can be displayed using the HMI on the frequency inverter or using the commissioning software.



### Reference guidelines for safety function STO

Safety function STO is defined as follows in section 4.2.2.2 of standard IEC 61800-5-2 (version 1.0 2007.07):

No power that could result in a rotation (or in a movement in the case of linear motors) is transferred to the motor. The PDS (SR) (power drive system suitable for safety-related applications) does not send any energy to the motor that can generate a torque (or power in the case of linear motors).

- NOTE 1: This safety function corresponds to a category 0 uncontrolled stop in accordance with IEC 60204-1.
- NOTE 2: This safety function may be used where it is necessary to disconnect the power supply to prevent an unexpected startup.
- NOTE 3: Situations in which external influences are present (e.g. falling of hanging loads) may require additional measures (e.g. mechanical brake).
- NOTE 4: Electronic instruments and contactors are unsuitable for providing protection against electric shock. Additional insulation measures may be necessary.

### Safety function level (SF) of safety function STO

| Configuration | SIL<br>Safety integrity level in accordance with IEC 61508 | PL<br>Performance level in accordance with ISO 13849-1 |
|---|---|---|
| STO with or without safety module | SIL 2 | PL d |
| STO and LI3 with or without safety module | SIL 3 | PL e |
| LI3 and LI4 | SIL 2 | PL d |
| LI5 and LI6 | SIL 2 | PL d |

### Emergency functions

Standard IEC 60204-1 describes two emergency functions:

- **Emergency switch-off set-up:**
  External switching components are required for this function. It cannot be implemented with functions based on the frequency inverter such as "Safe Torque Off" (STO).
- **Emergency stop set-up:**
  An emergency stop set-up must work in such a way that when it is activated the dangerous movement of the machine stops and the machine cannot start up again under any circumstances, even if the emergency stop is removed.
  An emergency stop set-up must be designed as a category 0 or category 1 stop.
  A category 0 stop means that the power transferred to the motor is cut off immediately. A category 0 stop corresponds to function "Safe Torque Off" (STO) in accordance with the definition in standard EN 61800-5-2.
  In addition to the requirements for stopping (see IEC 60204-1, section 9.2.5.3), the following provisions apply to the emergency stop set-up:
  - It must have priority over all other functions in all operating modes.
  - A reset is only permitted to be executed as a manual action at the place where the command was initiated. The reset command is not permitted to allow the machine to start up again directly. Instead, it can only enable it to be restarted.
  - With regard to the machine environment (IEC 60204-1 and Machinery Directive), the motor is not permitted to automatically start up again when safety function STO is being used to manage a category 0 emergency shutdown if safety function STO was triggered and deactivated (with or without switching off and on the power supply). For this reason, an additional safety module is required if the machine automatically starts up again after safety function STO has been deactivated.

### 8.2.2 Safety function "Safe Stop 1" (SS1)

#### Overview

Safety function "Safe Stop 1" (SS1) monitors the deceleration in accordance with a specific deceleration ramp and safely switches off the torque once standstill has been reached.

If safety function SS1 is activated, it receives priority over all other functions in all operating modes (except for function STO, which has the highest priority).

The SS1 deceleration ramp is specified in the unit Hz/s. The ramp is configured using two parameters:

**[SS1 ramp unit]** (SSrU) (Hz/s) for defining the unit for the ramp in 1 Hz/s, 10 Hz/s and 100 Hz/s

**[SS1 ramp value]** (SSrt) (0.1) for defining the value for the ramp

#### Calculating the ramp

Ramp = SSrU x SSrt

Example: For SSrU = 10 Hz/s and SSrt = 5.0, the value of the deceleration ramp is 50 Hz/s.

Safety function SS1 is configured using the commissioning software. For more information, see "Commissioning" on page 564.

The state of safety function SS1 can be displayed using the HMI on the frequency inverter or using the commissioning software.

#### Behavior when function SS1 is activated

When safety function SS1 is activated, it monitors the deceleration of the motor in accordance with the defined deceleration ramp until standstill is reached and ensures that the motor speed is not above a monitored limit that is determined by the defined deceleration ramp and parameter **[SS1 trip threshold]** (SStt).

If the defined limit is exceeded, the following happens:

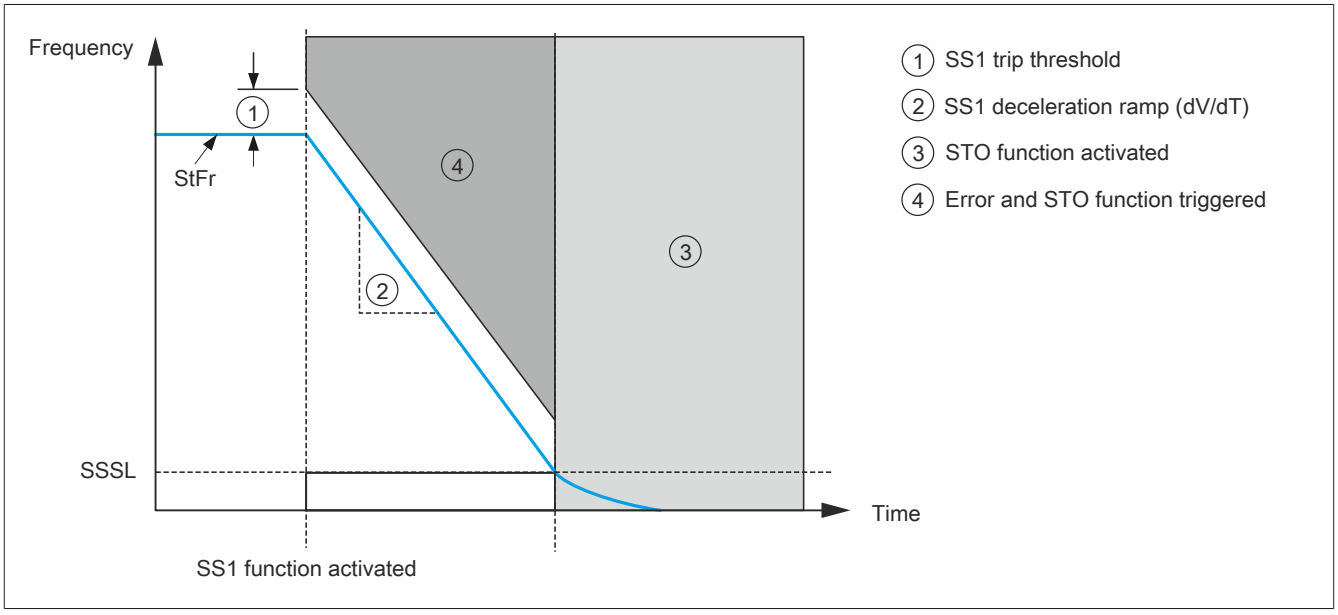
- An error is triggered and error code **[Safe function fault]** (SAFF) is displayed.
- Safety function STO is enabled.

As soon as **[Standstill level]** (SSSL) has been reached, safety function STO is activated.

Function SS1 continues to remain active if the request is removed before standstill has been reached.

**Note:**

**Error detection is dependent on [Stator Frequency] (StFr).**




#### Behavior when function SS1 is deactivated

After an SS1 stop, issue a new move command (even if the move command is set as level).

### SS1 reference guidelines

Function SS1 is defined as follows in section 4.2.2.2 of standard IEC 61800-5-2 standard:

The PDS (SR) (power drive system suitable for safety-related applications) executes the following actions:

- It initiates and controls the motor deceleration rate within defined limits in order to stop the motor and introduces function STO when the motor speed falls below a defined limit.
- Alternatively, it initiates and monitors the motor deceleration rate within defined limits in order to stop the motor and introduces function STO when the motor speed falls below a defined limit.
- Alternatively it initiates the motor deceleration and introduces function STO after an application-specific time delay has elapsed.

**Note:**

**This safety function corresponds to a category 1 controlled stop in accordance with IEC 60204-1.**

### Safety function level (SF) of safety function SS1

| Function | Configuration | SIL<br>Safety integrity level in accordance with IEC 61508 | PL<br>Performance level in accordance with ISO 13849-1 |
|---|---|---|---|
| SS1 type C | STO with safety relay | SIL 2 | PL d |
| | STO and LI3 with safety relay | SIL 3 | PL e |
| SS1 type B | LI3 and LI4 | SIL 2 | PL d |
| | LI5 and LI6 | SIL 2 | PL d |

### Category 1 emergency stop

An emergency stop set-up must work in such a way that when it is activated the dangerous movement of the machine stops and the machine cannot start up again under any circumstances, even if the emergency stop is removed.

An emergency stop set-up must be designed as a category 0 or category 1 stop.

A category 1 stop is a controlled shutdown in which the energy supply to the motor to execute the shutdown process is maintained and only interrupted once this process has been completed.

A category 1 stop corresponds to function **[Safe ramp]** (SS1) in accordance with the definition in standard EN 61800-5-2.

In addition to the requirements for stop (see IEC 60204-1, section 9.2.5.3), the following provisions apply to the emergency stop set-up:

- It must have priority over all other functions in all operating modes.
- A reset is only permitted to be executed as a manual action at the place where the command was initiated. The reset command is not permitted to allow the machine to start up again directly. Instead, it can only enable it to be restarted.

With regard to the machine environment (IEC 60204-1 and Machinery Directive), the motor is not permitted to automatically start up again when safety function SS1 is being used to manage a category 1 emergency shutdown if safety function SS1 was triggered and deactivated (with or without switching off and on the power supply). For this reason, an additional safety module is required if the machine automatically starts up again after safety function SS1 has been deactivated.

### 8.2.3 Safety function "Safely Limited Speed" (SLS)

#### Overview

This function is used to limit the speed of a motor.

There are six types of SLS function:

- SLS type 1: Limits the motor speed to the actual speed.
- SLS type 2: Limits the motor speed to a value set using a parameter.
- SLS type 3: Corresponds to type 2 but there is a specific behavior if the motor speed exceeds the threshold set using a parameter.
- SLS type 4: Limits the motor speed to a value set using a parameter. The direction of rotation can be changed while the safety function is active.
- SLS type 5: Corresponds to type 4 but there is a specific behavior if the motor speed exceeds the threshold set using a parameter.
- SLS type 6: Corresponds to type 4 but there is a specific behavior if the motor speed exceeds the threshold set using a parameter.

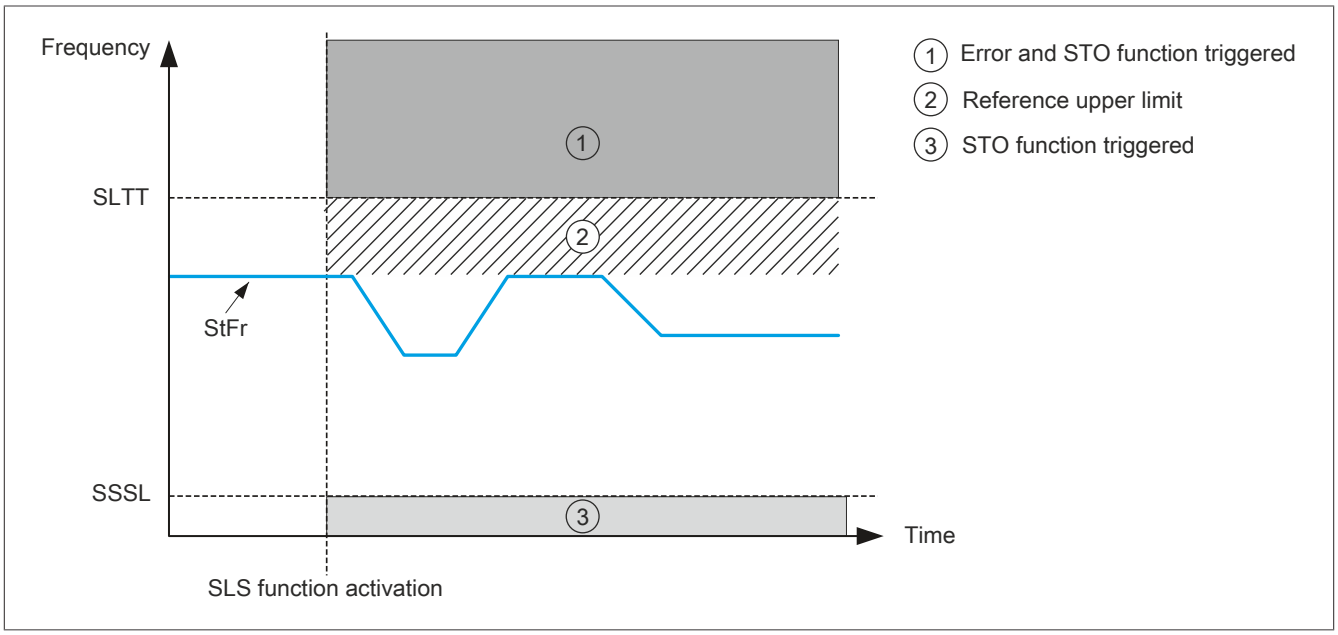
**Note:**

**SLS types 2 and 3 use parameter [SLS Wait time] (SLwt) so that the motor can run below [Standstill level ] (SSSL) for a specific period after safety function SLS has been activated.**

Safety function SLS is configured using the commissioning software. For more information, see "Commissioning" on page 564.

The state of safety function SLS can be displayed using the HMI of the frequency inverter or using the commissioning software.

#### Behavior when safety function SLS type 1 is activated



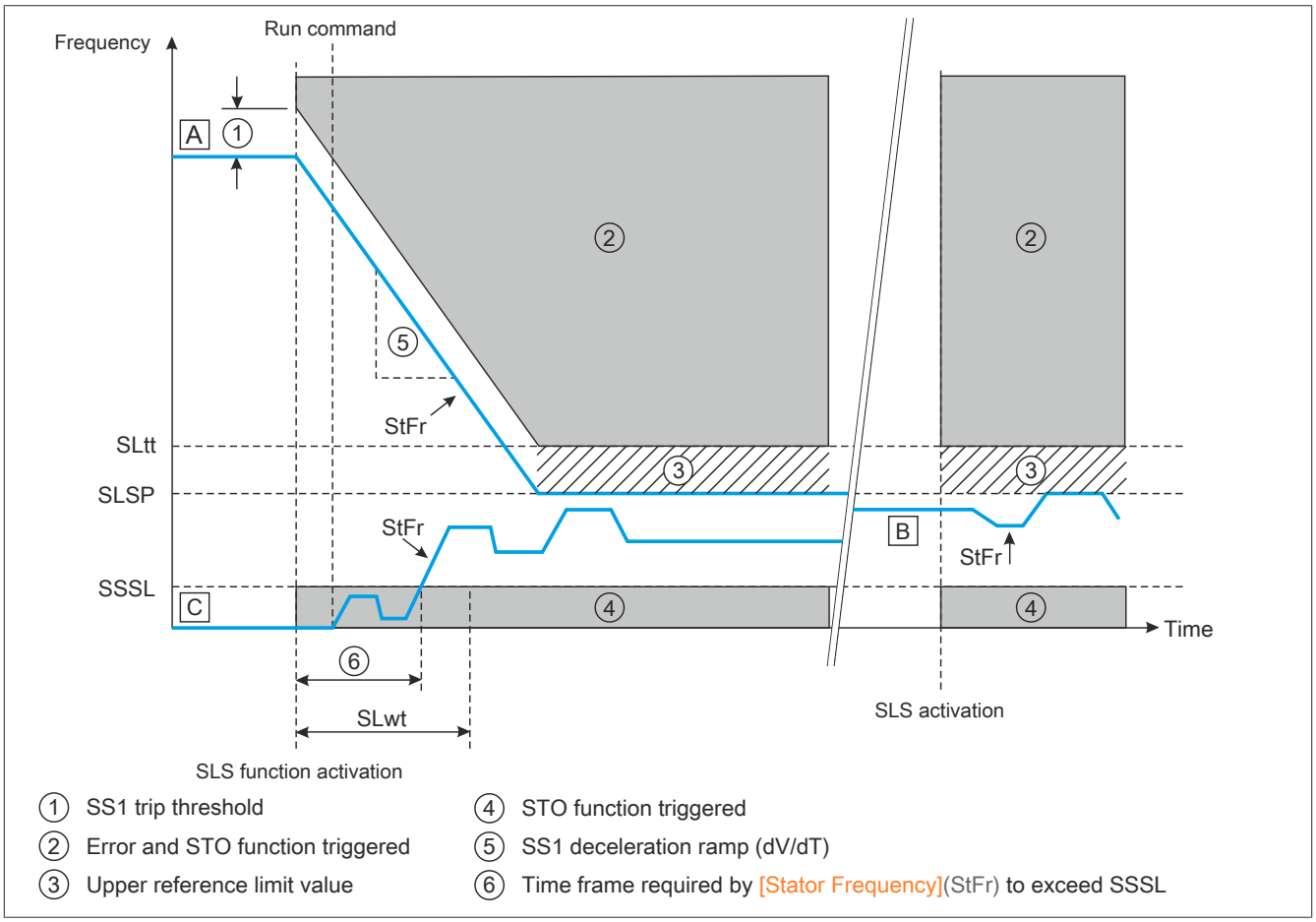

When the safety function is activated:

- If [Stator Frequency] (StFr) is above [SLS tolerance threshold] (SLtt), safety function STO is activated and an error is triggered with error code [Safe function fault] (SAFF).
- If [Stator Frequency] (StFr) is below [SLS tolerance threshold] (SLtt), the stator frequency is limited to the actual stator frequency. The frequency setpoint only varies between this value and the SSSL standstill value.

While the function is activated:

- If [Stator Frequency] (StFr) falls and reaches [Standstill level] (SSSL), safety function STO is activated.
- If [Stator Frequency] (StFr) rises and reaches [SLS tolerance threshold] (SLtt), safety function STO is activated and an error is triggered with error code [Safe function fault] (SAFF).

### Behavior when safety function SLS type 2 is activated




[A]: **[Stator Frequency]** (StFr) is above **[Reference]** (SLSP).

[B]: **[Stator Frequency]** (StFr) is between **[Standstill level]** (SSSL) and **[Reference]** (SLSP).

[C]: **[Stator Frequency]** (StFr) is under **[Standstill level]** (SSSL) and **[SLS delay]** (SLwt) ≠ 0.

When the function is activated:

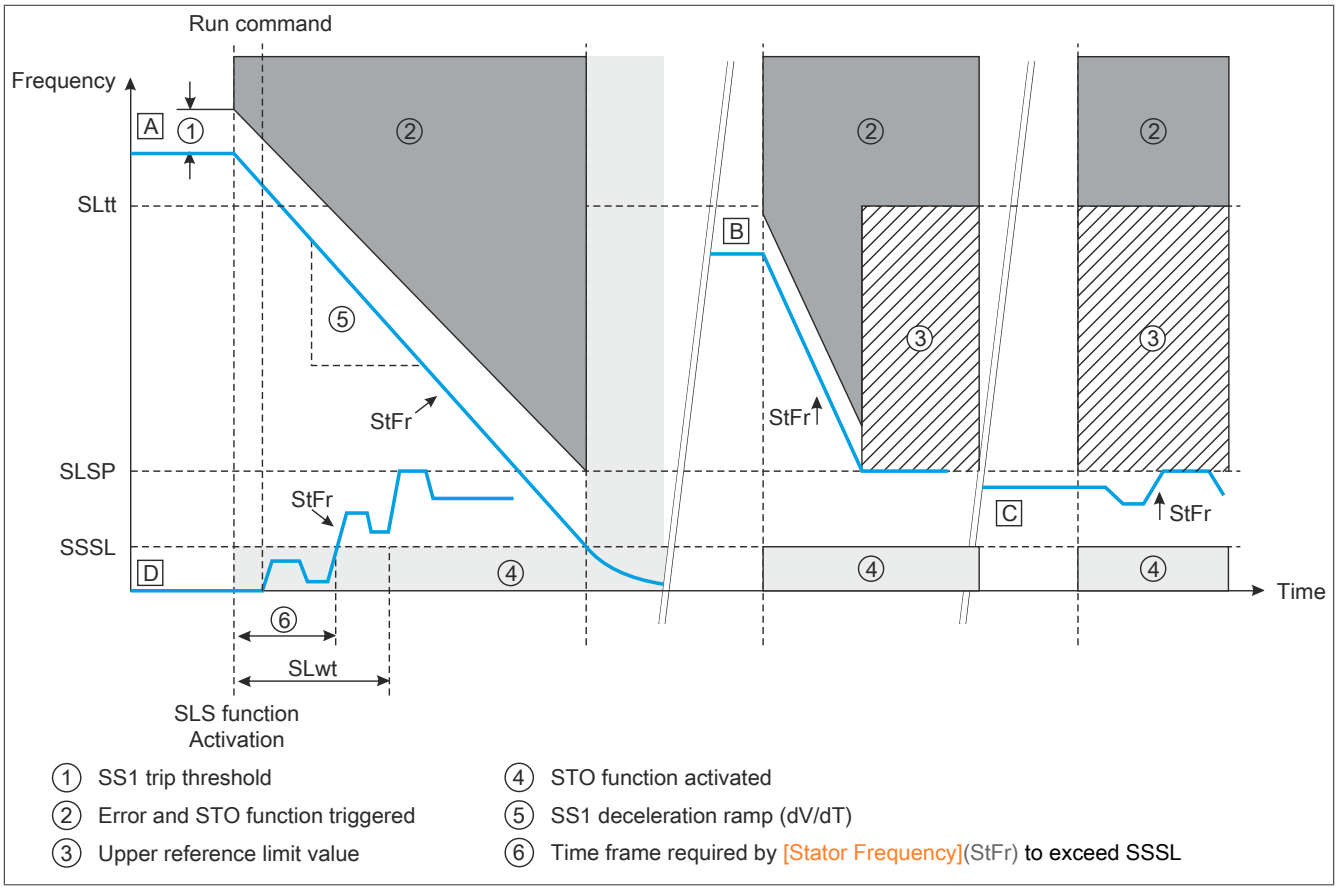
- If **[Stator Frequency]** (StFr) is above **[Reference]** (SLSP), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]** (SLSP) is reached (see case A).
- If **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP), the current reference value is not changed but is instead limited to just **[Reference]** (SLSP) (see case B).
- If **[Stator Frequency]** (StFr) is still below **[Standstill level]** (SSSL) of the frequency after **[SLS Wait time]** (SLwt) has expired, safety function STO is activated (see case C).

While the function is activated:

- The reference frequency value can only vary between **[Reference]** (SLSP) and **[Standstill level]** (SSSL).
- If **[Stator Frequency]** (StFr) falls and reaches **[Standstill level]** (SSSL), safety function STO is activated.
- If **[Stator Frequency]** (StFr) rises and reaches **[SLS tolerance threshold]** (SLtt), safety function STO is activated and an error is triggered with error code **[Safe function fault]** (SAFF).

### Behavior when safety function SLS type 3 is activated

SLS type 3 exhibits the same behavior as SLS type 2 with the following exception: If **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt), safety function SS1 is activated instead of deceleration occurring to **[Reference]** (SLSP) (see case A).




[A]: **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt).

[B]: **[Stator Frequency]** (StFr) is between **[Reference]** (SLSP) and **[SLS tolerance threshold]** (SLtt).

[C]: **[Stator Frequency]** (StFr) is between **[Standstill level]** (SSSL) and **[Reference]** (SLSP).

[D]: **[Stator Frequency]** (StFr) is below **[Standstill level]** (SSSL) and **[SLS Wait time]** (SLwt) ≠ 0.

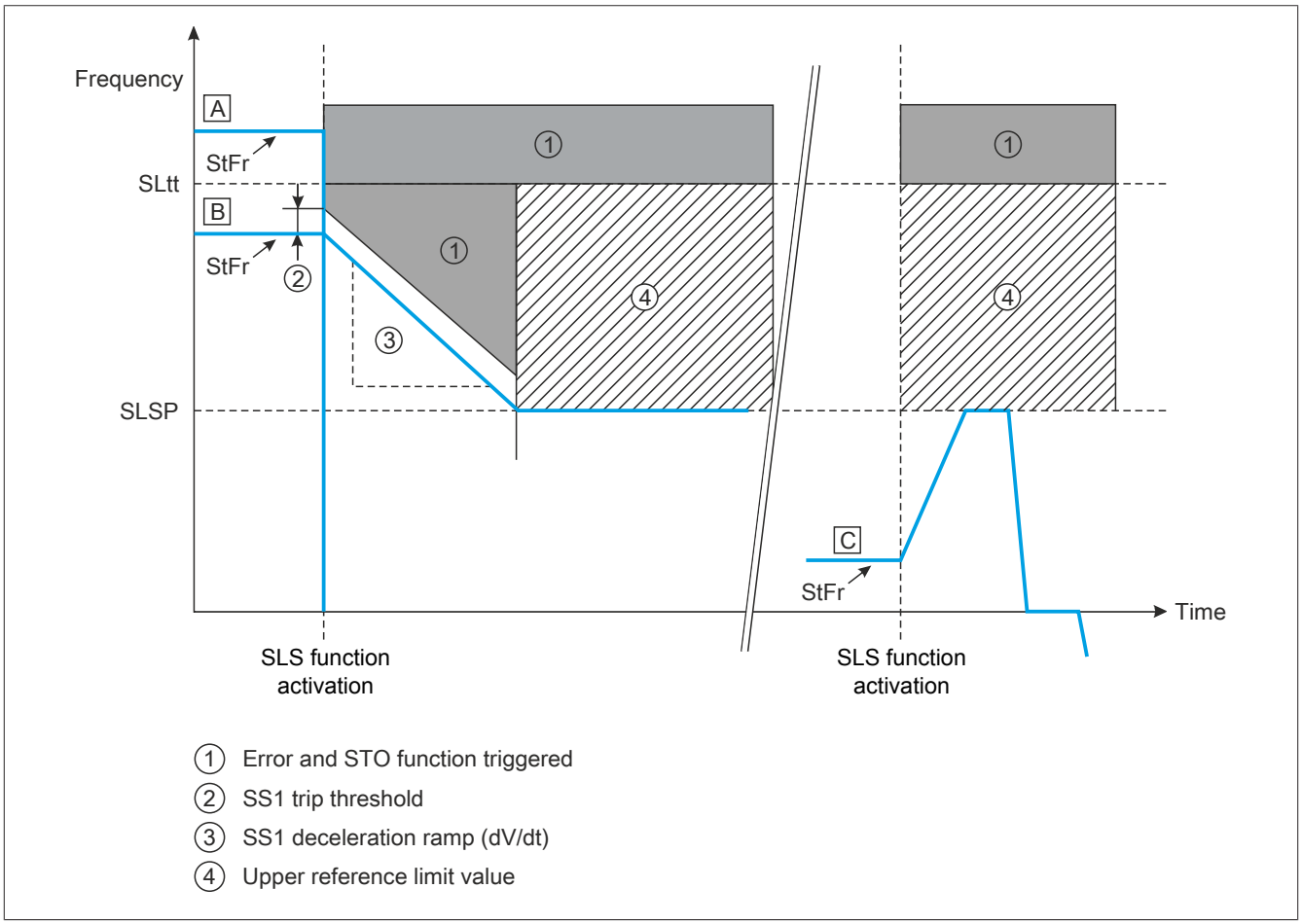
When the function is activated:

- If **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt), safety function SS1 is activated (see case A).
- If **[Stator Frequency]** (StFr) is between **[SLS tolerance threshold]** (SLtt) and **[Reference]** (SLSP), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]** (SLSP) has been reached (see case B).
- If **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP), the current reference value is not changed but is instead limited to just **[Reference]** (SLSP) (see case C).
- If **[Stator Frequency]** (StFr) is still below **[Standstill level]** (SSSL) of the frequency after **[SLS Wait time]** (SLwt) has expired, safety function STO is activated (see case D).

While the function is activated:

- The reference frequency value can only vary between **[Reference]** (SLSP) and **[Standstill level]** (SSSL).
- If **[Stator Frequency]**(StFr) falls and reaches **[Standstill level]** (SSSL) of the frequency, safety function STO is activated.
- If **[Stator Frequency]** (StFr) rises and reaches **[SLS tolerance threshold]** (SLtt), safety function STO is activated and an error is triggered with error code **[Safe function fault]** (SAFF).

### Behavior when safety function SLS type 4 is activated




[A]: **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt).

[B]: **[Stator Frequency]** (StFr) is between **[Reference]** (SLSP) and **[SLS tolerance threshold]** (SLtt).

[C]: **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP).

> **Note:**
>
> **If (SLTT) ≤ (SLSP) for SLS type 4, an SAFF error is triggered.**

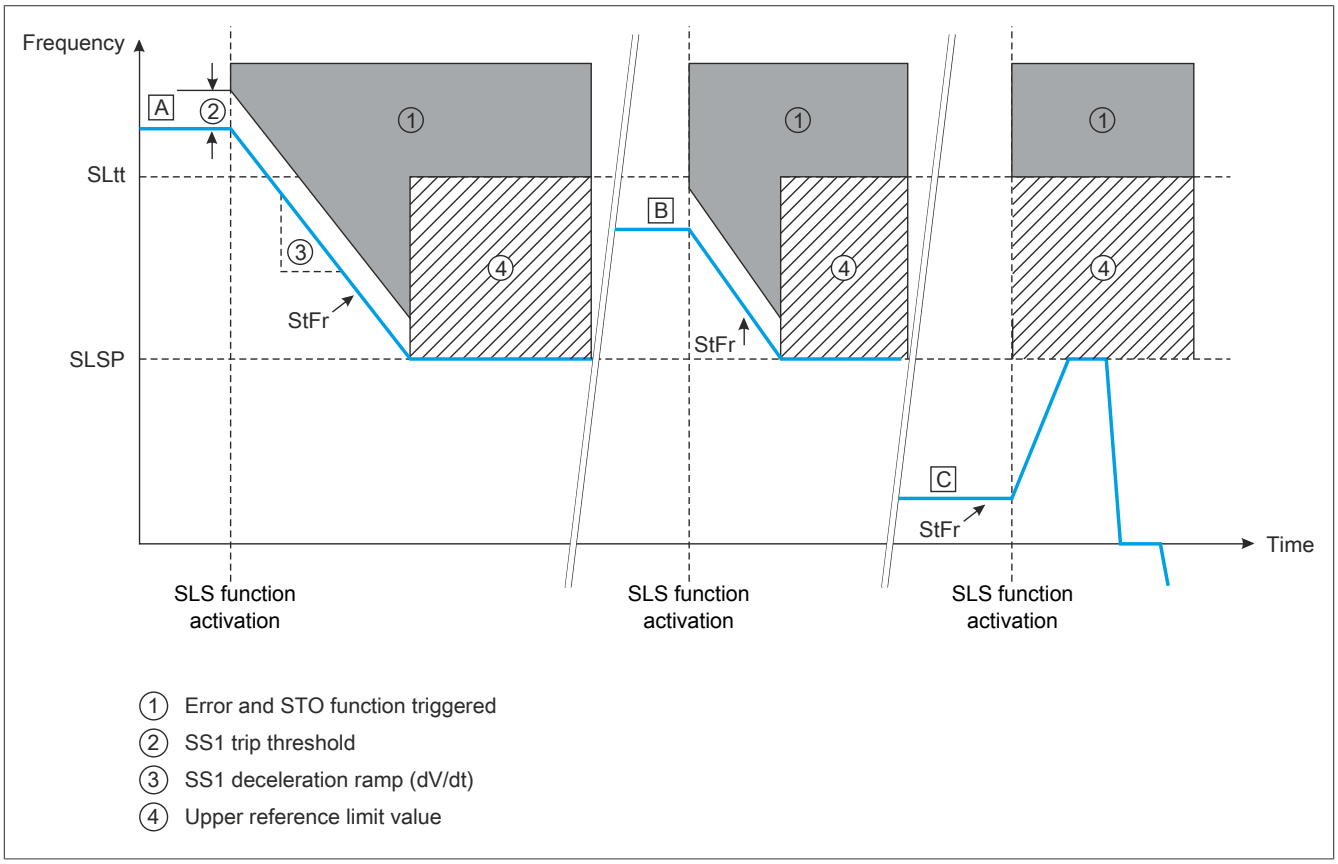
When the function is activated:

- If **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt), safety function STO and error code **[Safe function fault]** (SAFF) are activated (see case A).
- If **[Stator Frequency]** (StFr) is between **[SLS tolerance threshold]** (SLtt) and **[Reference]** (SLSP), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]**(SLSP) has been reached (see case B).
- If **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP), the current reference value is not changed but is instead limited to just **[Reference]** (SLSP) (see case C).

While the function is activated:

- The reference frequency value can vary between **[Reference]** (SLSP) in both directions.
- If **[Stator Frequency]** (StFr) rises and reaches **[SLS tolerance threshold]** (SLtt), safety function STO is activated and an error is triggered with error code **[Safe function fault]** (SAFF).

### Behavior when safety function SLS type 5 is activated




[A]: **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt).

[B]: **[Stator Frequency]** (StFr) is between **[Reference]** (SLSP) and **[SLS tolerance threshold]** (SLtt).

[C]: **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP).

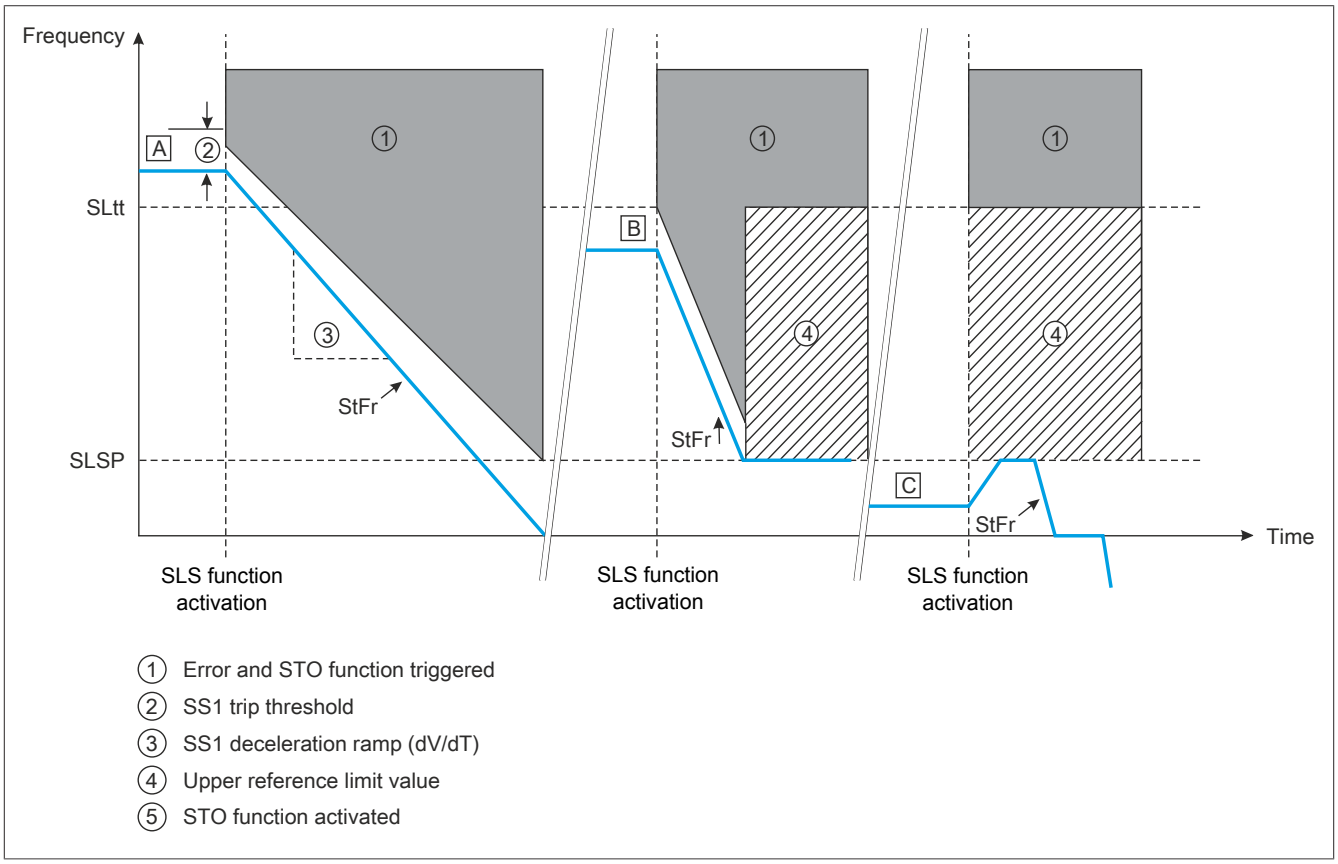
When the function is activated:

- If **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]** (SLSP) has been reached (see case A).
- If **[Stator Frequency]** (StFr) is between **[SLS tolerance threshold]** (SLtt) and **[Reference]** (SLSP), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]** (SLSP) has been reached (see case B).
- If **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP), the current reference value is not changed but is instead limited to just **[Reference]** (SLSP) (see case C).

While the function is activated:

- The reference frequency value can vary between **[Reference]** (SLSP) in both directions.
- If **[Stator Frequency]** (StFr) rises and reaches **[SLS tolerance threshold]** (SLtt), safety function STO is activated and an error is triggered with error code **[Safe function fault]** (SAFF).

### Behavior when safety function SLS type 6 is activated




[A]: **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt).

[B]: **[Stator Frequency]** (StFr) is between **[Reference]** (SLSP) and **[SLS tolerance threshold]** (SLtt).

[C]: **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP).

When the function is activated:

- If **[Stator Frequency]** (StFr) is above **[SLS tolerance threshold]** (SLtt), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until a value of 0 Hz has been reached (see case A).
- If **[Stator Frequency]** (StFr) is between **[SLS tolerance threshold]** (SLtt) and **[Reference]** (SLSP), the frequency inverter decelerates in accordance with the SS1 deceleration ramp until **[Reference]** (SLSP) has been reached (see case B).
- If **[Stator Frequency]** (StFr) is below **[Reference]** (SLSP), the current reference value is not changed but is instead limited to just **[Reference]** (SLSP) (see case C).

While the function is activated:

- The reference frequency value can vary between **[Reference]** (SLSP) in both directions.
- If **[Stator Frequency]** (StFr) rises and reaches **[SLS tolerance threshold]** (SLtt), safety function STO is activated and an error is triggered with error code **[Safe function fault]** (SAFF).

#### Behavior when safety function SLS is deactivated for all SLS types

- If the frequency inverter is still in operation when the function is disabled, then the frequency setpoint of the active channel is applied.
- If safety function STO has been enabled and the frequency inverter is not in an error state, then a new move command must be applied.
- If safety function SLS type 2, 3, 4 is disabled while the drive is decelerating to **[Setpoint]** (SLSP) according to SS1 deceleration ramp, safety function SLS type 3 is disabled while safety function SS1 is enabled, then safety function SLS remains enabled until **[Setpoint]** (SLSP) has been reached.
  STO is enabled if **[Standstill level]** (SSSL) is reached and a new move command must be applied.
- If a stop command is applied, then safety function SLS remains enabled and the frequency inverter decelerates until standstill is reached.
  Function STO will be activated for SLS type 1, 2 or 3 if **[Stator Frequency]** (StFr)decreases and the frequency reaches **[Standstill level]** (SSSL).
- If an error is detected, safety function SLS remains active and the frequency inverter decelerates according to the configured error response.
  Function STO will be activated for SLS type 1, 2 or 3 after **[Standstill level]** (SSSL) of the frequency has been reached. The frequency inverter can be reset as soon as the error is resolved.

#### SLS reference guidelines

Safety function SLS is defined in section 4.2.3.4 of the IEC standard 61800-5-2 as follows: Function SLS helps to prevent the motor speed from exceeding the defined limit value.

#### Safety function level (SF) of safety function SLS

| Configuration | SIL<br>Safety integrity level in accordance with IEC 61508 | PL<br>Power stage per ISO 13849-1 |
|---|---|---|
| LI3 and LI4 | SIL 2 | PL d |
| LI5 and LI6 | SIL 2 | PL d |

### 8.2.4 Safety function SMS (Safe Maximum Speed)

#### Overview

This function prevents the motor speed from exceeding the defined safe maximum speed limit value.

Safety function SMS is configured using the commissioning software. For more information, see "Commissioning" on page 564.

Parameter **[SMS Activation]** (SMSA) activates and deactivates function SMS.

The following parameters can be used to define two speed limit values:

- **[SMS Low Limit]** (SMLL): Used for selecting the lower speed limit.
- **[SMS High Limit]** (SMLH): Used for selecting the upper speed limit.

Depending on setting **[SMS Assignment]** (SMLS), **[SMS Low Limit]** (SMLL) or **[SMS High Limit]** (SMLH) apply as the limit value for the safe maximum speed.

If**[SMS Assignment]** (SMLS) is set to L34 or L56 (logic input 3 and 4 or logic input 5 and 6), the following applies:

- If logic input is Low (0), **[SMS Low Limit]** (SMLL) applies as the limit value for the safe maximum speed.
- If logic input is High (1), **[SMS High Limit]** (SMLH) applies as the limit value for the safe maximum speed.

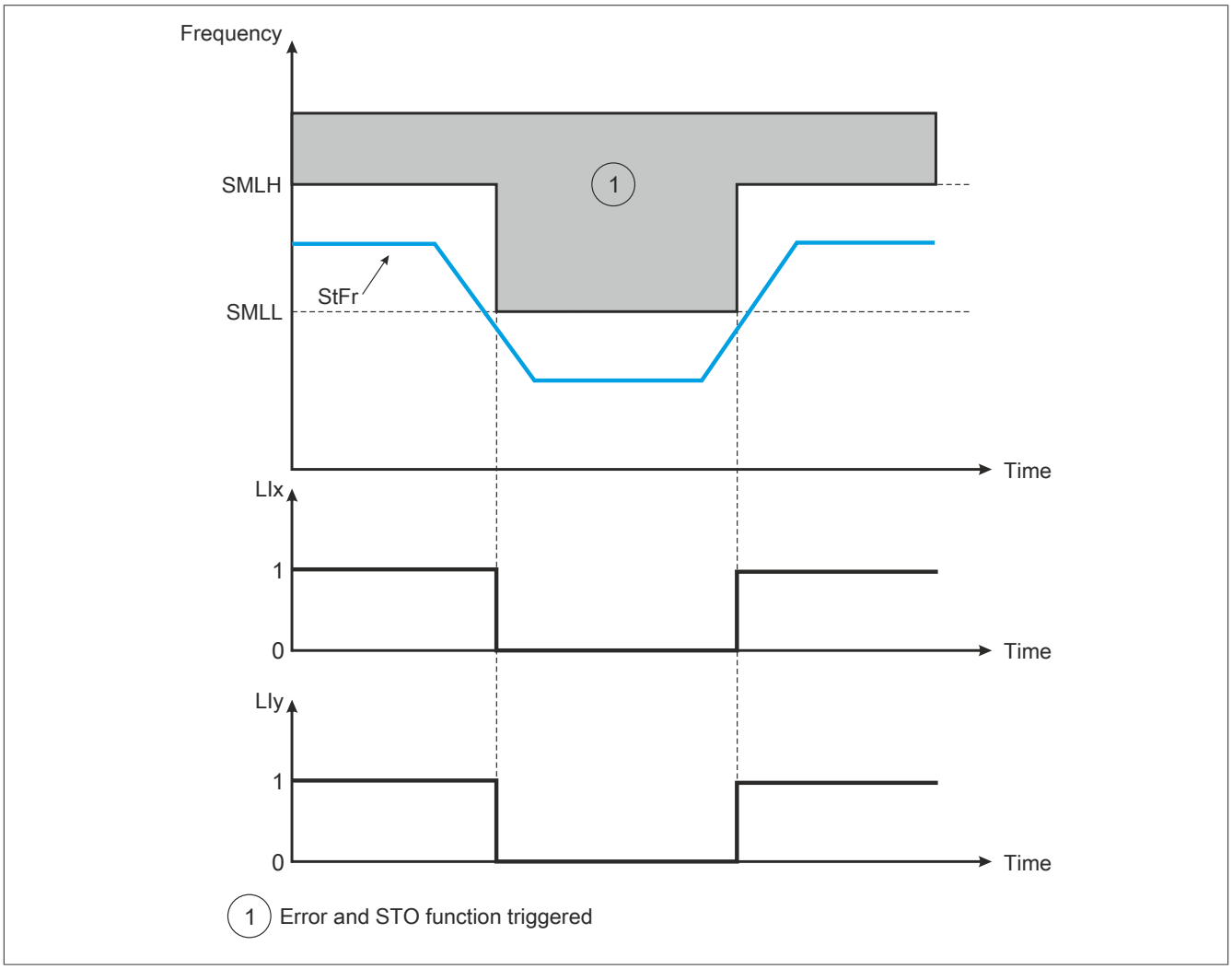
If**[SMS Assignment]** (SMLS) is set to NO, **[SMS Low Limit]** (SMLL) applies as the limit value for the safe maximum speed.

**Note:**

- **Function SMS is not used to set the speed setpoint.**
- **The speed setpoint should be set via an active speed setpoint channel according to the setting for [SMS Low Limit] (SMLL) and [SMS High Limit] (SMLH).**

The state of safety function SMS is displayed on the graphic display terminal of the frequency inverter and on the monitoring tab of the commissioning software.

### Behavior when safety function SMS is activated




While the function is activated, the following applies:

- When logic inputs (LIx and LIy) are Low (0) and **[Stator Frequency]** (StFR) increases and reaches **[SMS Low Limit]** (SMLL), function STO is triggered and an error with error code **[Safe function fault]** (SAFF) is displayed.
- When logic inputs (LIx and LIy) are High (1) and **[Stator Frequency]** (StFR) increases and reaches **[SMS High Limit]** (SMLH), function STO is triggered and an error with error code **[Safe function fault]** (SAFF) is displayed.
- When logic inputs (LIx and LIy) are not assigned and**[Stator Frequency]** (StFR) increases and reaches **[SMS Low Limit]** (SMLL), function STO is triggered and an error with error code **[Safe function fault]** (SAFF) is displayed.

### Reference guidelines for function SMS

Safety function SMS is not defined in the IEC 61800-5-2 guidelines. Function SMS prevents the motor speed from exceeding the specified speed limit. If the motor speed exceeds the specified speed limit, safety function STO is triggered. Function SMS can only be activated and deactivated with the commissioning software. When the function is deactivated , it continuously monitors the stator frequency irrespective of the operating mode.

### Safety function level (SF) of safety function SMS

| Configuration | Safety Integrity Level (SIL) in accordance with IEC 61508 | Power stage (PL) per ISO 13849-1 |
|---|---|---|
| LI3 and LI4 | SIL 2 | PL d |
| LI5 and LI6 | SIL 2 | PL d |
| No | SIL 2 | PL d |

### 8.2.5 Safety function GDL (safety gate interlock)

#### Overview

This function is used to unlock the safety gate after a preset delay when the motor is switched off. The front door of the machine can only be opened when the motor has been switched off beforehand. This function is designed to help ensure user safety.

For details of the certified wiring diagram see single motor drive according to IEC 61508 and IEC 62061 for function GDL (see "Single drive per IEC 61508 and IEC 62061 with safety function GDL" on page 563).

Parameter **[GDL Assignment]** (GDLA) activates and deactivates function GDL.

Function GDL uses parameter LO1.

The following parameters can be used to set two delays.

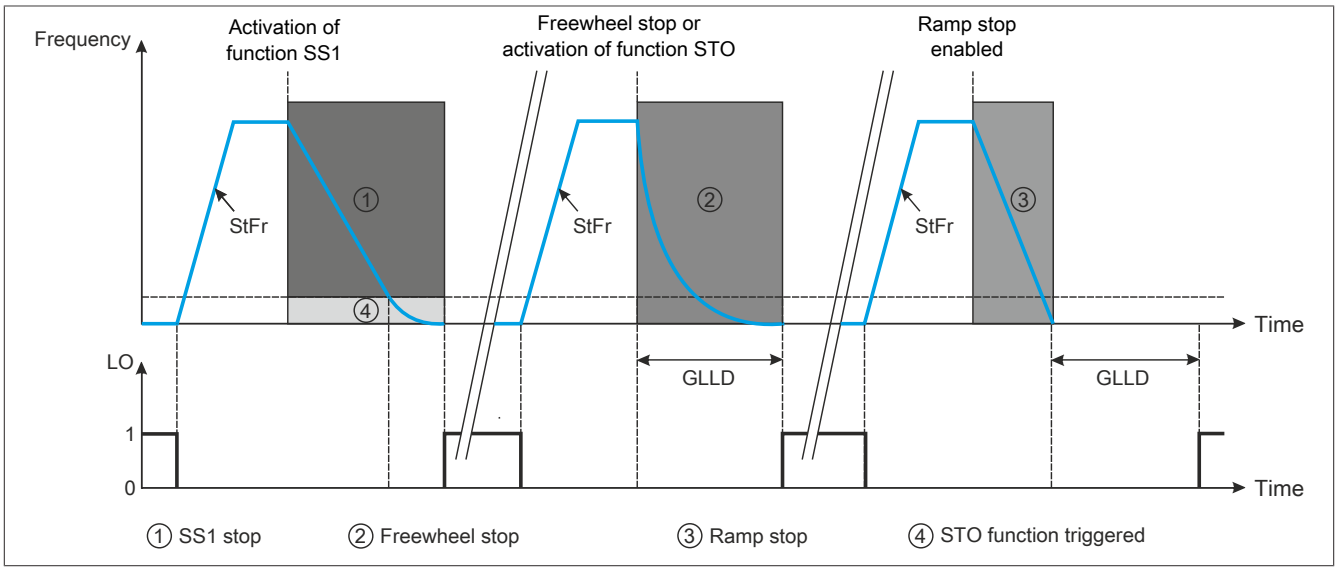
- **[GDL Long Delay]** (GLLD): Long delay after any stop command (e.g. STO, stop ramp, DC injection braking) except SS1 stop ensures that the machine is stopped.
- **[GDL Short Delay]** (GLSD): Short delay after SS1 ramp to ensure that the machine is stopped.

> **Note:**
>
> **[GDL Long Delay] (GLLD) and [GDL Short Delay] (GLSD) will be defined on the basis of the characteristics and requirements of the machine.**

Safety function GDL is configured using the commissioning software. For additional information, see "Commissioning" on page 564.

The state of safety function GDL is displayed on the graphic display terminal of the frequency inverter and on the monitoring tab of the commissioning software.

#### Behavior when safety function GDL is activated




While the function is activated, the following applies:

- If safety function SS1 is triggered, logic output (LO) changes to High (1) after **[Guard Door Locking Short Delay]** (GLSD) expiry and the safety gate is unlocked.
- If a stop is triggered with a freewheel stop or safety function STO is triggered, logic output (LO) changes to High (1) after **[Guard Door Locking Long Delay]** (GLLD) expiry and the safety gate is unlocked.
- If a ramp stop is triggered, logic output (LO) changes to High (1) after **[Guard Door Locking Long Delay]** (GLLD) expiry and the safety gate is unlocked.

#### Reference guidelines for function GDL

Safety function GDL is not defined in the IEC 61800-5-2 guidelines. Function GDL enables the unlocking of the safety gate when the motor is switched off.

### Safety function level (SF) of safety function GDL

| Configuration | Safety integrity level (SIL) according to IEC 61508 | Power stage (PL) per ISO 13849-1 |
|---|---|---|
| STO with safety module | SIL 1 | PL c |

## 8.3 Calculation of parameters relating to safety

### 8.3.1 SLS type 1

#### Record application data

The following data must be recorded before beginning to configure function SLS:

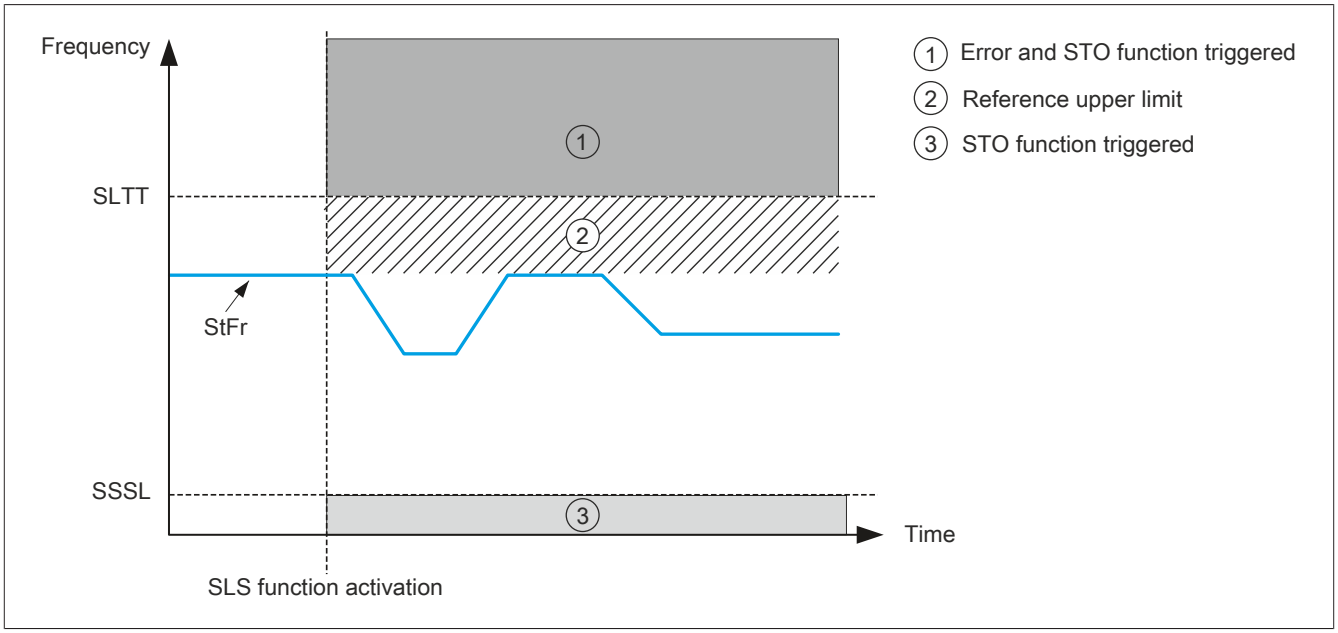
| Code | Description | Unit | Note |
|---|---|---|---|
| (FrS) | [Rated motor freq.] | Hz | See motor nameplates. |
| (nSp) | [Rated motor speed] | rpm | See motor nameplates. |
| ppn | Number of motor pole pairs | - | See motor nameplates. |
| Max. HSP freq | Maximum motor frequency in normal operation. | Hz | This value is equal to or lower than value [High speed] (HSP). |

Calculation of the nominal value of slip compensation "Fslip" (Hz) for the motor:

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

#### Configuration of the function

#### Outline diagram




#### Standstill value

The recommended standstill value is: SSSL = Fslip

If a different standstill value is required for the application, it can be configured in accordance with parameter SSSL.

#### Threshold value of the output frequency.

The recommended parameter value is SLtt = 1.2 x Max. freq HSP + Fslip

#### Test and set the configuration

Once configured, check that function SLS behaves as expected.

If an error is triggered with error code[Safe function fault] (SAFF), follow the corrective measures detailed below.

| Context | Inverter state | Tuning the inverter |
|---|---|---|
| SLS activated and motor running with frozen frequency setpoint | • SAFF error code<br>• SFFE.7 = 1 | Motor frequency has reached its threshold value.<br>An instability in the frequency may be the reason for the error. Check and correct the cause.<br>The value of SLtt can be changed to increase the tolerance value according to the instability of the drive system. |

### Example

| Code | Description | Unit |
|---|---|---|
| (FrS) | [Rated motor freq.] | 50 Hz |
| (nSp) | [Rated motor speed] | 1350 rpm |
| ppn | Number of motor pole pairs | 2 |
| Max. HSP freq | Maximum motor frequency in normal operation.<br>This value is equal to or lower than value [High speed] (HSP). | 50 Hz |

With these numeric values, the configuration of SLS type 1 is as follows:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5 \ Hz$$

SSSL = Fslip = 5 Hz

SLtt = 1.2 x Max. freq HSP + Fslip = 1.2 x 50 + 5 = 65 Hz

## 8.3.2 SLS type 2, type 3, type 4, type 5 and type 6

### Record application data

The following data must be recorded before beginning to configure function SLS:

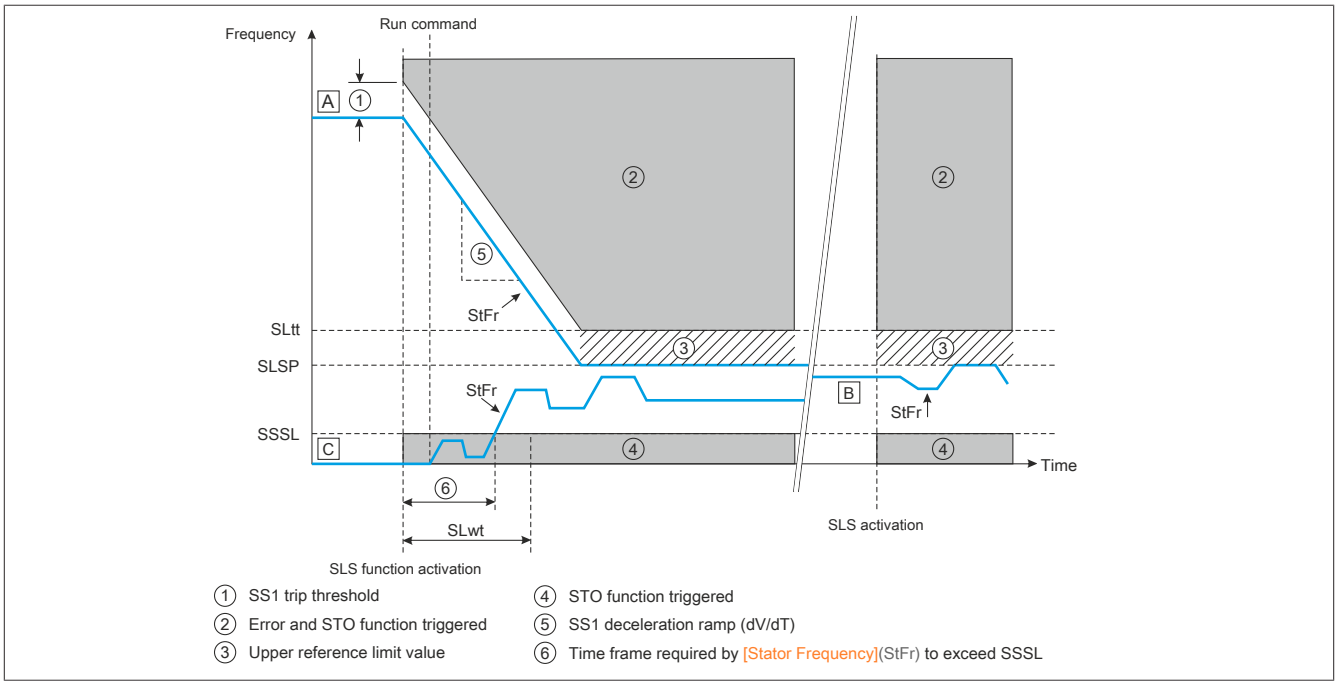
| Code | Description | Unit | Note |
|---|---|---|---|
| (FrS) | [Rated motor freq.] | Hz | See motor nameplates. |
| (nSp) | [Rated motor speed] | rpm | See motor nameplates. |
| ppn | Number of motor pole pairs | - | See motor nameplates. |
| Max. HSP freq | Maximum motor frequency in normal operation. | Hz | This value is equal to or lower than value [High speed] (HSP). |
| SS1 deceler-ation ramp | Deceleration ramp to be applied when SS1 ramp is triggered | Hz | - |

Calculation of the nominal value of slip compensation "Fslip" (Hz) for the motor:

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

## Configuration of the function

### Outline diagram




[A]: **[Stator Frequency]** (StFr) is above **[Reference]** (SLSP).

[B]: **[Stator Frequency]** (StFr) is between **[Standstill level]** (SSSL) and **[Reference]** (SLSP).

[C]: **[Stator Frequency]** (StFr) is under **[Standstill level]** (SSSL) and **[SLS delay]** (SLwt) ≠ 0.

#### Standstill value

The recommended standstill value is: SSSL = Fslip If a different standstill value is required for the application, it can be configured in accordance with parameter SSSL.

#### Ramp value and ramp unit

Set parameter (SSrt) (ramp value) and (SSrU) (ramp unit) according to the deceleration ramp that is to be applied when safety function SS1 is activated.
Ramp calculation: Ramp = SSrU x SSrt
Example 1: If SSrU = 1 Hz/s and SSrt = 500.0, the deceleration ramp is 500.0 Hz/s and the accuracy is 0.1 Hz.
Example 2: If SSrU = 10 Hz/s and SSrt = 50.0, the deceleration ramp is 500 Hz/s and the accuracy is 1 Hz.
Use the table to set the correct accuracy according to the deceleration ramp to be applied when safety function SS1 is activated.

| Min. | Max. | Accuracy | SSrt | SSrU |
|---|---|---|---|---|
| 0.1 Hz/s | 599 Hz/s | 0.1 Hz/s | 1 Hz/s | SS1 deceleration ramp |
| 599 Hz/s | 5990 Hz/s | 1 Hz/s | 10 Hz/s | SS1 deceleration ramp/10 |
| 5990 Hz/s | 59900 Hz/s | 10 Hz/s | 100 Hz/s | SS1 deceleration ramp/100 |

#### SLS setpoint

Set SLS setpoint parameter (SLSP) to: SLSP= Fsetpoint (SLS)

#### Motor frequency and ramp threshold value

The recommended motor frequency threshold value is SLtt = 1.2 x SLSP + Fslip and the recommended threshold value of the SS1 ramp is SStt = 0.2 x Max. Freq HSP.

#### SLS delay

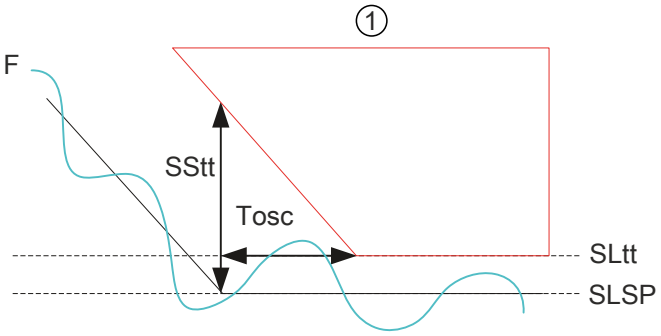
Set **[SLS delay]** (SLwt) to a value over 0 ms, so that over a specific time frame the motor can run under **[Standstill level]** (SSSL), once safety function SLS has been activated.

> **Note:**
>
> **When SLS type 4 is configured, [SLS delay] (SLwt) must be set to 0, as otherwise an error is triggered and error code [Safe function fault] (SAFF) is displayed.**

### Test and set the configuration

Once configured, check that function SLS behaves as expected.

If an error is triggered with error code **[Safe function fault]**(SAFF), follow the corrective measures detailed below.

| Context | Inverter state | Tuning the inverter |
|---|---|---|
| SLS activated and deceleration ramp in progress | • SAFF error code<br>• SFFE.3 = 1 | Motor frequency has reached its threshold value.<br>An instability in the frequency may be the reason for the error. Check and correct the cause. The value of SLtt can be changed to increase the tolerance value in correspondence to the drive system instability. |
| SLS activated and ramp end at SLSP frequency | • SAFF error code<br>• SFFE.3 = 1 or<br>• SFFE.7 = 1 | Stabilization of the motor frequency at SLSP is taking too long and has reached the error detection conditions of the safety function.<br>  <br><br>① Safety function error detection<br>Tosc: T oscillation<br>F: Frequency<br>The fluctuations must fall below (SLtt), before time frame T (oscillation) has expired.<br>If the condition has not been removed, an error will be triggered and error code **[Safe function fault]** (SAFF) is displayed. The relationship between (SStt) and T (oscillation) is as follows:<br>$T\left(osc\right)=\frac{SSTT - (SLTT - SLSP - Fslip)}{SSRT \times SSRU}$<br>Motor frequency has reached its threshold value.<br>An instability in the frequency may be the reason for the error. Check and correct the cause. The value of SStt can be changed to increase the tolerance value according to the fluctuations of the drive system. |
| SLS activated and motor running with SLSP frequency | • SAFF error code<br>• SFFE.7 = 1 | Motor frequency has reached its threshold value.<br>An instability in the frequency may be the reason for the error. Check and correct the cause. The value of SLtt can be changed to increase the tolerance value in correspondence to the drive system instability. |

### Example

| Code | Description | Unit |
|---|---|---|
| (FrS) | Rated motor frequency | 50 Hz |
| (nSp) | Rated motor speed | 1,350 rpm |
| ppn | Number of motor pole pairs | 2 |
| Max. HSP freq | Maximum motor frequency in normal operation. This value is equal to or lower than value **[High speed]** (HSP). | 50 Hz |
| Fsetpoint(SLS) | Motor frequency setpoint | 15 Hz |
| SS1 deceleration ramp | Deceleration ramp to be applied when SS1 is triggered | 20 Hz/s |

With these numeric values, the configuration of SLS types 2, 3 and 4 is as follows:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5 \; Hz$$

SSSL = Fslip = 5 Hz
SSrU = 1 Hz/s and SSrt = 20 when SS1 deceleration ramp = 20 Hz/s (accuracy: 0.1 Hz)
SLSP = Fsetpoint(SLS) = 15 Hz
SLtt = 1.2 x SLSP + Fslip = 1.2 x 15 + 5 = 23 Hz
SStt = 0.2 x Max. Freq HSP = 0.2 x 50 = 10 Hz

$$T\left(oscillation\right) = \frac{SSSt - (SLtt - SLSP - Fslip)}{SSrt \times SSrU} = \frac{10 - (23 - 15 - 5)}{20 \times 1} = 350 \; ms$$

In this example, the frequency fluctuations are permitted to exceed SLtt for 350 ms.

## 8.3.3 SS1

### Record application data

The following data must be recorded before configuring function SS1:

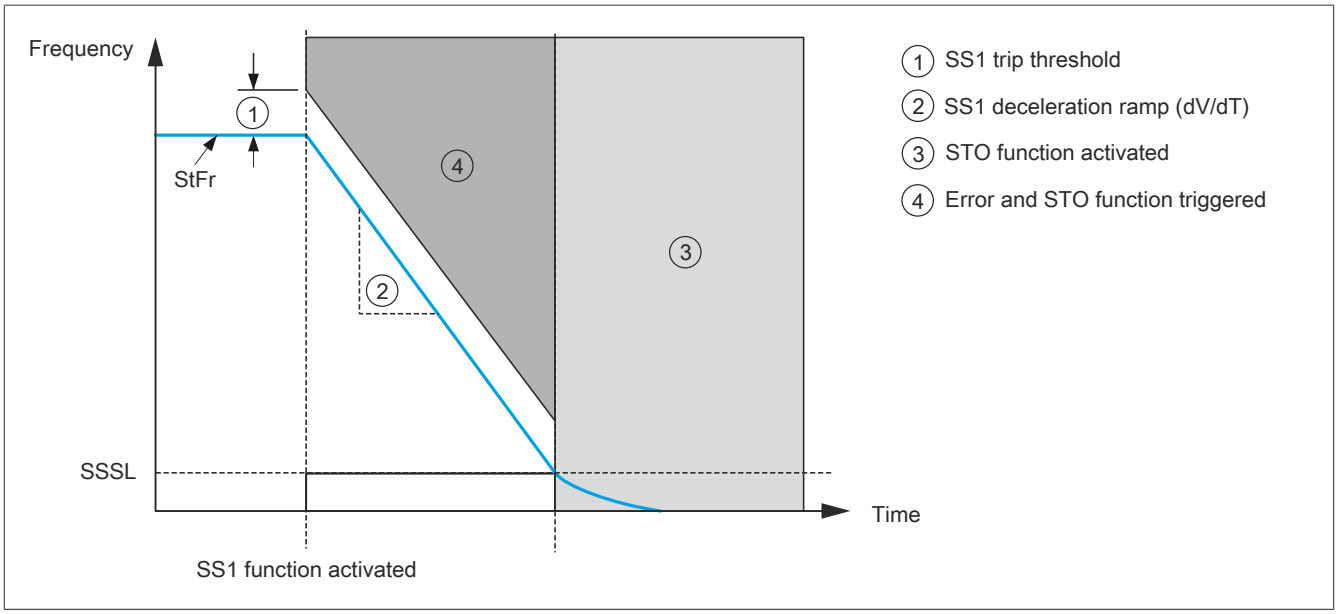
| Code | Description | Unit | Note |
|---|---|---|---|
| FrS | Rated motor frequency | Hz | From the motor |
| (nSp) | Rated motor speed | rpm | From the motor |
| ppn | Number of motor pole pairs | - | From the motor |
| Max. HSP freq | Maximum motor frequency in normal operation. | Hz | This value is equal to or lower than value [High speed] (HSP). |

Calculation of the nominal value of slip compensation "Fslip" (Hz) for the motor:

$$Fslip = FrS - \frac{Nsp \times ppn}{60}$$

### Configuration of the function

### Outline diagram




### Standstill value

The recommended standstill value is: SSSL = Fslip
If a different standstill value is required for the application, it can be configured in accordance with parameter SSSL.

### Ramp value and ramp unit

Set parameter SSrt (ramp value) and SSrU (ramp unit) according to the deceleration ramp to be applied when safety function SS1 is activated.
Ramp calculation: Ramp = SSrU x SSrt
Example 1: If SSrU = 1 Hz/s and SSrt = 500, the deceleration ramp is 500 Hz/s and the accuracy is 0.1 Hz.
Example 2: If SSrU = 10 Hz/s and SSrt = 50, the deceleration ramp is 500 Hz/s and the accuracy is 1 Hz.
Use the table to set the correct accuracy according to the deceleration ramp to be applied when safety function SS1 is activated.

| Min. | Max. | Accuracy | SSrU | SSrt |
|---|---|---|---|---|
| 0.1 Hz/s | 599 Hz/s | 0.1 Hz/s | 1 Hz/s | SS1 deceleration ramp |
| 599 Hz/s | 5990 Hz/s | 1 Hz/s | 10 Hz/s | SS1 deceleration ramp/10 |
| 5990 Hz/s | 59900 Hz/s | 10 Hz/s | 100 Hz/s | SS1 deceleration ramp/100 |

### Ramp threshold

The limit value for ramp activation SS1 will be calculated as follows: SStt = 0.2 x Max. Freq HSP
This value is equal to or lower than value [High speed] (HSP).

### Test and set the configuration

Once configured check that safety function SS1 behaves as expected.
If an error is triggered with error code[Safe function fault] (SAFF), follow the corrective measures detailed below.

| Context | Inverter state | Tuning the inverter |
|---|---|---|
| SS1 activated and [Standstill level] (SSSL) has not been reached yet | • SAFF error code<br>• SFFE.3 = 1 | Motor frequency has reached its threshold value.<br>An instability in the frequency may be the reason for the error.<br>Check and correct the cause. The value of SStt can be changed to increase the tolerance value according to the instability of the drive system. |

### Example

| Code | Description | Unit |
|---|---|---|
| (FrS) | Rated motor frequency | 50 Hz |
| (nSp) | Rated motor speed | 1,350 rpm |
| ppn | Number of motor pole pairs | 2 |
| Max. HSP freq | Maximum motor frequency in normal operation. | 50 Hz |
| SS1 deceler-ation ramp | Deceleration ramp to be applied when SS1 is triggered | 20 Hz/s |

With these numeric values, the configuration of SS1 is as follows:

$$Fslip = 50 - \frac{1350 \times 2}{60} = 5 \ Hz$$

SSSL = Fslip = 5 Hz
SSrU = 1 Hz/s and SSrt = 20 when SS1 deceleration ramp = 20 Hz/s (accuracy: 0.1 Hz)
SStt = 0.2 x Max. Freq HSP = 0.2 x 50 = 10 Hz

## 8.3.4 SMS

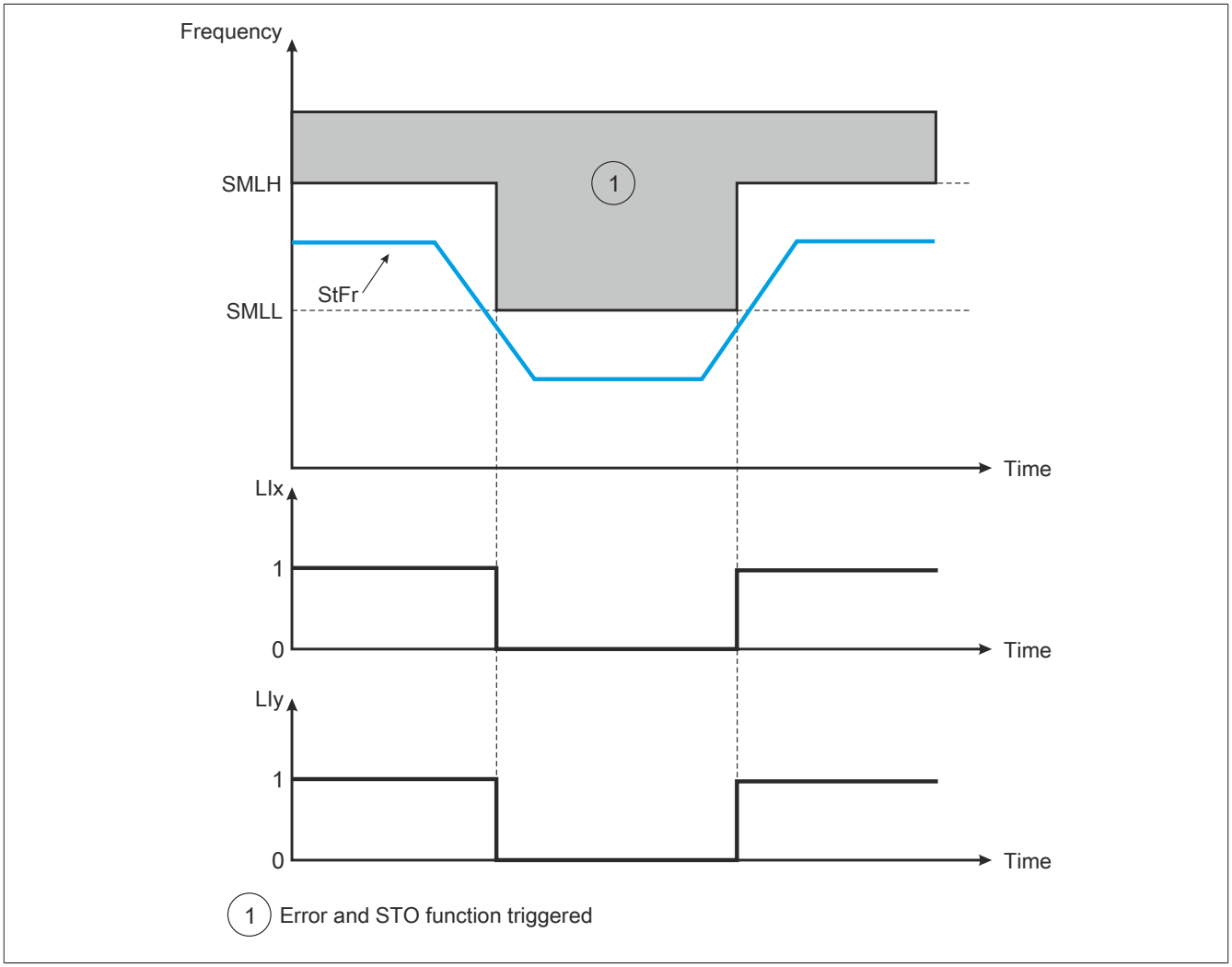
### Record application data

The following data must be recorded before beginning to configure function SMS:

| Code | Description | Unit | Note |
|---|---|---|---|
| PPn | Number of motor pole pairs | - | See motor nameplates. |

Max. output frequency in Hz = ((Max. speed in U/Min)/60)* PPn

### Configuration of the function




SMLL > Max. output frequency
SMLH > Max. output frequency

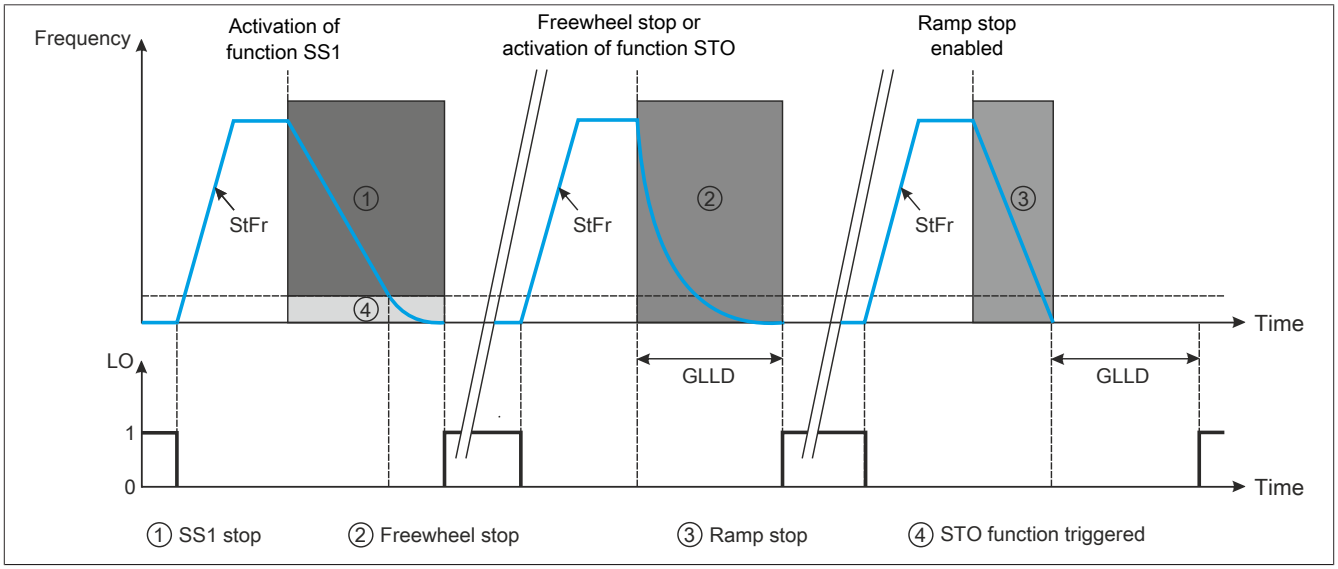
## 8.3.5 GDL

### Record application data

The following data must be recorded before beginning to configure function GDL:

| Code | Description | Unit | Note |
|---|---|---|---|
| (GLSD) | [GDL short delay] | s | Maximum delay after the SS1 ramp to stop the machine. |
| (GLLD) | [GDL long delay] | s | Maximum delay after activation of function STO or after a normal deceleration ramp command to stop the machine. |

### Configuration of the function




### Test and set the configuration

Once the configuration of GDL is completed:

- Activate safety function SS1 and check whether the logic output on stopping the machine changes to High (1).
- Activate safety function STO and check whether the logic output on stopping the machine changes to High (1).

# 8.4 Behavior of safety functions

## 8.4.1 Limitations

### Motor type

Safety functions SLS, SS1 and SMS for the ACOPOSinverter are only applicable for induction motors with open-loop control.

Safety functions STO and GDL can be used with synchronous and induction motors.

### Requirements for using safety functions

The following conditions must be met for smooth operation:

- The motor is sized for this application and is not at the capacity limit.
- The frequency inverter has been sufficiently configured taking into account the electrical data such as mains voltage, sequence and motor as well as the conditions of use and is not at the limit of its capacity.
- If required, the appropriate options will be used.
  Example: Brake resistor or motor choke.
- The inverter has been well adjusted to the speed and torque requirements of the application; The frequency setpoint profile applied to the frequency inverter control loop is followed.

### Logic input requirements

- Mode "sink" will not be used with safety function. If you are using the safety function, you must connect the logic input in mode "Source".
- PTC on LI6 is not compatible with the safety function provided on this input. When using safety function on LI6, do not set the PTC switch to PTC.
- If you use the pulse input, you cannot set the safety function on LI5 at the same time.

## 8.4.2 Error inhibition

If a safety function has been configured, error **[Safe function fault]** (SAFF) cannot be inhibited using function **[Fault inhibit assign.]** (InH)

## 8.4.3 Priority of safety functions

1) Safety function "STO has the highest priority. If safety function STO is triggered, a safe torque shutdown takes place independently of the other active functions.
2) Safety function SS1 has medium priority compared to the other safety functions.
3) Safety functions SLS and GDL have the lowest priority.

### 8.4.4 Factory settings

If the safety functions are configured and you restore the factory settings, only the parameters that do not relate to safety are reset to the factory settings. The settings of parameters that relate to safety can only be reset with the setup software. For more information, see "Commissioning" on page 564.

### 8.4.5 Configuration download

You can transfer a configuration in all situations. If a safety function has been configured, then the functions that are using the same logic inputs are not configured.

Example: If the downloaded configuration comprises functions (preset speed, etc.) on LI3-4-5-6 and a safety function has been configured on these logic inputs in the frequency inverter, then the safety function is not cleared. Functions with the same logic inputs as safety functions are not transferred. Modes "Multiple configuration/multi-motor" and "Macro configuration" are subject to the same rules.

### 8.4.6 Priority of safety functions and functions that do not relate to safety

For additional information about these functions, see chapter "The drive" on page 177.

o: Compatible functions

x: Incompatible functions

▲◄: The function marked with the arrow has priority over the other function.

## Safety functions

| Function of the frequency inverter | SLS | SS1 | STO | SMS |
|---|---|---|---|---|
| [High speed hoisting optim] (HSH-) | ▲ | ▲ | ▲ | ▲ |
| [+/- speed] (UPd-) | ▲ | ▲ | ▲ | ▲ |
| [Jump frequency] (JPF) | ▲ | o | o | ▲ |
| [Low speed time out] (tLS) | o | o | ▲ | o |
| [Multimotors] (MMC-) | The configuration must be consistent with the 3 motors. | | o | The configuration must be consistent with the 3 motors. |
| [PRESET SPEEDS] (PSS-) | ▲ | o | ▲ | ▲ |
| [PID regul.] (PId-) | ▲ | o | o | ▲ |
| [RAMP] (rPt-) | ▲ | ▲ | ▲ | o |
| [Freewheel] (nSt) | ◄ | ◄ | ▲ | o |
| [Fast stop assignment] (FSt) | ▲: SLS ramp<br>◄: SLS stable | ▲ | ▲ | o |
| [TRAVERSE CONTROL] (tr0-) | ▲ | ▲ | ▲ | ▲ |
| [EXTERNAL ERROR] (EtF-) | ◄: NST<br>x: DCI<br>▲: Fast, ramp, fallback, maintenance | | ◄: NST<br>▲: DCI<br>▲: Fast, ramp, fall-back, maintenance | ◄: NST<br>x: DCI<br>▲: Fast, ramp, fall-back, maintenance |
| [AUTOMATIC RESTART] (Atr-) | ▲ | ▲ | ▲ | ▲ |
| [FAULT RESET] (rSt-) | ▲ | ▲ | ▲ | ▲ |
| [JOG] (JOG-) | ▲ | ▲ | ▲ | ▲ |
| [STOP CONFIGURATION] (Stt-) | | | | |
| [Stop ramp] (rMP) | ▲: SLS ramp<br>◄: SLS stable | ▲ | ▲ | ▲ |
| [Fast stop] (FSt) | ▲: SLS ramp<br>◄: SLS stable | ▲ | ▲ | ◄ |
| [DC braking] (dCI) | x | x | ▲ | x |
| [+/- SPEED BY REFERENCE] (SrE-) | ▲ | ▲ | ▲ | ▲ |
| [Positioning by sensor] (LPO-) | ▲: SLS ramp and position not observed | ▲: Position not observed | ▲ | ▲ |
| [RP input] (PFrC) | o: If the safety function is not assigned to LI5. | | | |
| [Process Underload] (ULF) | ▲ | ▲ | ▲ | ▲ |
| [Process Overload] (OLC) | ▲ | ▲ | ▲ | ▲ |
| [Rope slack config.] (rSd) | x | x | x | x |
| [UnderV. prevention] (StP) | x | x | ▲ | ▲ |
| [AUTO DC INJECTION] (AdC-) | x | x | ▲ | x |
| [DC braking assignment] (dCI) | x | x | ▲ | x |
| [Load Sharing] (LbA) | o: If the value of [Stator frequency] (StFr) is over the threshold value of the motor frequency, error SAFF is triggered. | ▲ | ▲ | ▲ |
| [Motor control type] (Ctt) | | | | |
| [Standard] (Std) | x | x | o | x |
| [SVC V] (UUC) | o | o | o | o |
| [V/F Quad.] (UFq) | x | x | o | x |
| [Energy Sav.] (nLd) | x | x | o | x |
| [Sync. mot.] (SYn) | x | x | o | x |
| [U/F 5 points] (UF5) | x | x | o | x |
| [Output Phase Loss] (OPL) | x: The safety function detected an output phase loss. | | o | x: The safety function detected an output phase loss. |
| [Output cut] (OAC) | x | x | x | x |
| [Dec ramp adapt.] (brA) | o: If the value of [Stator frequency] (StFr) is over the threshold value of the motor frequency, error SAFF is triggered. | | ▲ | o |
| [REF. OPERATIONS] (OAI-) | ▲ | ▲ | o | ▲ |
| [2 wire] (2C) | o: Run command on transition.<br>▲: Move command at level is not compatible. | | | |
| [PTC MANAGEMENT] (PtC-) | o: Inactive if the safety function is not assigned to LI6. | | | |
| [Forced local] (LCF-) | ▲ | ▲ | o | ▲ |
| [LI configuration] | o: Inactive if the safety function is not assigned to a logic input. | | | |
| [MULTIMOTORS/CONFIG.] (MMC-) | o: Except for safety-related parameters. | | | |
| [Fault inhibition] (InH) | x | x | x | x |
| [Profile] (CHCF) | The logic input used by a safety function cannot be modified. | | | |
| [Macro configuration] (CFG) | ▲: The macro configuration can be overlapped if the safety function is using a logic input requested by the macro configuration. | | | |
| [Motor Short Circuit] (SCF1) | ▲ | ▲ | o | ▲ |
| [Ground Short Circuit] (SCF3) | ▲ | ▲ | o | ▲ |

| Function of the frequency inverter | SLS | SS1 | STO | SMS |
|---|---|---|---|---|
| [Overspeed] (SOF) | ▲ | ▲ | o | ▲ |
| [Sync. mot.] (SYn) | x | x | o | x |
| [Configuration transfer] | o: Except for safety-related parameters. | | | |
| [Energy Sav.] (nLd) | x | x | o | x |

## 8.5 Display of the safety function through HMI

### 8.5.1 State of safety functions

#### Description

The state of the safety functions can be displayed using the HMI of the frequency inverter or the setup software. The HMI of the frequency inverter can be the local HMI on the product, the graphic display terminal or the external operator terminal. There is a register for each safety function. For additional information about the safety functions, see section "Introduction" on page 514.
You can use this register with an HMI as follows: **[2 MONITORING]** (MOn-) → **[MONIT. SAFETY]** (SAF-)

- **[STO status]** (StOS): State of safety function STO (Safe Torque Off)
- **[SLS status]** (SLSS): State of safety function SLS (Safe limited speed)
- **[SS1 status]** (SS1S): State of safety function SS1 (Safe Stop 1)
- **[SMS status]** (SMSS): State of safety function SMS (Safe Maximum Speed)
- **[GDL status]** (GDLS): State of safety function GDL (Safety gate interlock)

The state registers are not permitted for any safety-relevant use.

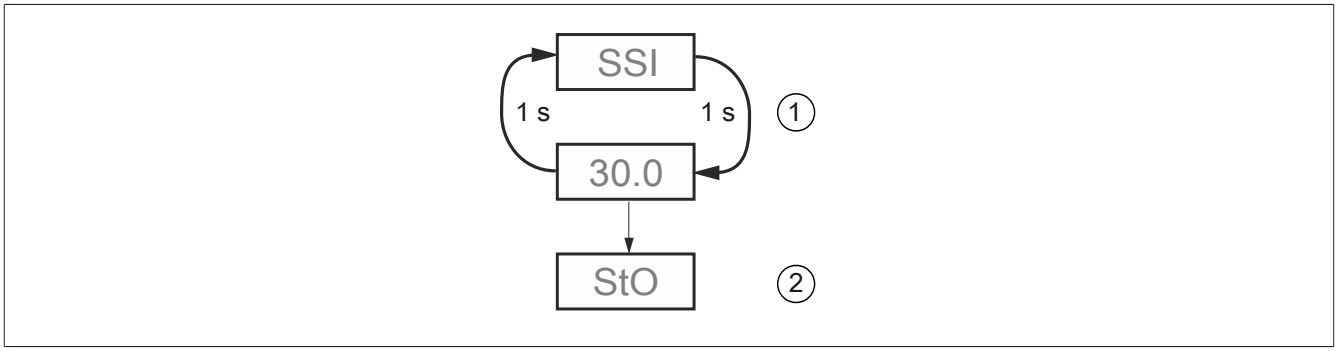
For additional information about this register, see "Safety functions display and states" on page 571.

### 8.5.2 Special HMI

#### Description

If a safety function is triggered, some information is displayed.

Example using the local HMI of the product upon triggering of safety function SS1:




(1) The name of safety function (SS1) and the current display parameter are displayed alternately as long as the motor is decelerating according to the defined deceleration ramp and has come to a standstill.

(2) ONce **[Standstill level]** (SSSL) has been reached, safety function STO is activated and displayed.

### 8.5.3 Error code description

#### Description

If a safety function detects an error, the frequency inverter shows **[Safe function fault]** (SAFF). This detected error can only be reset by switching the frequency inverter off and back on again.

If you want to display possible reasons for the error tripping, you can use the register.

This register can be displayed on the graphic display terminal or using the setup software.

**[DRIVE MENU]** → **[MONITORING]** → **[DIAGNOSTICS]** → **[ADDITIONAL ERROR INFO]**

### [Safety fault reg.] (SFFE)

| Bit | Description |
|---|---|
| Bit0=1 | Timeout on debouncing the logic input (check the value for the debounce time LIDT according to the application). |
| Bit1 | Reserved |
| Bit2=1 | Motor speed prefix changed during SS1 ramp. |
| Bit3=1 | Motor frequency reached its threshold value during SS1 ramp. |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6=1 | Motor speed prefix changed during SLS safety limit. |
| Bit7=1 | Motor frequency reached its threshold value during SS1. |
| Bit8 | Reserved |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13=1 | Measurement of motor speed not possible (check the motor wiring). |
| Bit14=1 | Motor ground short circuit detected (check the motor wiring). |
| Bit15=1 | Motor short circuit detected (check the motor wiring). |

This register is reset after switching the power supply off and back on.

You can also access this register under **[DRIVE MENU]** → **[MONITORING]** → **[MONIT. SAFETY]**.

### [Safety error register 1] (SAF1)

This error register is used for application control.

| Bit | Description |
|---|---|
| Bit0=1 | PWRM consistency error detected. |
| Bit1=1 | Error detected in parameters of safety functions. |
| Bit2=1 | The automatic test carried out in the application detected an error. |
| Bit3=1 | The diagnostics test on the safety function detected an error. |
| Bit4=1 | The diagnostics on the logic input detected an error. |
| Bit5=1 | Safety function SMS or GDL detected an error. For more information, see 546. |
| Bit6=1 | Watchdog management application active. |
| Bit7=1 | Error detected in motor control. |
| Bit8=1 | Error detected in internal serial connection. |
| Bit9=1 | Error detected on enabling the logic input. |
| Bit10=1 | Function "Safe torque off" triggered an error. |
| Bit11=1 | The application interface detected a safety function error. |
| Bit12=1 | Function "Safe stop 1" detected a safety function error. |
| Bit13=1 | Function "Safe limited speed" triggered an error. |
| Bit14=1 | The motor data is damaged. |
| Bit15=1 | Error detected in data flow of the internal serial connection. |

This register is reset after switching the power supply off and back on.

### [Safety fault Reg2] (SAF2)

This error register is used for motor control.

| Bit | Description |
|---|---|
| Bit0=1 | The consistency test on the stator frequency detected an error. |
| Bit1=1 | Error detected in stator frequency calculation. |
| Bit2=1 | Motor control watchdog management active. |
| Bit3=1 | Motor control hardware watchdog active. |
| Bit4=1 | The automatic test carried out on the motor control detected an error. |
| Bit5=1 | Error detected in chain test. |
| Bit6=1 | Error detected in internal serial connection. |
| Bit7=1 | Error detected through direct short circuit. |
| Bit8=1 | Error detected in PWM of the frequency inverter. |
| Bit9=1 | Internal error of the GDL safety function. |
| Bit10 | Reserved |
| Bit11=1 | The application interface detected a safety function error. |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14=1 | The motor data is damaged. |
| Bit15=1 | Error detected in data flow of the internal serial connection. |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 00] (SF00)

This error register is used for automated application tests.

| Bit | Description |
|---|---|
| Bit0 | Reserved |
| Bit1=1 | RAM stack overrun: |
| Bit2=1 | Error detected in integrity of the RAM address. |
| Bit3=1 | Error detected accessing RAM data |
| Bit4=1 | Error detected in flash checksum. |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9=1 | Fast task overrun |
| Bit10=1 | Slow task overrun |
| Bit11=1 | Application task overrun |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14=1 | The PWRM line is not enabled during the initialization phase. |
| Bit15=1 | The hardware watchdog application is not executed after the initialization phase. |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 01] (SF01)

This diagnostics error register is used for logic inputs.

| Bit | Description |
|---|---|
| Bit0=1 | Management error detected in state machine. |
| Bit1=1 | Data required for the test administration is corrupt. |
| Bit2=1 | Error detected on channel selection. |
| Bit3=1 | Test - Error detected in state machine. |
| Bit4=1 | Test requirement is corrupt. |
| Bit5=1 | Pointer for the test procedure is damaged. |
| Bit6=1 | Incorrect test action provided. |
| Bit7=1 | Error detected on collecting the results. |
| Bit8=1 | Error detected at LI3; Cannot activate safety function |
| Bit9=1 | Error detected at LI4; Cannot activate safety function. |
| Bit10=1 | Error detected at LI5; Cannot activate safety function. |
| Bit11=1 | Error detected at LI6; Cannot activate safety function. |
| Bit12=1 | The test sequence was updated during ongoing diagnostics. |
| Bit13=1 | Error detected in test type management. |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 02] (SF02)

This register is used for detected errors relating to application watchdog management.

| Bit | Description |
|---|---|
| Bit0=1 | Error detected in fast task. |
| Bit1=1 | Error detected in slow task. |
| Bit2=1 | Error detected in application task. |
| Bit3=1 | Error detected in background task. |
| Bit4=1 | Error detected in fast task/input of safety function. |
| Bit5=1 | Error detected in slow task/input of safety function. |
| Bit6=1 | Error detected in application task/input of safety function. |
| Bit7=1 | Error detected in application task/handling of safety function. |
| Bit8=1 | Error detected in background task of safety function. |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 03] (SF03)

| Bit | Description |
|---|---|
| Bit0=1 | Debounce timeout. |
| Bit1=1 | Input not consistent. |
| Bit2=1 | Consistency test - Error detected in state machine. |
| Bit3=1 | Consistency test - Debounce timeout corrupt. |
| Bit4=1 | Error detected in response time data. |
| Bit5=1 | Response time corrupt. |
| Bit6=1 | Non-defined consumer requested. |
| Bit7=1 | Error detected in configuration. |
| Bit8=1 | The inputs are not in nominal mode. |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 04] (SF04)

This is a register for errors detected in function **[Safe stop]** (STO).

| Bit | Description |
|---|---|
| Bit0=1 | No signal configured. |
| Bit1=1 | Error detected in state machine. |
| Bit2=1 | Error detected in internal data. |
| Bit3 | Reserved |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8=1 | SMS overspeed error detected. |
| Bit9=1 | SMS internal error detected. |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12=1 | GDL internal error detected 1. |
| Bit13=1 | GDL internal error detected 2. |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 05] (SF05)

This register is used for detected errors relating to function **[Safe ramp]** (SS1).

| Bit | Description |
|---|---|
| Bit0=1 | Error detected in state machine. |
| Bit1=1 | Motor speed prefix changed during stop. |
| Bit2=1 | Motor speed has reached the motor frequency threshold value. |
| Bit3=1 | Theoretical motor speed is corrupt. |
| Bit4=1 | Non-authorized configuration |
| Bit5=1 | Error detected in calculation of the theoretical motor speed. |
| Bit6 | Reserved |
| Bit7=1 | Review of speed prefix: Error detected in consistency. |
| Bit8=1 | Internal SS1 request corrupt. |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 06] (SF06)

This register is used for detected errors relating to function [Spd limited] (SLS).

| Bit | Description |
|---|---|
| Bit0=1 | Error detected in state machine. |
| Bit1=1 | Motor speed prefix changed during limits. |
| Bit2=1 | Motor speed has reached the motor frequency threshold value. |
| Bit3=1 | Data corrupt. |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 07] (SF07)

This register is used for detected errors relating to application watchdog management.

| Bit | Description |
|---|---|
| Bit0 | Reserved |
| Bit1 | Reserved |
| Bit2 | Reserved |
| Bit3 | Reserved |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 08] (SF08)

This register is used for detected errors relating to application watchdog management.

| Bit | Description |
|---|---|
| Bit0=1 | Error detected in PWM task. |
| Bit1=1 | Error detected in Fixed Task. |
| Bit2=1 | Error detected in ATMC watchdog. |
| Bit3=1 | Error detected in DYNFCT watchdog. |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 09] (SF09)

This register is used for detected errors relating to automated motor control tests.

| Bit | Description |
|---|---|
| Bit0 | Reserved |
| Bit1=1 | RAM stack overrun. |
| Bit2=1 | Error detected in integrity of the RAM address. |
| Bit3=1 | Error detected accessing RAM data |
| Bit4=1 | Error in flash checksum. |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9=1 | Task overrun 1 ms. |
| Bit10=1 | PWM Task overrun. |
| Bit11=1 | Fixed Task overrun. |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14=1 | Unintentional interruption. |
| Bit15=1 | The hardware watchdog is not executed after the initialization phase. |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 10] (SF10)

This register is used for detected errors relating to direct motor control short circuits.

| Bit | Description |
|---|---|
| Bit0=1 | Ground short circuit - Error detected in configuration. |
| Bit1=1 | Short circuit - Error detected in configuration. |
| Bit2=1 | Ground short circuit |
| Bit3=1 | Short circuit |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8 | Reserved |
| Bit9 | Reserved |
| Bit10 | Reserved |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

### [Safety error subregister 11] (SF11)

This register is used for detected errors relating to the motor control dynamic activity check.

| Bit | Description |
|---|---|
| Bit0=1 | The application requested diagnostics of the direct short circuit. |
| Bit1=1 | The application requested a consistency test on the stator frequency calculation (voltage and current). |
| Bit2=1 | The application requested diagnostics on the speed statistics delivered by the motor control. |
| Bit3 | Reserved |
| Bit4 | Reserved |
| Bit5 | Reserved |
| Bit6 | Reserved |
| Bit7 | Reserved |
| Bit8=1 | The motor control diagnostics of the direct short circuit is enabled. |
| Bit9=1 | The motor control consistency test on the stator frequency calculation is enabled. |
| Bit10=1 | The motor control diagnostics from the speed statistics delivered by the motor control is enabled. |
| Bit11 | Reserved |
| Bit12 | Reserved |
| Bit13 | Reserved |
| Bit14 | Reserved |
| Bit15 | Reserved |

This register is reset after switching the power supply off and back on.

# 8.6 Technical data

## 8.6.1 Electrical data

### Logic type

Contrary to the typical definition of sink and source, the following statements apply to this product:

Sink: The digital inputs need a voltage sink, i.e. the current flows out of the inputs and outputs.

Source: The digital inputs need a voltage source, i.e. the current flows into the inputs and outputs.

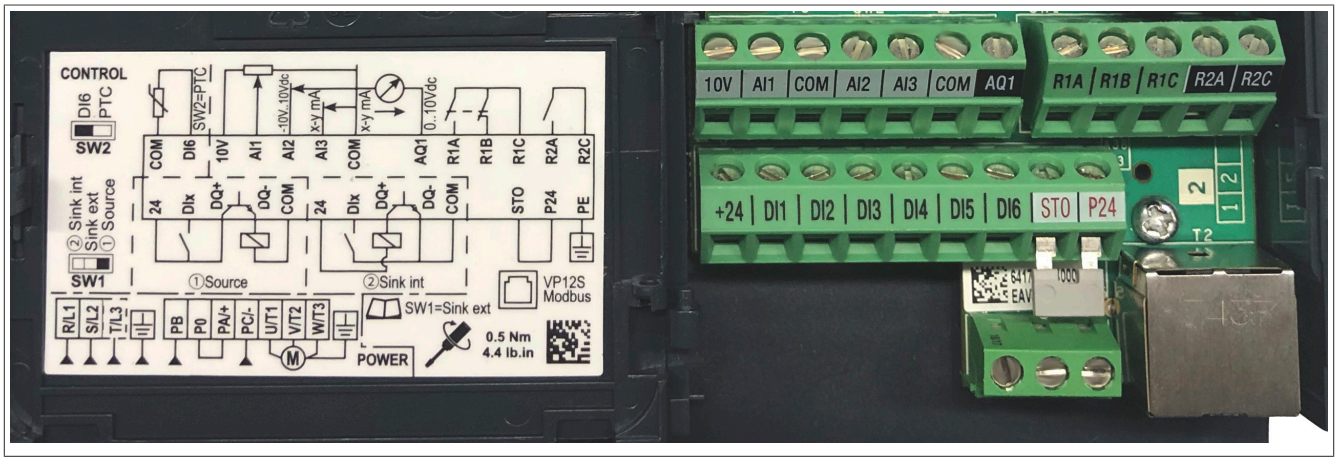
The logic inputs and outputs of the frequency inverter can be wired for logic type 1 or logic type 2.

| Logic type | Active state |
|---|---|
| 1 | Output drags current (sink = Dip)<br>Current flows to the input |
| 2 | Output supply is provided by input current<br>Current (source) |

Safety functions are only permitted to be used in mode "Source".

The signal inputs are protected against polarity reversal, while the outputs are protected against short circuits. The inputs and outputs are electrically isolated.

### Wiring diagram




## 8.6.2 Setup and operation of the safety function

### Logic input

General logic inputs can be used to trigger a safety function.
Logic inputs must be combined in pairs to obtain a redundant request. Only four general logic inputs can be linked to safety functions: LI3, LI4, LI5, LI6. The logic input pairs are determined as follows:

- LI3 and LI4
- LI5 and LI6
- An additional combination is only allowed for function STO: LI3 and STO.

Logic input pairs can only be assigned once they are linked to a safety function.
If you connect a safety function to a logic input you cannot connect any other function (safety relevant or not) to this logic input. If you connect a function that is not related to safety to a logic input you cannot connect any other function to this logic input.

## 8.6.3 Capability characteristics of safety functions

### The safety functions of the PDS(SR) are part of a global system.

If the qualitative and quantitative objectives set by the end-use application require settings to perform the safety functions safely, the responsibility for these additional development elements (e.g. management of the mechanical motor brake) lies with the integrator of the BDM (Basic Drive Module).

In addition, the output data generated when safety functions are used (error relay activation, display of error codes or information, etc.) are not considered safety information.

### Configuration of the machine application

| Standard | STO | | SS1 Type C [5] | | SLS/STO /SS1/ SMS type B[6] | |
|---|---|---|---|---|---|---|
| | STO | STO and LI3 | STO with safety relay or equivalent | STO and LI3 with safety relay or equivalent | LI3 LI4 | LI5 LI6 |
| IEC 61800-5-2 / IEC 61508 | SIL 2 | SIL 3 | SIL 2 | SIL 3 | SIL 2 | |
| IEC 62061[1] | SIL 2 | SIL 3 CL | SIL 2 CL | SIL 3 CL | SIL 2 CL | |
| IEC 62061[2] | Category 3 | Category 4 | Category 3 | Category 4 | Category 3 | |
| ISO 13849-1[3] | PL d | PL e | PL d | PL e | PL d | |
| IEC 60204-1[4] | Stop category 0 | Stop category 0 | Stop category 1 | Stop category 1 | | |

1) Since the IEC 62061 standard is an integration standard, the standard differentiates between the global safety function (i.e classification according to SIL 2 or SIL 3 for the ACOPOSinverter) according to the charts process system SF - Case 1 and process system SF - Case 2) and components that constitute the safety function (i.e. classification according to SIL 2 CL or SIL 3 CL for the ACOPOSinverter).
2) Per table 6 of IEC 62061 standard (2005).
3) Per table 4 of EN 13849-1 standard (2008).
4) If protection against power supply failure or voltage reduction and subsequent recovery in accordance with IEC 60204-1 is required, a safety relay or equivalent must be used.
5) SS1 type C: The power drive system initiates motor deceleration and initiates function STO after an application-specific time delay.
6) SS1 type B: The power drive system initiates and monitors the motor deceleration rate within specified limits to stop the motor and initiates function STO when the motor speed falls below a specified limit.

### Configuration of the process application

| Standard | STO | | SS1 Type C [2] | | SLS/STO /SS1/ SMS type B[3] | |
|---|---|---|---|---|---|---|
| | STO | STO and LI3 | STO with safety relay or equivalent | STO and LI3 with safety relay or equivalent | LI3 LI4 | LI5 LI6 |
| IEC 61800-5-2 / IEC 61508 | SIL 2 | SIL 3 | SIL 2 | SIL 3 | SIL 2 | |
| IEC 62061[1] | SIL 2 CL | SIL 3 CL | SIL 2 CL | SIL 3 CL | SIL 2 CL | |

1) Since the IEC 62061 standard is an integration standard, the standard differentiates between the global safety function (i.e classification according to SIL 2 or SIL 3 for the ACOPOSinverter) according to diagrams FALL 1 and FALL 2 and components that constitute the safety function (i.e. classification according to SIL 2 CL or SIL 3 CL for the ACOPOSinverter).
2) SS1 type C: The power drive system initiates motor deceleration and initiates function STO after an application-specific time delay.
3) SS1 type B: The power drive system initiates and monitors the motor deceleration rate within specified limits to stop the motor and initiates function STO when the motor speed falls below a specified limit.

### Input signals of the safety functions

| Input signals of the safety functions | Units | Value for LI3 to LI6 | Value for STO |
|---|---|---|---|
| Logic 0 ($U_{low}$) | V | <5 | <2 |
| Logic 1 ($U_{high}$) | V | >11 | >17 |
| Impedance (24 V) | kΩ | 3.5 | 1.5 |
| Debounce time | ms | <1 | <1 |
| Response time of the safety function | ms | <10 | <10 |

### Feasibility study synthesis

| Function | Standard | Input | STO input | STO input & LI3 | LI3 & LI4 or LI5 & LI6 |
|---|---|---|---|---|---|
| STO | IEC 61508 | SFF | 96.7% | 96% | 94.8% |
| | | $PFD_{10y}$ | $7.26 \times 10^{-4}$ | $4.00 \times 10^{-4}$ | $2.44 \times 10^{-3}$ |
| | | $PFD_{1y}$ | $7.18 \times 10^{-5}$ | $3.92 \times 10^{-5}$ | $2.33 \times 10^{-4}$ |
| | | $PFH_{equ_1y}$ | 8.20 FIT | 4.47 FIT | 26.6 FIT |
| | | Technology type | B | B | B |
| | | HFT | 1 | 1 | 0 |
| | | DC | 93.1% | 91.5% | 90% |
| | | SIL capability | 2 | 3 | 2 |
| | IEC 62061 | SIL CL capability | 2 | 3 | 2 |
| | ISO 13849-1 | PL | d | e | d |
| | | Category | 3 | 4 | 3 |
| | | MTTFd in years | 13900 | "L1" 3850<br>"L2" 29300 | 4290 |
| SS1 type B | IEC 61508 | SFF | 96.7% | 96% | 94.8% |
| | | $PFD_{10y}$ | $7.26 \times 10^{-4}$ | $4.00 \times 10^{-4}$ | $2.44 \times 10^{-3}$ |
| | | $PFD_{1y}$ | $7.18 \times 10^{-5}$ | $3.92 \times 10^{-5}$ | $2.33 \times 10^{-4}$ |
| | | $PFH_{equ_1y}$ | 8.20 FIT | 4.47 FIT | 26.6 FIT |
| | | Technology type | B | B | B |
| | | HFT | 1 | 1 | 0 |
| | | DC | 93.1% | 91.5% | 90% |
| | | SIL capability | 2 | 3 | 2 |
| | IEC 62061 | SIL CL capability | 2 | 3 | 2 |
| | ISO 13849-1 | PL | d | e | d |
| | | Category | 3 | 4 | 3 |
| | | MTTFd in years | 13900 | "L1" 3850<br>"L2" 29300 | 4290 |
| SLS<br>SMS | IEC 61508 | SFF | | | 93.3% |
| | | $PFD_{10y}$ | | | $2.72 \times 10^{-3}$ |
| | | $PFH_{equ_10y}$ | | | 31.1 FIT |
| | | Technology type | | | B |
| | | HFT | | | 0 |
| | | DC | | | 78.7% |
| | | SIL capability | | | 2 |
| | IEC 62061 | SIL CL capability | | | 2 |
| | ISO 13849-1 | PL | | | d |
| | | Category | | | 3 |
| | | MTTFd in years | | | 3670 |

| Function | Standard | Input | LO1 |
|---|---|---|---|
| GDL | IEC 61508 | SFF | 85% |
| | | $PFD_{10y}$ | $8.2 \times 10^{-4}$ |
| | | $PFD_{1y}$ | $8.2 \times 10^{-3}$ |
| | | $PFH_{equ_1y}$ | 187 FIT |
| | | Technology type | B |
| | | HFT | 0 |
| | | DC | 71% |
| | | SIL capability | 1 |
| | IEC 62061 | SIL CL capability | 1 |
| | ISO 13849-1 | PL | c |
| | | Category | 2 |
| | | MTTFd in years | 609 |

A preventative annual activation of the safety function is recommended. However, the safety levels are achieved with lower margins without annual activation. The machine requires the safety module for function STO. To avoid the use of a safety module, the parameters of function "Restart" must be part of the safety function. See details about the relevance of the safety module.

## Note:

**The table above is insufficient for assessing the power stage (PL) of a PDS. The PL assessment must take place at the system level. The installer or integrator of the BDM (Basic Drive Module) must include sensor data with figures from the above table when assessing PL System sensor data.**

### 8.6.4 Debounce time and response time

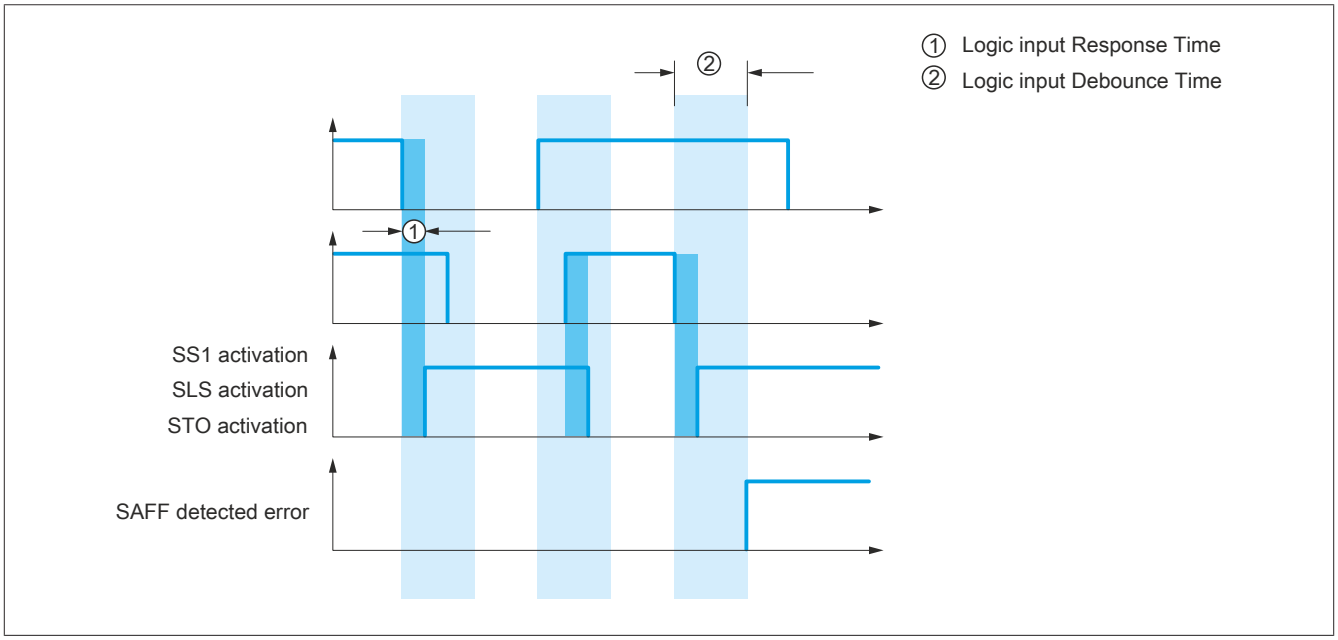
#### Description

In the ACOPOSinverter, there are two parameters for configuring logic inputs for safety functions (LI3, LI4, LI5, LI6).

The consistency of the individual logic input pairs is continuously checked.

**[LI debounce time]** (LIdt): A different logic state is permitted between LI3/LI4 or LI5/LI6 for the duration of the debounce time. Otherwise, an error will be triggered.

**[LI response time]** (LIrt): The logic input response time controls the delay until the safety function is activated.




## 8.7 Certified architectures

### 8.7.1 Introduction

#### Certified architectures

> **Note:**
>
> **For certification with respect to functional aspects, only the PDS (SR) (power drive system suitable for safety type applications) is taken into account, not the complete system in which it will be integrated in order to ensure the functional safety of a machine, system or process.**

The certified architectures are listed below:

- Multiple drive with safety relay - Case 1
- Multiple drive with safety relay - Case 2
- Multiple drive without safety module
- Single drive with safety relay - Case 1
- Single drive with safety relay - Case 2
- Single drive with safety relay - Case 1
- Single drive with safety relay - Case 2
- Single drive per IEC 61508 and IEC 60204-1 - Case 1
- Single drive per IEC 61508 and IEC 60204-1 - Case 2
- Single drive per IEC 61508 and IEC 62061 with safety function GDL

The safety functions of the PDS (SR) are part of a global system.

If the qualitative and quantitative objectives relating to safety set by the type of end-use require settings to perform the safety functions safely, the responsibility for these additional development elements (e.g. management of the mechanical motor brake) lies with the integrator of the BDM (Basic Drive Module).

In addition, the output data generated when safety functions are used (error relay activation, display of error codes or information, etc.) are not considered safety information.

## 8.7.2 Multiple drive with safety relay XPS AF - Case 1

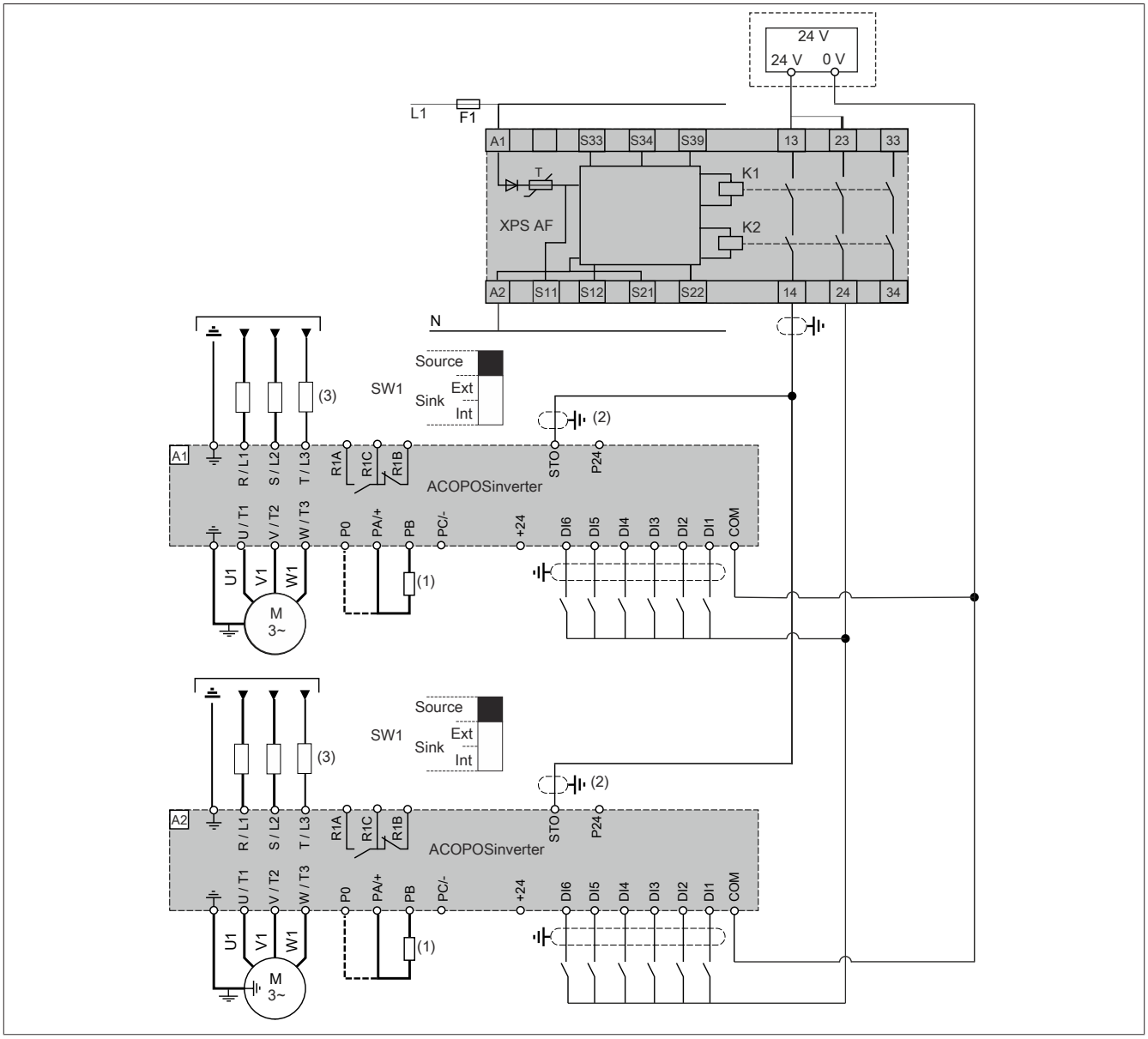
**Multiple drive with safety relay per EN 954-1, IEC 13849-1 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

- Machine with STO category 4, PL e / SIL 3 with safety relay or equivalent and LI3 set to STO.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI5/DI6.

Or:

- Machine with STO category 4, PL e / SIL 3 with safety relay or equivalent and DI3 set to STO.
- DI4 and DI5/DI6 are not set to a safety function.




(1) Braking resistor (if used)
(2) Standard coaxial cable type RG174/U in accordance with MILC17 or KX3B according to NF C 93-550, outer diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.
(3) Line choke (if used)
(4) Multiple drive is possible with another frequency inverter (for example: ACOPOSinverter P84 with PWR connection).

### Note:

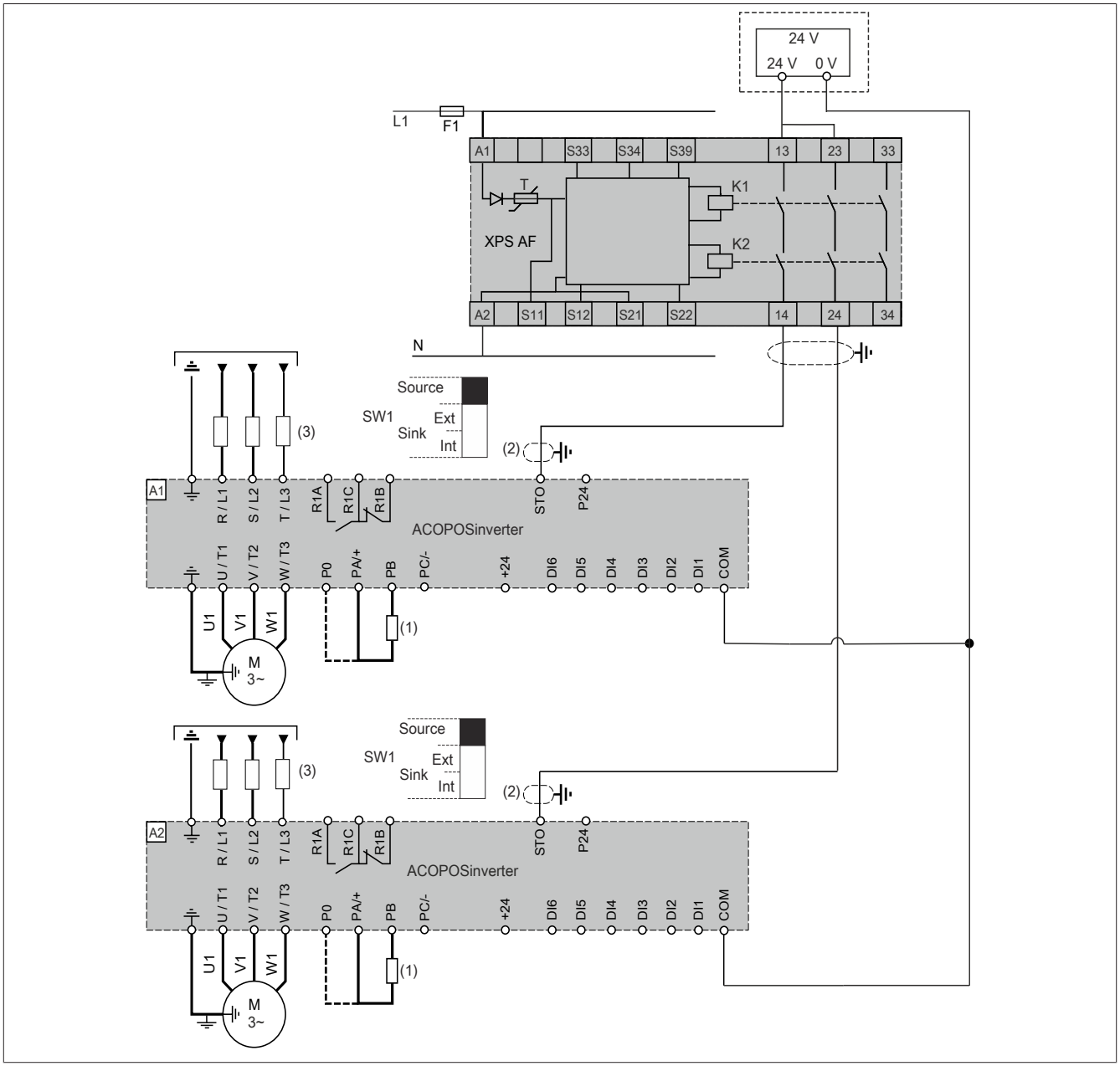
**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.3 Multiple drive with safety relay XPS AF - Case 2

**Multiple drive with safety relay per EN 954-1, IEC 13849-1 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

- Machine with STO category 3, PL d/SIL 3 with safety relay or equivalent.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI3/DI4 or DI5/DI6.




(1) Braking resistor (if used)
(2) Standard coaxial cable type RG174/U in accordance with MILC17 or KX3B according to NF C 93-550, outer diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.
(3) Line choke (if used)
(4) Multiple drive is possible with another frequency inverter (for example: ACOPOSinverter P84 with PWR connection).

## Note:

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

## 8.7.4 Multiple drive without safety module

### Multiple drive without safety relay according to IEC 61508

The following configurations correspond to the wiring diagram below:

- STO SIL 2 on STO.
- SLS SIL 2 or SS1 type B SIL 2 on DI3/DI4 or DI5/DI6.

Or:

- STO SIL 2 on STO.
- SLS or SS1 type B on DI3/DI4
- DI5/DI6 is not set to a safety function.

Or:

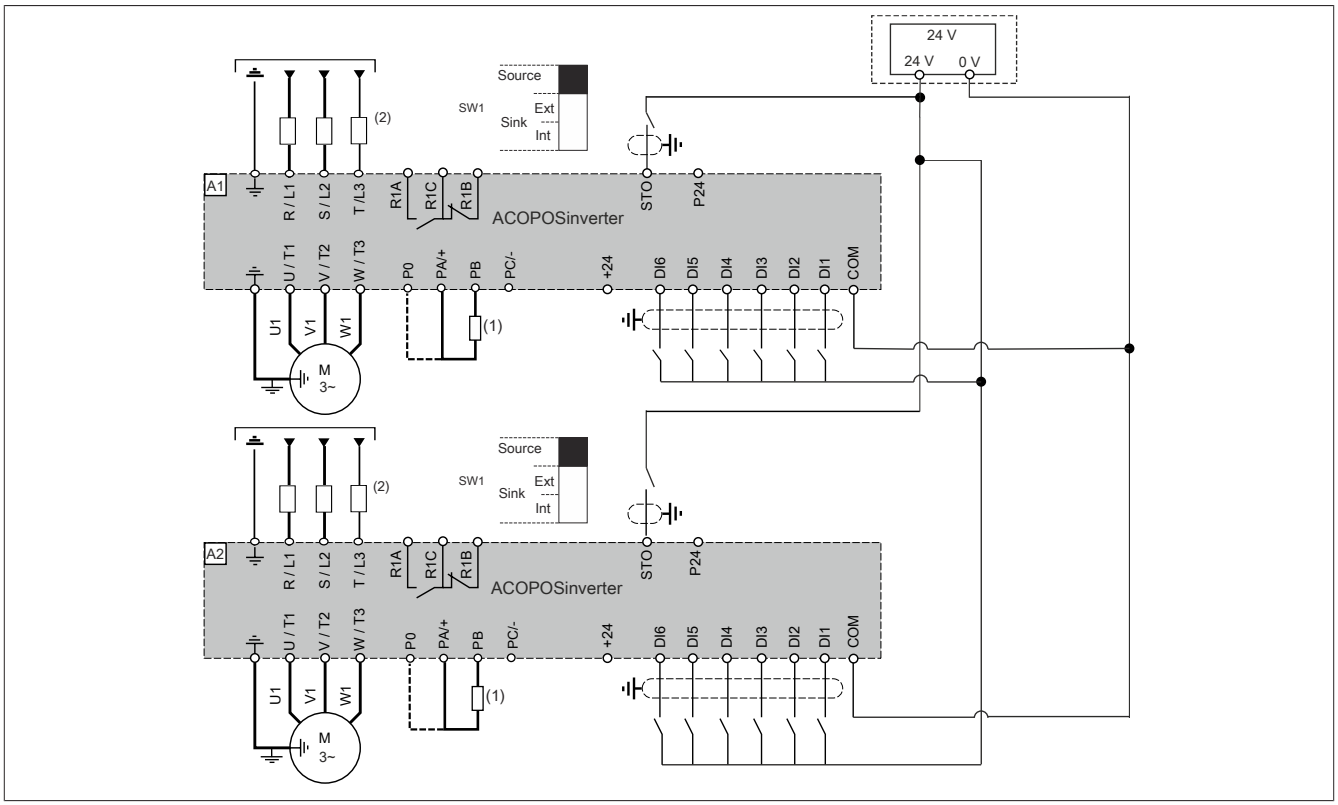
- STO SIL 2 on STO.
- DI3/DI4 and DI5/DI6 are not set to a safety function.

Or:

- STO SIL 3 on STO and DI3.
- SLS SIL 2 or SS1 type B SIL 2 on DI5/DI6.
- DI4 is not set to a safety function.

Or:

- STO SIL 3 on STO and DI3.
- DI4 and DI5/DI6 are not set to a safety function.




(1) Braking resistor (if used)
(2) Line chokes (if used)

**Note:**

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.5 Single drive with safety switching device XPS AV - Case 1

**Single drive with safety switching device in accordance with EN 954-1, IEC 13849-1 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

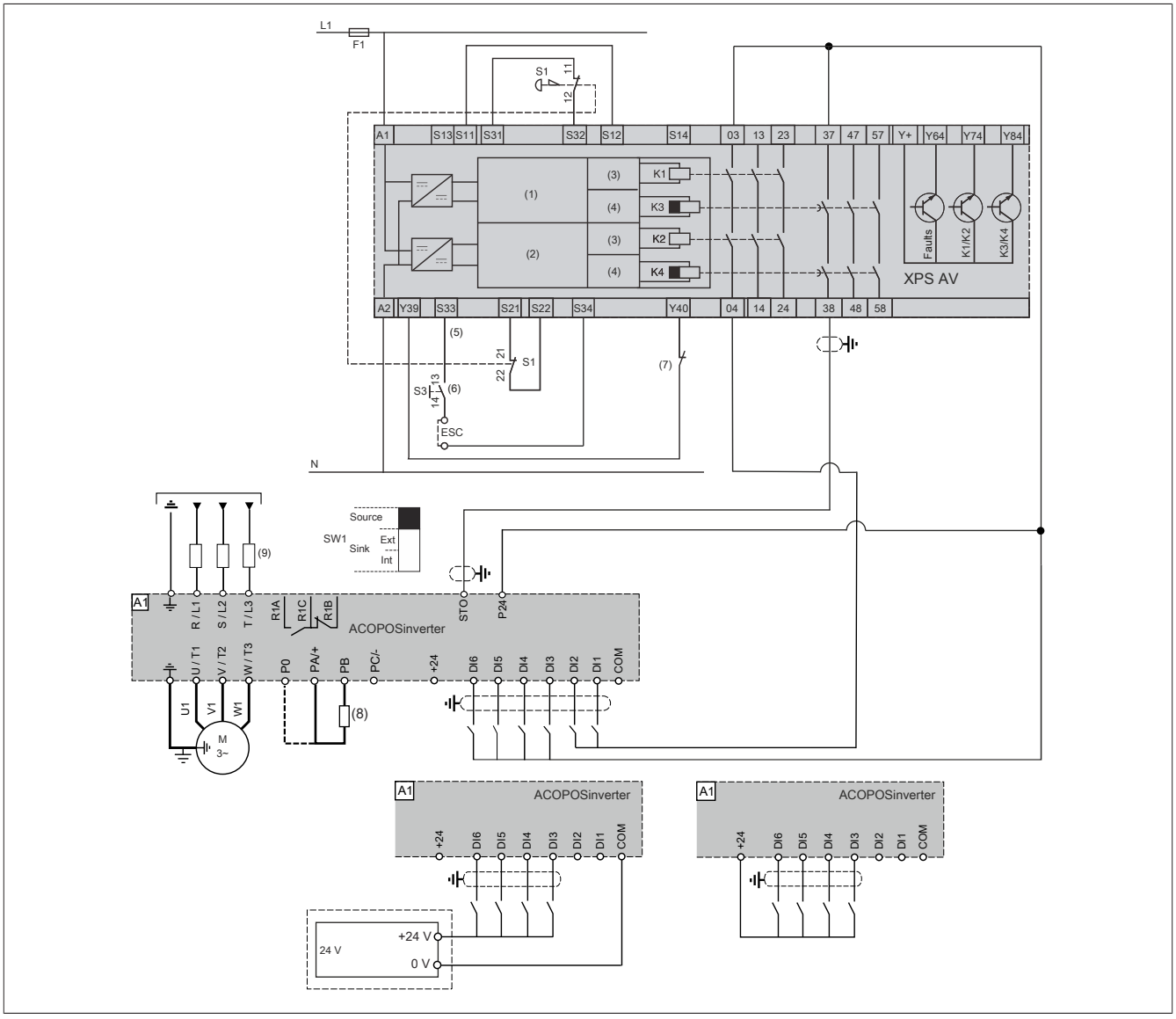
- SS1 type C category 3, PL d/SIL 2 on STO with safety switching device or equivalent.

Or:

- SS1 type C category 3, PL d/SIL 2 on STO with safety switching device or equivalent.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI3/DI4.
- DI5/DI6 is not set to a safety function.

Or:

- SS1 type C category 3, PL d/SIL 2 on STO and DI3 with safety switching device or equivalent.
- DI3/DI4 and DI5/DI6 are not set to a safety function.




(1) Channel logic
(2) Channel 2 logic
(3) Output 1
(4) Output 2
(5) Emergency switch-off
(6) Start
(7) Stop delay
(8) Braking resistor (if used)
(9) Line chokes (if used)

## Note:

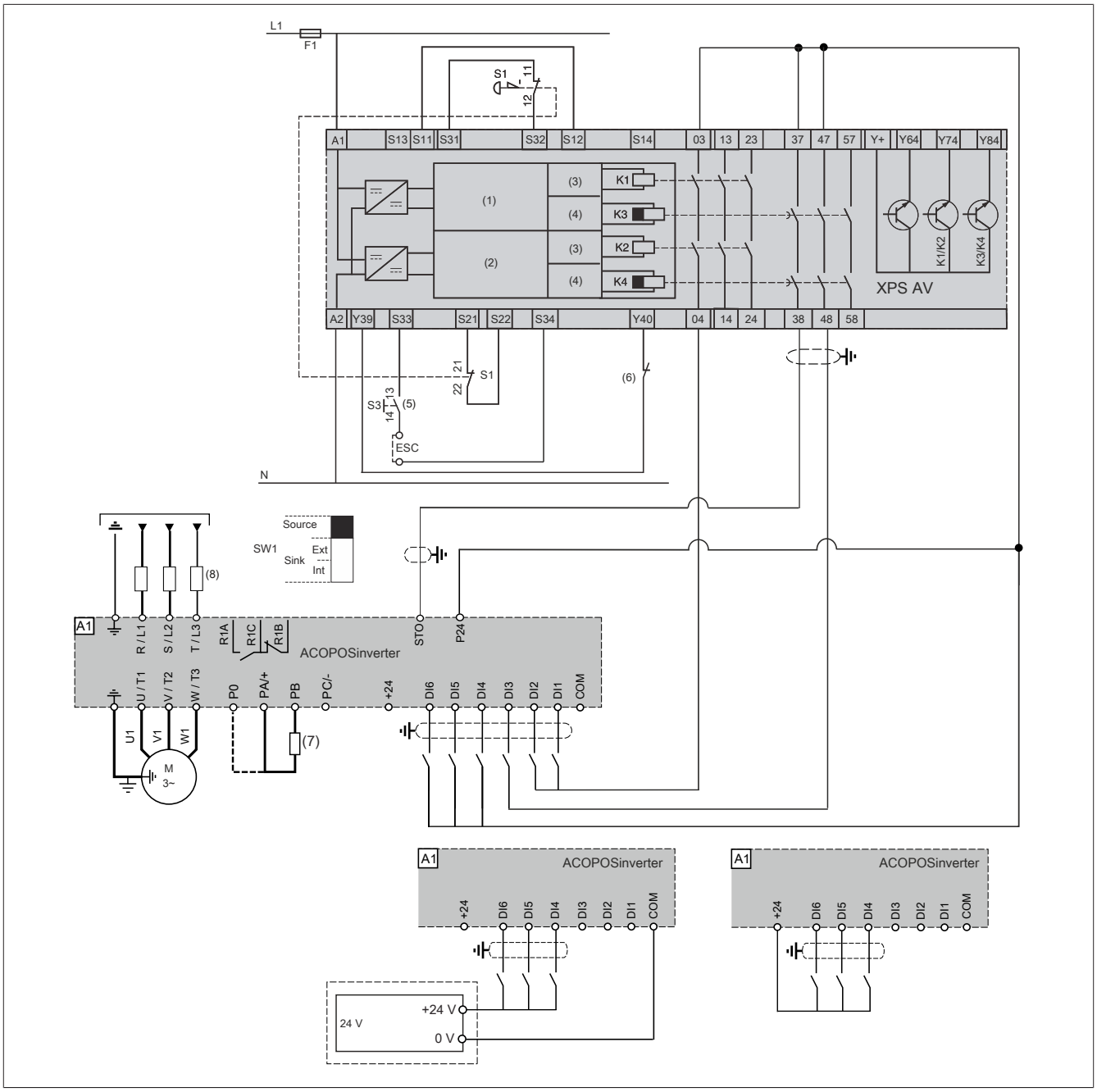
**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

## 8.7.6 Single drive with safety switching device XPS AV - Case 2

**Single drive with safety switching device in accordance with EN 954-1, IEC 13849-1 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

- SS1 type C category 4, PL e/SIL 3 on STO and DI3 with safety switching device or equivalent.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 PL d/SIL 2 on DI5/DI6.
- DI4 is not set to a safety function.




(1) Channel logic
(2) Channel 2 logic
(3) Output 1
(4) Output 2
(5) Emergency switch-off
(6) Stop delay
(7) Braking resistor (if used)
(8) Line chokes (if used)

### Note:

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.7 Single drive with safety switching device XPS AF - Case 1

**Single drive with safety switching device in accordance with EN 954-1, IEC 13849-1, IEC 62061 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

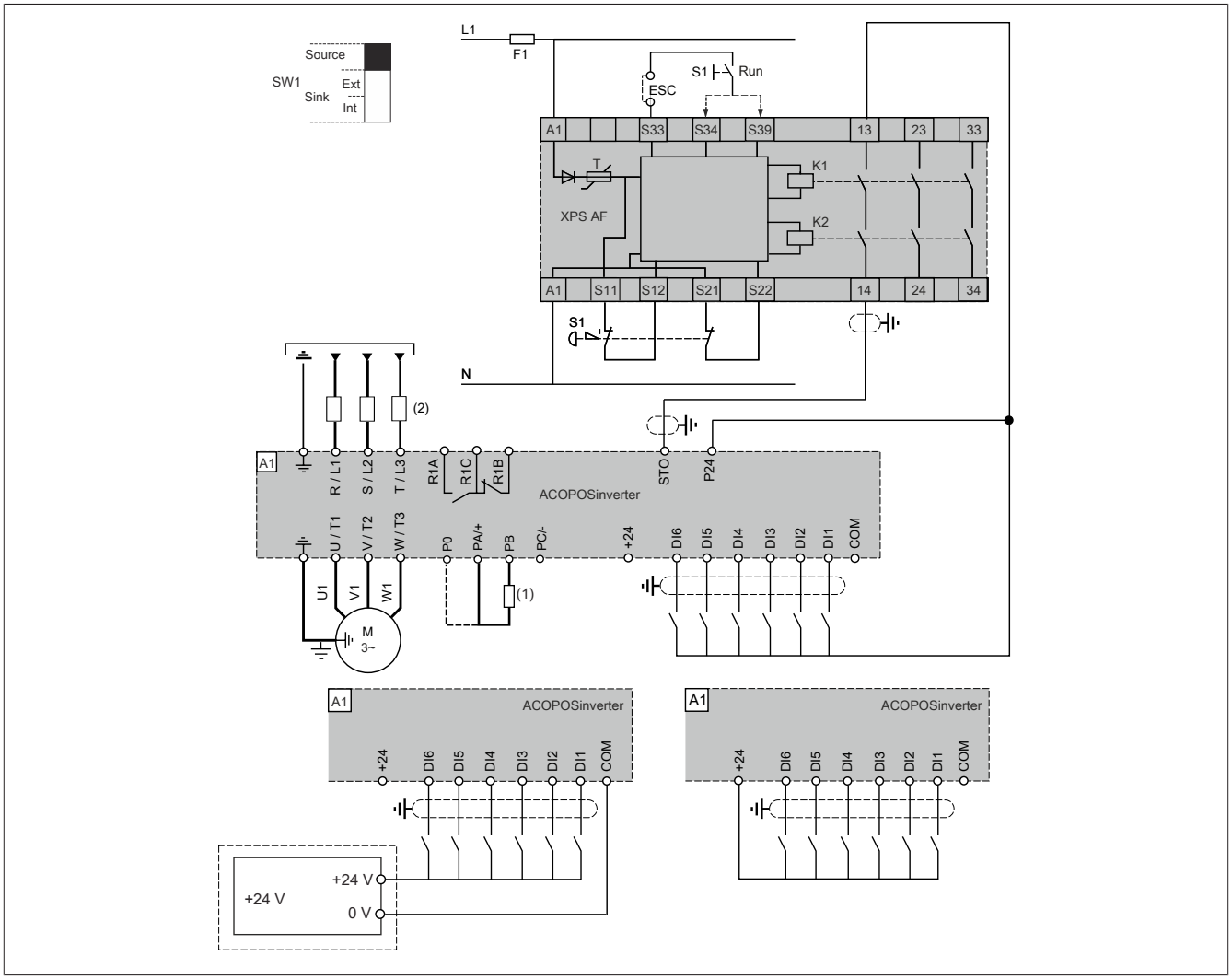
- STO category 3, PL d/SIL 2 on STO with safety switching device or equivalent.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI3/DI4 or DI5/DI6.

Or:

- STO category 3, PL d/SIL 2 on STO with safety switching device or equivalent.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI3/DI4.
- DI5/DI6 is not set to a safety function.

Or:

- STO category 3, PL d/SIL 2 on STO with safety switching device or equivalent.
- DI3/DI4 and DI5/DI6 are not set to a safety function.




(1) Braking resistor (if used)
(2) Line chokes (if used)

## Note:

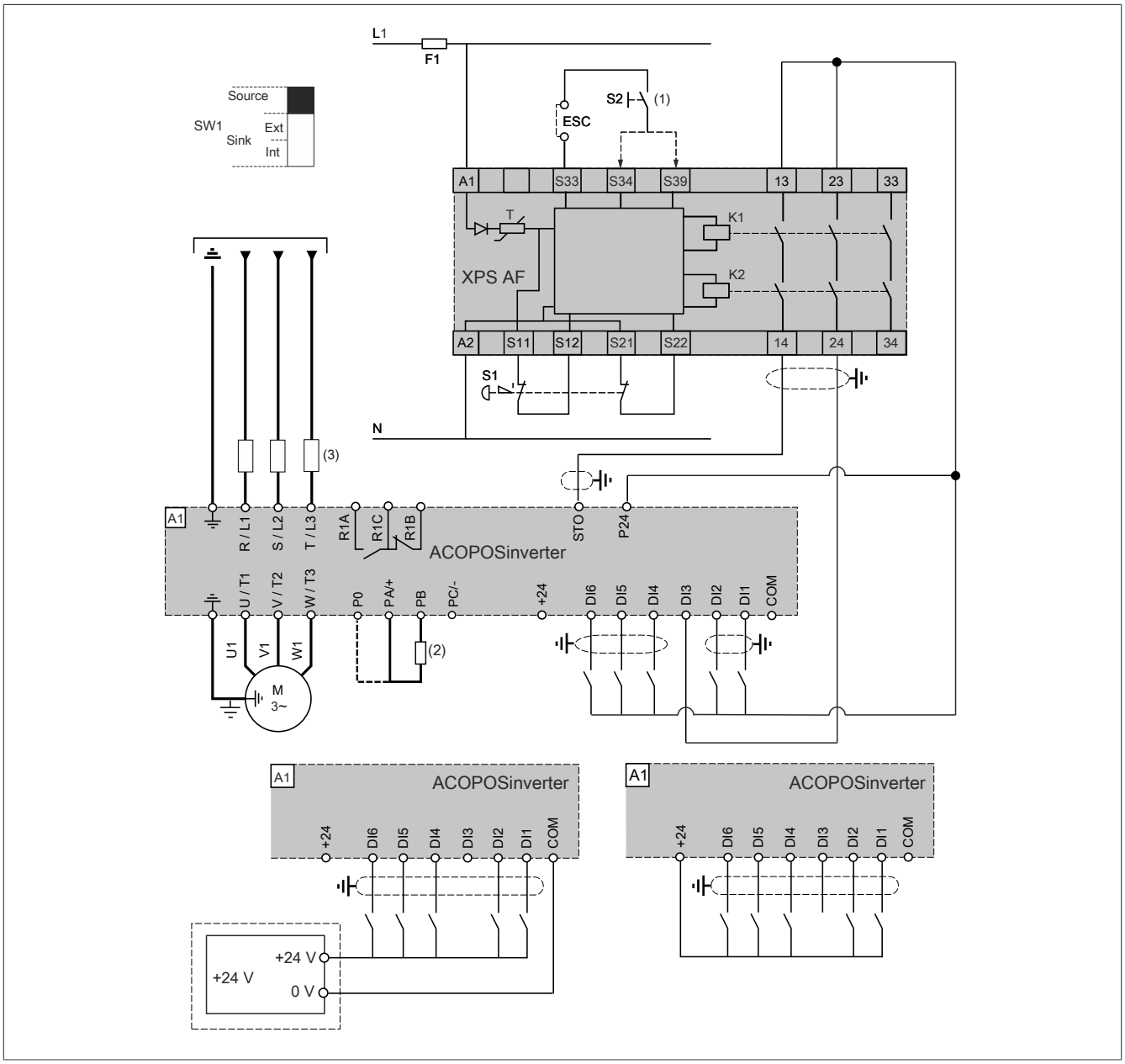
**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.8 Single drive with safety switching device XPS AF - Case 2

**Single drive with safety switching device in accordance with EN 954-1, IEC 13849-1, IEC 62061 and IEC 60204-1 (machine)**

The following configurations correspond to the wiring diagram below:

- STO category 4, PL e/SIL 3 on STO with safety switching device or equivalent and DI3 set to STO.
- SLS category 3, PL d/SIL 2 or SS1 type B category 3 on DI5/DI6.
- DI4 is not set to a safety function.




(1) Start
(2) Braking resistor (if used)
(3) Line chokes (if used)

## Note:

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.9 Single drive per IEC 61508 and IEC 60204-1 - Case 1

**Single drive according to IEC 61508 and IEC 60204-1 without protection against power supply interruption or voltage reduction and subsequent rotation**

The following configurations correspond to the wiring diagram below:

- STO SIL 2 on STO.
- STO or SLS SIL 2 or SS1 type B SIL 2 on DI3/DI4 or DI5/DI6.

Or:

- STO SIL 2 on STO.
- STO or SLS or SS1 type B on DI3/DI4.
- DI5/DI6 is not set to a safety function.

Or:

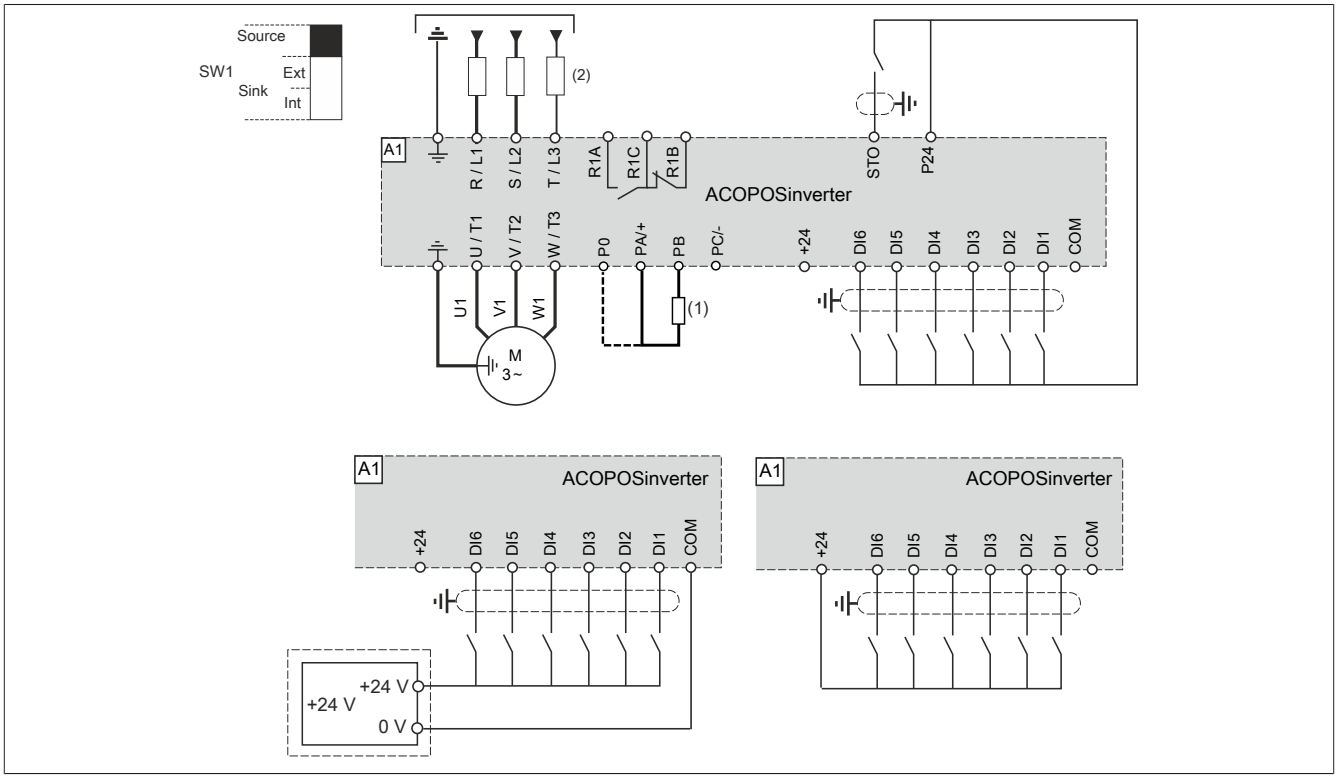
- STO SIL 2 on STO.
- DI3/DI4 and DI5/DI6 are not set to a safety function.

Or:

- STO SIL 3 on STO and DI3.
- SLS SIL 2 or SS1 type B SIL 2 on DI5/DI6.
- DI4 is not set to a safety function.

Or:

- STO SIL 3 on STO and DI3.
- DI4 and DI5/DI6 are not set to a safety function.




(1) Braking resistor (if used)

(2) Line chokes (if used)

## Note:

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

### 8.7.10 Single drive per IEC 61508 and IEC 60204-1 - Case 2

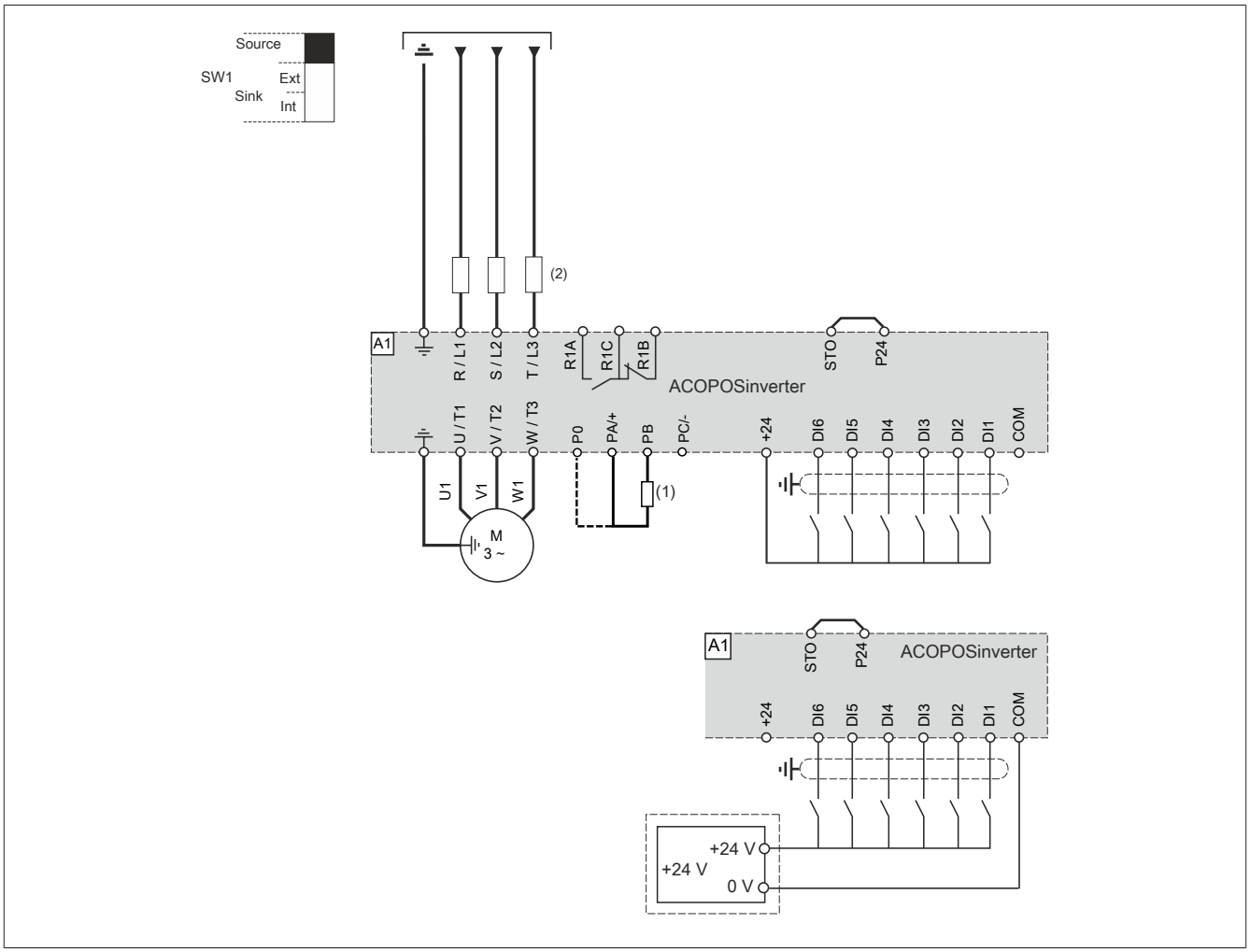
**Single drive according to IEC 61508 and IEC 60204-1 without protection against power supply interruption or voltage reduction and subsequent rotation**

The following configurations correspond to the wiring diagram below:

- STO SIL 2 on DI3 and DI4.
- SLS SIL 2 or SS1 type B SIL 2 on DI5/DI6.

Or:

- STO SIL 2 on DI3 and DI4.
- DI5/DI6 is not set to a safety function.




(1) Braking resistor (if used)
(2) Line chokes (if used)

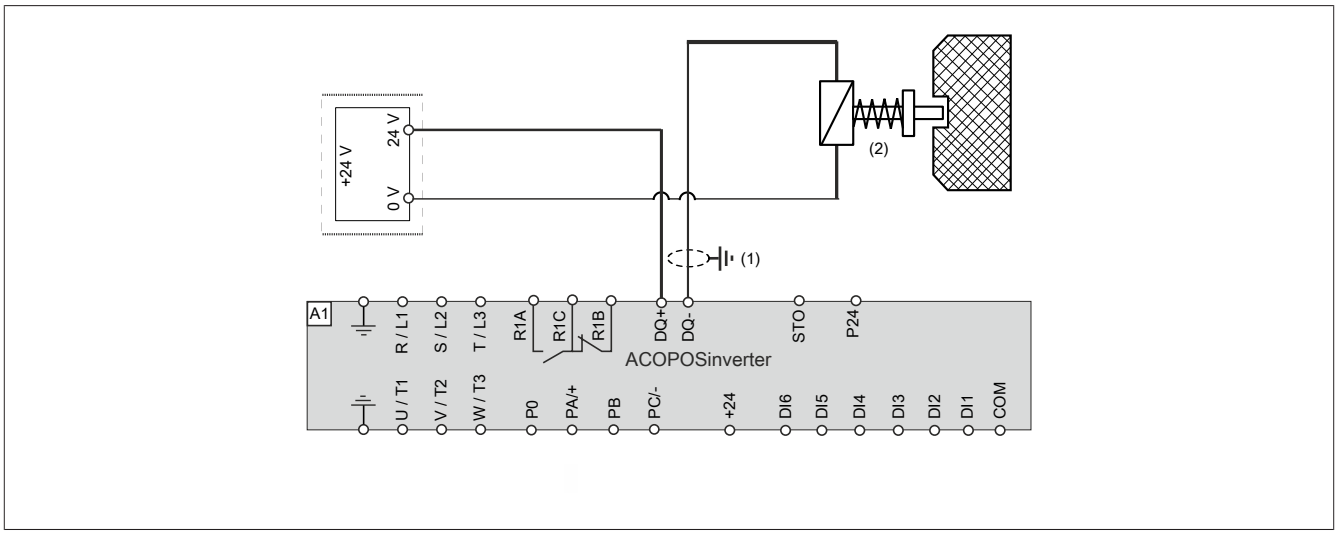
## Note:

**For additional information about the characteristics of the control terminal, see "Installation" on page 105.**

## 8.7.11 Single drive per IEC 61508 and IEC 62061 with safety function GDL

### Certified wiring diagram

GDL category 2, PL c/SIL 1 is applicable to the following wiring diagram.




(1) Standard coaxial cable, type RG174/U in accordance with MIL-C17 or KX3B in accordance with NF C 93-550. Maximum external diameter 2.54 mm, maximum length 15 m. The cable shield must be grounded.
(2) Safety gate locking

## 8.8 Commissioning

To enable the safety functions of the ACOPOSinverter, the additional software package "ACPi SafeConfigurator" must be used. The necessary requirements for using this tool and establishing a connection to ACOPOSinverter are explained in chapter 6 "The drive in ACPi SafeConfigurator" on page 439.

### 8.8.1 Tab "Safety functions"

#### Introduction

Click tab "Safety functions" to access **Safety functions**. All current safety function configurations are displayed on this read-only screen.

Tab **Safety functions** provides access to the following:

- An overview of the safety functions available in the ACOPOSinverter (accessible online/offline)
- The states of all inputs/outputs in mode "Connected"
- General information about the machine (online/offline)

The following dialog boxes can also be accessed:

- Configuration
  - Configure (available in connected mode only)
  - Reset configuration
  - Copy from DEVICE to a PC
  - Copy from PC to the DEVICE
- Password configuration
  - Change password
  - Reset password

#### Prerequisite

Before configuring safety parameters, ensure that the device firmware and the DTM version are the same.

#### Steps for configuring safety functions

- If you are not in online mode, then click Communication → **Connect to device** in the menu bar or click icon **Connect to device**.
- If you are located in online mode, click button **Configure** in tab "Safety functions".

As soon as you are connected, proceed as follows:

1) Click button **Configure** on tab "Safety functions".
   Comment: Dialog box **Define configuration password** is displayed:
   - Enter the new configuration password in field **Enter new password**.
   - In field **Confirm new password**, enter the password again.
   - Click **OK**.

   **Note:**

   **Your password must be structured as follows:**

   - **It must consist of a numerical value between 1 and 9999.**
   - **It is not permitted to be longer than four characters.**
   - **It is not permitted to have a value of 0.**

   Result: Window "Safety function configuration" is opened.

If you have already defined a password, then enter your configuration password for the security functions in dialog box **Enter configuration password** and click **OK**.

Result: Window "Configuration of the safety functions" is opened.

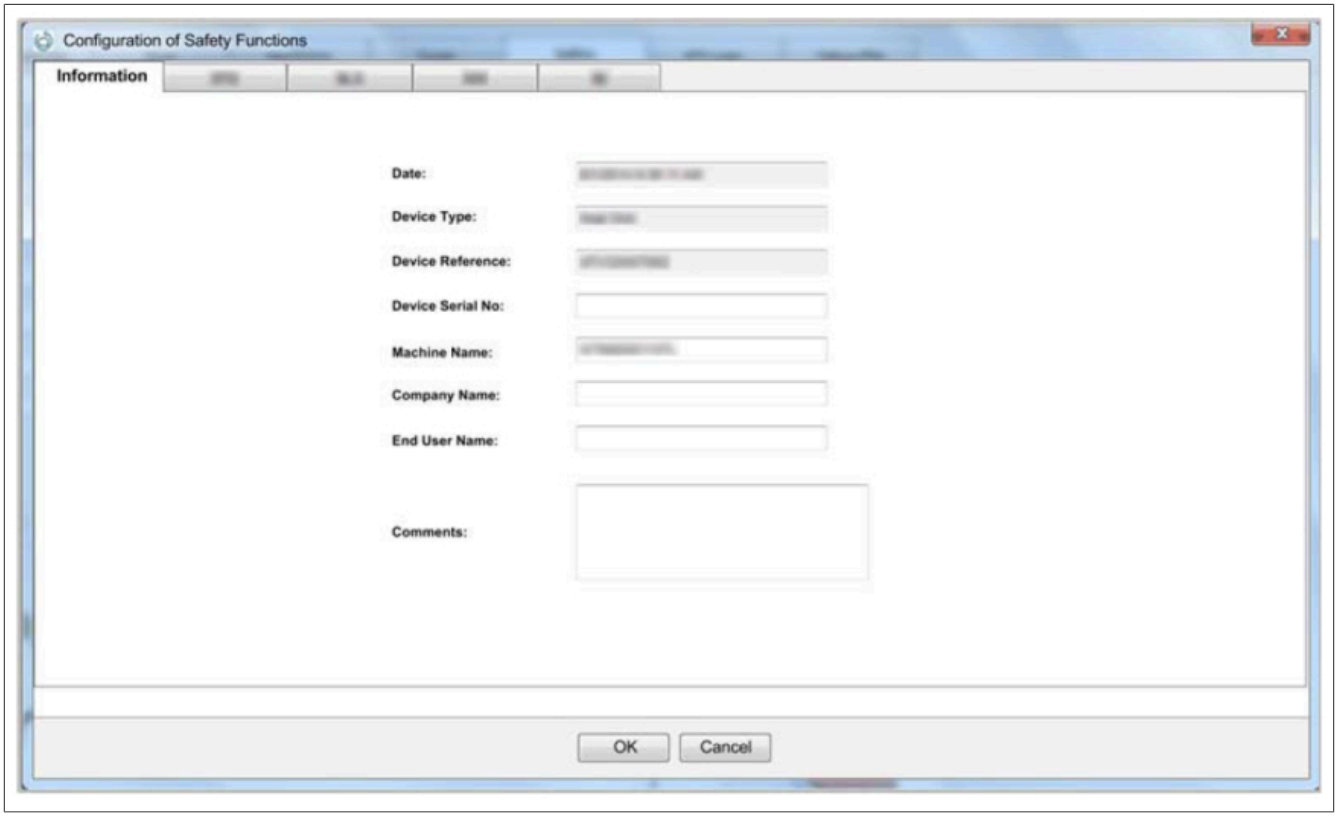
## 8.8.2 Window "Configuration of safety functions"

### Overview

Window "Configuration of safety functions" contains the tabs "Information", "STO", "SLS", "SS1", "SMS", "GDL" and "IO".

### Tab "Information"

On tab **Information**, you can define and display product system information.




The following data is automatically entered by the ACPi SafeConfigurator:

- Date (format depends on the local options and the language settings of the PC)
- Device type
- Order number of the inverter

The following data must be entered manually:

- Device serial number (numerical value)
- Device name
- Company name
- Name of the end user
- Comments

### Tab "STO" (Safe Torque Off)

For additional information about the STO function, see section "Safety function "Safe Torque Off " (STO)" on page 519. For this function, only the connected input blocks are permitted to be selected in the field. The parameter to be administered is STOA.

| Code | Name/Description | Clear all |
|---|---|---|
| StO | [Safe stop] | |
| StOA | [STO function activated] | [No] |
| nO | [No]: Not assigned | |
| L34 | [LI3 and LI4]: LI3/4 Low state | |
| L56 | [LI5 and LI6]: LI5/6 Low state | |
| L3PW | [LI3 and STO]: LI3/STO Low state | |
| | This parameter is used to configure the channel that is used to trigger the STO function. If STOA is set to No , the STO function is always active, but only on the STO input. | |

## Tab "SLS" (Safely Limited Speed)

For additional information about the SLS function, see section "Safety function "Safely Limited Speed" (SLS)" on page 523.

| Code | Name/Description | Setting range | Clear all |
|---|---|---|---|
| SLS | **[Spd limited]** | | |
| SLSA | **[SLS function activated]** | | **[No]** |
| nO | **[No]**: Not assigned | | |
| L34 | **[LI3 and LI4]**: LI3/4 Low state | | |
| L56 | **[LI5 and LI6]**: LI5/6 Low state | | |
| | This parameter is used to configure the channel that is used to trigger the SLS function. | | |
| SLt | **[Safely limited speed element type]** | | **[Typ1]** |
| | This parameter is used to select the SLS type. | | |
| tYp1 | **[Type 1]**: SLS type 1 | | |
| tYp2 | **[Type 2]**: SLS type 2 | | |
| tYp3 | **[Type 3]**: SLS type 3 | | |
| tYp4 | **[Type 4]**: SLS type 4 | | |
| | For information about the behavior of the various types, see the function description. | | |
| SLSP | **[SLS reference]** | 0 to 599 Hz | 0 Hz |
| | This parameter is only visible if SLT = Type 2 or SLT = Type 3 or SLT = Type 4. SLSP is used to set the maximum speed. | | |
| SLtt | **[SLS tolerance threshold]** | 0 to 599 Hz | 0 Hz |
| | The behavior of this parameter depends on the value for SLT; see above. | | |
| SLwt | **[SLS Wait time]** | 0 to 5000 ms | 0 Hz |
| | This parameter is used to set the maximum time so that (StFr) is greater than (SSSL).<br>If (SLwt) has been reached, the STO safety function is activated.<br>The unit of this parameter is 1 ms.<br>Example:<br>If the value is set to 2000 units, the SLS delay in seconds will be:<br>2000 x 1 ms = 2 s<br>This parameter can only be changed if SLT = Type 2 or SLT = Type 3.<br>For SLS = Type 1 and SLS = Type 4, SLwt is always set to 0. | | |
| SSrt | **[SS1 ramp value]** | 1 to 5990 | 1 |
| | The unit depends on the SSRU parameter. Use this parameter to set the value of the SS1 deceleration ramp.<br>SS1 ramp = (SSRT) x (SSRU); example: If (SSRT) = 250 and (SSRU) = 1 Hz/s, the deceleration ramp is = 250 Hz/s.<br>The parameter is similar to the SS1 safety function. For additional information, see "SS1" on page 536. | | |
| SSrU | **[SS1 ramp unit]** | | **[1 Hz/s]** |
| 1H | **[1 Hz/s]** | | |
| 10H | **[10 Hz/s]** | | |
| 100H | **[100 Hz/s]** | | |
| | This parameter is used to set the SSrt unit. This parameter is similar to the configuration for the SS1 safety function. For additional information, see "SS1" on page 536. | | |
| SStt | **[SS1 trip threshold]** | 0 to 599 Hz | 0 Hz |
| | This parameter defines the tolerance range around the deceleration ramp within which the frequency can vary.<br>It is similar to the SS1 safety function configured on another tab. | | |
| SSSL | **[SLS/SS1 standstill level]** | 0 to 599 Hz | 0 Hz |
| | This parameter defines the frequency at which the frequency inverter should change to STO state at the end of the SS1 ramp.<br>It is similar to the SS1 safety function configured on another tab. | | |

### Tab "Safe stop 1" (SS1)

For additional information about the SS1 function, see section "Safety function "Safe Stop 1" (SS1)" on page 521.

| Code | Name/Description | Setting range | Clear all |
|---|---|---|---|
| SS1 | [Safe ramp] | | |
| SS1A | [Safe stop 1 activation] | | [No] |
| nO | [No]: Not assigned | | |
| L34 | [LI3 and LI4]: LI3/4 Low state | | |
| L56 | [LI5 and LI6]: LI5/6 Low state | | |
| | This parameter is used to configure the channel that is used to trigger the SS1 function. | | |
| SSrt | [SS1 ramp value] | 1 to 800 | 1 |
| | The unit depends on the SSRU parameter. Use this parameter to set the value of the SS1 deceleration ramp.<br>SS1 ramp = (SSRT) x (SSRU); example: If (SSRT) = 250 and (SSRU) = 1 Hz/s, the deceleration ramp is = 250 Hz/s.<br>This parameter is similar to the SLS safety function configured on another tab. | | |
| SSrU | [SS1 ramp unit] | | [1 Hz/s] |
| 1H | [1 Hz/s] | | |
| 10H | [10 Hz/s] | | |
| 100H | [100 Hz/s] | | |
| | This parameter is used to set the SSrt unit.<br>It is similar to the SLS safety function configured on another tab. | | |
| SStt | [SS1 trip threshold] | 0 to 599 Hz | 0 Hz |
| | This parameter defines the tolerance range around the deceleration ramp within which the frequency can vary.<br>It is similar to the configuration for the SLS safety function. | | |
| SSSL | [SLS/SS1 standstill level] | 0 to 599 Hz | 0 Hz |
| | This parameter defines the frequency at which the frequency inverter should change to STO state at the end of the SS1 ramp.<br>It is similar to the SLS safety function configured on another tab. | | |

### Tab "SMS" (Safe Maximum Speed)

For additional information about the SMS function, see section "Safety function SMS (Safe Maximum Speed)" on page 529.

| Code | Name/Description | Setting range | Clear all |
|---|---|---|---|
| SMS | [SMS status] | | |
| SMSA | [SMS Activation] | | [No] |
| nO | [No]: The SMS function is not active. | | |
| Yes | [YES]: The SMS function is active. | | |
| | This parameter is used to configure the channel that is used to trigger the SMS function. | | |
| SMLS | [SMS Assignment] | | [No] |
| | This parameter is used to select the limit value for the safe maximum speed. | | |
| nO | [No]: [SMS Low Limit] (SMLL) is selected as the limit value for the safe maximum speed. | | |
| L34 | [LI3 and LI4] | | |
| | • If logic inputs 3/4 are in Low state (0), [SMS Low Limit] (SMLL) is selected as the limit value for the safe maximum speed. | | |
| | • If logic inputs 3/4 are in High state (1), [SMS High Limit] (SMLH) is selected as the limit value for the safe maximum speed. | | |
| L56 | [LI5 and LI6] | | |
| | • If logic inputs 5/6 are in Low state (0), [SMS Low Limit] (SMLL) is selected as the limit value for the safe maximum speed. | | |
| | • If logic inputs 5/6 are in High state (1), [SMS High Limit] (SMLH) is selected as the limit value for the safe maximum speed. | | |
| SMLL | [SMS Low Limit] | 0 to 599 Hz | 0 Hz |
| | This parameter is used to set the lower speed limit. | | |
| SMLH | [SMS High Limit] | 0 to 599 Hz | 0 Hz |
| | This parameter is used to set the upper speed limit. | | |

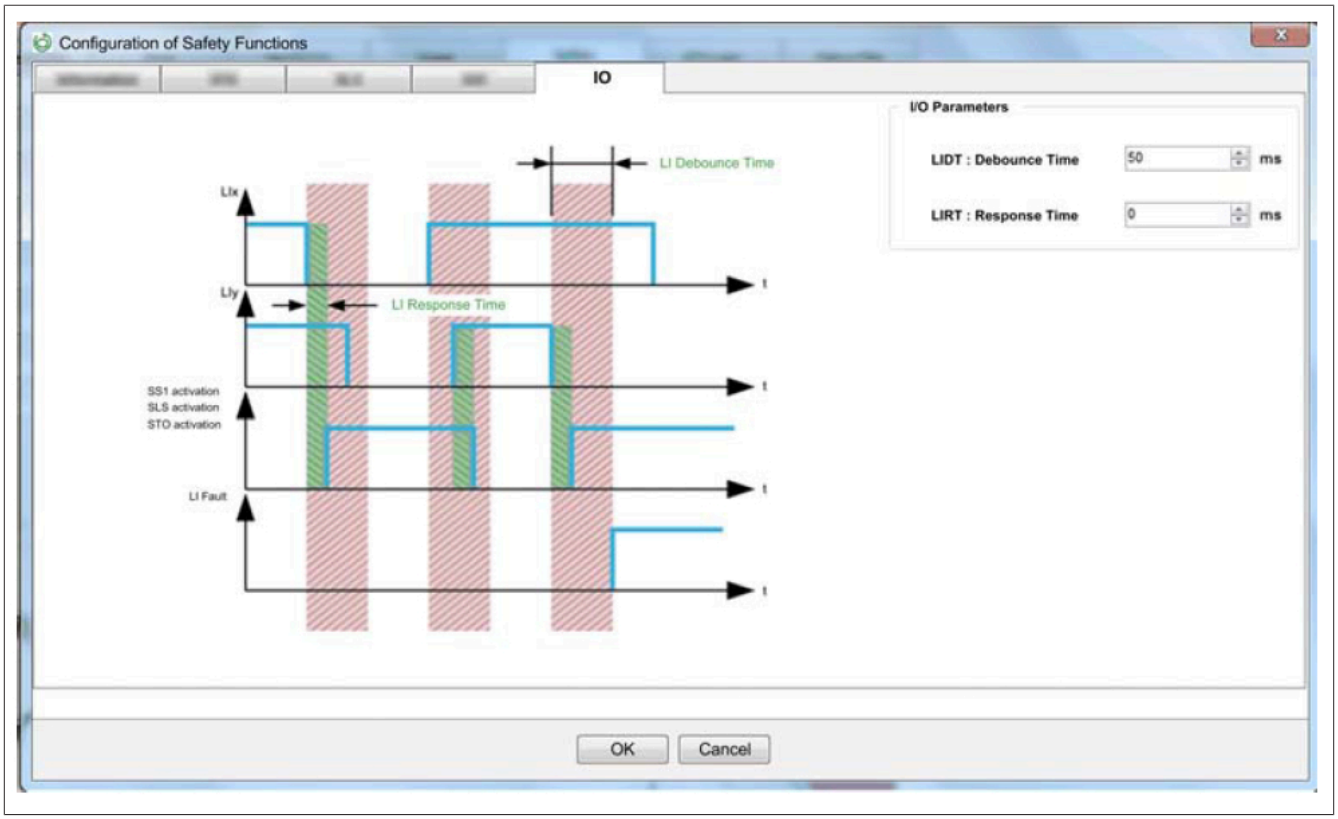
## Tab "Safety gate locking" (GDL)

For additional information about the GDL function, see section "Safety function GDL (safety gate interlock)" on page 531.

| Code | Name/Description | Setting range | Clear all |
|---|---|---|---|
| GdL | [GDL status] | | |
| GdLA | [GDL Assignment]<br>nO [No]: Safety gate locking is not assigned.<br>YES [YES]: Safety gate locking is assigned.<br>**Note:**<br>**(GdLA) can only be set to [YES] if the LO1 parameter is set to [No].**<br>This parameter is used to configure the channel that is used to trigger the GDL function. | | [No] |
| GLLd | [Guard Door Locking Long Delay]<br>This parameter is used to set the long delay for triggering of the GDL safety function.<br>Maximum delay after activation of the STO function or after a normal deceleration ramp command to stop the machine.<br>**Note:**<br>**The value for [Guard Door Locking Long Delay] must be higher than the value for [Guard Door Locking Short Delay]** | 1 to 3600 s | 1 s |
| GLSd | [Guard Door Locking Short Delay]<br>This parameter is used to set the short delay for triggering of the GDL safety function.<br>Maximum delay after the SS1 ramp for stopping the machine. | 1 to 3600 s | 1 s |

## Input/output configuration

The figure below shows the input/output tab.




| Code | Name/Description | Setting range | Clear all |
|---|---|---|---|
| I/O | **[Inputs/outputs]** | | |
| LIdt | **[LI debounce time]**<br>In most cases, the two logic inputs for a logic input pair used for safety functions (LI3-LI4 or LI5-LI6 or STO-LI3) are not 100% synchronized. Because there is a slight delay between the transition for both logic inputs, their state does not change at the same time.<br>(LIdt) is the parameter that is used to set this delay. If both logic inputs change to a state with a delay of less than (LIdt), this is regarded as a simultaneous transition of the logic inputs. If the delay is longer than (LIdt), the frequency inverter regards the logic inputs as no longer synchronized and triggers an error. | 0 to 2000 ms | 50 ms |
| LIrt | **[LI response time]**<br>This parameter is used to filter short pulses at the logic input (only for LI3-LI4 or LI5-LI6; does not affect STO). Some applications send short pulses in order to test the line. This parameter is used to filter out these short pulses. Commands are only taken into account if the pulse duration exceeds (LIrt).<br>If the duration is below this value, the frequency inverter assumes that there is no command pending: The command is filtered out. | 0 to 50 ms | 0 ms |

### Password configuration - Change password

Use this function to change the configuration password in the frequency inverter.

To change the configuration password, proceed as follows:

1) On tab **Safety functions**, click button **Change password**.
   **Result:** Dialog box **Change configuration password** is displayed.
2) On dialog box **Change configuration password**, proceed as follows:
   - Enter the existing configuration password in field **Enter current password**.
   - Enter the new configuration password in field **Enter new password**.
   - Re-enter the password in field **Confirm new password**.
   - Click **OK**.

> **Note:**
>
> **The same password must be entered in fields "Enter new password"and "Confirm new password".**

> **Note:**
>
> **Your password must be structured as follows:**
>
> - **It must consist of a numerical value between 1 and 9999.**
> - **It is not permitted to be longer than four characters.**
> - **It is not permitted to have a value of 0.**

**Result:** The configuration password has been changed.

### Password configuration - Reset password

This function is intended for cases where you have forgotten the configuration password that was defined in the frequency inverter. To reset the frequency inverter, the universal password is required. This password can be obtained from the B&R Support department.
After this action has been carried out, the device reverts to the undefined configuration password and the session is automatically closed.
The functional configuration remains unchanged, however.

### Reset configuration

This function is used to reset the configuration of the safety function to the factory settings.
On tab **Safety functions**, click button **Reset configuration**.
Enter the password and then confirm your selection.
After this action, all safety parameters are reset to the factory settings.

## 8.8.3 Safety functions display and states

| Code | Name/Description |
|---|---|
| SAF- | Menu **[MONIT. SAFETY]**: Visible in ACPi SafeConfigurator and on the graphic display terminal. |
| StFr | **[Stator Frequency]**<br>Displays the calculated stator frequency in Hz |
| StOS | **[STO state]**<br>State of the STO (Safe Torque Off) safety function |
| IdLE | **[Idle]**: STO has not been executed |
| StO | **[Safe stop]**: STO has been executed |
| FLt | **[Fault]**: Error detected in STO |
| SLSS | **[SLS state]**<br>State of the SLS (Safely Limited Speed) safety function |
| nO | **[Not config.]**: SLS not configured |
| IdLE | **[Idle]**: SLS has not been executed |
| SSI | **[Safe ramp]**: SLS ramp has been executed |
| StO | **[Safe stop]**: SLS request for Safe Torque Off has been executed |
| FLt | **[Fault]**: Error detected in SLS |
| WAIt | **[Idle]**: SLS is awaiting activation. |
| Strt | **[Started]**: SLS in temporary operation |
| SMSS | **[SMS state]**<br>State of the SMS (Safe Maximum Speed) safety function |
| nO | **[Not config.]**: SMS is not configured. |
| SMS | **[Active]**: SMS is in active state. |
| FTI | **[Internal Err.]**: Internal SMS error detected |
| FTO | **[Max Speed]**: SMS overspeed error detected |
| GDLS | **[GDL status]**<br>State of the GDL (Safety door locking) safety function |
| nO | **[Not config.]**: GDL is not configured. |
| OFF | **[Inactive]**: GDL is in inactive state. |
| STD | **[Short delay]**: GDL is in "Short delay" state. |
| LGD | **[Long delay]**: GDL is in "Long delay" state. |
| ON | **[Active]**: GDL is in active state. |
| FLT | **[Internal Err.]**: Internal GDL error detected |
| SS1S | **[SS1 state]**<br>State of the "Safe Stop 1" safety function |
| nO | **[Not config.]**: SS1 not configured |
| IdLE | **[Idle]**: SS1 has not been executed |
| SSI | **[Safe ramp]**: SS1 ramp has been executed |
| StO | **[Safe stop]**: SS1 request for "Safe Torque Off" has been executed. |
| FLt | **[Fault]**: Error detected in SS1 |
| SAF- | Menu **[MONIT. SAFETY]**: Visible in ACPi SafeConfigurator only |
| SFtY | **[Safety drive status]**<br>Safety function state of the frequency inverter |
| IStd | **[Standard inverter]**: Standard product with no configured safety function |
| SAFE | **[Safety drive]**: Product with at least one configured safety function |

## 8.8.4 Copying the safety configuration from the device to a PC and vice versa

### Overview

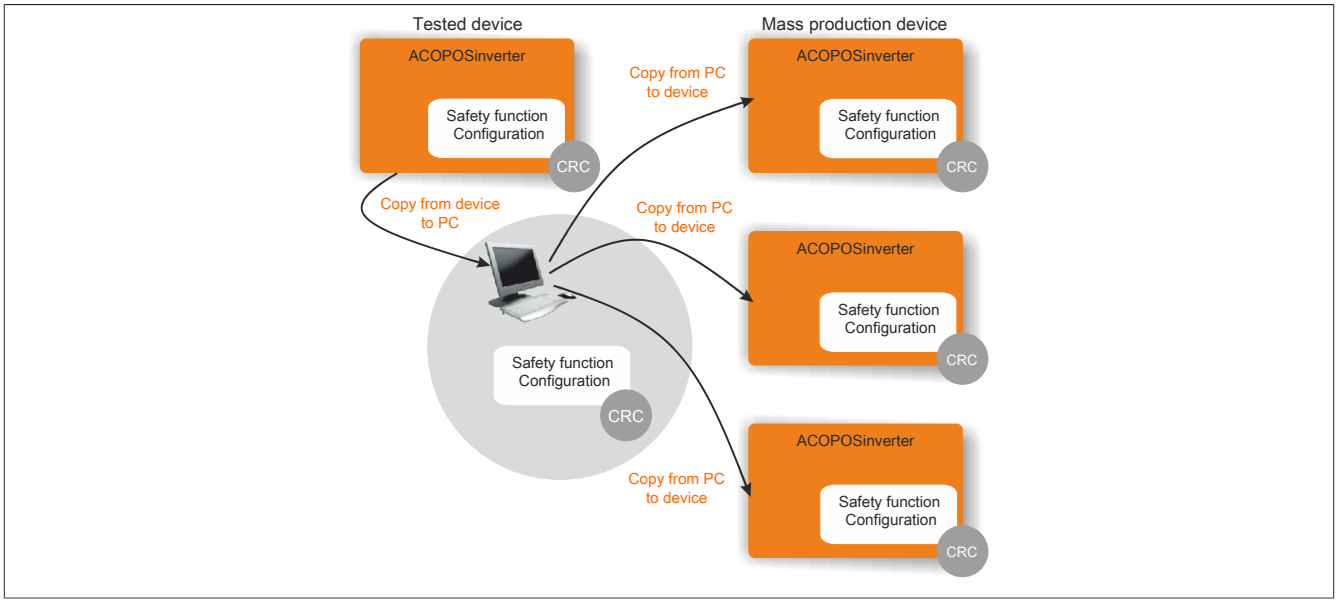
This function is used for copying a tested safety configuration for various frequency inverters and adding it to a different device of the same type.

This function allows you to do the following:

- Identifying a unique safety configuration on the frequency inverter
- Copying the safety configuration file from the frequency inverter to a PC
- Copying the safety configuration file from a PC to the frequency inverter

### Architecture

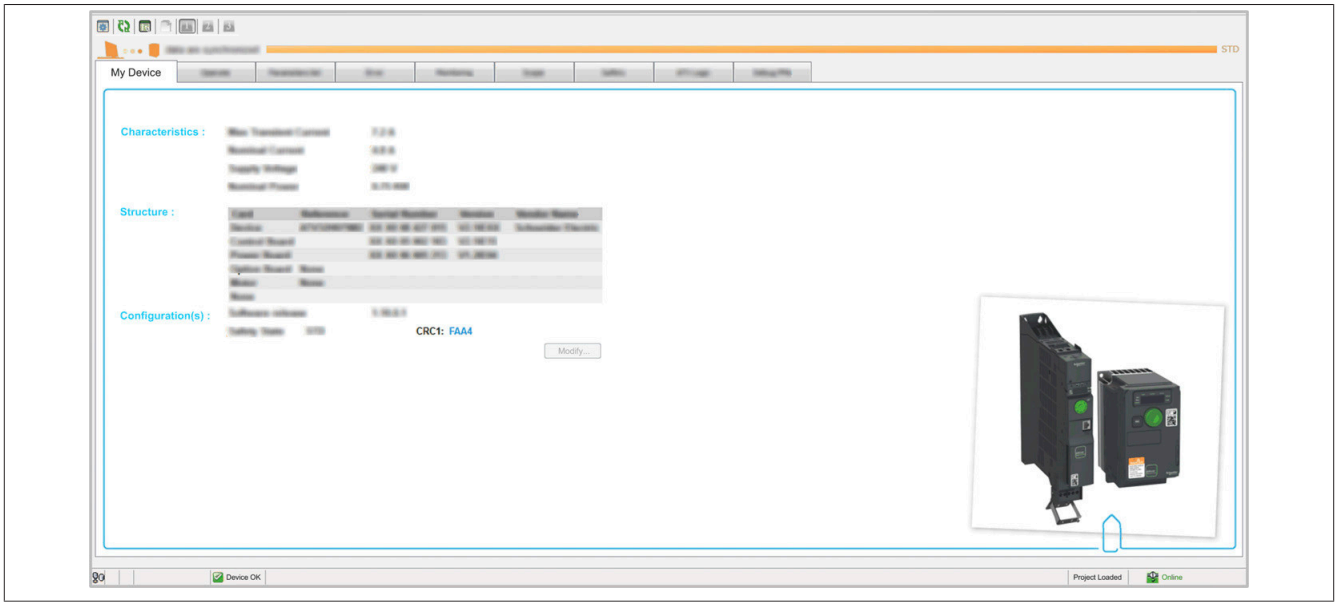
The figure below shows the architecture for copying the safety configuration from the device to a PC and vice versa:




### Identification of a unique safety configuration

The safety configuration is identified using CRC. All safety-related parameters are used for the calculation.

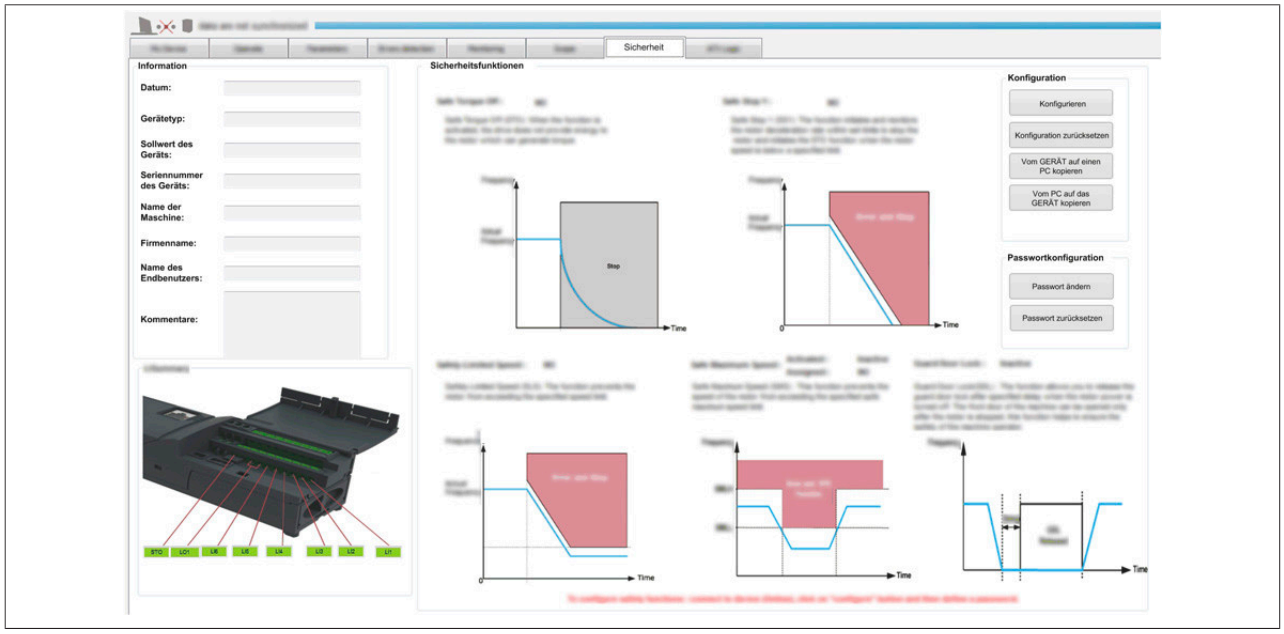
The CRC value is available on tab **My device**. After the frequency inverter has been fully tested, make a note of the CRC value.



### Copy from the device to a PC

To copy a configuration file from the device to a PC, proceed as follows:

1) On tab **Safety functions**, click button **Copy from the DEVICE to a PC**.




**Result:** Dialog box **Copy from device to PC** is opened.

2) Enter the configuration password in dialog box **Enter configuration password** and click **OK**.
**Result:** The CRC1 value is displayed.
3) Make a note of the CRC1 value and click **Save**.
**Result:** Window **Save file** is opened.
4) In window**Save file**, proceed as follows:
   - Select or create the following folder:
   - Enter the name of the file in field **File name**.
   - Click on **Save**.

**Result**: Message **Safety-relevant parameters saved successfully** is displayed on the screen. This confirms that the file has been saved successfully in the required location.

## Note:

**The configuration file cannot be copied from the device to a PC in the following case:**

- **If the motor is switched on**
- **If a function block is in operational state (Operational)**
- **If function Forced local is active**
- **If a safety function is enabled**

### Copying from a PC to the device

## Warning!

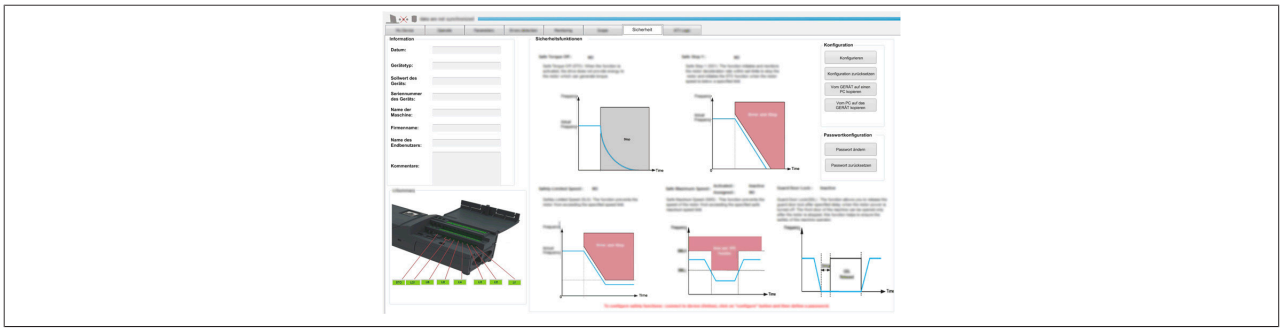
**UNINTENDED OPERATION OF THE DEVICE**

- **Connect the device to the PC via a point-to-point connection.**
- **In accordance with IEC 61800-5-2, only qualified personnel are permitted to copy configuration files from a PC to a device.**
- **After copying the configuration file from the PC to the device, test the configuration of the safety functions.**

**Failure to follow these instructions can result in death, serious injury or damage to property.**

To copy a configuration file from a PC to the device, proceed as follows:

1) On tab **Safety functions**, click button **Copy from the PC to the DEVICE**.



**Result**: A warning message (**Warning**) is displayed. Read the instructions before proceeding with the copy operation.

2) Click **OK**.

**Result:** Window **Open file** is opened.

3) In window **Open file**, proceed as follows:
   - Select a .sfty file.
   - Click on **Open**.

   **Result**: The CRC1 value is displayed.

4) Check whether the CRC1 value corresponds to the value that was noted when copying the configuration from the device to the PC. If both values are the same, click **Continue**.
   **Result**: Dialog box **Copy from the PC to the DEVICE** is opened.

5) Enter the password (49157) in dialog box **Enter copied password** and click **OK**.
   **Result**: The configuration has been successfully copied from the PC to the device. A commissioning test must be performed on the safety functions.

## Note:

**The configuration file cannot be copied from the PC to the device in the following case:**

- **If the motor is switched on**
- **If a function block is in operational state (Operational)**
- **If function Forced local is active**
- **If the configuration for the safety function is on the device already**

### 8.8.5 Device signature

#### Overview

The aim of the test is to confirm both the correct configuration of the defined safety functions and the test mechanisms. It is also designed to test the response behavior of specific monitoring functions to the explicit input of values outside the tolerance limits.

The test must cover all inverter-specific monitoring functions as well as all global integrated safety functions of the ACOPOSinverter.

#### Requirements for acceptance testing

- The machine is correctly wired.
- All safety-relevant equipment such as monitoring devices for safety doors, light barriers and emergency switching-off devices are connected and ready for operation.
- All motor and command parameters are correctly configured in the inverter.

#### Procedure for acceptance testing

Configuration of the acceptance test is set using the ACPi SafeConfigurator.

1) Choose option **Device** → **Additional functions** → **Safety functions** → **Machine signature** and complete the following five steps.
2) **General information**
   To add this step to the final report, select **Add to device signature**.
   Click **Next**.
   The information displayed here corresponds to section **Identification** of tab **Safety functions**.
3) **Functional summary**
   To add a function to the final report, select **Add to device signature**.
   Click **Next.**
   This step is broken down into interim steps.
   Each interim step corresponds to a safety function:
   - STO
   - SLS
   - SS1
   - SMS
   - GDL

   The functional diagram and parameter values are shown in an interim step for each function.
   Further comments can be added to a text field.
4) **I/O summary**
   To add a function to the final report, select **Add to device signature**.
   Click **Next**.
   The information displayed here corresponds to section **Overview of logic inputs** on tab **Safety functions**:
   - The logic input assigned to a safety function is shown in red and indicates the associated safety function.
   - Logic inputs that are not assigned to any safety function are displayed in green and do not indicate any assignment.
5) **Test**
   To add a function to the final report, select **Add to device signature**.
   Click **Next**.
   In this step, select the checkbox if you have tested your safety functions. This confirms that the functions exhibit the correct behavior for the overall equipment.
6) **Key**
   Click **Complete** to create the report.
   The checksum of the safety-related configuration is displayed as calculated. To send it to the connected device in this format, click **Transfer**.
   This allows you to compare the value of the checksum with the value that is displayed in the identification menu of the graphic display terminal.

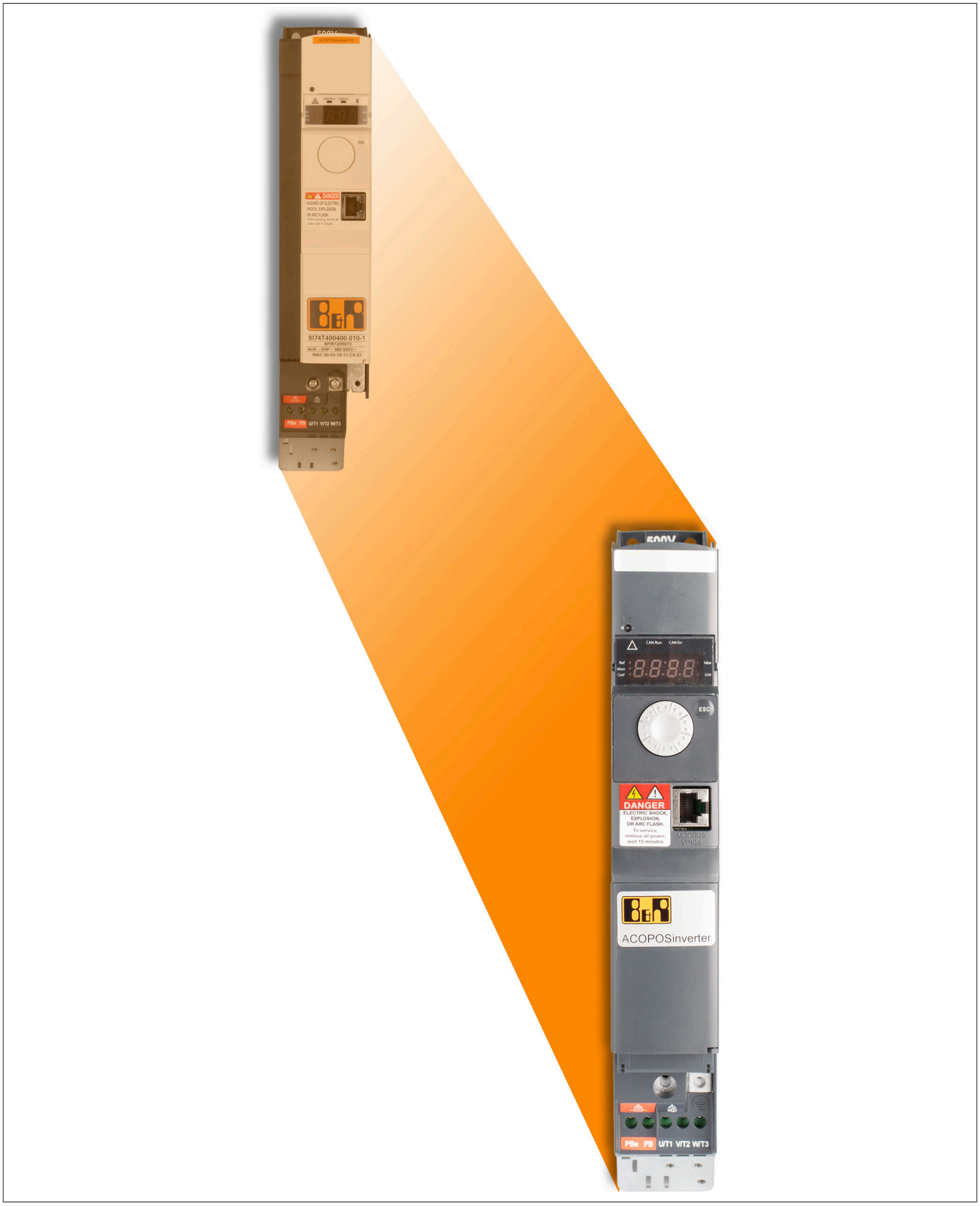
### Acceptance report

ACPi SafeConfigurator creates the acceptance report.

This function delivers a final report if one or more safety functions have been configured and tested. The report applies as a device signature and certifies that all safety functions are ready for operation. The acceptance report can be printed as an additional document or saved in PDF format.

**If changes are made to the inverter configuration (not just to safety-relevant parameters), the acceptance test must be performed again.**

## 8.9 Migration of an existing safety configuration




### 8.9.1 Migration from Parameter Tool to SafeConfigurator

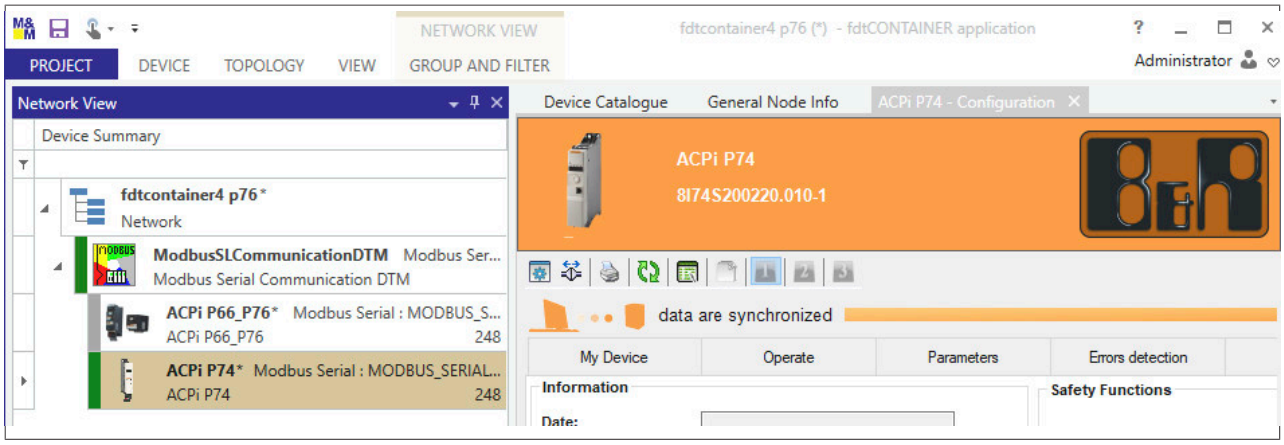
The previously used ACPi Parameter Tool was originally developed for Win XP and later released for Win 7. The successor ACPi SafeConfigurator was developed for use on Windows 10 and replaces the ACPi Parameter Tool.

### 8.9.2 Transfer of safety functions (safety configuration) to the new ACOPOSinverter

The migration of safety functions works similarly to the "copy from device to PC" process described in the previous chapter. The safety configuration can be read out from the device and saved to the PC as usual. Button "Convert" can then be used to convert the check sums and transfer the safety configuration to the connected drive.

The transfer of the safety functions from a P74 ACOPOSinverter to a P66 or P76 ACOPOSinverter works as follows:

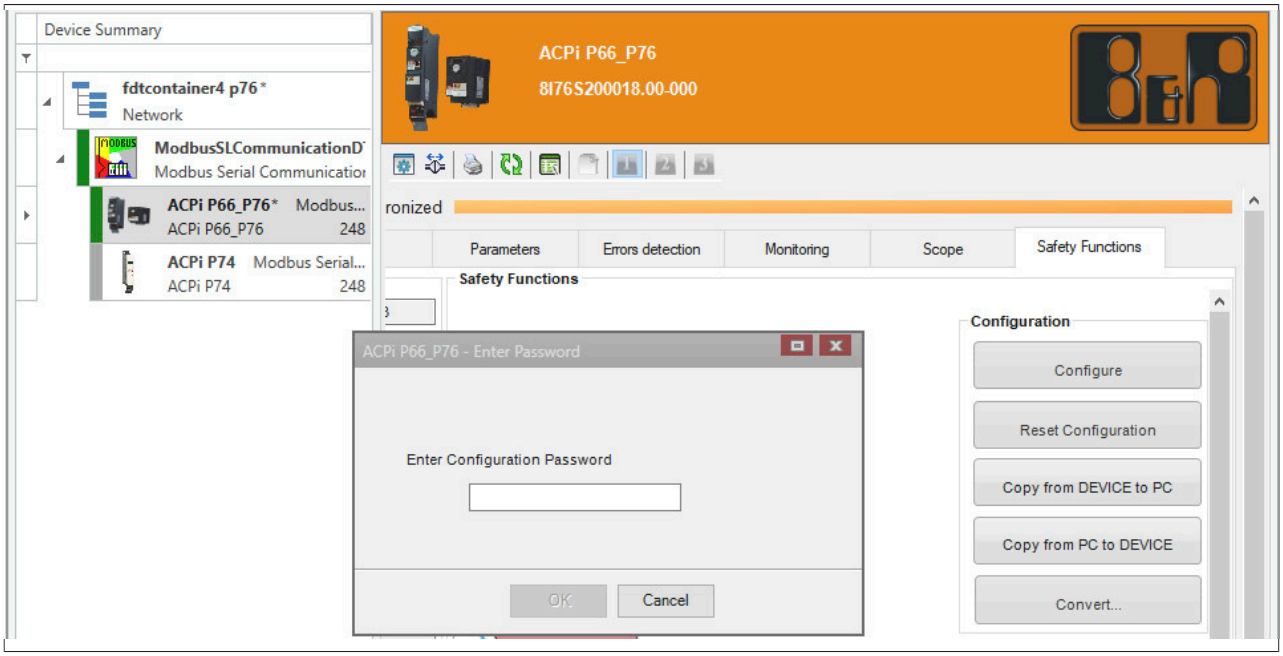
- Create new project in ACPi SafeConfigurator and arrange required hardware in network view of FDT-container (for detailed instructions, see "The drive in ACPi SafeConfigurator" on page 439).
  1) Modbus cable (set COM port!)
  2) ACOPOSinverter P74
  3) ACOPOSinverter P66 and P76
- Connect the Modbus cable to ACOPOSinverter P74, establish the connection and change to synchronized mode.




- Select tab "Safety functions", use button "Copy from device to PC", enter a user-defined password and save the .sfty file.
- Disconnect the connection between ACPi SafeConfigurator and ACOPOSinverter P74.

Then:

- Connect the Modbus cable to ACOPOSinverter P66/P76, establish the connection and change to synchronized mode.
- Select tab "Safety functions", use button "Convert", choose .sfty file and enter user-defined password.



## Information:

**ACOPOSinverter P66/76 is not permitted to have an existing security configuration at the time of the transfer; otherwise, it must first be reset with "Reset security" and then "Reset password" (master password is required).**

## Information:

**Due to the additional safety functions (SMS, GDL), the CRC values change when converting a safety configuration from ACOPOSinverter P74 to one of ACOPOSinverter P66/P76.**

# 9 Accessories

## 9.1 Overview

### Graphic display terminal

| Order number | Short description | Page |
|---|---|---|
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. | 581 |

### Braking resistors

| Order number | Short description | Page |
|---|---|---|
| 8I0BR028.000-1 | Braking resistor 28 Ω, continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW | 582 |
| 8I0BR060.000-1 | Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW | 582 |
| 8I0BR100.000-1 | Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW | 582 |

### Additional EMC filters

| Order number | Short description | Page |
|---|---|---|
| 8I0FT007.200-1 | 7 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 0.18-0.75 kW). | 584 |
| 8I0FT015.200-2 | ACPi additional EMC input filter 3-phase 15 A supply voltage 3-phase: 200...240 V 50/60 Hz | 584 |
| 8I0FT025.400-1 | 25 A EMC filter for ACOPOSinverter (3-phase 200-240 V, 3-4 kW and 380-500 V, 2.2-4 kW). | 584 |
| 8I0FT047.201-1 | ACPi additional EMC input filter 3-phase 47 A supply voltage 3-phase: 200...240 V 50/60 Hz | 584 |
| 8I0FT083.200-1 | 83 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 11-15 kW). | 584 |

### Mains chokes

| Order number | Short description | Page |
|---|---|---|
| 8I0CS004.000-1 | Mains choke 1-phase 4 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 0.18 to 0.37 kW. | 586 |
| 8I0CS007.000-1 | Mains choke 1-phase 7 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 0.55 to 0.75 kW. | 586 |
| 8I0CS018.000-1 | Mains choke 1-phase 18 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 1.1 to 2.2 kW. | 586 |
| 8I0CT004.000-1 | ACOPOSinverter mains choke 3-phase, 4 A, 50/60 Hz | 586 |
| 8I0CT010.000-1 | ACOPOSinverter mains choke 3-phase, 10 A, 50/60 Hz | 586 |
| 8I0CT016.000-1 | ACOPOSinverter mains choke 3-phase, 17 A, 50/60 Hz | 586 |
| 8I0CT030.000-1 | ACOPOSinverter mains choke 3-phase, 30 A, 50/60 Hz | 586 |

### X2X Link cables

| Order number | Short description | Page |
|---|---|---|
| X67CA0X99.1000 | Cable for custom assembly, 100 m | 591 |
| X67CA0X99.5000 | Cable for custom assembly, 500 m | 591 |

### USB accessories

| Order number | Short description | Page |
|---|---|---|
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | 592 |

### DC bus cables

| Order number | Short description | Page |
|---|---|---|
| 8I0XC003.400-1 | DC bus cable, 0.18 m, 5 pcs., for ACOPOSinverter | 593 |

### CANopen accessories

| Order number | Short description | Page |
|---|---|---|
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | 594 |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | 594 |

### Fans

| Order number | Short description | Page |
|---|---|---|

## 9.2 Graphics display

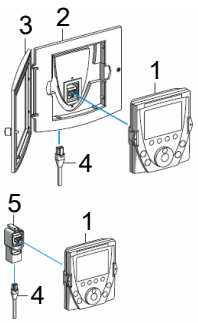
The optional graphic display can be used with ACOPOSinverter. It allows the following:

- Controlling, aligning and configuring the inverter
- Displaying current values (motor, I/O, etc.)
- Saving and downloading configurations (4 configuration files can be saved)

The following accessories are available:

- A remote mounting kit for mounting in the door of a control cabinet with IP54 protection
- A transparent cover that can be fastened to the remote mounting mechanism for IP65 protection
- A cable for connecting the graphics display to device ACOPOSinverter.
- An RJ45 adapter for connecting the graphics display to the remote cable

(1) 8I0XD301.300-1
(2) 8I0XD302.300-1
(3) 8I0XD303.300-1
(4) 8I0XD304.301-1, 8I0XD304.303-1, 8I0XD304.305-1, 8I0XD304.310-1
(5) 8I0XD305.300-1




### 9.2.1 Order data

| Order number | Short description |
|---|---|
| | Graphic display terminals |
| 8I0XD301.300-1 | Graphics display for ACOPOSinverter, 240 x 160 pixels, 8 lines, backlight, function keys, navigation key, IP54 protection. |
| | **Optional accessories** |
| | Cables and adapters |
| 8I0XD302.300-1 | Installation kit, IP54 protection, for graphic display of the ACOPOSinverter. |
| 8I0XD303.300-1 | Front cover for installation kit, IP65 protection, for graphic display of the ACOPOSinverter. |
| 8I0XD304.301-1 | RJ45 cable, 1 m, for graphic display of the ACOPOSinverter. |
| 8I0XD304.303-1 | RJ45 cable, 3 m, for graphic display of the ACOPOSinverter. |
| 8I0XD304.305-1 | RJ45 cable, 5 m, for graphic display of the ACOPOSinverter. |
| 8I0XD304.310-1 | RJ45 cable, 10 m, for graphic display of the ACOPOSinverter. |
| 8I0XD305.300-1 | Female to female adapter, RJ45, for graphics display of the ACOPOSinverter. |

Table 48: 8I0XD301.300-1, 8I0XD302.300-1, 8I0XD303.300-1, 8I0XD304.301-1, 8I0XD304.303-1, 8I0XD304.305-1, 8I0XD304.310-1, 8I0XD305.300-1 - Order data

## 9.3 Braking resistors

The braking resistor allows the inverter to continue running when braking to a stop or decelerating by branching off the brake energy. It permits a maximum short-term braking torque.

The resistors are intended for installation on the outside of the housing are not permitted to interfere with natural cooling. Incoming and outgoing air is not permitted to be blocked. The air must be free of dust, condensation and corrosive gases.

### 9.3.1 Order data

| Order number | Short description |
|---|---|
| | **Optional braking resistors** |
| 8I0BR028.000-1 | Braking resistor 28 Ω, continuous braking power 0.2 kW, for ACOPOSinverter P74 3x 380 to 500 V, 11 to 15 kW, for ACOPOSinverter P84 3x 200 to 240 V, 3 to 4 kW and 3x 380 to 480 V, 11 to 15 kW |
| 8I0BR060.000-1 | Braking resistor 60 Ω, continuous braking power 0.1 kW, for ACOPOSinverter P74 1x200 to 240 V, 2.2 kW and 3x 380 to 500 V, 5.5 to 7.5 kW, for ACOPOSinverter P84 3x 200 to 240 V, 1.5 to 2.2 kW and 3x 380 to 480 V, 5.5 to 7.5 kW |
| 8I0BR100.000-1 | Braking resistor 100 Ω, continuous braking power 0.05 kW, for ACOPOSinverter P74/P76 1x200 to 240 V, 0.18 to 1.5 kW and 3x 380 to 500 V, 0.37 to 4 kW for ACOPOSinverter P84 3x 200 to 240 V, 0.37 to 0.75 kW and 3x 380 to 480 V, 0.75 to 4 kW |

Table 49: 8I0BR028.000-1, 8I0BR060.000-1, 8I0BR100.000-1 - Order data

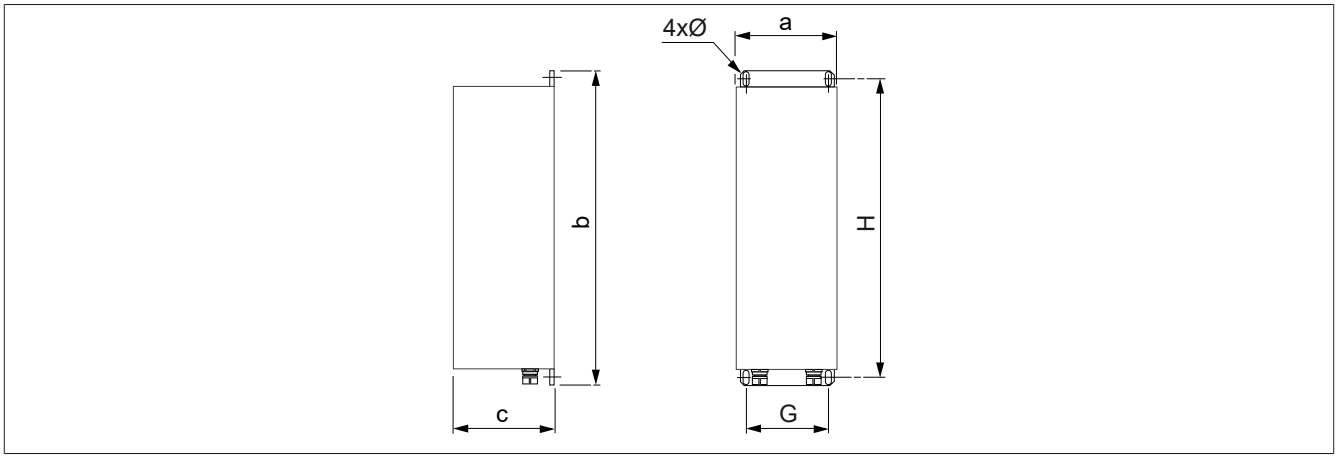
### 9.3.2 Technical data

| Order number | 8I0BR028.000-1 | 8I0BR060.000-1 | 8I0BR100.000-1 |
|---|---|---|---|
| **General information** | | | |
| Certifications | | | |
| KC | | Yes | |
| **Operating conditions** | | | |
| Rated protection of housing | | IP20 | |
| Ambient temperature | | 0 to 50°C | |
| **Ambient conditions** | | | |
| Temperature | | | |
| Storage | | -25 to 70°C | |
| **Mechanical properties** | | | |
| Weight | 3.5 kg | 2.4 kg | 2 kg |
| **Properties** | | | |
| Resistance value at 20°C | 28 Ω | 60 Ω | 100 Ω |
| Average available power at 50°C | 0.2 kW [1)] | 0.1 kW [1)] | 0.05 kW [1)] |
| Thermal protection | Using temperature-controlled switches or the inverter | | |
| Temperature controlled switch | | | |
| Activation temperature | | 120°C | |
| Max. voltage / Max. current | | 250 VAC / 1 A | |
| Min. voltage / Min. current | | 24 VDC / 0.1 A | |
| Max. contact resistance | | 60 mΩ | |
| Connection recommendation | The switch should be connected within the sequence (so it can be used for signaling or line contactor control) | | |

Table 50: 8I0BR028.000-1, 8I0BR060.000-1, 8I0BR100.000-1 - Technical data

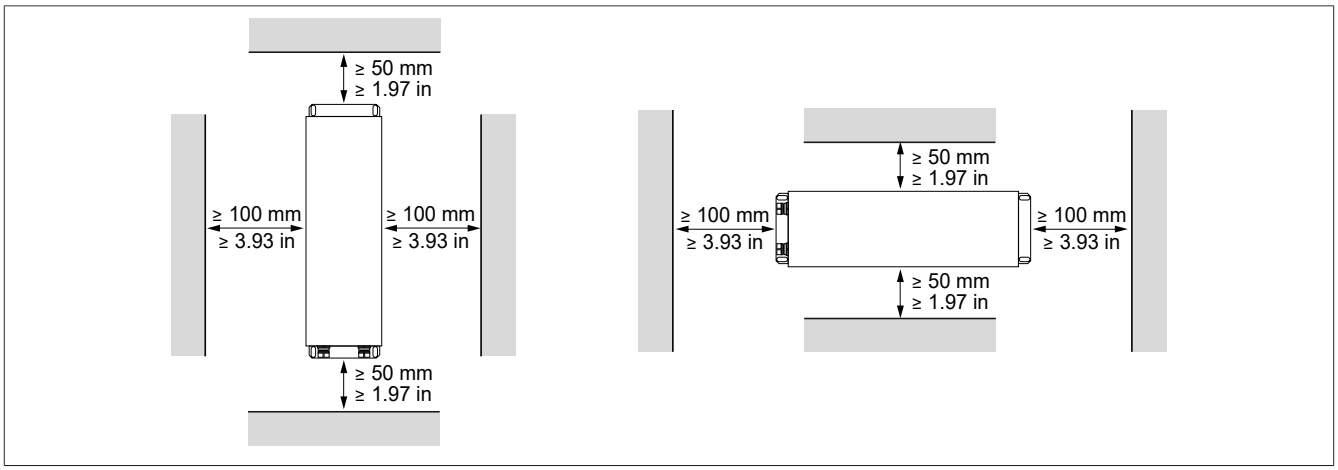
1) Load factors for resistances: The value for the average power that can be transfered from the resistor to the housing at 50°C is aligned to a brake load factor that corresponds to most standard applications.
For 8I0BR100.000-1 to 8I0BR003.000-1:
- Braking for 2 s with a braking torque of 0.6 Tn for a 40 second cycle
- Braking for 0.8 s with a braking torque of 1.5 Tn for a 40 second cycle
For 8I0BR003.001-1 to 8I0BR001.004-1:
- Braking for 10 s with a braking torque of 2 Tn for a 30 second cycle

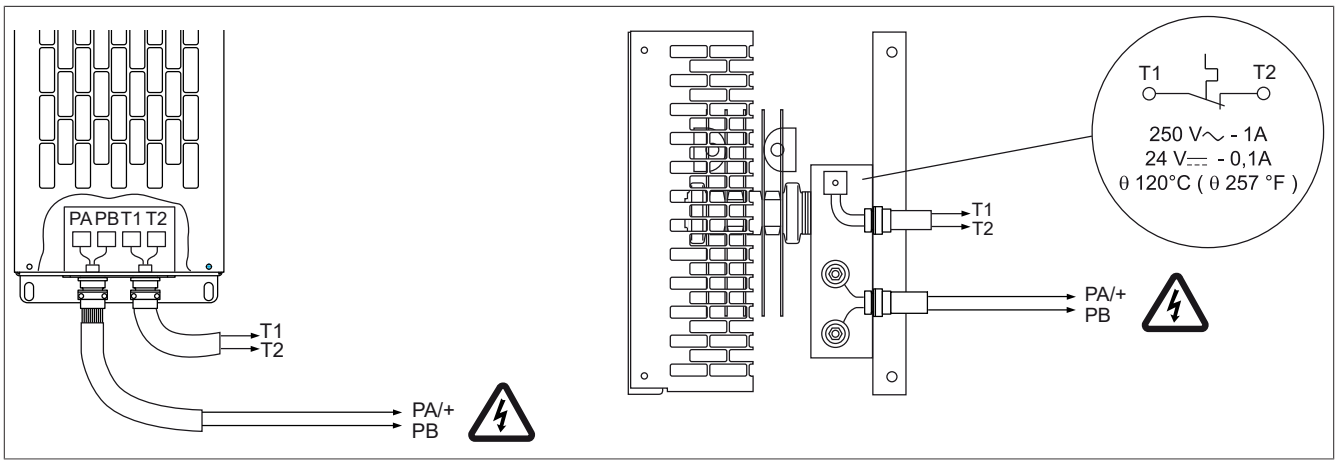
### 9.3.3 Dimensions




| Order number | a | b | c | G | H | ø |
|---|---|---|---|---|---|---|
| | mm (in.) | mm (in.) | mm (in.) | mm (in.) | mm (in.) | mm (in.) |
| 8I0BR028.000-1 | 95 (3.74) | 293 (11.54) | 95 (3.74) | 70 (2.76) | 275 (10.83) | 6 x 12 (0.24 x 0.48) |
| 8I0BR060.000-1 | 95 (3.74) | 393 (15.47) | 95 (3.74) | 70 (2.76) | 375 (14.76) | 6 x 12 (0.24 x 0.48) |
| 8I0BR0100.000-1 | 95 (3.74) | 393 (15.47) | 120 (4.72) | 120 (4.72) | 375 (14.76) | 6 x 12 (0.24 x 0.48) |

### 9.3.4 Installation



# 9.4 Additional EMC filters

- Additional EMC filters are intended to reduce line-conducted emissions from the mains supply to a level under the limits specified in IEC/EN 61800-3, category C1, C2 or C3 in environment 1 (public power system) or 2 (industrial power system), depending on the inverter power.
- The data for determining the permissible length of the shielded motor cable is listed in the technical data for ACOPOSinverter under "Line-conducted and radiated emissions".
- Additional EMC filters can only be used for connection types TN (neutral) and TT (neutral-ground).

## 9.4.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Optional EMC filters** | |
| 8I0FT007.200-1 | 7 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 0.18-0.75 kW). | |
| 8I0FT015.200-2 | ACPi additional EMC input filter 3-phase 15 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| 8I0FT025.400-1 | 25 A EMC filter for ACOPOSinverter (3-phase 200-240 V, 3-4 kW and 380-500 V, 2.2-4 kW). | |
| 8I0FT047.201-1 | ACPi additional EMC input filter 3-phase 47 A supply voltage 3-phase: 200...240 V 50/60 Hz | |
| 8I0FT083.200-1 | 83 A EMC filter for ACOPOSinverter X64 (3-phase 200-240 V, 11-15 kW). | |

Table 51: 8I0FT007.200-1, 8I0FT015.200-2, 8I0FT025.400-1, 8I0FT047.201-1, 8I0FT083.200-1 - Order data

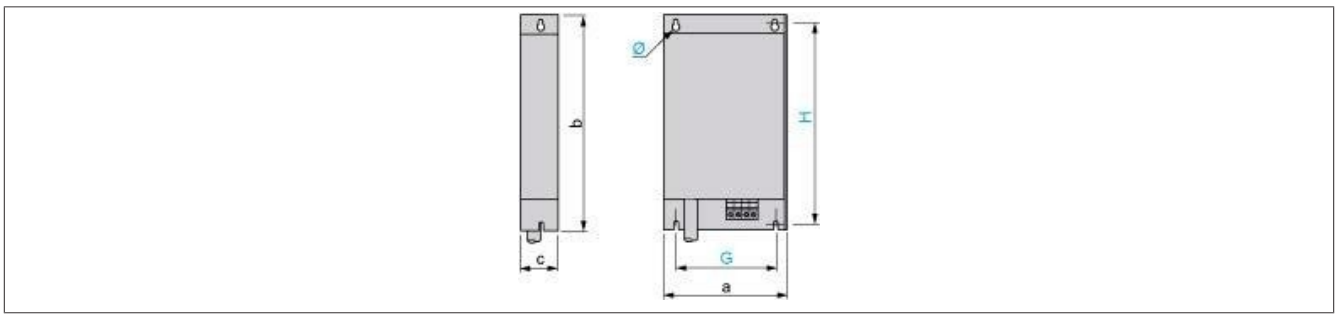
## 9.4.2 Technical data

| Order number | 8I0FT007.200-1 | 8I0FT015.200-2 | 8I0FT025.400-1 | 8I0FT047.201-1 | 8I0FT083.200-1 |
|---|---|---|---|---|---|
| **General information** | | | | | |
| Certifications | | | | | |
| CE | Yes | | | | |
| UKCA | - | Yes | | | - |
| KC | Yes | - | Yes | - | Yes |
| **Mains connection** | | | | | |
| Power dissipation | 2.6 W | 9.9 W | 15.8 W | 19.3 W | 35.2 W |
| Max. nominal voltage | 3x 240 VAC +10% | | 3x 500 VAC +10% | | |
| Nominal filter current | 7 A | 15 A | 25 A | 47 A | 83 A |
| Max. fault current | 7 mA | 15 mA | 35 mA | 45 mA | 15 mA |
| **Operating conditions** | | | | | |
| Installation elevation above sea level | 0 to 1000 m [1] | | | | |
| Degree of protection per EN 60529 | IP21 and IP41 on the upper part | | | | |
| Max. relative humidity per IEC 60068-2-3 | 95%, non-condensing<br>No dripping water | | | | |
| Ambient temperature | -10 to 50°C | | | | |
| **Ambient conditions** | | | | | |
| Temperature | | | | | |
| Storage | -25 to 70°C | | | | |
| **Mechanical properties** | | | | | |
| Weight | 0.65 kg | 1 kg | 1.35 kg | 3.15 kg | 5.3 kg |
| Installation | Below or next to the inverter | | | | |
| **General information** | | | | | |
| Conformity to standard | EN 133200 | | | | |

Table 52: 8I0FT007.200-1, 8I0FT015.200-2, 8I0FT025.400-1, 8I0FT047.201-1, 8I0FT083.200-1 - Technical data

1) Over 1000 m, current reduced by 1% per 100 m

## 9.4.3 Dimensions



### Dimensions in mm

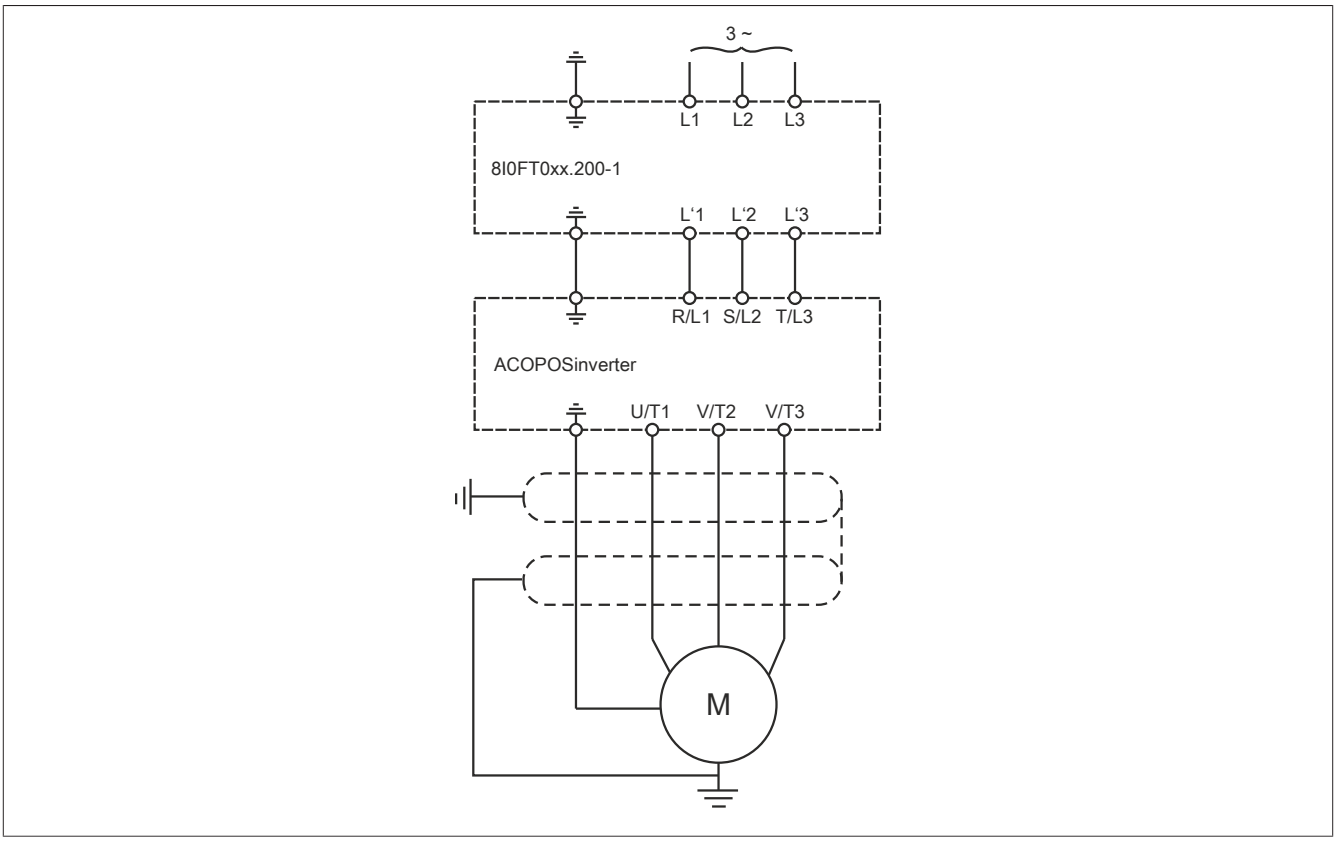
| EMC filter | a | b | c | G | H | ø |
|---|---|---|---|---|---|---|
| 8I0FT007.200-1 | 72 | 195 | 37 | 52 | 180 | 4.5 |
| 8I0FT015.200-2 | 107 | 195 | 42 | 85 | 180 | 4.5 |
| 8I0FT025.400-1 | 140 | 235 | 50 | 120 | 215 | 4.5 |
| 8I0FT047.201-1 | 180 | 305 | 60 | 140 | 285 | 5.5 |
| 8I0FT083.200-1 | 245 | 395 | 80 | 205 | 375 | 5.5 |

### Dimensions in in.

| EMC filter | a | b | c | G | H | ø |
|---|---|---|---|---|---|---|
| 8I0FT007.200-1 | 2.83 | 7.68 | 1.46 | 2.05 | 7.09 | 0.18 |
| 8I0FT015.200-2 | 4.12 | 7.68 | 1.65 | 3.35 | 7.09 | 0.18 |
| 8I0FT025.400-1 | 5.51 | 9.25 | 1.97 | 4.72 | 8.46 | 0.18 |
| 8I0FT047.201-1 | 7.09 | 12.01 | 2.36 | 5.51 | 11.22 | 0.22 |
| 8I0FT083.200-1 | 9.65 | 15.55 | 3.15 | 8.07 | 14.76 | 0.22 |

## 9.4.4 Installation

### 8I0FT0xx.200-1




**Notice!**

**To comply with EN 55011 and IEC/EN 61800-3, the rule is: only one EMC filter for one inverter.**

## 9.5 Mains choke

- Improved protection against overvoltages in the mains supply and reduced distortion factor of the current generated by the inverter.
- Limitation of the mains current.
- Using mains chokes is recommended when the following conditions apply:
  - Multiple inverters connected in parallel with little space between them.
  - Mains supply with disturbances from other devices (interference, overvoltage)
  - Line supply with voltage imbalance between phases >1.8% of the nominal voltage
  - Inverter supplied via a line with very low impedance (10x higher than the inverter's nominal voltage when close to power transformers).
  - Large number of frequency inverters connected on one line.
  - Reduction of overloads on capacitors for cosine ϕ correction if the system has equipment for power factor correction.

### 9.5.1 Order data

| Order number | Short description |
|---|---|
| | **Optional line chokes** |
| 8I0CS004.000-1 | Mains choke 1-phase 4 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 0.18 to 0.37 kW. |
| 8I0CS007.000-1 | Mains choke 1-phase 7 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 0.55 to 0.75 kW. |
| 8I0CS018.000-1 | Mains choke 1-phase 18 A, for ACOPOSinverter P76 and P74new 1x 200 to 240 V, 1.1 to 2.2 kW. |
| 8I0CT004.000-1 | ACOPOSinverter mains choke 3-phase, 4 A, 50/60 Hz |
| 8I0CT010.000-1 | ACOPOSinverter mains choke 3-phase, 10 A, 50/60 Hz |
| 8I0CT016.000-1 | ACOPOSinverter mains choke 3-phase, 17 A, 50/60 Hz |
| 8I0CT030.000-1 | ACOPOSinverter mains choke 3-phase, 30 A, 50/60 Hz |

Table 53: 8I0CS004.000-1, 8I0CS007.000-1, 8I0CS018.000-1, 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1, 8I0CT030.000-1 - Order data

## 9.5.2 Technical data

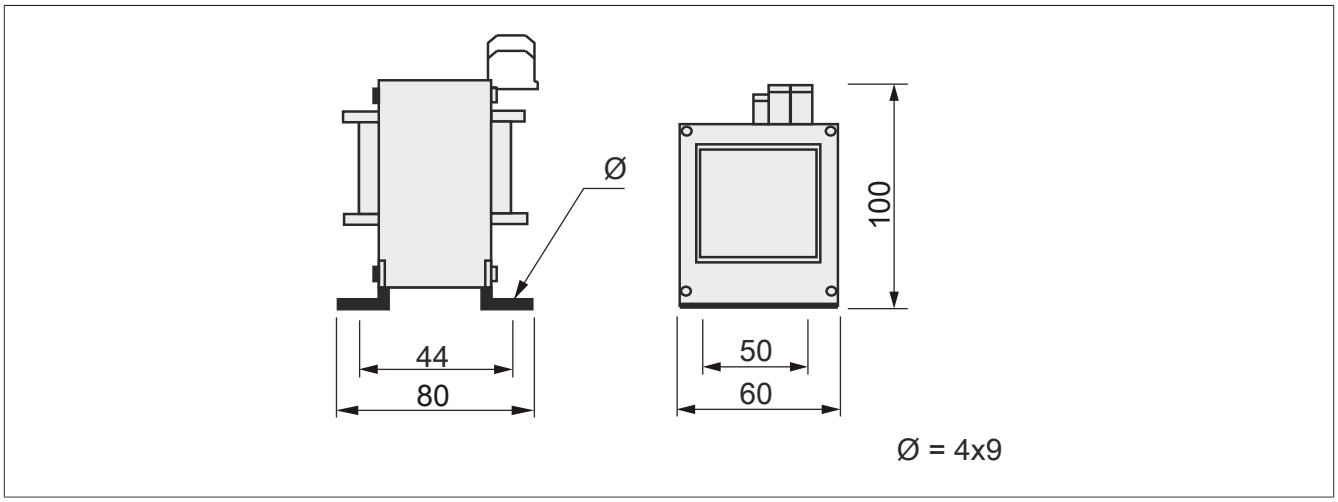
| Order number | 8I0CS004.000-1 | 8I0CS007.000-1 | 8I0CS018.000-1 | 8I0CT004.000-1 | 8I0CT010.000-1 | 8I0CT016.000-1 | 8I0CT030.000-1 |
|---|---|---|---|---|---|---|---|
| **General information** | | | | | | | |
| Certifications | | | | | | | |
| CE | | | | Yes | | | |
| KC | | | | Yes | | | |
| **Mains connection** | | | | | | | |
| Power dissipation | 17 W | 20 W | 30 W | 45 W | 65 W | 75 W | 90 W |
| Inductance | 10 mH | 5 mH | 2 mH | 10 mH | 4 mH | 2 mH | 1 mH |
| Nominal current | 4 A | 7 A | 18 A | 4 A [1)] | 10 A [1)] | 17 A [1)] | 30 A [1)] |
| Voltage drop | From 3 to 5% of the rated supply voltage. Higher values result in torque loss. | | | | | | |
| Saturation current | - | | | | | | |
| **Operating conditions** | | | | | | | |
| Installation elevation above sea level | 0 to 1000 m | | | | | | |
| Degree of protection | | | | | | | |
| Choke | IP00 | | | | | | |
| Terminals | IP20 | | | | | | IP10 |
| Max. relative humidity | 95%, non-condensing<br>No dripping water | | | | | | |
| Ambient temperature | 0 to 45°C | | | | | | |
| Max. ambient temperature | Up to 55°C [2)] | | | | | | |
| Maximum installation elevation | 3000 m [3)] | | | | | | |
| **Ambient conditions** | | | | | | | |
| Temperature | | | | | | | |
| Storage | -25 to 70°C | | | | | | |
| **Mechanical properties** | | | | | | | |
| Weight | 0.63 kg | 0.88 kg | 1.99 kg | 1.5 kg | 3.0 kg | 3.5 kg | 6.0 kg |
| **General information** | | | | | | | |
| Conformity to standard | IEC 61800-5-1 (protection level 1 regarding overvoltages in the mains supply according to VDE 0160) | | | | | | |

Table 54: 8I0CS004.000-1, 8I0CS007.000-1, 8I0CS018.000-1, 8I0CT004.000-1, 8I0CT010.000-1, 8I0CT016.000-1, 8I0CT030.000-1 - Technical data

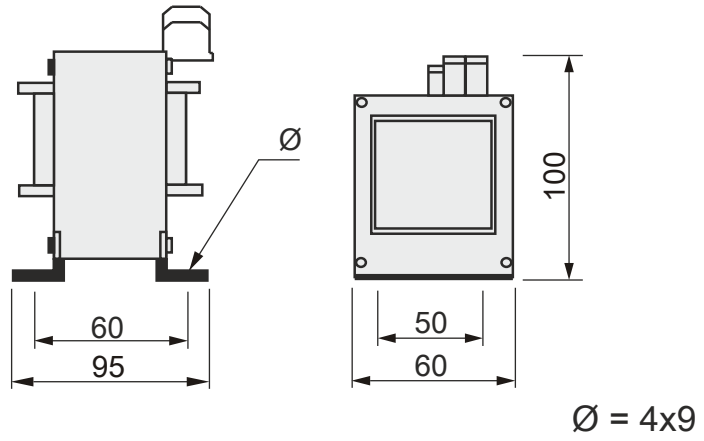
1) Max. current = 1.65 x rated current for 60 seconds.
2) With current reduction of 2% per °C above 45°C.
3) From 1000 to 3000 m, current reduced by 1% per 100 m

## 9.5.3 Dimensions

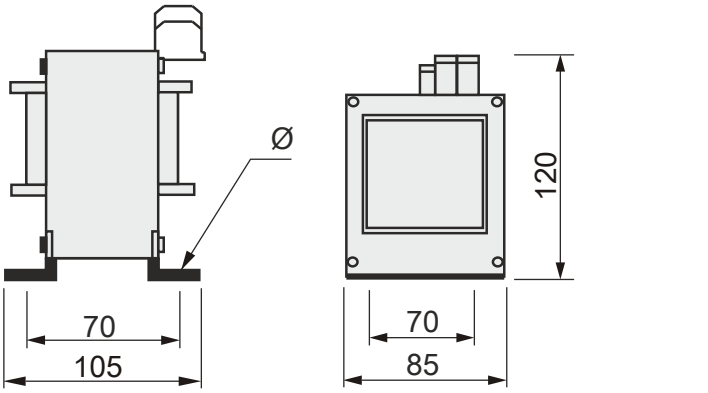
### 8I0CS004.000-1



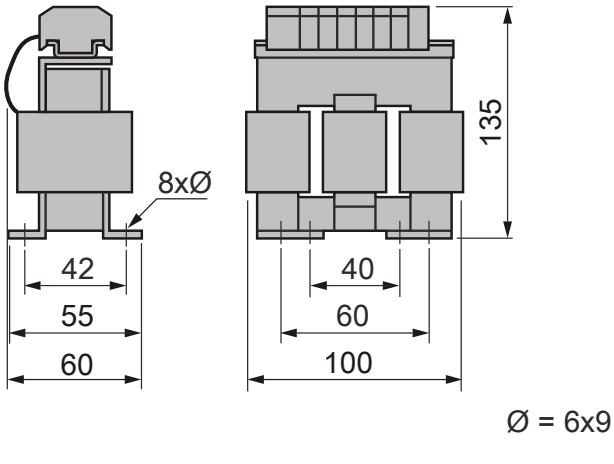
**8I0CS007.000-1**



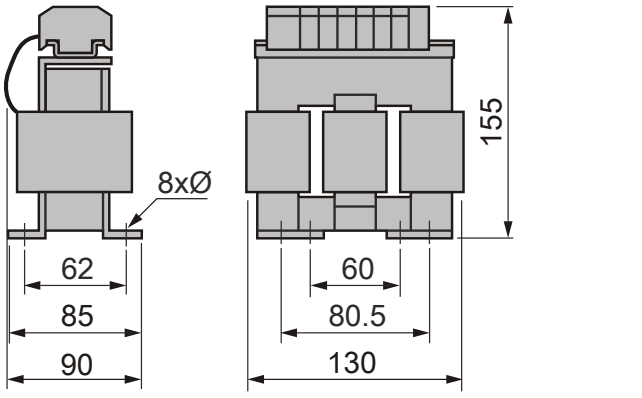

**8I0CS018.000-1**



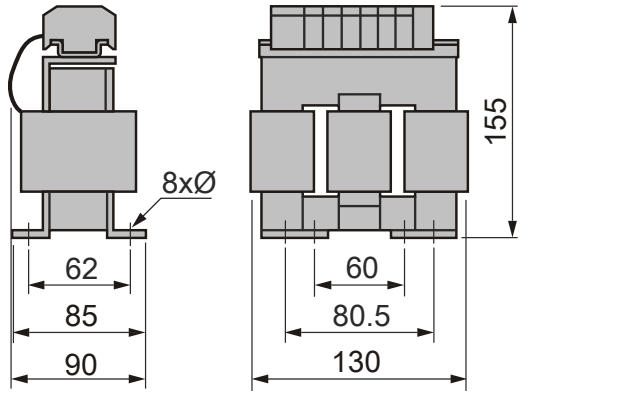

**8I0CT004.000-1**



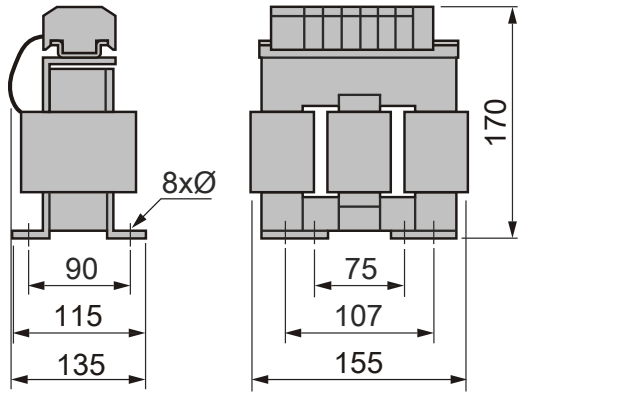
**8I0CT010.000-1**




**8I0CT016.000-1**

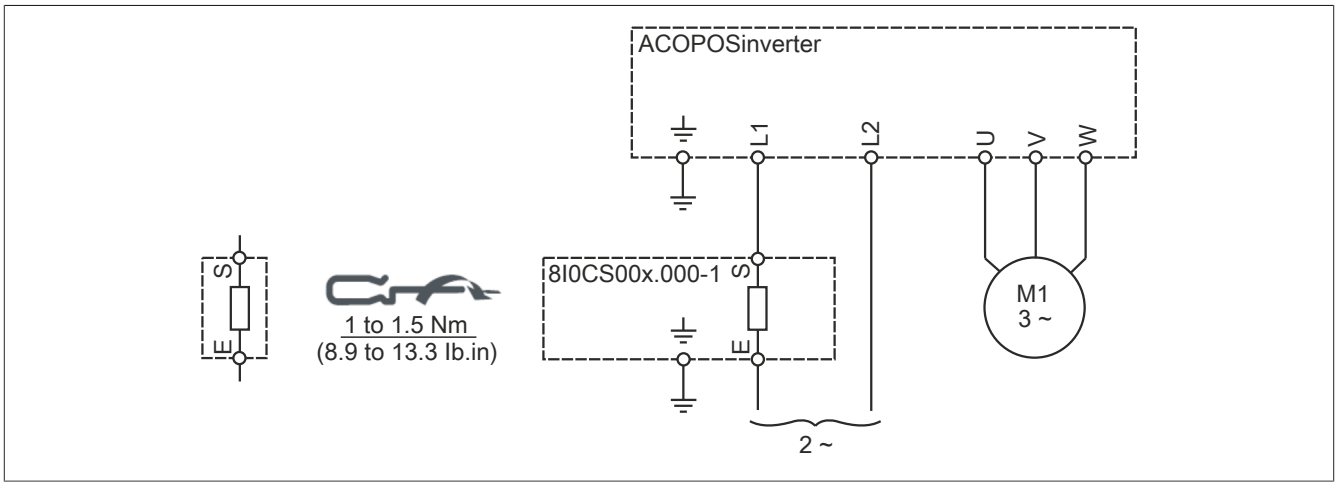



**8I0CT030.000-1**

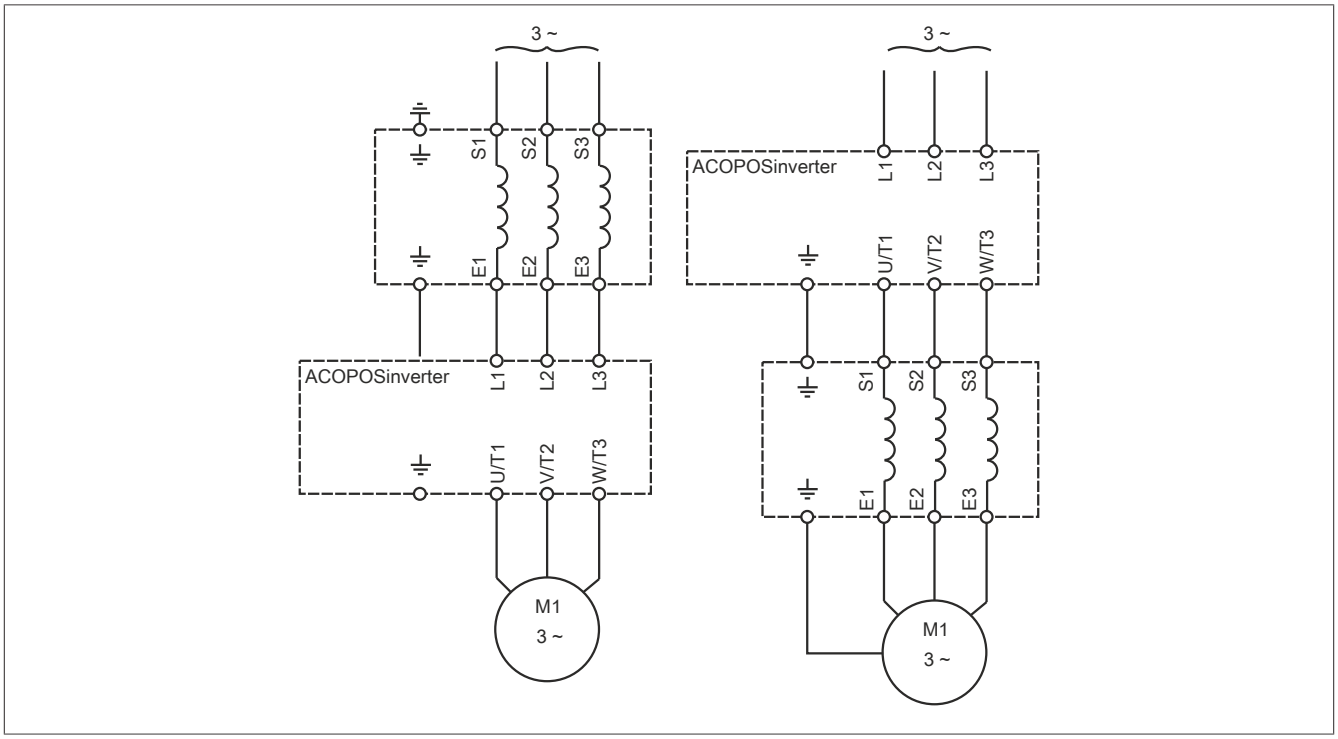


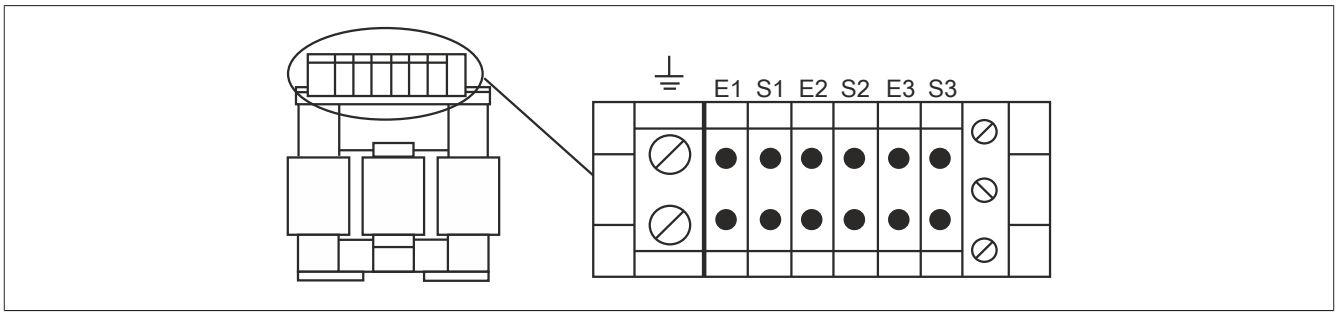
## 9.5.4 Installation

### 8I0CS0xx.000-1

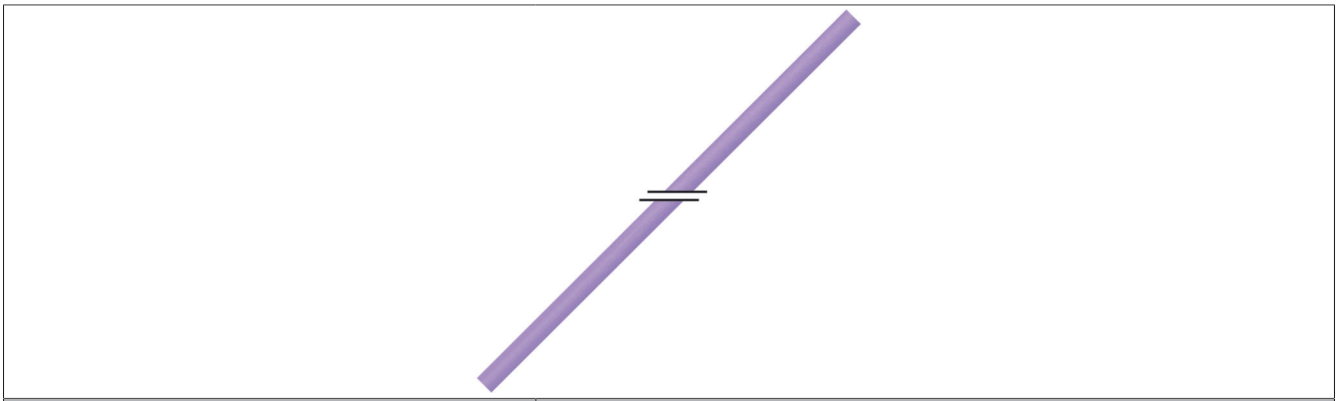



### 8I0CT0xx.000-1



# 9.6 X2X Link cables



| Order number | Short description |
|---|---|
| | **X2X Link Cable** |
| X67CA0X99.1000 | Cable for custom assembly, 100 m |
| X67CA0X99.5000 | Cable for custom assembly, 500 m |

Table 55: X67CA0X99.1000, X67CA0X99.5000 - Order data

## 9.6.1 X67CA0X99.xxxx

| Dimensions | | | |
|---|---|---|---|
| | | | |
| **Pinout** | | | |
| | **Description** | **Wire colors** | |
| For custom wiring | X2X+ | Red | For custom wiring |
| | X2X | White | |
| | X2X⊥ | Black | |
| | X2X\ | Blue | |
| | SHLD | - | |

## 9.6.2 Technical data

| Order number | X67CA0X99.1000 | X67CA0X99.5000 |
|---|---|---|
| **Short description** | | |
| Accessories | X2X Link cable for custom assembly, 100 m | X2X Link cable for custom assembly, 500 m |
| **General information** | | |
| Note | Halogen-free | |
| Durability | Flame-retardant | |
| Cable cross section | | |
| Data lines | | |
| AWG | 2x 24 AWG | |
| mm² | 2x 0.25 mm² | |
| Power supply lines | | |
| AWG | 2x 22 AWG | |
| mm² | 2x 0.34 mm² | |
| Certifications | | |
| CE | Yes | - |
| UKCA | Yes | - |
| **Cable construction** | | |
| Signal line | | |
| Shield | Pair shielding with aluminum foil | |
| Stranding | Twisted-pair wires | |
| Cable stranding | 0.35 mm² (22 AWG) with filler | |
| Cable shield | Tinned copper braiding, coverage >85% | |
| Outer jacket | | |
| Material | Thermoplastic polyurethane (TPU) | |
| Color | Violet | |

Table 56: X67CA0X99.1000, X67CA0X99.5000 - Technical data

| Order number | X67CA0X99.1000 | X67CA0X99.5000 |
|---|---|---|
| Wires | | |
| Type | Tinned copper ETB1<br>Data line: Fine stranded wire (19x 0.13 mm)<br>Supply line: Fine stranded wire (19x 0.15 mm) | |
| Wire colors | | |
| Data lines | Blue, white | |
| Power supply lines | Red, black | |
| Wire insulation | | |
| Data lines | Cell polyethylene (PE) | |
| Power supply lines | Polypropylene (PP) | |
| **Electrical properties** | | |
| Rated voltage | 250 V | |
| Nominal current | Max. 4 A / Contact at 40°C | |
| Operating voltage | Max. 250 V | |
| Degree of insulation | Category II per IEC 61076-2 | |
| Conductor resistance | Data line: ≤78 Ω/km<br>Supply line: ≤55 Ω/km | |
| Insulation resistance | ≥100 MΩ | |
| **Operating conditions** | | |
| Degree of protection per EN 60529 | | |
| Connector/Coupling | IP67, only when screwed in | |
| **Ambient conditions** | | |
| Temperature | | |
| Transport | -40 to 80°C | |
| Fixed installation | -40 to 80°C | |
| Flexible installation [1)] | -25 to 60°C | |
| **Mechanical properties** | | |
| Dimensions | | |
| Length | 100 m | 500 m |
| Diameter | 6.9 mm ±0.3 mm | |
| Bend radius | | |
| Fixed installation | ≥5x outer diameter | |
| Flexible installation | ≥15x outer diameter | |
| Drag chain data | | |
| Acceleration | Max. 4 m/s² | |
| Flex cycles | Min. 2 million | |
| Velocity | Max. 3 m/s | |
| Weight | 0.063 kg/m | |

Table 56: X67CA0X99.1000, X67CA0X99.5000 - Technical data

1) In cable drag chain operation

# 9.7 USB accessories

## 9.7.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Cable and adapters** | |
| 8I0XC001.003-1 | USB adapter cable, USB to Modbus, for ACOPOSinverter. | |

Table 57: 8I0XC001.003-1 - Order data

# 9.8 DC bus cable

## 9.8.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Cable and adapters** | |
| 8I0XC003.400-1 | DC bus cable, 0.18 m, 5 pcs., for ACOPOSinverter | |

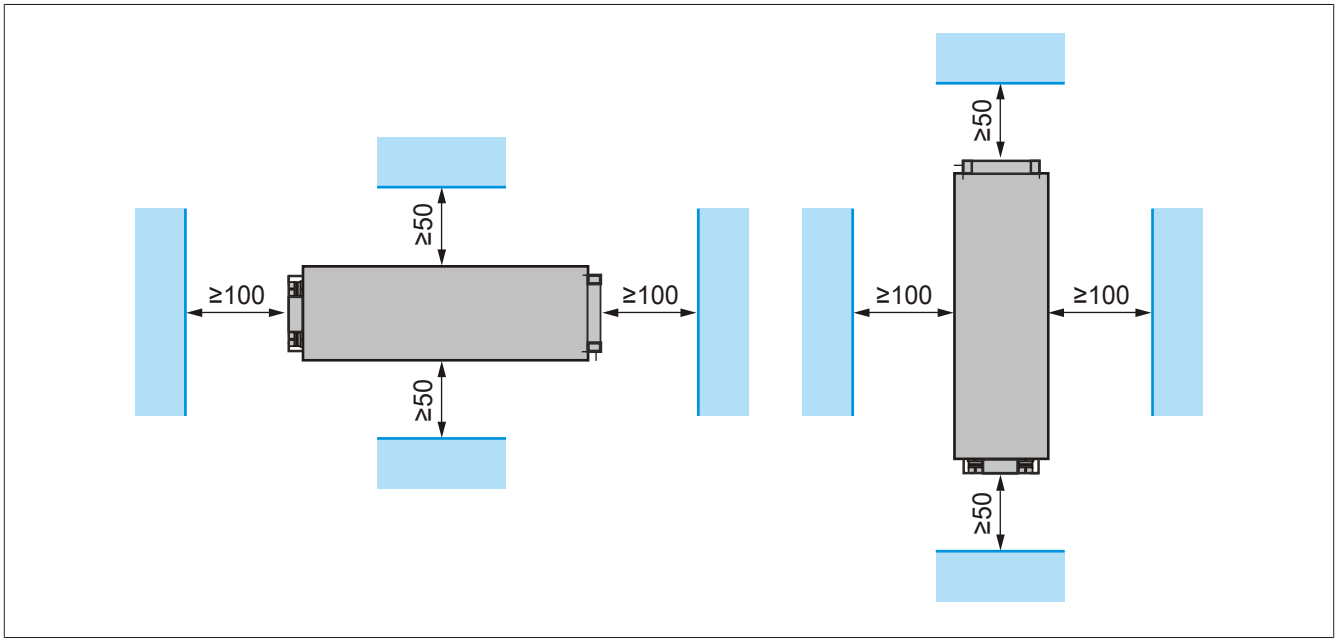
Table 58: 8I0XC003.400-1 - Order data

## 9.8.2 Technical data

| Order number | 8I0XC003.400-1 |
|---|---|
| **Short description** | |
| Accessories | ACPi P66/P74/P76/P86 DC bus cable |
| **Mechanical properties** | |
| Dimensions | |
| Length | 0.18 m |
| **Brief overview** | |
| Content of delivery | 5 pcs. |

Table 59: 8I0XC003.400-1 - Technical data

## 9.8.3 Installation



# 9.9 CANopen accessories

## 9.9.1 Order data

| Order number | Short description | Figure |
|---|---|---|
| | **Cable and adapters (CANopen)** | |
| 8I0CA001.000-1 | Y-cable, RJ45, daisy chain connection ≤0.3 m, for integrated CANopen interface of the ACOPOSinverter. | |
| 8I0XT001.000-1 | Terminating resistor 120 Ω, RJ45, for integrated CANopen interface of the ACOPOSinverter. | |

Table 60: 8I0CA001.000-1, 8I0XT001.000-1 - Order data

## 9.9.2 Technical data

| Order number | 8I0CA001.000-1 | 8I0XT001.000-1 |
|---|---|---|
| **Short description** | | |
| Accessories | CANopen terminal adapter | ACOPOSinverter P66 terminating resistor 120 Ω |
| **General information** | | |
| Connection | - | RJ45 |
| Certifications | | |
| CE | - | Yes |
| UKCA | - | Yes |
| KC | - | Yes |
| **Interfaces** | | |
| Terminating resistor | 8I0XT001.000-1 | - |
| **Mechanical properties** | | |
| Dimensions | | |
| Length | ≤0.3 m | - |
| **Brief overview** | | |
| Content of delivery | 1 piece, 8I0XT001.000-1<br>must be ordered separately. | - |

Table 61: 8I0CA001.000-1, 8I0XT001.000-1 - Technical data

## 9.10 Fan (replacement parts requirement)

### Danger!

**RISK OF ELECTRIC SHOCK OR ARC AND RISK OF EXPLOSION**

- **Work on and with this drive system is only permitted to be carried out by appropriately trained and authorized personnel who are familiar with the contents of this manual and all associated product documentation and who have completed safety training to recognize and avoid the hazards involved. Installation, adjustment, repair and servicing must be carried out by qualified personnel.**
- **The system integrator is responsible for compliance with all relevant local and national electrical engineering requirements and any other applicable regulations regarding the protective grounding of all equipment.**
- **Many components of the product, including the printed circuits, are supplied by the mains voltage.**
- **Only use electrically insulated tools and measuring instruments with the correct rated voltage.**
- **Do not touch any unshielded components or terminals when voltage is applied.**
- **Motors can generate voltage when the shaft is rotated. Before performing any work on the drive system, secure the motor shaft against being driven by an external source.**
- **With AC voltage, voltage can be coupled out to unused conductors in the motor cable. Insulate unused conductors in the motor cable at both ends.**
- **Do not short-circuit the DC bus terminals, the DC bus capacitors or the braking resistor terminals.**
- **Before performing any work on the drive system:**
  - **Disconnect all power supplies, including any external voltage to the control unit. Note that the circuit breaker or main power disconnect switch does not de-energize all circuits.**
  - **Affix a DO NOT SWITCH ON sign to all circuit breakers connected to the inverter system.**
  - **Lock all circuit breakers in the open position.**
  - **Wait 15 minutes to allow the DC bus capacitors to discharge.**
  - **Follow the instructions included in section "Checking for the absence of voltage" in the product installation instructions.**
- **Before switching on the power supply to the inverter system:**
  - **Ensure that work is completed and that there are no hazards resulting from installation.**
  - **If the mains input terminals and motor output terminals are grounded and shorted, remove the grounding and shorts circuits from the main input terminals and motor output terminals.**
  - **Ensure that all devices are properly grounded.**
  - **Ensure that all protective equipment such as covers, doors and screens are installed or closed.**
- **Install and close all covers before switching on the power supply.**

**Failure to follow these instructions will result in death or life-threatening injury.**

## 9.10.1 Order data

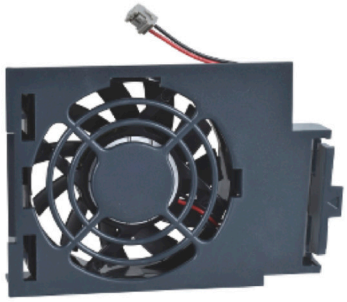
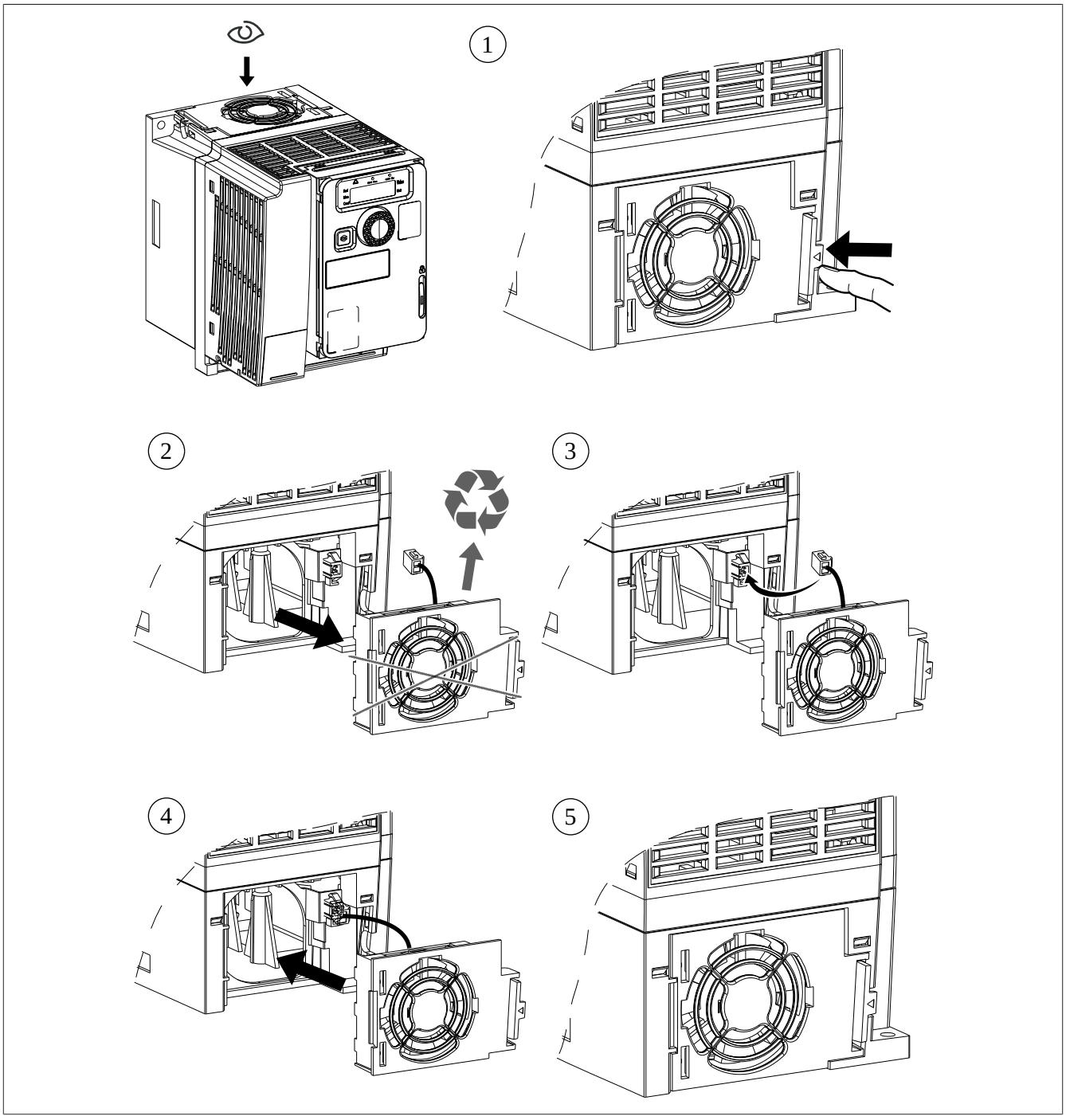
| Order number | Short description | Figure |
|---|---|---|
| 8I0XF066.021-1 | ACOPOSinverter P66 fan<br>1ph. 200...240 VAC: Power output class: 1.1 - 2.2 kW<br>3ph. 380...500 VAC: Power output class: 0.37 - 1.5 kW<br>3ph. 525...600 VAC: Power output class: 0.75 - 1.5 kW |  |
| 8I0XF066.030-1 | ACOPOSinverter P66 fan<br>3ph. 380...500 VAC: Power output class: 2.2 - 4 kW<br>3ph. 525...600 VAC: Power output class: 2.2 - 4 kW | |
| 8I0XF074.030-1 | ACOPOSinverter P66 fan<br>3ph. 200...240 VAC: Power output class: 5.5 - 7.5 kW<br>3ph. 380...500 VAC: Power output class: 5.5 - 7.5 kW<br>3ph. 525...600 VAC: Power output class: 5.5 - 7.5 kW<br><br>ACOPOSinverter P76, P74/P74new fan<br>3ph. 380...500 VAC: Power output class: 5.5 - 7.5 kW | |
| 8I0XF074.040-1 | ACOPOSinverter P66 fan<br>3ph. 200...240 VAC: Power output class: 11 - 15 kW<br>3ph. 380...500 VAC: Power output class: 11 - 15 kW<br>3ph. 525...600 VAC: Power output class: 11 - 15 kW<br><br>ACOPOSinverter P76, P74/P74new fan<br>3ph. 380...500 VAC: Power output class: 11 - 15 kW | |

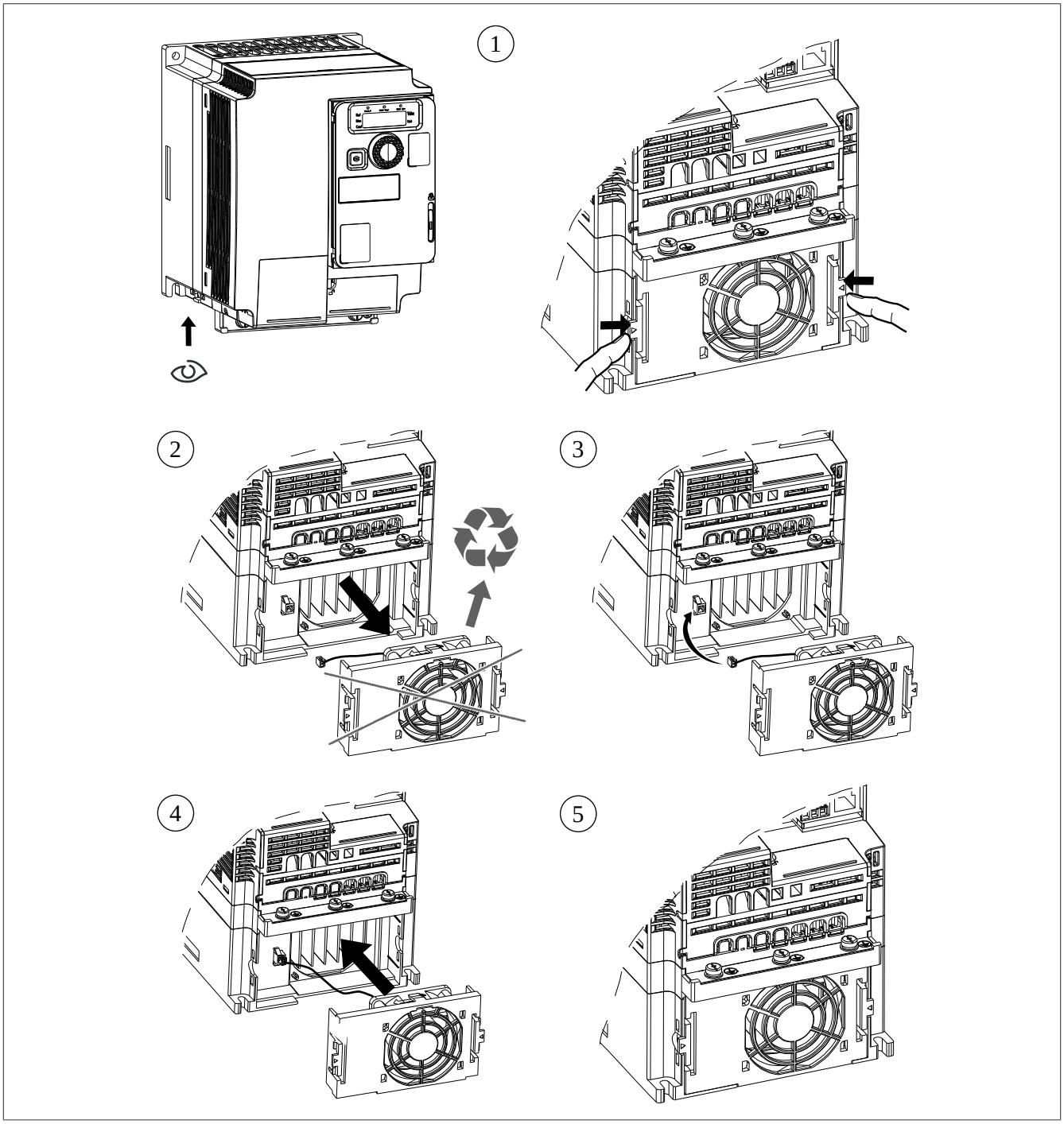
Table 62: 8I0XF066.021-1, 8I0XF066.030-1, 8I0XF074.030-1, 8I0XF074.040-1 - Order data

## 9.10.2 Installation

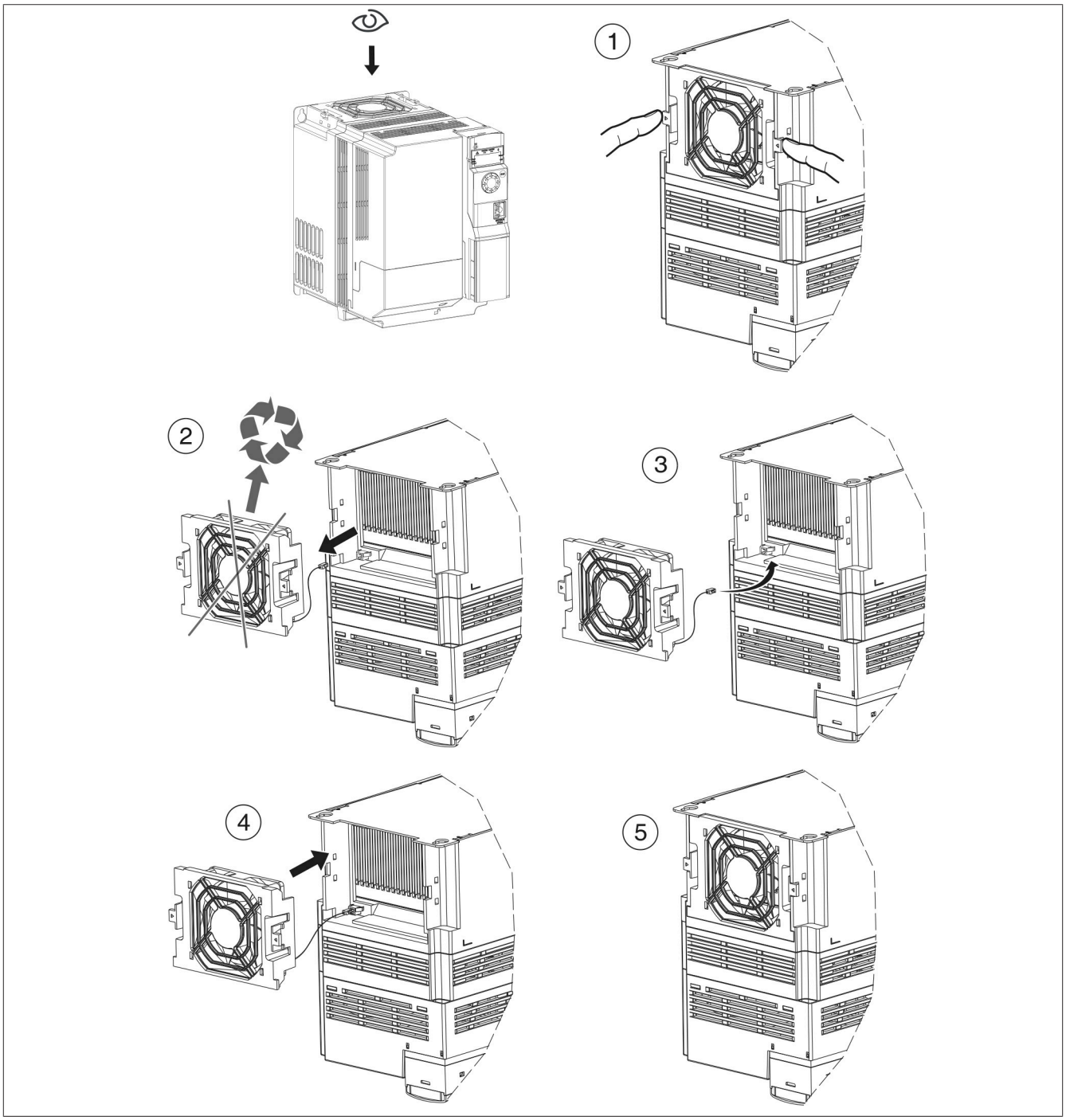
### 8I0XF066.021-1, 8I0XF066.022-1



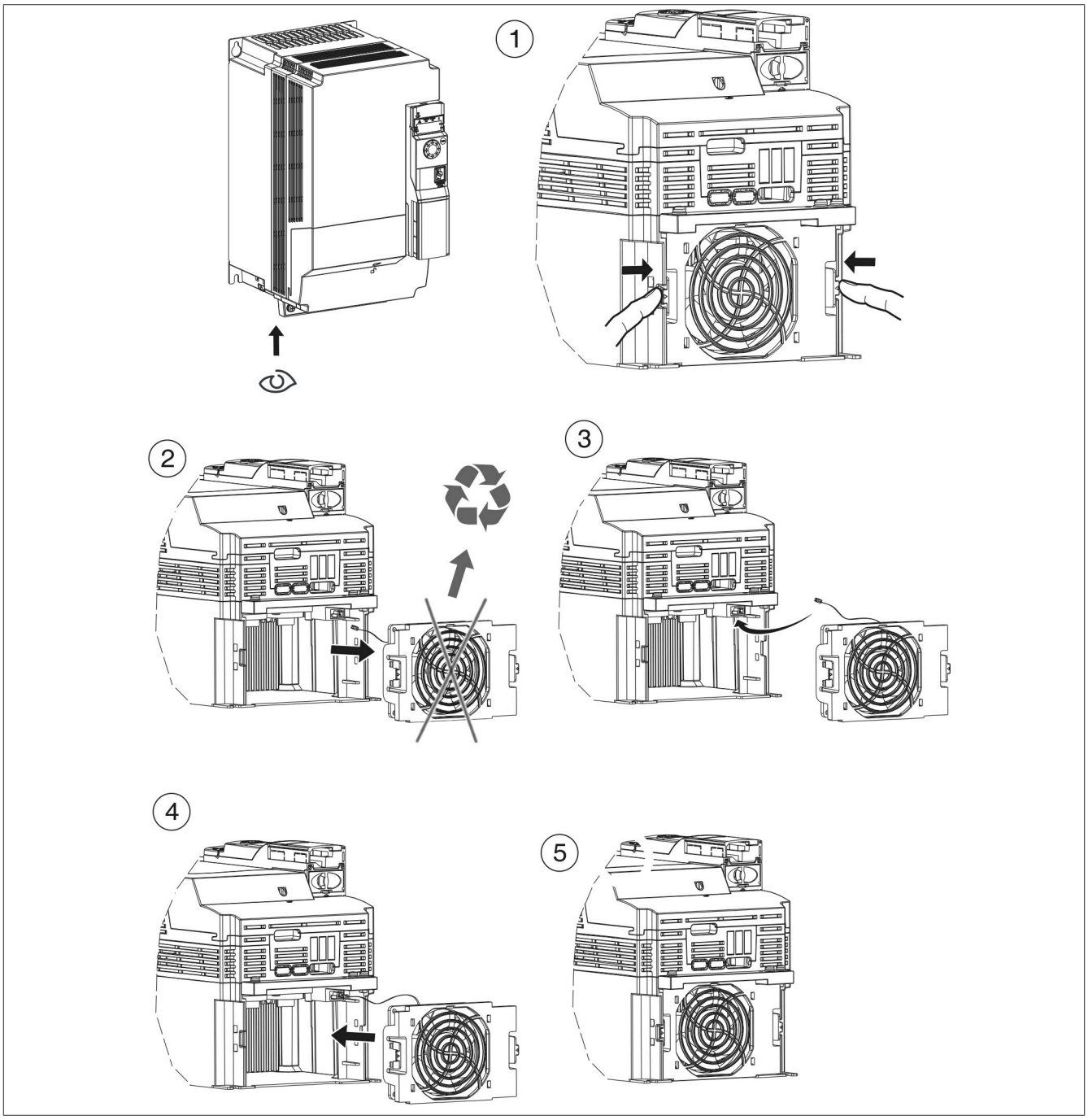
**8I0XF066.030-1**



**8I0XF074.030-1**



**8I0XF074.040-1**



# 10 EC declaration of conformity

This document was originally written in the English language. The English edition therefore represents the original instruction manual in accordance with the 2006/42/EC machinery directive. Documents in other languages are to be viewed as translations of the original instruction manual.

**Product manufacturer**

B&R Industrial Automation GmbH

B&R Strasse 1

5142 Eggelsberg

AUSTRIA

The EC declarations of conformity can be downloaded from the B&R website (www.br-automation.com).