Altivar Machine ATV320

Variable Speed Drives for Asynchronous and Synchronous Motors

Programming Manual

NVE41295.06

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www.se.com

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The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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ATV320 Programming Manual

Table of Contents

Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Qualification of Personnel

Only appropriately trained persons who are familiar with and understand the contents of this manual and all other pertinent product documentation are authorized to work on and with this product. In addition, these persons must have received safety training to recognize and avoid hazards involved. These persons must have sufficient technical training, knowledge and experience and be able to foresee and detect potential hazards that may be caused by using the product, by changing the settings and by the mechanical, electrical and electronic equipment of the entire system in which the product is used. All persons working on and with the product must be fully familiar with all applicable standards, directives, and accident prevention regulations when performing such work.

Intended Use

This product is intended for industrial use according to this manual.

The product may only be used in compliance with all applicable safety standard and local regulations and directives, the specified requirements and the technical data. The product must be installed outside the hazardous ATEX zone. Prior to using the product, you must perform a risk assessment in view of the planned application. Based on the results, the appropriate safety measures must be implemented. Since the product is used as a component in an entire system, you must ensure the safety of persons by means of the design of this entire system (for example, machine design). Any use other than the use explicitly permitted is prohibited and can result in hazards.

Product Related Information

Read and understand these instructions before performing any procedure with this device.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Only appropriately trained persons who are familiar with and fully understand the contents of the present manual and all other pertinent product documentation and who have received all necessary training to recognize and avoid hazards involved are authorized to work on and with this device system.
- Installation, adjustment, repair and maintenance must be performed by qualified personnel.
- Verify compliance with all local and national electrical code requirements as well as all other applicable regulations with respect to grounding of all equipment.
- Only use properly rated, electrically insulated tools and measuring equipment.
- Do not touch unshielded components or terminals with voltage present.
- Prior to performing any type of work on the device system, block the motor shaft to prevent rotation.
- Insulate both ends of unused conductors of the motor cable.
- Do not short across the DC bus terminals or the DC bus capacitors or the braking resistor terminals.

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

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Before performing work on the device system:

- Disconnect all power, including external control power that may be present. Take into account that the circuit breaker or main switch does not de-energize all circuits.
- Place a “Do Not Turn On” label on all power switches related to the device system.
- Lock all power switches in the open position.
- Wait 15 minutes to allow the DC bus capacitors to discharge.
- Verify the absence of voltage. (1)

Before applying voltage to the device system:

- Verify that the work has been completed and that the entire installation cannot cause hazards.
- If the mains input terminals and the motor output terminals have been grounded and short-circuited, remove the ground and the short circuits on the mains input terminals and the motor output terminals.
- Verify proper grounding of all equipment.
- Verify that all protective equipment such as covers, doors, grids is installed and/or closed.

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

Damaged products or accessories may cause electric shock or unanticipated equipment operation.

⚠⚠DANGER

ELECTRIC SHOCK OR UNANTICIPATED EQUIPMENT OPERATION

Do not use damaged products or accessories.

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

Contact your local Schneider Electric sales office if you detect any damage whatsoever.
This equipment has been designed to operate outside of any hazardous location. Only install this equipment in zones known to be free of a hazardous atmosphere.

⚠DANGER

POTENTIAL FOR EXPLOSION

Install and use this equipment in non-hazardous locations only.

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

Your application consists of a whole range of different interrelated mechanical, electrical, and electronic components, the device being just one part of the application. The device by itself is neither intended to nor capable of providing the entire functionality to meet all safety-related requirements that apply to your application. Depending on the application and the corresponding risk assessment to be conducted by you, a whole variety of additional equipment is required such as, but not limited to, external encoders, external brakes, external monitoring devices, guards, etc.

As a designer/manufacturer of machines, you must be familiar with and observe all standards that apply to your machine. You must conduct a risk assessment and determine the appropriate Performance Level (PL) and/or Safety Integrity Level (SIL) and design and build your machine in compliance with all applicable standards. In doing so, you must consider the interrelation of all components of the machine. In addition, you must provide instructions for use that enable the user of your machine to perform any type of work on and with the machine such as operation and maintenance in a safe manner.

The present document assumes that you are fully aware of all normative standards and requirements that apply to your application. Since the device cannot provide all safety-related functionality for your entire application, you must ensure that the required Performance Level and/or Safety Integrity Level is reached by installing all necessary additional equipment.

⚠WARNING

INSUFFICIENT PERFORMANCE LEVEL/SAFETY INTEGRITY LEVEL AND/OR UNINTENDED EQUIPMENT OPERATION

- Conduct a risk assessment according to EN ISO 12100 and all other standards that apply to your application.
- Use redundant components and/or control paths for all critical control functions identified in your risk assessment.
- Implement all monitoring functions required to avoid any type of hazard identified in your risk assessment, for example, slipping or falling loads.
- Verify that the service life of all individual components used in your application is sufficient for the intended service life of your overall application.
- Perform extensive commissioning tests for all potential error situations to verify the effectiveness of the safety-related functions and monitoring functions implemented, for example, but not limited to, speed monitoring by means of encoders, short circuit monitoring for all connected equipment, correct operation of brakes and guards.
- Perform extensive commissioning tests for all potential error situations to verify that the load can be brought to a safe stop under all conditions.

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

A specific application note NHA80973 is available on hoisting machines and can be downloaded on se.com. Product may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

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

⚠WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop, overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines (1).
- Each implementation of the product must be individually and thoroughly tested for proper operation before being placed into service.

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

(1) For USA: Additional information, refer to NEMA ICS 1.1 (latest edition), Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control and to NEMA ICS 7.1 (latest edition), Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems.
The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

⚠WARNING

HOT SURFACES

- Ensure that any contact with hot surfaces is avoided.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the product has sufficiently cooled down before handling it.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

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

Machines, controllers, and related equipment are usually integrated into networks. Unauthorized persons and malware may gain access to the machine as well as to other devices on the network/fieldbus of the machine and connected networks via insufficiently secure access to software and networks.

⚠WARNING

UNAUTHORIZED ACCESS TO THE MACHINE VIA SOFTWARE AND NETWORKS

- In your hazard and risk analysis, consider all hazards that result from access to and operation on the network/fieldbus and develop an appropriate cyber security concept.
- Verify that the hardware infrastructure and the software infrastructure into which the machine is integrated as well as all organizational measures and rules covering access to this infrastructure consider the results of the hazard and risk analysis and are implemented according to best practices and standards covering IT security and cyber security (such as: ISO/IEC 27000 series, Common Criteria for Information Technology Security Evaluation, ISO/ IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - Standard of Good Practice for Information Security, SE recommended Cybersecurity Best Practices*).
- Verify the effectiveness of your IT security and cyber security systems using appropriate, proven methods.

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

(*) : SE Recommended Cybersecurity Best Practices can be downloaded on SE.com.

⚠WARNING

LOSS OF CONTROL

Perform a comprehensive commissioning test to verify that communication monitoring properly detects communication interruptions.

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

NOTICE

DESTRUCTION DUE TO INCORRECT MAINS VOLTAGE

Before switching on and configuring the product, verify that it is approved for the mains voltage.

Failure to follow these instructions can result in equipment damage.

About the document

Document Scope

The purpose of this document is to:

- help you to set up the drive,
- show you how to program the drive,
- show you the different menus, modes, and parameters,
- help you in maintenance and diagnostics.

Validity Note

Original instructions and information given in the present document have been written in English (before optional translation).

This documentation is valid for the Altivar MachineATV320 drives.

Step	Action
1	Go to the Schneider Electric home page *www.se.com*.
2	In the **Search** box type the reference of the product or the name of a product range. • Do not include blank spaces in the reference or product range. • To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet.**

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

Related Documents

Use your tablet or your PC to quickly access detailed and comprehensive information on all our products on www.se.com.

The internet site provides the information you need for products and solutions:

- The whole catalog for detailed characteristics and selection guides,
- The CAD files to help design your installation, available in over 20 different file formats,
- All software and firmware to maintain your installation up to date,
- A large quantity of White Papers, Environment documents, Application solutions, Specifications... to gain a better understanding of our electrical systems and equipment or automation,
- And finally all the User Guides related to your drive, listed below:

Title of Documentation	Reference Number
ATV320 Catalog	DIA2ED2160311EN (English), DIA2ED2160311FR (French), ECATA947 (Chinese), LEESCAE592BI (Italian), DIA2ED2160311PT (Portuguese)
ATV320 Getting Started	NVE21763 (English), NVE21771 (French), NVE21772 (German), NVE21773 (Spanish) NVE21774 (Italian), NVE21776 (Chinese), NVE21763PT (Portuguese), NVE21763TR (Turkish)
ATV320 Getting Started Annex (SCCR)	NVE21777 (English)
ATV320 Installation manual	NVE41289 (English), NVE41290 (French), NVE41291 (German), NVE41292 (Spanish), NVE41293 (Italian), NVE41294 (Chinese), NVE41289PT (Portuguese), NVE41289TR (Turkish)
ATV320 Programming manual	NVE41295 (English), NVE41296 (French), NVE41297 (German), NVE41298 (Spanish), NVE41299 (Italian), NVE41300 (Chinese), NVE41295PT (Portuguese), NVE41295TR (Turkish)
ATV320 Modbus Serial Link manual (embedded)	NVE41308 (English)
ATV320 Modbus TCP - Ethernet IP manual (VW3A3616)	NVE41313 (English)
ATV320 PROFIBUS DP manual (VW3A3607)	NVE41310 (English)
ATV320 DeviceNet manual (VW3A3609)	NVE41314 (English)
ATV320 CANopen manual (VW3A3608, 618, 628)	NVE41309 (English)
ATV320 POWERLINK manual (VW3A3619)	NVE41312 (English)
ATV320 EtherCAT manual (VW3A3601)	NVE41315 (English)
ATV320 PROFINET manual (VW3A3627)	NVE41311 (English)
ATV320 PROFINET manual (VW3A3647)	BQT46622 (English)
ATV320 Communication Parameters	NVE41316 (English)
ATV320 DC Bus Sharing Technical Note	MFR90089 (English)
ATV312 to ATV320 Migration Manual	QGH39563 (English)
ATV320 Safety Functions manual	NVE50467 (English), NVE50468 (French), NVE50469 (German), NVE50470 (Spanish), NVE50472 (Italian), NVE50473 (Chinese)
ATV320 ATEX manual	NVE41307 (English)
BMP Synchronous Motor manual	0198441113981-EN (English), 0198441113982-FR (French), 0198441113980-DE (German), 0198441113984-ES (Spanish), 0198441113983-IT (Italian), 0198441113985-ZH (Chinese)
ATV320 ATV Logic manual	NVE71954 (English), NVE71955 (French), NVE71957 (German), NVE71959 (Spanish), NVE71958 (Italian), NVE71960 (Chinese)
ATV320 Time Delay Control application note	BQT76109 (English)
SoMove: FDT	SoMove_FDT (English, French, German, Spanish, Italian, Chinese)
ATV320: DTM	ATV320_DTM_Library (English, French, German, Spanish, Italian, Chinese)
Recommended Cybersecurity Best Practices	CS-Best-Practices-2019-340 (English)

(Other option manuals and Instruction sheets are available on www.se.com)

You can download these technical publications and other technical information from our website at www.se.com/en/download.

Electronic product data sheet

Scan the QR code in front of the drive to get the product data sheet.

Terminology used in this document

The technical terms, terminology, and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

Among others, these standards include:

- ISO 13849: The Foundation of Functional Safety in the Machinery
- IEC 60204-1: Safety of machinery - Electrical equipment of machines – Part 1: General requirements.
- IEC 61010: Safety requirements for electrical equipment for measurement, control, and laboratory use.
- IEC 61158 series: Industrial communication networks - Fieldbus specifications
- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/ programmable electronic safety-related.
- IEC 61784 series: Industrial communication networks - Profiles.
- IEC 61784-5-3: Industrial communication networks - Profiles - Part 5-3: Installation of fieldbuses - Installation profiles for CPF 3
- IEC 61800 series: Adjustable speed electrical power drive systems.
- IEC 61918: Industrial communication networks - Installation of communication networks in industrial premises.
- IEC 62443: Security for industrial automation and control systems.

In the area of drive systems this includes, but is not limited to, terms such as **error, error message, failure, fault, fault reset, protection, safe state, safety function, warning, warning message**, and so on.

In addition, the term **zone of operation** is used in conjunction with the description of specific hazards, and is defined as it is for a **hazard zone** or **danger zone** in the EC Machinery Directive (2006/42/EC) and in ISO 12100-1.

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General Overview

What’s in This Part

Overview

What's in This Chapter

Factory Configuration

Factory Settings

The ATV320 is factory-set for common operating conditions:

- Display: drive ready **[Ready]** rdY when motor is ready to run and the output frequency when motor is running.
- The LI3 to LI6 logic inputs, AI2 and AI3 analog inputs, LO1 logic output, AO1 analog output, and R2 relay are unassigned.
- Stop mode if error is detected: freewheel.

This table presents the basic parameters of the drive and their factory setting values:

Code	Name	Factory setting values
bFr , page 98	**[Motor Standard]**	50 **[IEC]**
tCC , page 97	**[2/3-Wire Control]**	**[2-Wire Control]** 2C : 2-wire control
Ctt , page 121	**[Motor control type]**	**[Standard]** Std: Standard motor law
ACC , page 100	**[Acceleration]**	3.0 s
dEC , page 101	**[Deceleration]**	3.0 s
LSP , page 101	**[Low Speed]**	0.0 Hz
HSP , page 101	**[High Speed]**	50.0 Hz
ItH , page 100	**[Motor Th Current]**	Nominal motor current (value depending on drive rating)
SdC1	**[Auto DC inj Level 1]**	0.7 x nominal drive current, for 0.5 s
SFr	**[Switching frequency]**	4 kHz
Frd , page 146	**[Forward]**	**[DI1]** LI1: Logic input LI1
rrS , page 147	**[Reverse Assign]**	**[DI2]** LI2: Logic input LI2
Fr1 , page 188	**[Ref Freq 1 Config]**	**[AI1]** AI1: Analog input AI1
r1	**[R1 Assignment]**	**[No drive flt]** 11: The contact opens when the drive has detected error or when the drive has been switched off
brA	**[Dec.Ramp Adapt]**	**[Yes]** YES: Function active (automatic adaptation of deceleration ramp)
Atr	**[Auto Fault Reset]**	**[No]** no: Function inactive
Stt	**[Type of stop]**	**[Ramp Stop]** rMP: On ramp
CFG , page 93	**[Macro Config]**	**[Start/Stop]** StS

NOTE: If you want to keep the drive pre-settings to a minimum, select the macro configuration **[Macro Config]** CFG = **[Start/Stop]** SES followed by **[Restore Configuration]** FCS to **[Macro Config]** In I. Refer CFG, page 93 for information.

Verify whether the above values are compatible with the application and modify them if required.

Application Functions

Introduction

The following tables show the combinations of functions and applications to guide your selection.

The applications in these tables relate to the following machines:

- **Hoisting:** cranes, overhead cranes, gantries (vertical hoisting, translation, slewing), lifting platforms
- **Handling:** palletizers/depalletizers, conveyors, roller tables
- **Packing:** carton packers, labeling machines
- **Textiles:** weaving looms, carding frames, washing machines, spinners, drawing frames
- **Wood:** automatic lathes, saws, milling
- **Process**

Each application has its own special features, and the combinations listed here are not mandatory or exhaustive.

Some functions are designed specifically for a given application. In this case, the application is identified by a tab in the margin on the relevant programming pages.

Motor Control Functions

Function	Application					
	Hoisting	Handling	Packing	Textiles	Wood	Process
V/f ratio , page 121	–	✓	–	–	✓	–
Sensorless flux vector control , page 121	✓	✓	✓	✓	✓	✓
2-point vector control , page 121	✓	–	–	✓	–	–
Open-loop synchronous motor , page 121	–	–	–	✓	–	–
Output frequency up to 599 Hz , page 121	–	–	–	✓	✓	–
Motor overvoltage limiting	–	–	–	✓	✓	–
DC bus connection (see Installation manual)	–	–	–	✓	–	✓
Motor fluxing using a logic input	✓	✓	✓	–	–	–
Switching frequency of up to 16 kHz	–	–	–	✓	✓	–
Auto-tuning , page 100	✓	✓	✓	✓	✓	✓

Functions on Speed References

Function	Application					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Differential bipolar reference	✓	✓	✓	–	–	–
Reference delinearization (magnifying glass effect)	✓	✓	–	–	–	–
Frequency control input , page 188	–	–	–	✓	–	✓
Reference switching	–	–	✓	–	–	–
Reference summing	–	–	✓	–	–	–
Reference subtraction	–	–	✓	–	–	–
Reference multiplication	–	–	✓	–	–	–
Adjustable profile ramp	✓	✓	–	–	–	–
Jog operation	–	✓	–	✓	–	✓
Preset speeds	✓	✓	✓	–	–	–
+ speed / - speed using single action pushbuttons (1 step)	–	–	–	–	–	✓
+ speed / - speed using double action pushbuttons (2 steps)	✓	–	–	–	–	–
+/- speed around a reference	–	–	–	✓	–	✓
Save reference	–	–	–	–	–	✓

Application-Specific Functions

Function	Application					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Fast stop	–	–	–	–	✓	–
Brake control	✓	✓	–	–	–	–
Load measurement	✓	–	–	–	–	–
High-speed hoisting	✓	–	–	–	–	–
Rope slack	✓	–	–	–	–	–
PID regulator	–	–	–	–	–	✓
Motor/generator torque limit	–	✓	–	✓	–	✓
Load sharing	✓	✓	–	–	–	–
Line contactor control	✓	✓	–	–	✓	–
Output contactor control	✓	–	–	–	–	–
Positioning by limit switches or sensors	✓	✓	✓	–	–	–
Stop at distance calculated after deceleration limit switch	–	✓	✓	–	–	–
Parameter switching	✓	✓	✓	✓	✓	✓
Motor or configuration switching	✓	✓	✓	–	–	–
Traverse control	–	–	–	✓	–	–
Stop configuration	–	✓	–	✓	✓	–

Safety Functions/Error Handling

Function	Application					
	Hoisting	Handling	Packing	Textiles	Wood	Process
Safe Torque Off (STO)	✓	✓	✓	✓	✓	✓
Deferred stop on thermal alert	✓	–	–	–	–	✓
Alarm handling	✓	✓	✓	✓	✓	✓
Detected Fault management	✓	✓	✓	✓	✓	✓
IGBT tests	✓	✓	✓	✓	✓	✓
Catch a spinning load	–	–	–	✓	✓	–
Motor monitoring with PTC probes	✓	✓	✓	✓	✓	✓
Undervoltage management	–	–	–	✓	✓	–
4-20 mA loss	✓	✓	–	✓	✓	✓
Uncontrolled output cut (output phase loss)	–	✓	–	–	–	–
Automatic restart	–	✓	–	–	–	–
Use of the Pulse input to measure the speed of rotation of the motor	✓	✓	–	–	–	–
Load variation detection	✓	–	–	–	–	–
Underload detection	–	–	–	–	–	✓
Overload detection	–	–	–	–	–	✓
Safety Integrated functions , page 11	–	✓	✓	✓	✓	✓

Basic Functions

Drive Ventilation

The fan starts automatically when the drive thermal state reaches 70% of the maximum thermal state and if the **[Fan mode]** FFM is set to **[Standard]** Std. For ATV320xxxxxW(S), **[Fan mode]** FFM is forced to **[Always]** run, the fan is always activated.

Graphic Display Terminal Option

Description of the Graphic Display Terminal (VW3A1101)

With the graphic display terminal, which works with FLASH V1.1IE26 or higher, it is possible to display more detailed information than can be shown on the integrated display terminal.

1. Graphic display
2. Function keys F1, F2, F3, F4 , page 192
3. STOP/RESET key
4. RUN key
5. Jog dial:
   - Press (ENT):
     - To save the current value
     - To enter the selected menu or parameter
   - Turn +/-:
     - To increment or decrement a value
     - To go to the next or previous line
     - To increase or decrease the reference if control via the graphic display terminal is activated
6. Key for reversing the direction of rotation of the motor
7. ESC key: Aborts a value, a parameter or a menu to return to the previous selection

   NOTE: Keys **3**, **4**, **5** and **6** can be used to control the drive directly, if control via the graphic display terminal is activated.

To activate the keys on the remote display terminal, you first have to configure **[Ref Freq Channel 1]** *Fr 1* , page 188= **[HMI]** *LCC* .

Example Configuration Windows

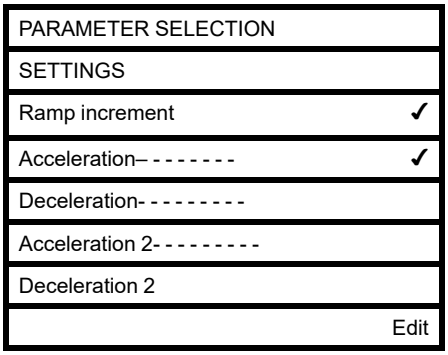
***Single selection*:**

When powering up the graphic display terminal for the first time, you have to select the required language.

When only one selection is possible, the selection made is indicated by ✓ .

Example: Only one language can be chosen.

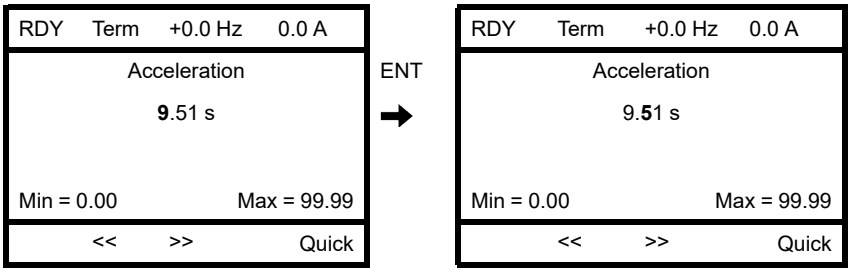
***Multiple selection*:**



When multiple selection is possible, the selections made are indicated by ✓.

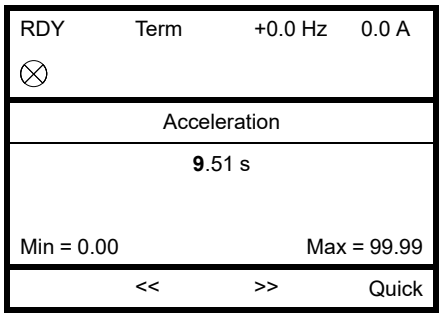
Example: A number of parameters can be chosen to form the **[USER MENU]**.

Example Configuration Window for One Value



The << and >> arrows (keys F2 and F3) are used to select the digit to be modified, and the jog dial is rotated to increase or decrease this number.

Example Visualization of Function Blocks State



⊗ OFF light: A valid function blocks program is in the ATV320 in stop mode.

⊗ ON light: A valid function blocks program is in the ATV320 in run mode. The drive is considered as being in running state and configuration parameters cannot be modified.

Powering Up the Drive for the First Time

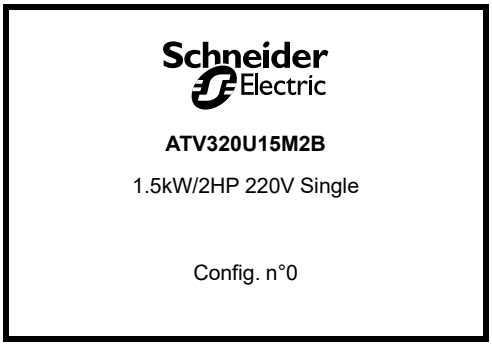
Powering Up the Drive with Graphic Display Terminal for the First Time

When powering up the graphic display terminal for the first time, you have to select the required language.

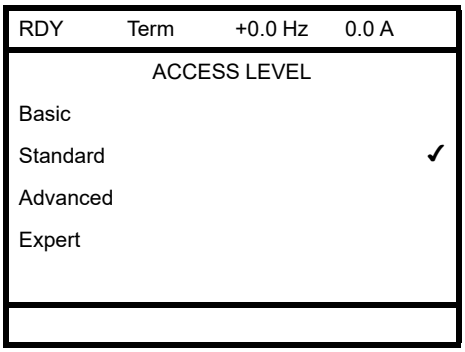
The following is displayed after the graphic display terminal has been powered up for the first time.

Select the language and press ENT.

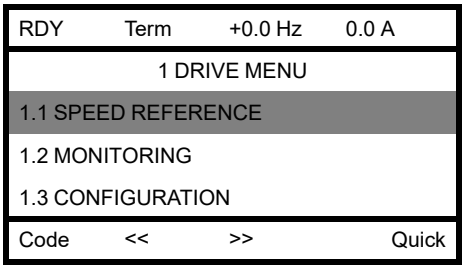
The drive rating details are displayed.


Schneider Electric
ATV320U15M2B
1.5kW/2HP 220V Single
Config. n°0

3 s

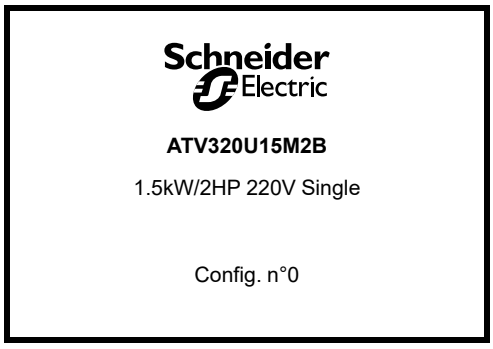

RDY Term +0.0 Hz 0.0 A
ACCESS LEVEL
Basic
Standard ✓
Advanced
Expert

ENT


RDY Term +0.0 Hz 0.0 A
1 DRIVE MENU
1.1 SPEED REFERENCE
1.2 MONITORING
1.3 CONFIGURATION
Code << >> Quick

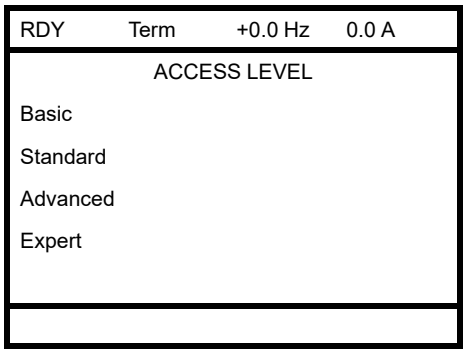
Powering Up the Drive for the First Time

With the integrated display terminal, when powering up the drive for the first time, the user immediately accesses to **[Motor Standard]** bFr , page 98) in the menu (**[Configuration]** ➡ **[Full]** ➡ **[Simply start]**).



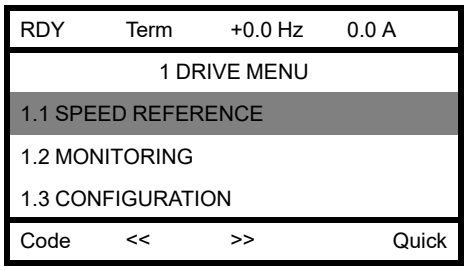
Display after the drive has been powered up for the first time.

3 s



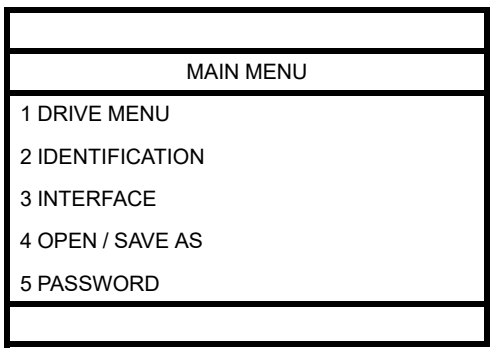
The **[Access Level]** screen follows automatically.

ENT



Automatically switches to the **1 [Drive menu]** menu after 3 seconds.

ESC

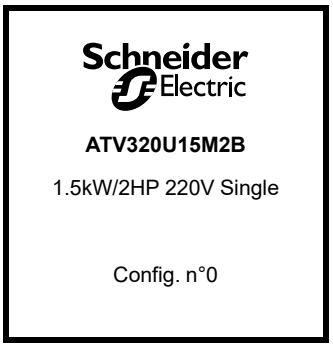


The **MAIN MENU** appears on the graphic display terminal if you press the ESC key.

Subsequent Power-ups

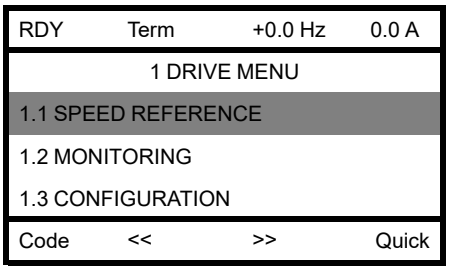
With the integrated display terminal, at subsequent power-ups of the drive for the first time, you can immediately access the drive state (Same list than **[Device State]** HS I , page 71. Example : **[Ready]** rdY.

The following is displayed after powering up.



3 s

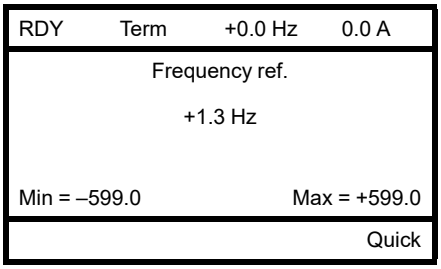
Automatically switches to the **1 [Drive menu]** menu after 3 seconds.



Select the menu and press ENT.

10 s

Automatically switches to the monitoring screen after 10 seconds.

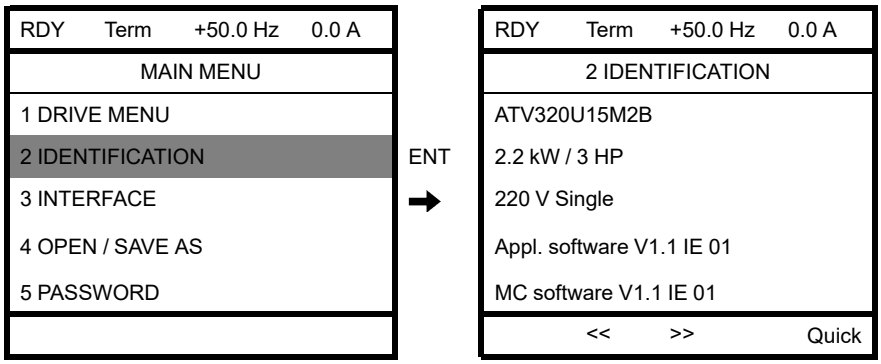


Identification Menu

The **2 [Identification]** - menu can only be accessed on the graphic display terminal.

This is a read-only menu that cannot be configured. It enables the following information to be displayed:

- Drive reference, power rating and voltage
- Drive software version
- Drive serial number
- Safety function status and checksum
- Function blocks program and catalogue version
- Type of options present, with their software version
- Graphic display terminal type and version



FFFFFFFFF

Product V1.1 IE 01

SAFETY FUNCTIONS

Drive Safety status Standard

Safe param. CRC 8529

FUNCTION BLOCKS

Prg. format version 1

Catalogue version 1

OPTION 1

No option

GRAPHIC TERMINAL

GRAPHIC S

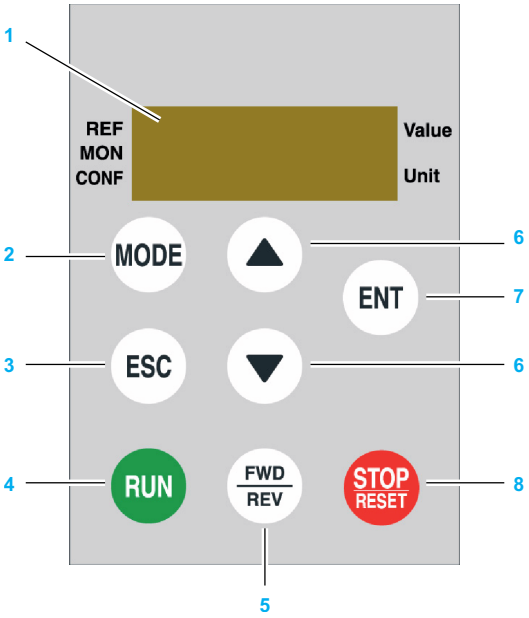
V1.2IE07

00000000000000000

Remote Display Terminal Option

Description

This remote display terminal is a local control unit which can be mounted on the door of the wall-mounted or floor-standing enclosure. It has a cable with connectors, which is connected to the drive serial link. With this remote display terminal, up and down arrows are used for navigation rather than a jog dial.



1. Four digits display
2. **MODE** key(1): used to switch **1.1 [Reference speed]** rEF-, **1.2 [MONITORING]** Mon- and **1.3 [Configuration]** CONF- menus.

   NOTE:

   (1) If the drive is locked by a code (**[PIN code 1]** COd, page 398), pressing the MODE key enables you to switch from the **1.2 [MONITORING]** Mon menu to the **1.1 [Reference speed]** rEF menu and vice versa.
3. **ESC** key: used to quit a menu/parameter or remove the currently displayed value to revert to the previous value retained in the memory
4. **RUN** key: executes the function assuming it has been configured
5. Key for reversing the direction of rotation of the motor
6. Navigation keys
7. **ENT** key: used to save the current value or access the selected menu/parameter
8. **STOP** key: used to stop the motor and perform a reset

To activate the keys on the remote display terminal, you have to configure **[Ref Freq Channel 1]** Fr1, page 188 =**[HMI]** LCC.

Accessory: Graphic Display Terminal VW3A1111

Software Version of the Graphic Display Terminal

⚠⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- The software version of the Graphic Display Terminal VW3A1111 must be equal to or higher than V2.0 to be used with ATV320 drives.

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

NOTE: Go to **[Identification]** - menu to verify the software version of the Graphic Display Terminal.

Software Version of the Graphic Display Terminal VW3A1111

On VW3A1111 Graphic Display Terminal, the parameter labels may differ from VW3A1101 Remote Graphic Display Terminal. This document shows the labels of the most recent Remote Graphic Display Terminal, the VW3A1111.

NOTE: The code of the menus and parameters remains identical for VW3A1111 and VW3A1101.

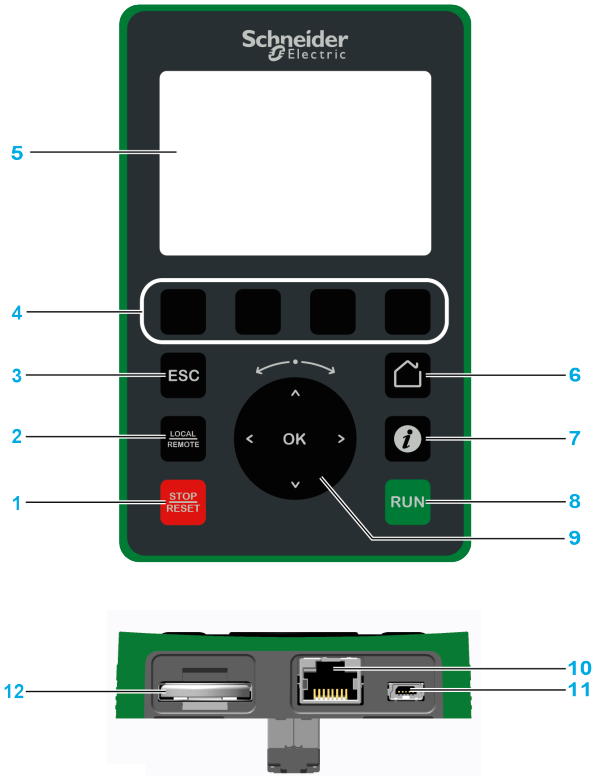
On VW3A1111, the password feature, the interface menu and the configuration transfer/storage are identical to the VW3A1101 Graphic Display Terminal.

The Multipoint Screen feature of the Graphic Display Terminal VW3A1111 can be used with ATV320.

VW3A1111 and VW3A1101 shows different keys, for more information refer to the description of each Graphic Display Terminal.

Description of the Graphic Display Terminal

The Graphic Display Terminal is a local control unit which can be either plugged on the drive or mounted on the door of the wall-mounted or floor-standing enclosure. It has a cable with connectors, which is connected to the drive front Modbus serial link.



1 STOP / RESET: Stop command / apply a Fault Reset.

2 LOCAL / REMOTE: used to switch between local and remote control of the drive if one of the function keys displays **[T/K]** FtK, otherwise the key is unused.

NOTE:

To assign a function key (F1…F4) to the function LOCAL/REMOTE, go to **[Command]** CtL - menu

and assign **[F1 key assignment]** Fn1 or … or **[F4 key assignment]** Fn4 to **[T/K]** FtK.

3 ESC: used to quit a menu/parameter or remove the currently displayed value to revert to the previous value retained in the memory.

4 F1 to F4: function keys used to access quick view, and submenus. Simultaneous press of F1 and F4 keys generates a screenshot file in the Graphic Display Terminal internal memory.

5 Graphic display.

6 Home: used to access directly at the home page if the Graphic Display Terminal displays **Quick** on one of its function keys.

7 Information: used to show the code of menus, submenus, and parameters if the Graphic Display Terminal displays **Code** on one of its function keys.

8 RUN: executes the function assuming it has been configured.

9 Touch wheel / OK: used to save the current value or access the selected menu/parameter. The touch wheel is used to scroll fast into the menus. Up/down arrows are used for precise selections, right/left arrows are used to select digits when setting a numerical value of a parameter.

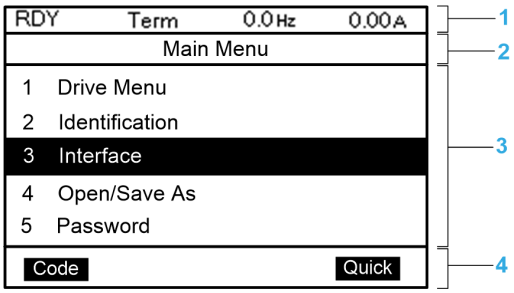
10 RJ45 Modbus serial port: used to connect the Graphic Display Terminal to the drive in remote control.

11 MiniB USB port: used to connect the Graphic Display Terminal to a computer.

12 Battery (10 years service life. Type: CR2032). The battery positive pole points to the front face of the Graphic Display Terminal.

NOTE: Keys 1, 8 and 9 can be used to control the drive if control via the Graphic Display Terminal is activated. To activate the keys on the Graphic Display Terminal, you first need to set (**[Ref Freq Channel 1]** Fr 1 to **[HMI]** LCC).

Description of the Graphic Display



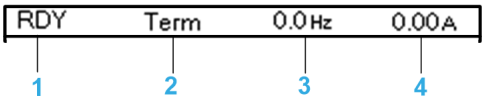
1 Display line: its content can be configured

2 Menu line: indicates the name of the current menu or submenu

3 Menus, submenus, parameters, values, bar charts, and so on, are displayed in drop-down window format on a maximum of five lines. The line or value selected by the navigation button is displayed in reverse video

4 Section displaying tabs (1 to 4 by menu), these tabs can be accessed using F1 to F4 keys

Display line details:



Number	Description
1	Drive status
2	Active control channel • TERM: terminals • HMI: Graphic Display Terminal • MDB: integrated Modbus serial • CAN: CANopen® • NET: fieldbus module • TUD: +/- speed • PWS: DTM based commissioning software
3	Customer defined via the menu **[Param. Bar Select]** Pb S-.
4	Customer defined via the menu **[Param. Bar Select]** Pb S-.

Graphic Display Terminal Connected to a Computer

NOTICE
INOPERATIVE EQUIPMENT Do not connect equipment to the RJ45 port and to the USB port of the Graphic Display Terminal at the same time. **Failure to follow these instructions can result in equipment damage.**

The Graphic Display Terminal is recognized as a USB storage device named SE_VW3A1111 while plugged on a computer.

This allows to access the saved drive configurations (*DRVCONF* folder) and the Graphic Display Terminal screenshots (*PRTSCR* folder).

Screenshots can be stored by a simultaneous press on *F1* and *F4* function keys.

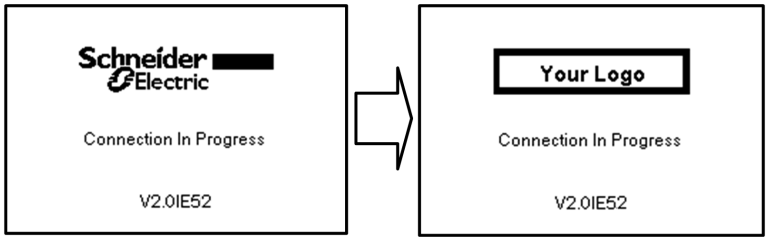
How To Update Language Files on the Graphic Display Terminal?

The Graphic Display Terminal (VW3A1111) language files can be updated:

- Download the latest version of language files here: Languages_Drives_VW3A1111
- Unzip the file and follow the instructions of the ReadMe text file.

How to customize the logo displayed at power on of the Graphic Display Terminal?

From the firmware version V2.0 of the Graphic Display Terminal, the logo displayed at power on by the Graphic Display Terminal can be customized. By default, the Schneider-Electric logo is displayed.



To modify the displayed logo, you must:

- Create your own logo and save it as a *bitmap file* (*.bmp*) with the name *logo_ini*. The logo must be saved in black & white and the dimensions must be 137x32 pixels.
- Connect the Graphic Display Terminal to a computer via an USB cable.
- Copy your logo (*logo_init.bmp*) in the folder *KPCONFIG* of the Graphic Display Terminal.

At next power on of the Graphic Display Terminal connected to the drive, your own logo should be displayed.

If the logo of Schneider-Electric is still displayed, verify the characteristics of your file and the location where it has been copied.

Structure of the Parameter Table

General Legend

Pictogram	Description
★	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.
( )	Setting of this parameter can be done during operation or when stopped.
2 s	To change the assignment of this parameter, press the ENT key for 2 s.

Menu Presentation

This document shows the **[Short Label]** labels and ***Long Label*** of the most recent Remote Graphic Display Terminal, the VW3A1111.

Below an example of a menu presentation:

[Short Label] CodE

Long Label (is written in italic and accessible with the "i" button on the graphic display terminal VW3A1111, or visible on the DTM interface).

Access path: MEnu codE ➡ Sub-MEnu codE

About this menu
Description of the menu.

Parameter Presentation

Below an example of a parameter presentation:

HMI label	Setting or Display	Factory setting
[Short Label] CodE (pictogram)	XXX...XXX **[unit]** **[additional informations]**	**Factory setting**: **[Short Label]** CodE
[Long label] Reference exclusivity and required optional modules. Example: Fieldbus Module VW3A3607 is required. Description of the parameter. Parameter incompatibilities and / or required configuration. Example: This parameter can be accessed it **[Short Label]** CodE is set to **[Short Label]** CodE. This parameter is not compatible with **[Short Label]** CodE. Impact on other parameters. Example: If this parameter is modified, the parameter **[Short Label]** CodE is set to factory settings.		

Finding a Parameter in this Document

The following assistance with finding explanations on a parameter is provided:

- With the integrated display terminal and the remote display terminal: direct use of the parameter code index Index of Parameter Codes, page 427, to find the page giving details of the displayed parameter.
- Select the required parameter and press F1 (F1) : **[Code]**. The parameter code is displayed instead of its name while the key is held down.

  Example: ACC

RDY	Term	+0.0 Hz	0.0 A
SETTINGS			
Ramp increment			0.1
Acceleration			9.51 s
Deceleration			9.67 s
Low speed			0.0 Hz
High speed			50.0Hz
Code	<<	>>	Quick

Code ➡

RDY	Term	+0.0 Hz	0.0 A
SETTINGS			
Ramp increment			0.1
ACC			9.51 s
Deceleration			9.67 s
Low speed			0.0 Hz
High speed			50.0Hz
Code	<<	>>	Quick

- Use the parameter code index Index of Parameter Codes, page 427, to find the page giving details of the displayed parameter.

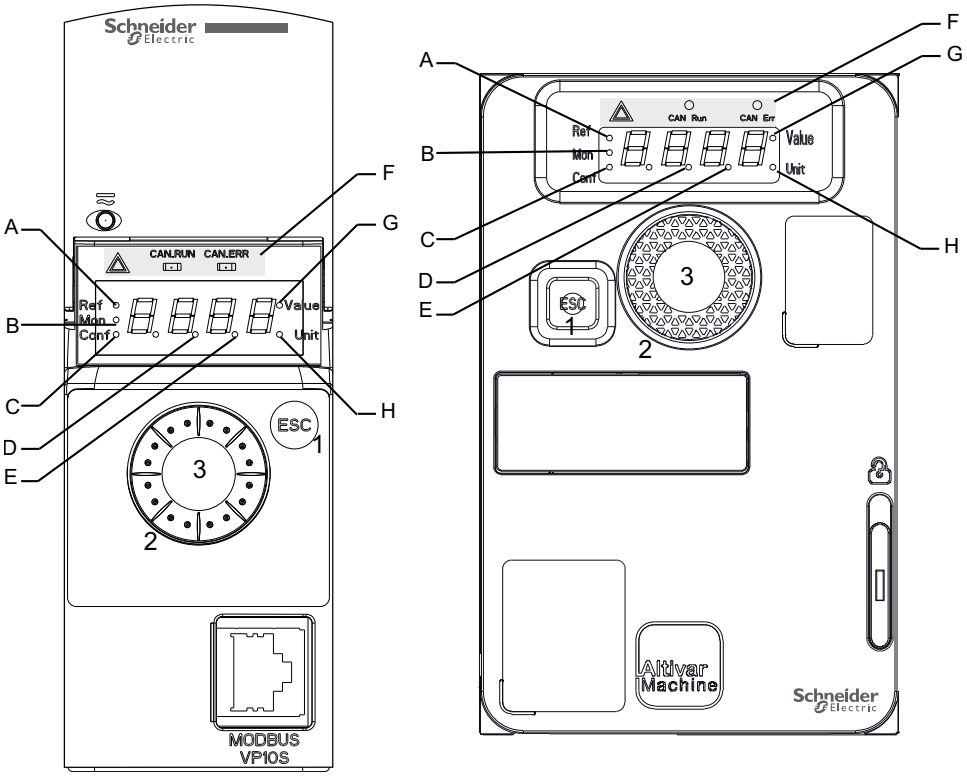
Description of the HMI

Display and Keys Functionalities

1 The **ESC** key is used for menu navigation (backward) and parameters adjustment (cancel)

2 The **Jog dial** is used for menu navigation (up or down) and parameters adjustment (increase/decrease value or element choice). It can be used as Virtual analog input 1 for drive frequency reference value.

3 The **ENT** key (push on the Jog dial) is used for menu navigation (forward) and parameters adjustment (validation).



Item	Description
A	Reference mode selected rEF-
B	Monitoring mode selected Mon-
C	Configuration mode selected CONF
D	Dot used to display parameter value (1/100 unit)
E	Dot used to display parameter value (1/10 unit)
F	From the left to the right: • Indicates that the drive has detected an error • CANopen RUN Led Status (refer to the CANopen Manual). • CANopen Error Led Status (refer to the CANopen Manual).
G	Current display is parameter value
H	Current display is parameter unit

Normal display, with no detected error code displayed and no startup:

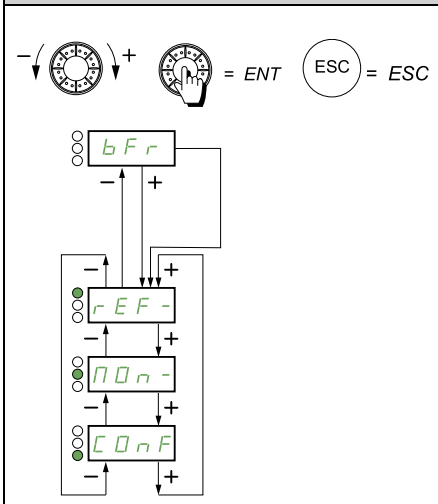
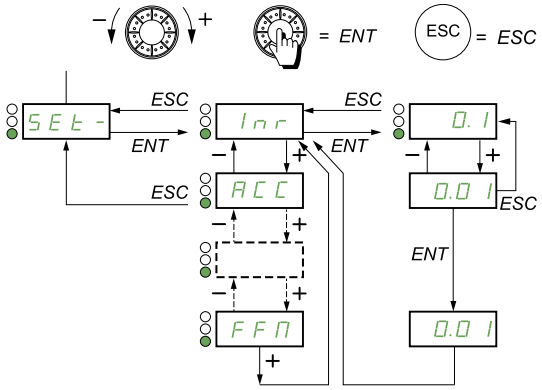
Displays the parameter selected in the **1.2 [MONITORING]** Mon- menu (default: **[Pre-Ramp Ref Freq]** FrH).

- InIt: Initialization sequence (only on remote display terminal)
- tUn: AutoTuning
- dCb: Injection braking
- rdY: Drive ready

- nSt: Freewheel stop control
- CL1: Current limit
- FSt: Fast stop
- FLU: Fluxing function is activated
- nLP: Control is powered on but the DC bus is not loaded
- CtL: Controlled stop
- obr: Adapted deceleration
- SoC: Stand by output cut
- uSA: Under-voltage alarm
- SS1: Safety function SS1
- SLS: Safety function SLS
- Sto: Safety function STO
- SMS: Safety function SMS
- GdL: Safety function GDL

NOTE: In the event of a detected error, the display flashes to notify the user accordingly. If a Graphic Display Terminal is connected, the name of the detected error is displayed.

Structure of the Menus

Powering up		Parameter selection
	This parameter is only visible when the drive is powered up for the first time. The setting can be amended subsequently in the menu **[Motor control]** drC- for **[Motor Standard]** bFr **1.1** **[Reference speed]** rEF- **1.2 [MONITORING]** MOn- **1.3 [Configuration]** COnF	

On the 7-segment display, a dash after menu and submenu codes is used to differentiate them from parameter codes.

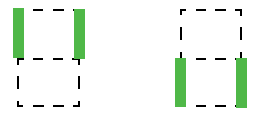
Example: **[Application function]** FUn- menu, **[Acceleration]** ACC parameter

Selection of Multiple Assignments for One Parameter

Example: List of group 1 warning in **[Inputs / Outputs]** I_O- menu

A number of warnings can be chosen by selecting them as follows.

The digit on the right indicates:



The same principle is used for all multiple selections.

Cyber Security

Overview

Cyber Security is a branch of network administration that addresses attacks on or by computer systems and through computer networks that can result in accidental or intentional disruptions.

The objective of Cyber Security is to help provide increased levels of protection for information and physical assets from theft, corruption, misuse, or accidents while maintaining access for their intended users.

No single Cyber Security approach is adequate. Schneider Electric recommends a defense-in-depth approach. Conceived by the **National Security Agency** (NSA), this approach layers the network with security features, appliances, and processes.

The basic components of this approach are:

- Risk assessment
- A security plan built on the results of the risk assessment
- A multi-phase training campaign
- Physical separation of the industrial networks from enterprise networks using a demilitarized zone (DMZ) and the use of firewalls and routing to establish other security zones
- System access control
- Device hardening
- Network monitoring and maintenance

This chapter defines the elements that help you configure a system that is less susceptible to cyber attacks.

For detailed information on the defense-in-depth approach, refer to the TVDA: **How Can I Reduce Vulnerability to Cyber Attacks in the Control Room (STN V2)** on the Schneider Electric website.

To submit a Cyber Security question, report security issues, or get the latest news from Schneider Electric, visit the Schneider Electric website.

Potential Risks and Compensating Controls

Address potential risks using these compensating controls:

Area	Issue	Risk	Compensating controls
User accounts.	Default account settings are often the source of unauthorized access by malicious users.	If you do not change default password or disable the user access control, unauthorized access can occur.	Ensure User access control is enabled on all the communication ports and change the default passwords to help reduce unauthorized access to your device.
Secure protocols.	The device does not have the capability to transmit data encrypted using these protocols: • Modbus serial • Modbus TCP • EtherNet/IP • SNMP	If a malicious user gained access to your network, they could intercept communication.	For transmitting data over internal network, physically or logically segment your network. For transmitting data over external network, encrypt protocol transmissions over all external connections using an encrypted tunnel, TLS wrapper or a similar solution.

Data Flow Restriction

To secure the access to the drive and limit the data flow, the use of a firewall device is required.

ConneXium Tofino Firewall Product

The ConneXium TCSEFEA Tofino Firewall is a security appliance that provides levels of protection against cyber threats for industrial networks, automation systems, SCADA systems, and process control systems.

This Firewall is designed to permit or deny communications between devices connected to the external network connection of the Firewall and the protected devices connected to the internal network connection.

The Firewall can restrict network traffic based on user defined rules that would permit only authorized devices, communication types and services.

The Firewall includes built-in security modules and an off-line configuration tool for creating secure zones within an industrial automation environment.

Backing-up and Restoring the Software Configuration

To protect your data, Schneider Electric recommends backing-up the device configuration and keeping your backup file in a secure place. The backup is available in the device DTM, using **load from device** and **store to device** functions.

Remote Access to the Drive

When remote access is used between a device and the drive, ensure your network is secure (VPN,Firewall…).

Machines, controllers, and related equipment are usually integrated into networks. Unauthorized persons and malware may gain access to the machine as well as to other devices on the network/fieldbus of the machine and connected networks via insufficiently secure access to software and networks.

⚠WARNING

UNAUTHORIZED ACCESS TO THE MACHINE VIA SOFTWARE AND NETWORKS

- In your hazard and risk analysis, consider all hazards that result from access to and operation on the network/fieldbus and develop an appropriate cyber security concept.
- Verify that the hardware infrastructure and the software infrastructure into which the machine is integrated as well as all organizational measures and rules covering access to this infrastructure consider the results of the hazard and risk analysis and are implemented according to best practices and standards covering IT security and cyber security (such as: ISO/IEC 27000 series, Common Criteria for Information Technology Security Evaluation, ISO/ IEC 15408, IEC 62351, ISA/IEC 62443, NIST Cybersecurity Framework, Information Security Forum - Standard of Good Practice for Information Security, SE recommended Cybersecurity Best Practices*).
- Verify the effectiveness of your IT security and cyber security systems using appropriate, proven methods.

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

(*) : SE Recommended Cybersecurity Best Practices can be downloaded on SE.com.

Control Command Restriction

To prevent unauthorized use of the command of the drive, it is possible to grant access to a limited number of IP address using the IP master parameter.

The parameter IP Master defines which device can command with the device. This parameter is available in the device DTM.

Deactivation of Unused Functions

To avoid unauthorized access, it is advisable to deactivate unused functions.

Example: Fast Device Replacement if Ethernet option module is used.

Password

With Ethernet and Profinet option module, Ethernet channels and Profinet channels, allowing the access to the configuration of the drive, are secured by a password. The password is required in case of access via PC software tools provided by Schneider Electric (such as SoMove FDT / DTM).

The ethernet password must contain:

- A total of eight characters
- At least one upper-case letter
- At least one lower-case letter
- At least one special character (for example, @, #, $)
- No blank character

The figure below displays the first connection a dialog box requiring the modification of the default password. This dialog box continues to be displayed until a password is defined.

Additionally:

- The system can be secured with a drive password 4. **[Password]** COD-, page 397 to access the drive configuration and parameter visibility.
- The device topology can be secured with a password . These passwords must contain four digits.

  NOTE: After five unsuccessful login attempts, the access must be reactivated by the administrator.

Schneider Electric recommends to:

- Modify the password every 90 days
- Use a dedicated password (not related to your personal password)

  NOTE: No responsibility is assumed by Schneider Electric for any consequences if anyone hacks your product password and if you use the same password for personal usage.

Setup

What's in This Chapter

Steps for Setting-Up the Drive

① Refer to the installation manual, page 11.

② Apply input power to the drive, but do not give a run command.

③ Configure:

- The nominal frequency of the motor **[Motor Standard]** bFr , page 98 if this is not 50 Hz.
- The motor parameters in the **[Motor control]** drC- , page 121 menu, only if the factory configuration of the drive is not suitable.
- The application functions in the **[Input/Output]** I-O- , page 145 menu, the **[Command]** CtL- Access, page 188 menu, and the **[Application function]** Fun- , page 203 menu, only if the factory configuration of the drive is not suitable.

④ In the **[Settings]** SEt- menu, adjust the following parameters:

- **[Acceleration]** ACC , page 100 and **[Deceleration]** dEC , page 101.
- **[Low Speed]** LSP , page 101 and **[High Speed]** HSP , page 101.
- **[Motor Th Current]** ItH , page 100.

⑤ Start the drive.

Drive systems may perform unexpected movements because of incorrect wiring, incorrect settings, incorrect data or other errors.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Carefully install the wiring in accordance with the EMC requirements.
- Do not operate the product with unknown or unsuitable settings or data.
- Perform a comprehensive commissioning test.

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

Tips

- Before beginning programming, complete the customer setting tables. See parameter code index, page 427.
- Use the **[Restore Configuration]** FCS 1.3.2 **[Factory settings]** FCS-, page 90 parameter to return to the factory settings at any time.
- To locate the description of a function quickly, use the index of functions, page 425.

- Before configuring a function, read carefully the Function compatibility section.

  NOTE: The following operations must be performed for optimum drive performance in terms of accuracy and response time:

  - Enter the values indicated on the motor nameplate in the **[Motor control]** drC- , page 121 menu.
  - Perform auto-tuning with the motor cold and connected using the **[Autotuning]** tUn , page 100 parameter.

Initial Steps

If the drive was not connected to mains for an extended period of time, the capacitors must be restored to their full performance before the motor is started.

NOTICE
REDUCED CAPACITOR PERFORMANCE • Apply mains voltage to the drive for one hour before starting the motor if the drive has not been connected to mains for the specified periods of time.(1) • Verify that no Run command can be applied before the period of one hour has elapsed. • Verify the date of manufacture if the drive is commissioned for the first time and run the specified procedure if the date of manufacture is more than 12 months in the past. **Failure to follow these instructions can result in equipment damage.**

(1) Period of time:

- 12 months at a maximum storage temperature of +50°C (+122°F)
- 24 months at a maximum storage temperature of +45°C (+113°F)
- 36 months at a maximum storage temperature of +40°C (+104°F)

If the specified procedure cannot be performed without a Run command because of internal mains contactor control, perform this procedure with the power stage enabled, but the motor being at a standstill so that there is no appreciable mains current in the capacitors.

Before Powering up the Drive

⚠WARNING
UNANTICIPATED EQUIPMENT OPERATION Before switching on the device, verify that no unintended signals can be applied to the digital inputs that could cause unintended movements. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Drive Locked in Blocking State

The drive is in a blocking state and displays **[Freewheel Stop]** nSt , If a Run command such as Run forward, Run reverse, DC injection is still active during:

- a product reset to the factory settings,
- a manual **Fault Reset** using **[Fault Reset Assign]** rSF ,

- a manual **Fault Reset** by applying a product switched off and on again,
- a stop command given by a channel that is not the active channel command (such as Stop key of the display terminal in 2/3 wires control).

It is necessary to deactivate all active Run commands prior to authorizing a new Run command.

Mains Contactor

NOTICE

RISK OF DAMAGE TO THE DRIVE

Do not switch on the drive at intervals of less than 60 s.

Failure to follow these instructions can result in equipment damage.

Using a Motor with a Lower Rating or Dispensing with a Motor Altogether

With the factory settings, the motor output phase loss detection is active: **[Output phase loss]** oPL is set to **[Yes]** YES.

For commissioning tests or maintenance phase, deactivate the motor output phase loss detection (**[Output phase loss]** oPL = **[No]** nO) to avoid the usage of a motor with the same rating as the drive.

This can prove particularly useful if very large drives are being tested with a small motor.

Set **[Motor control type]** Ctt , page 121, to **[Standard]** Std in **[Motor control]** drC-.

NOTICE

MOTOR OVERHEATING

Install external thermal monitoring equipment under the following conditions:

- If a motor with a nominal current of less than 20% of the nominal current of the drive is connected.
- If you use the function Motor Switching.

Failure to follow these instructions can result in equipment damage.

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

If output phase monitoring is disabled, phase loss and, by implication, accidental disconnection of cables, are not detected.

- Verify that the setting of this parameter does not result in unsafe conditions.

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

Software Enhancements

Overview

Since the ATV320 was first launched, it has benefited from the addition of several new functions. The software version has been updated to V3.5IE46.

Although this documentation relates to version V3.5IE46, it can still be used with earlier versions.

Enhancements Made

Comparison	Enhancements
V3.2IE43 to V3.5IE46	Software improvement.
V2.9IE40 to V3.2IE43	Improvements related to cybersecurity. By default, user authentication is necessary to connect to the drive via PC software tools, such as SoMove-DTM (using Modbus TCP communication through Ethernet).**[User authentication]** SEC- menu has been added in **[Communication module]** Cbd- menu. For more information refer to DTM online help. **NOTE:** To fully support this evolution with Ethernet module (respectively Profinet module), the minimum firmware version of Ethernet module (respectively Profinet module) must be V1.15IE19 (respectively V1.9IE19).
V2.9IE37 to V2.9IE40	Software improvement (such as ATV logic timer).
V2.9IE36 to V2.9IE37	Graphic Display Terminal (VW3A1111) is supported by ATV320. Some fixed bugs (such as untimely detected SAFF errors).
V2.9IE34 to V2.9IE36	Software improvement.
V2.7IE32 to V2.9IE34	Support of ATV320 IP66 offer. New parameter for the identification of the drive via fieldbus (refer to **[Fieldbus Identifier Sel]** nEid). Fallback mode on Analog Output AO1 (refer to **[Enable AQ1 fallback]** AoFI). Software improvement.
V2.7IE30 to V2.7IE32	Software improvement.
V2.7IE28 to V2.7IE30	Support of ATV320 600V - 3phase – Compact (ATV320●●●S6C). Software improvement.
V2.7IE26 to V2.7IE28	Software improvement.
V2.7IE25 to V2.7IE26	Software improvement.
V2.7IE23 to V2.7IE25	Support of ATV320 200V - 3phase – Compact (ATV320●●●M3C). Software improvement.
V2.7IE23	First version

For more information related to software improvement on each version, contact your Customer Care Centre.

Programming

What's in This Part

Unsuitable settings or unsuitable data or unsuitable wiring may trigger unintended movements, trigger signals, damage parts and disable monitoring functions.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Only start the system if there are no persons or obstructions in the zone of operation.
- Verify that a functioning emergency stop push-button is within reach of all persons involved in the operation.
- Do not operate the product with unknown settings or data.
- Verify that the wiring is appropriate for the settings.
- Never modify a parameter unless you fully understand the parameter and all effects of the modification.
- When commissioning, carefully run tests for all operating states, operating conditions and potential error situations.
- Anticipate movements in unintended directions or oscillation of the motor.

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

1.1 [Reference speed] rEF-

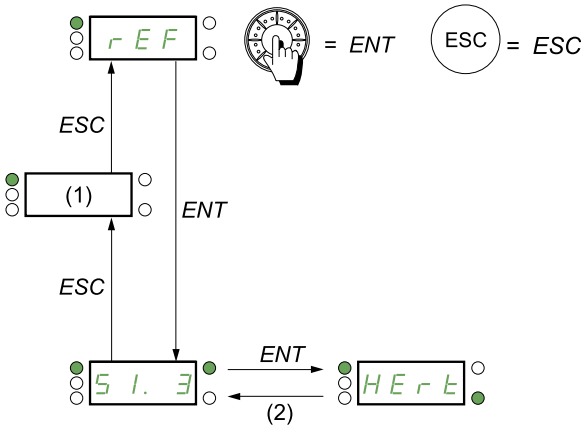
Introduction

Use the reference mode to monitor and, if the reference channel is the analog input 1 (**[Ref Freq Channel 1]** Fr1, page 188 set to **[AI Virtual 1]** AIV1), adjust the actual reference value by modifying the analog input voltage value.

If local control is enabled (**[Ref Freq Channel 1]** Fr1, page 188 set to **[HMI]** LCC), the jog dial or the Up/Down navigation keys on the remote display terminal acts as a potentiometer to change the reference value up and down within the limit preset by other parameters (**[Low Speed]** LSP or **[High Speed]** HSP).

There is no need to press the ENT key to confirm the change of the reference.

Organization Tree



Value – Unit

1. Depending on the active reference channel. Possible values:
   AIV1, LFr, MFr, rP1, FrH, rPC
2. 2 s or ESC

NOTE: Displayed parameter value and unit of the diagram are given as examples.

Access

Parameters described below can be accessed by: dr1 ➡ rEF

About This Menu

Displayed parameters depend on drive 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.

: Setting of this parameter can be done during operation or when stopped.

1.1 [Reference speed] rEF-

Displayed parameters depend on drive settings.

HMI label	Settings	Factory setting
[AIV1 Image input] AIV1 ★ (1)	0 to 100% of HSP-LSP	0%
AIV1 Image input, first virtual AI value. This parameter allows to modify the frequency reference with the embedded jog dial.		
[Ref Frequency] LFr ★ (1)	-599 to +599 Hz	0 Hz
Reference frequency (signed value). This parameter allows to modify the frequency reference with the remote HMI.		
[Multiplying coeff.] MFr ★	0 to 100%	100%
Multiplying coefficient, can be accessed if **[Ref Freq 2 Multiply] [Ref Freq 3 Multiply]** MA2, MA3 has been assigned to the graphic terminal.		
[Internal PID ref] rPI ★ (1)	0 to 32,767	150
Internal PID reference This parameter allows to modify the PID internal reference with the jog dial. Internal PID reference is visible if **[PID feedback Assign]** PIF is not set to **[No]** no.		
[Pre-Ramp Ref Freq] FrH ★	-599 to +599 Hz	–
Reference frequency before ramp (signed value). Actual frequency reference applied to the motor regardless of which reference channel has been selected. This parameter is in read-only mode. Frequency reference is visible if the command channel is not HMI or virtual AI.		
[PID reference] rPC ★	0 to 65,535	–
PID reference PID: Setpoint value. PID reference is visible if **[PID feedback Assign]** PIF is not set to **[No]** no.		

(1) It is not necessary to press the ENT key to confirm the modification of the reference.

1.2 [MONITORING] MON-

What's in This Chapter

Introduction

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

Some functions have numerous parameters. To clarify programming and avoid having to scroll through endless parameters, these functions have been grouped in submenus. Like menus, submenus are identified by a dash after their code.

When the drive is running, the value displayed is one of the monitoring parameters. By default, the value displayed is the input frequency reference **[Pre-Ramp Ref Freq]** FRH parameter , page 49).

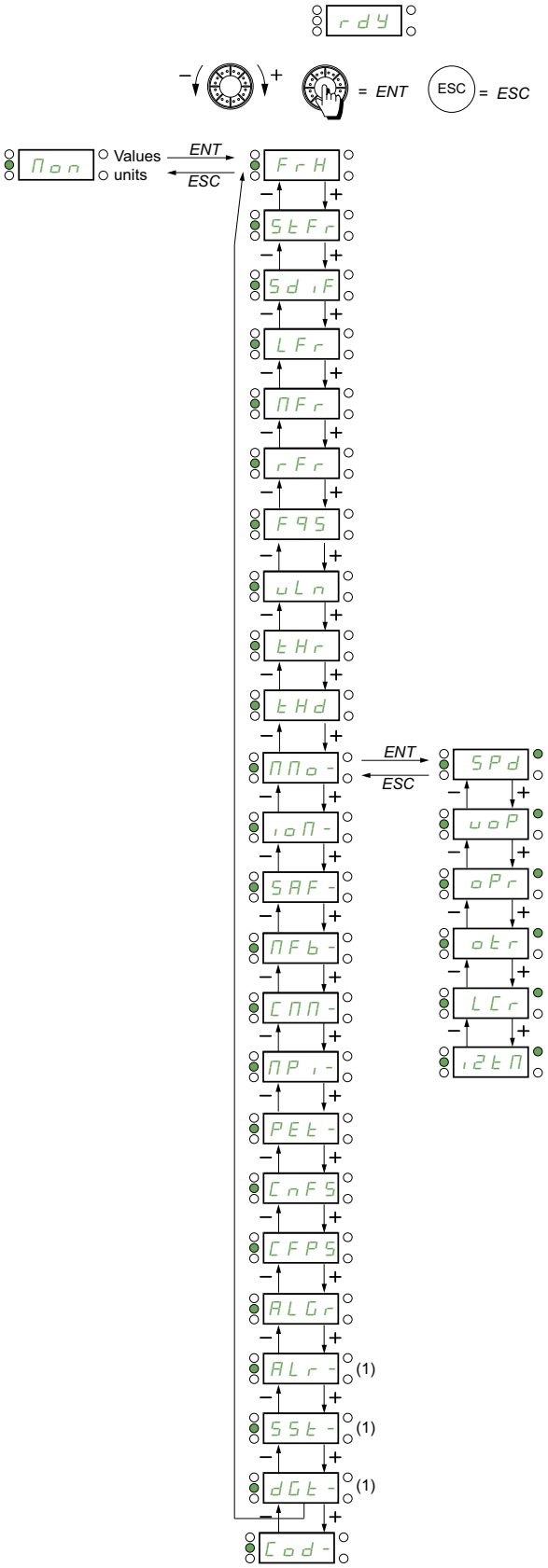
While the value of the new monitoring parameter required is being displayed, press the jog dial key for the second time to display the units or press and hold down the jog dial (OK) again (for 2 seconds) to confirm the change of monitoring parameter and store it. From then on, it is the value of this parameter that is displayed during operation (even after powering down).

Unless the new choice is confirmed by pressing and holding down ENT again, the display reverts to the previous parameter after powering down.

> **NOTE:** After the drive has been turned off or following a loss of supply mains, the parameter displayed is the drive status (example: **[Ready]** RDY). The selected parameter is displayed following a run command.

Organization Tree

Displayed parameters of the diagram are given as examples.



(1) Visible only with graphic display terminal.

Access

Parameters described below can be accessed by: drI → Mon

About This Menu

Displayed parameters depend on drive 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.

(↻) : Setting of this parameter can be done during operation or when stopped.

1.2 [MONITORING] Mon-

HMI label	Settings	Factory setting
[AIV1 Image input] AIV1 (↻)	[%]	—
AIV1 Image input, First virtual AI value. This parameter is read-only. It enables you to display the speed reference applied to the motor.		
[Pre-Ramp Ref Freq] FrH	[Hz]	—
Reference frequency before ramp (signed value). This parameter is read-only. It enables you to display the speed reference applied to the motor, regardless of which reference channel has been selected.		
[Stator frequency] StFr	[Hz]	—
Stator frequency, displays the estimated stator frequency in Hz (signed value).		
[Stator Freq Consist] SdtF	[Hz]	—
Stator frequency Consistency, displays the difference between the estimated stator frequency and the internal computed stator frequency in Hz. For more information refer to the ATV320 safety functions manual Related Documents, page 11.		
[Ref Frequency] LFr	[Hz]	—
Reference frequency (signed value). This parameter only appears if the function has been enabled. It is used to change the speed reference from the remote control. ENT does not have to be pressed to enable a change of reference.		
[Multiplying coeff.] MFr ★ (↻)	[%]	—
Multiplying coefficient. It can be accessed if **[Ref Freq 2 Multiply] [Ref Freq 3 Multiply]** MA3 MA2 has been assigned.		
[Measured output fr.] MMF	[Hz]	—
Measured output freq. (signed value). The measured motor speed is displayed if the speed monitoring module has been inserted (VW3A3620).		
[Motor Frequency] rFr	[Hz]	—
Motor frequency (signed value)		
[Measured Freq] F95 ★	[Hz]	—
Pulse input measured frequency		
[Mains Voltage] ULn	[V]	—

HMI label	Settings	Factory setting
Mains voltage. Based on DC bus measurement, motor running or stopped.		
[Motor Therm State] tHr	[%]	—
Motor thermal state. 100% = Nominal thermal state, 118% = "OLF" threshold (motor overload).		
[Drive Therm State] tHd	[%]	—
Drive thermal state. 100% = Nominal thermal state, 118% = "OHF" threshold (drive overload).		

[MONIT. MOTOR] MMO-

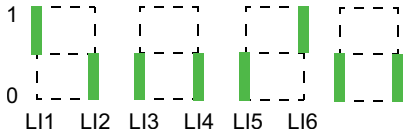
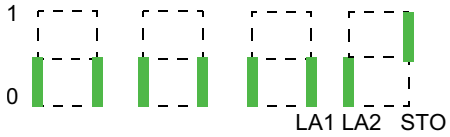
Access
Parameters described below can be accessed by: dr1 ➡ MON

HMI label	Settings	Factory setting
[Motor Speed] SPd	[rpm]	—
Motor speed in rpm (Estimated value)		
[Motor voltage] uoP	[V]	—
Motor voltage (Estimated value)		
[Mot Mech Power in %] oPr	[%]	—
Motor power in %. Output power monitoring (100% = nominal motor power, estimated value based on current measure).		
[Motor torque] otr	[%]	—
Motor torque. Output torque value (100% = nominal motor torque, estimated value based on current measure).		
[Motor Current] LCr	[A]	—
Motor current (Estimated value)		
[I2t overload level] I2tM	[%]	—
Monitoring of I2t overload level. This parameter can be accessed if **[I²t model activation]** I2tA is set to **[Yes]** YES.		

[I/O Map] IOM-

Access
Parameters described below can be accessed by: dr1 ➡ MON ➡ IOM ➡ **[LOGIC INPUT CONF.]**

HMI label	Settings	Factory setting
[Digital Input Map] LIA-		
Logic input functions.		
[DI1 assignment] LI1A	—	—
DI1 assignment Read-only parameters, cannot be configured. It displays all the functions that are assigned to the logic input to check for multiple assignments.		

HMI label	Settings	Factory setting
If no functions have been assigned, **[No]** no is displayed. Use the jog dial to scroll through the functions. The use of graphic display terminal allows to see the delay **[DI1 Delay]** L Id. Possible values are the same than in configuration menu .		
[DI2 assignment] L2A to **[DI6 assignment]** L6A **[DA1 assignment]** LA1A **[DA2 assignment]** LA2A	—	—
All the logic inputs available on the drive are processed as in the example for LI1 above.		
[State of logic inputs LI1 to LI6] LIS1		
It can be used to visualize the state of logic inputs LI1 to LI6 (display segment assignment: high = 1, low = 0).  Example above: LI1 and LI6 are at 1; LI2 to LI5 are at 0.		
[State of Safe Torque Off] LIS2	—	—
It can be used to visualize the state of LA1, LA2 and STO (Safe Torque Off) (display segment assignment: high = 1, low = 0).  Example above: LA1 and LA2 are at 0; STO (Safe Torque Off) is at 1.		

[Analog inputs image] AIA-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ IOM ➜ AIA

Analog input functions.

HMI Label	Settings	Factory setting
[AI1] AI1C	[V]	—
Physical value AI1. AI1 customer image: Value of analog input 1.		
[AI1 assignment] AI1A	—	—

HMI Label	Settings	Factory setting
AI1 assignment		
If no functions have been assigned, **[No]** nO is displayed.		
Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.		
[No] nO: Not assigned		
[Ref Freq 1 Config] Fr1: Reference source 1		
[Ref Freq 2 Config] Fr2: Reference source 2		
[Summing Input 2] SA2: Summing reference 2		
[PID feedback Assign] PIF: PI feedback (PI control)		
[Ref Torque Assign] tAA: Torque limitation: Activation by an analog value		
[Subtract Ref Freq 2] dA2: Subtracting reference 2		
[Manual PID reference] PIM: Manual speed reference of the PI(D) regulator (auto-man)		
[Speed ref. assign.] FPI: Speed reference of the PI(D) regulator (predictive reference)		
[Summing Input 3] SA3: Summing reference 3		
[Ref.1B channel] Fr1b: Reference source 1B		
[Subtract Ref Freq 3] dA3: Subtracting reference 3		
[Forced Local Chan] FLoC: Forced local reference source		
[Ref Freq 2 Multiply] MA2: Multiplying reference 2		
[Ref Freq 3 Multiply] MA3: Multiplying reference 3		
[Weight Sensor Assign] PES: External weight measurement function		
[IA01 Assignment] IA01: Functions blocks: Analog Input 01		
....		
[IA10 Assignment] IA10: Functions blocks: Analog Input 10		
[AI1 Min. Value] uIL1	[V]	—
AI1 voltage scaling parameter of 0%		
[AI1 Max Value] uIH1	[V]	—
AI1 voltage scaling parameter of 100%		
[AI1 filter] AI1F	[s]	—
AI1 filter. Interference filtering cut-off time of the low-filter.		
[AI2] AI2C	[V]	—
Physical value AI2. AI2 customer image: Value of analog input 2.		
[AI2 Assignment] AI2A	—	—
AI2 assignment		
If no functions have been assigned, **[No]** nO is displayed.		
Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.		
Identical to **[AI1 assignment]** AI1A , page 51.		
[AI2 Min. Value] uIL2	[V]	—
AI2 voltage scaling parameter of 0%		
[AI2 Max value] uIH2	[V]	—

HMI Label	Settings	Factory setting
AI2 voltage scaling parameter of 100%		
[AI2 filter] AI2F	[s]	—
AI2 filter. Interference filtering cutoff time of the low-filter.		
[AI3] AI3C	[V]	—
Physical value AI3. AI3 customer image: Value of analog input 3.		
[AI3 Assignment] AI3A	—	—
AI3 assignment If no functions have been assigned, **[No]** NO is displayed. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter. Identical to **[AI1 assignment]** AI1A , page 51.		
[AI3 Min. Value] CrL3	[mA]	—
AI3 current scaling parameter of 0%		
[AI3 Max Value] CrH3	[mA]	—
AI3 current scaling parameter of 100%		
[AI3 filter] AI3F	[s]	—
AI3 filter. Interference filtering cutoff time of the low-filter.		

[Analog outputs image] AoA-

Access
Parameters described below can be accessed by: dr1 → Mon → ioM → AoA

Analog output functions.

Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.

HMI label	Settings	Factory setting
[AQ1] Ao1C	—	—
AQ1 physical value. AO1 customer image: Value of analog output 1.		
[AQ1 assignment] Ao1	—	—
AQ1 assignment If no functions have been assigned, **[No]** no is displayed. Identical to **[AQ1 assignment]** Ao1.		
[AQ1 min Output] uoL1 ★	[V]	—
AQ1 minimum output. Voltage scaling parameter of 0%. Can be accessed if **[AQ1 Type]** Ao1t is set to **[Voltage]** 10u.		
[AQ1 max Output] uoH1 ★	[V]	—
AQ1 maximum output. Voltage scaling parameter of 100%. Can be accessed if **[AQ1 Type]** Ao1t is set to **[Voltage]** 10u.		
[AQ1 min output] AoL1 ★	[mA]	—
AQ1 min output value. Current scaling parameter of 0%. Can be accessed if **[AQ1 Type]** Ao1t is set to **[Current]** 0A.		
[AQ1 max output] AoH1 ★	[mA]	—
AQ1 max output value. Current scaling parameter of 100%. Can be accessed if **[AQ1 Type]** Ao1t is set to **[Current]** 0A.		
[Scaling AQ1 Min] ASL1	[%]	—
Scaling AQ1 min		
[Scaling AQ1 Max] ASH1	[%]	—
Scaling AQ1 max		
[AQ1 Filter] Ao1F	[s]	—
AQ1 filter. Cutoff time of the low-filter.		

[Freq. signal image] FSI-

Access
Parameters described below can be accessed by: drI → Mon → IOM → FSI

Frequency signal image.

This menu is visible only on graphic display terminal.

HMI label	Settings	Factory setting
[RP input] PFrC	[Hz]	—
Custom filter pulse input. Following parameters are visible on the graphic display terminal by pressing the ENT key on the parameter.		
[RP assignment] PIA	—	—
Pulse input assignment. If no functions have been assigned, **[No]** no is displayed. Identical to **[AI1 assignment]** AI1A , page 51.		
[RP min value] PIL	[kHz]	—
Minimum pulse input. RP minimum value. Pulse input scaling parameter of 0%.		
[RP max value] PFr	[kHz]	—
RP maximum value. Pulse input scaling parameter of 100%.		
[RP filter] PFI	[ms]	—
RP filter. Interference filtering pulse input cutoff time of the low-filter.		

[MONIT. SAFETY] SAF-

Access
Parameters described below can be accessed by: drI → Mon → SAF

For more details on Integrated Safety Functions, please refer to dedicated Safety manual.

HMI label	Settings	Factory setting
[STO fct status] StoS	—	—
Safe torque Off function Status • **[Not active]** IdLE: ***Not active***, STO not in progress • **[Active]** Sto: ***Active***, STO in progress • **[Error]** FLt: ***Error***, SLS error detected		
[SLS status] SLSS	—	—
Safe limited speed status • **[Not configured]** no: ***Not configured***, SLS not configured • **[Idle]** IdLE: ***No activated***, SLS not in progress • **[SLS wait]** WAIt: ***SLS wait***, SLS waiting for activation • **[SLS Start]** Strt: ***SLS Start***, SLS in transient state • **[Safe ramp]** SSI: ***Safe ramp***, SLS ramp in progress • **[Spd limited]** SLS: ***Speed limited***, SLS speed limitation in progress • **[Safe stop]** Sto: ***Safe stop***, SLS safe torque off request in progress • **[Error]** FLt: ***Error***, SLS error detected		

HMI label	Settings	Factory setting
[SS1 status] SS1S	—	—
Safe stop 1 status • **[Not configured]** no: ***Not configured***, SS1 not configured • **[Idle]** idLE: ***No activated***, SS1 not in progress • **[Safe ramp]** SS1: ***Safe ramp***, SS1 ramp in progress • **[Safe stop]** Sto: ***Safe stop***, SS1 safe torque off request in progress • **[Error]** FLt: ***Error***, SS1 error detected		
[SMS Status] SMSS	—	—
SMS Status, status of the Safe Maximum Speed safety function. • **[Not Set]** no: ***Not Set***, SMS not set • **[OFF]** oFF: ***OFF***, SMS active • **[Internal Error]** Ft1: ***Internal error***, SMS internal detected error • **[Max Speed]** Fto: ***Maximum speed reached***		
[GDL Status] GdLS	—	—
GDL Status, status of the Guard Door Locking safety function. • **[Not Set]** no: ***Not Set***, GDL not set • **[OFF]** oFF: ***OFF***, GDL inactive • **[Short Delay]** Std: ***Short delay In Progress*** • **[Long Delay]** LGd: ***Long delay In Progress*** • **[Active]** on: ***Active***, GDL active • **[Last Error]** LFt: ***Last error occurred***, GDL internal detected error		
[Safety fct ErrorReg] SFFE	—	—
Safety function error register • Bit0 = 1: Logic inputs debounce time-out (verify value of debounce time LIDT according to the application) • Bit1 Reserved • Bit2 = 1: Motor speed sign has changed during SS1 ramp • Bit3 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp. • Bit4: Reserved • Bit5: Reserved • Bit6 = 1: Motor speed sign has changed during SLS limitation • Bit7 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp. • Bit8: Reserved • Bit9: Reserved • Bit10: Reserved • Bit11: Reserved • Bit12: Reserved • Bit13 = 1: Not possible to measure the motor speed (verify the motor wiring connection) • Bit14 = 1: Motor ground short-circuit detected (verify the motor wiring connection) • Bit15 = 1: Motor phase to phase short-circuit detected (verify the motor wiring connection)		

[Monit. Fun. Blocks] MFb-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ MFb

For more details on function blocks, please refer to dedicated function blocks manual.

HMI label	Settings	Factory setting
[FB Status] FbSt	—	—
FunctionBlock status • **[Not Active]** idLE: ***Not active***, idle state • **[Check prog.]** CHEC: ***Check program*** • **[Stop]** StoP: ***Stop*** • **[Init]** in it: ***Init***, initialization state • **[Run]** run: ***Run***, RUN state • **[Error]** Err: ***Error***, Error state		
[FB Error] FbFt	—	—
FunctionBlock error Status of the function blocks execution. • **[No]** no: ***No***, no error detected • **[Internal]** int: ***Internal***, internal error detected • **[Binary file]** bin: ***Binary file***, binary error detected • **[Intern para.]** inP: ***Internal parameters***, internal parameter error detected • **[Para. RW]** PAr: ***Parameter access on read or write***, parameter access error detected • **[Calculation]** CAL: ***Calculation***, calculation error detected • **[AUX TO]** toAu: ***TimeOut AUX task*** • **[Synch TO]** toPP: ***TimeOut in synchronous tasks***, timeOut in PRE/POST task • **[Bad ADLC]** AdL: ***ADLC with bad parameter*** • **[Input assig.]** in: ***Inputs assignment***, input not configured		

[FB Identification] Fb1-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ Fb1

HMI label	Settings	Factory setting
[Program version] bVEr ★	—	—
Program version Can be accessed if **[FB Status]** FbSt is not set to **[Idle]** idLE.		
[Program size] bnS ★	—	—
Program size Program file size. Can be accessed if **[FB Status]** FbSt is not set to **[Idle]** idLE.		
[Prg. format version] bnV	—	—
Program format version Binary format version of the drive. Can be accessed if **[FB Status]** FbSt is not set to **[Idle]** idLE.		

HMI label	Settings	Factory setting
[Catalogue version] CtV	—	—
Catalogue version		

[Communication map] CMM-

Access
Parameters described below can be accessed by: drI ➜ Mon ➜ CMM

This menu is visible only on graphic display terminal, except for **[Com. scanner input map]** ISA- and **[Com scan output map]** oSA- menus.

HMI label	Settings	Factory setting
[Command Channel] CMdC	—	—
Command channel • **[Terminals]** tEr : ***Terminal block*** • **[HMI]** LCC : ***Local HMI***, graphic display terminal or remote display terminal • **[MODBUS]** Mdb : ***Modbus communication***,integrated Modbus • **[CANOpen]** CAn : ***CANOpen***, integrated CANopen® • **[+/- speed]** tUd : ***Increase/Decrease speed*** • **[Com. Module]** nEt : ***Ext. communication module***, communication module (if inserted) • **[PC tool]** P5) : ***PC tool***		
[Cmd Register] CMd	—	—
Command register DRIVECOM command register value. **[Profile]** CHCF , page 189 is not set to **[I/O profile]** IO. Possible values in CiA402 profile, separate or not separate mode. • Bit 0: "Switch on"/Contactor command • Bit 1: "Disable voltage"/Authorization to supply AC power • Bit 2: "Quick stop"/Emergency stop • Bit 3: "Enable operation"/Run command • Bit 4 to Bit 6: Reserved (set to 0) • Bit 7: "Fault reset"/detected error acknowledgment active on 0 to 1 rising edge • Bit 8: Halt Stop according to the **[Type of stop]** Stt parameter without leaving the operation enabled state • Bit 9: Reserved (set to 0) • Bit 10: Reserved (set to 0) • Bit 11 to Bit 15: Can be assigned to a command Possible values in the IO profile. On state command **[2-Wire Control]** 2C. Bit 0: Forward (on state) command • = 0: No forward command • = 1: Forward command The assignment of bit 0 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bit 0 (**[CD00]** CdO0) is only active if the channel of this control word is active. Bit 1 to Bit 15: Can be assigned to commands.		

HMI label	Settings	Factory setting
On edge command **[3-Wire Control]** 3C. Bit 0: Stop (run authorization). • = 0: Stop • = 1: Run is authorized on a forward or reverse command Bit 1: Forward (on 0 to 1 rising edge) command The assignment of bits 0 and 1 cannot be modified. It corresponds to the assignment of the terminals. It can be switched. Bits 0 (**[CD00]** CD00) and 1 (**[CD01]** CD01) are only active if the channel of this control word is active. Bit 2 to Bit 15: Can be assigned to commands		
[Ref Freq Channel] rFCC	—	—
Channel for reference frequency • **[Terminals]** tEr: ***Terminal block*** • **[Local]** LOC: ***Local***, jog dial • **[HMI]** LCC: ***Local HMI***, graphic display terminal or remote display terminal: • **[MODBUS]** Mdb: ***Modbus communication***, integrated Modbus • **[CANOpen]** CAn: ***CANOpen***, integrated CANopen® • **[+/- speed]** tUd: ***Increase/Decrease speed*** • **[Com. Module]** nEt: ***Ext. communication module***, communication module (if inserted) • **[PC tool]** PS: ***PC tool***		
[Pre-Ramp Ref Freq] FrH	[Hz]	—
Reference frequency before ramp		

HMI label	Settings	Factory setting
[Status Register] EtA	—	—

Status Register

DRIVECOM status word.

Possible values in CiA402 profile, separate or not separate mode.

- Bit 0: "Ready to switch on", awaiting power section supply mains
- Bit 1: "Switched on", ready
- Bit 2: "Operation enabled", running
- Bit 3: "Fault"
  - = 0: No error detected
  - = 1: Detected error
- Bit 4: "Voltage enabled", power section supply mains present
  - = 0: Power section supply mains absent
  - = 1: Power section supply mains present

  When the drive is powered by the power section only, this bit is always at 1.
- Bit 5: Quick stop/Emergency stop
- Bit 6: "Switched on disabled", power section supply mains locked
- Bit 7: Alarm
  - = 0: No alarm
  - = 1: Alarm
- Bit 8: Reserved (= 0)
- Bit 9: Remote: command or reference via the network
  - = 0: Command or reference via the graphic display terminal or the remote display terminal
  - = 1: Command or reference via the network
- Bit 10: Target reference reached
  - = 0: The reference is not reached
  - = 1: The reference has been reached

  When the drive is in speed mode, this is the speed reference.
- Bit 11: "Internal limit active", reference outside limits
  - = 0: The reference is within the limits
  - = 1: The reference is not within the limits

  When the drive is in speed mode, the limits are defined by the **[Low Speed]** LSP and **[High Speed]** HSP parameters.
- Bit 12 and Bit 13: Reserved (= 0)
- Bit 14: "Stop key", STOP via stop key
  - = 0: STOP key not pressed
  - = 1: Stop triggered by the STOP key on the graphic display terminal or the remote display terminal
- Bit 15: "Direction", direction of rotation
  - = 0: Forward rotation at output
  - = 1: Reverse rotation at output

The combination of bits 0, 1, 2, 4, 5 and 6 defines the state in the DSP 402 state chart (see the Communication manuals).

Possible values in the I/O profile.

NOTE: The value is identical in the CiA402 profile and the I/O profile. In the I/O profile, the description of the values is simplified and does not refer to the CiA402 (Drivecom) state chart.

- Bit 0: Reserved (= 0 or 1)
- Bit 1: Ready

HMI label	Settings	Factory setting
◦ = 0: Not ready ◦ = 1: Ready • Bit 2: Running ◦ = 0: The drive does not start if a reference other than zero is applied. ◦ = 1: Running, if a reference other than zero is applied, the drive can start. • Bit 3: Fault ◦ = 0: No error detected . ◦ = 1: Detected error • Bit 4: Power section supply mains present ◦ = 0: Power section supply mains absent ◦ = 1: Power section supply mains present • Bit 5: Reserved (= 1) • Bit 6: Reserved (= 0 or 1) • Bit 7: Alarm ◦ = 0: No alarm ◦ = 1: Alarm • Bit 8: Reserved (= 0) • Bit 9: Command via a network ◦ = 0: Command via the terminals or the graphic display terminal ◦ = 1: Command via a network • Bit 10: Reference reached ◦ = 0: The reference is not reached ◦ = 1: The reference has been reached • Bit 11: Reference outside limits ◦ = 0: The reference is within the limits ◦ = 1: The reference is not within the limits When the drive is in speed mode, the limits are defined by LSP and HSP parameters. • Bit 12 and Bit 13: Reserved (= 0) • Bit 14: Stop via STOP key ◦ = 0: STOP key not pressed ◦ = 1: Stop triggered by the STOP key on the graphic display terminal or the remote display terminal • Bit 15: Direction of rotation ◦ = 0: Forward rotation at output ◦ = 1: Reverse rotation at output		

[Modbus network diag] Mnd-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ COM ➜ Mnd

Modbus network diagnostic.

HMI label	Settings	Factory setting
[COM LED] Mdbl	—	—
COM LED. View of the Modbus Communication.		

HMI label	Settings	Factory setting
[Mdb Frame Nb] nICt	—	—
Mdb frame number. Modbus number of processed frames.		
[Mdb CRC errors] nIEC	—	—
Mdb CRC errors. Modbus network CRC errors counter.		

[Com. scanner input map] iSA-

Access
Parameters described below can be accessed by: dri ➡ Mon ➡ CNN ➡ iSA

Used for CANopen® and Modbus Network.

HMI label	Settings	Factory setting
[Com Scan In1 val.] nM1	—	—
Com scan input 1 value		
[Com Scan In2 val.] nM2	—	—
Com scan input 2 value		
[Com Scan In3 val.] nM3	—	—
Com scan input 3 value		
[Com Scan In4 val.] nM4	—	—
Com scan input 4 value		
[Com Scan In5 val.] nM5	—	—
Com scan input 5 value		
[Com Scan In6 val.] nM6	—	—
Com scan input 6 value		
[Com Scan In7 val.] nM7	—	—
Com scan input 7 value		
[Com Scan In8 val.] nM8	—	—
Com scan input 8 value		

[Com scan output map] oSA-

Access
Parameters described below can be accessed by: dri ➡ Mon ➡ CNN ➡ oSA

HMI label	Settings	Factory setting
[Com Scan Out1 val.] nC1	—	—
Com scan output 1 value		
[Com Scan Out2 val.] nC2	—	—
Com scan output 2 value		

HMI label	Settings	Factory setting
[Com Scan Out3 val.] nC3	—	—
Com scan output 3 value		
[Com Scan Out4 val.] nC4	—	—
Com scan output 4 value		
[Com Scan Out5 val.] nC5	—	—
Com scan output 5 value		
[Com Scan Out6 val.] nC6	—	—
Com scan output 6 value		
[Com Scan Out7 val.] nC7	—	—
Com scan output 7 value		
[Com Scan Out8 val.] nC8	—	—
Com scan output 8 value		

[Command word image] C I-

Access
Parameters described below can be accessed by: dr I ➜ Mon ➜ CMM ➜ C I

Command word image: Only accessible via graphic display terminal.

HMI label	Settings	Factory setting
[Modbus Cmd] CMd1	—	—
Modbus command register		
[CANopen Cmd] CMd2	—	—
CANopen command register		
[COM. Module cmd.] CMd3	—	—
DrivecomCmdRegCom.. Communication module command word image.		

[Freq. ref. word map] r I-

Access
Parameters described below can be accessed by: dr I ➜ Mon ➜ CMM ➜ r I

Frequency reference image: Only accessible via graphic display terminal.

HMI label	Settings	Factory setting
[Modbus Ref Freq] LFr1	[Hz]	—
Modbus reference frequency		
[CAN Ref Freq] LFr2	[Hz]	—
CANopen reference frequency		

HMI label	Settings	Factory setting
[Com Module Ref Freq] LFr3	[Hz]	—
Communication module reference frequency		

[CANopen map] CnM-

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ CNM ➡ CnM

CANopen® image: Only accessible via graphic display terminal.

HMI label	Settings	Factory setting
[RUN LED] Con	—	—
RUN LED. View of the CANopen® RUN Led Status.		
[ERR LED] CAnE	—	—
ERR LED. View of the CANopen® Error Led Status.		
[PDO1 image] PO1–		
View of the RPDO1 and TPDO1.		
[Receive PDO1-1] rP11 ★	—	—
Receive PDO1-1. First frame of the received PDO1.		
[Receive PDO1-2] rP12 ★	—	—
Receive PDO1-2. Second frame of the received PDO1.		
[Receive PDO1-3] rP13 ★	—	—
Receive PDO1-3. Third frame of the received PDO1.		
[Receive PDO1-4] rP14 ★	—	—
Receive PDO1-4. Fourth frame of the received PDO1.		
[Transmit PDO1-1] tP11 ★	—	—
Transmit PDO1-1. First frame of the transmit PDO1.		
[Transmit PDO1-2] tP12 ★	—	—
Transmit PDO1-2. Second frame of the transmit PDO1.		
[Transmit PDO1-3] tP13 ★	—	—
Transmit PDO1-3. Third frame of the transmit PDO1.		
[Transmit PDO1-4] tP14 ★	—	—
Transmit PDO1-4. Fourth frame of the transmit PDO1.		
[PDO2 image] PO2 –		
View of the RPDO2 and TPDO2: Same structure as **[PDO1 image]** PO1 –.		
[Receive PDO2-1] rP21 ★	—	—
Receive PDO2-1. First frame of the received PDO2.		
[Receive PDO2-2] rP22 ★	—	—
Receive PDO2-2. Second frame of the received PDO2.		

HMI label	Settings	Factory setting
[Receive PDO2-3] rP23 ★	—	—
Receive PDO2-3. Third frame of the received PDO2.		
[Receive PDO2-4] rP24 ★	—	—
Receive PDO2-4. Fourth frame of the received PDO2.		
[Transmit PDO2-1] tP21 ★	—	—
Transmit PDO2-1. First frame of the transmit PDO2.		
[Transmit PDO2-2] tP22 ★	—	—
Transmit PDO2-2. Second frame of the transmit PDO2.		
[Transmit PDO2-3] tP23 ★	—	—
Transmit PDO2-3. Third frame of the transmit PDO2.		
[Transmit PDO2-4] tP24 ★	—	—
Transmit PDO2-4. Fourth frame of the transmit PDO2.		
[PDO3 image] PD3 –		
View of the RPDO3 and TPDO3: Same structure as **[PDO1 image]** PD1 –.		
[Receive PDO3-1] rP31 ★	—	—
Receive PDO3-1. First frame of the received PDO3.		
[Receive PDO3-2] rP32 ★	—	—
Receive PDO3-2. Second frame of the received PDO3.		
[Receive PDO3-3] rP33 ★	—	—
Receive PDO3-3. Third frame of the received PDO3.		
[Receive PDO3-4] rP34 ★	—	—
Receive PDO3-4. Fourth frame of the received PDO3.		
[Transmit PDO3-1] tP31 ★	—	—
Transmit PDO3-1. First frame of the transmit PDO3.		
[Transmit PDO3-2] tP32 ★	—	—
Transmit PDO3-2. Second frame of the transmit PDO3.		
[Transmit PDO3-3] tP33 ★	—	—
Transmit PDO3-3. Third frame of the transmit PDO3.		
[Transmit PDO3-4] tP34 ★	—	—
Transmit PDO3-4. Fourth frame of the transmit PDO3.		
[Canopen NMT state] nMtS	—	—
Canopen NMT state Drive NMT State of the CANopen® device. • **[Boot]** boot: ***On boot up*** • **[Stopped]** Stop: ***Stopped*** • **[Operation]** oPE: ***Operational*** • **[Pre-op]** PoPE: ***Pre operation***		
[Number of TX PDO] nbtP	—	—

HMI label	Settings	Factory setting
Number of TX PDO, number of transmit PDO.		
[Number of RX PDO] nbrP	—	—
Number of RX PDO, number of received PDO.		
[CANopen Error] ErCo	—	—
CANopen error, CANopen® error register (from 1 to 5).		
[RX Error Counter] rEC1	—	—
RX error counter, controller Rx error counter (not stored at power off).		
[TX Error Counter] tEC1	—	—
TX error counter, controller Tx error counter (not stored at power off).		

[MONIT. PI] MPI-

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ MPI

★: PID management. Visible if **[PID feedback Assign]** PIF is not set to **[No]** no.

HMI label	Settings	Factory setting
[Internal PID ref] rPI ★	—	—
Internal PID reference		
[PID Error] rPE ★	—	—
PID error		
[PID feedback] rPF ★	—	—
PID feedback		
[PID reference] rPC ★	—	—
PID reference. PID setpoint value via graphic display terminal.		
[PID Output] rPo	[Hz]	—
PID output. PID output value with limitation.		

[Power-On time] PET-

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ PEt

HMI label	Settings	Factory setting
[Consumption] APH	[Wh], [kWh], [MWh]	—
Power consumption. Energy consumption in Wh, kWh or MWh (accumulated consumption). If you read this parameter via fieldbus, the unit of this parameter is given by the parameter **[Unit]** un1. See the Communication Parameters file.		
[Motor Run Time] rtH	[s], [min], [h]	—

HMI label	Settings	Factory setting
Motor run time. Run elapsed time display (resetable) in seconds, minutes or hours (length of time the motor has been switched on). If you read this parameter via fieldbus, the unit of this parameter is given by the parameter **[Unit]** UNI. See the Communication Parameters file.		
[Power-on time] PTH	[s], [min], [h]	—
Power-on time. Power elapsed time display in seconds, minutes or hours (length of time the drive has been switched on). If you read this parameter via fieldbus, the unit of this parameter is given by the parameter **[Unit]** UNI. See the Communication Parameters file.		
[Counter Reset] rPr	—	—
Counter reset. Reset of run elapsed time. • **[No]** NO: ***No***, reset operation not in progress • **[Reset Consumption]** APH: ***Reset consumption counters***, clear **[Reset Consumption]** APH • **[Reset Run Time]** rTH: ***Reset run time***, clear **[Reset Run Time]** rTH • **[Reset Power On Time]** PTH:***Reset power ON time***, clear **[Reset Power On Time]** PTH		
[Config. active] CNFS	—	—
Active configuration • **[In progress]** NO: ***In progress***, transitory state (configuration changing) • **[Config. No.0]** CNF0: ***Configuration 0 active*** • **[Config. No.1]** CNF1: ***Configuration 1 active*** • **[Config. No.2]** CNF2: ***Configuration 2 active***		
[Used param. set] CFPS ★	—	—
Used parameter set Configuration parameter status (can be accessed if parameter switching has been enabled. • **[None]** NO: ***Not Assigned*** • **[Set No.1]** CFP1: ***Parameter set 1***, Parameter set 1 active • **[Set No.2]** CFP2: ***Parameter set 2***, Parameter set 2 active • **[Set No.3]** CFP3: ***Parameter set 3***, Parameter set 3 active		
[Warning groups] ALGr	—	—
Warning groups Current impacted alarm group numbers Group of alarms could be user defined in **[Inputs / Outputs]** I-O , page 145 . • **[— Groups Warning]** ---: ***No warning groups active*** • **[1– Groups Warning]** 1--: ***Warning group 1 active*** • **[-2- Groups Warning]** -2-: ***Warning group 2 active*** • **[12- Groups Warning]** 12-: ***Warning groups 12 active*** • **[–3 Groups Warning]** --3: ***Warning group 3 active*** • **[1-3 Groups Warning]** 1-3: ***Warning groups 1_3 active*** • **[-23 Groups Warning]** -23: ***Warning groups _23 active*** • **[123 Groups Warning]** 123: ***Warning groups 123 active***		
[Cust. output value] SPd1 or **[Cust. output value]** SPd2 or **[Cust. output value]** SPd3	—	—
Output value customer **[Cust. output value]** SPd1, **[Cust. output value]** SPd2 or **[Cust. output value]** SPd3 depending on the **[Scale factor display]** SdS parameter **[Cust. output value]** SPd3in the factory setting		

[Warnings] ALr-

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ ALr

HMI label	Settings	Factory setting
List of current alarms. If an alarm is present, a appears ✓ on the graphic display terminal. • **[No Warning]** noAL : ***No warning*** • **[PTC Fdbk Handling]** PtCL : ***PTC probe feedback handling*** • **[Ext Error assign]** EtF : ***External error assignment*** • **[Undervoltage Warning]** uSA: ***Undervoltage warning*** • **[Current Thd Reached]** CtA: ***Current threshold reached*** • **[Mot Freq High Thd]** FtA: ***Motor frequency high threshold reached*** • **[2nd Freq Thd Reached]** F2A: ***2nd frequency threshold reached*** • **[Ref Frequency Warning]** SrA: ***Reference frequency warning*** • **[Motor Therm Thd reached]** tSA: ***Motor thermal threshold reached*** • **[Mot2 Therm Thd reached]** tS2: ***Motor 2 thermal threshold reached*** • **[Mot3 Therm Thd reached]** tS3: ***Motor 3 thermal threshold reached*** • **[Preventive UnderV Active]** uPA: ***Preventive undervoltage active*** • **[High Speed Reached]** FLA: ***High speed reached*** • **[Device Therm Warn]** tHA: ***Device thermal state warning*** • **[Warning Grp 1]** AG1: ***Warning group 1*** • **[Warning Grp 2]** AG2: ***Warning group 2*** • **[Warning Grp 3]** AG3: ***Warning group 3*** • **[PID error Warning]** (PEE: ***PID error warning*** • **[PID Feedback Warn]** PFA: ***PID feedback warning*** • **[AI3 4-20 Warning]** AP3: ***AI3 4-20 loss warning*** • **[Torque Limit Reached]** SSA: ***Torque limit reached*** • **[Dev Thermal reached]** tAd: ***Device thermal threshold reached*** • **[Therm Junction Warn]** tJA: ***Thermal junction warning*** • **[Process Undld Warning]** uLA: ***Process underload warning*** • **[Process Overload Warning]** oLA: ***Process overload warning*** • **[Slack Rope Warning]** rSdA: ***Slack rope warning*** • **[High Torque Warning]** ttHA: ***High torque warning*** • **[Low Torque Warning]** ttLA: ***Low torque warning*** • **[Dynamic Load Warning]** dLdA: ***Dynamic load warning*** • **[Pulse Warn Thd Reached]** FqLA: ***Pulse warning threshold reached***		

[Other State] SSt-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ SSt

HMI label	Settings	Factory setting
List of secondary states. This menu is visible only on graphic display terminal. • **[In motor fluxing]** FLX: ***In motor fluxing*** • **[PTC Fdbk Handling]** PtCL: ***PTC probe feedback handling*** • **[Fast Stop Assign]** FSt: ***Fast stop assignment*** • **[Current Thd Reached]** CtA: ***Current threshold reached*** • **[Mot Freq High Thd]** FtA: ***Motor frequency high threshold reached*** • **[2nd Freq Thd Reached]** F2A: ***2nd frequency threshold reached*** • **[Ref Frequency Warning]** SrA: ***Reference frequency warning*** • **[Motor Therm Thd reached]** tSA: ***Motor thermal threshold reached*** • **[External Error Assignment]** EtF: ***External error assignment*** • **[Auto]** Auto: ***Auto*** • **[Remote]** FtL: ***Remote*** • **[Autotuning]** tun: ***Autotuning*** • **[Undervoltage Warning]** uSA: ***Undervoltage warning*** • **[Conf. 1 act.]** CnF1: ***2 configurations assignt.*** • **[Conf. 2 act.]** CnF2: ***3 configurations assignt.*** • **[High Speed Reached]** FLA: ***High speed reached*** • **[Set 1 active]** CFP1: ***Parameter set 1*** • **[Set 2 active]** CFP2: ***Parameter set 2*** • **[Set 3 active]** CFP3: ***Parameter set 3*** • **[In braking]** brS: ***In braking sequence*** • **[DC charged]** dbL: ***DC bus charged*** • **[High Torque Warning]** ttHA: ***High torque warning*** • **[Low Torque Warning]** ttLA: ***Low torque warning*** • **[Run Forward]** MFrd: ***Run forward*** • **[Run Reverse]** Mrrs: ***Run reverse*** • **[Pulse Warn Thd Reached]** F9LA: ***Pulse warning threshold reached***		

[Diagnostics] dGt-

This menu is visible only on graphic display terminal.

[Error history] PFH-

Shows the 8 last detected errors.

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ dGt ➡ PFH

HMI label	Settings	Factory setting
[Last Error 1] dP1	—	—

Last error 1 (1 is last)

- **[No Error]** noF: ***No error detected***
- **[Angle error]** ASF: ***Angle error***, Angle setting detected error
- **[Brake Control]** bLF: ***Brake control***, Brake's motor 3-phases loss
- **[Brake Feedback]** brF: ***Brake feedback***, Brake contactor detected error
- **[Incorrect Config]** CFF: ***Incorrect configuration*** Invalid configuration at power on
- **[Conf Transfer Error]** CF12: ***Configuration transfer error***
- **[Fieldbus Com Interrupt]** CnF: ***Fieldbus communication interruption***
- **[CANopen Com Interrupt]** CoF: ***CANopen communication interruption***
- **[AFE contactor feedback error]** CrF3: ***AFE contactor feedback error***
- **[Channel Switch Error]** CSF: ***Channel switching detected error***
- **[Dynamic Load Error]** dLF: ***Dynamic load detected error***
- **[Control Memory Error]** EEF1: ***Control memory error***
- **[Power Memory Error]** EEF2: ***Power memory error***
- **[External Error]** EPF1: ***External detected error***
- **[Fieldbus Error]** EPF2: ***External error detected by Fieldbus***
- **[Function Block Error]** FbE: ***Function Block error***
- **[Function Block Stop Error]** FbES: ***Function Block stop error***
- **[Out Contact Closed Error]** FCF1: ***Output contactor closed error***
- **[Out Contact Opened Error]** FCF2: ***Output contactor opened error***
- **[Boards Compatibility]** HCF: ***Boards compatibility***, hardware configuration detected error
- **[IGBT desaturation]** HdF: ***IGBT desaturation***, hardware detected error
- **[Internal Link Error]** iLF: ***Internal communication interruption with option module***
- **[Internal Error 1]** inF1: ***Internal error 1 (Rating)***
- **[Internal Error 2]** inF2: ***Internal error 2 (Soft)***, unknown or incompatible power board
- **[Internal Error 3]** inF3: ***Internal error 3 (Intern Comm)***, internal serial link communication interruption
- **[Internal Error 4]** inF4: ***Internal error 4 (Manufacturing)***, invalid industrialization zone
- **[Internal Error 6]** inF6: ***Internal error 6 (Option)***, unknown or incompatible option board
- **[Internal Error 9]** inF9: ***Internal error 9 (Measure)***, current measurement circuit detected error
- **[Internal Error 10]** inFA: ***Internal error 10 (Mains)***, input phase loss circuit detected error
- **[Internal Error 11]** inFb: ***Internal error 11 (Temperature)***, thermal sensor detected error (OC or SC)
- **[Internal Error 14]** inFE: ***Internal error 14 (CPU)*** (ram, flash, task ...)
- **[Input Contactor]** LCF: ***input contactor***, line contactor detected error
- **[AI3 4-20mA loss]** LFF3: ***AI3 4-20mA loss***

HMI label	Settings	Factory setting
• **[DC Bus Overvoltage]** obF: ***DC bus overvoltage*** • **[Overcurrent]** oCF: ***Overcurrent*** • **[Device Overheating]** oHF: ***Device overheating*** • **[Process Overload]** oLC: ***Process overload*** • **[Motor Overload]** oLF: ***Motor overload*** • **[Single output phase loss]** oPF1: ***Single output phase loss*** • **[Output Phase Loss]** oPF2: ***Output phase loss*** • **[Supply Mains Overvoltage]** oSF: ***Supply mains overvoltage***, oversupply detected error • **[DI6=PTC Overheat]** otFL: ***DI6=PTC overheat***, motor overheating detected error from PTCL: standard product • **[Input Phase Loss]** PHF: ***Input phase loss*** • **[DI6=PTC Probe Error]** PtFL: ***DI6=PTC probe detected error*** (OC or SC) • **[Safety Function Error]** SAFF: ***Safety function detected error*** • **[Motor short circuit]** SCF1: ***Motor short circuit*** (hard detection) • **[Ground Short Circuit]** SCF3: ***Ground short circuit*** (hard detection) • **[IGBT Short Circuit]** SCF4: ***IGBT short circuit*** (hard detection) • **[Motor Short Circuit]** SCF5: ***Motor short circuit***, Load short-circuit during Igon load sequence (hard detection) • **[Modbus Com Interruption]** SLF1: ***Modbus communication interruption*** • **[PC Com Interruption]** SLF2: ***PC communication interruption*** • **[HMI Com Interruption]** SLF3: ***HMI communication interruption*** • **[Motor Overspeed]** SoF: ***Motor overspeed*** • **[Encoder Feedback Loss]** SPF: ***Encoder feedback loss*** • **[Torque Limitation Error]** SSF: ***Torque limitation error*** • **[Device Overheating]** tJF: ***Device overheating*** • **[Autotuning Error]** tnF: ***Autotuning detected error*** • **[Process Underload]** uLF: ***Process underload*** • **[Supply Mains UnderV]** uSF: ***Supply mains undervoltage***		
[Device State] HS1	—	—
HMI status HMI Status of the detected error record 1. • **[Autotuning]** tun: ***Autotuning*** • **[In DC inject.]** dCb: ***DC injection*** • **[Ready]** rdY: ***Ready*** • **[Freewheel]** nSt: ***Freewheel stop*** • **[Running]** run: ***Running***, motor in steady state or run command present and zero reference • **[Accelerating]** ACC: ***Accelerating*** • **[Decelerating]** dEC: ***Decelerating*** • **[Current Limitation]** CL1: ***In current limitation***, current limit (in case of using a synchronous motor, if the motor does not start, follow the procedure) • **[Fast stop]** FSt: ***Fast stop*** • **[Mot. fluxing]** FLu: ***Motor fluxing*** fluxing function is activated • **[No Mains Voltage]** nLP: ***No mains voltage***, control is powered on but the DC bus is not loaded • **[control.stop]** CtL: ***Control stopping*** • **[Dec. adapt.]** obr: ***Dec ramp adaptation*** • **[Output cut]** SoC: ***Output cut***		

HMI label	Settings	Factory setting
• **[Undervoltage Warning]** uSA: ***Undervoltage warning*** • **[TC Mode Active]** tC: ***TC mode active*** • **[In autotest]** St: ***In autotest*** • **[Autotest error]** FA: ***Autotest error*** • **[Autotest OK]** YES: ***Autotest OK*** • **[EEprom test]** EP: ***EEprom test***, self test Eeprom detected error • **[Operating State "Fault"]** FLt: ***Operating state "Fault"***, product has detected a error • **[SS1 Active]** SS1: ***SS1 active***, safety function SS1 • **[SLS Active]** SLS: ***SLS active***, safety function SLS • **[STO active]** Sto: ***STO active***, safety function STO • **[SMS Active]** SMS: ***SMS active***, safety function SMS • **[GDL Active]** GdL: ***GDL active***, safety function GdL		
[Last Error 1 Status] EP1	—	—
Status of last error 1, DRIVECOM status register of detected error record 1 (same as **[Status Register]** EtA, page 60).		
[ETI state word] iP1	—	—
ETI state word, extended status register of detected error record 1 (see the communication parameters file).		
[Cmd word] CMP1	—	—
Cmd word, command register of detected error record 1 (same as **[Cmd Register]** Cmd, page 58).		
[Motor current] LCP1	[A]	—
Motor current, estimated motor current of detected error record 1 (same as **[Motor Current]** LCr, page 50).		
[Output frequency] rFP1	[Hz]	—
Output frequency, estimated motor frequency of detected error record 1 (same as **[Motor Frequency]** rFr, page 49).		
[Run Elapsed time] rtP1	[h]	—
Run Elapsed time. Elapsed run time of detected error record 1 (same as **[Motor Run Time]** rtH, page 66).		
[Mains Voltage] uLP1	[V]	—
Mains voltage. Main voltage of detected error record 1 (same as **[Mains Voltage]** uLn).		
[Motor therm state] tHP1	[%]	—
Motor thermal state. Motor thermal state of detected error record 1 (same as **[Motor Therm State]** tHr).		
[Command Channel] dCC1	—	—
Command channel. Command channel of detected error record 1 (same as **[Command Channel]** CMdC, page 58).		
[Ref Freq Channel] drC1	—	—
Channel for reference frequency. Reference channel of detected error record 1 (same as **[Ref Freq Channel]** rFCC, page 59).		
[Saf1 Reg n-1] Sr11	—	—
Saf1 Reg n-1, SAF1 Register x (1 is last)		
[Saf2 Reg n-1] Sr21	—	—
Saf2 Reg n-1, SAF2 Register x (1 is last)		
[SF00 Reg n-1] SrA1	—	—

HMI label	Settings	Factory setting
SF00 Reg n-1, SF00 Register x (1 is last)		
[SF01 Reg n-1] Srb1	—	—
SF01 Reg n-1, SF01 Register x (1 is last)		
[SF02 Reg n-1] SrC1	—	—
SF02 Reg n-1, SF02 Register x (1 is last)		
[SF03 Reg n-1] Srd1	—	—
SF03 Reg n-1, SF03 Register x (1 is last)		
[SF04 Reg n-1] SrE1	—	—
SF04 Reg n-1, SF04 Register x (1 is last)		
[SF05 Reg n-1] SrF1	—	—
SF05 Reg n-1, SF05 Register x (1 is last)		
[SF06 Reg n-1] SrG1	—	—
SF06 Reg n-1, SF06 Register x (1 is last)		
[SF07 Reg n-1] SrH1	—	—
SF07 Reg n-1, SF07 Register x (1 is last)		
[SF08 Reg n-1] Sr 1 1	—	—
SF08 Reg n-1, SF08 Register x (1 is last)		
[SF09 Reg n-1] SrJ1	—	—
SF09 Reg n-1, SF09 Register x (1 is last)		
[SF10 Reg n-1] SrK1	—	—
SF10 Reg n-1, SF10 Register x (1 is last)		
[SF11 Reg n-1] SrL1	—	—
SF11 Reg n-1, SF11 Register x (1 is last)		
[Last Error 2] dP2	—	—
Last error 2 **[Saf1 Reg n-2]** Sr12, **[Saf2 Reg n-2]** Sr22, **[SF00 Reg n-2]** SrA2, **[SF01 Reg n-2]** Srb2, and **[SF02 Reg n-2]** SrC2 to **[SF11 Reg n-2]** SrL2 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 3] dP3	—	—
Last error 3 **[Saf1 Reg n-3]** Sr13, **[Saf2 Reg n-3]** Sr23, **[SF00 Reg n-3]** SrA3, **[SF01 Reg n-3]** Srb3, and **[SF02 Reg n-3]** SrC3 to **[SF11 Reg n-3]** SrL3 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 4] dP4	—	—
Last error 4 **[Saf1 Reg n-4]** Sr14, **[Saf2 Reg n-4]** Sr24, **[SF00 Reg n-4]** SrA4, **[SF01 Reg n-4]** Srb4, and **[SF02 Reg n-4]** SrC4 to **[SF11 Reg n-4]** SrL4 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 5] dP5	—	—

HMI label	Settings	Factory setting
Last error 5 **[Saf1 Reg n-5]** Sr15, **[Saf2 Reg n-5]** Sr25, **[SF00 Reg n-5]** SrA5, **[SF01 Reg n-5]** Srb5, and **[SF02 Reg n-5]** SrC5 to **[SF11 Reg n-5]** SrL5 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 6] dP6	—	—
Last error 6 **[Saf1 Reg n-6]** Sr16, **[Saf2 Reg n-6]** Sr26, **[SF00 Reg n-6]** SrA6, **[SF01 Reg n-6]** Srb6, and **[SF02 Reg n-6]** SrC6 to **[SF11 Reg n-6]** SrL6 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 7] dP7	—	—
Last error 7 **[Saf1 Reg n-7]** Sr17, **[Saf2 Reg n-7]** Sr27, **[SF00 Reg n-7]** SrA7, **[SF01 Reg n-7]** Srb7, and **[SF02 Reg n-7]** SrC7 to **[SF11 Reg n-7]** SrL7 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		
[Last Error 8] dP8	—	—
Last error 8 **[Saf1 Reg n-8]** Sr18, **[Saf2 Reg n-8]** Sr28, **[SF00 Reg n-8]** SrA8, **[SF01 Reg n-8]** Srb8, and **[SF02 Reg n-8]** SrC8 to **[SF11 Reg n-8]** SrL8 may be visible with this parameter. Identical to **[Last Error 1]** dP1, page 70.		

[Actual error] PFL-

Access
Parameters described below can be accessed by: dr1 ➜ Mon ➜ PFL

HMI label	Settings	Factory setting

- **[No Error]** nOF : ***No error detected***
- **[Angle error]** ASF : ***Angle error***, angle setting detected error
- **[Brake Control]** bLF : ***Brake control***, Brake's motor 3-phases loss
- **[Brake Feedback]** brF : ***Brake feedback***, brake contactor detected error
- **[Incorrect Config]** CFF : ***Incorrect configuration***, invalid configuration at power on
- **[Conf Transfer Error]** CFI2 : ***Configuration transfer error***
- **[Fieldbus Com Interrupt]** CnF : ***Fieldbus communication interruption***
- **[CANopen Com Interrupt]** CoF : ***CANopen communication interruption***
- **[AFE contactor feedback error]** CrF3 : ***AFE contactor feedback error***
- **[Channel Switch Error]** CSF : ***Channel switching detected error***
- **[Dynamic Load Error]** dLF : ***Dynamic load detected error***
- **[Control Memory Error]** EEF1 : ***Control memory error***
- **[Power Memory Error]** EEF2 : ***Power memory error***
- **[External Error]** EPF1 : ***External detected error***
- **[Fieldbus Error]** EPF2 : ***External error detected by Fieldbus***
- **[Function Block Error]** FbE : ***Function Block error***
- **[Function Block Stop Error]** FbES : ***Function Block stop error***
- **[Out Contact Closed Error]** FCF1 : ***Output contactor closed error***
- **[Out Contact Opened Error]** FCF2 : ***Output contactor opened error***
- **[Boards Compatibility]** HCF : ***Boards compatibility***, hardware configuration detected error
- **[IGBT desaturation]** HdF : ***IGBT desaturation***, hardware detected error
- **[Internal Link Error]** ILF : ***Internal communication interruption with option module***, option internal link interruption
- **[Internal Error 1]** InF1 : ***Internal error 1 (Rating)***
- **[Internal Error 2]** InF2 : ***Internal error 2 (Soft)***, unknown or incompatible power board
- **[Internal Error 3]** InF3 : ***Internal error 3 (Intern Comm)***, internal serial link communication interruption
- **[Internal Error 4]** InF4 : ***Internal error 4 (Manufacturing)***, invalid industrialization zone
- **[Internal Error 6]** InF6 : ***Internal error 6 (Option)***, unknown or incompatible option board
- **[Internal Error 9]** InF9 : ***Internal error 9 (Measure)***, current measurement circuit detected error
- **[Internal Error 10]** InFA : ***Internal error 10 (Mains)***, input phase loss circuit detected error
- **[Internal Error 11]** InFb : ***Internal error 11 (Temperature)***, thermal sensor detected error (OC or SC)
- **[Internal Error 14]** InFE : ***Internal error 14 (CPU)***, CPU detected error (ram, flash, task ...)
- **[Input Contactor]** LCF : ***input contactor***, line contactor detected error
- **[AI3 4-20mA loss]** LFF3 : ***AI3 4-20mA loss***
- **[DC Bus Overvoltage]** obF : ***DC bus overvoltage***
- **[Overcurrent]** oCF : ***Overcurrent***
- **[Device Overheating]** oHF : ***Device overheating***
- **[Process Overload]** oLC : ***Process overload***
- **[Motor Overload]** oLF : ***Motor overload***
- **[Single output phase loss]** oPF1 : ***Single output phase loss***
- **[Output Phase Loss]** oPF2 : ***Output phase loss***
- **[Supply Mains Overvoltage]** oSF : ***Supply mains overvoltage***, oversupply detected error
- **[DI6=PTC Overheat]** otFL : ***DI6=PTC overheat***, motor overheating detected error from PTCL: standard product
- **[Input Phase Loss]** PHF : ***Input phase loss***
- **[DI6=PTC Probe Error]** PtFL : ***DI6=PTC probe detected error*** (OC or SC)

HMI label	Settings	Factory setting
• **[Safety Function Error]** SAFF: ***Safety function detected error*** • **[Motor short circuit]** SCF1: ***Motor short circuit*** (hard detection) • **[Ground Short Circuit]** SCF3: ***Ground short circuit*** (hard detection) • **[IGBT Short Circuit]** SCF4: ***IGBT short circuit*** (hard detection) • **[Motor Short Circuit]** SCF5: ***Motor short circuit***, load short-circuit during Igon load sequence (hard detection) • **[Modbus Com Interruption]** SLF1: ***Modbus communication interruption***, modbus local serial communication interruption • **[PC Com Interruption]** SLF2: ***PC communication interruption***, PC Software communication interruption • **[HMI Com Interruption]** SLF3: ***HMI communication interruption*** • **[Motor Overspeed]** SOF: ***Motor overspeed*** • **[Encoder Feedback Loss]** SPF: ***Encoder feedback loss*** • **[Torque Limitation Error]** SSF: ***Torque limitation error*** • **[Device Overheating]** tJF: ***Device overheating*** • **[Autotuning Error]** tnF: ***Autotuning detected error*** • **[Process Underload]** uLF: ***Process underload*** • **[Supply Mains UnderV]** uSF: ***Supply mains undervoltage***		

[More error info] AF1-

Access
Parameters described below can be accessed by: dr1 ➡ Mon ➡ AF1

Additional detected error information.

HMI label	Settings	Factory setting
[Fieldbus Com Interrupt] CnF	—	—
Fieldbus module Communication interruption, communication option module detected error code. This parameter is read-only. The detected error code remains saved in the parameter, even if the cause disappears. The parameter is reset after the drive is disconnected and then reconnected. The values of this parameter depend on the network module. Consult the manual for the corresponding module.		
[InternCom Error1] iLF1	—	—
Internal communication interruption 1, communication interruption between option module 1 and drive. This parameter is read-only. The detected error code remains saved in the parameter, even if the cause disappears. The parameter is reset after the drive is disconnected and then reconnected.		
[Safety fct ErrorReg] SFFE (1)	—	—

HMI label	Settings	Factory setting
Safety function error register • Bit0 = 1: Logic inputs debounce time-out (verify value of debounce time LIDT according to the application) • Bit1 Reserved • Bit2 = 1: Motor speed sign has changed during SS1 ramp • Bit3 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp. • Bit4: Reserved • Bit5: Reserved • Bit6 = 1: Motor speed sign has changed during SLS limitation • Bit7 = 1: Motor speed has reached the frequency limit threshold during SS1 ramp. • Bit8: Reserved • Bit9: Reserved • Bit10: Reserved • Bit11: Reserved • Bit12: Reserved • Bit13 = 1: Not possible to measure the motor speed (verify the motor wiring connection) • Bit14 = 1: Motor ground short-circuit detected (verify the motor wiring connection) • Bit15 = 1: Motor phase to phase short-circuit detected (verify the motor wiring connection)		
[Safety Error Reg1] SAF 1 (1)	—	—
Safety error register 1,application control error register. • Bit0 = 1: PWRM consistency detected error • Bit1 = 1: Safety functions parameters detected error • Bit2 = 1: Application auto test has detected an error • Bit3 = 1: Diagnostic verification of safety function has detected an error • Bit4 = 1: Logical input diagnostic has detected an error • Bit5 = 1: SMS or GDL safety functions detected error (Details in **[SAFF Subcode 4]** SF04 register , page 80) • Bit6 = 1: Application watchdog management active • Bit7 = 1: Motor control detected error • Bit8 = 1: Internal serial link core detected error • Bit9 = 1: Logical input activation detected error • Bit10 = 1: Safe Torque Off function has triggered an event • Bit11 = 1: Application interface has detected an error of the safety functions • Bit12 = 1: Safe Stop 1 function has detected an error of the safety functions • Bit13 = 1: Safely Limited Speed function has triggered an event • Bit14 = 1: Motor data is corrupted • Bit15 = 1: Internal serial link data flow detected error		
[Safety Error Reg2] SAF2 (1)	—	—

HMI label	Settings	Factory setting
Safety error register 2, motor Control error register • Bit0 = 1 : Consistency stator frequency verification has detected an error • Bit1 = 1 : Stator frequency estimation detected error • Bit2 = 1 : Motor control watchdog management is active • Bit3 = 1 : Motor control hardware watchdog is active • Bit4 = 1 : Motor control auto test has detected an error • Bit5 = 1 : Chain testing detected error • Bit6 = 1 : Internal serial link core detected error • Bit7 = 1 : Direct short-circuit detected error • Bit8 = 1 : PWM driver detected error • Bit9 = 1 : GDL internal detected error • Bit10 : Reserved • Bit11 = 1 : Application interface has detected an error of the safety functions • Bit12 = 1 : Reserved • Bit13: Reserved • Bit14 = 1 : Motor data is corrupted • Bit15 = 1 : Internal serial link data flow detected error		
[SAFF Subcode 0] SF00 (1)	—	—
SAFF subcode 0, safety fault subregister 00 Appplication auto test error register • Bit0 : Reserved • Bit1 = 1 : Ram stack overflow • Bit2 = 1 : Ram address integrity detected error • Bit3 = 1 : Ram data access detected error • Bit4 = 1 : Flash Checksum detected error • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 : Reserved • Bit9 = 1 : Fast task overflow • Bit10 = 1 : Slow task overflow • Bit11 = 1 : Application task overflow • Bit12 : Reserved • Bit13 : Reserved • Bit14 = 1 : PWRM line is not activated during initialization phase • Bit15 = 1 : Application hardware Watch Dog is not running after initialization		
[SAFF Subcode 1] SF01 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 1, safety fault subregister 01 Logical input diagnostics error register • Bit0 = 1 : Management - state machine detected error • Bit1 = 1 : Data required for test management are corrupted • Bit2 = 1 : Channel selection detected error • Bit3 = 1 : Testing - state machine detected error • Bit4 = 1 : Test request is corrupted • Bit5 = 1 : Pointer to test method is corrupted • Bit6 = 1 : Incorrect test action provided • Bit7 = 1 : Detected Error in results collecting • Bit8 = 1 : LI3 detected error. Cannot activate safe function • Bit9 = 1 : LI4 detected error. Cannot activate safe function • Bit10 = 1 : LI5 detected error. Cannot activate safe function • Bit11 = 1 : LI6 detected error. Cannot activate safe function • Bit12 = 1 : Test sequence updated while a diagnostic is in progress • Bit13 = 1 : Detected error in test pattern management • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 2] SF02 (1)	—	—
SAFF subcode 2, safety fault subregister 02 Application Watchdog Management detected error register • Bit0 = 1 : Fast task detected error • Bit1 = 1 : Slow task detected error • Bit2 = 1 : Application task detected error • Bit3 = 1 : Background task detected error • Bit4 = 1 : Safety fast task/input detected error • Bit5 = 1 : Safety slow task/input detected error • Bit6 = 1 : Safety app task/input detected error • Bit7 = 1 : Safety app task/treatment detected error • Bit8 = 1 : Safety background task detected error • Bit9 : Reserved • Bit10 : Reserved • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 3] SF03 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 3, safety fault subregister 03 • Bit0 = 1 : Debounce time out • Bit1 = 1 : Input not consistent • Bit2 = 1 : Consistency check - state machine detected error • Bit3 = 1 : Consistency check - debounce timeout corrupted • Bit4 = 1 : Response time data detected error • Bit5 = 1 : Response time corrupted • Bit6 = 1 : Undefined consumer queried • Bit7 = 1 : Configuration detected error • Bit8 = 1 : Inputs are not in nominal mode • Bit9 : Reserved • Bit10 : Reserved • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 4] SF04 (1)	—	—
SAFF subcode 4, safety fault subregister 04 **[Trq/I Limit Timeout]** Sto detected error register • Bit0 = 1 : No signal configured • Bit1 = 1 : State machine detected error • Bit2 = 1 : Internal data detected error • Bit3 : Reserved • Bit4 : Reserved • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 = 1 : SMS overspeed detected error • Bit9 = 1 : SMS internal detected error • Bit10 : Reserved • Bit11 = 1 : GDL internal detected error 1 • Bit12 = 1 : GDL internal detected error 2 • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 5] SF05 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 5, safety fault subregister 05 **[SS1 Channel 1]** SS11 detected error register • Bit0 = 1 : State machine detected error • Bit1 = 1 : Motor speed sign changed during stop • Bit2 = 1 : Motor speed reached trigger area • Bit3 = 1 : Theoretical motor speed corrupted • Bit4 = 1 : Unauthorized configuration • Bit5 = 1 : Theoretical motor speed computation detected error • Bit6 : Reserved • Bit7 = 1 : Speed sign check: consistency detected error • Bit8 = 1 : Internal SS1 request corrupted • Bit9 : Reserved • Bit10 : Reserved • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 6] SF06 (1)	—	—
SAFF subcode 6, safety fault subregister 06 **[SLS]** SLS detected error register • Bit0 = 1 : State machine detected error register • Bit1 = 1 : Motor speed sign changed during limitation • Bit2 = 1 : Motor speed has reached the frequency limit threshold • Bit3 = 1 : Data corruption • Bit4 : Reserved • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 : Reserved • Bit9 : Reserved • Bit10 : Reserved • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 7] SF07 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 7, safety fault subregister 07 Application Watchdog Management detected error register • 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		
[SAFF Subcode 8] SF08 (1)	—	—
SAFF subcode 8, safety fault subregister 08 Application Watchdog Management detected error register • Bit0 = 1 : PWM task detected error • Bit1 = 1 : Fixed task detected error • Bit2 = 1 : ATMC watchdog detected error • Bit3 = 1 : DYNFCT watchdog detected error • Bit4 : Reserved • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 : Reserved • Bit9 : Reserved • Bit10 : Reserved • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[SAFF Subcode 9] SF09 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 9, safety fault subregister 09 Motor control Auto Test detected error register • Bit0 : Reserved • Bit1 = 1 : Ram stack overflow • Bit2 = 1 : Ram address integrity detected error • Bit3 = 1 : Ram data access detected error • Bit4 = 1 : Flash Checksum detected error • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 : Reserved • Bit9 = 1 : 1ms task overflow • Bit10 = 1 : PWM task overflow • Bit11 = 1 : Fixed task overflow • Bit12 : Reserved • Bit13 : Reserved • Bit14 = 1 : Unwanted interruption • Bit15 = 1 : Hardware WD is not running after initialization		
[SAFF Subcode 10] SF10 (1)	—	—
SAFF subcode 10, safety fault subregister 10 Motor control direct short-circuit detected error register • Bit0 = 1 : Ground short circuit - Configuration detected error • Bit1 = 1 : Phase to phase short circuit - Configuration detected error • Bit2 = 1 : Ground short circuit • Bit3 = 1 : Phase to phase 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		
[SAFF Subcode 11] SF11 (1)	—	—

HMI label	Settings	Factory setting
SAFF subcode 11, safety fault subregister 11 Motor Control dynamic check of activity detected error register • Bit0 = 1 : Application requested a diagnostic of direct short circuit • Bit1 = 1 : Application requested consistency verification of stator frequency estimation (voltage and current) • Bit2 = 1 : Application requested diagnostic of SpdStat provided by Motor Control • Bit3 : Reserved • Bit4 : Reserved • Bit5 : Reserved • Bit6 : Reserved • Bit7 : Reserved • Bit8 = 1 : Motor Control safe diagnostic of direct short circuit is enabled • Bit9 = 1 : Motor Control consistency check of stator frequency estimation is enabled • Bit10 = 1 : Motor Control diagnostic of SpdStat provided by Motor Control is enabled • Bit11 : Reserved • Bit12 : Reserved • Bit13 : Reserved • Bit14 : Reserved • Bit15 : Reserved		
[IGBT Warning Counter] tAC	—	—
IGBT warning counter, transistor alarm time counter (length of time the "IGBT temperature" alarm has been active).		
[Min. freq time] tAC2	—	—
Min IGBT frequency time. Transistor alarm time counter at minimum switching frequency (length of time the "IGBT temperature" alarm has been active after the drive has automatically reduced the switching frequency to the minimum value).		
[IGBT Warning Nb] nbJ ★	—	—
Number of IGBT warnings. Transistor alarm counter: number detected during lifecycle. Visible if **[3.1] [Access Level]** LAC is set to **[Expert]** EPr.		
[Service Message] SEr–	—	—
Refer to **[Service Message]** SEr –, page 389.		
[Clear Error History] rFLt	—	—
Clear error history. Reset all resetable previous detected errors. **[No]** no: Reset not active **[Yes]** YES: Reset in progress		

(1) Hexadecimal values are displayed on the Graphic display terminal

Example:

SFFE = **0x0008** in Hexadecimal

SFFE = Bit **3**

★ : 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.

[Password] Cod-

Access
Parameters described below can be accessed by: dr ➜ Mon ➜ Cod

HMI Password.

If you have lost your code, please contact Schneider Electric.

HMI label	Settings	Factory setting
[Status] CSt	—	—
Status, Status of the drive (lock/unlock). Information parameter, cannot be modified. • **[Locked]** LCK : The drive is locked by a password • **[Unlocked]** uLCK : The drive is not locked by a password		
[PIN code 1] Cod	—	—
Password code 1, confidential code. Enables the drive configuration to be protected using an access code. When access is locked by means of a code, only the parameters in the **[1.2] [MONITORING]** Mon — and **[1.1] [Reference speed]** rEF — menus can be accessed. The MODE key can be used to switch between menus. **NOTE:** Before entering a code, do not forget to make a careful note of it. **[OFF]** oFF : No access locking codes. • To lock access, enter a code (2 to 9,999). The display can be incremented using the jog dial. Then press ENT. **[ON]** on appears on the screen to indicate that access has been locked. **[ON]** on : A code is locking access (2 to 9,999). • To unlock access, enter the code (incrementing the display using the jog dial) and press ENT. The code remains on the display and access is unlocked until the next time the drive is turned off. Access is locked again the next time the drive is turned on. • If an incorrect code is entered, the display changes to **[ON]** on and access remains locked. Access is unlocked (the code remains on the screen). • To reactivate locking with the same code when access has been unlocked, return to **[ON]** on using the jog dial and then press ENT. **[ON]** on remains on the screen to indicate that access has been locked. • To lock access with a new code when access has been unlocked, enter the new code (increment the display using the jog dial) and then press ENT. **[ON]** on remains on the screen to indicate that access has been locked. • To clear locking when access has been unlocked, return to **[OFF]** oFF using the jog dial and then press ENT. **[OFF]** oFF remains on the display. Access is unlocked and remains so until the next restart.		
[PIN code 2] Cod2 ★	—	—
Password code 2, confidential code 2. Visible if **[3.1] [Access Level]** LAC is set to **[Expert]** EPr . **[OFF]** oFF : The value **[OFF]** oFF indicates that no password has been set **[Unlocked]** uLCK . **[ON]** on : The value **[ON]** on indicates that the drive configuration is protected and an access code must be entered to unlock it. Once the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. **8888**: PIN code 2 is an unlock code known only to Schneider Electric Product Support.		
[Upload rights] uLr	—	—
Upload rights • **[Permitted]** uLr 0: Means that SoMove or the graphic display terminal can save the whole configuration (password, protections, configuration). When the configuration is edited, only the non protected parameters is accessible.		

HMI label	Settings	Factory setting
• **[Not allowed]** ULR 1: Means that SoMove or the graphic display terminal cannot save the configuration.		
[Download rights] dLr	—	—
Download rights • **[Locked drv]** dLr 0: Locked drive: means that the configuration can be downloaded only in a locked drive which configuration has the same password. If the passwords are different, download is not permitted. • **[Unlock. drv]** dLr 1: Unlocked drive: means that the configuration can be downloaded only in a drive without active password. • **[Not allowed]** dLr 2: Not allowed: the configuration cannot be downloaded. • **[Lock/unlock]** dLr 3: Lock. + Not: download is permitted following 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.

: Setting of this parameter can be done during operation or when stopped.

1.3 [Configuration] CONF

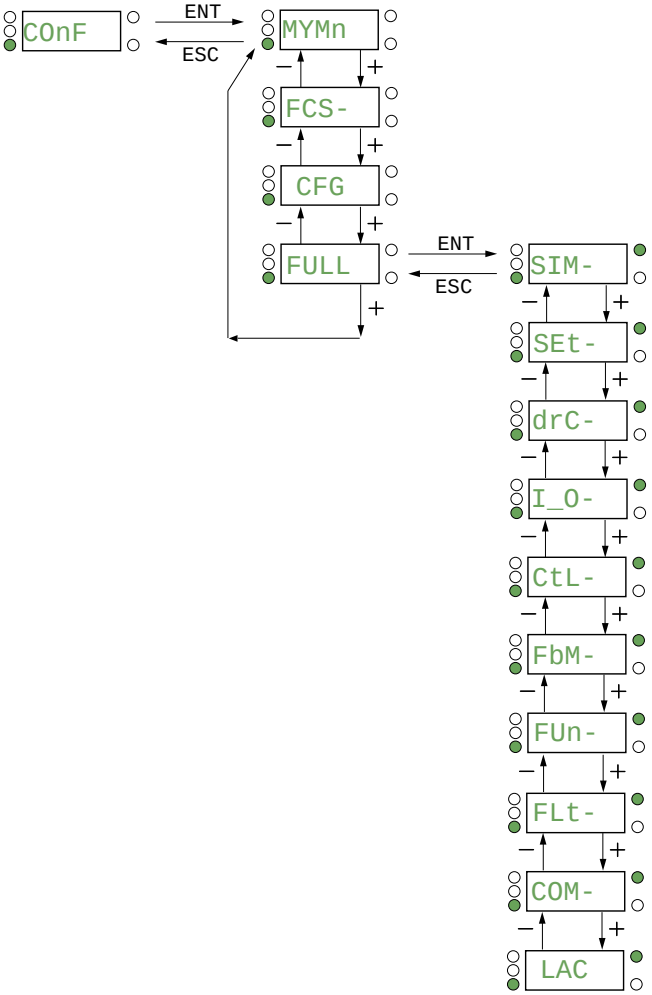
Introduction

Configuration mode includes 4 parts:

1. **[My menu]** MYMN — menu includes up to 25 parameters available for user to customize using the graphic display terminal or SoMove software.
2. Store/recall parameter set: These 2 functions are used to store and recall customer settings.
3. **[Macro-configuration]** CFG parameter , page 93 which allows to load predefined values for applications.
4. **[Full]** FULL —: This menu provides access to all other parameters. It includes 10 sub-menus:
   - **[Simply start]** SIM —, page 97
   - **[Settings]** SET —, page 104
   - **[Motor control]** DRC —, page 121
   - **[Inputs / Outputs]** I-O —, page 145
   - **[control.stop]** CTL —, page 188
   - **[Function Blocks]** FBM —, page 195
   - **[Application function]** FUN —, page 203
   - **[Operating State Fault]** FLT —, page 323
   - **[Communication]** COM —, page 369
   - **[Access Level]** LAC , page 376

Organization Tree

Displayed parameter values are given as examples.



1.3.1 [My menu] MYMn-

Access
Parameters described below can be accessed by: dr ➜ CONF ➜MYMn

HMI label	Settings	Factory setting
This menu contains the parameters selected in the **[3.4] [Display config.]** dCF — **[Display config.]** dCF-, page 387 menu.		

1.3.2 [Factory settings] FCS-

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡FCS

Parameters List

HMI label	Settings	Factory setting
[Config. Source] FCS1 ★	—	**[Macro Config]** In1
Source configuration If the configuration switching function is configured, it is not possible to access **[Config 1]** CFG1 and **[Config 2]** CFG2. **NOTE:** To load the drive's presettings previously stored (**[Config 1]** Str1 or **[Config 2]** Str2), select the source configuration **[Config. Source]** FCS1 = **[Config 1]** CFG1 or **[Config 2]** CFG2 followed by a factory setting **[Go to Factory Settings]** GFS = **[Yes]** YES. **[Macro Config]** In1: Factory configuration, return to selected macro configuration **[Config 1]** CFG1: Configuration 1 **[Config 2]** CFG2: Configuration 2		
[Factory Setting Group] FrY —	—	—
Factory setting group Selection of menus to be loaded. See the multiple selection procedure Description of the HMI, page 34 for the integrated display terminal and the graphic display terminal Graphic Display Terminal Option, page 20. **NOTE:** In factory configuration and after a return to "factory settings", **[Factory Setting Group]** FrY is empty. **[All]** ALL: All parameters (the function blocks program is also erased) **[Device Configuration]** drM: The **[1] [Drive menu]** dr1 — menu without **[Communication]** CoM —. In the **[3.4] [Display config.]** dCF menu, **[Return std name]** GSP , page 389 returns to **[No]** no. **[Motor param]** Mot: Refer to Motor parameters . The following selections can only be accessed if **[Config. Source]** FCS1 is set to **[Macro Config]** In1. **[Comm. menu]** CoM: The **[Comm. menu]** CoM — menu without either **[Scan. IN1 address]** nMA1 to **[Scan. IN8 address]** nMA8 or **[Scan.Out1 address]** nCA1 to **[Scan.Out8 address]** nCA8. **[Display config.]** d1S: The **[3.3] [MONITORING CONFIG.]** MCF — menu.		
[Go to Factory Settings] GFS ★ ⏳ 2 s	—	—
[Go to Factory Settings] **⚠WARNING** **UNANTICIPATED EQUIPMENT OPERATION** Verify that restoring the factory settings is compatible with the type of wiring used. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** It is only possible to revert to the factory settings if at least one group of parameters has previously been selected. • **[No]** no: No • **[Yes]** YES: The parameter changes back to **[No]** no automatically as soon as the operation is complete.		

HMI label	Settings	Factory setting
[Save Configuration] SCS ★	—	**[No]** nO
Save configuration The active configuration to be saved does not appear for selection. For example, if it is **[Config 0]** Str0, only **[Config 1]** Str1 and **[Config 2]** Str2 appear. The parameter changes back to **[No]** nO as soon as the operation is complete. • **[No]** nO: No • **[Config 0]** Str0: Press and hold down the ENT key for 2 s • **[Config 1]** Str1: Press and hold down the ENT key for 2 s • **[Config 2]** Str2: Press and hold down the ENT key for 2 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.

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

1.3.3 [Macro-configuration] CFG —

What's in This Chapter

[Macro-configuration] CFG

Access

Parameters described below can be accessed by: dr ➔ ConF

Parameters list

HMI label	Settings	Factory setting
[Macro Config] CFG ★ ⏳ 2 s	—	**[Start/Stop]** StS

Macro configuration

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that the selected macro configuration is compatible with the type of wiring used.

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

- **[Start/Stop]** StS: Start/stop
- **[M. handling]** HdG: Handling
- **[Hoisting]** HSt: Hoisting
- **[Gen. Use]** GEn: General use
- **[PID regul.]** PId: PID regulation
- **[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 s.

Example of total return to factory settings

- **[Config. Source]** FCS1 is set to **[Macro Config]** In1
- **[Factory Setting Group]** FrY is set to **[All]** ALL
- **[Go to Factory Settings]** GFS is set to **[Yes]** YES

[Macro-configuration] CFG : Assignment of the inputs/ outputs

Input/ output	[Start/Stop]	[M. handling]	[Gen. Use]	[Hoisting]	[PID regul.]	[Network C.]
AI1	**[Ref Freq 1 Config]**	**[Ref Freq 1 Config]**	**[Ref Freq 1 Config]**	**[Ref Freq 1 Config]**	**[Ref Freq 1 Config]** (PID reference)	**[Ref Freq 2 Config]** (**[Ref Freq 1 Config]** = integrated Modbus) (1)
AI2	**[No]**	**[Summing Input 2]**	**[Summing Input 2]**	**[No]**	**[PID feedback Assign]**	**[No]**
[AI3]	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**
AO1	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**
r1	**[No drive flt]**	**[No drive flt]**	**[No drive flt]**	**[No drive flt]**	**[No drive flt]**	**[No drive flt]**
r2	**[No]**	**[No]**	**[No]**	**[Brake logic control]**	**[No]**	**[No]**
LI1 (2-wire)	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**
LI2 (2-wire)	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**
LI3 (2-wire)	**[No]**	**[2 preset speeds]**	**[Jog]**	**[Fault reset]**	**[PID Integral OFF]**	**[Ref Freq 2 switching]**
LI4 (2-wire)	**[No]**	**[4 preset speeds]**	**[Fault reset]**	**[External error]**	**[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)	**[Drive Running]**	**[Drive Running]**	**[Drive Running]**	**[Drive Running]**	**[Drive Running]**	**[Drive Running]**
LI2 (3-wire)	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**	**[Forward]**
LI3 (3-wire)	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**	**[Run Reverse]**
LI4 (3-wire)	**[No]**	**[2 preset speeds]**	**[Jog]**	**[Fault reset]**	**[PID Integral OFF]**	**[Ref Freq 2 switching]**
LI5 (3-wire)	**[No]**	**[4 preset speeds]**	**[Fault reset]**	**[External error]**	**[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
F2, F3, F4 keys	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**	**[No]**

(1) To start with, integrated Modbus **[Modbus Address]** Add must first be configured.

In 3-wire control, the assignment of inputs LI1 to LI6 shifts.

NOTE: These assignments are reinitialized every time the macro configuration changes.

[Macro-configuration] CFG : Other configurations and settings

In addition to the assignment of inputs/outputs, other parameters are assigned **only in the Hoisting macro configuration.**

Hoisting

- **[Movement type]** bST is set to **[Hoisting]** VER
- **[Brake Contact]** bC1 is set to **[No]** no
- **[Brake Release Pulse]** b1P is set to **[Yes]** YES
- **[Brk Release Current]** 1br is set to 0 A
- **[Brake Release time]** brt is set to 0 s
- **[Brake release freq]** b1r is set to **[Auto]** Auto
- **[Brake engage freq]** bEn is set to **[Auto]** Auto
- **[Brake engage time]** bET is set to 0 s
- **[Engage at reversal]** bEd is set to **[No]** no
- **[Jump at reversal]** JdC is set to **[Auto]** Auto
- **[Time to restart]** ttr is set to 0 s
- **[Current ramp time]** brr is set to 0 s
- **[Low Speed]** LSP , page 101 is set to Rated motor slip calculated by the drive
- **[OutPhaseLoss Assign]** oPL is set to **[OPF Error Triggered]** YES
  No further modifications can be made to this parameter.
- **[Catch On Fly]** FLr is set to **[No]** no
  No further modifications can be made to this parameter.

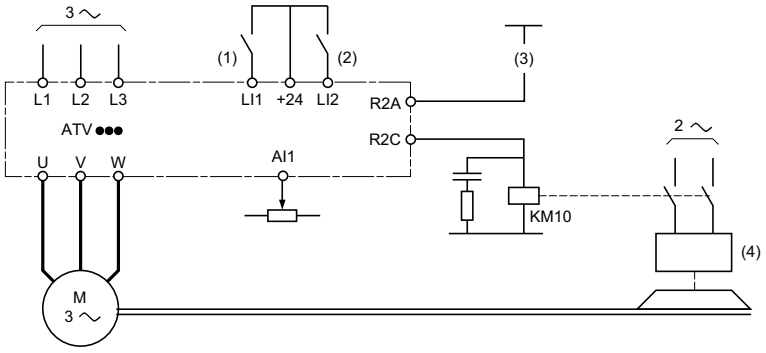
Return to factory settings:

Returning to factory settings with **[Config. Source]** FCS1 is set to **[Macro Config]** in1 , page 90 returns the drive to the selected macro configuration. The **[Macro-configuration]** CFG parameter does not change, although **[Customized macro]** CCFG disappears.

NOTE: The factory settings that appear in the parameter tables correspond to **[Macro-configuration]** CFG = **[Start/Stop]** StS. This is the macro configuration set at the factory.

Example diagrams for use with the macro configurations

[Hoisting] H S t diagram



(1) : Forward (Ascend)

(2) : Reverse (Descend)

(3) : Without integrated safety function, a contact on the Preventa module must be inserted in the brake control circuit to engage it when the "Safe Torque Off" safety function is activated (see connection diagrams in the Installation manual).

(4) : Electromagnetic brake

1.3.4.1 [Full] FULL – – [Simply start] SIM–

Access

Parameters described below can be accessed by: dr I ➡ ConF ➡ FULL ➡ SIM

Parameters list

HMI label	Settings	Factory setting
[Simply start] SIM —		

⚠WARNING

LOSS OF CONTROL

- Fully read and understand the manual of the connected motor.
- Verify that all motor parameters are correctly set by referring to the nameplate and the manual of the connected motor.
- If you modify the value of one or more motor parameters after having performed autotuning, the value of **[Tune selection]** STUN is reset to **[Default]** TAB and you must re-perform autotuning.

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

[2/3-Wire Control] tCC 2s	—	**[2-Wire Control]** 2C

2/3-wire control , page 145

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

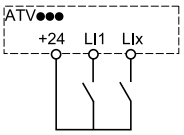
If this parameter is changed, the parameters **[Auto Fault Reset]** ATR and **[2-wire type]** TCT and the assignments of the digital and virtual inputs are partially reset to the factory setting.

- Verify that this change is compatible with the type of wiring used.

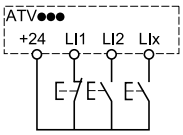
Failure to follow these instructions can result in death, serious injury, or equipment damage.

[2-Wire Control] 2C
2-wire control (level commands): This is the input state (0 or 1) or edge (0 to 1 or 1 to 0), which controls running or stopping.

Example of "source" wiring:



LI1: forward
LIx: reverse

HMI label	Settings	Factory setting
[3-Wire Control] 3C **3-wire control (pulse commands):**A "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping. Example of "source" wiring:  LI1: stop LI2: forward LIx: reverse		
[Macro-configuration] CFG ★ 2s	—	**[Start/Stop]** STS
Macro configuration , page 93		
⚠WARNING **UNANTICIPATED EQUIPMENT OPERATION** Verify that the selected macro configuration is compatible with the type of wiring used. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**		
• **[Start/Stop]** STS: ***Standard Start/Stop*** • **[M. handling]** HDG: ***Material handling*** • **[Hoisting]** HST: ***Hoisting*** • **[Gen. Use]** GEN: ***General use*** • **[PID regul.]** PID: ***PID regulation*** • **[Network C.]** NET: ***Network communications***		
[Customized macro] CCFG ★	—	—
Customized macro Read-only parameter, only visible if at least one macro configuration parameter has been modified. • **[No]** NO: ***No*** • **[Yes]** YES: ***Yes***		
[Motor Standard] bFr	—	**[50 Hz] [IEC]** 50
Motor Standard This parameter modifies the presets of the following parameters:**[Nom Motor Voltage]** UNS below,**[High Speed]** HSP , page 101, **[Motor Freq Thd]** FTD , **[Nominal Motor Freq]** FRS and **[Max Frequency]** TFR . **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** STUN is reset to **[Default]** TAB. Autotuning is needed to be performed again. • **[50 Hz]** 50): ***50Hz motor frequency*** • **[60 Hz]** 60: ***60Hz motor frequency***		
[InPhaseLoss Assign] IPL ★	—	Yes or No, according to drive rating
Input Phase Loss assignment This parameter is only accessible in this menu on 3-phase drives. If one phase disappears, the drive switches to detected error mode **[Input Phase Loss]** PHF , but if 2 or 3 phases disappear, the drive continues to operate until it trips on an undervoltage detected error (the drive trips in **[Input Phase Loss]** PHF if there is an input phase loss and if this leads to performance decrease).		

HMI label	Settings	Factory setting
See **[Input phase loss]** IPL • **[Ignore]** nO: ***Ignore***, detected error ignored, to be used when the drive is supplied via a single-phase supply or by the DC bus • **[Freewheel Stop]** YES: ***Freewheel stop***		
[Nominal Motor Power] nPr ★	—	According to drive rating
Nominal motor power Rated motor power given on the nameplate, in kW if **[Motor Standard]** bFr is set to **[50 Hz]** 50, in HP if **[Motor Standard]** bFr is set to **[60 Hz]** 60. See **[Nominal Motor Power]** (nPr **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom Motor Voltage] UnS ★	100 to 480 V	According to drive rating
Nominal motor voltage ATV320●●●M2●: 100 to 240 V – ATV320●●●N4●: 200 to 480 V. See **[Nom Motor Voltage]** UnS **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom Motor Current] nCr ★	0.25 to 1.5 In (1)	According to drive rating and **[Motor Standard]** bFr
Nominal motor current See **[Nom Motor Current]** nCr **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nominal Motor Freq] FrS ★	10 to 800 Hz	50 Hz
Nominal motor frequency The factory setting is 50 Hz, or preset to 60 Hz if **[Motor Standard]** bFr is set to 60 Hz. This parameter is not visible if **[Motor control type]** Ctt , page 121 is set to **[Synchronous motor]** SYn. See **[Nominal Motor Freq]** FrS **NOTE:** • The value of **[Nominal Motor Freq]** FrS is limited by **[High Speed]** HSP. • Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nominal Motor Speed] nSP ★	0 to 65,535 rpm	According to drive rating
Nominal motor speed This parameter is not visible if **[Motor control type]** Ctt , page 121 is set to **[Synchronous motor]** SYn. See **[Nominal Motor Speed]** nSP 0 to 9,999 rpm then 10.00 to 60.00 krpm on the integrated display terminal. If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows: Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$ or		

HMI label	Settings	Factory setting
Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors). or Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors) **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** STUN is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Max Frequency] tFr	10 to 599 Hz	60 Hz
Max frequency The factory setting is 60 Hz, or preset to 72 Hz if **[Motor Standard]** bFr is set to 60 Hz. The maximum value is limited by the following conditions: It must not exceed 10 times the value of **[Nominal Motor Freq]** Fr5. To help prevent detected **[Motor Overspeed]** SoF error, it is recommended to have **[Max Frequency]** tFr equal to or higher than 110% of **[High Speed]** HSP. See **[Max Frequency]** tFr , page 121.		
[Autotuning] tUn	—	**[No Action]** no
Autotuning For asynchronous motors . For synchronous motors .		
[Autotuning Status] tUS	—	**[Not Done]** tAb
Autotuning status This parameter is not saved at drive power off. It shows the Autotuning status since last power on. • **[Not Done]** tAb: ***Not done***, autotune is not done • **[Pending]** PEnd: ***Test is pending***, autotune has been requested but not yet performed • **[In Progress]** PrOG: ***Test in progress***, autotune is in progress • **[Error]** FAIL: ***Error detected***, autotune has detected a error • **[Autotuning Done]** donE: ***Autotuning Done***, the stator resistance measured by the auto-tuning function is used to control the motor		
[Tune selection] STUn	—	**[Default]** tAb
Tune selection • **[Default]** tAb: ***Default***, the default stator resistance value is used to control the motor • **[Measure]** MEAS: ***Measure***, the stator resistance measured by the auto-tuning function is used to control the motor • **[Custom]** CUS: ***Custom***, the stator resistance set manually is used to control the motor		
[Motor Th Current] ItH	0.2 to 1.5 In (1)	According to drive rating
Motor Thermal current See **[Motor Th Current]** ItH .		
[Acceleration] ACC	0.00 to 6,000 s (2)	3.0 s
Acceleration ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** Fr5 , page 99. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Acceleration]** ACC .		

HMI label	Settings	Factory setting
[Deceleration] d E C ↻	0.00 to 6,000 s (2)	3.0 s
Deceleration ramp time Time to decelerate from the **[Nominal Motor Freq]** F r S , page 99 to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Deceleration]** d E C .		
[Low Speed] L S P ↻	0 to 599 Hz	0
Low speed Motor frequency at minimum reference, can be set between 0 and **[High Speed]** H S P. See **[Low Speed]** L S P .		
[High Speed] H S P ↻	0 to 599 Hz	50 Hz
High speed Motor frequency at maximum reference, can be set between **[Low Speed]** L S P and **[Max Frequency]** t F r . The factory setting changes to 60 Hz if **[Motor Standard]** b F r is set to **[60 Hz]** 6 0. To help prevent detected **[Motor Overspeed]** S o F error, it is recommended to have **[Max Frequency]** t F r equal to or higher than 110% of **[High Speed]** H S P. See **[High Speed]** H S P .		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 s according to **[Ramp increment]** i n r .

★ : 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.

↻ : Setting of this parameter can be done during operation or when stopped.

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

1.3.4.2 [Full] FULL – – [Settings] SET –

What's in This Chapter

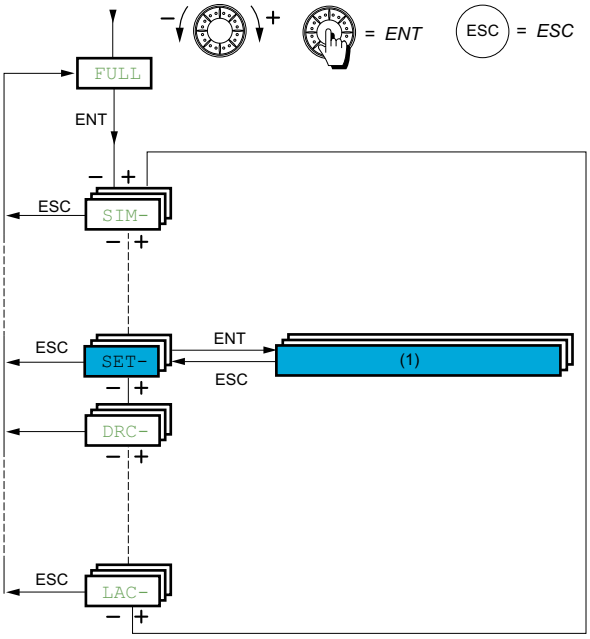
With Integrated Display Terminal

Access

Parameters described below can be accessed by: drI ➔ ConF ➔ FULL ➔ SET

It is recommend to stop the motor before modifying any of the settings.

From ConF menu



(1) : SETTINGS

The adjustment parameters can be modified with the drive running or stopped.

[Settings] SET - parameters

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ SET

Parameters list

HMI label	Settings	Factory setting
[Settings] SET —		
[Ramp increment] inr	—	0.1
Ramp increment This parameter is valid for **[Acceleration]** ACC, **[Deceleration]** dEC, **[Acceleration 2]** AC2 and **[Deceleration 2]** dE2. See **[Ramp increment]** inr . • **[0.01]** 0.01: Ramp up to 99.99 seconds • **[0.1]** 0.1: Ramp up to 999.9 seconds • **[1]** 1: Ramp up to 6,000 seconds		
[Acceleration] ACC	0.00 to 6,000 s (1)	3.0 s
Acceleration ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** Frs , page 99. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Acceleration]** ACC .		
[Deceleration] dEC	0.00 to 6,000 s (1)	3.0 s
Deceleration ramp time Time to decelerate from the **[Nominal Motor Freq]** Frs , page 99 to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Deceleration]** dEC .		
[Acceleration 2] AC2 ★	0.00 to 6,000 s (1)	5 s
Acceleration 2 ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** Frs , page 99. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Acceleration 2]** AC2 .		
[Deceleration 2] dE2 ★	0.00 to 6,000 s (1)	5 s
Deceleration 2 Time to decelerate from the **[Nominal Motor Freq]** Frs , page 99 to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. See **[Deceleration 2]** dE2 .		
[Begin Acc round] tA1 ★	0 to 100%	10%
Start ACC ramp rounding Rounding of start of acceleration ramp as a % of the **[Acceleration]** ACC or **[Acceleration 2]** AC2 ramp time. Visible if **[Ramp Type]** rPt is set to **[Customized]** CUS. See **[Begin Acc round]** tA1 .		
[End Acc round] tA2 ★	0 to 100%	10%
End ACC ramp rounding Rounding of end of acceleration ramp as a % of the **[Acceleration]** ACC or **[Acceleration 2]** AC2 ramp time. Can be set between 0 and 100% - **[Begin Acc round]** tA1.		

HMI label	Settings	Factory setting
Visible if **[Ramp Type]** rPt is set to **[Customized]** CUS. See **[End Acc round]** tA2 .		
[Begin Dec round] tA3 ★ (1)	0 to 100%	10%
Start DEC ramp rounding Rounding of start of deceleration ramp as a % of the**[Deceleration]** dEC or **[Deceleration 2]** dE2 ramp time. Visible if **[Ramp Type]** rPt is set to **[Customized]** CUS. See **[Begin Dec round]** tA3 .		
[End Dec round] tA4 ★ (1)	0 to 100%	10%
End DEC ramp rounding Rounding of end of deceleration ramp as a % of the **[Deceleration]** dEC or **[Deceleration 2]** dE2 ramp time. Can be set between 0 and 100% - **[Begin Dec round]** tA3. Visible if **[Ramp Type]** rPt is set to **[Customized]** CUS. See **[End Dec round]** tA4 .		
[Low Speed] LSP (1)	0 to 599 Hz	0 Hz
Low speed Motor frequency at minimum reference, can be set between 0 and **[High Speed]** HSP , page 101. See **[Low Speed]** LSP , page 101.		
[High Speed] HSP (1)	0 to 599 Hz	50 Hz
High speed Motor frequency at maximum reference, can be set between **[Low Speed]** LSP and **[Max Frequency]** tFr . The factory setting changes to 60 Hz if **[Motor Standard]** bFr is set to **[60 Hz]** 60. See **[High Speed]** HSP , page 101. To help prevent detected **[Motor Overspeed]** SOF error, it is recommended to have **[Max Frequency]** tFr equal to or higher than 110% of **[High Speed]** HSP.		
[High speed 2] HSP2 ★ (1)	0 to 599 Hz	50 Hz
High speed 2 Visible if **[2 High speed]** SH2 is not set to **[No]** no. See **[High speed 2]** HSP2 .		
[High speed 3] HSP3 ★ (1)	0 to 599 Hz	50 Hz
High speed 3 Visible if **[4 High speed]** SH4 is not set to **[No]** no. See **[High speed 3]** HSP3 .		
[High speed 4] HSP4 ★ (1)	0 to 599 Hz	50 Hz
High speed 4 Visible if **[4 High speed]** SH4 is not set to **[No]** no. See **[High speed 4]** HSP4 .		
[Motor Th Current] ItH (1)	0.2 to 1.5 In (2)	According to drive rating
Motor Thermal current See **[Motor Th Current]** ItH , page 100		
[IR compensation] UFr (1)	0 to 200%	100%
IR compensation See **[IR compensation]** UFr .		
[Slip compensation] SLP (1)	0 to 300%	100%
Slip Compensation		

HMI label	Settings	Factory setting
See **[Slip compensation]** SLP .		
[K speed loop filter] SFC ★ ( )	0 to 100	65
K speed loop filter See **[K speed loop filter]** SFC .		
[Speed time integral] S itE ★ ( )	1 to 65,535 ms	63 ms
Speed time integral See **[Speed time integral]** S itE .		
[Speed prop. gain] SPG ★ ( )	0 to 1,000%	40%
Speed proportional gain See **[Speed prop. gain]** SPG		
[Inertia Factor] SPGu ★ ( )	0 to 1,000%	40%
Inertia factor See **[Inertia Factor]** SPGu .		

(1) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 s according to **[Ramp increment]** inr .

(2) In corresponds to the rated drive current indicated in the Installation manual or on the drive 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.

( ) : Setting of this parameter can be done during operation or when stopped.

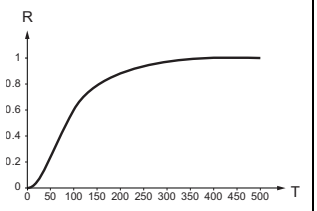
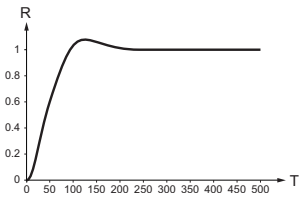
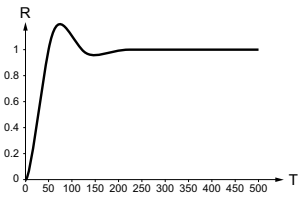
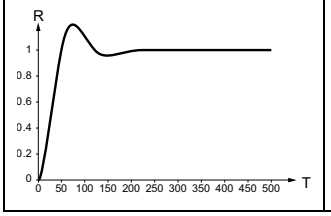
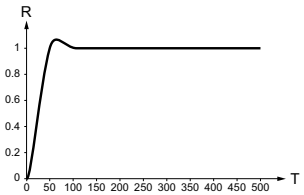
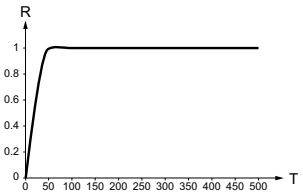
Parameter settings for [K speed loop filter] SFC, [Speed prop. gain] SPG and [Speed time integral] S itE

The following parameters can be accessed if **[Motor control type]** CtT, page 121 is set to **[SVC V]** VVC, **[Synchronous motor]** SYn or **[Energy Sav.]** nLd.

General Case: Setting for [K speed loop filter] SFC = 0

The regulator is an "IP" type with filtering of the speed reference, for applications requiring flexibility and stability (hoisting or high inertia, for example).

- **[Speed prop. gain]** SPG affects excessive speed.
- **[Speed time integral]** S itE affects the passband and response time.

Initial response	**Reduction in SIT** ↘	**Reduction in SIT** ↘↘
		
Initial response	**Increase in SPG** ↗	**Increase in SPG** ↗↗
		

R : Reference division

T : Time in ms

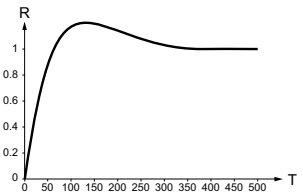
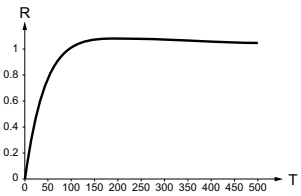
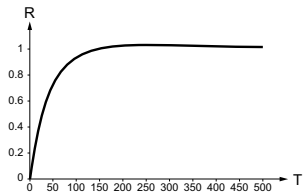
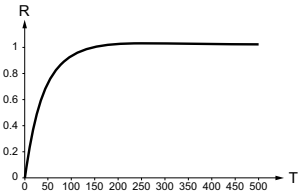
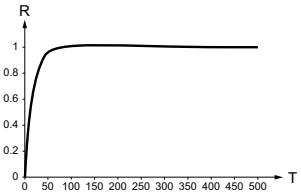
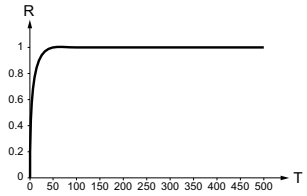
Special case: Parameter [K speed loop filter] SFC is not 0

This parameter must be reserved for specific applications that require a short response time (trajectory positioning or servo control).

- When set to 100 as described above, the regulator is a “PI” type, without filtering of the speed reference.
- Settings between 0 and 100 obtains an intermediate function between the settings below and those on the previous page.

Example: Setting for **[K speed loop filter]** SFC = 100

- **[Speed prop. gain]** SPG affects the passband and response time.
- **[Speed time integral]** S itE affects excessive speed.

Initial response	**Reduction in SIT** ↘	**Reduction in SIT** ↘↘
		
Initial response	**Increase in SPG** ↗	**Increase in SPG** ↗↗
		

R : Reference division

T : Time in ms

[Settings] SET - parameters (continued)

HMI label	Settings	Factory setting
[Ramp Divider] dCF ★ ()	0 to 10	4
Fast Stop ramp Divider See **[Ramp Divider]** dCF .		
[DC Inj Level 1] IdC ★ ()	0.1 to 1.41 In (1)	0.64 In (1)
DC injection level 1 Level of DC injection braking current activated via logic input or selected as stop mode. See **[DC Inj Level 1]** IdC .		
[DC Inj Time 1] tdI ★ ()	0.1 to 30 s	0.5 s
DC injection time 1 Maximum current injection time **[DC Inj Level 1]** IdC. After this time, the injection current becomes **[DC Inj Level 2]** IdC2. See **[DC Inj Time 1]** tdI .		
[DC Inj Level 2] IdC2 ★ ()	0.1 In to 1.41 In (1)	0.5 In (1)
DC injection level 2 Injection current activated by logic input or selected as stop mode, once period of time **[DC Inj Time 1]** tdI has elapsed. See **[DC Inj Level 2]** IdC2 .		
[DC Inj Time 2] tdC ★ ()	0.1 to 30 s	0.5 s
DC injection time 2 Maximum injection time **[DC Inj Level 2]** IdC2 for injection selected as stop mode only. See **[DC Inj Time 2]** tdC .		
[Auto DC inj Level 1] SdC1 ★ ()	0 to 1.2 In (1)	0.7 In (1)
Auto DC injection level 1 **NOTICE** **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.** Level of standstill DC injection current **[Auto DC injection]** AdC is not **[No]** no. Refer to **[Auto DC inj Level 1]** SdC1 .		
[Auto DC Inj Time 1] tdC1 ★ ()	0.1 to 30 s	0.5 s
Auto DC injection time 1 **NOTICE** **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		

HMI label	Settings	Factory setting
This parameter can be accessed if **[Auto DC injection]** ADC is not **[No]** nO. if **[Motor control type]** CTT , page 121 is set to **[Synchronous motor]** SYn, this time corresponds to the zero speed maintenance time. Refer to **[Auto DC Inj Time 1]** tDC 1 .		
[Auto DC inj Level 2] SDC2 ★ ()	0 to 1.2 In (1)	0.5 In (1)
Auto DC injection level 2		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.** This parameter can be accessed if **[Auto DC injection]** ADC is not **[No]** nO. Refer to **[Auto DC inj Level 2]** SDC2 .		
[Auto DC Inj Time 2] tDC2 ★ ()	0 to 30 s	0 s
Auto DC injection time 2		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.** This parameter can be accessed if **[Auto DC injection]** ADC is not **[Yes]** YES. Refer to **[Auto DC Inj Time 2]** tDC2 .		
[Switching frequency] SFr ()	2 to 16 kHz	4.0 kHz
Switching frequency		
NOTICE **DAMAGE TO THE DRIVE** Verify that the switching frequency of the drive does not exceed 4 kHz if the EMC filter is disconnected for operation of the drive in an IT mains. **Failure to follow these instructions can result in equipment damage.** This applies to the following drive versions: ATV320•••2• Refer to **[Switching frequency]** SFr . **Adjustment range:** The maximum value is limited to 4 kHz if **[Motor surge limit.]** SVL parameter is configured. **NOTE:** In the event of excessive temperature rise, the drive automatically reduces the switching frequency and reset it once the temperature returns to normal.		
[Current Limitation] CL , ★ ()	0 to 1.5 In (1)	1.5 In (1)
Current limitation		

HMI label	Settings	Factory setting

NOTICE

OVERHEATING

- Verify that the motor is properly rated for the maximum current to be applied to the motor.
- Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit.

Failure to follow these instructions can result in equipment damage.

Used to limit the motor current. Refer to **[Current Limitation]** CL1.

NOTE: If the setting is less than 0.25 In, the drive may lock in detected **[Output phase loss]** OPL error mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.

[Current Limit2 Value] CL2 ★ ()	0 to 1.5 In (1)	1.5 In (1)

Current limitation 2 value

NOTICE

OVERHEATING

- Verify that the motor is properly rated for the maximum current to be applied to the motor.
- Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit.

Failure to follow these instructions can result in equipment damage.

Refer to **[Current Limit2 Value]** CL2.

NOTE: If the setting is less than 0.25 In, the drive may lock in detected **[Output phase loss]** OPL error mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.

[Motor fluxing] FLU ★ () 2s	—	**[No]** FNO

Motor fluxing configure

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the parameter **[Motor fluxing]** FLU is set to **[Continuous]** FCT, fluxing is always active, even if the motor does not run.

- Verify that using this setting does not result in unsafe conditions.

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

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the flux current to be applied.

Failure to follow these instructions can result in equipment damage.

The parameter is visible if **[Motor control type]** CTT, page 121 is not set to **[Synchronous motor]** SYN,

To obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.

In **[Continuous]** FCT mode, the drive automatically builds up flux when it is powered up.

In **[Not continuous]** FNC mode, fluxing occurs when the motor starts up.

The flux current is greater than **[Nom Motor Current]** NCR when the flux is established and is then adjusted to the motor magnetizing current. Refer to **[Motor fluxing]** FLU.

HMI label	Settings	Factory setting
• **[Not continuous]** FnC : ***Not continuous*** • **[Continuous]** FCt : ***Continuous***. This option is not possible if **[Auto DC injection]** AdC is **[Yes]** YES or if **[Type of stop]** Stt is **[Freewheel]** nSt . • **[No]** Fno : ***No***, Function inactive. This option is not possible if **[Brake assignment]** bLC is not **[No]** no .		
[Low Speed Timeout] tLS	0 to 999.9 s	0 s
Low speed timeout Maximum operating time at **[Low Speed]** LSP , page 101. Following operation at LSP for a defined period, a motor stop is requested automatically. The motor restarts if the reference is greater than LSP and if a run command is still present. Refer to **[Low Speed Timeout]** tLS . **NOTE:** A value of 0 indicates an unlimited period of time. **NOTE:** If **[Low Speed Timeout]** tLS is not 0, **[Type of stop]** Stt is forced to **[Ramp Stop]** rMP (only if a ramp stop can be configured).		
[Jog Frequency] JGF ★	0 to 10 Hz	10 Hz
Jog frequency Refer to **[Jog Frequency]** JGF .		
[Jog Delay] JGt ★	0 to 2.0 s	0.5 s
Jog delay Anti-repeat delay between 2 consecutive jog operations. Refer to **[Jog Delay]** JGt .		
[Preset speed 2] SP2 ★	0 to 599 Hz	10 Hz
Preset speed 2 See **[Preset speed 2]** SP2 .		
[Preset speed 3] SP3 ★	0 to 599 Hz	15 Hz
Preset speed 3 See **[Preset speed 3]** SP3 .		
[Preset speed 4] SP4 ★	0 to 599 Hz	20 Hz
Preset speed 4 See **[Preset speed 4]** SP4 .		
[Preset speed 5] SP5 ★	0 to 599 Hz	25 Hz
Preset speed 5 See **[Preset speed 5]** SP5 .		
[Preset speed 6] SP6 ★	0 to 599 Hz	30 Hz
Preset speed 6 See **[Preset speed 6]** SP6 .		
[Preset speed 7] SP7 ★	0 to 599 Hz	35 Hz
Preset speed 7 See **[Preset speed 7]** SP7 .		
[Preset speed 8] SP8 ★	0 to 599 Hz	40 Hz

HMI label	Settings	Factory setting
Preset speed 8		
See **[Preset speed 8]** SP8 .		
[Preset speed 9] SP9 ★ ()	0 to 599 Hz	45 Hz
Preset speed 9		
See **[Preset speed 9]** SP9 .		
[Preset speed 10] SP 10 ★	0 to 599 Hz	50 Hz
Preset speed 10		
See **[Preset speed 10]** SP 10 .		
[Preset speed 11] SP 11 ★ ()	0 to 599 Hz	55 Hz
Preset speed 11		
See **[Preset speed 11]** SP 11 .		
[Preset speed 12] SP 12 ★ ()	0 to 599 Hz	60 Hz
Preset speed 12		
See **[Preset speed 12]** SP 12 .		
[Preset speed 13] SP 13 ★ ()	0 to 599 Hz	70 Hz
Preset speed 13		
See **[Preset speed 13]** SP 13 .		
[Preset speed 14] SP 14 ★ ()	0 to 599 Hz	80 Hz
Preset speed 14		
See **[Preset speed 14]** SP 14 .		
[Preset speed 15] SP 15 ★ ()	0 to 599 Hz	90 Hz
Preset speed 15		
See **[Preset speed 15]** SP 15 .		
[Preset speed 16] SP 16 ★ ()	0 to 599 Hz	100 Hz
Preset speed 16		
See **[Preset speed 16]** SP 16 .		
[Multiplying coeff.] MFr ★ ()	0 to 100%	100%
Multiplying coefficient		
It can be accessed if **[Ref Freq 2 Multiply]** MA2, **[Ref Freq 3 Multiply]** MA3 has been assigned to the graphic display terminal. Refer to **[Multiplying coeff.]** MFr , page 46.		
[+/- Speed limitation] SrP ★ ()	0 to 50%	10%
+/- speed limitation		
Refer to **[+/- Speed limitation]** SrP .		
[PID Prop.Gain] rPG ★ ()	0.01 to 100	1
PID Proportional gain		
Refer to **[PID Prop.Gain]** rPG .		

HMI label	Settings	Factory setting
[PID Intgl.Gain] rIG ★ ()	0.01 to 100	1
PID controller integral gain Refer to **[PID Intgl.Gain]** rIG .		
[PID derivative gain] rdG ★ ()	0.00 to 100	0
PID derivative gain Refer to **[PID derivative gain]** rdG .		
[PID ramp] PrP ★ ()	0 to 99.9 s	0 s
PID ramp PID acceleration/deceleration ramp, defined to go from **[Min PID Process]** PIP1 to **[Max PID Process]** PIP2 and vice versa. Refer to **[PID ramp]** PrP .		
[PID Min Output] PoL ★ ()	-599 to 599 Hz	0 Hz
PID controller min. output Minimum value of regulator output in Hz. Refer to **[PID Min Output]** PoL .		
[PID Max Output] PoH ★ ()	0 to 599 Hz	60 Hz
PID controller max. output Maximum value of regulator output in Hz. Refer to **[PID Max Output]** PoH .		
[Min fbk Warning] PAL ★ ()	Refer to **[Min fbk Warning]** PAL (2)	100
Minimum feedback level warning Minimum monitoring threshold for regulator feedback. Refer to **[Min fbk Warning]** PAL .		
[Max fbk Warning] PAH ★ ()	Refer to **[Max fbk Warning]** PAH (2)	1,000
Maximum feedback level warning Maximum monitoring threshold for regulator feedback. Refer to **[Max fbk Warning]** PAH .		
[PID error Warning] PEr ★ ()	0 to 65,535 (2)	100
PID error warning Regulator error monitoring threshold. Refer to **[PID error Warning]** PEr .		
[Speed input %] PSr ★ ()	1 to 100%	100%
PID speed input % ref Multiplying coefficient for predictive speed input. Refer to **[Speed input %]** PSr .		
[Ref PID Preset 2] rP2 ★ ()	Refer to **[Ref PID Preset 2]** rP2 (2)	300
2nd PID preset reference Refer to **[Ref PID Preset 2]** rP2 .		
[Ref PID Preset 3] rP3 ★ ()	Refer to **[Ref PID Preset 3]** rP3 (2)	600
3rd PID preset reference Refer to **[Ref PID Preset 3]** rP3 .		

HMI label	Settings	Factory setting
[Ref PID Preset 4] rP4 ★ (1)	Refer to **[Ref PID Preset 4]** rP4 (2)	900
4th PID preset reference Refer to **[Ref PID Preset 4]** rP4 .		
[Brk Release Current] ibr ★ (1)	0 to 1.36 In (1)	0.0 A
Brake Release current Brake release current threshold for lifting or forward movement. Refer to **[Brk Release Current]** ibr .		
[Brake release I Rev] ird ★ (1)	0 to 1.36 In (1)	0.0 A
Rev. brake release curr. Brake release current threshold for lowering or reverse movement. Refer to **[Brake release I Rev]** ird .		
[Brake Release time] brt ★ (1)	0 to 5.00 s	0 s
Brake release time Refer to **[Brake Release time]** brt .		
[Brake release freq] b ir ★ (1)	**[Auto]** Auto 0 to 10 Hz	**[Auto]** Auto
Brake release frequency Refer to **[Brake release freq]** b ir . **[Auto]** Auto: Nominal value		
[Brake engage freq] bEn ★ (1)	**[Auto]** Auto 0 to 10 Hz	**[Auto]** Auto
Brake engage frequency Refer to **[Brake engage freq]** bEn .		
[Brake engage delay] tbE ★ (1)	0 to 5.00 s	0 s
Brake engage delay Time delay before request to engage brake. Refer to **[Brake engage delay]** tbE .		
[Brake engage time] bEt ★ (1)	0 to 5.00 s	0 s
Brake engage time Refer to **[Brake engage time]** bEt .		
[Jump at reversal] JdC ★ (1)	**[Auto]** Auto 0 to 10 Hz	**[Auto]** Auto
Jump at reversal Refer to **[Jump at reversal]** JdC . **[Auto]** Auto: Nominal value		
[Time to restart] ttr ★ (1)	0.00 to 15.00 s	0.00 s
Time to restart Time between the end of a brake engage sequence and the start of a brake release sequence. Refer to **[Time to restart]** ttr .		
[Motor torque limit] tL iM ★ (1)	0 to 300%	100%

HMI label	Settings	Factory setting
Motoring torque limit		
Torque limitation in motor mode, as a % or in 0.1% increments of the rated torque in accordance with the **[Torque increment]** inCr parameter.		
Refer to **[Motor torque limit]** tLIM .		
[Gen. torque limit] tLIG ★	0 to 300%	100%
Generator torque limit		
Torque limitation in generator mode, as a % or in 0.1% increments of the rated torque in accordance with the **[Torque increment]** inCr parameter.		
Refer to **[Gen. torque limit]** tLIG .		
[Traverse freq. high] trH ★	0 to 10 Hz	4 Hz
Traverse frequency high		
Refer to **[Traverse freq. high]** trH .		
[Traverse freq. Low] trL ★	0 to 10 Hz	4 Hz
Traverse frequency low		
Refer to **[Traverse freq. Low]** trL .		
[Quick step High] qSH ★	0 to **[Traverse freq. high]** trH	0 Hz
Quick step high		
Refer to **[Quick step High]** qSH .		
[Quick step Low] qSL ★	0 to **[Traverse freq. Low]** trL	0 Hz
Quick step low		
Refer to **[Quick step Low]** qSL .		
[High Current Thd] CtdA	0 to 1.5 In (1)	In (1)
High current threshold		
Current threshold for **[Current Thd Reached]** CtAA function assigned to a relay or a logic output. Refer to **[High Current Thd]** CtdA .		
[High torque thd.] ttH	-300% to +300%	100%
High torque threshold		
High torque threshold for **[High Torque Warning]** ttHA function assigned to a relay or a logic output, as a % of the rated motor torque. Refer to **[High torque thd.]** ttH .		
[Low torque thd.] ttL	-300% to +300%	50%
Low torque threshold		
Low torque threshold for **[Low Torque Warning]** ttLA function assigned to a relay or a logic output, as a % of the rated motor torque. Refer to **[Low torque thd.]** ttL .		
[Pulse warning thd.] FqL ★	0 Hz to 20,000 kHz	0 Hz
Pulse warning threshold		
Speed threshold measured by the **[Frequency meter]** FqF — function, assigned to a relay or a logic output (refer to **[Pulse Warn Thd Reached]** FqLA . Refer to **[Pulse warning thd.]** FqL .		
[Motor Freq Thd] FtdA	0.0 to 599 Hz	HSP

HMI label	Settings	Factory setting
Motor frequency threshold		
Motor frequency threshold for **[Mot Freq High Thd]** F t A function assigned to a relay or a logic output, or used by the **[Parameters switching]** M L P — function . Refer to **[Motor Freq Thd]** F t d .		
[Freq. threshold 2] F 2 d	0.0 to 599 Hz	HSP
Frequency threshold 2		
Motor frequency threshold for **[2nd Freq Thd Reached]** F 2 A function assigned to a relay or a logic output (), or used by the **[Parameters switching]** M L P — function . Refer to **[Freq. threshold 2]** F 2 d .		
[Freewheel stop Thd] F F t ★	0.2 to 599 Hz	0.2 Hz
Freewheel stop threshold		
Speed threshold below which the motor switches to freewheel stop. This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. It can be accessed if **[Type of stop]** S t t is set to **[Fast stop]** F S t or **[Ramp Stop]** r M P and if **[Brake assignment]** b L C and **[Auto DC Injection]** A d C are not configured. Refer to **[Freewheel stop Thd]** F F t .		
[Motor Therm Thd] t t d	0 to 118%	100%
Motor thermal threshold		
Threshold for motor thermal alarm (logic output or relay). Refer to **[Motor Therm Thd]** t t d .		
[Skip Frequency] J P F	0 to 599 Hz	0 Hz
Skip frequency		
This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive. Refer to **[Skip Frequency]** J P F .		
[Skip Frequency 2] J F 2	0 to 599 Hz	0 Hz
Skip frequency 2		
This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive. Refer to **[Skip Frequency 2]** J F 2 .		
[3rd Skip Frequency] J F 3	0 to 599 Hz	0 Hz
3rd Skip frequency		
This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive. Refer to **[3rd Skip Frequency]** J F 3.		
[Skip Freq.Hysteresis] J F H ★	0.1 to 10 Hz	1 Hz
Skip Freq. hysteresis		
Parameter visible if at least one skip frequency **[Skip Frequency]** J P F , **[Skip Frequency 2]** J F 2 or **[3rd Skip Frequency]** J F 3 is different from 0. Skip frequency range: between J P F — J F H and J P F + J F H for example. This adjustment is common to the 3 frequencies J P F , J F 2 , J F 3 . Refer to **[Skip Freq.Hysteresis]** J F H .		
[Unld.Thr.Nom.Speed] L u n ★	20 to 100% of **[Nom Motor Current]** n C r	60%
Unld.Thr. at Nom. speed		

HMI label	Settings	Factory setting
Underload threshold at rated motor frequency (**[Nominal Motor Freq]** F r S , page 99), as a % of the rated motor torque. Visible only if **[Unld Detect Delay]** u L t is not set to 0. Refer to **[Unld.Thr.Nom.Speed]** L u n .		
[Unld.Thr.0.Speed] L u L ★()	0 to **[Unld.Thr.Nom.Speed]** L u n	0%
Unld.Thr. at O speed Underload threshold at zero frequency, as a % of the rated motor torque. Visible only if **[Unld Detect Delay]** u L t is not set to 0. Refer to **[Unld.Thr.0.Speed]** L u L .		
[Unld. FreqThr. Det.] r N u d ★()	0 to 599 Hz	0 Hz
Unld. Freq.Thr. Detection Underload detection minimum frequency threshold. Refer to **[Unld. FreqThr. Det.]** r N u d .		
[Hysteresis Freq] S r b ★()	0.3 to 599 Hz	0.3 Hz
Hysteresis frequency Maximum deviation between the frequency reference and the motor frequency, which defines steady state operation. Refer to **[Hysteresis Freq]** S r b .		
[Underload T.B.Rest.] F t u ★()	0 to 6 min	0 min
Unld time Before Restart Minimum time permitted between an underload being detected and any automatic restart. For an automatic restart to be possible, the value of **[Fault Reset Time]** t A r , page 329 must exceed that of this parameter by at least one minute. Refer to **[Underload T.B.Rest.]** F t u .		
[Overload Threshold] L o C ★()	70% to 150% of **[Nom Motor Current]** n C r	110%
Current overload threshold Overload detection threshold, as a % of the rated motor current **[Nom Motor Current]** n C r . This value must be less than the limit current for the function to work. Refer to **[Overload Threshold]** L o C . Visible only if **[Ovld Detection Delay]** t o L is not set to 0. This parameter is used to detect an "application overload". This is not a motor or drive thermal overload.		
[Overload T.B.Rest.] F t o ★()	0 to 6 min	0 min
Ovld time Before Restart Minimum time permitted between an overload being detected and any automatic restart. For an automatic restart to be possible, the value of **[Fault Reset Time]** t A r , page 329 must exceed that of this parameter by at least one minute. Refer to **[Overload T.B.Rest.]** F t o , page 362.		
[Load correction] L b C ★()	0 to 599 Hz	0 Hz
Load correction Rated correction in Hz. See **[Load correction]** L b C .		
[Fan mode] F F N ()	—	**[Standard]** S t d or **[Always]** r u n according to the drive.

HMI label	Settings	Factory setting
Fan mode For ATV320•••••W(S), this parameter is forced to **[Always]** r u n. Depending on the software version, the fan of the device can be disabled. **NOTICE** **OVERHEATING** Verify that the ambient temperature does not exceed 40 °C (104 ° F) if the fan is disabled. **Failure to follow these instructions can result in equipment damage.** • **[Standard]** S t d: ***Standard***, the fan starts and stops automatically according to the drive thermal state • **[Always]** r u n: ***Always***, the fan is always activated • **[Never]** S t P: ***Never***, the fan is disabled		
[Scale factor display] S d S ( )	0.1 to 200	30
Customer scale factor Used to display a value in proportion to the output frequency **[Motor Frequency]** r F r: the machine speed, the motor speed, etc The display shows (**[Cust. output value]** S P d 3 = **[Scale factor display]** S d S x **[Motor Frequency]** r F r) / 1000 to 2 decimal places • If **[Scale factor display]** S d S ≤ 1, **[Cust. output value]** S P d 1 is displayed (possible definition = 0.01) • If 1 < **[Scale factor display]** S d S ≤ 10, **[Cust. output value]** S P d 2 is displayed (possible definition = 0.1) • If **[Scale factor display]** S d S > 10, **[Cust. output value]** S P d 3 is displayed (possible definition = 1) • If **[Scale factor display]** S d S > 10 and **[Scale factor display]** S d S X **[Motor Frequency]** r F r > 9,999: example: for 24,223, display shows 24.22 - If **[Scale factor display]** S d S > 10 and **[Scale factor display]** S d S X **[Motor Frequency]** r F r > 65,535, display locked at 65.54 Example: Display motor speed for 4-pole motor, 1,500 rpm at 50 Hz (synchronous speed): **[Scale factor display]** S d S = 30 **[Cust. output value]** S P d 3 = 1,500 at **[Motor Frequency]** r F r = 50 Hz		

(1) In corresponds to the rated drive current indicated in the Installation manual or on the drive nameplate.

(2) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

( ) : Setting of this parameter can be done during operation or when stopped.

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

1.3.4.3 [Full] FULL – – [Motor control] drC –

What's in This Chapter

[Motor control] drC - parameters

Access

Parameters described below can be accessed by: dr1 ➔ ConF ➔ FULL ➔ drC

The parameters in the **[Motor control]** drC — menu can only be modified when the drive is stopped and no run command is present, with the following exceptions:

- **[Autotuning]** tUn , which may cause the motor to start up.
- Parameters containing the sign ( ) the code column, which can be modified with the drive running or stopped.

  NOTE: We recommend to perform auto-tuning if one of the following parameters are modified from their factory setting.

⚠WARNING

LOSS OF CONTROL

- Fully read and understand the manual of the connected motor.
- Verify that all motor parameters are correctly set by referring to the nameplate and the manual of the connected motor.
- If you modify the value of one or more motor parameters after having performed autotuning, the value of **[Tune selection]** STUN is reset to **[Default]** TAB and you must re-perform autotuning.

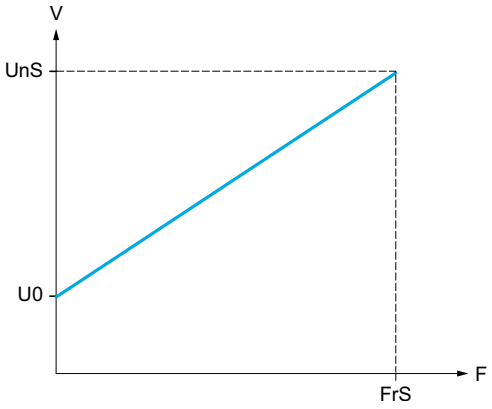
Failure to follow these instructions can result in death, serious injury, or equipment damage.

HMI label	Settings	Factory setting
[Motor control] drC —		
[Motor Standard] bFr	-	**[50 Hz] [IEC]** 50
Motor Standard This parameter modifies the presets of the following parameters: **[High Speed]** HSP , page 101, **[Motor Freq Thd]** FTd , **[Nom Motor Voltage]** UnS, **[Nominal Motor Freq]** FrS and **[Max Frequency]** tFr . **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again. • **[50 Hz]** 50: ***50Hz motor frequency*** IEC • **[60 Hz]** 60: ***60Hz motor frequency*** NEMA		
[Max Frequency] tFr	10 to 599 Hz	60 Hz
Max frequency The factory setting is 60 Hz, or preset to 72 Hz if **[Motor Standard]** bFr is set to 60 Hz. The maximum value is limited by the following conditions: It must not exceed 10 times the value of **[Nominal Motor Freq]** FrS. To help prevent detected **[Motor Overspeed]** SoF error, it is recommended to have **[Max Frequency]** tFr equal to or higher than 110% of **[High Speed]** HSP.		
[Motor control type] Ctt	—	**[Standard]** Std
Motor control type **NOTE:** Select law before entering parameter values. **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		

HMI label	Settings	Factory setting

[SVC V] V V C: Sensorless vector control with internal speed loop based on voltage feedback calculation. For applications needing high performance during starting or operation.

[Standard] S t d: Standard motor law. For simple applications that do not require high performance. Simple motor control law keeping a constant Voltage Frequency ratio, with a possible adjustment of the curve bottom. This law is generally used for motors connected in parallel. Some specific applications with motors in parallel and high performance levels may require **[SVC V]** V V C.



V : Voltage

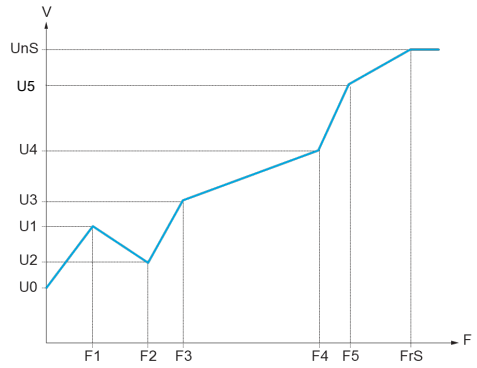
F : Frequency

NOTE: U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by modifying UFr value.

[U/F VC 5pts] u F 5	—	—

U/F VC 5 point voltage/frequency

[U/F VC 5pts] u F 5: 5-segment V/F profile: As **[Standard]** S t d profile but also supports the avoidance of resonance (saturation).



The profile is defined by the values of parameters UnS, FrS, U0 to U5 and F1 to F5.

FrS > F5 > F4 > F3 > F2 > F1

V : Voltage

F : Frequency

NOTE:

- U0 is the result of an internal calculation based on motor parameters and multiplied by UFr (%). U0 can be adjusted by modifying UFr value.
- You must respect the constraint on the order of F1, F2, F3, F4, F5 and FrS otherwise an **[Invalid Configuration]** C F I event is triggered.

[Sync. mot.] S Y n: For synchronous permanent magnet motors with sinusoidal electromotive force (EMF) only. This selection makes the asynchronous motor parameters inaccessible, and the synchronous motor parameters accessible.

[U/F VC Quad.] u F 9: Variable torque. For pump and fan applications.

[Energy Sav.] n L d): Energy saving. For applications that do not require high dynamics.

[Asynchronous motor] ASY —

Access

Parameters described below can be accessed by: dr i ➜ ConF ➜ FULL ➜ drC ➜ ASY

Parameter list

HMI label	Settings	Factory setting
[Asynchronous motor] ASY —		
Only visible if **[Motor control type]** Ctt , page 121 is not set to **[Sync. mot.]** SYn.		
[Nominal Motor Power] nPr ★	According to drive rating	According to drive rating
Nominal motor power This parameter cannot be accessed if **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. Rated motor power given on the nameplate, in kW if **[Motor Standard]** bFr is set to **[50 Hz]** 50, in HP if **[Motor Standard]** bFr is set to **[60 Hz]** 60. **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** Stun is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Motor 1 Cosinus Phi] Cos ★	0.5 to 1	According to drive rating
Motor 1 Cosinus Phi This parameter can be accessed if **[Motor param choice]** nPC is set to **[Motor 1 Cosinus Phi]** Cos. **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** Stun is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom Motor Voltage] unS ★	100 to 480 V	According to drive rating and **[Motor Standard]** bFr
Nominal motor voltage This parameter cannot be accessed if **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** Stun is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom Motor Current] nCr ★	0.25 to 1.5 In (1)	According to drive rating and **[Motor Standard]** bFr
Nominal motor current This parameter cannot be accessed if **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** Stun is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nominal Motor Freq] FrS ★	10 to 800 Hz	50 Hz
Nominal motor frequency This parameter cannot be accessed if **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. The factory setting is 50 Hz, or preset to 60 Hz if **[Motor Standard]** bFr is set to 60 Hz. **NOTE:** • The value of **[Nominal Motor Freq]** FrS is limited by **[High Speed]** HSP. • Modifying this parameter resets the motor tune parameters and, **[Tune selection]** Stun is reset to **[Default]** tAb. Autotuning is needed to be performed again.		

HMI label	Settings	Factory setting
[Nominal Motor Speed] n S P ★	0 to 65,535 rpm	According to drive rating

Nominal motor speed

This parameter cannot be accessed if **[Motor control type]** C t t , page 121 is set to **[Sync. mot.]** S Y n.

0 to 9,999 rpm then 10.00 to 65.53 krpm on the integrated display terminal.

If, rather than the rated speed, the nameplate indicates the synchronous speed and the slip in Hz or as a %, calculate the rated speed as follows:

Nominal speed = Synchronous speed x $\frac{100 - \text{slip as a \%}}{100}$

or

Nominal speed = Synchronous speed x $\frac{50 - \text{slip in Hz}}{50}$ (50 Hz motors).

or

Nominal speed = Synchronous speed x $\frac{60 - \text{slip in Hz}}{60}$ (60 Hz motors)

NOTE: Modifying this parameter resets the motor tune parameters and, **[Tune selection]** S t u n is reset to **[Default]** t A b. Autotuning is needed to be performed again.

[Autotuning] t u n 2 s	—	**[No]** n o

Autotuning

⚠WARNING

UNEXPECTED MOVEMENT

Autotuning moves the motor in order to tune the control loops.

- Only start the system if there are no persons or obstructions in the zone of operation.

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

During autotuning, noise development and oscillations of the system are normal.

⚠WARNING

LOSS OF CONTROL

- If you modify the value of one or more motor parameters after having performed autotuning, the value of **[Tune selection]** is reset to **[Default]** and you must re-perform autotuning.

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

- Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0).
- Auto-tuning takes priority over any run or prefluxing commands, which is taken into account after the auto-tuning sequence.
- If auto-tuning detects a error, the drive displays **[No Action]** n o and, depending on the configuration of **[Tuning Error Resp]** t n L , may switch to detected **[Autotuning Error]** t n F error mode.
- Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to **[No Action]** n o.

NOTE: Motor thermal state has a big influence on tune result. Make the tune with the motor stopped and cold.

To redo a tune of the motor, wait that it is completely stopped and cold. Set first **[Autotuning]** t u n) to **[Erase Autotuning]** C L r), then redo the motor tuning.

HMI label	Settings	Factory setting
The use of the motor tuning without doing a **[Erase Autotuning]** C L r) first is used to get the thermal state estimation of the motor. In any case, the motor has to be stopped before performing a tune operation. Cable length has an influence on the Tune result. If the cabling is modified, it is necessary to redo the tune operation. **[No Action]** n o : Auto-tuning not in progress **[Apply Autotuning]** Y E S : Auto-tuning is performed immediatly if possible, then the parameter automatically changes to **[No Action]** n o . If the drive state does not allow the tune operation immediately, the parameter changes to **[No Action]** n o and the operation must be done again. **[Erase Autotuning]** C L r : The motor parameters measured by the auto-tuning function are reseted. The default motor parameters values are used to control the motor. **[Autotuning Status]** t u S is set to **[Not Done]** t A b .		
[Autotuning Status] t u S	—	**[Not Done]** t A b
Autotuning status (for information only, cannot be modified) This parameter is not saved at drive power off. It shows the Autotuning status since last power on. • **[Not Done]** t A b : ***Not done***, autotune is not done • **[Pending]** P E n d : ***Test is pending***, autotune has been requested but not yet performed • **[In Progress]** P r o G : ***Test in progress***, autotune is in progress • **[Error]** F A i L : ***Error detected***, autotune has detected a error • **[Autotuning Done]** d o n E : ***Autotuning Done***, the motor parameters measured by the auto-tuning function are used to control the motor		
[Tune selection] S t u n	—	**[Default]** t A b
Tune selection (for information only, cannot be modified) • **[Default]** t A b : ***Default***, the default values are used to control the motor • **[Measure]** M E A S : ***Measure***, the values measured by the auto-tuning function are used to control the motor • **[Custom]** C u S : ***Custom***, the values set manually are used to control the motor **NOTE:** Tune of the motor increases significantly the performances.		
[Autotuning Usage] t u n u	—	**[Therm mot]** t M
Autotuning usage		

HMI label	Settings	Factory setting
On some applications requiring high torque at low speeds, motor temperature has a significant influence on behavior and the ability to maintain performance optimization resulting from auto-tuning. Setting the **[Autotuning Usage]** TUNU parameter to **[Therm mot]** TM allows the stator resistance to be compensated according to the estimation of the thermal state of the motor but as the drive power-off time is not calculated, this setting should only be used if the drive is always powered on with a cold motor. If it is not possible to guarantee that the motor is cold every time the drive is powered up, setting the **[Autotuning Usage]** TUNU parameter to **[Cold tun]** CT is using an alternative method to compensate the stator resistance based on the estimation of the thermal state of the motor. In this case, the cold tuning must be carried out before setting **[Autotuning Usage]** TUNU = **[Cold tun]** CT and it should be noted that the cold tuning values are not included in the configuration transfer file. **⚠WARNING** **LOSS OF CONTROL DUE TO INCORRECT INITIALIZATION OF COLD TUNING VALUES** • Cold tuning must be carried out with a cold motor and only with **[Autotuning Usage]** TUNU = **[Therm mot]** TM. • Since the values corresponding to the cold tuning are not transferred during the configuration transfer, a new cold tuning with **[Autotuning Usage]** TUNU = **[Therm mot]** TM must be done again. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** • **[No]** nO: ***No***, no thermal state estimation • **[Therm mot]** tM: ***Use the motor thermal evolution***, statoric thermal state estimation based on nominal current and current consumed by the motor • **[Cold tun]** Ct: ***Use the cold tune values***, Statoric thermal state estimation based on statoric resistance measured at the first cold tune and tune done at each power up **NOTE:** An autotuning must be performed before setting **[Autotuning Usage]** tunU to **[Cold tun]** Ct to get the references values of a cold tune.		
[Automatic autotune] AUt (2 s)	—	**[No]** nO
Automatic autotune		
⚠WARNING **UNEXPECTED MOVEMENT** If this function is activated, autotuning is performed each time the drive is switched on. • Verify that activating this function does not result in unsafe conditions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** The motor must be stopped when switching on the drive. **[Automatic autotune]** AUt is forced to **[Yes]** YES if **[Autotuning Usage]** tunU is set to **[Cold tun]** Ct. The value of motor statoric resistance measured during the tune is used to estimate the thermal state of the motor at power up. • **[No]** nO: ***No***, function deactivated • **[Yes]** YES: ***Yes***, a tune is automatically done at each power up • **[One]** OnE: ***At first run order***		
[Motor fluxing] FLU ★ (1) (2 s)	—	**[No]** FnO
Motor fluxing configure		

HMI label	Settings	Factory setting

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the parameter **[Motor fluxing]** FLU is set to **[Continuous]** FCT , fluxing is always active, even if the motor does not run.

- Verify that using this setting does not result in unsafe conditions.

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

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the flux current to be applied.

Failure to follow these instructions can result in equipment damage.

If **[Motor control type]** CtT , page 121 is set to **[Sync. mot.]** SYn, the factory setting is replaced by **[Not continuous]** FnC.

To obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.

In **[Continuous]** FCt mode, the drive automatically builds up flux when it is powered up.

In **[Not continuous]** FnC mode, fluxing occurs when the motor starts up

The flux current is greater than **[Nom Motor Current]** nCr (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current.

- **[Not continuous]** FnC: ***Not continuous***
- **[Continuous]** FCt: ***Continuous***. This option is not possible if **[Auto DC Injection]** AdC is **[Yes]** YES or if **[Type of stop]** Stt is **[Freewheel Stop]** nSt.
- **[No]** Fno: Function inactive. This option is not possible if **[Brake assignment]** bLC is not **[No]** no.

If **[Motor control type]** CtT , page 121 is set to **[Sync. mot.]** SYn, the **[Motor fluxing]** FLu parameter causes the alignment of the rotor and not the fluxing.

If **[Brake assignment]** bLC is not **[No]** no, the **[Motor fluxing]** FLu parameter has no effect.

[Motor param choice] nPC ★	—	**[Nominal Motor Power]** nPr

Motor parameter choice

NOTE: Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.

- **[Nominal Motor Power]** nPr
- **[Motor 1 Cosinus Phi]** Cos

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Asynchronous motor] A S Y — : Expert mode

HMI label	Settings	Factory setting
[Asynchronous motor] A S Y —		
[AsyncMotor R Stator] r S A ★ (1)	0 to 65,535 mΩ	0 mΩ
AsyncMotor Stator resistance, cold state stator resistance (per winding), modifiable value. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		
[AsyncMotor Lf Induct] L F A ★	0 to 655.35 mH	0 mH
AsyncMotor Leakage inductance, cold state leakage inductance, modifiable value. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		
[Magnetizing Current] i d A ★	0 to 6,553.5 A	0 A
Magnetizing current. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		
[Rotor Time Const] t r A ★	0 to 65,535 ms	0 ms
Rotor time constant. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		

(1) On the integrated display unit: 0 to 9,999 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.

[Synchronous motor] SYn —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ drC ➡ SYn

These parameters can be accessed if **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. In this case, the asynchronous motor parameters cannot be accessed.

When the drive is chosen:

1- Enter the motor nameplate.

2 - Perform the tune.

- Do an **[Autotuning]** tun
- Check the state of the synchronous motor saliency (refer to **[Autotuning]** tun .

If **[Saliency mot. state]** SMot displays **[Med salient]** MLS or **[High salient]** HLS

- follow the procedure below **"3 - Improve the tune result"** and
- follow the procedure below **"4 - Adjust PHS"**

Or if **[Saliency mot. state]** SMot displays **[Low salient]** LLS

- follow the procedure below **"4 - Adjust PHS"**

3 - Improve the tune results.

NOTICE

OVERHEATING

- Verify that the motor is properly rated for the maximum current to be applied to the motor.
- Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit.

Failure to follow these instructions can result in equipment damage.

- Set **[PSI Align Curr Max]** nCr conforming to the maximum motor current. The maximum value of **[PSI Align Curr Max]** nCr is limited by **[Current Limitation]** CL1. Without information set **[PSI Align Curr Max]** nCr to **[Auto]** Auto.
- Do a second **[Autotuning]** tun after the **[PSI Align Curr Max]** nCr modification.

4 - Adjust PHS.

Adjust **[Syn. EMF constant]** PHS to have optimal behavior.

- Start the motor at minimal stable frequency available on the machine (without load).
- Check and note the **[Relative d-axis error]** rdAE value.
  - If the **[Relative d-axis error]** rdAE value is lower than 0%, then **[Syn. EMF constant]** PHS may be increased.
  - If the **[Relative d-axis error]** rdAE value is upper than 0%, then **[Syn. EMF constant]** PHS may be reduced.

  [Relative d-axis error] rdAE value should be closed to 0%.
- Stop the motor for modify **[Syn. EMF constant]** PHS in accordance with the value of the **[Relative d-axis error]** rdAE (previously noted).

Advices:

The drive must be chosen to have enough current according to the need of behavior, but not too much, to have enough accuracy in the current measurement, especially with the high frequency signal injection (see **[HF inj. activation]** HFI).

Performances may be higher on high saliency motors by activating high frequency injection function (see **[HF inj. activation]** HFI).

Parameter list

HMI label	Settings	Factory setting
[Synchronous motor] SYn —		
[Sync Nominal I] nCrS ★	0.25 to 1.5 In (1)	According to drive rating
Sync motor nominal current **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Pole pairs] PPnS ★	1 to 50	According to drive rating
Pole pairs number (sync) **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom SyncMotor Speed] nSPS ★ (2)	0 to 48,000 rpm	According to drive rating
Nominal synchronous motor speed **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Nom Motor torque] tqS ★	0.1 to 6,553.5 Nm	According to drive rating
Nominal motor torque **NOTE:** Modifying this parameter resets the motor tune parameters and, **[Tune selection]** StUn is reset to **[Default]** tAb. Autotuning is needed to be performed again.		
[Autotuning] tUn 2 s	—	**[No]** nO
Autotuning		

⚠WARNING

UNEXPECTED MOVEMENT

Autotuning moves the motor in order to tune the control loops.

- Only start the system if there are no persons or obstructions in the zone of operation.

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

During autotuning, noise development and oscillations of the system are normal.

⚠WARNING

LOSS OF CONTROL

- If you modify the value of one or more motor parameters after having performed autotuning, the value of **[Tune selection]** is reset to **[Default]** and you must re-perform autotuning.

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

HMI label	Settings	Factory setting
• Auto-tuning is only performed if no stop command has been activated. If a "freewheel stop" or "fast stop" function has been assigned to a logic input, this input must be set to 1 (active at 0). • Auto-tuning takes priority over any run or prefluxing commands, which is taken into account after the auto-tuning sequence. • If auto-tuning detects a error, the drive displays **[No Action]** n o and, depending on the configuration of **[Tuning Error Resp]** t n L , may switch to detected**[Tune Error Status]** t n L error mode. • Auto-tuning may last for 1 to 2 seconds. Do not interrupt the process. Wait for the display to change to **[No Action]** n o . **NOTE:** Motor thermal state has a big influence on tune result. Make the tune with the motor stopped and cold. To redo a tune of the motor, wait that it is completely stopped and cold. Set first **[Autotuning]** t u n to **[Erase Autotuning]** C L r , then redo the motor tuning. The use of the motor tuning without doing a **[Erase Autotuning]** C L r first is used to get the thermal state estimation of the motor. In any case, the motor has to be stopped before performing a tune operation. Cable length has an influence on the Tune result. If the cabling is modified, it is necessary to redo the tune operation. • **[No Action]** n o : ***No action***, auto-tuning not in progress • **[Apply Autotuning]** Y E S : ***Apply autotuning***, auto-tuning is performed immediatly if possible, then the parameter automatically changes to **[No Action]** n o . If the drive state does not allow the tune operation immediately, the parameter changes to **[No]** n o and the operation must be done again. • **[Erase Autotuning]** C L r : ***Erase autotuning***, the motor parameters measured by the auto-tuning function are reseted. The default motor parameters values are used to control the motor. **[Autotuning Status]** t u S is set to **[Not Done]** t A b .		
[Autotuning Status] t u S	—	**[Not Done]** t A b
Autotuning status (for information only, cannot be modified) This parameter is not saved at drive power off. It shows the Autotuning status since last power on. • **[Not Done]** t A b : ***Not done***, autotune is not done • **[Pending]** P E n d : ***Test is pending***, autotune has been requested but not yet performed • **[In Progress]** P r o G : ***Test in progress***, autotune is in progress • **[Error]** F A i L : ***Error detected***, autotune has detected a error • **[Autotuning Done]** d o n E : ***Autotuning Done***, the motor parameters measured by the auto-tuning function are used to control the motor		
[Tune selection] S t u n	—	**[Default]** t A b
Tune selection (for information only, cannot be modified) **NOTE:** Tune of the motor increases significantly the performances. • **[Default]** t A b : ***Default***, the default values are used to control the motor • **[Measure]** M E A S : ***Measure***, the values measured by the auto-tuning function are used to control the motor • **[Custom]** C u S : ***Custom***, the values set manually are used to control the motor		
[Autotuning Usage] t u n u	—	**[Therm mot]** t M
Autotuning usage This parameter shows the way used to modify the motor parameters according to its estimated thermal state. • **[No]** n o : ***No***, no thermal state estimation • **[Therm mot]** t M : ***Use the motor thermal evolution***, statoric thermal state estimation based on nominal current and current consumed by the motor • **[Cold tun]** C t : ***Use the cold tune values***, statoric thermal state estimation based on statoric resistance measured at the first cold tune and tune done at each power up.		

HMI label	Settings	Factory setting
NOTE: An autotuning must be performed before setting **[Autotuning Usage]** tunU to **[Cold tun]** CT to get the references values of a cold tune.		
[Automatic autotune] AUt 2 s	—	**[No]** no
Automatic autotune		

⚠WARNING

UNEXPECTED MOVEMENT

If this function is activated, autotuning is performed each time the drive is switched on.

- Verify that activating this function does not result in unsafe conditions.

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

The motor must be stopped when switching on the drive.

[Automatic autotune] AUt is forced to **[Yes]** YES if **[Autotuning Usage]** tunU is set to **[Cold tun]** CT. The value of motor statoric resistance measured during the tune is used to estimate the thermal state of the motor at power up.

- **[No]** no: ***No***, function deactivated
- **[Yes]** YES: ***Yes***, a tune is automatically done at each power up
- **[One]** onE: ***At first run order***

[Saliency mot. state] SMot★	—	—
Status of motor tune in term of saliency		

(for information only, cannot be modified)

Information on synchronous motor saliency.

This parameter can be accessed if **[Tune selection]** StUn is set to **[Measure]** MEAS.

NOTE: In case of motor with low saliency, the standard control law is advised.

- **[No info.]** no: ***No information***, tune not done
- **[Low salient]** LLS: ***Low saliency*** (Recommended configuration: **[Angle setting type]** ASt = **[PSI align.]** PSI or **[PSIO align.]** PSIo and **[HF inj. activation]** HFI = **[No info.]** no).
- **[Med salient]** MLS: ***Medium saliency*** **[Angle setting type]** ASt = **[SPM align.]** SPMA is possible. **[HF inj. activation]** HFI = **[Yes]** YES could work).
- **[High salient]** HLS: ***High saliency*** **[Angle setting type]** ASt = **[IPM align.]** IPMA) is possible. **[HF inj. activation]** HFI = **[Yes]** YES is possible).

[Angle setting type] ASt★	—	**[PSIO align.]** PSIo
Auto angle setting type		

Mode for measuring the phase-shift angle. Visible only if **[Motor control type]** Ctt is set to **[Sync. mot.]** SYn,

[PSI align.] PSI and **[PSIO align.]** PSIo are working for all type of synchronous motors. **[SPM align.]** SPMA and **[IPM align.]** IPMA increase performances depending on the type of synchronous motor.

- **[IPM align.]** IPMA: ***IPM alignment***, alignment for IPM motor. Alignment mode for Interior-buried Permanent Magnet motor (usually, this kind of motor has a high saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.
- **[SPM align.]** SPMA: ***SPM alignment***, Alignment for SPM motor. Mode for Surface-mounted Permanent Magnet motor (usually, this kind of motor has a medium or low saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.
- **[PSI align.]** PSI: ***Pulse Signal injection***. Standard alignment mode by pulse signal injection.

HMI label	Settings	Factory setting
• **[PSIO align.]** P S i o: ***Pulse Signal injection - Optimized***. Standard optimized alignment mode by pulse signal injection. The phase shift angle measurement time is reduced after the first run order or tune operation, even if the drive has been turned off. • **[No align.]** n o: ***NO alignment***		
[HF inj. activation] H F i ★	—	**[No]** n o
Activation of HF injection Activation of high frequency signal injection in RUN. This function allows to estimate the motor speed in a view to have torque at low speed without speed feedback. **NOTE:** The more the saliency is high, the more the **[HF inj. activation]** H F i function is efficient. To ensure the performances, it could be necessary to adjust the speed loop parameters (**[K speed loop filter]** S F C, **[Speed time integral]** S i t and **[Speed prop. gain]** S P G) and the speed estimation phase locked loop (Expert parameters **[HF pll bandwidth]** S P b and **[HF pll dump. factor]** S P F). High frequency injection is not efficient with low saliency motors (see **[Saliency mot. state]** S M o t). It is advised to have 4 kHz of pwm frequency (**[Switching frequency]** S F r). In case of instability with no load, it is advised to decrease **[Speed prop. gain]** S P G and **[HF pll bandwidth]** S P b. Then, adjust the speed loop parameters to have the dynamic behavior and the PLL gains to have a good speed estimation at low speed. In case of instability with load, it could help to increase the **[Angle error Comp.]** P E C parameter (mainly for SPM motor). • **[No]** n o: ***No***, function deactivated • **[Yes]** Y E S: ***Yes***, high frequency injection is used for speed estimation		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

(2) On the integrated display unit: 0 to 9,999 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Synchronous motor] S Y n — : Expert mode

HMI label	Settings	Factory setting
[Synchronous motor] S Y n —		
[SyncMotor Stator R] r S A S ★ ( ) (1)	0 to 65,535 mΩ	0 mΩ
Calculated SyncMotor Stator R. Cold state stator resistance (per winding). The factory setting is replaced by the result of the auto-tuning operation, if it has been performed. The value can be entered by the user, if he knows it.		
[Autotune L d-axis] L d S ★	0 to 655.35 mH	0 mH
Sync motor d inductance, axis "d" stator inductance in mH (per phase). On motors with smooth poles **[Autotune L d-axis]** L d S = **[Autotune L q-axis]** L 9 S = Stator inductance L. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		
[Autotune L q-axis] L 9 S ★	0 to 655.35 mH	0 mH
Sync motor q inductance, axis "q" stator inductance in mH (per phase). On motors with smooth poles **[Autotune L d-axis]** L d S = **[Autotune L q-axis]** L 9 S = Stator inductance L. The factory setting is replaced by the result of the auto-tuning operation, if it has been performed.		
[Syn. EMF constant] P H S ★ (1)	0 to 6,553.5 mV/rpm	0 mV/rpm
Sync. EMF constant, is in 0.1mV/RPM (peak per phase). PHS adjustment allows to reduce the current in operation without load.		
[Sync Nominal Freq] F r S S ★ ( )	10 to 800 Hz	nSPS * PPnS / 60
Synchronous motor nominal freq, in Hz unit Automatically updated according to **[Nom SyncMotor Speed]** n S P S and **[Pole pairs]** P P n S data. A **[Sync Nominal Freq]** F r S S lower than the minimal value 10.0 Hz triggers a **[Incorrect Config]** C F F at the next power on. **NOTE:** • The value of **[Sync Nominal Freq]** F r S S is limited by **[High Speed]** H S P. • Modifying this parameter resets the motor tune parameters and, **[Tune selection]** S t u n is reset to **[Default]** t A b. Autotuning is needed to be performed again.		
[HF pll bandwidth] S P b ★	0 to 100 Hz	25 Hz
Bandwidth of the HF PLL, bandwidth of the stator frequency Pll.		
[HF pll dump. factor] S P F ★	0 to 200%	100%
Dumping factor of the HF PLL, dumping factor of the stator frequency Pll.		
[Angle error Comp.] P E C ★	0 to 500%	0%
Angle position error compensation, error compensation of the angle position in high frequency mode. It increases performances at low speed in generator and motor mode, particularly for SPM motors. **[Auto]** A u t o: The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters.		
[HF injection freq.] F r i ★	250 to 1,000 Hz	500 Hz
Frequency of the HF injection signal It has an influence on the noise during angle shift measurement and speed estimation accuracy.		

HMI label	Settings	Factory setting
[HF current level] HIr ★	0 to 200%	25%
Current level of the HF injection signal Ratio for the current level of the high frequency injection signal. It has an influence on the noise during angle shift measurement and speed estimation accuracy.		
[PSI Align Curr Max] nCr ★	**[Auto]** Auto to 300%	**[Auto]** Auto
Maximum current of PSI alignment Current level in % of **[Sync Nominal I]** nCrS for **[PSI align.]** PS I and **[PSIO align.]** PS Io angle shift measurement modes. This parameter has an impact on the inductor measurement. **[PSI Align Curr Max]** nCr is used for tune operation. This current must be equal or higher than the maximum current level of the application, otherwise instability may occur. If **[PSI Align Curr Max]** nCr is set to **[Auto]** Auto , **[PSI Align Curr Max]** nCr = 150% of **[Sync Nominal I]** nCrS during the tune operation and 100% of **[Sync Nominal I]** nCrS during angle shift measurement in case of standard alignment **[PSI align.]** PS I or **[PSIO align.]** PS Io.		
[Current Level Align] ILr ★	0 to 200%	50%
Current level of the HF alignment Current level in % of **[Sync Nominal I]** nCrS for high frequency phase-shift angle measurement IPMA type.		
[Boost level align.] SIr ★	0 to 200%	100%
Boost level for IPMA alignment Current level in % of **[Sync Nominal I]** nCrS for high frequency phase-shift angle measurement SPMA type.		
[Relative d-axis error] rdAE	-3276.7 to 3275.8 %	—
Relative d-axis error in % Use **[Relative d-axis error]** rdAE to adjust **[Syn. EMF constant]** PHS, **[Relative d-axis error]** rdAE should be closed to 0. If the **[Relative d-axis error]** rdAE value is lower than 0%, then **[Syn. EMF constant]** PHS, may be increased. If the **[Relative d-axis error]** rdAE value is upper than 0%, then **[Syn. EMF constant]** PHS, may be reduced.		

(1) On the integrated display unit: 0 to 9,999 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[Motor control] drC - parameters (continued)

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ drC

Parameters List

HMI label	Settings	Factory setting
[Speed prop. gain] SPG ★ ( )	0 to 1,000%	40%
Speed proportional gain Visible if **[Motor control type]** CtT is not set to **[Standard]** Std, **[U/F VC 5pts]** UF5 or **[U/F VC Quad.]** UF9.		
[Inertia Factor] SPGU ★ ( )	0 to 1,000%	40%
Inertia factor Visible if **[Motor control type]** CtT is set to **[Standard]** Std, **[U/F VC 5pts]** UF5 or **[U/F VC Quad.]** UF9.		
[Speed time integral] S1t ★ ( )	1 to 65,535 ms	63 ms
Speed time integral Visible if **[Motor control type]** CtT) is not set to **[Standard]** Std, **[U/F VC 5pts]** UF5 or **[U/F VC Quad.]** UF9.		
[K speed loop filter] SFC ★ ( )	0 to 100	65
K speed loop filter (0(IP) to 100(PI))		
[Spd est. filter time] FFH ★	0 to 100 ms	6.4 ms
Filter time of the estimated speed Accessible in Expert mode only.		
[Current Filter Time] CrtF ★	0 to 100 ms	3.2 ms
Filter time of the current Accessible in Expert mode only. Filter time of the current reference filter [of control law (if **[No]** no: stator natural frequency)].		
[IR compensation] UFr ( )	0 to 200%	100%
IR compensation Used to optimize torque at very low speed, or to adapt to special cases (for example: for motors connected in parallel, decrease **[IR compensation]** UFr. If there is insufficient torque at low speed, increase **[IR compensation]** UFr. A too high value can avoid the motor to start (locking) or change the current limiting mode.		
[Slip compensation] SLP ★ ( )	0 to 300%	100%
Slip Compensation This parameter cannot be accessed if **[Motor control type]** CtT is set to **[Sync. mot.]** SYn. This parameter is written at 0% when **[Motor control type]** CtT is set to **[U/F VC Quad.]** UF9. Adjusts the slip compensation around the value set by the rated motor speed.		

HMI label	Settings	Factory setting
The speeds given on motor nameplates are not necessarily exact. If slip setting is lower than actual slip: The motor is not rotating at the correct speed in steady state, but at a speed lower than the reference. If slip setting is higher than actual slip: The motor is overcompensated and the speed is unstable.		
[U1] u 1 ★	0 to 800 V according to rating	0 V
Volt point 1 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[F1] F 1 ★	0 to 599 Hz	0 Hz
Freq point 1on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[U2] u 2 ★	0 to 800 V according to rating	0 V
Volt point 2 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[F2] F 2 ★	0 to 599 Hz	0 Hz
Freq point 2 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[U3] u 3 ★	0 to 800 V according to rating	0 V
Volt point 3 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[F3] F 3 ★	0 to 599 Hz	0 Hz
Freq point 3 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[U4] u 4 ★	0 to 800 V according to rating	0 V
Volt point 4 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[F4] F 4 ★	0 to 599 Hz	0 Hz
Freq point 4 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[U5] u 5 ★	0 to 800 V according to rating	0 V
Volt point 5 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		
[F5] F 5 ★	0 to 599 Hz	0 Hz
Freq point 5 on 5pt V/F This parameter can be accessed if **[Motor control type]** C t t is set to **[U/F VC 5pts]** u F 5.		

HMI label	Settings	Factory setting
[Current Limitation] C L ★	0 to 1.5 In (1)	1.5 In (1)

Current limitation

NOTICE

OVERHEATING

- Verify that the motor is properly rated for the maximum current to be applied to the motor.
- Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit.

Failure to follow these instructions can result in equipment damage.

NOTE: If the setting is less than 0.25 In, the drive may lock in detected **[OutPhaseLoss Assign]** o P L error mode if this has been enabled. If it is less than the no-load motor current, the motor cannot run.

[Switch Freq Type] S F t	—	**[SFR type 1]** H F 1

Switching frequency type

The motor switching frequency is modified (reduced) when the internal temperature of the drive is too high.

[SFR type 1] H F 1: Heating optimization
Allows the system to adapt the switching frequency according to the motor frequency.

[SFR type 2] H F 2: Motor noise optimization (for high switching frequency)
Allows the system to keep a constant chosen switching frequency **[Switching frequency]** S F r whatever the motor frequency **[Motor Frequency]** r F r.

In the event of overheating, the drive automatically decreases the switching frequency.

It is restored to its original value when the temperature returns to normal.

[Switching frequency] S F r	2 to 16 kHz	4 kHz

Switching frequency

NOTICE

DAMAGE TO THE DRIVE

Verify that the switching frequency of the drive does not exceed 4 kHz if the EMC filter is disconnected for operation of the drive in an IT mains.

Failure to follow these instructions can result in equipment damage.

This applies to the following drive versions: ATV320•••M2•

Switching frequency setting.

Adjustment range: The maximum value is limited to 4 kHz if **[Motor surge limit.]** S V L parameter is configured.

NOTE: In the event of excessive temperature rise, the drive is automatically reduce the switching frequency and reset it once the temperature returns to normal.

In case of high speed motor, it is advised to increase the Pulse Width Modulation (PWM) frequency **[Switching frequency]** S F r at 8, 12 or 16 kHz.

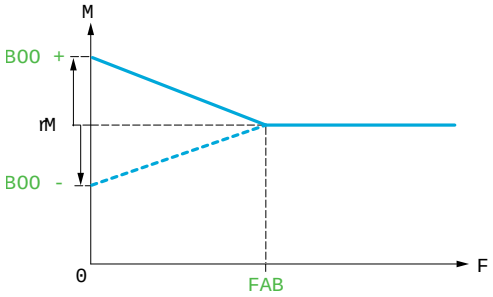
[Noise Reduction] n r d	—	**[No]** n o

Motor Noise Reduction

Random frequency modulation helps to prevent any resonance, which may occur at a fixed frequency.

- **[No]** n o: ***No***, fixed frequency
- **[Yes]** Y E S: ***Yes***, frequency with random modulation

[Boost activation] b o A	—	**[Dynamic]** d Y n A

HMI label	Settings	Factory setting
Boost activation • **[Inactive]** n o: ***Inactive***, no boost • **[Dynamic]** d Y n A: ***Dynamic*** • **[Static]** S t A t: ***Static***		
[Boost] b o o ★	-100 to 100%	0%
Boost This parameter can be accessed if **[Boost]** b o o is not set to **[No]** n o. Adjustment of the motor magnetizing current at low speed, as a % of the rated magnetizing current. This parameter is used to increase or reduce the time taken to establish the torque. It allows gradual adjustment up to the frequency set by **[Freq Boost]** F A b. Negative values apply particularly to tapered rotor motors.  **M** : Magnetizing current **F** : Frequency **IM** : Rated magnetizing current **FAB** : **[Freq Boost]** F A b b o o **+** : Positive **[Boost]** b o o **-** : Negative**[Boost]**		
[Freq Boost] F A b ★	0 to 599 Hz	0 Hz
Frequency boost This parameter can be accessed if **[Boost activation]** b o A is not set to **[No]** n o. Frequency above which the magnetizing current is no longer affected by **[Boost]** b o o.		
[Motor surge limit.] S V L	—	**[No]** n o
Motor surge limitation This function limits motor overvoltages and is useful in the following applications: • NEMA motors • Japanese motors • Spindle motors • Rewound motors This parameter can remain set to **[No]** n o for 230/400 V motors used at 230 V, or if the length of cable between the drive and the motor does not exceed: • 4 m with unshielded cables • 10 m with shielded cables **NOTE:** When **[Motor surge limit.]** S V L is set to **[Yes]** Y E S, the maximum switching frequency **[Switching frequency]** S F r is modified. • **[No]** n o: ***No***, function inactive • **[Yes]** Y E S: ***Yes***, function active		

HMI label	Settings	Factory setting
[Attenuation Time] S o P ★	—	10 µs
Attenuation time Optimization parameter for transient overvoltages at the motor terminals. This parameter can be accessed if **[Motor surge limit.]** S V L is set to **[Yes]** Y E S. **[6 µs]** 6 **[8 µs]** 8 **[10 µs]** 1 0: Set to 6, 8 or 10 µs, according to the following table. **NOTE:** This parameter is useful for ATV320•••N4• drives.		

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

The value of the **[Attenuation Time]** S o P parameter corresponds to the attenuation time of the cable used. It is defined to help to prevent the superimposition of voltage wave reflections resulting from long cable lengths. It limits overvoltages to twice the DC bus rated voltage.

The tables on the following page give examples of correspondence between the **[Attenuation Time]** S o P parameter and the length of the cable between the drive and the motor. For longer cable lengths, an output of the filter or a dV/dt protection filter must be used.

For motors in parallel, the sum of all the cable lengths must be taken into consideration. Compare the length given in the table row corresponding to the power for one motor with that corresponding to the total power, and select the shorter length.

Example: Two 7.5 kW (10 HP) motors

Take the lengths on the 15 kW (20 HP) table row, which are shorter than those on the 7.5 kW (10 HP) row, and divide by the number of motors to obtain the length per motor (with unshielded "Nexans" cable and SOP = 6, the result is 40/2 = 20 m 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.

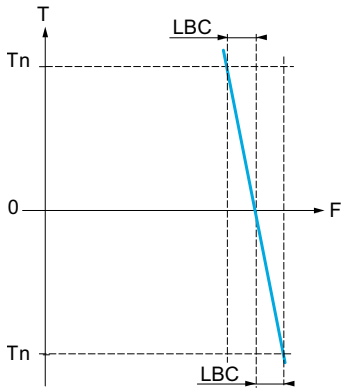
To retain the overall drive performance, do not increase the S o P value unnecessarily.

Tables giving the correspondence between the S o P parameter and the cable length, for 400 V supply mains

					Maximum cable length in meters								
Reference	Motor power		Cable crosssection (minimum)		Unshielded "Nexans" cable Type H07 RN-F 4Gxx			Shielded "Nexans" cable Type GVCSTV-LS/LH			Shielded "BELDEN" cable Type 2950x		
	kW	HP	in mm²	AWG	S o P = 10	S o P = 8	S o P = 6	S o P = 10	S o P = 8	S o P = 6	S o P = 10	S - o P = 8	S o P = 6
ATV320U04N4•	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
ATV320U06N4•	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
ATV320U07N4•	0.75	1	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320U11N4•	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
ATV320U15N4•	1.5	2	1.5	14	100 m	70 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320U22N4•	2.2	3	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320U30N4•	3	—	1.5	14	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m

					Maximum cable length in meters								
ATV320U40N4•	4	5	2.5	12	110 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320U55N4•	5.5	7.5	4	10	120 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320U75N4•	7.5	10	6	8	120 m	65 m	45 m	105 m	85 m	65 m	50 m	40 m	30 m
ATV320D11N4•	11	15	10	8	115 m	60 m	45 m	100 m	75 m	55 m	50 m	40 m	30 m
ATV320D15N4•	15	20	16	6	105 m	60 m	40 m	100 m	70 m	50 m	50 m	40 m	30 m

‘For 230/400 V motors used at 230 V, the **[Motor surge limit.]** S V L parameter can remain set to **[No]** n o.

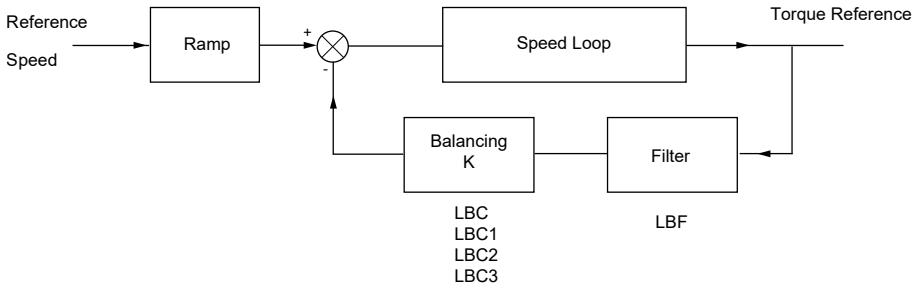
HMI label	Settings	Factory setting
[Braking level] U b r ↻	335 to 995 V	According to drive rating voltage
Braking level Braking transistor command level (See **[Braking level]** U b r).		
[Load sharing] L b A ★	—	**[No]** n o
Load sharing When 2 motors are connected mechanically and therefore at the same speed, and each is controlled by a drive, this function can be used to improve torque distribution between the two motors. To do this, it varies the speed based on the torque. This parameter can only be accessed if **[Motor control type]** C t t , page 121 is set to **[SVC V]** U U C. • **[No]** n o: ***No***, function inactive • **[Yes]** Y E S: ***Yes***, function active		
[Load correction] L b C ★ ↻	0 to 599 Hz	0 Hz
Load correction Rated correction in Hz. This parameter can be accessed if **[Load sharing]** L b A is set to **[Yes]** Y E S.  **T**: Torque **T_n**: Nominal torque **F**: Frequency		

★ : 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.

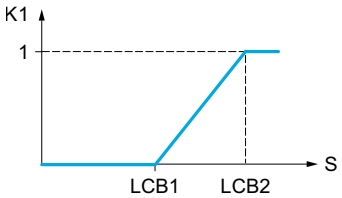
↻ : Setting of this parameter can be done during operation or when stopped.

[Motor control] d r C - : Load sharing, parameters that can be accessed at expert level

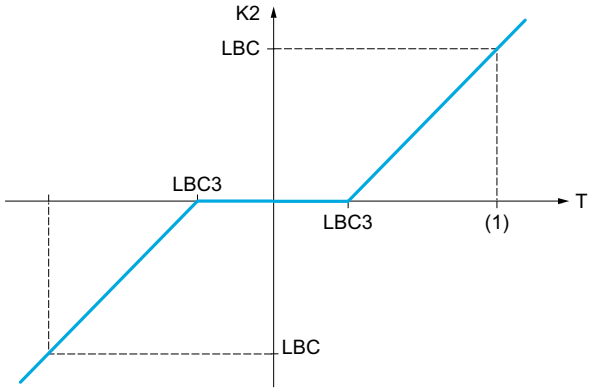
Principle:



The load sharing factor K is determined by the torque and speed, with two factors K1 and K2 (K = K1 x K2).



S: Speed



1. Rated torque x (1 + LBC3)

T: Torque

HMI label	Settings	Factory setting
[Correction min spd] L b C 1 ★ ( )	0 to 598.9 Hz	0 Hz
Correction min speed This parameter can be accessed if **[Load sharing]** L b A is set to **[Yes]** Y E S. Minimum speed for load correction in Hz. Below this threshold, no corrections are made. Used to cancel correction at very low speed if this would hamper rotation of the motor.		
[Correction max spd] L b C 2 ★ ( )	**[Correction min spd]** L b C 1 + 0.1 at 599 Hz	0.1 Hz
Correction max speed This parameter can be accessed if **[Load sharing]** L b A is set to **[Yes]** Y E S. Speed threshold in Hz above which maximum load correction is applied.		
[Torque offset] L b C 3 ★ ( )	0 to 300%	0%
Torque offset		

HMI label	Settings	Factory setting
This parameter can be accessed if **[Load sharing]** L b A is set to **[Yes]** Y E S. Minimum torque for load correction as a % of the rated torque. Below this threshold, no corrections are made. Used to avoid torque instabilities when the torque direction is not constant.		
[Sharing filter] L b F ★ ↻	0 to 20 s	100 ms
Sharing filter This parameter can be accessed if **[Load sharing]** L b A is set to **[Yes]** Y E S. Time constant (filter) for correction in ms. Used in the event of flexible mechanical coupling to avoid instabilities.		

★ : 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.

↻ : Setting of this parameter can be done during operation or when stopped.

1.3.4.4 [Full] F u L L – – [Inputs / Outputs] I _ o —

What's in This Chapter

[Inputs / Outputs] I_O-

Access

Parameters described below can be accessed by: dr I ➡ ConF ➡ FULL ➡ I_O

Name of the Inputs/outputs of the drive

The parameters in the **[Inputs / Outputs]** I_O — menu can only be modified when the drive is stopped and no run command is present.

The name of the inputs and outputs may differ from a tool to the other:

- 4-digit 7-segment display,
- code displayed on the terminals (Control Block),
- labels displayed on ATV320 DTM,
- labels displayed on Graphic Display Terminal (VW3A1111), and
- labels displayed on Remote Graphic Terminal (VW3A1101).

The following list shows a sum up of the different name used:

- **LI1…LI6 or DI1…DI6:** for logic input 1…6 or digital input 1…6,
  - **- LI5 or DI5** can be configured as a pulse input (PI or RP),
  - **LI6 or DI6**can be configured as a PTC (Positive Temperature Coefficient) using hardware switch SW2.
- **LO1 or DQ+/DQ-:** logic output or digital output,
- **AI1…AI3:** for analog inputs,
- **AQ1 or AO1:** for analog output,
- The analog output can be configured as a digital output (named **DO1 or DQ1**)
- **R1, R2:** for relay 1 and relay 2,
- **STO:** Safe Torque Off input.

For more information on the control terminals, refer to the installation manual Related Documents, page 11.

Parameters list

HMI label	Settings	Factory setting
[Inputs / Outputs] I_O —		
[2/3-Wire Control] tCC 2 s	—	**[2-Wire Control]** 2C

2/3-wire control

⚠WARNING

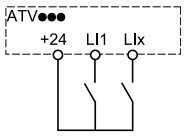
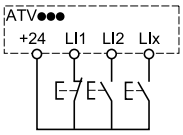
UNANTICIPATED EQUIPMENT OPERATION

If this parameter is changed, the parameters **[Auto Fault Reset]** ATR and **[2-wire type]** TCT and the assignments of the digital and virtual inputs are partially reset to the factory setting.

- Verify that this change is compatible with the type of wiring used.

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

[2-Wire Control] 2C

HMI label	Settings	Factory setting
2-wire control (level commands): This is the input state (0 or 1) or edge (0 to 1 or 1 to 0) which controls running or stopping. Example of "source" wiring:  LI1: forward LIx: reverse **[3-Wire Control]** 3 C **3-wire control (pulse commands):** A "forward" or "reverse" pulse is sufficient to command starting, a "stop" pulse is sufficient to command stopping Example of "source" wiring:  LI1: stop LI2: forward LIx: reverse		
[2-wire type] t C t ★ 2 s	—	**[Transition]** t r n
Type of 2-wire control **⚠WARNING** **UNANTICIPATED EQUIPMENT OPERATION** Verify that the parameter setting is compatible with the type of wiring used. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** • **[Level]** L E L : ***Level***, state 0 or 1 is taken into account for run (1) or stop (0) • **[Transition]** t r n : ***Transition***, a change of state (transition or edge) is necessary to initiate operation, to avoid accidental restarts after a break in the power supply • **[Level With Fwd Priority]** (P F o : ***Level with forward priority***, state 0 or 1 is taken into account for run or stop, but the "forward" input takes priority over the "reverse" input		
[Drive Running] r u n ★	—	**[No]** n o
Drive running, assignment of the stop command. Visible only if **[2/3-Wire Control]** t C C is set to **[3-Wire Control]** 3 C . **[DI1]** L I 1 : Logical input LI1 if not in **[I/O profile]** I O **[CD00]** C d 0 0 : In **[I/O profile]** I O , can be switched with possible logic inputs **[OL01]** o L 0 1 : Function blocks: Logical Output 01 ... **[OL10]** o L 1 0 : Function blocks: Logical Output 10		
[Forward] F r d	—	**[DI1]** L I 1
Forward input, assignment of the forward direction command. **[DI1]** L I 1 : Logical input LI1 if not in **[I/O profile]** I O **[CD00]** C d 0 0 : In **[I/O profile]** I O , can be switched with possible logic inputs **[OL01]** o L 0 1 : Function blocks: Logical Output 01		

HMI label	Settings	Factory setting
... **[OL10]** o L I O: Function blocks: Logical Output 10 **NOTE:** You can also use F1, F2, F3, and F4 to assign the forward direction command.		
[Reverse Assign] r r S	—	**[DI2]** L I 2
Reverse assignment, assignment of the reverse direction command. **[Not Assigned]** n o: Not assigned **[DI1]** L I 1: Logical input LI1 **[...] (...)**: See the assignment conditions (If **[Profile]** C H C F is set to **[Not separ.]** S I n or **[Separate]** S E P then **[CD11]** C d 1 1 up to **[CD15]** C d 1 5, **[C111]** C 1 1 1 up to **[C115]** C 1 1 5, **[C211]** C 2 1 1 up to **[C215]** C 2 1 5 and **[C311]** C 3 1 1 up to **[C315]** C 3 1 5 are not available). **NOTE:** You can also use F1, F2, F3, and F4 to assign the reverse direction command.		

[DI1 Configuration] L I —

Access

Parameters described below can be accessed by: dr I ➜ ConF ➜ FULL ➜ I_O ➜ L I

Parameters list

HMI label	Settings	Factory setting
[DI1 Configuration] L I —		
[DI1 assignment] L IA	—	—

DI1 assignment

Read-only parameter, cannot be configured.

It displays all the functions that are assigned to input LI1 to check for multiple assignments.

- **[Not Assigned]** nO: ***Not assigned***
- **[Run]** run: **[Run]**
- **[Forward]** Frd: **[Forward]**
- **[Reverse]** rrS: ***Reverse direction***
- **[Ramp switching]** rPS: ***Ramp switching***
- **[Jog]** JOG: ***Jog***
- **[+ speed]** USP: ***Increase speed***
- **[-speed]** dSP: ***Decrease speed***
- **[2 preset speeds]** PS2: ***Select 2 preset speeds***
- **[4 preset speeds]** PS4: ***Select 4 preset speeds***
- **[8 preset speeds]** PS8: ***Select 8 preset speeds***
- **[Ref Freq 2 switching]** rFC: ***Reference frequency 2 switching***
- **[Freewheel Stop]** nSt: ***Freewheel stop***
- **[DC injection]** dC I: ***DC inj. braking***
- **[Fast stop]** FSt: ***Fast stop***
- **[Forced Local]** FLO: ***Forced local mode***
- **[Fault Reset]** rSF: ***Fault Reset***
- **[Autotuning]** tUL: ***Autotuning***
- **[Ref Frequency stored]** SPM: ***Reference frequency stored***
- **[Pre Fluxing]** FL I: ***Pre fluxing***
- **[Auto / manual]** PAU: ***Auto/Manual switch***, PI(D) auto-manu
- **[PID Integral Disabled]** PIS: ***PID integral disabled***, integral shunting PI(D)
- **[2 preset PID ref.]** Pr2: ***Select 2 preset PID refs.***
- **[4 preset PID ref.]** Pr4: ***Select 4 preset PID refs.***
- **[Torque limitation]** tLA: ***Torque limitation***
- **[External Error]** EtF: ***External error***
- **[Output contact. fdbk]** rCA: ***Output contact. feedback***
- **[2 config. switching]** CnF1: ***2 configuration switching***
- **[3 config. switching]** CnF2: Configuration switching 2
- **[2 parameter sets]** CHA1: Parameter switching 1
- **[3 parameter sets]** CHA2: Parameter switching 2

HMI label	Settings	Factory setting
• **[Analog torque limitation]** tLC: Torque limitation: Activation (analog input) by a logic input • **[Cmd switching]** CCS: Command channel switching • **[Disable Error Detect]** InH: Detected error inhibition • **[16 preset speeds]** PS16: 16 preset speeds • **[Current limit 2]** LC2: Current limitation switching • **[Ref Freq 1B switching]** rCb: Reference channel switching (1 to 1B) • **[Traverse control]** trC: Traverse control • **[Brake Contact]** bC I: Brake logic input contact • **[Stop Fwd limit sw.]** SAF: Stop switch forward • **[Stop RV limit sw.]** SAr: Stop switch reverse • **[Forward slowdown]** dAF: Slowdown attained forward • **[Reverse slowdown]** dAr: Slowdown attained reverse • **[Disable limit sw.]** CLS: Limits switches clearing • **[Device Lock]** LES: Emergency stop • **[Init. traverse ctrl.]** rtr: Reload traverse control • **[Counter wobble]** SnC: Counter wobble synchronization • **[Product Restart]** rPA: Reset Product • **[2 HSP]** SH2: High Speed 2 • **[4 HSP]** SH4: High Speed 4 • **[Preset Speed 1]** FPS1: Function key preset speed 1 assignment • **[Preset Speed 2]** FPS2: Function key preset speed 2 assignment • **[PID Ref Freq 1]** FPr1: Function key preset PI 1 assignment • **[PID Ref Freq 2]** FPr2: Function key preset PI 2 assignment • **[+speed]** FUSP: Function key faster assignment • **[-speed]** FdSP: Function key slower assignment • **[T/K]** FtK: ***Terminal keypad***,function key bumpless assignment • **[+speed around Ref Freq]** uS1: ***Increase speed around reference frequency*** • **[-speed around Ref Freq]** dS1: ***Decrease speed around reference frequency*** • **[IL01]** IL01: ***IL01***, function blocks: Logical Input 1 ... • **[IL10]** IL10: ***IL10***, function blocks: Logical Input 10 • **[FB start]** FbrN: ***FB start***, function blocks: Run mode • **[SLS Channel 1]** SLS1: ***Safe limited speed channel1*** • **[SLS Channel 2]** SLS2: ***Safe limited speed channel2*** • **[SS1 Channel 1]** SS11: ***Safe Stop 1 channel 1*** • **[SS1 Channel 2]** SS12: ***Safe Stop 1 channel 2*** • **[STO Channel1]** Sto1: ***Safe torque Off channel1*** • **[STO Channel2]** Sto2: ***Safe torque Off channel2*** • **[SMS Channel 1]** SMS1: ***SMS safety function channel 1*** • **[SMS Channel 2]** SMS2: ***SMS safety function channel 2*** **NOTE:** Safety function channels are available for LI3-LI4 and LI5-LI6 only.		
[DI1 Delay] LId	0 to 200 ms	0 ms
DI1 delay This parameter is used to take account of the change of the logic input to state 1 with a delay that can be adjusted between 0 and 200 milliseconds, to filter out possible interference. The change to state 0 is taken into account without delay.		

HMI label	Settings	Factory setting
[DI2 Configuration] L2 — to **[DI6 Configuration]** L6 —		
All the logic inputs available on the drive are processed as in the example for LI1 above, up to LI6.		
[DI5 Configuration] L5 —		
Specific parameters for LI5 used as a pulse input.		
[RP assignment] PIA	—	—
Pulse input assignment Read-only parameter, cannot be configured. It displays all the functions associated with the plse input to check, for example, for compatibility problems. Identical to **[AI1 assignment]** AI1A.		
[RP min value] PIL	0 to 20.00 kHz	0 kHz
Minimum pulse input, pulse input scaling parameter of 0% in Hz * 10 unit.		
[RP max value] PFr	0 to 20.00 kHz	20.00 kHz
RP maximum value, pulse input scaling parameter of 100% in Hz * 10 unit.		
[RP filter] PFI	0 to 1,000 ms	0 ms
RP filter, I/O ext Pulse input cutoff time of the low-filter.		
[DA1 Configuration] LA1 — **[DA2 Configuration]** LA2 —		
The 2 analog inputs AI1 and AI2 on the drive could be used as LI inputs and are processed as in the example for LI1 above.		

★ : 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.

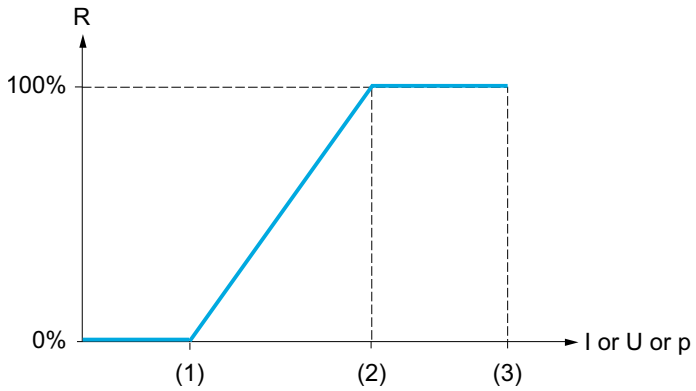
2 s: To change the assignment of this parameter, press the ENT key for 2 s.

Configuration of analog inputs and Pulse input

The minimum and maximum input values (in volts, mA, etc.) are converted to % to adapt the references to the application.

Minimum and maximum input values:

The minimum value corresponds to a reference of 0% and the maximum value to a reference of 100%. The minimum value may be greater than the maximum value:



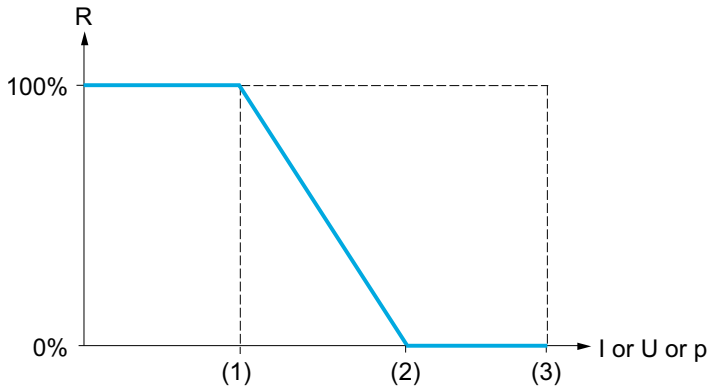
1. **[Min value]** CrLx or ULx or PIL
2. **[Max value]** CrHx or UHx or PFr
3. 20 mA or 10 V or 20.00 kHz

R: Reference

I: Current input

U: Voltage input

p: Pulse input



1. **[Max value]** CrHx or UHx or PFr
2. **[Min value]** CrLx or ULx or PIL
3. 20 mA or 10 V or 20.00 kHz

R: Reference

I: Current input

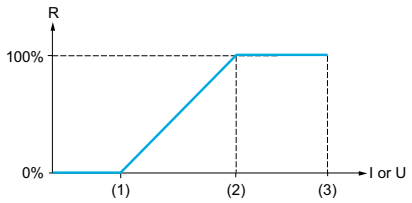
U: Voltage input

p: Pulse input

For +/- bidirectional inputs, the min. and max. are relative to the absolute value, for example +/- 2 to 8 V.

Range (output values): For analog inputs only

This parameter is used to configure the reference range to [0% —>100%] or [-100% —> +100%] to obtain a bidirectional output from a unidirectional input.



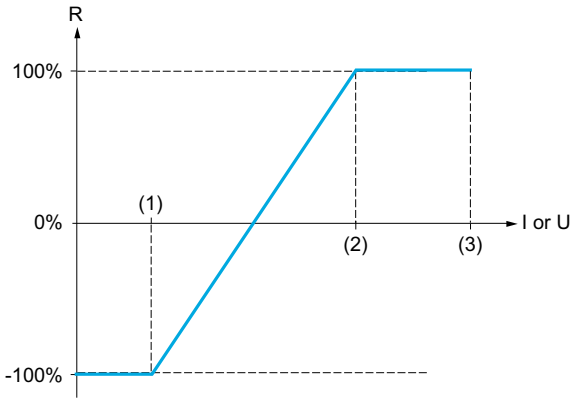
1. **[Min value]**
2. **[Max value]**
3. 20 mA or 10 V

R: Reference

I: Current input

U: Voltage input

Range : [0% —>100%]



1. **[Min value]**
2. **[Max value]**
3. 20 mA or 10 V

R: Reference

I: Current input

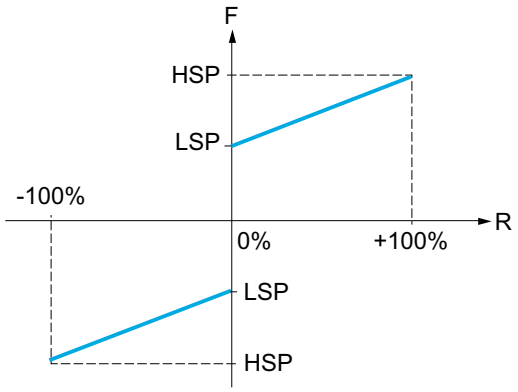
U: Voltage input

Range : [-100% —> +100%]

HMI label	Settings	Factory setting
[Ref Freq template] b S P	-	**[Standard]** b S d

Reference frequency template selection

[Standard] b S d

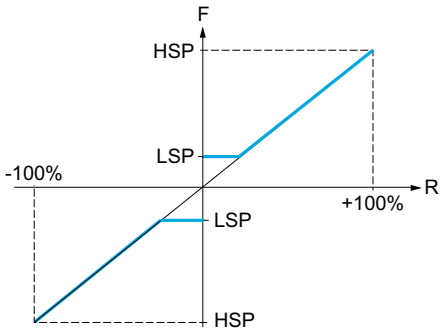


F: Frequency

R: Reference

At zero reference the frequency = LSP

[Pedestal] b L S

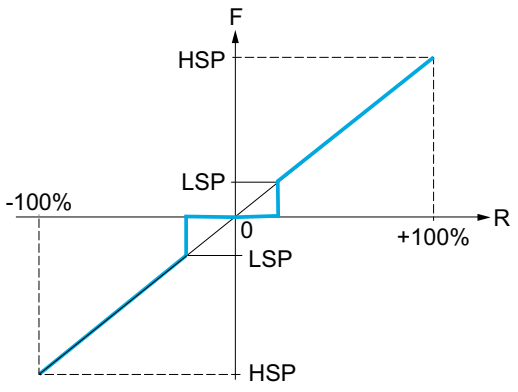


F: Frequency

R: Reference

At reference = 0 to LSP the frequency = LSP

[Deadband] b n S

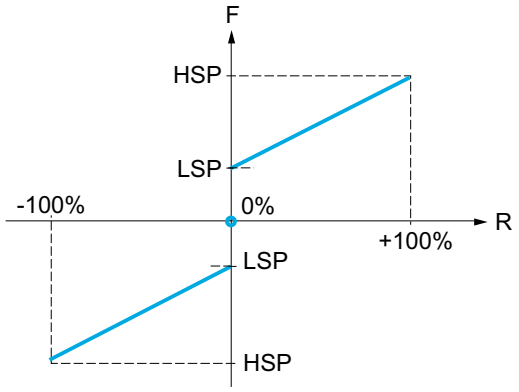


F: Frequency

R: Reference

At reference = 0 to LSP the frequency = 0

HMI label	Settings	Factory setting
[Deadband at 0%] b n S 0		



F: Frequency

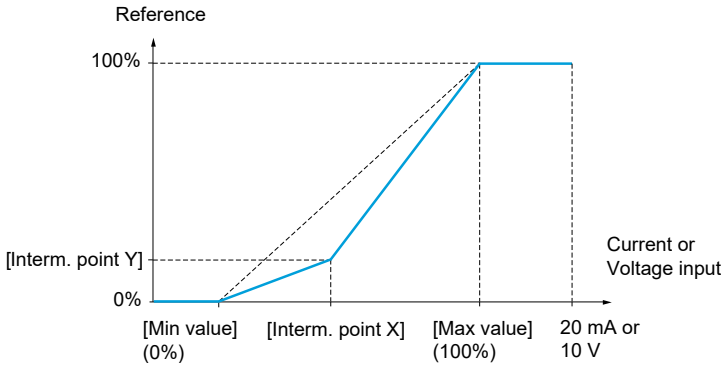
R: Reference

This operation is the same as **[Standard]** b S d except that in the following cases at zero reference, the frequency = 0:
The signal is less than **[Min value]** which is greater than 0 (example 1 V on a 2 - 10 V input)
The signal is greater than **[Min value]**, which is greater than **[Max value]** (example: 11 V on a 10 - 0 V input).
If the input range is configured as "bidirectional", operation remains identical to **[Standard]** b S d.
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.
The limits are set by the **[Low Speed]** L S P , page 101 and **[High Speed]** H S P parameters , page 101.

: Setting of this parameter can be done during operation or when stopped.

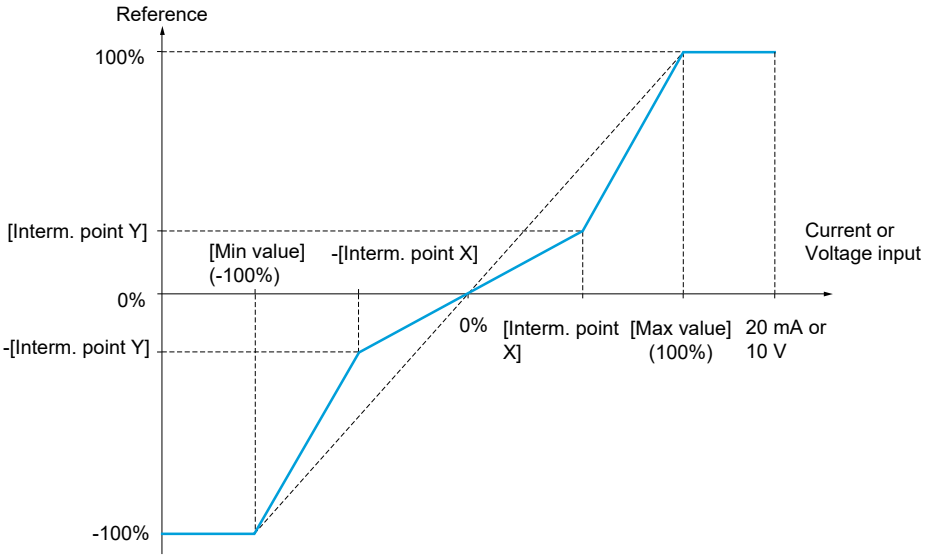
Delinearization: For analog inputs only

The input can be delinearized by configuring an intermediate point on the input/output curve of this input:
For range 0 V 100%



NOTE: For [Interm. point X], 0% corresponds to [Min value] and 100% to [Max value].

For range -100% V 100%



[AI1 configuration] AI1 —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ I_O ➜ AI1

Parameters list

HMI label	Settings	Factory setting
[AI1 configuration] AI1 —		
[AI1 assignment] AI1A	-	-
AI1 assignment Read-only parameter, cannot be configured. It displays all the functions associated with input AI1 to check, for example, for compatibility problems. • **[No]** nO: ***No*** • **[AQ1 assignment]** AO1: ***AQ1 assignment***, analog output AO1 • **[Ref Frequency 1]** Fr1: ***Reference frequency 1*** • **[Ref Frequency 2]** Fr2: ***Reference frequency 2*** • **[Ref Frequency 2 Summing]** SA2: ***Reference frequency 2 Summing*** • **[PID feedback]** PIF: ***PI controller feedback*** (PI control) • **[Torque limitation]** tAA: ***Torque limitation***, activation by an analog value • **[Subtract Ref Freq 2]** dA2: ***Subtract reference frequency 2*** • **[Manual PID ref.]** PIM: ***Manual PID reference***, manual speed reference of the PI(D) regulator (auto-man) • **[PID Ref Frequency]** FPI: **[PID Ref Frequency]**, speed reference of the PI(D) regulator (predictive reference) • **[Ref Frequency 3 Summing]** SA3: ***Reference frequency 3 Summing*** • **[Ref Frequency 1B]** Fr1b: ***Reference frequency 1B*** • **[Subtract Ref Freq 3]** dA3: ***Subtract reference frequency 3*** • **[Forced local]** FLoC: ***Forced loc mode channel*** • **[Ref Frequency 2 multiplier]** MA2: ***Reference frequency 2 multiplier*** • **[Ref Frequency 3 multiplier]** MA3: ***Reference frequency 3 multiplier*** • **[Weight input]** PES: ***Weight sensor input***, hoisting: External weight measurement function • **[IA01]** IA01: ***IA01***, function blocks: Analog Input 01 ... • **[IA10]** IA10: ***IA10***, function blocks: Analog Input 10		
[AI1 Type] AI1t	-	**[Voltage]** 10U
Configuration of AI1 **[Voltage]** 10U: Positive voltage input 0 - 10 V (negative values are interpreted as zero: the input is unidirectional)		
[AI1 Min. Value] UIL1	0 to 10.0 V	0 V
AI1 voltage scaling parameter of 0%		
[AI1 Max Value] UIH1	0 to 10.0 V	10.0 V
AI1 voltage scaling parameter of 100%		

HMI label	Settings	Factory setting
[AI1 filter] A I 1 F	0 to 10.00 s	0 s
AI1 filter, interference filtering.		
[AI1 range] A I 1 L	—	**[0 - 100%]** P o S
Analog input 1 range • **[0 - 100%]** P o S: ***Positive only*** • **[+/- 100%]** n E G: ***Positive and negative***		
[AI1 X Interm. Point] A I 1 E	0 to 100%	0%
AI1 intermediate point X. Input delinearization point coordinate. Percentage of the physical input signal. • 0% corresponds to **[AI1 Min. Value]** u I 1 L. • 100% corresponds to **[AI1 Max Value]** u I 1 H.		
[AI1 Interm. point Y] A I 1 S	0 to 100%	0%
AI1 intermediate point Y Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI1 X Interm. Point]** A I 1 E percentage of physical input signal.		

[AI2 configuration] AI2—

Access

Parameters described below can be accessed by: drI ➡ ConF ➡ FULL ➡ I_O ➡ AI2

Parameters list

HMI label	Settings	Factory setting
[AI2 configuration] AI2 —		
[AI2 Assignment] AI2A	-	-
AI2 assignment Identical to **[AI1 assignment]** AI1A .		
[AI2 Type] AI2t	-	**[Voltage +/-]** nIOu
Configuration of AI2 **[Voltage]** IOu: ***Voltage***, positive voltage input 0 - 10 V (negative values are interpreted as zero: the input is unidirectional) **[Voltage +/-]** nIOu: ***AI bipolar volts selected***, positive and negative voltage input +/- 10 V (the input is bidirectional)		
[AI2 Min. Value] uIL2	0 to 10.0 V	0 V
AI2 voltage scaling parameter of 0%		
[AI2 Max value] uIH2	0 to 10.0 V	10.0 V
AI2 voltage scaling parameter of 100%		
[AI2 filter] AI2F	0 to 10.00 s	0 s
AI2 filter, interference filtering.		
[AI2 range] AI2L	—	**[0 - 100%]** Pos
Analog input 2 range This parameter is forced to **[0 - 100%]** Pos and can not be accessed if **[AI2 Type]** AI2t is set to **[Voltage +/-]** nIOu . • **[0 - 100%]** Pos: ***Positive only*** • **[+/- 100%]** nEG: ***Positive and negative***		
[AI2 X Interm. Point] AI2E	0 to 100%	0%
AI2 intermediate point X, input delinearization point coordinate. Percentage of the physical input signal. • 0% corresponds to **[AI2 Min. Value]** uIL2 if the range is 0 ➡ 100%. • 0% corresponds to **[AI2 Max value]** + **[AI2 Min. Value]**/ 2 if the range is -100% ➡ +100%. • 100% corresponds to **[AI2 Max value]** (uIH2)		
[AI2 Interm. point Y] AI2S	0 to 100%	0%
AI2 intermediate point Y Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI2 X Interm. Point]** AI2E percentage of physical input signal.		

[AI3 configuration] AI3

Access

Parameters described below can be accessed by: dri ➡ ConF ➡ FULL ➡ I_O ➡ AI3

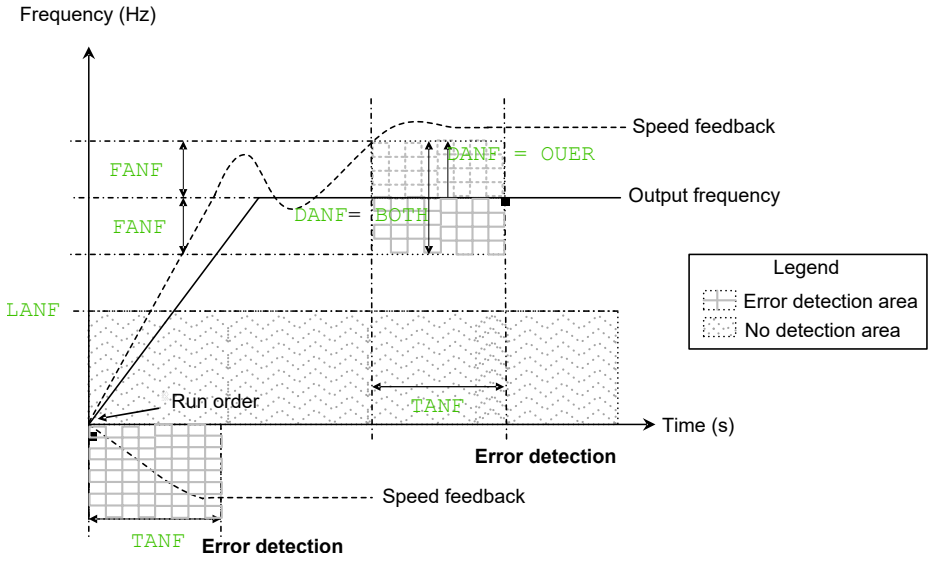
Parameters list

HMI label	Settings	Factory setting
[AI3 configuration] AI3 —		
[AI3 Assignment] AI3A	-	-
AI3 assignment Identical to **[AI1 assignment]** AI1A .		
[AI3 Type] AI3t	-	**[Current]** 0A
Configuration of AI3 **[Current]** 0A: Current input 0 - 20 mA		
[AI3 Min. Value] CrL3	0 to 20.0 mA	0 mA
AI3 current scaling parameter of 0%		
[AI3 Max Value] CrH3	0 to 20.0 mA	20.0 mA
AI3 current scaling parameter of 100%		
[AI3 filter] AI3F	0 to 10.00 s	0 s
AI3 filter, interference filtering.		
[AI3 range] AI3L	—	**[0 - 100%]** Pos
Analog input 3 range **[0 - 100%]** Pos: ***Positive only***, unidirectional input **[+/- 100%]** nEG: ***Positive and negative***, bidirectional input Example: On a 4 - 20 mA input. 4 mA corresponds to reference -100%. 12 mA corresponds to reference 0%. 20 mA corresponds to reference +100%. Since AI3 is, in physical terms, a bidirectional input, the **[+/- 100%]** nEG configuration must only be used if the signal applied is unidirectional. A bidirectional signal is not compatible with a bidirectional configuration.		
[AI3 X Interm. point] AI3E	0 to 100%	0%
AI3 intermediate point X, input delinearization point coordinate. Percentage of the physical input signal. • 0% corresponds to **[AI3 Min. Value]** CrL3 if the range is 0 ➡ 100%. • 0% corresponds to (**[AI3 Max Value]** CrH3 — **[AI3 Min. Value]** CrL3) / **[AI3 Min. Value]** CrL3 if the range is -100% V +100%. • 100% corresponds to **[AI3 Max Value]** CrH3.		
[AI3 Y Interm. point] AI3S	0 to 100%	0%
AI3 intermediate point Y Output delinearization point coordinate (frequency reference). Percentage of the internal frequency reference corresponding to the **[AI3 X Interm. point]** AI3E percentage of physical input signal.		

HMI label	Settings	Factory setting
[Virtual AI1] AV1 —		
[AIV1 assignment] AV1A	—	—
AIV1 assignment Virtual analog input 1 via the jog dial available on the front side of the product. Identical to **[AI1 assignment]** AI1A .		
[Virtual AI2] AV2 —		
[AIV2 assignment] AV2A	—	—
AIV2 assignment Possible assignments for **[AIV2 Image input]** AIV2: Virtual analog input 2 via communication channel, to be configured with **[AIV2 Channel Assign]** AIC2. Identical to **[AIV1 assignment]** AV1A .		
[AIV2 Channel Assign] AIC2 ★	—	**[No]** no
Channel assignment for virtual Analog input AIV2 **[AIV2 assignment]** AV2A source channel. This parameter can also be accessed in the **[PID controller]** PID — submenu. Scale: The value 8192 transmitted by this input is equivalent to 10 V on a 10 V input. • **[No]** no: ***No***, not assigned • **[Modbus]** Mdb: ***Modbus communication*** • **[CANopen]** CAn: ***CANopen communication*** • **[Com. Module]** (nEt: ***Ext. communication module***		
[Encoder configuration] IEn —		
Following parameters can be accessed if the speed monitoring module VW3A3620 has been inserted.		
[Encoder usage] Enu	—	**[No]** no
Encoder usage • **[No]** no: ***No***, function inactive. • **[Speed Monitoring]** SEC: ***Speed feedback monitoring***		
[Encoder type] EnS ★	—	**[AABB]** AAbb
Encoder type configure, encoder usage configuration. To be configured in accordance with the type of encoder used. • **[AABB]** AAbb: ***For signals A/A-/B/B-*** • **[AB]** Ab: ***For signals A/B*** Following parameters can be accessed if **[Encoder usage]** Enu is set to **[Speed Monitoring]** SEC .		
[Number of pulses] PGI ★	100 to 3600	1024
Number of pulses, number of pulses per encoder revolution. Following parameters can be accessed if **[Encoder usage]** Enu is set to **[Speed Monitoring]** 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.

Load slip detection



The drive detects an error and display the detected error code **[Load slipping]** AnF in the following cases:

- As soon as the RUN order is received, if the sign of the output frequency and the speed feedback are in opposite way during **[ANF Time Thd.]** tAnF.
- During operation:
  - if the speed feedback is in the same direction than the output frequency
  - and the speed feedback is over **[ANF Detection level]** LAnF.
  - and,
    "if **[ANF Direction check]** dAnF is set to **[Over]** oVEr, the difference between the output frequency and the speed feedback is over **[ANF Frequency Thd]** FAnF during **[ANF Time Thd.]** tAnF (Overspeed detection).
    or,
    "if **[ANF Direction check]** dAnF is set to **[Both]** both, the difference between the output frequency and the speed feedback is over **[ANF Frequency Thd]** FAnF or below - **[ANF Frequency Thd]** FAnF during **[ANF Time Thd.]** tAnF (Overspeed or underspeed detection).

[Encoder configuration] IEn

Access

Parameters described below can be accessed by: dr I ➔ ConF ➔ FULL ➔ I_O ➔ IEn

Parameters list

HMI label	Settings	Factory setting
[Encoder configuration] IEn — (continued)		
Following parameters can be accessed if the speed monitoring module VW3A3620 has been inserted and if **[Encoder usage]** Enu is set to **[Speed Monitoring]** SEC.		
[ANF Frequency Thd] FAnF ★	0.1 to 50 Hz	5.0 Hz
ANF error detection frequency Level of **[Load slipping]** AnF detected error. The drive do not detect the error **[Load slipping]** AnF if the difference between the output frequency and the speed feedback is below than **[ANF Frequency Thd]** FAnF.		
[ANF Detection level] LAnF ★	0 to 10 Hz	0.0 Hz
ANF error detection level The drive do not detect the error **[Load slipping]** AnF if the speed feedback is below **[ANF Detection level]** LAnF.		
[ANF Direction check] dAnF ★	—	**[Over]** oVEr
Available ANF detection direction • **[Over]** oVEr: ***Trip in case of overspeed***, the drive detects the error **[Load slipping]** AnF in case of overspeed. • **[Both]** both: ***Trip in case of overspeed or underspeed***, the drive detects the error **[Load slipping]** AnF in case of overspeed or underspeed.		
[ANF Time Thd.] tAnF ★	0 to 10 s	0.10 s
Detection time of ANF detected fault The drive detects the error **[Load slipping]** AnF if the conditions are present during **[ANF Time Thd.]** tAnF.		

★ : 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.

[R1 Configuration] r 1—

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ I_O ➜ r1

Parameters List

HMI label	Settings	Factory setting
[R1 Configuration] r 1—		
[R1 Assignment] r1	—	**[Operating State Fault]** FLt

R1 assignment

[No] nO: Not assigned. In this case, the output can be controlled via the internal parameter OL1R (refer to the communication parameter addresses file). By default, if an error (such as a communication interruption is detected), the output remains unchanged. Use the parameter **[Enable R1 fallback]** r1F to disable the output in case of error detection.

- **[Operating State Fault]** FLt: Drive error detection status (relay normally energized, and de-energized in the event of an error)

  [Drive Running] run: Drive running
- **[Mot Freq High Thd]** FtA: ***Motor frequency high threshold reached***
- **[High Speed Reached]** FLA: ***High speed reached***
- **[Current Thd Reached]** CtA: ***Current threshold reached*** **[High Current Thd]** Ctd)
- **[Current Thd Reached]** CtA: ***Current threshold reached***
- **[Motor Therm Thd reached]** tSA: ***Motor thermal threshold reached***
- **[PID error Warning]** PEE: ***PID error warning***
- **[PID Feedback Warn]** PFA: ***PID feedback warning***
- **[Mot Freq High Thd 2]** F2A: ***Motor frequency high threshold 2 reached*** **[Freq. threshold 2]** F2d
- **[Dev Thermal reached]** tAd: ***Device thermal threshold reached***
- **[Process Undld Warn]** uLA: ***Process underload warning***
- **[Process Overload Warning]** oLA: ***Process overload warning***
- **[Slack Rope Warning]** rSdA: ***Slack rope warning*** (see **[Rope slack config.]** rSd parameter
- **[High Torque Warning]** ttHA: ***High torque warning*** **[High torque thd.]** ttH
- **[Low Torque Warning]** ttLA: ***Low torque warning*** **[Low torque thd.]** ttL
- **[Run Forward]** nFrd: ***Run forward***
- **[Run Reverse]** nrrS: ***Run reverse***
- **[Mot2 Therm Thd reached]** tS2: ***Motor 2 thermal threshold reached***
- **[Mot3 Therm Thd reached]** tS3: ***Motor 3 thermal threshold reached***
- **[Neg Torque]** AtS: ***Negative torque*** (braking)
- **[Cnfg.0 act.]** CnF0: ***Configuration 0 active***
- **[Cnfg.1 act.]** CnF1: ***Configuration 1 active***
- **[Cnfg.2 act.]** CnF2: ***Configuration 2 active***
- **[set 1 active]** CFP1: ***Parameter set 1 active***
- **[set 2 active]** CFP2: ***Parameter set 2 active***
- **[set 3 active]** CFP3: ***Parameter set 3 active***
- **[DC charged]** dbL : ***DC bus charged***
- **[In braking]** brS: ***In braking sequence***

HMI label	Settings	Factory setting
• **[Power Removal State]** P r M: ***Power Removal state***, drive locked by "Safe Torque Off" input • **[Pulse Warn Thd Reached]** F 9 L A: ***Pulse warning threshold reached*** **[Pulse warning thd.]** F 9 L • **[I present]** M C P: ***I present***, motor current present • **[Limit Switch Reached]** L S A: ***Limit switch reached*** • **[Dynamic Load Warning]** d L d A: ***Dynamic load warning*** Load variation detection • **[Warning Grp 1]** A G 1: ***Warning group 1*** • **[Warning Grp 2]** A G 2: ***Warning group 2*** • **[Warning Grp 3]** A G 3: ***Warning group 3*** • **[DI6=PTC Warning]** P L A: ***DI6=PTC warning*** • **[External Error Warning]** E F A: ***External error warning*** • **[Undervoltage Warning]** u S A: ***Undervoltage warning*** • **[Preventive UnderV Active]** u P A: ***Preventive undervoltage active*** • **[Device Therm Warn]** t H A: ***Device thermal state warning*** • **[Lim T/I Reached]** S S A: ***Limit torque / I reached*** • **[Therm Junction Warn]** t J A: ***Thermal junction warning*** • **[AI3 4-20 Warning]** A P 3: ***AI3 4-20 Loss warning*** • **[Ready]** r d Y: ***Ready*** • **[OL01]** o L 0 1: ***OL01***, function blocks: Logical Output 01 ... • **[OL10]** o L 1 0: ***OL10***, function blocks: Logical Output 10		
[R1 Delay time] r 1 d (1)	0 to 60,000 ms	0 ms
R1 delay time The change in state only takes effect once the configured time has elapsed, when the information becomes true. The delay cannot be set for the **[Operating State Fault]** F L t assignment, and remains at 0.		
[R1 Active at] r 1 S	—	**[1] (POS)**
R1 active level Configuration of the operating logic: • **[High Level]** P o S: ***High level***, state 1 when the information is true • **[Low Level]** n E G: ***Low level***, state 0 when the information is true Configuration **[High Level]** P o S cannot be modified for the **[Operating State Fault]** F L t assignment.		
[R1 Holding time] r 1 H	0 to 9,999 ms	0 ms
R1 holding time The change in state only takes effect once the configured time has elapsed, when the information becomes false. The holding time cannot be set for the **[Operating State Fault]** F L t assignment, and remains at 0.		
[Enable R1 fallback] r 1 F	—	**[No]** n o
Enable relay 1 fallback		

HMI label	Settings	Factory setting
If the output is controlled by fieldbus and has been enabled, transition to operating state Fault such as, but not limited to, communication interruption, will not disable the output if this parameter is set to **[No]** NO . **NOTE: [Auto Fault Reset]** A t r remains priority over r 2 F selection. **⚠WARNING** **LOSS OF CONTROL** • Verify that using this default setting does not result in unsafe conditions including communication interruption. • Set this parameter to **[Yes]** YES to disable the output if an error is triggered. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** This parameter is forced to **[No]** n o if **[R1 Assignment]** r 1 is set to a value different from **[No]** n o . **[Yes]** Y E S : Fallback feature enabled: The state of the relay can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If an error is detected, the output is disabled. **NOTE:** If an error is detected, the process applied on the output (e.g. delays, active level) remains applied. **[No]** n o : Fallback feature disabled: When the output is assigned, the state of the output is defined according to its assignment. When the corresponding output is not assigned, the state of the output can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If a error is detected, the output remains unchanged.		
[R2 Configuration] r 2 —		
[R2 Assignment] r 2	—	**[No]** n o
R2 assignment Identical to **[R1 Assignment]** r 1 with the addition of: • **[Brake Sequence]** b L C : ***Brake sequence*** • **[Mains Contactor]** L L C : ***Mains contactor control*** • **[Output cont]** o C C : ***Ouput contactor control*** • **[Spool end]** E b o : ***Spool end***, end of reel (traverse control function) • **[Sync wobble]** t S Y : ***Sync wobble***, "Counter wobble" synchronization		
[R2 Delay time] r 2 d (1)	0 to 60,000 ms	0 ms
R2 delay time The delay cannot be set for the **[Operating State Fault]** F L t , **[Brake Sequence]** b L C , **[Output cont]** o C C and **[Mains Contactor]** L L C assignments, and remains at 0. The change in state only takes effect once the configured time has elapsed, when the information becomes true.		
[R2 Active at] r 2 S	—	**[1] (POS)**
R2 active level Configuration of the operating logic: • **[High Level]** P o S : ***High level***, state 1 when the information is true • **[Low Level]** n E G : ***Low level***, state 0 when the information is true The configuration **[High Level]** P o S cannot be modified for the **[Operating State Fault]** F L t , **[Brake Sequence]** b L C , **[DC charging]** d C o , and **[Mains Contactor]** L L C assignments.		
[R2 Holding time] r 2 H	0 to 9,999 ms	0 ms
R2 holding time The holding time cannot be set for the **[Operating State Fault]** F L t , **[Brake Sequence]** b L C and **[Mains Contactor]** L L C assignments, and remains at 0.		

HMI label	Settings	Factory setting
The change in state only takes effect once the configured time has elapsed, when the information becomes false.		
[Enable R2 fallback] r 2 F	—	**[No]** n o

Enable relay 2 fallback
If the output is controlled by fieldbus and has been enabled, transition to operating state Fault such as, but not limited to, communication interruption, will not disable the output if this parameter is set to **[No]** NO .

NOTE: [Auto Fault Reset] A t r remains priority over r 2 F selection.

⚠WARNING

LOSS OF CONTROL

- Verify that using this default setting does not result in unsafe conditions including communication interruption.
- Set this parameter to **[Yes]** YES to disable the output if an error is triggered.

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

This parameter is forced to **[No]** n o if **[R2 Assignment]** r 2 is set to a value different from **[No]** n o.

[Yes] Y E S: Fallback feature enabled: The state of the relay can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If an error is detected, the output is disabled when **[Auto Fault Reset]** A t r is set to **[No]** n o, but when **[Auto Fault Reset]** A t r is set to **[Yes]** Y E S the output remains unchanged as long as the **[Fault Reset Time]** t A r has not been elapsed.

NOTE: If an error is detected, the process applied on the output (e.g. delays, active level) remains applied.

[No] n o: Fallback feature disabled: When the output is assigned, the state of the output is defined according to its assignment. When the corresponding output is not assigned, the state of the output can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If a error is detected, the output remains unchanged.

[LO1 CONFIGURATION] LO1 —

Access

Parameters described below can be accessed by: dr1 ➜ CONF ➜ FULL ➜ I_O ➜ LO1

Parameters list

HMI label	Settings	Factory setting
[LO1 CONFIGURATION] LO1 —		
[LO1 assignment] LO1	—	**[No]** NO
LO1 assignment Identical to **[R1 Assignment]** R1 with the addition following parameter value (shown for information only as these selections can only be configured in the **[Application function]** FUN — menu): • **[Brake Sequence]** BLC: ***Brake sequence*** • **[Mains Contactor]** LLC: ***Mains contactor control*** • **[Output cont]** OCC: ***Ouput contactor control*** • **[Spool end]** EBO: ***Spool end***, end of reel (traverse control function) • **[Sync wobble]** tSY: ***Sync wobble***, "Counter wobble" synchronization • **[GDL]** GDL: ***GDL***, safety function		
[LO1 delay time] LO1d	0 to 60,000 ms (1)	0 ms
LO1 delay time The delay cannot be set for the **[No drive flt] FLt**, **[Brake Sequence]** BLC, **[Output cont]** OCC and **[Mains Contactor]** LLC assignments, and remains at 0. The change in state only takes effect after the configured time has elapsed, when the information becomes true. (1) 0 to 9,999 ms then 10.00 to 60.00 s on the integrated display terminal.		
[LO1 active at] LO1S	-	**[1] POS**
LO1 active level Configuration of the operating logic: • **[High Level]** POS: ***High level***, state 1 when the information is true • **[Low Level]** nEG: ***Low level***, state 0 when the information is true The configuration **[High Level]** POS cannot be modified for the **[No drive flt] FLt**, **[Brake Sequence]** BLC and **[Mains Contactor]** LLC assignments.		
[LO1 holding time] LO1H	0 to 9,999 ms	0
LO1 holding time The holding time cannot be set for the **[No drive flt] FLt**, **[Brake Sequence]** BLC and **[Mains Contactor]** LLC assignments, and remains at 0. The change in state only takes effect after the configured time has elapsed, when the information becomes false.		

HMI label	Settings	Factory setting
[Enable LO1 fallback] LO1F	—	**[No]** NO

Enable LO1 fallback
If the output is controlled by fieldbus and has been enabled, transition to operating state Fault such as, but not limited to, communication interruption, will not disable the output if this parameter is set to **[No]** NO .

NOTE: [Auto Fault Reset] ATR remains priority over r2F selection.

⚠WARNING

LOSS OF CONTROL

- Verify that using this default setting does not result in unsafe conditions including communication interruption.
- Set this parameter to **[Yes]** YES to disable the output if an error is triggered.

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

This parameter is forced to **[No]** NO if **[LO1 assignment]** LO1 is set to a value different from **[No]** NO.

[Yes] YES: Fallback feature enabled: The state of the relay can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If an error is detected, the output is disabled.

NOTE: If an error is detected, the process applied on the output (e.g. delays, active level) remains applied.

[No] NO: Fallback feature disabled: When the output is assigned, the state of the output is defined according to its assignment. When the corresponding output is not assigned, the state of the output can be controlled via a bit of OL1R (refer to the communication parameter addresses file). If a error is detected, the output remains unchanged.

[DQ1 configuration] dO 1—

Use of analog output AO1 as a logic output

Analog output AO1 can be used as a logic output, by assigning DO1. In this case, when set to 0, this output corresponds to the AO1 min. value (0 V, or 0 mA for example), and when set to 1 to the AO1 max. value (10 V, or 20 mA for example). The electrical characteristics of this analog output remain unchanged. As these characteristics are different from logic output characteristics, check that it is still compatible with the intended application.

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ I_O ➡ dO1

Parameters list

HMI label	Settings	Factory setting
[DQ1 configuration] dO 1—		
[DQ1 Assignment] dO1	—	**[No]** nO
DQ1 assignment Identical to **[R1 Assignment]** r1 with the addition following parameter value (shown for information only as these selections can only be configured in the **[Application function]** FUn — menu: • **[Brake Sequence]** bLC: ***Brake sequence*** • **[Mains Contactor]** LLC: ***Mains contactor control*** • **[Output cont]** oCC: ***Ouput contactor control*** • **[Spool end]** Ebo: ***Spool end***, end of reel (traverse control function) • **[Sync wobble]** tSY: ***Sync wobble***, "Counter wobble" synchronization		
[DQ1 Delay time] dO1d	0 to 60,000 ms (1)	0 ms
DQ1 delay time The delay cannot be set for the **[No drive flt] FLt**, **[Brake Sequence]** bLC, **[Output cont]** oCC and **[Mains Contactor]** LLC assignments, and remains at 0. The change in state only takes effect after the configured time has elapsed, when the information becomes true.		
[DQ1 Active at] dO1S	-	**[1] POS**
DQ1 active level Configuration of the operating logic: • **[High Level]** POS: ***High level***, state 1 when the information is true • **[Low Level]** nEG: ***Low level***, state 0 when the information is true The configuration **[High Level]** POS cannot be modified for the **[No drive flt] FLt**, **[Brake Sequence]** bLC and **[Mains Contactor]** LLC) assignments.		
[DQ1 Holding time] dO1H	0 to 9,999 ms	0 ms

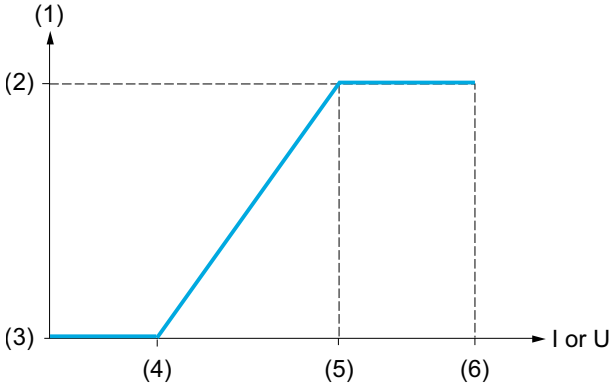
HMI label	Settings	Factory setting
DQ1 holding time		
The holding time cannot be set for the **[No drive flt] FLt**, **[Brake Sequence]** b L C and **[Mains Contactor]** L L C assignments, and remains at 0.		
The change in state only takes effect after the configured time has elapsed, when the information becomes false.		

(1) 0 to 9,999 ms then 10.00 to 60.00 s on the integrated display terminal.

Configuration of analog output

Minimum and maximum values (output values):

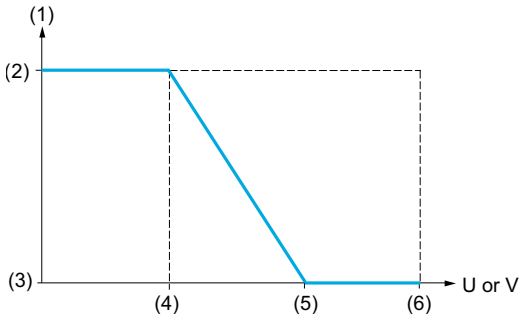
The minimum output value, in volts, corresponds to the lower limit of the assigned parameter and the maximum value corresponds to its upper limit. The minimum value may be greater than the maximum value.



1. Parameter assigned
2. Upper limit
3. Lower limit
4. **[Min Output]** AOLx or UOLx
5. **[Max Output]** AOHx or UOHx
6. 20 mA or 10V

I: Current

U: Voltage



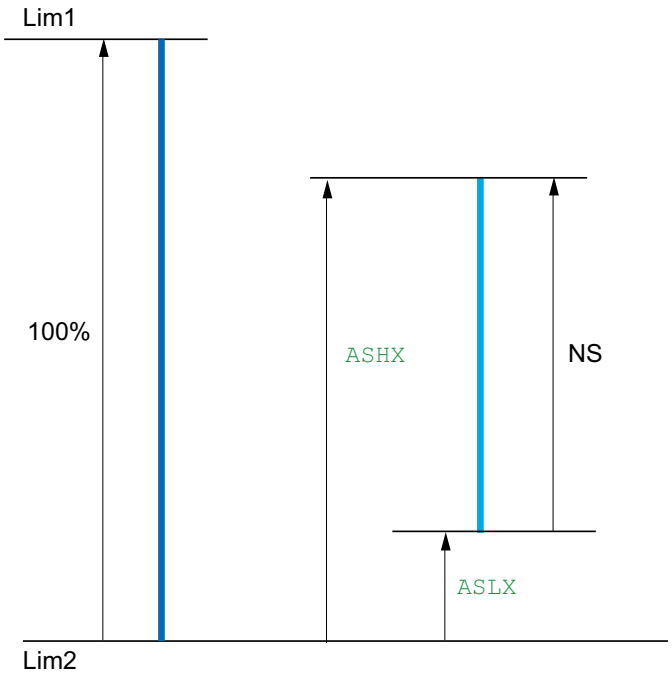
1. Parameter assigned
2. Upper limit
3. Lower limit
4. **[Max Output]** AOHx or UOHx
5. **[Min Output]** AOLx or UOLx
6. 20 mA or 10V

Scaling of the assigned parameter

The scale of the assigned parameter can be adapted in accordance with requirements by modifying the values of the lower and upper limits by means of two parameters for each analog output.

These parameters are given in %. 100% corresponds to the total variation range of the configured parameter, so: 100% = upper limit - lower limit For example, **[Sign. Torque]** S t q which varies between -3 and +3 times the rated torque, 100% corresponds to 6 times the rated torque.

- The **[Scaling AQx Min]** A S L x parameter modifies the lower limit: new value = lower limit + (range x ASLx). The value 0% (factory setting) does not modify the lower limit.
- The **[Scaling AQx Max]** A S H x parameter modifies the upper limit: new value = lower limit + (range x ASLx). The value 100% (factory setting) does not modify the upper limit.
- **[Scaling AQx Min]** A S L x must always be lower than **[Scaling AQx Max]** A S H x.



Lower limit of the assigned parameter

Lim1: Upper limit of the assigned parameter

Lim2: Lower limit of the assigned parameter

NS: New scale

Application example 2

The value of the motor current at the AO1 output is to be transferred with 0 - 20 mA, range 2 In motor, In motor being the equivalent of a 0.8 In drive.

The **[Motor Current]** o C r parameter varies between 0 and 2 times the rated drive current, or a range of 2.5 times the rated drive current.

[Scaling AQ1 Min] A S L 1 must not modify the lower limit, which therefore remains at its factory setting of 0%.

[Scaling AQ1 Max] A S H 1 must modify the upper limit by 0.5x the rated motor torque, or 100 - 100/5 = 80% (new value = lower limit + (range x ASH1).

[AQ1 configuration] AO1 —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ I_O ➜ AO1

Parameters list

HMI label	Settings	Factory setting
[AQ1 configuration] AO1 —		
[AQ1 assignment] AO1	—	**[No]** no
AQ1 assignment • **[No]** no: ***No***, not assigned. In this case, the output can be controlled via the internal parameter AO1R (refer to the communication parameter addresses file). By default, if an error (such as a communication interruption) is detected, the output remains unchanged. Use the parameter **[Enable AQ1 fallback]** AOF1 to disable the output in case of error detection. • **[Motor Current]** oCr: ***Motor current***, between 0 and 2 In (In = rated drive current indicated in the Installation manual and on the drive nameplate) • **[Motor Frequency]** oFr: ***Motor frequency***, from 0 to **[Max Frequency]** tFr • **[Sig. O/P Frq.]** oFS: ***Signed output frequency***, between - **[Max Frequency]** tFr and + **[Max Frequency]** tFr • **[Ramp Out.]** orP: ***Ramp output***, from 0 to **[Max Frequency]** tFr • **[Motor Torq.]** tr9: ***Motor torque***, between 0 and 3 times the rated motor torque • **[Sign. Torque]** St9: ***Signed torque***, between -3 and +3 times the rated motor torque. The + sign corresponds to the motor mode and the - sign to the generator mode (braking). • **[sign Ramp]** orS: ***Signed ramp***, between - **[Max Frequency]** tFr and + **[Max Frequency]** tFr. • **[PID Ref.]** oPS: ***PID reference*** between **[Min PID Process]** P1P1 and **[Max PID Process]** P1P2. • **[PID Feedbk]** oPF: ***PID feedback*** between **[Min PID feedback]** P1F1 and **[Max PID feedback]** P1F2 • **[PID Error]** oPE: ***PID error*** between- 5 % and + 5 % of **[Max PID feedback]** P1F2- **[Min PID feedback]** P1F1 • **[PID Output]** oP1: ***PID output*** between **[Low Speed]** LSP and **[High Speed]** HSP • **[Mot Mech Power in %]** oPr: ***Motor power in %***, between 0 and 2.5 times **[Nominal Motor Power]** nPr • **[Motor volt.]** uoP: ***Motor voltage***, between 0 and **[Nom Motor Voltage]** unS • **[Mot Thermal]** tHr: ***Motor thermal state***, between 0 and 200% of the rated thermal state • **[Mot Therm2]** tHr2: ***Motor thermal 2 state***, between 0 and 200 % of the rated thermal state • **[Mot Therm3]** tHr3: ***Motor thermal 3 state***, between 0 and 200 % of the rated thermal state • **[Drv Thermal]** tHd: ***Drive thermal state***, between 0 and 200% of the rated thermal state • **[Torque Lim.]** t9L: ***Torque limit***, between 0 and 3 times the rated motor torque • **[DQ1]** do1: ***Digital output 1***, assignment to a logic output. This assignment can only appear if **[DQ1 Assignment]** do1 has been assigned. This is the only possible choice in this case, and is only displayed for informational purposes. • **[Torque 4Q]** t9MS: ***Master / slave torque***, between -3 and +3 times the rated motor torque. The + sign and the - sign correspond to the physical direction of the torque, regardless of mode (motor or generator). • **[OA01]** oA01: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** oA10: ***OA10***, function blocks: Analog Output 10		
[AQ1 Type] AO1t	—	**[Current]** 0A

HMI label	Settings	Factory setting
AQ1 Type • **[Voltage]** I O u: ***Voltage*** • **[Current]** O A: ***Current***		
[AQ1 min output] A o L I ★	0 to 20.0 mA	0 mA
AQ1 min output value This parameter can be accessed if **[AQ1 Type]** A o I t is set to **[Current]** O A.		
[AQ1 max output] A o H I ★	0 to 20.0 mA	20.0 mA
AQ1 max output value This parameter can be accessed if **[AQ1 Type]** A o I t is set to **[Current]** O A.		
[AQ1 min Output] u o L I ★	0 to 10.0 V	0 V
AQ1 minimum output This parameter can be accessed if **[AQ1 Type]** A o I t is set to **[Voltage]** I O u.		
[AQ1 max Output] u o H I ★	0 to 10.0 V	10.0 V
AQ1 maximum output This parameter can be accessed if **[AQ1 Type]** A o I t is set to **[Voltage]** I O u.		
[Scaling AQ1 Min] A S L I	0 to 100.0%	0%
Scaling AQ1 min, scaling of the lower limit of the assigned parameter, as a % of the maximum possible variation.		
[Scaling AQ1 Max] A S H I	0 to 100.0%	100.0%
Scaling AQ1 max, scaling of the upper limit of the assigned parameter, as a % of the maximum possible variation.		
[AQ1 Filter] A o I F	0 to 10.00 s	0 s
AQ1 filter, interference filtering. This parameter is forced to 0 if **[AQ1 assignment]** A o I is set to **[DQ1]** d o I.		

HMI label	Settings	Factory setting
[Enable AQ1 fallback] AOFI	—	**[No]** nO

Enable AQ1 fallback
If the output is controlled by fieldbus and has been enabled, transition to operating state Fault such as, but not limited to, communication interruption, will not disable the output if this parameter is set to **[No]** NO .

NOTE: [Auto Fault Reset] AtR remains priority over r2F selection.

⚠WARNING

LOSS OF CONTROL

- Verify that using this default setting does not result in unsafe conditions including communication interruption.
- Set this parameter to **[Yes]** YES to disable the output if an error is triggered.

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

This parameter is forced to **[No]** nO if **[AQ1 assignment]** AO1 is set to a value different from **[No]** nO.

[Yes] YES: Fallback feature enabled: The state of the relay can be controlled via a bit of AO1R (refer to the communication parameter addresses file). If an error is detected, the output is disabled.

NOTE: If an error is detected, the process applied on the output (e.g. delays, active level) remains applied.

[No] nO: Fallback feature disabled: When the output is assigned, the state of the output is defined according to its assignment. When the corresponding output is not assigned, the state of the output can be controlled via a bit of AO1R (refer to the communication parameter addresses file). If a error is detected, the output remains unchanged..

The following submenus group the alarms into 1 to 3 groups, each of which can be assigned to a relay or a logic output for remote signaling. These groups can also be displayed on the graphic display terminal (see **[3.3] [MONITORING CONFIG.]** MCF — menu , page 381) and viewed via the **[1.2] [MONITORING]** MON — menu 1.2 **[MONITORING]** MON-, page 47.

When one or a number of alarms selected in a group occurs, this alarm group is activated.

HMI label	Settings	Factory setting
[Warn grp 1 definition] A1C —		

Selection to be made from the following list:

- **[DI6=PTC Warning]** PLA: ***DI6=PTC warning***
- **[External Error Warning]** EFA: ***External error warning***
- **[Undervoltage Warning]** USA: ***Undervoltage warning***
- **[Current Thd Reached]** CtA: ***Current threshold reached*** **[High Current Thd]** Ctd
- **[Mot Freq High Thd]** FtA: ***Motor frequency high threshold reached*** **[Motor Freq Thd]** Ftd
- **[Mot Freq High Thd 2]** F2A): ***Motor frequency high threshold 2 reached*** **[Freq. threshold 2]** F2d
- **[Ref Freq Reached]** SrA: ***Reference frequency reached***
- **[Motor Therm Thd reached]** tSA: ***Motor thermal threshold reached***
- **[Mot2 Therm Thd reached]** tS2: ***Motor 2 thermal threshold reached***
- **[Mot3 Therm Thd reached]** tS3: ***Motor 3 thermal threshold reached***
- **[Preventive UnderV Active]** UPA: ***Preventive undervoltage active***
- **[High Speed Reached]** FLA: ***High speed reached***
- **[Device Therm Warn]** tHA: ***Device thermal state warning***
- **[PID error Warning]** PEE: ***PID error warning***
- **[PID Feedback Warn]** PFA: ***PID feedback warning***
- **[AI3 4-20 Warning]** AP3: ***AI3 4-20 Loss warning***

HMI label	Settings	Factory setting
• **[Lim T/I Reached]** SSA): ***Limit torque / I reached*** • **[Dev Thermal reached]** tAd: ***Device thermal threshold reached*** • **[Therm Junction Warn]** tJA: ***Thermal junction warning*** • **[Process Undld Warn]** uLA: ***Process underload warning*** • **[Process Overload Warning]** oLA: ***Process overload warning*** • **[Slack Rope Warning]** rSdA: ***Slack rope warning*** (see **[Rope slack config.]** rSd parameter) • **[High Torque Warning]** ttHA: ***High torque warning*** **[High torque thd.]** ttH . • **[Low Torque Warning]** ttLA: ***Low torque warning*** **[Low torque thd.]** ttL . • **[Pulse Warn Thd Reached]** FqLA: ***Pulse warning threshold reached***: **[Pulse warning thd.]** FqL . • **[Dynamic Load Warning]** dLdA: ***Dynamic load warning*** (see **[Dynamic load detect.]** dLd —). See the multiple selection procedure Description of the HMI, page 34 for the integrated display terminal, and the graphic display terminal Graphic Display Terminal Option, page 20.		
[Warn grp 2 definition] A2C —		
Identical to **[Warn grp 1 definition]** A1C — .		
[Warn grp 3 definition] A3C —		
Identical to **[Warn grp 1 definition]** A1C — .		

1.3.4.5 [Full] F u L L – – [Command] C t L —

What's in This Chapter

Command and reference channels

Command and reference channels

The parameters in the **[Command]** C t L — menu can only be modified when the drive is stopped and no run command is present.

Run commands (forward, reverse, stop, etc.) and references can be sent using the following channels:

Command	Reference
Terminals: logic inputs LI or analog inputs used as logic inputs LA	Terminals: analog inputs AI, pulse input
Function blocks	Function blocks
Remote display terminal	Remote display terminal
Graphic display terminal	Graphic display terminal
Integrated Modbus	Integrated Modbus
Integrated CANopen®	Integrated CANopen®
Communication module	Communication module
	+/- speed via the terminals
	+/- speed via the graphic display terminal

If analog inputs are configured as digital inputs, the original configuration as analog inputs is not automatically removed.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that the configuration of an input as analog input is removed before configuring the affected input as a digital input.

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

NOTE: [LA1] LA1 and **[LA2] LA2**can be used as 2 logic inputs in source mode only.

- + 24 V power supply (max. 30 V)
- State 0 if < 7.5 V, state 1 if > 8.5 V

NOTE: The stop keys on the graphic display terminal or remote display can be programmed as non-priority keys. A stop key can only have priority if the **[Stop Key Enable]** P S t parameter in the **[Command]** C t L — menu **[Command]** C t L – parameters list, page 188 is set to **[Yes]** Y E S.

The behavior of the ATV320 can be adapted according to requirements:

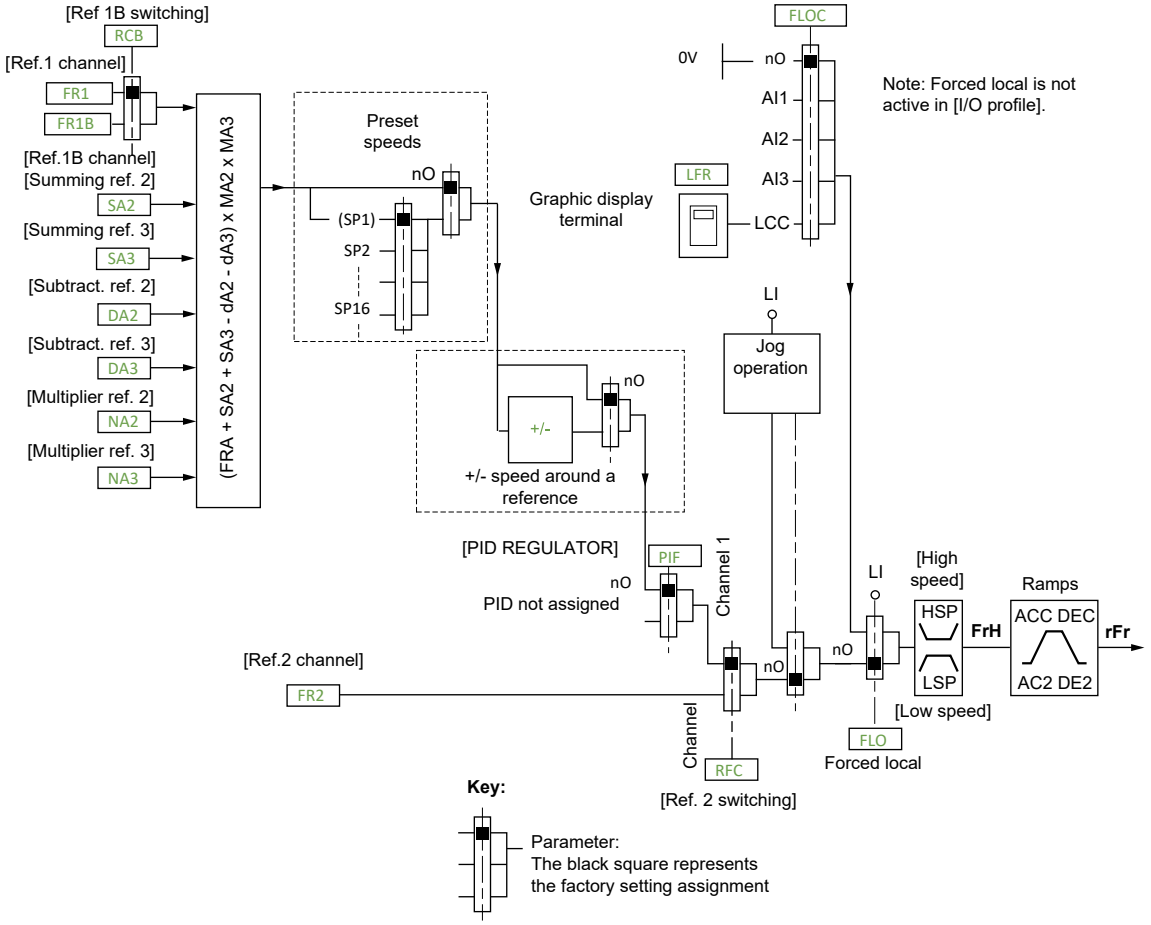
- **[Not separ.]** S , n: Command and reference are sent via the same channel.
- **[Separate]** S E P: Command and reference may be sent via different channels.

In these configurations, control via the communication bus is performed in accordance with the DRIVECOM standard with only 5 freely-assignable bits (see Communication Parameters Manual). The application functions cannot be accessed via the communication interface.

- **[I/O profile]** , o: The command and the reference can come from different channels. This configuration both simplifies and extends use via the communication interface. Commands may be sent via the logic inputs on the terminals or via the communication bus. When commands are sent via a bus, they are available on a word, which acts as virtual terminals containing 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 from the graphic display terminal or remote display terminal remain active even if the terminals are not the active command channel.

Reference channel for [Not separ.] SIM, [Separate] SEP and [I/O profile] IO configurations, PID not configured



[Ref Freq 1 Config] Fr1, **[Summing Input 2]** SA2, **[Summing Input 3]** SA3, **[Subtract Ref Freq 2]** dA2, **[Subtract Ref Freq 3]** dA3, **[Ref Freq 2 Multiply]** MA2, **[Ref Freq 3 Multiply]** MA3:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

[Ref.1B channel] Fr1b, for **[Separate]** SEP and **[I/O profile]** IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

[Ref.1B channel] Fr1b, for **[Not separ.]** SIM:

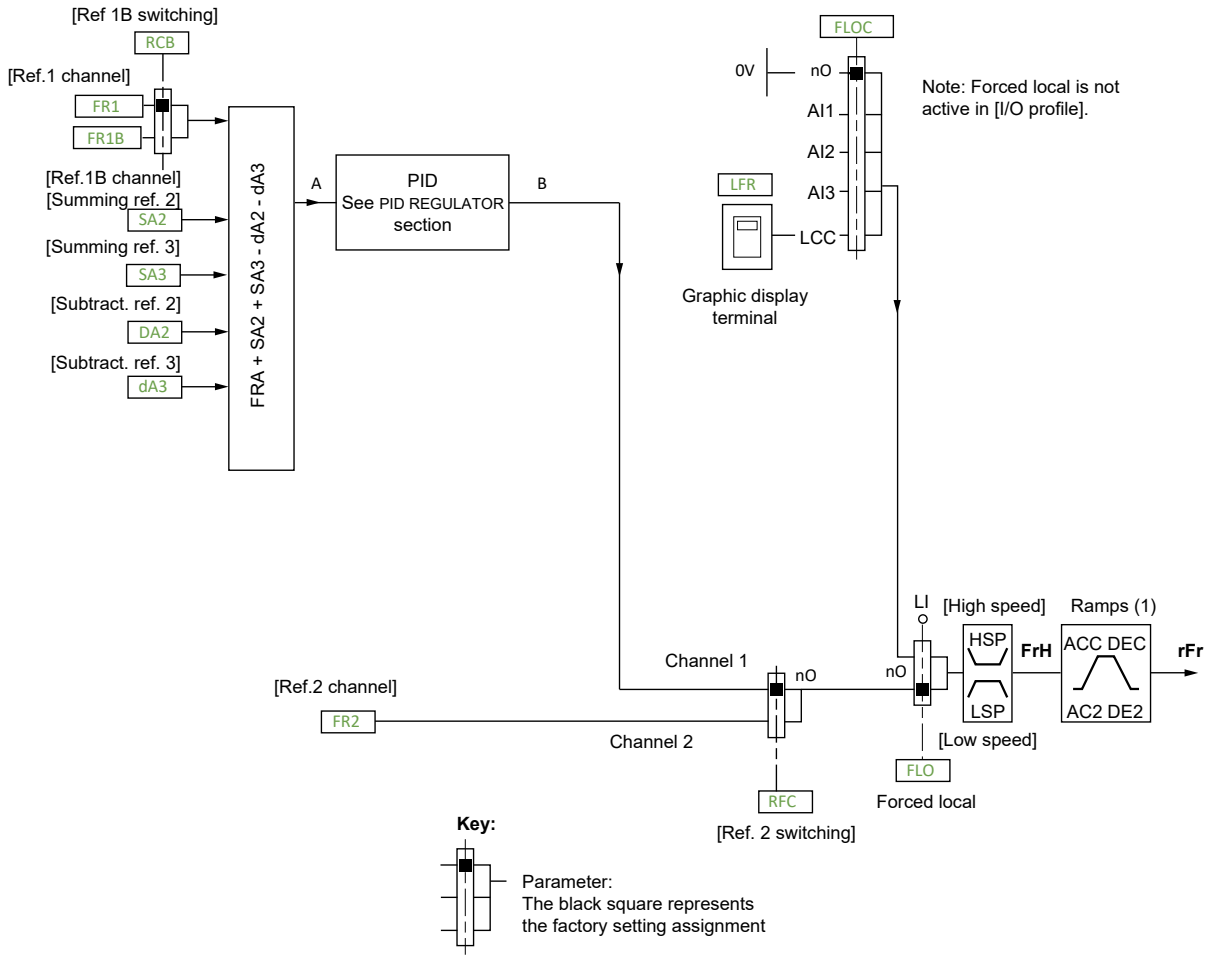
- Terminals, only accessible if **[Ref Freq 1 Config]** Fr1 = terminals

[Ref Freq 2 Config] Fr2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module, and +/- speed

  NOTE: [Ref.1B channel] Fr1b and **[Ref 1B switching]** rCb must be configured in the **[Application function]** Fun — menu.

Reference channel for [Not separ.] SIM, [Separate] SEP and [I/O profile] IO configurations, PID configured with PID references at the terminals



(1) Ramps not active if the PID function is active in automatic mode.

[Ref Freq 1 Config] FR1:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

[Ref.1B channel] FR1b, for **[Separate]** SEP and **[I/O profile]** IO:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

[Ref.1B channel] FR1b, for **[Not separ.]** SIM:

- Terminals, only accessible if **[Ref Freq 1 Config]** FR1 = terminals

[Summing Input 2] SA2, **[Summing Input 3]** SA3, **[Subtract Ref Freq 2]** dA2, **[Subtract Ref Freq 3]** dA3:

- Terminals only

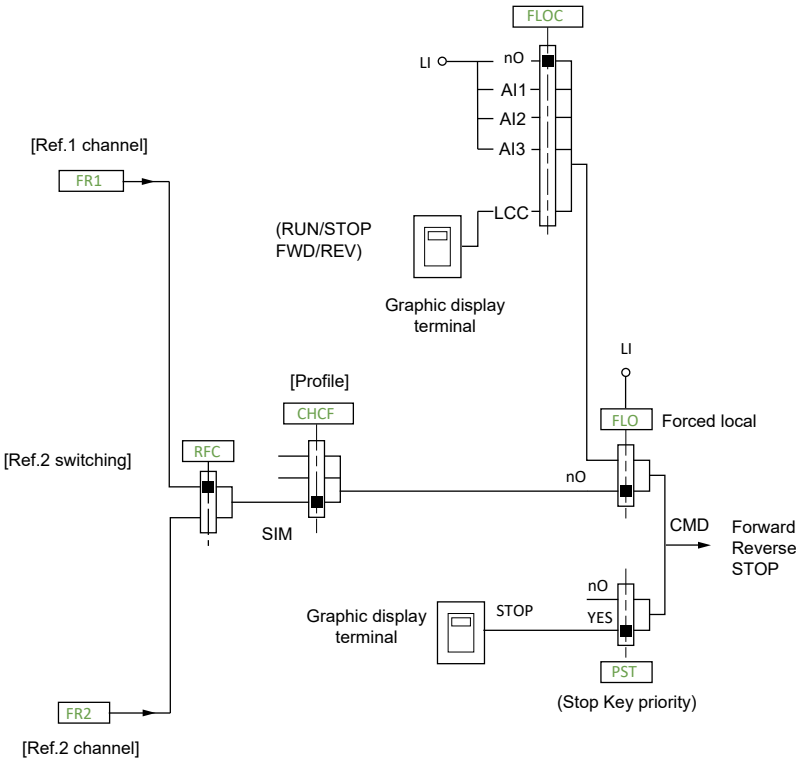
[Ref Freq 2 Config] FR2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module, and +/- speed

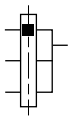
  NOTE: [Ref.1B channel] FR1b and **[Ref 1B switching]** rCb must be configured in the **[Application function]** FUn — menu.

Command channel for [Not separ.] SIM configuration

Reference and command, not separate
The command channel is determined by the reference channel. Parameters **[Ref Freq 1 Config]** Fr1, **[Ref Freq 2 Config]** Fr2, **[Freq Switch Assign]** rFC, **[Forced Local Assign]** FLO and **[Forced Local Chan]** FLOC are common to reference and command.
Example: If the reference is **[Ref Freq 1 Config]** Fr1 = **[AI1]** AI1 (analog input at the terminals), control is via **[Digital Input NST Freewheel]** LI1 (logic input at the terminals).



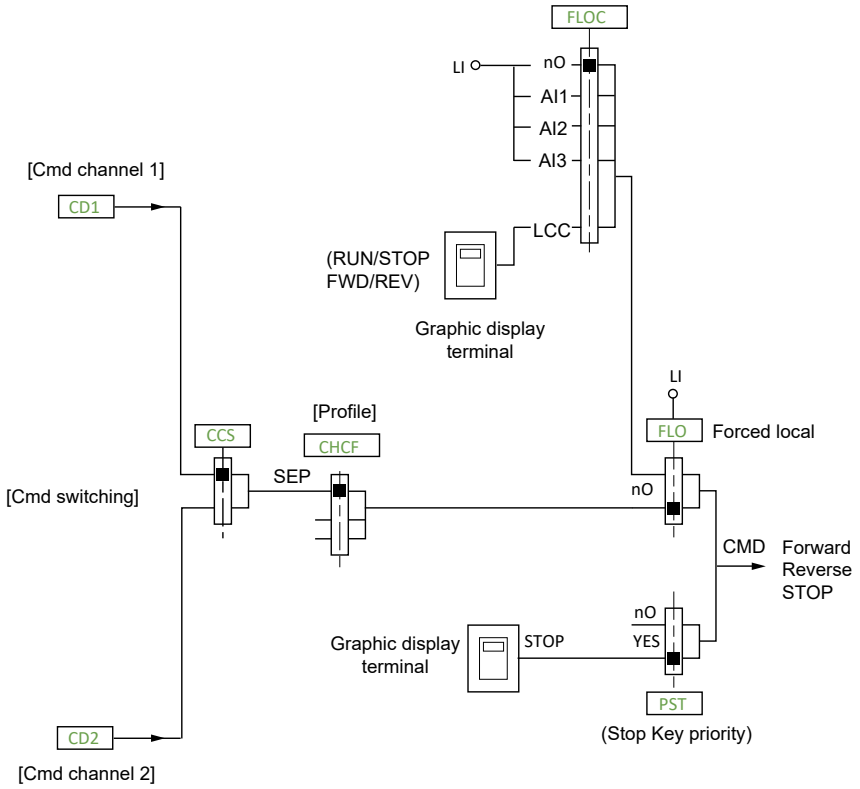
Key:



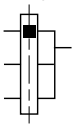
Parameter:
The black square represents
the factory setting assignment

Command channel for [Separate] S E P configuration

Separate reference and command
Parameters **[Forced Local Assign]** F L o and **[Forced Local Chan]** F L o C are common to reference and command.
Example: If the reference is in forced local mode via **[AI1]** A I 1 (analog input at the terminals), command in forced local mode is via **[Digital Input NST Freewheel]** L I (logic input at the terminals).
The command channels **[Cmd channel 1]** C d 1 and **[Cmd channel 2]** C d 2 are independent of the reference channels **[Ref Freq 1 Config]** F r 1, **[Ref.1B channel]** F r 1b and **[Ref Freq 2 Config]** F r 2.



Key:



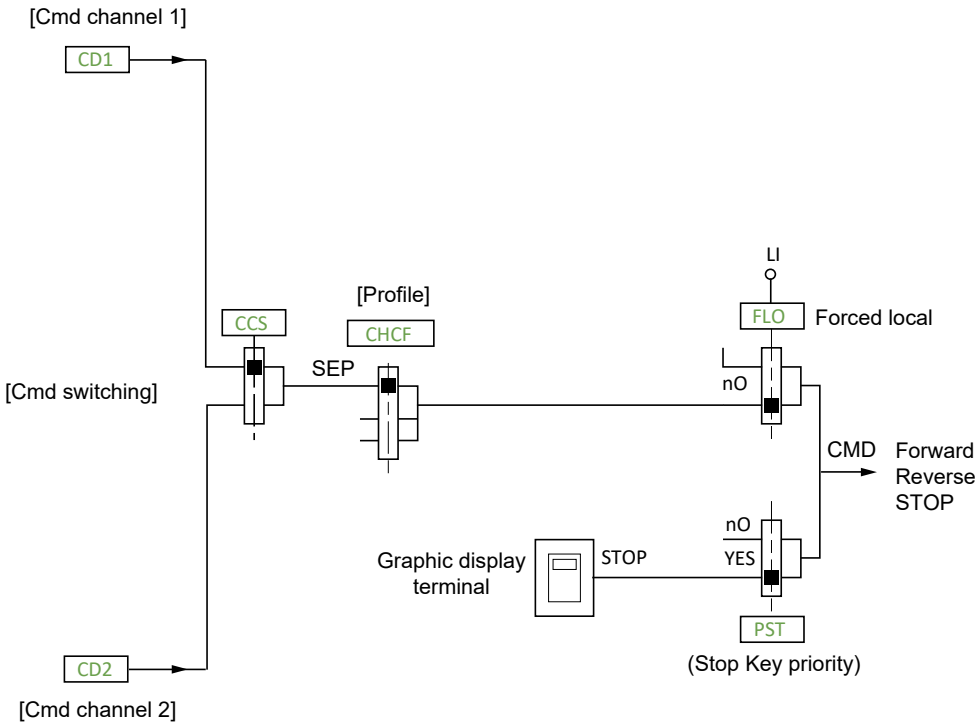
Parameter:
The black square represents the factory setting assignment, except for [Profile].

[Cmd channel 1] C d 1 **[Cmd channel 2]** C d 2:

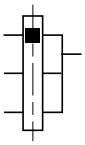
- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

Command channel for [I/O profile] i o configuration

Separate reference and command, as in **[Separate]** S E P configuration
The command channels **[Cmd channel 1]** C d 1 and **[Cmd channel 2]** C d 2 are independent of the reference channels **[Ref Freq 1 Config]** F r 1, **[Ref.1B channel]** F r 1b and **[Ref Freq 2 Config]** F r 2.



Key:



Parameter:
The black square represents the factory setting assignment, except for [Profile].

[Cmd channel 1] C d 1 **[Cmd channel 2]** C d 2:

- Terminals, graphic display terminal, integrated Modbus, integrated CANopen®, communication module

A command or an action can be assigned:

- To a fixed channel by selecting an **[Digital Input NST Freewheel]** L i input or a Cxxx bit:
  - By selecting, for example, **[DI3]** L i 3, this action is triggered by **[DI3]** L i 3 regardless of which command channel is switched.
  - By selecting, for example, **[C214]** C 2 1 4, this action is triggered by integrated CANopen® with bit 14 regardless of which command channel is switched.
- To a switchable channel by selecting a CDxx bit:
  - By selecting, for example, **[CD11]** C d 1 1, this action is triggered by:
    [DI12] L i 1 2 if the terminals channel is active
    [C111] C 1 1 1 if the integrated Modbus channel is active
    [C211] C 2 1 1 if the integrated CANopen® channel is active
    [C311] C 3 1 1 if the communication module channel is active

If the active channel is the graphic display terminal, the functions and commands assigned to CDxx switchable internal bits are inactive.

NOTE: [CD06] C d 0 6 to **[CD13]** C d 1 3 can only be used for switching between 2 networks. They do not have equivalent logic inputs.

Terminals	Integrated Modbus	Integrated CANopen®	Communication module	Internal bit, can be switched
				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]** t C C , page 97 is set to **[3-Wire Control]** 3 C, **[DI2]** L I 2, **[C101]** C 1 0 1, **[C201]** C 2 0 1 and **[C301]** C 3 0 1 cannot be accessed.

Assignment conditions for 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:

[DI1] L I 1 to **[DI6]** L I 6	Logical inputs
[DAI1] L A I 1 to **[DAI2]** L A I 2	Virtual logic input
[C101] C 1 0 1 to **[C110]** C 1 1 0	With integrated **Modbus** in **[I/O profile]** I o configuration
[C111] C 1 1 1 to **[C115]** C 1 1 5	With integrated **Modbus** regardless of configuration
[C201] C 2 0 1 to **[C210]** C 2 1 0	With integrated **CANopen®** in **[I/O profile]** I o configuration
[C211] C 2 1 1 to **[C215]** C 2 1 5	With integrated **CANopen®** regardless of configuration
[C301] C 3 0 1 to **[C310]** C 3 1 0	With a **communication module** in **[I/O profile]** I o configuration
[C311] C 3 1 1 to **[C315]** C 3 1 5	With a **communication module** regardless of configuration
[CD00] C d 0 0 to **[CD10]** C d 1 0	In **[I/O profile]** I o configuration
[CD11] C d 1 1 to **[CD15]** C d 1 5	Regardless of configuration
[OL01] o L 0 1 to **[OL10]** o L 1 0	Regardless of configuration

NOTE: In **[I/O profile]** I o configuration, **[DI1]** L I 1 cannot be accessed and if **[2/3-Wire Control]** t C C , page 97 is set to **[3-Wire Control]** 3 C, **[DI2]** L I 2, **[C101]** C 1 0 1, **[C201]** C 2 0 1 and **[C301]** C 3 0 1 cannot be accessed either.

[Command] CTL – parameters list

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ CTL

Parameters list

HMI label	Settings	Factory setting
[Ref Freq Channel 1] Fr1	—	**[AI1]** AI1
Reference frequency channel 1 • **[AI1]** AI1: ***AI1***, analog input A1 • **[AI2]** AI2: ***AI2***, analog input A2 • **[AI3]** AI3: ***AI3***, analog input A3 • **[HMI]** LCC: ***Local HMI***, graphic display terminal or remote display terminal source • **[Modbus]** Mdb: ***Modbus communication*** • **[CANopen]** CAn: ***CANopen communication*** • **[Com. Module]** nET: ***Ext. communication module*** • **[RP]** P1: ***Pulse input*** • **[AI Virtual 1]** AIV1: Virtual analog input 1 with the jog dial (only available if **[Profile]** CHCF is not set to **[Not separ.]** SIM • **[OA01]** oA01: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** oA10: ***OA10***, function blocks: Analog Output 10		
[Reverse Disable] rIn	—	**[No]** no
Reverse direction disable Inhibition of movement in reverse direction, does not apply to direction requests sent by logic inputs. Reverse direction requests sent by logic inputs are taken into account. Reverse direction requests sent by the graphic display terminal are not taken into account. Reverse direction requests sent by the fieldbus are not taken into account. Any reverse speed reference originating from the PID, summing input, etc., is interpreted as a zero reference (0 Hz). • **[No]** no • **[Yes]** YES		
[Stop Key Enable] PSt 2 s	—	**[Yes]** YES
Stop key enable Setting this function to No disables the Stop keys of the Display Terminals if the setting of the parameter **[Command Channel]** CMDC is not **[HMI]** LCC. **⚠WARNING** **LOSS OF CONTROL** Only set this parameter to **[Stop Key No Priority]** NO if you have implemented appropriate alternative stop functions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**		

HMI label	Settings	Factory setting
This is a freewheel stop. If the active command channel is the graphic display terminal, the stop is performed according to the **[Type of stop]** S t t irrespective of the configuration of **[Stop Key Enable]** P S t. • **[No]** n o • **[Yes]** Y E S: Gives priority to the STOP key on the graphic display terminal when the graphic display terminal is not enabled as the command channel.		
[Profile] C H C F 2 s	—	**[Not separ.]** S i M
Channel mode config.		
⚠WARNING **UNANTICIPATED EQUIPMENT OPERATION** Disabling **[I/O profile]** IO resets the device to the factory settings. • Verify that restoring the factory settings is compatible with the type of wiring used. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**		
• **[Not separ.]** S i M: ***Combined channel mode***, reference and command, not separate • **[Separate]** S E P: ***Separated channel mode***, separate reference and command. This assignment cannot be accessed in **[I/O profile]** i o. • **[I/O profile]** i o: ***I/O mode***		
[Command Switching] C C S ★	—	**[Cmd Channel 1]** C d 1
Command switching		
⚠WARNING **UNANTICIPATED EQUIPMENT OPERATION** This parameter can cause unintended movements, for example, inversion of the direction of rotation of the motor, sudden acceleration or stops. • Verify that the setting of this parameter does not cause unintended movements. • Verify that the setting of this parameter does not result in unsafe conditions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**		
This parameter can be accessed if **[Profile]** C H C F is set to **[Separate]** S E P or **[I/O profile]** i o. If the assigned input or bit is at 0, channel **[Cmd Channel 1]** C d 1 is active. If the assigned input or bit is at 1, channel **[Cmd Channel 2]** C d 2 is active. If **[I/O profile]** i o is set to **[Not separ.]** S i M, only **[Cmd Channel 1]** C d 1 setting value is possible. **[Cmd Channel 1]** C d 1: **[Cmd Channel 1]** C d 1 active (no switching) **[Cmd Channel 2]** C d 2: **[Cmd Channel 2]** C d 2 active (no switching) **[DI1]** L i 1: Logical input LI1 **[...] (...)**: See the assignment conditions (not **[CD00]** C d 0 0 to **[CD15]** C d 1 5)		
[Cmd Channel 1] C d 1 ★	—	**[Terminal]** t E r
Command channel 1		
This parameter can be accessed if **[Profile]** C H C F is set to **[Separate]** S E P or **[I/O profile]** i o. • **[Terminal]** t E r: ***Terminal*** • **[HMI]** L C C: ***Local HMI***, graphic display terminal or remote display terminal • **[Modbus]** M d b: ***Modbus communication***		

HMI label	Settings	Factory setting
• **[CANopen]** C A n: ***CANopen communication*** • **[Com. Module]** n E t: ***Ext. communication module***		
[Cmd Channel 2] C d 2 ★	—	**[Modbus]** n d b
Command channel 2 This parameter can be accessed if **[Profile]** C H C F is set to **[Separate]** S E P or **[I/O profile]** i o. • **[Terminal]** t E r: ***Terminal*** • **[HMI]** L C C: ***Local HMI***, graphic display terminal or remote display terminal • **[Modbus]** n d b: ***Modbus communication*** • **[CANopen]** C A n: ***CANopen communication*** • **[Com. Module]** n E t: ***Ext. communication module***		
[Ref Freq 2 switching] r F C	—	**[Ref Freq Channel 1]** F r 1
Reference frequency 2 switching **⚠WARNING** **UNANTICIPATED EQUIPMENT OPERATION** This parameter can cause unintended movements, for example, inversion of the direction of rotation of the motor, sudden acceleration or stops. • Verify that the setting of this parameter does not cause unintended movements. • Verify that the setting of this parameter does not result in unsafe conditions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** If the assigned input or bit is at 0, channel **[Cmd Channel 1]** C d 1 is active. If the assigned input or bit is at 1, channel **[Cmd Channel 2]** C d 2 is active. **[Ref Freq Channel 1]** F r 1: **[Cmd Channel 1]** C d 1 active (no switching) **[Ref Freq Channel 2]** F r 2: **[Cmd Channel 2]** C d 2 active (no switching) **[DI1]** L I 1: Logical input LI1 **[...] ...**: See the assignment conditions (not **[CD00]** C d 0 0 to **[CD15]** C d 1 5)		
[Ref Freq Channel 2] F r 2	—	**[No]** n o
Reference frequency channel 2 • **[No]** n o: ***No*** Not assigned. If **[Profile]** C H C F is set to **[Not separ.]** S I M, the command is at the terminals with a zero reference. If **[Profile]** C H C F is set to **[Separate]** S E P or **[I/O profile]** i o, the reference is zero. • **[AI1]** A I 1: ***AI1***, analog input A1 • **[AI2]** A I 2: ***AI2***, analog input A2 • **[AI3]** A I 3: ***AI3***, analog input A3 • **[+/-Speed] UPDT**: +/- speed command • **[HMI]** L C C: ***Local HMI***, graphic display terminal or remote display terminal • **[Modbus]** n d b: ***Modbus communication*** • **[CANopen]** C A n: ***CANopen communication*** • **[Com. Module]** n E t: ***Ext. communication module*** • **[RP]** P I: ***Pulse input*** • **[AI Virtual 1]** A I V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[OA01]** o A 0 1: ***OA01***, function blocks: Analog Output 01 ...		

HMI label	Settings	Factory setting
• **[OA10]** o A 1 0: ***OA10***, function blocks: Analog Output 10		
[Copy Ch1-Ch2] C o P 2 s	—	**[No]** n o

Copy Ch.1-Ch.2

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example, inversion of the direction of rotation of the motor, sudden acceleration or stops.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

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

Can be used to copy the current reference and/or the command by means of switching, to avoid speed surges, for example.

If **[Profile]** C H C F , page 189 is set to **[Not separ.]** S i M or **[Separate]** S E P, copying is possible from channel 1 to channel 2.

Copying is possible from channel 2 to channel 1 if **[Ref Freq Channel 2]** F r 2 is set to **[Ref Frequency via DI]** u P d t or set to **[HMI]** L C C with **[+speed]** F u S P or **[-speed]** F d S P assigned to **[Function key 1]** F n 1 or.... **[Function key 4]** F n 4.

If **[Profile]** C H C F is set to **[I/O profile]** i o, copying is possible in both directions.

A reference or a command cannot be copied to a channel on the terminals.

The reference copied is **[Pre-Ramp Ref Freq]** F r H (before ramp) unless the destination channel reference is set via +/- speed. In this case, the reference copied is **[Motor Frequency]** r F r (after ramp).

- **[No]** n o: ***No***, No copy
- **[Reference Frequency]** S P: ***Copy reference frequency***
- **[Command]** C d: ***Copy command***
- **[Cmd + Ref Frequency]** A L L: ***Copy command & reference frequency***

★ : 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 s.

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 display terminal command/reference is only active if the command and/or reference channels from the terminal are active with the exception of **[T/K]** F t K (command via the display terminal), which takes priority over these channels. Press **[T/K]** F t K (command via the display terminal) again to revert control to the selected channel.
- Command and reference via the display terminal are impossible if the latter is connected to more than one drive.

- The JOG, preset speed and +/- speed functions can only be accessed if **[Profile]** CHCF is set to **[Not separ.]** SIM.
- The preset PID reference functions can only be accessed if **[Profile]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP.
- The **[T/K]** FtK (command via the display terminal) can be accessed regardless of the **[Profile]** CHCF.

HMI label	Settings	Factory setting
[Function key 1] Fn1	—	**[No]** no
Graphic display terminal function key 1 • **[No]** no: ***No***, not assigned • **[FW JOG]** FJoG): JOG operation • **[Preset Speed 1]** FPS1: ***Preset speed 1***, press the key to run the drive at the 2nd preset speed **[Preset speed 2]** SP2. Press STOP to stop the drive. • **[Preset Speed 2]** FPS2: ***Preset speed 2***, press the key to run the drive at the 3rd preset speed **[Preset speed 3]** SP3. Press STOP to stop the drive. • **[PID Ref Freq 1]** FPr1: ***PID reference frequency 1***, sets a PID reference equal to the 2nd preset PID reference **[Ref PID Preset 2]** rP2, without sending a run command. Only operates if **[Ref Freq Channel 1]** Fr1 is set to **[HMI]** LCC. Does not operate with the **[T/K]** FtK function. • **[PID Ref Freq 2]** FPr2: ***PID reference frequency 2***, sets a PID reference equal to the 3rd preset PID reference **[Ref PID Preset 3]** rP3, without sending a run command. Only operates if **[Ref Freq Channel 1]** Fr1 is set to **[HMI]** LCC. Does not operate with the **[T/K]** FtK function. • **[+speed]** FUSP: ***Increase speed***, only operates if **[Ref Freq Channel 2]** Fr2 is set to **[HMI]** LCC. Press the key to run the drive and increase the speed. Press STOP to stop the drive. • **[-speed]** FdSP: ***Decrease speed***, only operates if **[Ref Freq Channel 2]** Fr2 is set to **[HMI]** LCC and if a different key has been assigned to **[+ speed]**. Press the key to run the drive and decrease the speed. Press STOP to stop the drive. • **[T/K]** FtK: ***Terminal keypad***, command via the display terminal: Takes priority over **[Command Switching]** CCS and over **[Ref Freq 2 switching]** rFC.		
[Function key 2] Fn2	—	**[No]** no
Graphic display terminal function key 2 Identical to **[Function key 1]** Fn1, page 192.		
[Function key 3] Fn3	—	**[No]** no
Graphic display terminal function key 3 Identical to **[Function key 1]** Fn1, page 192.		
[Function key 4] Fn4	—	**[No]** no
Graphic display terminal function key 4 Identical to **[Function key 1]** Fn1, page 192.		
[HMI L/R cmd] bMP ★	—	**[Stop]** StoP
HMI local/remote command When the **[T/K]** FtK function is assigned to a key and that function is active, this parameter defines the behavior at the moment when control returns to the graphic display terminal or remote display terminal. • **[Stop]** StoP: Stops the drive (although the controlled direction of operation and reference of the previous channel are copied (to be taken into account on the next RUN command)). • **[Bumpless]** bUMP: Does not stop the drive (the controlled direction of operation and the reference 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.

1.3.4.6 [Full] F u L L – – [Function Blocks] F b n –

What's in This Chapter

[Monit. Fun. Blocks] MFB —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FBN

Parameters list

HMI label	Settings	Factory setting
[Monit. Fun. Blocks] MFB —		
NOTE: This section shows only what is possible to do with local or remote display on the drive. For advanced configuration using PC software, please refer to the dedicated Function blocks manual.		
[FB Status] FBST	—	—
FunctionBlock status • **[Not Active]** IDLE: ***Not active***, no binary file in the target, the FB is waiting for a download • **[Check prog.]** CHEC: ***Check program*** • **[Stop]** STOP: ***Stop***, the function blocks application is stopped • **[Init]** INIT: ***Init***, check coherency between ATV Logic program and Function blocks parameters • **[Run]** RUN: ***Run***, the function blocks application is running • **[Error]** ERR: ***Error***, an internal error has been detected. The Function blocks application is in detected error state mode.		
[FB Error] FBFT	—	—
FunctionBlock error • **[No]** NO: ***No***, no detected fault • **[Internal]** INT: ***Internal***, Internal detected error • **[Binary file]** BIN: ***Binary file***, binary file corrupted • **[Intern para.]** INP: ***Internal parameters***, internal parameter detected error • **[Para. RW]** PAR: ***Parameter access on read or write***, parameter access detected error • **[Calculation]** CAL: ***Calculation***, calculation detected error • **[AUX TO]** TOAU: ***TimeOut AUX task*** • **[Synch TO]** TOPP: ***TimeOut in synchronous tasks*** • **[Bad ADLC]** ADL: ***ADLC with bad parameter*** • **[Input assig.]** IN: ***Inputs assignment***, input not configured		

(1) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

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

[FB Identification] FB 1 —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ FBN

Parameters list

HMI label	Settings	Factory setting
[FB Identification] FB 1 —		
[Program version] bVEr ★	0 to 255	—
Program version		
[Program size] bnS ★	0 to 65,535	—
Program size		
[Prg. format version] bnV	0 to 255	—
Program format version		
[Catalogue version] CtV	0 to 65,535	—
Catalogue version		
[FB Activation] FbCd	—	—
FunctionBlock activation Allows to start and stop the function blocks manually. • **[FB Activation]** FbCd is forced to **[Stop]** StoP if there is no valid function blocks application in the drive memory. • **[FB Activation]** FbCd is set to **[Start]** Strt when the function blocks application switch to Run according to **[FB Start Mode]** FbrM configuration. **NOTE:** As soon as the function blocks are started, the drive is considered as in running state and the modification of configuration parameters is no longer possible. • **[Stop]** StoP: Function blocks application Stop command • **[Start]** Strt: Function blocks application Start command		
[FB Start Mode] FbrM 2 s	—	**[No]** no
FunctionBlock start mode **⚠WARNING** **UNANTICIPATED EQUIPMENT OPERATION** If this parameter is set to **[Yes]** YES, function blocks are immediately executed after the drive is powered on. This can result in immediate movements. • Verify that the setting of this parameter does not result in unsafe conditions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Allows to choose the different ways of starting the Function blocks application. **NOTE:** Modifications of this parameter are not taken into account if the Function blocks application is running. • **[No]** no: ***No***, function blocks application is controlled by **[FB Activation]** FbCd parameter		

HMI label	Settings	Factory setting
• **[Yes]** YES: ***Yes***, function blocks application switches to run automatically at drive power on • **[DI1]** LI1: ***Digital input 1***, function blocks application switches to run on a rising edge of the logic input. It switch to stop on falling edge of the logic input. • **[...] ...**: See the assignment conditions **[OL01]** OL01 up to **[OL10]** OL10 and **[CD00]** CD00 up to **[CD15]** CD15 are not available).		
[FB Motor Stop Type] FBSM	—	**[Freewheel Stop]** YES
Motor stop type on FunctionBlock stop **⚠WARNING** **LOSS OF CONTROL** If **[FB Motor Stop Type]** FBSM is set to **[Ignore]** NO, the motor continues to run as it ran before the function block application was stopped. • Only set this parameter to **[Ignore]** NO if you have implemented appropriate stop functions to achieve a safe standstill of the motor. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** Allows to setup the way of working of the drive when function blocks are stopped. • **[Ignore]** NO: ***Ignore***, the drive does not stop • **[Freewheel Stop]** YES: ***Freewheel stop*** • **[Ramp stop]** RMP: ***Ramp stop*** • **[Fast stop]** FST: ***Fast stop*** • **[DC injection]** DCI: ***DC injection***		
[FB DriveError Resp] FBDF	—	**[Stop]** STOP
FunctionBlock response to drive error, behavior of function blocks when the drive trips. • **[Stop]** STOP: ***Stop***, function blocks stops when the drive trips, outputs are released • **[Ignore]** IGN: ***Ignore***, function blocks continue to work when the drive trips (except CFF and INFE)		

(1) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Input Assignments] FbA —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ FbN

Parameters list

HMI label	Settings	Factory setting
[Input Assignments] FbA —		
[IL01 Assignment] IL01	—	**[No]** no
Function blocks logic input 01 assignment Identical to **[R1 Assignment]** r1 not **[Limit Switch Reached]** LSA with the addition of the following parameter values (shown for information only as these selections can only be configured in the **[Application function]** FUn — menu): • **[Yes]** YES: ***Yes*** • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Logic input x assignment] IL–	—	**[No]** no
[Logic input x assignment] IL– All the Function Blocks logic inputs available on the drive are processed as in the example for **[IL01 Assignment]** IL01 above, up to **[IL10 Assignment]** IL10.		
[IA01 Assignment] IA01	—	**[No]** no
Function blocks analog input 01 assignment Possible assignment for the Function block analog input. • **[No]** no: ***No*** • **[AI1]** AI1: ***AI1***, analog input A1 • **[AI2]** AI2: ***AI2***, analog input A2 • **[AI3]** AI3: ***AI3***, analog input A3 • **[Motor Current]** oCr: ***Motor current*** • **[Motor Frequency]** oFr: ***Motor frequency*** • **[Ramp Out.]** orP: ***Ramp output*** • **[Motor Torq.]** tr9: ***Motor torque*** • **[Sign. Torque]** St9: ***Signed torque*** • **[sign Ramp]** or S: ***Signed ramp*** • **[PID Ref.]** oPS: ***PID reference*** • **[PID Feedbk]** oPF: ***PID feedback*** • **[PID Error]** oPE: ***PID error*** • **[PID Output]** oP1: ***PID output*** • **[Mot Mech Power in %]** oPr: ***Motor power in %*** • **[Mot Thermal]** tHr: ***Motor thermal state*** • **[Drv Thermal]** tHd: ***Drive thermal state*** • **[Torque 4Q]** t9nS: ***Master / slave torque*** • **[Sig. O/P Frq.]** oFS: ***Signed output frequency*** • **[Mot Therm2]** tHr2: ***Motor thermal 2 state***		

HMI label	Settings	Factory setting
• **[Mot Therm3]** t H r 3: ***Motor thermal 3 state*** • **[Motor volt.]** u o P: ***Motor voltage*** • **[RP]** P i: ***Pulse input*** • **[AI Virtual 1]** A i V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[DQ1]** d o 1: ***Digital output 1***, analog/logical output DO1 • **[AI Virtual 2]** A i V 2: ***AI Virtual 2***, virtual analog input 2 by the communication bus • **[OA01]** (o A O 1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** o A 10: ***OA10***, function blocks: Analog Output 10		
[Analog input x assignment] IA–	—	**[No]** n o
[Analog input x assignment] IA– All the Function blocks analog inputs available on the drive are processed as in the example for **[IA01]** i A O 1 above, up to **[IA10]** i A 10.		

(1) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

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

[ADL Containers] F A d —

Access

Parameters described below can be accessed by: d r ➜ C o n F ➜ F u L L ➜ F b N

Parameters list

HMI label	Settings	Factory setting
[ADL Containers] F A d —		
ADL containers contain Modbus logical address of internal parameters of the drive. If the chosen address is valid, the display shows the parameter name instead of the address.		
LA01	3,015 to 64,299	0
ADL Container 01		
LA02	3,015 to 64,299	0
ADL Container 02		
LA03	3,015 to 64,299	0
ADL Container 03		
LA04	3,015 to 64,299	0
ADL Container 04		
LA05	3,015 to 64,299	0
ADL Container 05		
LA06	3,015 to 64,299	0
ADL Container 06		
LA07	3,015 to 64,299	0
ADL Container 07		
LA08	3,015 to 64,299	0
ADL Container 08		

(1) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

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

[FB Parameters] F b P —

Access

Parameters described below can be accessed by: d r ı ➡ C o n F ➡ F u L L ➡ F b n

Parameters list

HMI label	Settings	Factory setting
[FB Parameters] F b P —		
Internal parameters available for the user program.		
[M001 Parameter] n 0 0 1 (1)	0 to 65,535	0
Function blocks M001 parameter, M001 parameter saved in EEprom		
[M002 Parameter] n 0 0 2 (1)	0 to 65,535	0
Function blocks M002 parameter, M002 parameter saved in EEprom		
[M003 Parameter] n 0 0 3 (1)	0 to 65,535	0
Function blocks M003 parameter, M003 parameter saved in EEprom		
[M004 Parameter] n 0 0 4 (1)	0 to 65,535	0
Function blocks M004 parameter, M004 parameter saved in EEprom		
[M005 Parameter] n 0 0 5 (1)	0 to 65,535	0
Function blocks M005 parameter, M005 parameter written in RAM		
[M006 Parameter] n 0 0 6 (1)	0 to 65,535	0
Function blocks M006 parameter, M006 parameter written in RAM		
[M007 Parameter] n 0 0 7 (1)	0 to 65,535	0
Function blocks M007 parameter, M007 parameter written in RAM		
[M008 Parameter] n 0 0 8 (1)	0 to 65,535	0
Function blocks M008 parameter, M008 parameter written in RAM		

(1) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

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

1.3.4.7 [Full] FULL– – [Application function] Fun–

What's in This Chapter

Summary of [Application function] F u n –

Summary of functions:

Code	Name
r E F —	**[Ref Freq switch]**
o A 1 —	**[Ref. operations]**
r P t —	**[Ramp switching]**
S t t —	**[Stop configuration]**
A d C —	**[Auto DC injection]**
J o G —	**[Jog]**
P S S —	**[Preset speeds]**
u P d —	**[+/- speed]**
S r E —	**[+/- speed around ref]**
S P M —	**[Memo reference frequency]**
F L 1 —	**[Fluxing by DI]**
b L C —	**[Brake logic control]**
E L M —	**[External weight meas.]**
H S H —	**[High speed hoisting]**
P 1d —	**[PID controller]**
P r 1 —	**[PID preset references]**
t o L —	**[Torque limitation]**
C L 1 —	**[2nd current limit.]**
1 2t —	**[Current Limit Dyn]**
L L C —	**[Mains contactor command]**
o C C —	**[Output contactor cmd]**
L P o —	**[Positioning by sensors]**
M L P —	**[Parameters switching]**
M M C —	**[Multimotors config]**
t n L —	**[Autotuning by DI]**
t r O —	**[Traverse control]**
C H S —	**[High Speed Switching]**
d C C —	**[DC bus]**

The parameters in the **[Application function]** F u n — menu can only be modified when the drive is stopped and there is no run command, except for parameters with a ( ) symbol in the code column, which can be modified with the drive running or stopped.

NOTE: Compatibility of functions
The choice of application functions may be limited by the number of I/O and by the fact that some functions are incompatible with others. Functions that are not listed in the table below are fully compatible.
If there is an incompatibility between functions, the first function configured helps to prevent the others being configured.
Each of the functions on the following pages can be assigned to one of the inputs or outputs.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

Multiple functions can be assigned to and simultaneously activated via a single input.

- Verify that assigning multiple functions to a single input does not result in unsafe conditions.

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

It is only possible to assign one input to several functions at **[Advanced]** ADV and **[Expert]** EPR.

Before assigning a command, reference or function to an input or output, the user must check that this input or output has not already been assigned and that another input or output has not been assigned to an incompatible function.

The drive factory setting or macro configurations automatically configure functions, **which may help to prevent other functions being assigned. In some case, it is necessary to unconfigure one or more functions to be able to enable another.** Check the compatibility table below.

Stop functions have priority over run commands.
Speed references via logic command have priority over analog references.

NOTE: This compatibility table does not affect commands that can be assigned to the keys of the graphic display terminal (see Graphic Display Terminal Option, page 20).

Compatibility table

	[AI1 Sensor config.] AI1 —	**[+/- speed]** UPD — (3)	**[Preset speeds]** PSS —	**[PID controller]** PID —	**[Traverse control]** TRO —	**[Jog]** JOG —	**[Ref Freq switch]** REF —	**[Skip Frequency]** JPF	**[Brake logic control]** BLC —	**[Auto DC injection]** ADC —	**[Catch on the fly]** FLR —	**[Output contactor cmd]** OCC —	**[DC injection]** DCI	**[Fast stop]** FST	**[Freewheel Stop]** NST	**[+/- speed around ref]** SRE —	**[High speed hoisting]** HSH —	**[Load sharing]** LBA	**[Positioning by sensors]** LPO —	**[Time delay control]** TDC
[AI1 Sensor config.] AI1 —			↑	• (2)		↑	↑	↑												
[+/- speed] UPD — (3)					•	•	↑	↑												
[Preset speeds] PSS —	←					↑	↑	↑												
[PID controller] PID —	• (2)				•	•	↑	↑	•							•	•	•	•	
[Traverse control] TRO —		•		•		•	↑	↑								•	•			•

	[AI1 Sensor config.] AI1 —	[+/- speed] UPD — (3)	[Preset speeds] PSS —	[PID controller] PID —	[Traverse control] TRO —	[Jog] JOG —	[Ref Freq switch] REF —	[Skip Frequency] JPF	[Brake logic control] BLC —	[Auto DC injection] ADC —	[Catch on the fly] FLR —	[Output contactor cmd] OCC —	[DC injection] DCI	[Fast stop] FST	[Freewheel Stop] NST	[+/- speed around ref] SRE —	[High speed hoisting] HSH —	[Load sharing] LBA	[Positioning by sensors] LPO —	[Time delay control] TDC
[Jog] JOG —	←	•	←	•	•			↑	•	←						•	•			•
[Ref Freq switch] REF —	←	←	←	←	←			↑								↑				
[Skip Frequency] JPF	←	←	←	←	←	←	←									←				•
[Brake logic control] BLC —				•		•					•		•							
[Auto DC injection] ADC —						↑							↑		↑					
[Catch on the fly] FLR —									•											
[Output contactor cmd] OCC —																				
[DC injection] DCI									•	←				• (1)	↑					
[Fast stop] FST													• (1)		↑					
[Freewheel Stop] NST										←			←	←						
[+/- speed around ref] SRE —				•	•	•	←	↑												
[High speed hoisting] HSH —				•	•	•														•
[Load sharing] LBA				•																•
[Position-ing by sensors] LPO —				•																•

(1) Priority is given to the first of these two stop modes to be activated.

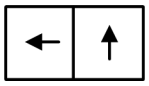
(2) Only the multiplier reference is incompatible with the PID regulator.

Incompatible functions

Compatible functions

Not applicable

Priority functions (functions which cannot be active at the same time):



The function indicated by the arrow has priority over the other.

Incompatible Functions

The following function is inaccessible or deactivated after an Automatic restart. This is only possible for control type if **[2/3-Wire Control]** tCC is set to **[2-Wire Control]** 2C and if **[2-wire type]** tCt is set to **[Level]** LEL or **[Level With Fwd Priority]** PFO. See **[2/3-Wire Control]** tCC , page 97.

The **[1.2] [MONITORING]** MON — menu 1.2 **[MONITORING]** MON-, page 47 can be used to display the functions assigned to each input to check their compatibility.

When a function is assigned, a ✓ appears on the graphic display terminal, as illustrated in the example below:

RDY Term 0.0 Hz 0.0 A	
APPLICATION FUNCT.	
REFERENCE SWITCH.	
REF. OPERATIONS	
RAMP	
STOP CONFIGURATION	
AUTO DC INJECTION	
Code << >>	Quick

If you attempt to assign a function that is incompatible with another function that has already been assigned, an alarm message appears:

- With the graphic display terminal:

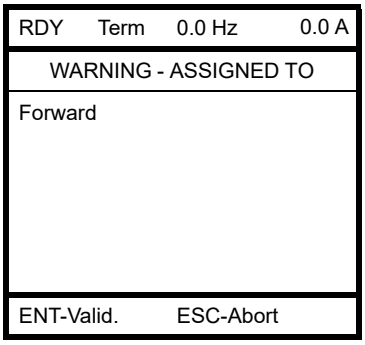
RDY Term +0.0 Hz 0.0 A
INCOMPATIBILITY
The function can't be assigned because an incompatible function is already selected. See programming book. ENT or ESC to continue

- With the integrated display terminal and the remote display terminal: COMP flashes until ENT or ESC is pressed.

  When you assign a logic input, an analog input, a reference channel or a bit to a function, pressing the HELP key displays the functions that may already have been activated by this input, bit or channel.

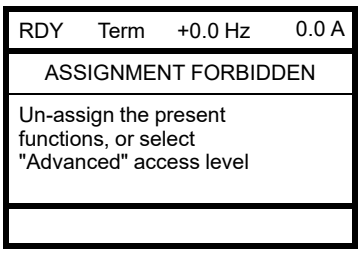
  When a logic input, an analog input, a reference channel or a bit that has already been assigned is assigned to another function, the following screens appear:

- 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 display terminal:
The code for the first function, which is already assigned, is displayed flashing.

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.

[Ref Freq switch] rEF —

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUn ➜ **[Ref Freq switch]** rEF

Parameters list

HMI label	Settings	Factory setting
[Ref Freq switch] rEF —		
[Ref 1B switching] rCb	—	**[Ref Freq Channel 1]** Fr1

Select switching (1 to 1B)

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

This parameter can cause unintended movements, for example, inversion of the direction of rotation of the motor, sudden acceleration or stops.

- Verify that the setting of this parameter does not cause unintended movements.
- Verify that the setting of this parameter does not result in unsafe conditions.

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

See the reference channel diagrams PID not configured and PID configured with PID references at the terminals .

If the assigned input or bit is at 0, **[Ref Freq Channel 1]** Fr1 is active (see **[Ref Freq Channel 1]** Fr1, page 188).

If the assigned input or bit is at 1, **[Ref.1B channel]** Fr1b is active.

[Ref 1B switching] rCb is forced to **[ch1 active] FR1** if **[Profile]** CHCF is set to **[Not separ.]** SIM with **[Ref Freq Channel 1]** Fr1 assigned via the terminals (analog inputs, pulse input). See **[Ref Freq Channel 1]** Fr1, page 188.

[Ref Freq Channel 1] Fr1: No switching, **[Ref Freq Channel 1]** Fr1 active

[ch1B active] Fr1b: No switching, **[Ref.1B channel]** Fr1b active

[DI1] LI1: Logical input LI1

[...] ...: See the assignment conditions (not **[CD00]** CD00 to **[CD15]** CD15).

HMI label	Settings	Factory setting
[Ref.1B channel] F r 1 b	—	**[No]** n o

Configuration ref. 1B

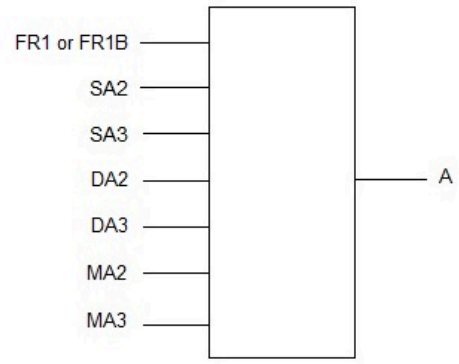
- **[No]** n o: ***No***
- **[AI1]** A i 1: ***AI1***, analog input A1
- **[AI2]** A i 2: ***AI2***, analog input A2
- **[AI3]** A i 3: ***AI3***, analog input A3
- **[HMI]** L C C: ***Local HMI***, graphic display terminal or remote display terminal source
- **[Modbus]** M d b: ***Modbus communication***
- **[CANopen]** C A n: ***CANopen communication***
- **[Com. Module]** n E t: ***Ext. communication module***
- **[RP]** P i: ***Pulse input***
- **[AI Virtual 1]** A i V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial (only available if **[Profile]** C H C F is set to **[Not separ.]** S i M)
- **[OA01]** o A 0 1: ***OA01***, function blocks: Analog Output 01

...

- **[OA10]** o A 1 0: ***OA10***, function blocks: Analog Output 10

[AI1 Sensor config.] oAI —

Summing input / Subtracting input / Multiplier



A = (FR1 or FR1B + SA2 + SA3 - dA2 - dA3) x MA2 x MA3

- If **[Summing Input 2]** SA2, **[Summing Input 3]** SA3, **[Subtract Ref Freq 2]** dA2, **[Subtract Ref Freq 3]** dA3 are not assigned, they are set to 0.
- If **[Ref Freq 2 Multiply]** MA2, **[Ref Freq 3 Multiply]** MA3 are not assigned, they are set to 1.
- A is limited by the minimum **[Low Speed]** LSP and maximum **[High Speed]** HSP parameters.
- For multiplication, the signal on **[Ref Freq 2 Multiply]** MA2 or **[Ref Freq 3 Multiply]** MA3 is interpreted as a %. 100% corresponds to the maximum value of the corresponding input. If **[Ref Freq 2 Multiply]** MA2 or **[Ref Freq 3 Multiply]** MA3 is sent via the communication bus or graphic display terminal, an **[Multiplying coeff.]** MFR multiplication variable , page 382 must be sent via the bus or graphic display terminal.
- Reversal of the direction of operation in the event of a negative result can be inhibited (see **[Reverse Disable]** rIN , page 188).

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[AQ1 configuration]** oAI

Parameters list

HMI label	Settings	Factory setting
[AI1 Sensor config.] oAI —		
Reference = (FR1 or FR1B + SA2 + SA3 - dA2 - dA3) x MA2 x MA3. See the reference channel diagrams PID not configured and PID configured with PID references at the terminals . **NOTE:** This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[Summing Input 2] SA2	—	**[No]** nO

HMI label	Settings	Factory setting
Summing input 2 Selection of a reference to be added to **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. • **[No]** nO: ***No*** • **[AI1]** AI1: ***AI1***, analog input A1 • **[AI2]** AI2: ***AI2***, analog input A2 • **[AI3]** AI3: ***AI3***, analog input A3 • **[HMI]** LCC: ***Local HMI***, graphic display terminal or remote display terminal source • **[Modbus]** Mdb: ***Modbus communication*** • **[CANopen]** CAn: ***CANopen communication*** • **[Com. Module]** nET: ***Ext. communication module*** • **[RP]** PI: ***Pulse input*** • **[AI Virtual 1]** AIV1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[AI Virtual 2]** AIV2: ***AI Virtual 2***, virtual analog input 2 by the communication bus • **[OA01]** oAO1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** oA10: ***OA10***, function blocks: Analog Output 10		
[Summing Input 3] SA3	—	**[No]** nO
Summing input 3 Selection of a reference to be added to **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. Identical to **[Summing Input 2]** SA2 .		
[Subtract Ref Freq 2] dA2	—	**[No]** nO
Subtract reference frequency 2 Selection of a reference to be subtracted from **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. Identical to **[Summing Input 2]** SA2 .		
[Subtract Ref Freq 3] dA3	—	**[No]** nO
Subtract reference frequency 3 Selection of a reference to be subtracted from **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. Identical to **[Summing Input 2]** SA2 .		
[Ref Freq 2 Multiply] MA2	—	**[No]** nO
Reference frequency 2 multiply Selection of a multiplier reference **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. Identical to **[Summing Input 2]** SA2 . This parameter is incompatible with the PID regulator, **[No]** nO is the only setting possible		
[Ref Freq 3 Multiply] MA3	—	**[No]** nO
Reference frequency 3 multiply Selection of a multiplier reference **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B. Identical to **[Summing Input 2]** SA2 . This parameter is incompatible with the PID regulator, **[No]** nO is the only setting possible		

[Ramp switching] rPt —

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➜ **[Configuration]** ConF ➜ **[Full]** FULL ➜ **[Application function]** FUn ➜ **[Ramp switching]** rPt

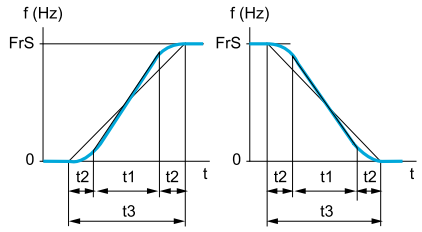
Parameters list

HMI label	Settings	Factory setting
[Ramp switching] rPt —		
[Ramp Type] rPt	—	**[Linear]** Lin

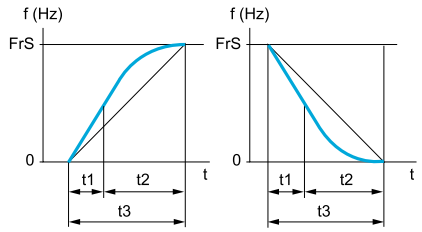
Type of ramp

- **[Linear]** Lin: ***Linear ramp***
- **[S-Ramp]** S: ***S-Ramp***
- **[U-Ramp]** U: ***U-Ramp***
- **[Customized]** CUS: ***Ramp customized***

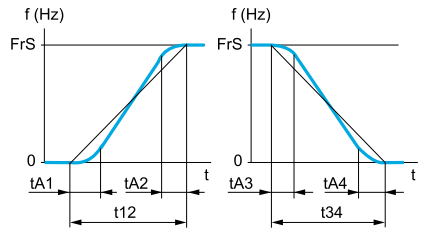
S ramps



The rounding coefficient is fixed,
t1 = 0.6 set ramp time (linear)
t2 = 0.4 set ramp time (round)
t3 = 1.4 set ramp time



The rounding coefficient is fixed,
t1 = 0.5 set ramp time (linear)
t2 = 1.0 set ramp time (round)
t3 = 1.5 set ramp time



tA1: adjustable from 0 to 100%
tA2: adjustable from 0 to (100% - tA1)
tA3: adjustable from 0 to 100%
tA4: adjustable from 0 to (100% - tA3)

t12 = ACC * (tA1(%) / 100 + tA2(%) / 100 + 1)
t34 = DEC * (tA3(%) / 100 + tA4(%) / 100 + 1)

[Ramp increment] inr (1)	—	**[0.1]** 01

Ramp increment

This parameter is valid for **[Acceleration]** ACC, **[Deceleration]** dEC, **[Acceleration 2]** AC2 and **[Deceleration 2]** dE2.

- **[0.01]** 0.01: ***hundredths of seconds***, ramp up to 99.99 seconds

HMI label	Settings	Factory setting
• **[0.1]** D . 1: ***Tenths of seconds***, ramp up to 999.9 seconds • **[1]** 1: ***seconds***, ramp up to 6,000 seconds		
[Acceleration] A C C (1)	0.00 to 6,000 s (2)	3.0 s
Acceleration ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** F r S , page 99. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.		
[Deceleration] d E C (1)	0.00 to 6,000 s (2)	3.0 s
Deceleration ramp time Time to decelerate from the **[Nominal Motor Freq]** F r S , page 99 to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.		
[Begin Acc round] t A 1 ★ (1)	0 to 100%	10%
Start ACC ramp rounding Rounding of start of acceleration ramp as a % of the **[Acceleration]** A C C or **[Acceleration 2]** A C 2 ramp time. Can be set between 0 and 100%. This parameter can be accessed if the **[Ramp Type]** r P t is **[Customized]** C u S.		
[End Acc round] t A 2 ★ (1)	0 to 100%	10%
End ACC ramp rounding Rounding of end of acceleration ramp as a % of the **[Acceleration]** A C C or **[Acceleration 2]** A C 2 ramp time. Can be set between 0 and (100% - **[Begin Acc round]** t A 1). This parameter can be accessed if the **[Ramp Type]** r P t is **[Customized]** C u S.		
[Begin Dec round] t A 3 ★ (1)	0 to 100%	10%
Start DEC ramp rounding Rounding of start of deceleration ramp as a % of the **[Deceleration]** d E C or **[Deceleration 2]** d E 2 ramp time. Can be set between 0 and 100%. This parameter can be accessed if the **[Ramp Type]** r P t is **[Customized]** C u S.		
[End Dec round] t A 4 ★ (1)	0 to 100%	10%
End DEC ramp rounding Rounding of end of deceleration ramp as a % of the **[Deceleration]** d E C or **[Deceleration 2]** d E 2 ramp time. Can be set between 0 and (100% - **[Begin Dec round]** t A 3). This parameter can be accessed if the **[Ramp Type]** r P t is **[Customized]** C u S.		
[Ramp 2 Thd] F r t	0 to 599 Hz according to rating	0 Hz
Ramp 2 frequency threshold The 2nd ramp is switched if the value of **[Ramp 2 Thd]** F r t is not 0 (0 deactivates the function) and the output frequency is greater than **[Ramp 2 Thd]** F r t. Threshold ramp switching can be combined with **[Ramp Switch Assign]** r P S switching as follows:		

HMI label	Settings	Factory setting

LI or bit	Frequency	Ramp
0	< Frt	ACC, dEC
0	> Frt	AC2, dE2
1	< Frt	AC2, dE2
1	> Frt	AC2, dE2

[Ramp Switch Assign] rPS	—	**[No]** nO

Ramp switching assignment

- **[No]** nO: ***No***, function not assigned
- **[DI1]** LI1: ***Digital input 1***
- **[...] ...**: See the assignment conditions

[Acceleration 2] AC2 ★ (1)	0.00 to 6,000 s (2)	5.0 s

Acceleration 2 ramp time

Time to accelerate from 0 to the **[Nominal Motor Freq]** FrS. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

This parameter can be accessed if **[Ramp 2 Thd]** Frt is greater than 0 or if **[Ramp Switch Assign]** rPS is assigned.

[Deceleration 2] dE2 ★ (1)	0.00 to 6,000 s (2)	5.0 s

Deceleration 2

Time to decelerate from **[Nominal Motor Freq]** FrS to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application.

This parameter can be accessed if **[Ramp 2 Thd]** Frt is greater than 0 or if **[Ramp Switch Assign]** rPS is assigned.

[Dec.Ramp Adapt] brA	—	**[Yes]** YES

HMI label	Settings	Factory setting

Decel ramp adaptation

NOTICE

DAMAGE TO THE MOTOR

Only set this parameter to **[Yes]** YES or **[No]** NO if the connected motor is a permanent magnet synchronous motor. Other settings demagnetize permanent magnet synchronous motors.

Failure to follow these instructions can result in equipment damage.

Activating this function automatically adapts the deceleration ramp, if this has been set at a too low value according to the inertia of the load, which can cause an overvoltage detected error.

The function is incompatible with applications requiring:

- Positioning on a ramp.
- The use of a braking resistor (the resistor would not operate correctly).

[Dec.Ramp Adapt] brA is forced to **[No]** nO if the brake logic control **[Brake assignment]** bLC is assigned.

NOTE: Whatever the setting of **[Dec.Ramp Adapt]** brA, the usage of braking resistor is allowed in any operating state (including **[STO active]** STO, **[Operating State "Fault"]** FLt, **[Freewheel]** nST, **[Ready]** rdY).

[No] nO: Function inactive

[Yes] YES: Function active, for applications that do not require strong deceleration
The following selections appear depending on the rating of the drive and **[Motor control type]** Ctt , page 121. They enable stronger deceleration to be obtained than with **[Yes]** (YES. Use comparative testing to determine your selection.

[High Torque] dYnA: Addition of a constant current flow component.
When **[Dec.Ramp Adapt]** brA is configured on **[High torq. x] DYNX**, the dynamic performances for braking are improved by the addition of a current flow component. The aim is to increase the iron loss and magnetic energy stored in the motor.

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 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.

: Setting of this parameter can be done during operation or when stopped.

[Stop configuration] STT —

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Stop configuration]** STT

Parameters list

HMI label	Settings	Factory setting
[Stop configuration] STT —		
NOTE: Some types of stops cannot be used with all other functions. Follow the instructions in compatibility of functions .		
[Type of stop] STT	—	**[On Ramp]** rMP
Type of stop Stop mode on disappearance of the run command or appearance of a stop command. **NOTE:** If the "brake logic" function has been enabled, or if **[Low Speed Timeout]** tLS or **[Low Speed Timeout]** tLS is not 0, only ramp type stops may be configured. • **[On Ramp]** rMP: ***On ramp***, stop on ramp • **[Fast stop]** FST: ***Fast stop*** • **[Freewheel Stop]** nST: ***Freewheel stop*** • **[DC injection]** dCI: ***DC injection***. Available only if **[Motor control type]** CTT , page 121 is not set to **[Synchronous motor]** SYN.		
[Freewheel stop Thd] FFT ★ ( )(1)	0.2 to 599 Hz	0.2 Hz
Freewheel stop threshold Speed threshold below which the motor switches to freewheel stop. This parameter supports switching from a ramp stop or a fast stop to a freewheel stop below a low speed threshold. This parameter can be accessed if **[Type of stop]** STT is set to **[Fast stop]** FST or **[On Ramp]** rMP and if **[Brake assignment]** bLC and **[Auto DC Injection]** AdC are not configured.		
[Freewheel Stop] nST	—	**[No]** nO
Freewheel stop threshold The stop is activated when the input or the bit changes to 0. If the input returns to state 1 and the run command is still active, the motor restarts only if **[2/3-Wire Control]** tCC , page 97 is set to **[2-Wire Control]** 2C and if **[2-wire type]** tCT is set to **[Level]** LEL or **[Level With Fwd Priority]** PFO. If not, a new run command must be sent. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Fast Stop Assign] FST	—	**[No]** nO
Fast stop assignment The stop is activated when the input changes to 0 or the bit changes to 1 (bit in **[I/O profile]** IO at 0). If the input returns to state 1 and the run command is still active, the motor restarts only if **[2/3-Wire Control]** tCC , page 97 is set to **[2-Wire Control]** 2C and if **[2-wire type]** tCT is set to **[Level]** LEL or **[Level With Fwd Priority]** PFO. If not, a new run command must be sent.		

HMI label	Settings	Factory setting
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions . • **[No]** n o: ***No***, not assigned • **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions If **[Profile]** C H C F is set to **[Not separ.]** S I M then **[CD11]** C d 1 1 up to **[CD15]** C d 1 5, **[C111]** C 1 1 1 up to **[C115]** C 1 1 5, **[C211]** C 2 1 1 up to **[C215]** C 2 1 5 and **[C311]** C 3 1 1 up to **[C315]** C 3 1 5 are not available.		
[Ramp Divider] d C F ★ (1)	0 to 10	4
Fast Stop ramp Divider This parameter can be accessed if **[Type of stop]** S t t is set to **[Fast stop]** F S t and if **[Fast Stop Assign]** F S t is not **[No]** n o and if **[Stop type]** P A S is set to **[Fast stop]** F S t. The ramp that is enabled **[Deceleration]** (d E C) or **[Deceleration 2]** d E 2 is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.		
[DC Injection Assign] d C I	—	**[No]** n o
DC injection assignment **⚠WARNING** **UNINTENDED MOVEMENT** • Do not use DC injection to generate holding torque when the motor is at a standstill. • Use a holding brake to keep the motor in the standstill position. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** DC injection braking is initiated when the assigned input or bit changes to state 1. If the input returns to state 0 and the run command is still active, the motor restarts only if **[2/3-Wire Control]** t C C , page 97 is set to **[2-Wire Control]** 2 C and if **[2-wire type]** t C t is set to **[Level]** L E L or **[Level With Fwd Priority]** P F o. If not, a new run command must be sent. **NOTE:** This function cannot be used with certain other functions. Follow the instructions in compatibility of functions . • **[No]** n o: ***No***, not assigned • **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[DC Inj Level 1] I d C ★ (1) (3)	0.1 to 1.41 In (2)	0.64 In (2)
DC injection level 1 ***NOTICE*** **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.** Level of DC injection braking current activated via logic input or selected as stop mode. This parameter can be accessed if **[Type of stop]** S t t is set to **[DC injection]** d C I or if **[DC Injection Assign]** d C I is not **[No]** n o.		
[DC Inj Time 1] t d I ★ (1) (3)	0.1 to 30 s	0.5 s

HMI label	Settings	Factory setting
DC injection time 1		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Maximum current injection time **[DC Inj Level 1]** IDC. After this time, the injection current becomes **[DC Inj Level 2]** IDC2. This parameter can be accessed if **[Type of stop]** STT is set to **[DC injection]** DC I or if **[DC Injection Assign]** DC I is not set to **[No]** NO.		
[DC Inj Level 2] IDC2 ★ (1) (3)	0.1 In (2) to **[DC Inj Level 1]** IDC	0.5 In (2)
DC injection level 2		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Injection current activated by logic input or selected as stop mode, once period of time **[DC Inj Time 1]** TDI has elapsed. This parameter can be accessed if **[Type of stop]** STT is set to **[DC injection]** DC I or if **[DC Injection Assign]** DC I is not set to **[No]** NO.		
[DC Inj Time 2] TDC ★ (1) (3)	0.1 to 30 s	0.5 s
DC injection time 2		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Maximum injection time **[DC Inj Level 2]** IDC2 for injection, selected as stop mode only. This parameter can be accessed if **[Type of stop]** STT is set to c**[DC injection]** DC I.		
[SwitchOnDisable Stp] DOTD	—	**[Ramp Stop]** RMP
Type of switchOn Disable Stop, disable operation stop mode. • **[Freewheel Stop]** NST: ***Freewheel stop***, disable drive function • **[Ramp Stop]** RMP: ***Ramp stop***, ramp stop then disable drive function		

(1) The parameter can also be accessed in the **[Settings]** SET — menu.

(2) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

(3) These settings are independent of the **[Auto DC injection]** ADC — function.

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[Auto DC injection] AdC —

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUn ➜ **[Auto DC injection]** AdC

Parameters list

HMI label	Settings	Factory setting
[Auto DC injection] AdC —		
[Auto DC Injection] AdC 2 s	—	**[Yes]** YES
Automatic DC injection		

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the parameter **[Auto DC Injection]** ADC is set to **[Continuous]** CT, DC injection is always active, even if the motor does not run.

- Verify that using this setting does not result in unsafe conditions.

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

⚠WARNING

UNINTENDED MOVEMENT

- Do not use DC injection to generate holding torque when the motor is at a standstill.
- Use a holding brake to keep the motor in the standstill position.

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

Automatic current injection on stopping (at the end of the ramp).

NOTE: There is an interlock between this function and **[Motor fluxing]** FLU . If **[Motor fluxing]** FLU is set to **[Continuous]** FCT, **[Auto DC Injection]** AdC must be **[No]** nO.

NOTE: [Auto DC Injection] AdC is set to **[No]** nO when **[Motor control type]** CTT , page 121 is set to **[Synchronous motor]** SYn.

[Auto DC Injection] AdC is forced to **[No]** nO when **[Brake assignment]** bLC is not set to **[No]** nO.

This parameter gives rise to the injection of current even if a run command has not been sent. It can be accessed with the drive running.

- **[No]** nO: ***No DC injection***
- **[Yes]** YES: ***DC injection***, adjustable injection time
- **[Continuous]** CT: ***Continuous DC injection***

[Auto DC inj Level 1] SdC1 ★ (1)	0 to 1.2 In (2)	0.7 In (2)
Auto DC injection level 1		

HMI label	Settings	Factory setting

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

Level of standstill DC injection current **[Auto DC Injection]** A D C is not **[No]** n o.

[Auto DC Inj Time 1] t D C 1 ★ (1)	0.1 to 30 s	0.5 s

Auto DC injection time 1

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

Standstill injection time. This parameter can be accessed if **[Auto DC Injection]** A D C is not set to **[No]** n o.

If **[Motor control type]** C t t , page 121 is set to **[Synchronous motor]** S Y n, this time corresponds to the zero speed maintenance time.

[Auto DC inj Level 2] S D C 2 ★ (1)	0 to 1.2 In (2)	0.5 In (2)

Auto DC injection level 2

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

This parameter can be accessed if **[Auto DC Injection]** A D C is not **[No]** n o.

[Auto DC Inj Time 2] t D C 2 ★ (1)	0 to 30 s	0 s

HMI label	Settings	Factory setting

Auto DC injection time 2

NOTICE

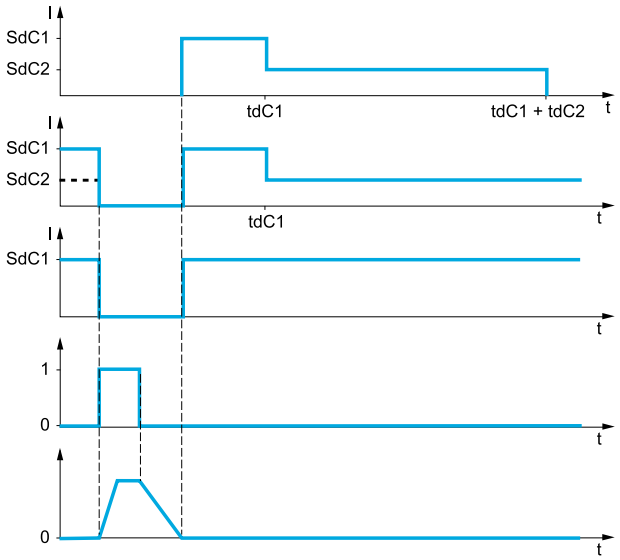
OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

2nd standstill injection time.

This parameter can be accessed if **[Auto DC Injection]** AdC is set to **[Yes]** YES.

AdC	SdC2	Operation
YES	X	
Ct	≠ 0	
Ct	= 0	
Run command		
Speed		

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

(2) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

: Setting of this parameter can be done during operation or when stopped.

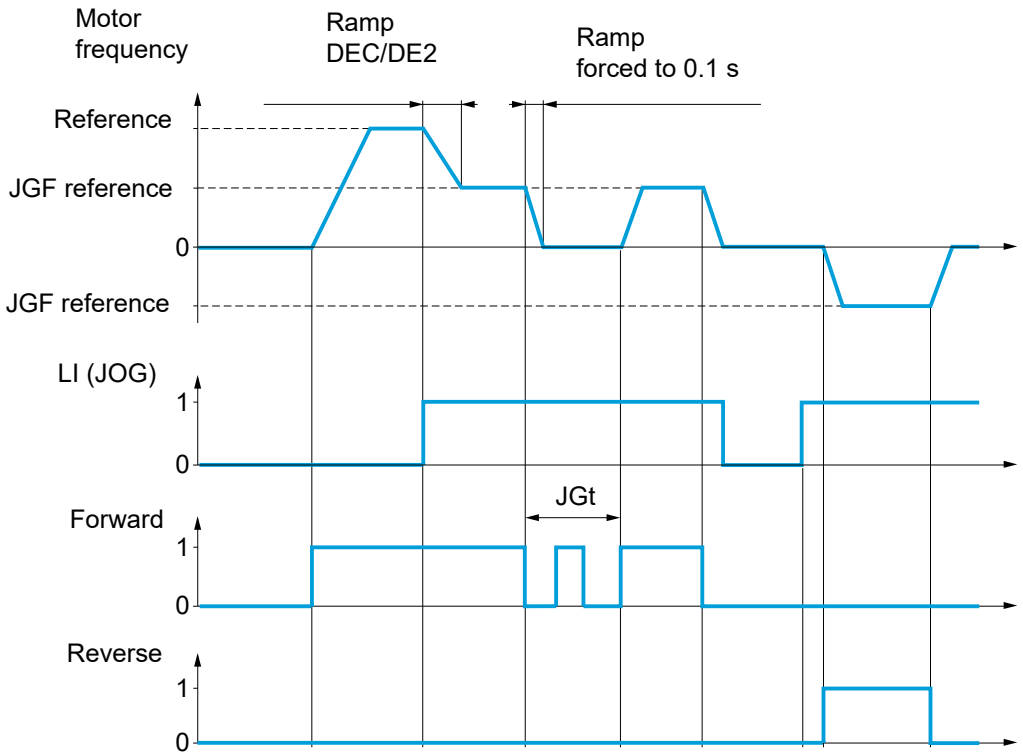
2 s: To change the assignment of this parameter, press the ENT key for 2 s.

[Jog] JOG —

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[Jog]** JOG

Parameters list

HMI label	Settings	Factory setting
[Jog] JOG —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[Jog Assign] JOG	—	**[Not Assigned]** nO
Jog assignment, pulse operation. The JOG function is only active if the command channel and the reference channels are on the terminals. The function is active when the assigned input or bit is at 1. Example: 2-wire control operation (tCC = 2C).  • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions (If **[Profile]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP then **[CD11]** Cd11 up to **[CD15]** Cd15, **[C111]** C111 up to **[C115]** C115, **[C211]** C211 up to **[C215]** C215 and **[C311]** C311 up to **[C315]** C315 are not available).		
[Jog Frequency] JGF ★ (1)	0 to 10 Hz	10 Hz
Jog frequency, reference in jog operation.		

HMI label	Settings	Factory setting
This parameter can be accessed if **[Jog]** JOG is not set to **[No]** nO.		
[Jog Delay] JGt ★ (1)	0 to 2.0 s	0.5 s
Jog delay, anti-repeat delay between 2 consecutive jog operations. This parameter can be accessed if **[Jog]** JOG is not set to **[No]** nO.		

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Preset speeds] PSS —

Preset speeds

2, 4, 8 or 16 speeds can be preset, requiring 1, 2, 3 or 4 logic inputs respectively.

NOTE:
You must configure 2 and 4 speeds to obtain 4 speeds.
You must configure 2, 4 and 8 speeds to obtain 8 speeds.
You must configure 2, 4, 8, and 16 speeds to obtain 16 speeds.

Combination table for preset speed inputs

16 speeds LI (PS16)	8 speeds LI (PS8)	4 speeds LI (PS4)	2 speeds LI (PS2)	Speed 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) See the diagram : Reference 1 = (SP1).

Access

Parameters described below can be accessed by: **[Drive menu]** DRI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Preset speeds]** PSS

Parameters list

HMI label	Settings	Factory setting
[Preset speeds] PSS —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[2 Preset Freq] PS2	—	**[No]** NO
2 Preset Freq assignment • **[No]** NO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1***		

HMI label	Settings	Factory setting
• **[...] ...**: See the assignment conditions		
[4 Preset Freq] P54	—	**[No]** no
4 Preset Freq assignment Identical to **[2 Preset Freq]** P52 . To obtain 4 speeds, you must also configure 2 speeds.		
[8 Preset Freq] P58	—	**[No]** no
8 Preset Freq assignment Identical to **[2 Preset Freq]** P52 . To obtain 8 speeds, you must also configure 2 and 4 speeds.		
[16 Preset Freq] P5 16	—	**[No]** no
16 Preset Freq assignment Identical to **[2 Preset Freq]** P52 . To obtain 16 speeds, you must also configure 2, 4 and 8 speeds.		
[Preset speed 2] SP2 ★ (1)	0 to 599 Hz	10 Hz
Preset speed 2 See the Combination table for preset PID references.		
[Preset speed 3] SP3 ★ (1)	0 to 599 Hz	15 Hz
Preset speed 3 See the Combination table for preset PID references.		
[Preset speed 4] SP4 ★ (1)	0 to 599 Hz	20 Hz
Preset speed 4 See the Combination table for preset PID references.		
[Preset speed 5] SP5 ★ (1)	0 to 599 Hz	25 Hz
Preset speed 5 See the Combination table for preset PID references.		
[Preset speed 6] SP6 ★ (1)	0 to 599 Hz	30 Hz
Preset speed 6 See the Combination table for preset PID references.		
[Preset speed 7] SP7 ★ (1)	0 to 599 Hz	35 Hz
Preset speed 7 See the Combination table for preset PID references.		
[Preset speed 8] SP8 ★ (1)	0 to 599 Hz	40 Hz
Preset speed 8 See the Combination table for preset PID references.		
[Preset speed 9] SP9 ★ (1)	0 to 599 Hz	45 Hz
Preset speed 9 See the Combination table for preset PID references.		

HMI label	Settings	Factory setting
[Preset speed 10] SP10 ★ (1)	0 to 599 Hz	50 Hz
Preset speed 10 See the Combination table for preset PID references.		
[Preset speed 11] SP11 ★ (1)	0 to 599 Hz	55 Hz
Preset speed 11 See the Combination table for preset PID references.		
[Preset speed 12] SP12 ★ (1)	0 to 599 Hz	60 Hz
Preset speed 12 See the Combination table for preset PID references.		
[Preset speed 13] SP13 ★ (1)	0 to 599 Hz	70 Hz
Preset speed 13 See the Combination table for preset PID references.		
[Preset speed 14] SP14 ★ (1)	0 to 599 Hz	80 Hz
Preset speed 14 See the Combination table for preset PID references.		
[Preset speed 15] SP15 ★ (1)	0 to 599 Hz	90 Hz
Preset speed 15 See the Combination table for preset PID references.		
[Preset speed 16] SP16 ★ (1)	0 to 599 Hz	100 Hz
Preset speed 16 The appearance of these **[Preset speed x] SPX** parameters is determined by the number of speeds configured. See the Combination table for preset PID references.		
[Skip Frequency] JPF	0 to 599 Hz	0 Hz
Skip frequency This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
[Skip Frequency 2] JF2	0 to 599 Hz	0 Hz
Skip frequency 2 This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
[3rd Skip Frequency] JF3	0 to 599 Hz	0 Hz
3rd Skip frequency This parameter helps to prevent prolonged operation within an adjustable range around the regulated frequency. This function can be used to help to prevent a critical speed, which would cause resonance, being reached. Setting the function to 0 renders it inactive.		
[Skip Freq.Hysteresis] JFH ★	0.1 to 10 Hz	1 Hz

HMI label	Settings	Factory setting
Skip Freq. hysteresis		
This parameter is visible if at least one skip frequency **[Skip Frequency]** JPF, **[Skip Frequency 2]** JF2 or **[3rd Skip Frequency]** JF3 is different from 0.		
Skip frequency range: between JPF – JFH and JPF + JFH, for example.		
This adjustment is common to the 3 frequencies JPF, JF2, JF3.		

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

[+/- speed] U P D —

+/- Speed

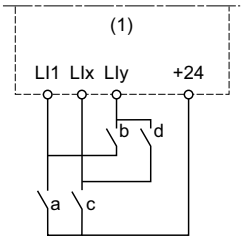
Two types of operations are available:

- **Use of single action keys:** Two logic inputs are required in addition to the operating direction(s). The input assigned to the “+ speed” command increases the speed, the input assigned to the “- speed” command decreases the speed.
- **Use of double action keys:** Only one logic input assigned to “+ speed” is required.

+/- speed with double-press buttons:
Description: 1 button pressed twice (2 steps) for each direction of rotation. A contact closes each time the button is pressed.

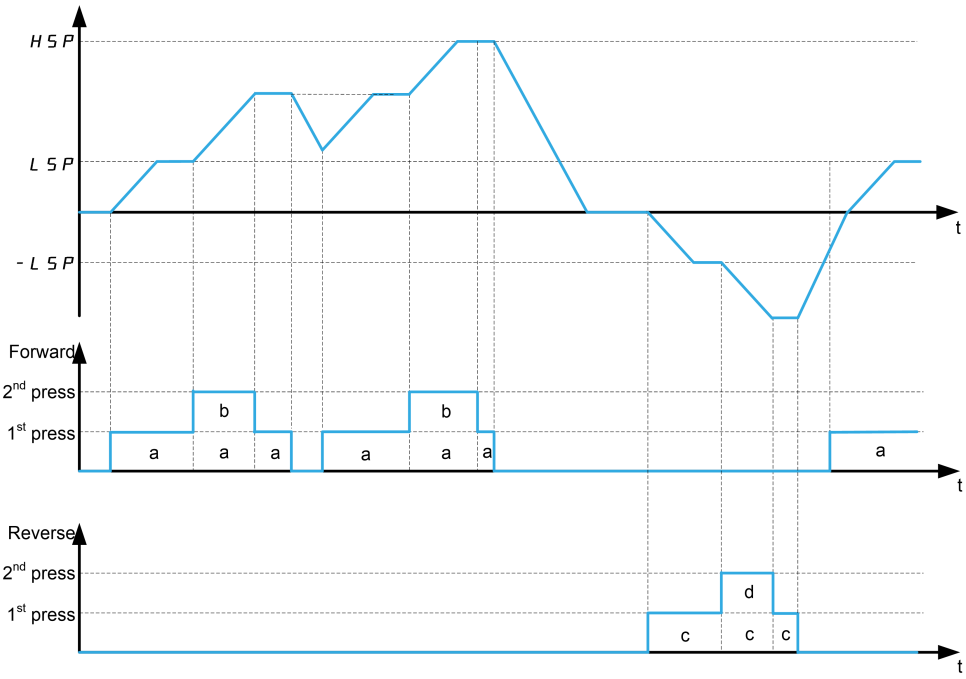
	Released (- speed)	1st press (speed maintained)	2nd press (faster)
Forward button	—	a	a and b
Reverse button	—	c	c and d

Example of wiring:



LI1: Forward
LIx: Reverse
LIy: + speed

1. ATVxxx control terminals



Do not use this +/-speed type with 3-wire control.
Whichever type of operation is selected, the max. speed is set by **[High Speed]** H S P , page 101.

NOTE:
If the reference is switched via **[Ref Freq 2 switching]** rFC , page 190 from any one reference channel to another reference channel with "+/- speed", the value of reference **[Motor Frequency]** rFr (after ramp) may be copied at the same time in accordance with the **[Copy Ch1-Ch2]** CoP parameter , page 191.

If the reference is switched via **[Ref Freq 2 switching]** rFC , page 190 from one reference channel to any other reference channel with "+/- speed", the value of reference **[Motor Frequency]** rFr (after ramp) is copied at the same time.

This helps to prevent the speed being incorrectly reset to zero when switching takes place.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[+/- speed]** UPd

Parameters list

HMI label	Settings	Factory setting
[+/- speed] UPd —		
This function can be accessed if reference channel **[Ref Freq Channel 2]** Fr2 is set to **[+/-Speed] UPDT** , page 190. **NOTE:** This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[+ Speed Assign] USP	—	**[No]** nO
+ speed assignment Function active if the assigned input or bit is at 1. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions If **[Profile]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP then **[CD11]** Cd11 up to **[CD15]** Cd15, **[C111]** C111 up to **[C115]** C115, **[C211]** C211 up to **[C215]** C215 and **[C311]** C311 up to **[C315]** C315 are not available.		
[- Speed Assign] dSP	—	**[No]** nO
- speed assignment Assignment identical to **[+ Speed Assign]** USP. Function active if the assigned input or bit is at 1.		

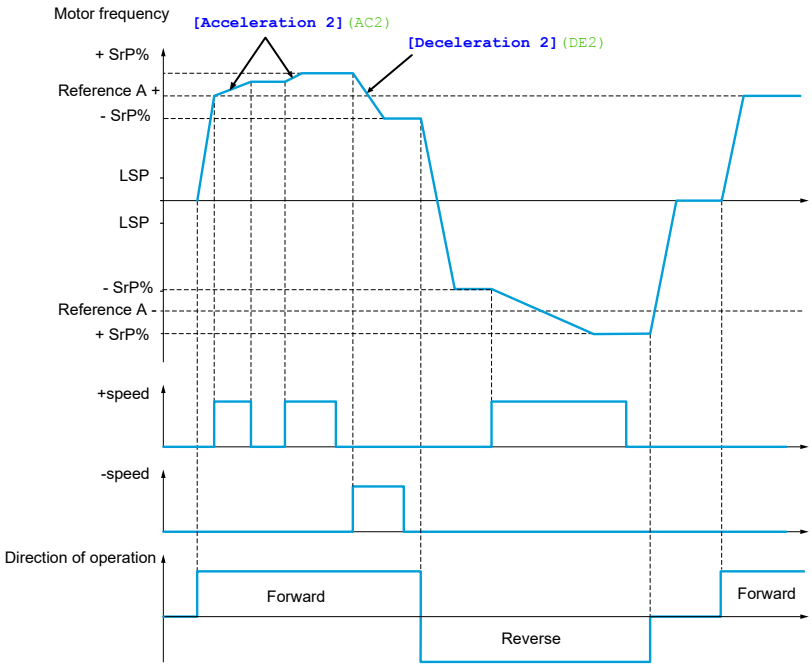
HMI label	Settings	Factory setting
[Ref Frequency Save] S t r ★	—	**[No Save]** n o
Reference frequency save Associated with the "+/- speed" function, this parameter can be used to save the reference: • When the run commands disappear (saved to RAM). • When the supply mains or the run commands disappear (saved to EEPROM). Therefore, the next time the drive starts up, the speed reference is the last reference saved. • **[No Save]** n o: ***No save*** (the next time the drive starts up, the speed reference is **[Low Speed]** L S P, page 101 • **[Save to RAM]** r A M: ***Save to RAM*** • **[Save to EEPROM]** E E P: ***Save 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.

[+/- speed around ref] SrE —

+/- Speed around a reference

The reference is given by **[Ref Freq Channel 1]** Fr1 or **[Ref.1B channel]** Fr1b with summing/subtraction/multiplication functions and preset speeds if relevant (see the diagram). For improved clarity, call this reference A. The action of the +speed and -speed keys can be set as a % of this reference A. On stopping, the reference (A +/- speed) is not saved, so the drive restarts with reference A+ only.
The maximum total reference is limited by **[High Speed]** HSP and the minimum reference by **[Low Speed]** LSP , page 101.
Example of 2-wire control:



Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** ConF ➡ **[Full]** FULL ➡ **[Application function]** Fun ➡ **[+/- speed around ref]** SrE

Parameters list

HMI label	Settings	Factory setting
[+/- speed around ref] SrE —		
This function can be accessed if reference channel **[Ref Freq Channel 1]** Fr1. **NOTE:** This function cannot be used with certain other functions. Follow the instructions in incompatible functions .		
[+ Speed Assign] uS1	—	**[No]** no
+ speed assignment • **[No]** no: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...]** ...: See the assignment conditions		

HMI label	Settings	Factory setting
[- Speed Assign] d S 1	—	**[No]** n o
- speed assignment See the assignment conditions Assignment identical to **[+ Speed Assign]** u S 1. Function active if the assigned input or bit is at 1.		
[+/- Speed limitation] S r P ★ ↻	0 to 50%	10%
+/- speed limitation This parameter limits the variation range with +/- speed as a % of the reference. The ramps used in this function are **[Acceleration 2]** A C 2 and **[Deceleration 2]** d E 2. This parameter can be accessed if +/- speed is assigned.		
[Acceleration 2] A C 2 ★ ↻ (1)	0.00 to 6,000 s (2)	5.00 s
Acceleration 2 ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** F r S. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[+/- speed]** t u d is assigned.		
[Deceleration 2] d E 2 ★ ↻ (1)	0.00 to 6,000 s (2)	5.00 s
Deceleration 2 Time to decelerate from the **[Nominal Motor Freq]** F r S to 0. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. This parameter can be accessed if **[+/- speed]** t u d is assigned.		

(1) The parameter can also be accessed in the **[Settings]** S E t — menu.

(2) Range 0.01 to 99.99 s or 0.1 to 999.9 s or 1 to 6,000 s according to **[Ramp increment]** i n r .

★ : 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.

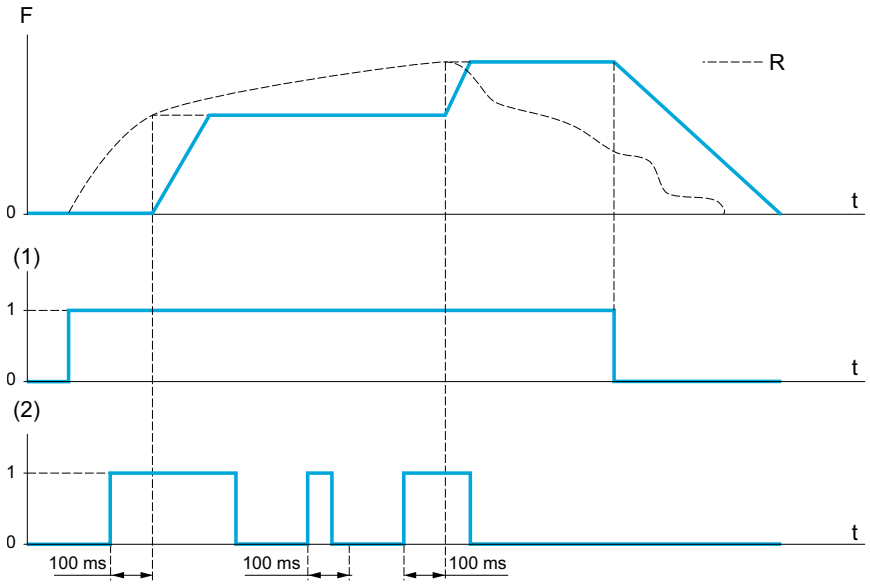
↻ : Setting of this parameter can be done during operation or when stopped.

[Memo reference frequency] SPM —

Reference memorizing

Saving a speed reference value using a logic input command lasting longer than 0.1 s.

- This function is used to control the speed of several drives alternately via a single analog reference and one logic input for each drive.
- It is also used to confirm a line reference (communication bus or network) on several drives via a logic input. This allows movements to be synchronized by getting rid of variations when the reference is set.
- The reference is acquired 100 ms after the rising edge of the request. A new reference is not then acquired until a new request is made.



1. Run command
2. LIx (saved)

F: Motor frequency

R: Reference

Access

Parameters described below can be accessed by: **[Drive menu]** DRI ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUN ➜ **[Memo reference frequency]** SPM

Parameters list

HMI label	Settings	Factory setting
[Memo reference frequency] SPM —		
[Ref Freq Memo assign] SPM	—	**[No]** nO
Reference frequency memory assignment Assignment to a logic input. Function active if the assigned input is at active state. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** ... • **[DI6]** LI6: ***Digital input 6*** • **[DAI1]** LAI1: ***Digital input AI1*** • **[DAI2]** LAI2: ***Digital input AI2*** • **[OL01]** OL01: ***OL01***, function blocks: Logical Output 01 ... • **[OL10]** OL10: ***OL10***, function blocks: Logical Output 10		

[Fluxing by DI] FLI —

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUN ➜ **[Fluxing by DI]** FLI

Parameters list

HMI label	Settings	Factory setting
[Fluxing by DI] FLI —		
[Motor fluxing] FLU ★ (1) 2 s	—	**[No]** FNO
Motor fluxing configure		

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

If the parameter **[Motor fluxing]** FLU is set to **[Continuous]** FCT , fluxing is always active, even if the motor does not run.

- Verify that using this setting does not result in unsafe conditions.

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

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the flux current to be applied.

Failure to follow these instructions can result in equipment damage.

[Not continuous] FNC: ***Not continuous***

[Continuous] FCT: ***Continuous***
This option is not possible if **[Auto DC Injection]** ADC is **[Yes]** YES or if **[Type of stop]** STT is **[Freewheel Stop]** NST.

[No] FNO: Function inactive

To obtain rapid high torque on startup, magnetic flux needs to already have been established in the motor.

In **[Continuous]** FCT mode, the drive automatically builds up flux when it is powered up.

[Not continuous] FNC mode, fluxing occurs when the motor starts up.

The flux current is greater than **[Nom Motor Current]** NCR (configured rated motor current) when the flux is established and is then adjusted to the motor magnetizing current.

If **[Motor control type]** CTT , page 121 is set to **[Synchronous motor]** SYN, the **[Motor fluxing]** FLU parameter causes the alignment of the rotor and not the fluxing.

If **[Brake assignment]** BLC is not **[No]** NO, the **[Motor fluxing]** FLU parameter has no effect.

[Fluxing assignment] FLI ★	—	**[No]** NO
Fluxing input assignment		

HMI label	Settings	Factory setting

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the flux current to be applied.

Failure to follow these instructions can result in equipment damage.

Assignment is only possible if **[Motor fluxing]** FLU is set to **[Not continuous]** FNC.

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 run command is sent, fluxing occurs when the motor starts.

[No] NO: Not assigned

[DI1] LI1: Logical input LI1

[...] ...: See the assignment conditions

[Angle setting type] AST ★	—	**[PSIO align.]** PS IO

Auto angle setting type

Mode for measuring the phase-shift angle. Visible only if **[Motor control type]** CTT is set to **[Synchronous motor]** SYN.

[PSI align.] PS I and **[PSIO align.]** PS IO are working for all type of synchronous motors. **[SPM align.]** SPMA and **[IPM align.]** IPMA increase performances depending on the type of synchronous motor.

- **[IPM align.]** IPMA: ***IPM alignment***. Alignment mode for Interior-buried Permanent Magnet motor (usually, this kind of motor has a high saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.
- **[SPM align.]** SPMA: ***SPM alignment***. Mode for Surface-mounted Permanent Magnet motor (usually, this kind of motor has a medium or low saliency level). It uses high frequency injection, which is less noisy than standard alignment mode.
- **[PSI align.]** PS I: ***Pulse Signal injection***. Standard alignment mode by pulse signal injection.
- **[PSIO align.]** PS IO: ***Pulse Signal injection - Optimized***. Standard optimized alignment mode by pulse signal injection. The phase-shift angle measurement time is reduced after the first run order or tune operation, even if the drive has been turned off.
- **[No align.]** NO: ***NO alignment***

(1) The parameter can also be accessed in the **[Settings]** SET — menu.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Brake logic control] b L C —

⚠DANGER

HAZARD OF FIRE

- Some braking resistors are equipped with a thermal switch to detect overheating of the resistor. This thermal switch must be used upstream to the drive to switch off the mains contactor in case of overheating detection (1).
- When a braking resistor from third party supplier is used , conduct your own risk assessment according to EN ISO 12100 and all other standards that apply to your application to ensure that any failure mode does not result in unsafe conditions. For example, but not limited to, thermal monitoring must be used to switch off the mains contactor and/or the braking resistor itself in case of overheating detection.

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

(1) Refer to the wiring diagrams provided into the braking resistors instruction sheet NHA87388. This instruction sheet is delivered with the braking resistor and/or can be downloaded on www.se.com.

Brake logic control

Used to control one or several electromagnetic brake(s) via a single output of the drive, for horizontal and vertical hoisting applications, and for unbalanced machines.

For vertical movements, the objective is to maintain motor torque in the lifting direction during the release and the application of the brake, to hold the load. Start smoothly when the brake is released and stop smoothly when the brake is applied.

For horizontal movements, the objective is to synchronize during the beginning of the movement the release of the brake with the built-up of torque and during stopping the application of the brake with the zero speed, to help prevent jerking.

Instructions for brake logic control for a vertical hoisting application:

Your application consists of a whole range of different interrelated mechanical, electrical, and electronic components, the drive being just one part of the application. The drive by itself is neither intended to nor capable of providing the entire functionality to meet all safety-related requirements that apply to your application. Depending on the application and the corresponding risk assessment to be conducted by you, a whole variety of additional equipment is required such as, but not limited to, external encoders, external brakes, external monitoring devices, guards, etc.

As a designer/manufacturer of machines, you must be familiar with and observe all standards that apply to your machine. You must conduct a risk assessment and determine the appropriate Performance Level (PL) and/or Safety Integrity Level (SIL) and design and build your machine in compliance with all applicable standards. In doing so, you must consider the interrelation of all components of the machine. In addition, you must provide instructions for use that enable the user of your machine to perform any type of work on and with the machine such as operation and maintenance in a secure manner.

The present document assumes that you are fully aware of all normative standards and requirements that apply to your application. Since the drive cannot provide all safety-related functionality for your entire application, you must ensure

that the required Performance Level and/or Safety Integrity Level is reached by installing all necessary additional equipment.

⚠WARNING

INSUFFICIENT PERFORMANCE LEVEL/SAFETY INTEGRITY LEVEL AND/OR UNINTENDED EQUIPMENT OPERATION

- Conduct a risk assessment according to EN ISO 12100 and all other standards that apply to your application.
- Use redundant components and/or control paths for all critical control functions identified in your risk assessment.
- Implement all monitoring functions required to avoid any type of hazard identified in your risk assessment, for example, slipping or falling loads.
- Verify that the service life of all individual components used in your application is sufficient for the intended service life of your overall application.
- Perform extensive commissioning tests for all potential error situations to verify the effectiveness of the safety-related functions and monitoring functions implemented, for example, but not limited to, speed monitoring by means of encoders, short circuit monitoring for all connected equipment, correct operation of brakes and guards.
- Perform extensive commissioning tests for all potential error situations to verify that the load can be brought to a safe stop under all conditions.

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

A specific application note NHA80973 is available on hoisting machines and can be downloaded on se.com.

⚠WARNING

FALLING LOAD

- Verify that the parameters are correctly set in the sequence indicated in the table.
- Verify that the settings of the parameters do not cause unintended movements.
- Verify that the settings of the parameters do not result in unsafe conditions.

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

When the drive transitions to operating state Fault, the mains contactor and the brake contactor must be deenergized.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Assign **[Operating State Fault]** FLT to output relay R1.
- Connect the coil of the mains contactor to output relay R1.
- Connect the contact of the brake contactor downstream of the mains contactor.

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

Step	Action
1	Enter the motor nameplate parameters.
2	Set **[Motor Thermal Mode]** ETH according to the cooling mode.

3	Verify **[Autotuning Usage]** tUNU is set to **[Therm mot]** tM or set it, then perform a motor autotuning (**[Autotuning]** tUN to **[Apply Autotuning]** YES). **NOTE:** The autotuning must be performed with a cold motor.
4	Assign **[Brake assignment]** bLC. It activates the function and the assigned output controls the command to release/apply the brake.
5	Verify **[Movement type]** bSt is set to **[Hoisting]** VER.
6	Set **[Brake Release Pulse]** b iP to **[Yes]** YES. Ensure that the direction of rotation forward (i.e. forward digital input with positive frequency reference) corresponds to the lift of the load. For applications in which the load being lowered is very different from the load being lifted, set **[Brake Release Pulse]** b iP = **[2 IBR]** 2 ibr (e.g., ascent always with a load and descent always without a load).
7	Assign **[Brake Contact]** bC i to handle the brake contact feedback. **NOTE:** An external filter can be used to help prevent the noise consideration. Otherwise, the monitoring of the brake contact can be deactivated in steady state by setting **[BRH b1]** brH1 to **[1]** 1.
8	Brake release current **[Brk Release Current]** ibr and **[Brake release I Rev]** ird if **[Brake Release Pulse]** b iP = **[2 IBR]** 2 ibr: adjust the brake release current to the rated current indicated on the motor. During testing, adjust the brake release current to hold the load smoothly.
9	Acceleration time: for hoisting applications it is advisable to set the acceleration ramps to more than 0.5 seconds. Ensure that the drive does not exceed the current limit. The same recommendation applies for deceleration. **Reminder:** for a hoisting movement, a braking resistor should be used.
10	**[Brake Release time]** brt: set according to the type of brake. It is the time required for the mechanical brake to release.
11	**[Brake release freq]** b ir, in open-loop mode only: Leave in **[AUTO]** Auto, adjust if necessary.
12	**[Brake engage freq]** bEn: leave in **[AUTO]** Auto, adjust if necessary.
13	**[Brake engage time]** bEt: set according to the type of brake. It is the time required for the mechanical brake to engage.

Instructions for brake logic control for a horizontal hoisting application:

Your application consists of a whole range of different interrelated mechanical, electrical, and electronic components, the drive being just one part of the application. The drive by itself is neither intended to nor capable of providing the entire functionality to meet all safety-related requirements that apply to your application. Depending on the application and the corresponding risk assessment to be conducted by you, a whole variety of additional equipment is required such as, but not limited to, external encoders, external brakes, external monitoring devices, guards, etc.

As a designer/manufacturer of machines, you must be familiar with and observe all standards that apply to your machine. You must conduct a risk assessment and determine the appropriate Performance Level (PL) and/or Safety Integrity Level (SIL) and design and build your machine in compliance with all applicable standards. In doing so, you must consider the interrelation of all components of the machine. In addition, you must provide instructions for use that enable the user of your machine to perform any type of work on and with the machine such as operation and maintenance in a secure manner.

The present document assumes that you are fully aware of all normative standards and requirements that apply to your application. Since the drive cannot provide all safety-related functionality for your entire application, you must ensure that the required Performance Level and/or Safety Integrity Level is reached by installing all necessary additional equipment.

⚠WARNING

INSUFFICIENT PERFORMANCE LEVEL/SAFETY INTEGRITY LEVEL AND/OR UNINTENDED EQUIPMENT OPERATION

- Conduct a risk assessment according to EN ISO 12100 and all other standards that apply to your application.
- Use redundant components and/or control paths for all critical control functions identified in your risk assessment.
- Implement all monitoring functions required to avoid any type of hazard identified in your risk assessment, for example, slipping or falling loads.
- Verify that the service life of all individual components used in your application is sufficient for the intended service life of your overall application.
- Perform extensive commissioning tests for all potential error situations to verify the effectiveness of the safety-related functions and monitoring functions implemented, for example, but not limited to, speed monitoring by means of encoders, short circuit monitoring for all connected equipment, correct operation of brakes and guards.
- Perform extensive commissioning tests for all potential error situations to verify that the load can be brought to a safe stop under all conditions.

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

A specific application note NHA80973 is available on hoisting machines and can be downloaded on se.com.

When the drive transitions to operating state Fault, the mains contactor and the brake contactor must be deenergized.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

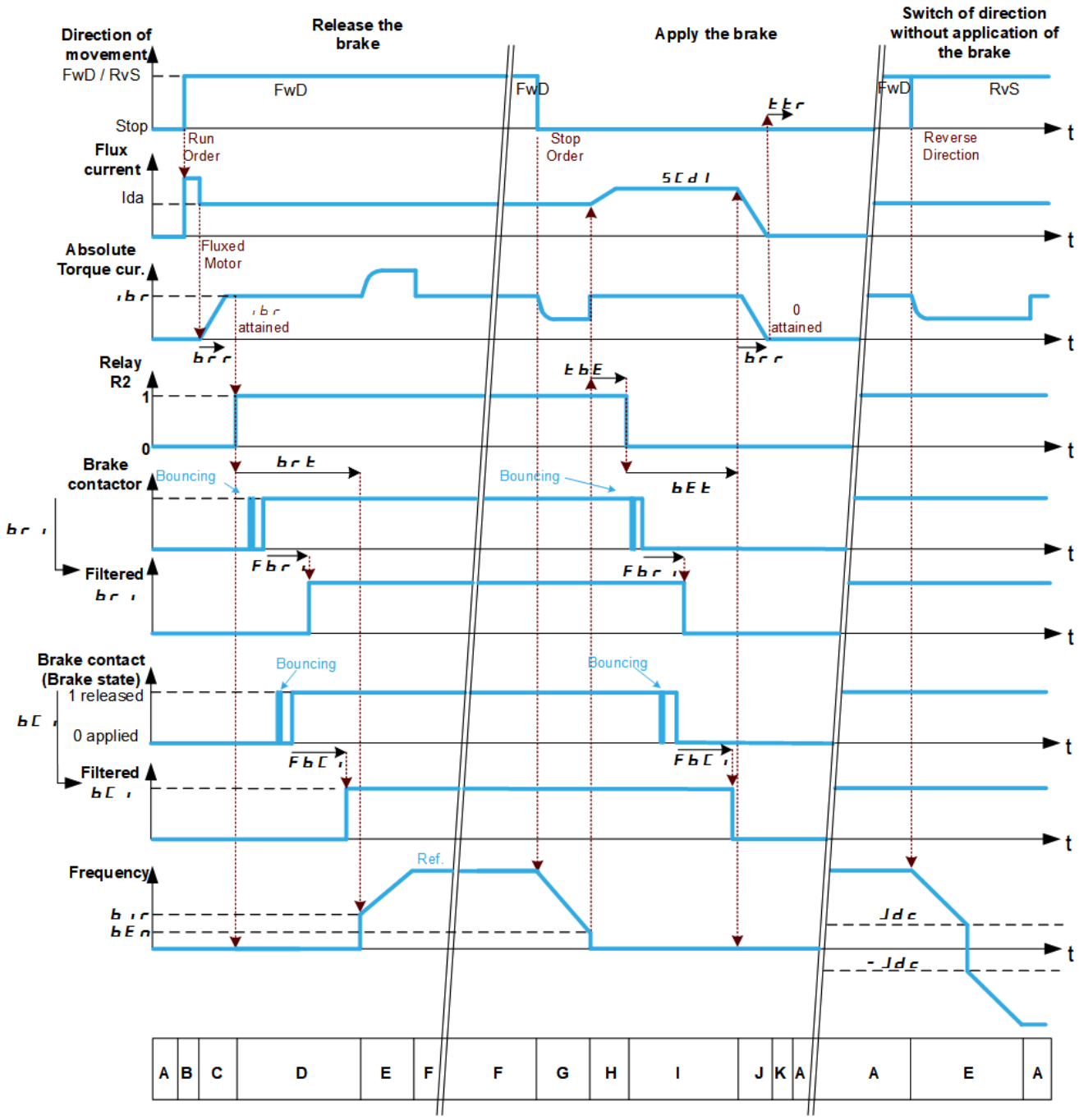
- Assign **[Operating State Fault]** FLT to output relay R1.
- Connect the coil of the mains contactor to output relay R1.
- Connect the contact of the brake contactor downstream of the mains contactor.

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

Step	Action
1	Enter the motor nameplate parameters.
2	Set **[Motor Thermal Mode]** t H t according to the cooling mode.
3	Verify **[Autotuning Usage]** t u n u is set to **[Therm mot]** t M or set it, then perform a motor autotuning (**[Autotuning]** t u n to **[Apply Autotuning]** Y E S). **NOTE:** The autotuning must be performed with a cold motor.
4	Assign **[Brake assignment]** b L C. It activates the function and the assigned output controls the command to release/apply the brake.
5	Verify **[Movement type]** b S t is set to **[Traveling]** H o r.
6	Set **[Brake Release Pulse]** b i P to **[No]** n o.
7	Assign **[Brake Contact]** b C i to handle the brake contact feedback. **NOTE:** An external filter can be used to help prevent the noise consideration. Otherwise, the monitoring of the brake contact can be deactivated in steady state by setting **[BRH b1]** b r H 1 to **[1]** 1.
8	**[Brk Release Current]** i b r: set to 0.
9	**[Brake Release time]** b r t: set according to the type of brake. It is the time required for the mechanical brake to release.

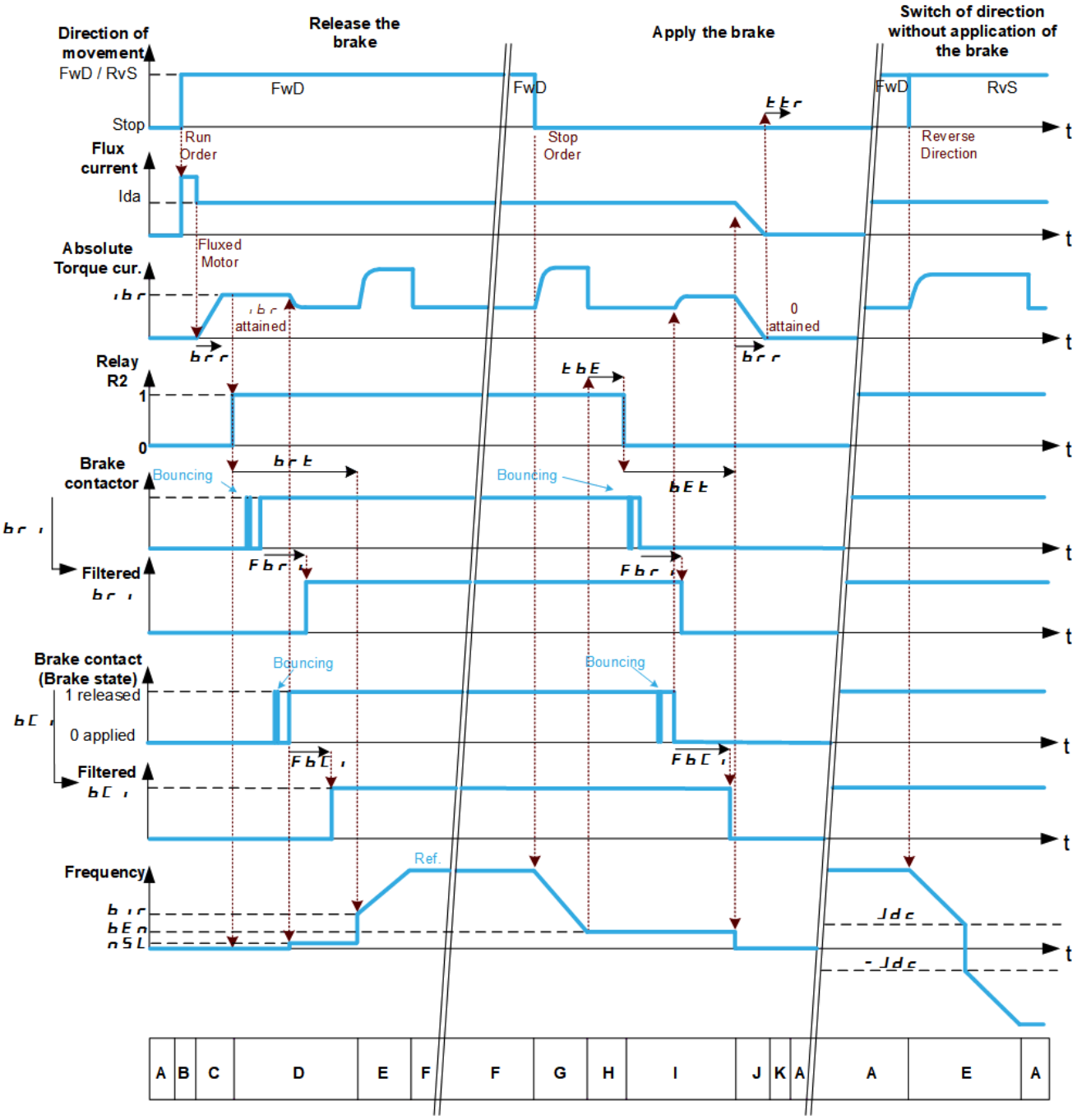
10	**[Brake engage freq]** bEn, in open-loop mode only: leave in **[AUTO]** AUtO, adjust if necessary.
11	**[Brake engage time]** bEt: set according to the type of brake. It is the time required for the mechanical brake to engage.

Brake logic control, horizontal movement in open-loop mode



Key:
A: Waiting for run command
B: Motor fluxing
C: Injection of the torque-generating current
D: Release of the brake
E: Acceleration/deceleration
F: Reference value attained
G: Deceleration due to stop command
H: Delay before command to apply the brake
I: Application of the brake
J: Removal of current
K: Restart delay

Brake logic control, vertical movement in open-loop mode



Key:
A: Waiting for run command
B: Motor fluxing
C: Injection of the torque-generating current
D: Release of the brake
E: Acceleration/deceleration
F: Reference value attained
G: Deceleration due to stop command
H: Delay before command to apply the brake
I: Application of the brake
J: Removal of current
K: Restart delay

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[Brake logic control]** bLC

Parameters list

HMI label	Settings	Factory setting
[Brake logic control] bLC —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[Brake assignment] bLC	—	**[No]** nO
Brake assignment Logic output or control relay. **NOTE:** If the brake is assigned, only a ramp stop is possible. Check the **[Type of stop]** StT . Brake logic control can only be assigned if **[Motor control type]** CtT is set to **[U/F VC Standard]** Std, **[U/F VC 5pts]** UF5, **[U/F VC Quad.]** UF9 or **[Synchronous motor]** SYn. See Compatibility table to see the compatible functions. • **[No]** nO: ***No***, function not assigned (in this case, none of the function parameters can be accessed) • **[R2]** r2: ***Relay R2*** • **[LO1]** LO1: ***Logic output 1*** • **[DQ1 Digital Output]** dO1: ***DQ1 digital output***, analog output AO1 functioning as a logic output. Selection can be made if **[AQ1 assignment]** AO1 is set to **[No]** nO.		
[Movement type] bSt ★	—	**[Hoisting]** VEr
Motion type selection This parameter can be accessed if **[Brake assignment]** bLC is set to a value different from **[No]** nO. **[Traveling]** Hor: Resistive-load movement (translational motion of overhead crane, for example) **NOTE:** If **[Motor control type]** CtT is set to **[U/F VC Standard]** Std or **[U/F VC 5pts]** UF5, **[Movement type]** bSt is forced to **[Traveling]** Hor . **[Hoisting]** VEr: Driving-load movement (hoisting winch, for example) **NOTE:** If **[Weight Sensor Assign]** PES is not **[No]** nO, **[Movement type]** bSt is forced to **[Hoisting]** VEr .		
[Brake Contact] bC1 ★	—	**[No]** nO
Brake contact input If the brake has a monitoring contact (closed for released brake). This parameter can be accessed if **[Brake assignment]** bLC is set to a value different from **[No]** nO. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Brake Release Pulse] bIP ★ ( )	—	**[Yes]** YES
Brake release pulse This parameter can be accessed if **[Movement type]** bSt is set to **[Hoisting]** VEr and **[Weight Sensor Assign]** PES is set to **[No]** nO . This parameter is forced to **[No]** nO if **[Movement type]** bSt is set to **[Traveling]** Hor .		

HMI label	Settings	Factory setting
This parameter is forced to **[Yes]** YES if **[Weight Sensor Assign]** PES is set to a value different from **[No]** nO. • **[No]** nO: ***No***. The motor torque is given in the required operating direction, at current **[Brk Release Current]** IBR • **[Yes]** YES: ***Brake impulse Fwd***, the motor torque is in forward direction (check that this direction corresponds to ascending), at current **[Brk Release Current]** IBR • **[2 IBR]** 2 IBR: ***Brake impulse Fwd/Rev***, the torque is in the required direction, at current **[Brk Release Current]** IBR for Forward and **[Brake release I Rev]** IRD for Reverse, for certain specific applications		
[Brk Release Current] IBR ★ (1)	0 to 1.36 In (2)	0 A
Brake Release current This parameter can be accessed if **[Weight Sensor Assign]** PES is set to **[No]** nO .		
[Brake release I Rev] IRD ★	0 to 1.36 In (2)	0 A
Rev. brake release curr. This parameter can be accessed if **[Brake assignment]** BLC is set to a value different from **[No]** nO and **[Brake Release Pulse]** BIP is set to **[2 IBR]** 2 IBR and **[Weight Sensor Assign]** PES is set to **[No]** nO.		
[Brake Release time] BRT ★ (1)	0 to 5.00 s	0 S
Brake release time		
[Brake release freq] BIR ★ (1)	**[AUTO]** AUTO to 10 Hz	**[AUTO]** AUTO
Brake release frequency (initialization of acceleration ramp). This parameter can be accessed if **[Movement type]** BST is set to **[Hoisting]** VER . **[AUTO]** AUTO: The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters **[0 to 10 Hz]** -: Manual control		
[Brake engage freq] BEN ★ (1)	**[AUTO]** AUTO 0 to 10 Hz	**[AUTO]** AUTO
Brake engage frequency Brake engage frequency threshold. **NOTE: [Brake engage freq]** BEN cannot be higher than **[Low Speed]** LSP. **[AUTO]** AUTO: The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters **[0 to 10 Hz]** -: Manual control		
[Brake engage delay] TBE ★ (1)	0 to 5.00 s	0 s
Brake engage delay, time delay before request to engage brake.		
[Brake engage time] BET ★ (1)	0 to 5.00 s	0 s
Brake engage time		
[Auto DC inj Level 1] SDC 1 ★ (1)	0 to 1.2 In (2)	0.7 In (2)
Auto DC injection level 1		

HMI label	Settings	Factory setting

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

Level of standstill DC injection current.

NOTE: This parameter can be accessed if **[Movement type]** bST is set to **[Traveling]** Hor.

[Engage at reversal] bED ★ ↻	0 to 1.2 In (2)	**[No]** no

Brake engage at reversal

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***, the brake does not engage
- **[Yes]** YES: ***Brake impulse Fwd***, the brake engages

[Jump at reversal] JdC ★ ↻ (1)	**[AUTO]** Auto to 10 Hz	**[AUTO]** Auto

Jump at reversal

This parameter can be accessed if **[Movement type]** bST is set to **[Hoisting]** VER.

- **[AUTO]** Auto: The drive takes a value equal to the rated slip of the motor, calculated using the drive parameters
- **[0 to 10 Hz]** **-**: Manual control

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. Parameter is not applicable if **[Engage at reversal]** bED = **[Yes]** YES.

[Time to restart] tbr ★ ↻ (1)	0.00 to 15.00 s	0 s

Time to restart

Time between the end of a brake engage sequence and the start of a brake release sequence.

(1) The parameter can also be accessed in the **[Settings]** SET — menu.

(2) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

↻ : Setting of this parameter can be done during operation or when stopped.

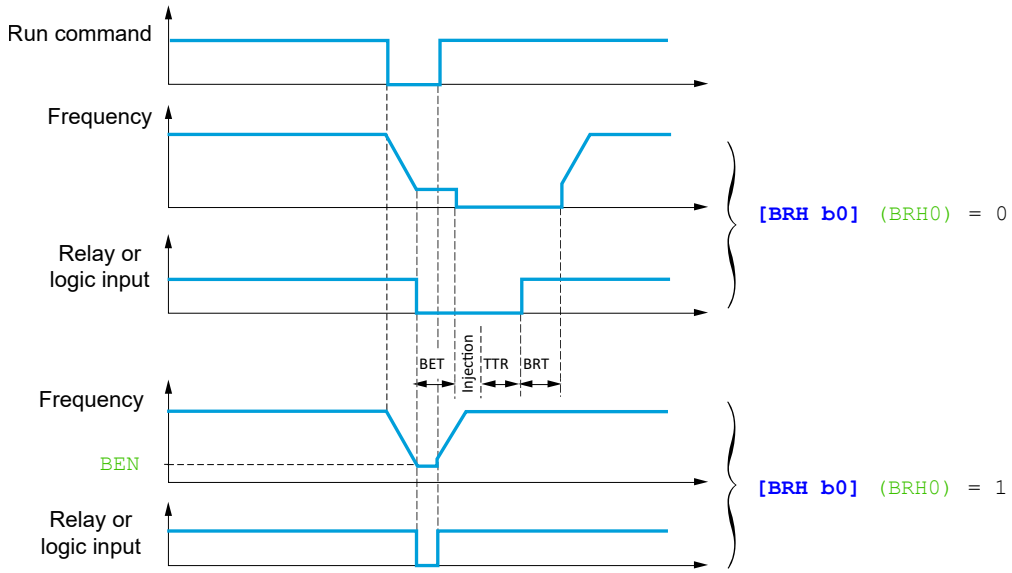
[Brake logic control] bLC — in expert mode only

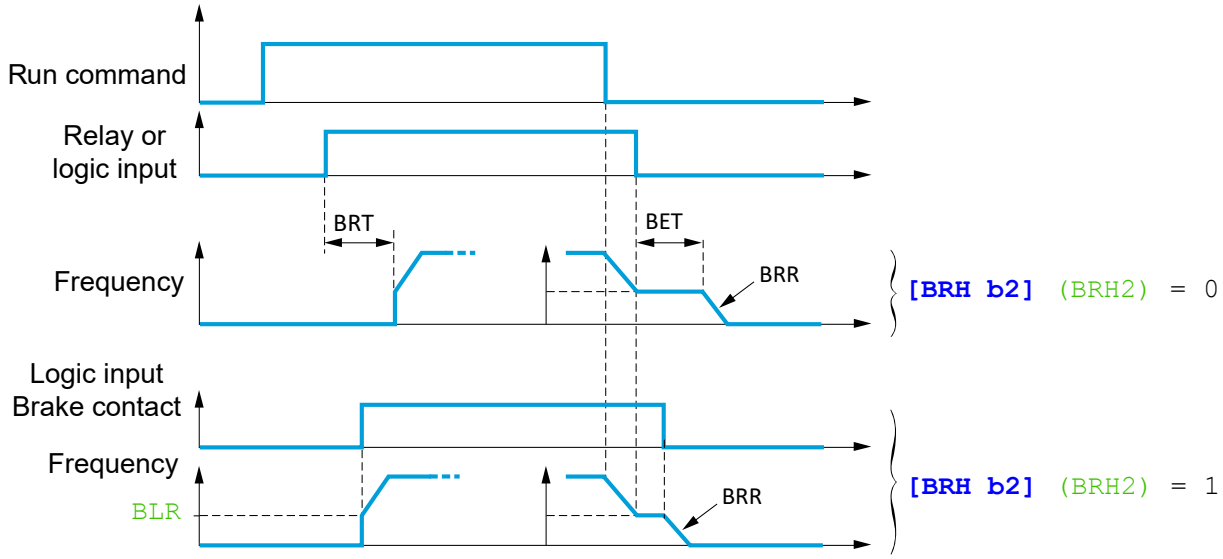
Access

Following parameters for brake logic sequence are accessible in expert mode only.

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Brake logic control]** bLC

Parameters list

HMI label	Settings	Factory setting
[BRH b0] brH0 ★	—	0
BRH b0		
Selection of the brake restart sequence if a run command is repeated while the brake is engaging. • **[0] 0**: The engage/release sequence is completely executed • **[1]** 1: The brake is released immediately A run command may be requested during the brake engagement phase. Whether or not the brake release sequence is executed depends on the value selected for **[BRH b0]** brH0.  **NOTE:** If a run command is requested during the "ttr" phase, the complete brake control sequence is initialized.		
[BRH b1] brH1 ★	—	0
BRH b1		
Deactivation of the brake contact in steady state detected error. • **[0] 0**: The brake contact in steady state detected error is active (detected error state if the contact is open during operation). The detected **[Brake Feedback]** brF brake contact error is monitored in all operating phases. • **[1]** 1: The brake contact in steady state detected error is inactive. The detected **[Brake Feedback]** brF brake contact error is only monitored during the brake release and engage phases.		
[BRH b2] brH2 ★	—	0
BRH b2		

HMI label	Settings	Factory setting
Taking the brake contact into account for the brake control sequence. • **[0] 0**: The brake contact is not taken into account • **[1]** I: The brake contact is taken into account If a logic input is assigned to the brake contact: • **[BRH b2]** b r H 2 = 0: During the brake release sequence, the reference is enabled at the end of the time **[Brake Release time]** b r t. During the brake engage sequence, the current changes to 0 according to the ramp **[Current ramp time]** b r r at the end of the **[Brake engage time]** b E t. • **[BRH b2]** b r H 2 = 1: When the brake is released, the reference is enabled when the logic input changes to 1. When the brake is engaged, the current changes to 0 according to the ramp **[Current ramp time]** b r r when the logic input changes to 0.  		
[Current ramp time] b r r ★ ( )	0 to 5.00 s	0 s
Current ramp time Torque current ramp time (increase and decrease) for a current variation equal to **[Brk Release Current]** I b r.		

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[External weight meas.] ELM —

Load measurement

⚠WARNING

WARNING LOSS OF CONTROL

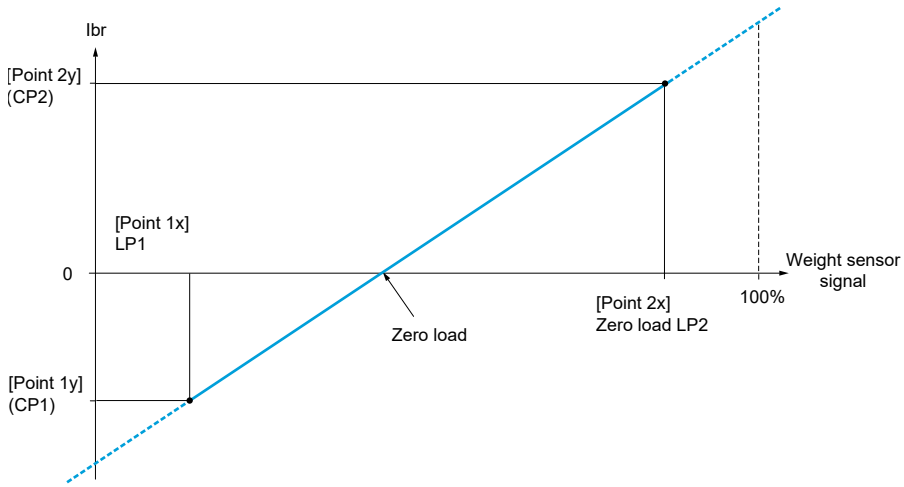
Perform a comprehensive commissioning test to verify correct operation of the weight sensor under all operating and error conditions.

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

This function uses the information supplied by a weight sensor to adapt the current **[Brk Release Current]** IBR of the **[Brake logic control]** BLC — function. The signal from the weight sensor can be assigned to an analog input (usually a 4 - 20 mA signal) or to the pulse-in input, according to the type of weight sensor.

Example: Measurement of the total weight of a hoisting winch and its load

The current **[Brk Release Current]** IBR is adapted in accordance with the curve below.



Access

Parameters described below can be accessed by: **[Drive menu]** DRI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[External weight meas.]** ELM

Parameters list

HMI label	Settings	Factory setting
[External weight meas.] ELM —		
[Weight Sensor Assign] PES	—	**[No]** NO
Weight sensor assignment		

HMI label	Settings	Factory setting
This parameter can be configured if **[Brake logic control]** b L C — is not set to **[No]** n o. • **[No]** n o: Not assigned • **[AI1]** A I 1: ***AI1***, analog input A1 • **[AI2]** A I 2: ***AI2***, analog input A2 • **[AI3]** A I 3: ***AI3***, analog input A3 • **[RP]** P I: ***Pulse input*** • **[AI Virtual 1]** A I V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[AI Virtual 2]** A I V 2: ***AI Virtual 2***, virtual analog input 2 by the communication bus • **[OA01]** o A O 1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** o A 10: ***OA10***, function blocks: Analog Output 10		
[Point 1 X] L P 1 ★	0 to LP2-0.01%	0%
Ext weight point 1 X 0 to 99.99% of signal on assigned input. **[Point 1 X]** L P 1 must be less than **[Point 2 X]** L P 2. This parameter can be accessed if **[Weight Sensor Assign]** P E S is assigned.		
[Point 1Y] C P 1 ★	-1.36 In to 1.36 In (1)	-In (1)
Ext weight point 1Y Current corresponding to load **[Point 1 X]** L P 1, in A. This parameter can be accessed if **[Weight Sensor Assign]** P E S is assigned.		
[Point 2 X] L P 2 ★	LP1+0.01% to 100%	50%
Ext weight point 2 X 0.01 to 100% of signal on assigned input. **[Point 2 X]** L P 2 must be greater than **[Point 1 X]** L P 1. This parameter can be accessed if **[Weight Sensor Assign]** P E S is assigned.		
[Point 2Y] C P 2 ★	-1.36 In to 1.36 In (1)	0 A
Ext weight point 2Y Current corresponding to load **[Point 2 X]** L P 2, in A. This parameter can be accessed if **[Weight Sensor Assign]** P E S is assigned.		
[Ibr 4-20 mA loss] I b r A ★ ( )	0 to 1.36 In (1)	0
IBR when weight loss Brake release current in the event of the loss of the weight sensor information. This parameter can be accessed if the weight sensor is assigned to an analog current input and the 4-20 mA loss is deactivated. Recommended settings: Rated motor current for a hoisting application.		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

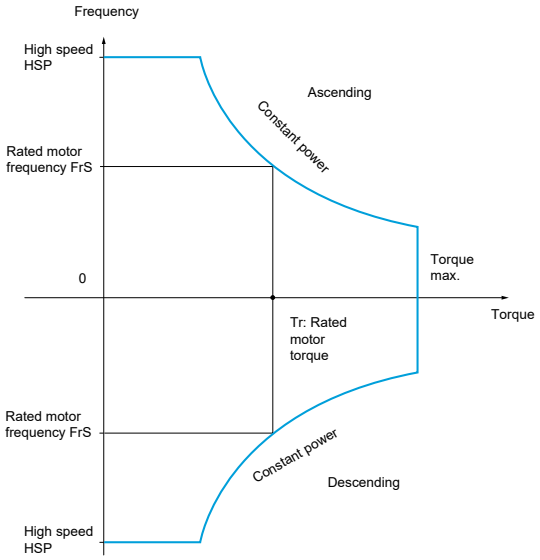
★ : These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

: Setting of this parameter can be done during operation or when stopped.

[High speed hoisting] H S H —

High speed hoisting

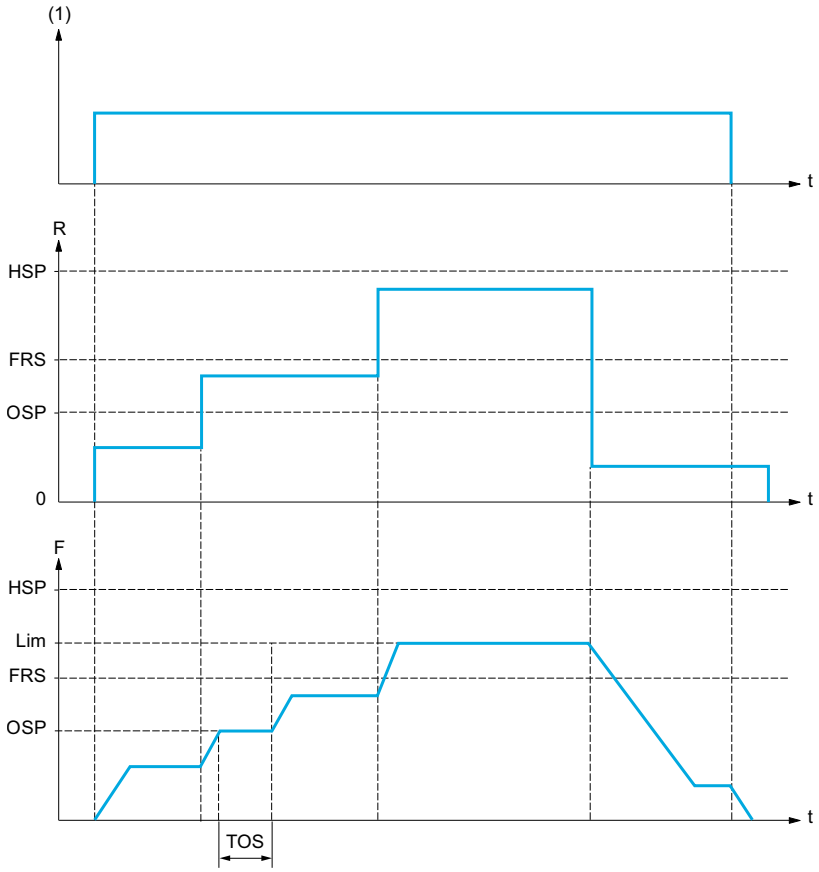
This function can be used to optimize the cycle times for hoisting movements for zero or lightweight loads. It authorizes operation at "constant power" to reach a speed greater than the rated speed without exceeding the rated motor current. The speed remains limited by the **[High Speed]** H S P parameter , page 101. The function acts on the speed reference pedestal and not on the reference itself. Principle:



There are 2 possible operating modes:

- **Speed reference mode:** The maximum permissible speed is calculated by the drive during a speed step that is set so that the drive can measure the load.
- **Current limitation mode:** The maximum permissible speed is the speed that supports current limitation in motor mode, in the "ascending" direction only. For the "descending" direction, operation is in Speed reference mode.

Speed reference mode



1. Ascend or descend command

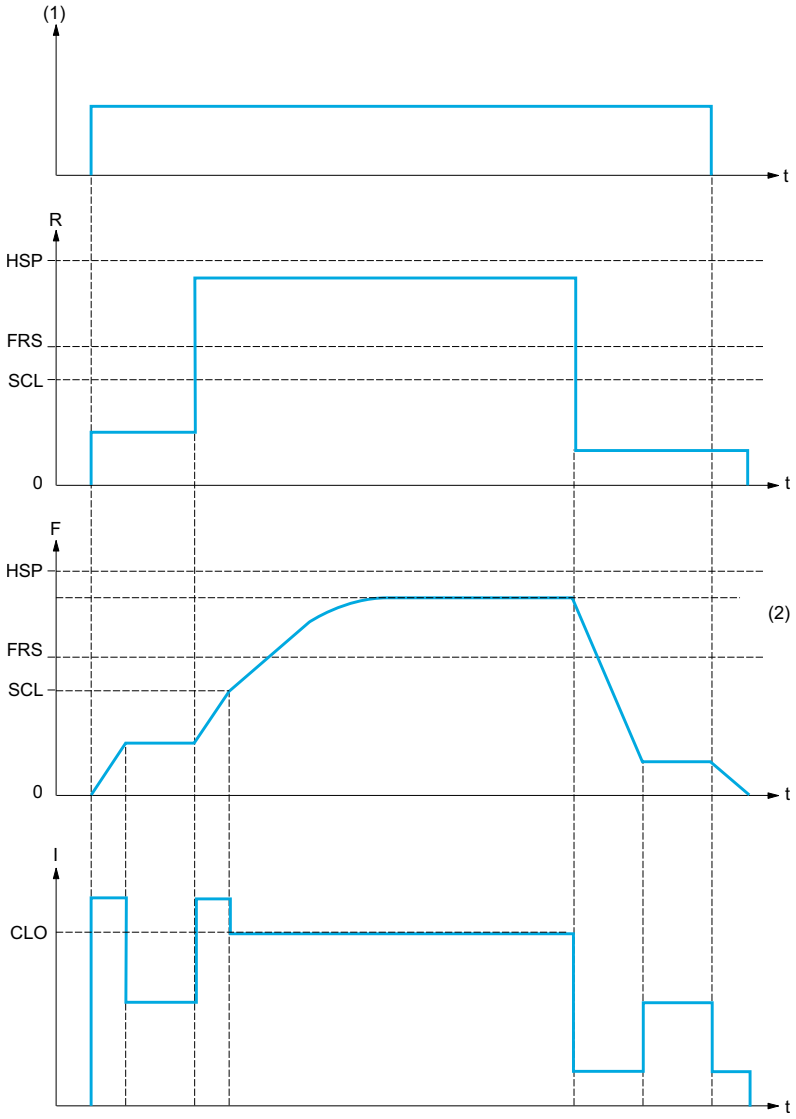
R: Reference

F: Frequency

Lim: Calculated limit

OSP: Adjustable speed step for load measurement
tOS: Load measuring time
Two parameters are used to reduce the speed calculated by the drive, for ascending and descending.

Current limiting mode



1. Ascend command
2. Limit imposed by current limitation

R: Reference

F: Frequency

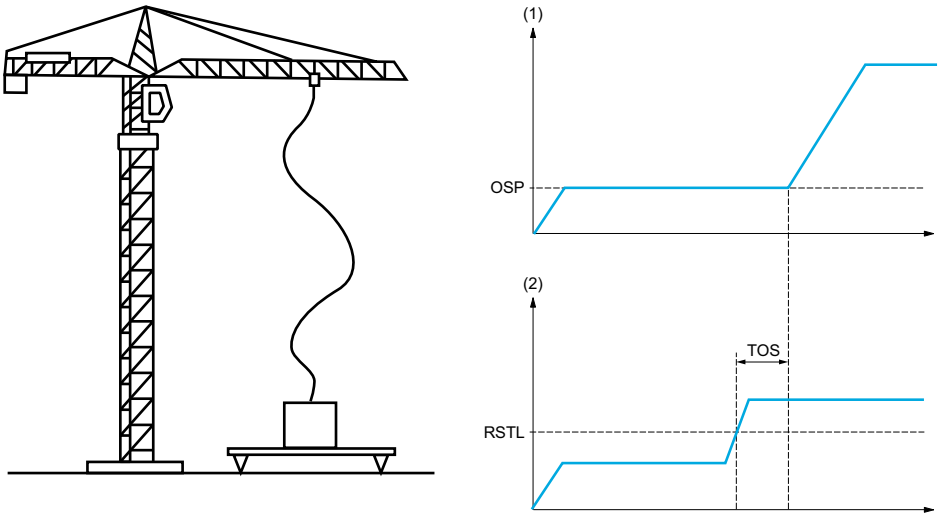
I: Current

SCL: Adjustable speed threshold, above which current limitation is active
CLO: Current limitation for high-speed function

NOTE: The speed reached for a specific current is lower in case of network undervoltage in comparison with nominal network voltage.

Rope slack

The Rope slack function can be used to help to prevent starting up at high speed when a load has been set down ready for lifting but the rope is still slack (as illustrated below).



1. Speed
2. Load

The speed step (OSP parameters) is used to measure the load. The effective measurement cycle is not triggered until the load reaches the adjustable threshold **[Rope slack trq level]** rSLL, which corresponds to the weight of the hook.

A logic output or a relay can be assigned to the indication of the rope slack state in the **[Inputs / Outputs]** I_O — menu.

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[High speed hoisting]** HSH

Parameters list

HMI label	Settings	Factory setting
[High speed hoisting] HSH —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[High speed hoisting] HSO	—	**[No]** nO
High speed hoisting • **[No]** nO: ***Inactive*** • **[Reference Frequency]** SSO: ***Reference frequency*** • **[Current Limit]** CSO: ***Current limit***		
[Motor speed coeff.] COF ★ ( )	0 to 200%	100%
Motor speed coefficient Speed reduction coefficient calculated by the drive for ascending direction. This parameter can be accessed if **[High speed hoisting]** HSO is set to **[Reference Frequency]** SSO.		
[Gen. speed coeff] COR ★ ( )	0 to 200%	50%
Generator speed coefficient		

HMI label	Settings	Factory setting
Speed reduction coefficient calculated by the drive for descending direction. This parameter can be accessed if **[High speed hoisting]** HSO is not set to **[No]** NO.		
[Load measuring tm.] tOS ★ (↻)	0.1 s to 65 s	0.5 s
Load measuring time This parameter can be accessed if **[High speed hoisting]** HSO is not set to **[No]** NO.		
[Measurement spd] OSP ★ (↻)	-0 to **[Nominal Motor Freq]** FRS	40 Hz
Measurement speed This parameter can be accessed if **[High speed hoisting]** HSO is not set to **[No]** NO.		
[High speed I Limit] CLO ★ (↻)	0 to 1.5 In (1)	In (1)
High speed I limit This parameter can be accessed if **[High speed hoisting]** HSO is set to **[Current Limit]** CSO. **NOTE:** If the setting is less than 0.25 In, the drive may lock in detected **[Output phase loss]** OPL error mode if this has been enabled.		
[I Limit. frequency] SCL ★ (↻)	0 to 599 Hz according to rating	40 Hz
Current limit. frequency This parameter can be accessed if **[High speed hoisting]** HSO is set to **[Current Limit]** CSO.		
[Rope slack config.] rSd ★	—	**[No]** NO
Rope slack configuration This parameter can be accessed if **[High speed hoisting]** HSO is not set to **[No]** NO. • **[No]** NO: ***No***, function inactive • **[Weight Estimation]** dr1: ***Weight estimation***, measurement of the load by estimating the torque generated by the drive • **[Ext Weight Sensor]** PES: ***External weight sensor***, measurement of the load using a weight sensor, can only be assigned if **[Weight Sensor Assign]** PES is not **[No]** NO		
[Rope slack trq level] rStL ★	0 to 100%	0%
Rope slack torque level Adjustment threshold corresponding to a load weighing slightly less than the hook when off-load, as a % of the rated load. This parameter can be accessed if **[Rope slack config.]** rSd has been assigned.		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

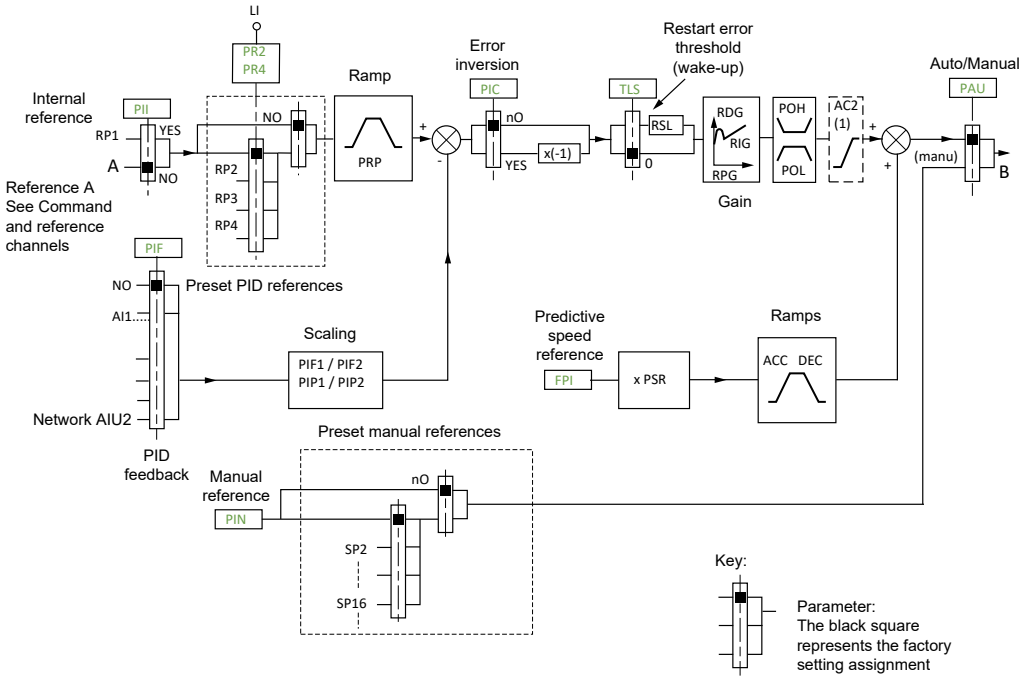
★ : These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

(↻) : Setting of this parameter can be done during operation or when stopped.

[PID controller] PID —

Block diagram

The function is activated by assigning an analog input to the PID feedback (measurement).



(1) Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".

PID feedback

The PID feedback must be assigned to one of the analog inputs AI1 to AI3, to the pulse input, according to whether any extension modules have been inserted.

PID reference

The PID reference must be assigned to the following parameters: Preset references via logic inputs **[Ref PID Preset 2]** rP2, **[Ref PID Preset 3]** rP3, **[Ref PID Preset 4]** rP4
In accordance with the configuration of **[Intern PID Ref]** PIC:
Internal reference **[Internal PID ref]** rPI or Reference A **[Ref Freq Channel 1]** Fr1 or **[Ref.1B channel]** Fr1b, page 188.

Combination table for preset PID references

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

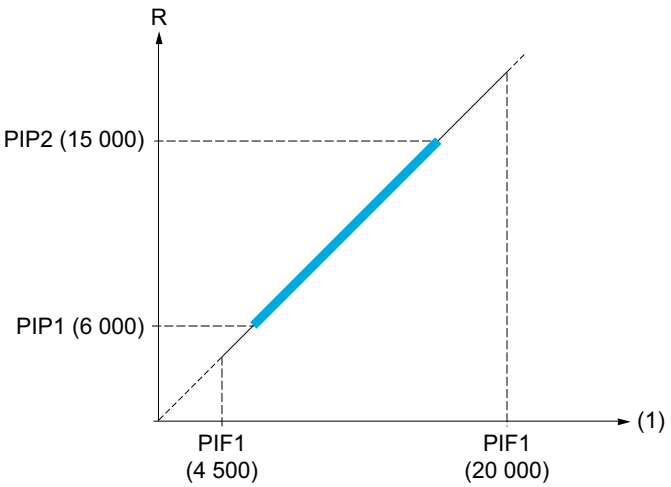
- **[Min PID feedback]** P I F 1, **[Max PID feedback]** P I F 2 parameters can be used to scale the PID feedback (sensor range). **This scale MUST be maintained for all other parameters.**
- **[Min PID Process]** P I P 1, **[Max PID Process]** P I P 2 parameters can be used to scale the adjustment range, for example the reference. **The adjustment range MUST remain within the sensor range.**

The maximum value of the scaling parameters is 32,767. To facilitate installation, we recommend using values as close as possible to this maximum level, while retaining powers of 10 in relation to the actual values.

Example (see graph below): Adjustment of the volume in a tank, between 6 m^3 and 15 m^3.

- Sensor used 4-20 mA, 4.5 m3 for 4 mA and 20 m3 for 20 mA, with the result that **[Min PID feedback]** P I F 1 4,500 and **[Max PID feedback]** P I F 2 = 20,000.
- Adjustment range 6 to 15 m3, with the result that **[Min PID Process]** P I P 1 = 6,000 (min. reference) and **[Max PID Process]** P I P 2 = 15,000 (max. reference).
- Example references:
  - rP1 (internal reference) = 9,500
  - rP2 (preset reference) = 6,500
  - rP3 (preset reference) = 8,000
  - rP4 (preset reference) = 11,200

The **[3.4] [Display config.]** d C F — menu can be used to customize the name of the unit displayed and its format.



1. PID feedback

Other parameters

- **[PID wake up thresh.]** r S L parameter: Can be used to set the detected PID error threshold, above which the PID regulator is reactivated (wake-up) after a stop due to the max. time threshold being exceeded at low speed **[Low Speed Timeout]** t L S

- Reversal of the direction of correction **[PID Inversion]** PIC: If **[PID Inversion]** PIC is set to **[No]** nO, the speed of the motor increases when the detected error is positive (for example: pressure control with a compressor. If **[PID Inversion]** PIC is set to **[Yes]** YES, the speed of the motor decreases when the detected error is positive (for example: temperature control using a 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 detected PID error may be configured and indicated by a logic output.

"Manual - Automatic" Operation with PID

This function combines the PID regulator, the preset speeds and a manual reference. Depending on the state of the logic input, the speed reference is given by the preset speeds or by a manual reference input via the PID function.

Manual reference

[Manual PID reference] PIM:

- Analog inputs AI1 to AI3
- Pulse input

Predictive speed reference

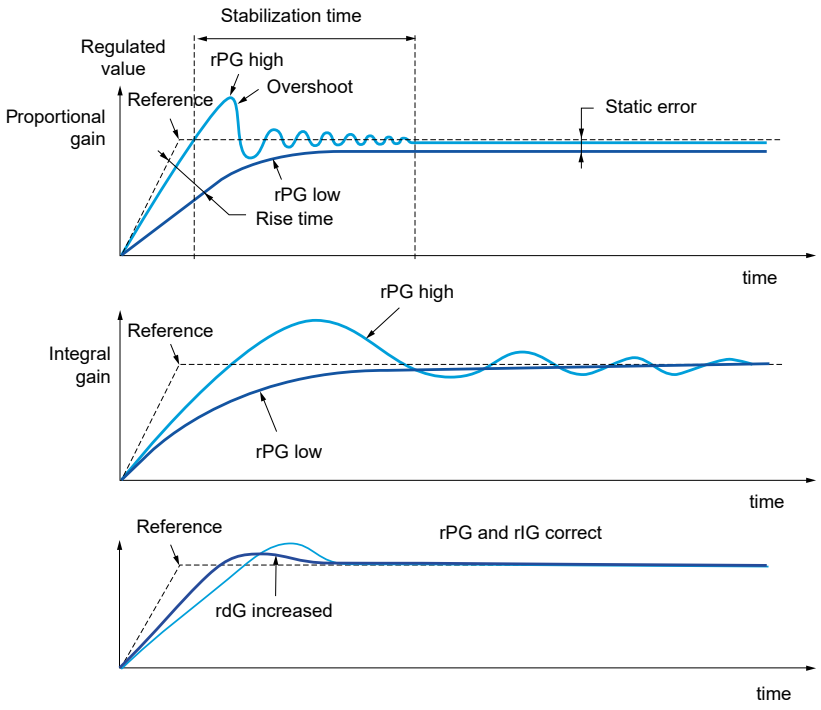
[Speed ref. assign.] FPI:

- **[AI1]** AI1: Analog input
- **[AI2]** AI2: Analog input
- **[AI3]** AI3: Analog input
- **[RP]** PI: Pulse input
- **[HMI]** LCC: Graphic display terminal or remote display terminal
- **[Modbus]** Mdb: Integrated Modbus
- **[CANopen]** CAN: Integrated CANopen®
- **[Com. Module]** nET: Communication module (if inserted)

Setting up the PID regulator

1. **Configuration in PID mode.**
   See the diagram .
2. **Perform a test in factory settings mode.**
   To optimize the drive, adjust **[PID Prop.Gain]** rPG or **[PID Intgl.Gain]** rIG gradually and independently, and observe the effect on the PID feedback in relation to the reference.

3. **If the factory settings are unstable or the reference is incorrect.**
   - Perform a test with a speed reference in Manual mode (without PID regulator) and with the drive on load for the speed range of the system:
     - In steady state, the speed must be stable and comply with the reference, and the PID feedback signal must be stable.
     - In transient state, the speed must follow the ramp and stabilize quickly, and the PID feedback must follow the speed. If this is not the case, see the settings for the drive and/or sensor signal and wiring.
   - Switch to PID mode.
   - Set **[Dec.Ramp Adapt]** b r A to **[No]** n o (no auto-adaptation of the ramp).
   - Set **[PID ramp]** P r P to the minimum permitted by the mechanism without triggering an **[Overbraking level]** V o b F.
   - Set the integral gain **[PID Intgl.Gain]** r I G to minimum.
   - Leave the derivative gain **[PID derivative gain]** r d G at 0.
   - Observe the PID feedback and the reference.
   - Switch the drive ON/OFF a number of times or vary the load or reference rapidly a number of times.
   - Set the proportional gain **[PID Prop.Gain]** r P G to ascertain the compromise between response time and stability in transient phases (slight overshoot and 1 to 2 oscillations before stabilizing).
   - If the reference varies from the preset value in steady state, gradually increase the integral gain **[PID Intgl.Gain]** r I G, reduce the proportional gain **[PID Prop.Gain]** r P G in the event of instability (pump applications), find a compromise between response time and static precision (see diagram).
   - Lastly, the derivative gain may permit the overshoot to be reduced and the response time to be improved, although this is more difficult to obtain a compromise in terms of stability, as it depends on 3 gains.
   - Perform in-production tests over the whole reference range.



The oscillation frequency depends on the system kinematics.

Parameter	Rise time	Overshoot	Stabilization time	Detected Static error
rPG ↗	↘↘	↗	=	↘
rIG ↗	↘	↗↗	↗	↘↘
rdG ↗	=	↘	↘	=

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[PID controller]** PId

Parameters list

HMI label	Settings	Factory setting
[PID controller] PId —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[PID feedback Assign] PIF	—	**[No]** nO
PID controller feedback • **[No]** nO: ***No***, not assigned • **[AI1]** AI1: ***AI1***, analog input A1 • **[AI2]** AI2: ***AI2***, analog input A2 • **[AI3]** AI3: ***AI3***, analog input A3 • **[RP]** PI: ***Pulse input*** • **[AI Virtual 1]** AIV1: ***AI Virtual 1***, virtual analog input 1 by the communication bus • **[AI Virtual 2]** AIV2: ***AI Virtual 2***, virtual analog input 2 by the communication bus • **[OA01]** OAO1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** OA10: ***OA10***, function blocks: Analog Output 10		
[AIV2 Channel Assign] AIC2 ★	—	**[No]** nO
Channel assignment for virtual Analog input AIV2 This parameter can be accessed if **[PID feedback Assign]** PIF is set to **[AI Virtual 2]** AIV2. This parameter can also be accessed in the **[Inputs / Outputs]** I_O — menu. • **[No]** nO: ***No***, not assigned • **[Modbus]** Mdb: ***Modbus communication*** • **[CANopen]** CAn: ***CANopen communication*** • **[Com. Module]** nEt: ***Ext. communication module***		
[Min PID feedback] PIF1 ★ ( ) (1)	0 to **[Max PID feedback]** PIF2 (2)	100
Minimum PID feedback		
[Max PID feedback] PIF2 ★ ( ) (1)	**[Min PID feedback]** PIF1 to 32,767 (2)	1,000
Maximum PID feedback		

HMI label	Settings	Factory setting
[Min PID Process] PIP1 ★ (1)	**[Min PID feedback]** PIF1 to **[Max PID Process]** PIP2 (2)	150
Minimum PID process		
[Max PID Process] PIP2 ★ (1)	**[Min PID Process]** PIP1 to **[Max PID feedback]** PIF2 (2)	900
Maximum PID process		
[Intern PID Ref] PII ★	—	**[No]** NO
Internal PID reference • **[No]** NO: ***No***, the PID regulator reference is given by **[Ref Freq Channel 1]** FR1 or **[Ref.1B channel]** FR1B with summing/subtraction/multiplication functions (see the diagram . • **[Yes]** YES: ***Yes***, the PID regulator reference is internal via **[Internal PID ref]** rPI.		
[Internal PID ref] rPI ★	**[Min PID Process]** PIP1 to **[Max PID Process]** PIP2	150
Internal PID reference This parameter can also be accessed in the 1.2 **[MONITORING]** MON — menu.		
[PID Prop.Gain] rPG ★	0.01 to 100	1
PID Proportional gain		
[PID Intgl.Gain] rIG ★	0.01 to 100	1
PID controller integral gain		
[PID derivative gain] rdG ★	0.00 to 100	0
PID derivative gain		
[PID ramp] PrP ★ (1)	0 to 99.9 s	0 s
PID ramp PID acceleration/deceleration ramp, defined to go from **[Min PID Process]** PIP1 to **[Max PID Process]** PIP2 and vice versa.		
[PID Inversion] PIC ★	—	**[No]** NO
PID inversion Reversal of the direction of correction **[PID Inversion]** PIC: If **[PID Inversion]** PIC is set to **[No]** NO, the speed of the motor increases when the detected error is positive (example: pressure control with a compressor) If **[PID Inversion]** PIC is set to **[Yes]** YES, the speed of the motor decreases when the error is positive (example: temperature control using a cooling fan). • **[No]** NO: ***No*** • **[Yes]** YES: ***Yes***		
[PID Min Output] POL ★ (1)	- 599 to 599 Hz	0 Hz
PID controller min. output		
[PID Max Output] POH ★ (1)	0 to 599 Hz	60 Hz
PID controller max. output		

HMI label	Settings	Factory setting
[Min fbk Warning] PAL ★ (1)	**[Min PID feedback]** PIF1 to **[Max PID feedback]** PIF2 (2)	100
Minimum feedback level warning		
[Max fbk Warning] PAH ★ (1)	**[Min PID feedback]** PIF1 to **[Max PID feedback]** PIF2 (2)	1,000
Maximum feedback level warning		
[PID error Warning] PEr ★ (1)	0 to 65,535 (2)	100
PID error warning		
[PID Integral OFF] PIS ★	—	**[No]** no
PID integral disabled If the assigned input or bit is at 0, the function is inactive (the PID integral is enabled). If the assigned input or bit is at 1, the function is active (the PID integral is disabled). • **[No]** no: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Speed ref. assign.] FPI ★	—	**[No]** no
Speed ref. assignment PID regulator predictive speed input. • **[No]** no: ***No***, not assigned • **[AI1]** AI1: ***AI1***, analog input A1 • **[AI2]** AI2: ***AI2***, analog input A2 • **[AI3]** AI3: ***AI3***, analog input A3 • **[HMI]** LCC: Graphic display terminal or remote display terminal source • **[Modbus]** Mdb: ***Modbus communication*** • **[CANopen]** CAn: ***CANopen communication*** • **[Com. Module]** nEt: ***Ext. communication module*** • **[RP]** PI: ***Pulse input*** • **[AI Virtual 1]** AIV1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[OA01]** oAO1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** oA10: ***OA10***, function blocks: Analog Output 10		
[Speed input %] PSr ★ (1)	1 to 100%	100%
PID speed input % ref Multiplying coefficient for predictive speed input. This parameter cannot be accessed if **[Speed ref. assign.]** FPI is set to **[No]** no.		
[Auto/Manual assign.] PAU ★	—	**[No]** no
Auto/Manual select input If the assigned input or bit is at 0, the PID is active. If the assigned input or bit is at 1, manual operation is active. • **[No]** no: ***No***, not assigned		

HMI label	Settings	Factory setting
• **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Acceleration 2] A C 2 ★ (1)	0.00 to 6,000 s (3)	5 s
Acceleration 2 ramp time Time to accelerate from 0 to the **[Nominal Motor Freq]** F r S. To have repeatability in ramps, the value of this parameter must be set according to the possibility of the application. Ramp AC2 is only active when the PID function starts up and during PID "wake-ups".		
[Manual PID reference] P I M ★	—	**[No]** n o
Manual PID reference Manual speed input. This parameter can be accessed if **[Auto/Manual assign.]** P A u is not set to **[No]** n o. The preset speeds are active on the manual reference if they have been configured. • **[No]** n o: ***No***, not assigned • **[AI1]** A I 1: ***AI1***, analog input A1 • **[AI2]** A I 2: ***AI2***, analog input A2 • **[AI3]** A I 3: ***AI3***, analog input A3 • **[RP]** P I: ***Pulse input*** • **[AI Virtual 1]** A I V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[OA01]** o A 0 1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** o A 1 0: ***OA10***, function blocks: Analog Output 10		
[Low Speed Timeout] t L S (1)	0 to 999.9 s	0 s
Low speed timeout Maximum operating time at **[Low Speed]** L S P see **[Low Speed]** L S P, page 101. Following operation at **[Low Speed]** L S P for a defined period, a motor stop is requested automatically. The motor restarts if the reference is greater than **[Low Speed]** L S P and if a run command is still present. **NOTE:** A value of 0 indicates an unlimited period of time. If **[Low Speed Timeout]** t L S is not 0, **[Type of stop]** S t t is forced to **[Ramp Stop]** r M P (only if a ramp stop can be configured).		
[PID wake up thresh.] r S L ★ 2 s	0.0 to 100.0	0

HMI label	Settings	Factory setting
PID wake up threshold		

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

Verify that activating this function does not result in unsafe conditions.

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

If the "PID" and "Low speed operating time" **[Low Speed Timeout]** tLS functions are configured at the same time, the PID regulator may attempt to set a speed lower than **[Low Speed]** LSP.

This results in unsatisfactory operation, which consists of starting, operating at low speed then stopping, and so on…

Parameter **[PID wake up thresh.]** rSL (restart detected error threshold) can be used to set a minimum detected PID error threshold for restarting after a stop at prolonged **[Low Speed]** LSP. **[PID wake up thresh.]** rSL is a percentage of the detected PID error (value depends on **[Min PID feedback]** PIF1 and **[Max PID feedback]** PIF2, see **[Min PID feedback]** PIF1). The function is inactive if **[Low Speed Timeout]** tLS = 0 or if **[PID wake up thresh.]** rSL = 0.

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

(2) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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 6,000 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.

: Setting of this parameter can be done during operation or when stopped.

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

[PID preset references] Pr 1 —

Access

Parameters described below can be accessed by: **[Drive menu]** dr 1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[PID preset references]** Pr 1

Parameters list

HMI label	Settings	Factory setting
[PID preset references] Pr 1 —		
Function can be accessed if **[PID feedback Assign]** P 1F is assigned.		
[2 PID Preset Assign] Pr2	—	**[No]** no
2 PID Preset assignment If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active. • **[No]** no: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[4 PID Preset Assign] Pr4	—	**[No]** no
4 PID Preset assignment Check that **[2 PID Preset Assign]** Pr2 has been assigned before assigning this function. Identical to **[2 PID Preset Assign]** Pr2 . If the assigned input or bit is at 0, the function is inactive. If the assigned input or bit is at 1, the function is active.		
[Ref PID Preset 2] rP2 ★ (1)	**[Min PID Process]** P1P1 to **[Max PID Process]** P1P2 (2)	300
2nd PID preset reference This parameter can be accessed if **[2 PID Preset Assign]** Pr2 is assigned.		
[Ref PID Preset 3] rP3 ★ (1)	**[Min PID Process]** P1P1 to **[Max PID Process]** P1P2 (2)	600
3rd PID preset reference This parameter can be accessed if **[3 preset PID ref.] PR3** is assigned.		
[Ref PID Preset 4] rP4 ★ (1)	**[Min PID Process]** P1P1 to **[Max PID Process]** P1P2 (2)	900
4th PID preset reference This parameter can be accessed if **[4 PID Preset Assign]** Pr4 is assigned.		

(1) The parameter can also be accessed in the **[Settings]** SET — menu.

(2) If a graphic display terminal is not in use, values greater than 9,999 is displayed on the 4-digit display with a period mark after the thousand digit, 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.

: Setting of this parameter can be done during operation or when stopped.

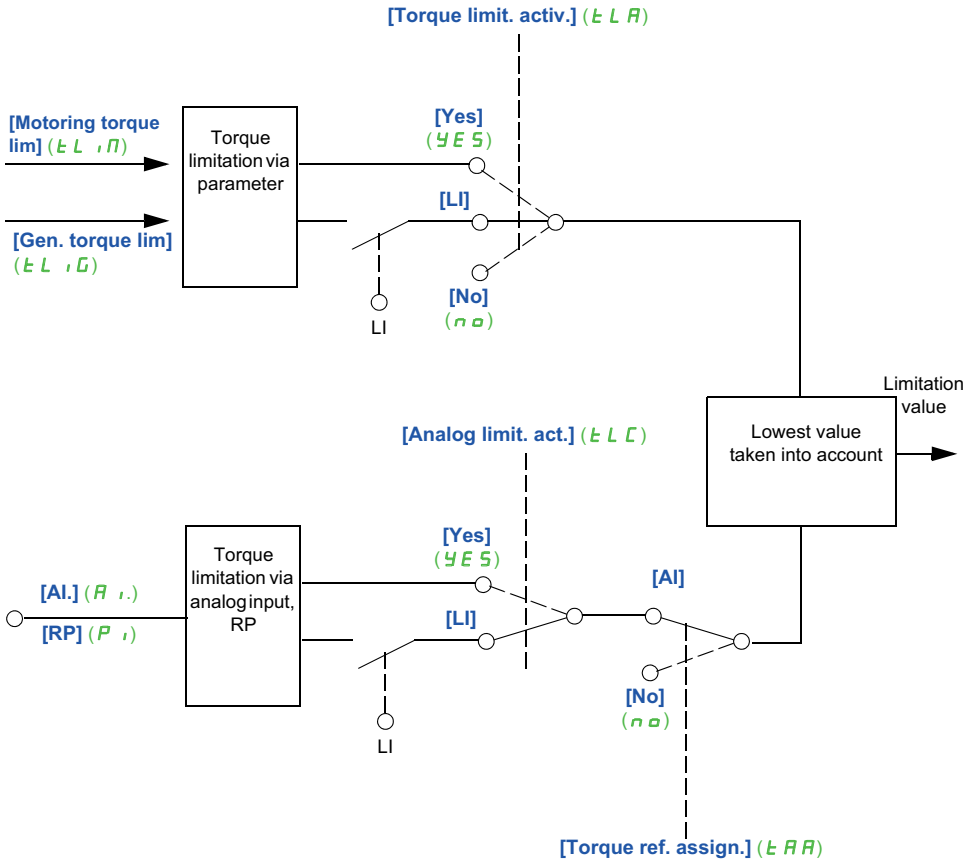
[Torque limitation] tOL —

Introduction

There are two types of torque limitation:

- With a value that is fixed by a parameter
- With a value that is set by an analog input (AI or pulse)

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.



Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Torque limitation]** tOL

Parameters list

HMI label	Settings	Factory setting
[Torque limitation] tOL —		
[Torque limit activ.] tLA	—	**[No]** no
Torque limit. activation		
If the assigned input or bit is at 0, the function is inactive.		

HMI label	Settings	Factory setting
If the assigned input or bit is at 1, the function is active. • **[No]** n o: ***No***, not assigned • **[Yes]** Y E S: ***Yes***, function always active • **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Torque increment] I n t P ★	—	**[1%]** 1
Torque increment This parameter cannot be accessed if **[Torque limit activ.]** t L A is set to **[No]** n o. Selection of units for the **[Motor torque limit]** t L I n and **[Gen. torque limit]** t L I G parameters. • **[0.1%]** 0. 1: ***0.1%*** • **[1%]** 1: ***1%***		
[Motor torque limit] t L I n ★ ( ) (1)	0 to 300%	100%
Motoring torque limit This parameter cannot be accessed if **[Torque limit activ.]** t L A is set to **[No]** n o. Torque limitation in motor mode, as a % or in 0.1% increments of the rated torque in accordance with the **[Torque increment]** I n t P parameter.		
[Gen. torque limit] t L I G ★ ( ) (1)	0 to 300%	100%
Generator torque limit This parameter cannot be accessed if **[Torque limit activ.]** t L A is set to **[No]** n o. Torque limitation in generator mode, as a % or in 0.1% increments of the rated torque in accordance with the **[Torque increment]** I n t P parameter.		
[Ref Torque Assign] t A A	—	**[No]** n o
Reference torque assignment If the function is assigned, the limitation varies between 0% and 300% of the rated torque on the basis of the 0% to 100% signal applied to the assigned input. Examples: 12 mA on a 4-20 mA input results in limitation to 150% of the rated torque. 2.5 V on a 10 V input results in 75% of the rated torque. • **[No]** n o: ***No***, not assigned (function inactive) • **[AI1]** A I 1: ***AI1***, analog input A1 • **[AI2]** A I 2: ***AI2***, analog input A2 • **[AI3]** A I 3: ***AI3***, analog input A3 • **[RP]** P I: ***Pulse input*** • **[AI Virtual 1]** A I V 1: ***AI Virtual 1***, virtual analog input 1 with the jog dial • **[AI Virtual 2]** A I V 2: ***AI Virtual 2***, virtual input via communication bus, to be configured via **[AIV2 Channel Assign]** A I C 2 . • **[OA01]** o A O 1: ***OA01***, function blocks: Analog Output 01 ... • **[OA10]** o A 1 0: ***OA10***, function blocks: Analog Output 10		
[Analog limit activ.] t L C ★	—	**[Yes]** (Y E S)

HMI label	Settings	Factory setting
Torque analog limit. activ		
This parameter cannot be accessed if **[Torque limit activ.]** tLA is set to **[No]** no. Identical to **[Torque limit activ.]** tLA . If the assigned input or bit is at 0: The limitation is specified by the **[Motor torque limit]** tL iM and **[Gen. torque limit]** tL iG) parameters if **[Torque limit activ.]** tLA is set to **[No]** no. No limitation if **[Torque limit activ.]** tLA is set to **[No]** no. If the assigned input or bit is at 1: The limitation depends on the input assigned by **[Ref Torque Assign]** tAA. **NOTE:** If **[Torque limit activ.]** tLA and **[Ref Torque Assign]** tAA are enabled at the same time, the lowest value is taken into account.		

(1) The parameter can also be accessed in the **[Settings]** SEt — menu.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

[2nd current limit.] CL1 —

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUn ➜ **[2nd current limit.]** CL1

Parameters list

HMI label	Settings	Factory setting
[2nd current limit.] CL1 —		
[Current Limitation2] LC2	—	**[No]** no
Current limitation 2 If the assigned input or bit is at 0, the first current limitation is active. If the assigned input or bit is at 1, the second current limitation is active. • **[No]** no: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Current Limit2 Value] CL2 ★ ( )	0 to 1.5 In (1)	1.5 In (1)
Current limitation 2 value ***NOTICE*** **OVERHEATING** • Verify that the motor is properly rated for the maximum current to be applied to the motor. • Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit. **Failure to follow these instructions can result in equipment damage.** This parameter can be accessed if **[Current Limitation2]** LC2 is not set to **[No]** no. The adjustment range is limited to 1.5 In. **NOTE:** If the setting is less than 0.25 In, the drive may lock in detected **[Output phase loss]** oPL error mode if this has been enabled (see **[Output phase loss]** oPL). If it is less than the no-load motor current, the motor cannot run.		
[Current Limitation] CL1 ★ ( )	0 to 1.5 In (1)	1.5 In (1)

HMI label	Settings	Factory setting
Current limitation		

NOTICE

OVERHEATING

- Verify that the motor is properly rated for the maximum current to be applied to the motor.
- Consider the duty cycle of the motor and all factors of your application including derating requirements in determining the current limit.

Failure to follow these instructions can result in equipment damage.

This parameter can be accessed if **[Current Limitation2]** L C 2 is not set to **[No]** n o.

The adjustment range is limited to 1.5 In.

NOTE: If the setting is less than 0.25 In, the drive may lock in detected **[Output phase loss]** o P L error mode if this has been enabled (see **[Output phase loss]** o P L). If it is less than the no-load motor current, the motor cannot run.

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

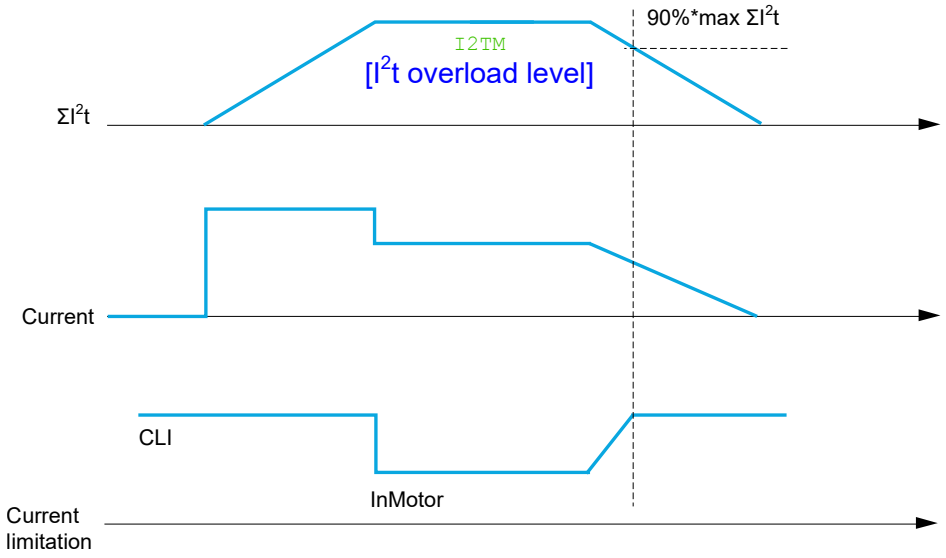
( ) : Setting of this parameter can be done during operation or when stopped.

[Current Limit Dyn] I 2 t —

DYN Current limit

Inside SoMove and with ATV320 DTM, If **BMP motors is selected this function is automatically configured.**

NOTE: The function remains configurable irrespective of **[Motor control type]** C t t setting value.



HMI label	Settings	Factory setting
[Current Limit Dyn] I 2 t —		
[I²t model activation] I 2 t A ★	—	**[No]** n o
I²t model activation for current limitation • **[No]** n o • **[Yes]** y E S when I²t ≥ Max ΣI²t, **[I2t overload level]** I 2 t n = 100 and current limitation is set to InMotor when I²t ≤ Max ΣI²t*90%, **[I2t overload level]** I 2 t n ≤ 90 and the current limitation is set to CLI This parameter can be accessed if **[Max Time of I2t]** I 2 t t is not set to **[0.00] 0.00**		
[Max Current of I2t] I 2 t I ★	—	1.5 In +1 (1)
Maximum current of I2t model		
[Max Time of I2t] I 2 t t	0.00 to 655.35	**[0.00] 0.00**
Maximum time of I2t model		

(1) In corresponds to the rated drive current indicated in the Installation manual or on the drive 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.

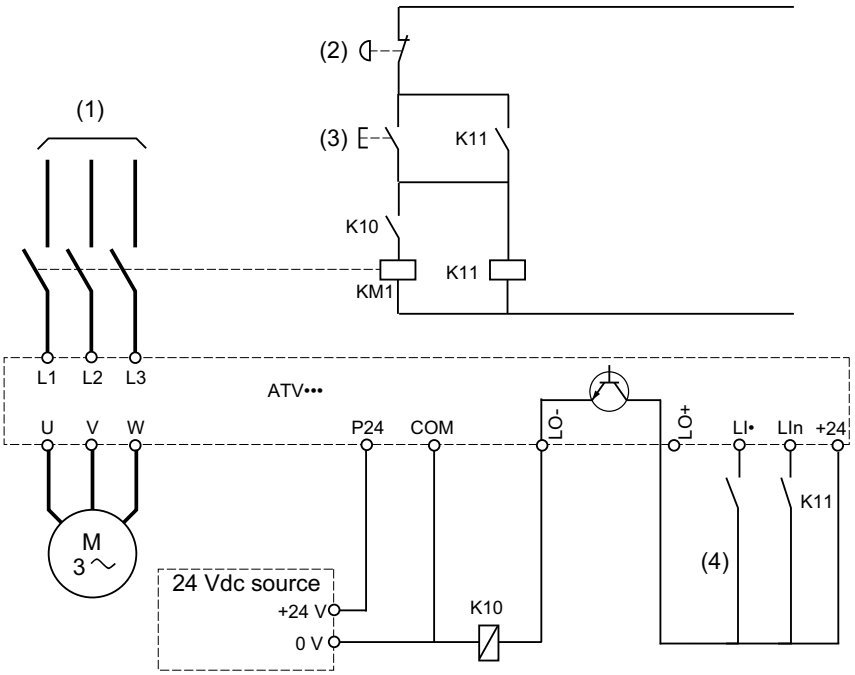
[Mains contactor command] L L C —

Line contactor command

The line contactor closes every time a run command (forward or reverse) is sent and opens after every stop, as soon as the drive is locked. For example, if the stop mode is stop on ramp, the contactor opens when the motor reaches zero speed.

NOTE: The drive control power supply must be provided via an external 24 V source.

Example circuit:



1. 3-phase supply mains
2. Emergency stop
3. Run/Reset
4. Forward or reverse

NOTE: The "Run/Reset" key must be pressed once the "Emergency stop" key has been released.

LI• = Run command **[Forward]** F r d or **[Reverse Assign]** r r S

LO-/LO+ = **[Mains Contactor]** L L C

LIn = **[Device Lock]** L E S

NOTICE
RISK OF DAMAGE TO THE DRIVE
Do not switch on the drive at intervals of less than 60 s.
Failure to follow these instructions can result in equipment damage.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[Mains contactor command]** LLC

Parameters list

HMI label	Settings	Factory setting
[Mains contactor command] LLC —		
[Mains Contactor] LLC	—	**[No]** nO
Mains contactor control • **[No]** nO: Function not assigned (in this case, none of the function parameters can be accessed) • **[LO1]** LO1: Logical output LO1 • **[R2]** r2: Relay r2 • **[DQ1]** dO1: Analog output AO1 functioning as a logic output. Selection can be made if **[AQ1 assignment]** AO1 is set to **[No]** nO		
[Device Lock] LES ★	—	**[No]** nO
Device lock assignment This parameter can be accessed if **[Mains Contactor]** LLC is not set to **[No]** nO. The drive locks when the assigned input or bit changes to 0. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Mains V. time out] LCt ★	5 to 999 s	5 s
Mains V. time out Monitoring time for closing of line contactor. If, once this time has elapsed, there is no voltage on the drive power circuit, the drive locks with a **[Input Contactor]** LCF detected error.		

★ : 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.

[Output contactor cmd] OCC —

Output contactor command

This allows the drive to control a contactor located between the drive and the motor. The contactor is closed when a run command is applied. The contactor is opened when there is no longer any current in the motor.

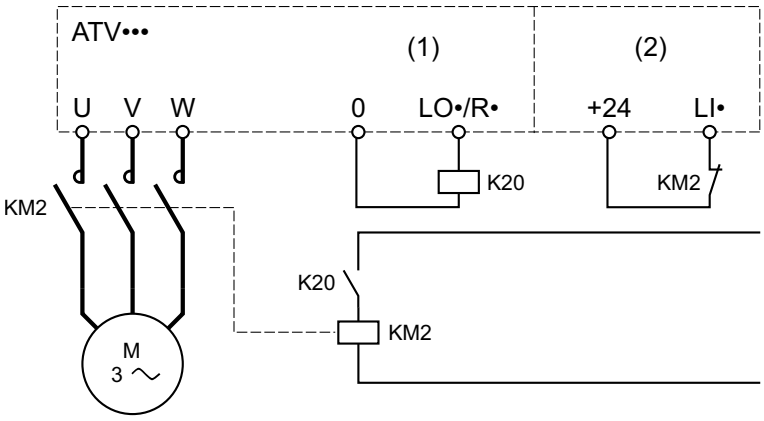
NOTE: If the DC injection braking function is used, the output contactor does not close as long as DC injection braking is active.

Output contactor feedback

The corresponding logic input should be at 1 when there is no run command and at 0 during operation.
In the event of an inconsistency, the drive trips in FCF2 if the output contactor is not successful to close (LIx at 1) and in FCF1 if it is stuck (LIx at 0).

The **[Delay to motor run]** dbS parameter can be used to delay tripping in detected fault mode when a run command is sent and the **[Delay to open cont.]** dAS parameter delays the detected fault when a stop command is set.

NOTE: FCF2 (contactor is not successful to close) can be reset by the run command changing state from 1 to 0 (0 --> 1 - -> 0 in 3-wire control).



1. Control
2. Feedback

The **[Out. Contactor Assign]** OCC and **[Output contact fdbk]** rCA functions can be used individually or together.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Output contactor cmd]** OCC

Parameters list

HMI label	Settings	Factory setting
[Output contactor cmd] oCC —		
[Out. Contactor Assign] oCC	—	**[No]** nO
Output contactor control assignment • **[No]** nO: ***No***, function not assigned (in this case, none of the function parameters can be accessed) • **[LO1]** LO1: ***Logical output LO1*** • **[R2]** r2: ***Relay R2*** • **[DQ1]** dO1: ***Digital ouptut DQ1***, analog output AO1 functioning as a logic output. Selection can be made if **[AQ1 assignment]** AO1 is set to **[No]** nO		
[Output contact fdbk] rCA	—	**[No]** nO
Output contactor fdbk The motor starts up when the assigned input or bit changes to 0. • **[No]** nO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Delay to motor run] dbS ★ (↻)	0.05 to 60 s	0.15 s
Delay to close o/p cont. Time delay for: Motor control following the sending of a run command Output contactor state monitoring, if the feedback is assigned. If the contactor is not successful to close at the end of the set time, the drive locks in FCF2 mode. This parameter can be accessed if **[Out. Contactor Assign]** oCC is assigned or if **[Output contact fdbk]** rCA is assigned. The time delay must be greater than the closing time of the output contactor.		
[Delay to open cont.] dAS ★ (↻)	0 to 5.00 s	0.10 s
Delay to open contactor Time delay for output contactor opening command following motor stop. This parameter can be accessed 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 detected fault is not monitored. If the contactor is not successful to open at the end of the set time, the drive locks in detected FCF1 fault mode.		

★ : 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.

(↻) : Setting of this parameter can be done during operation or when stopped.

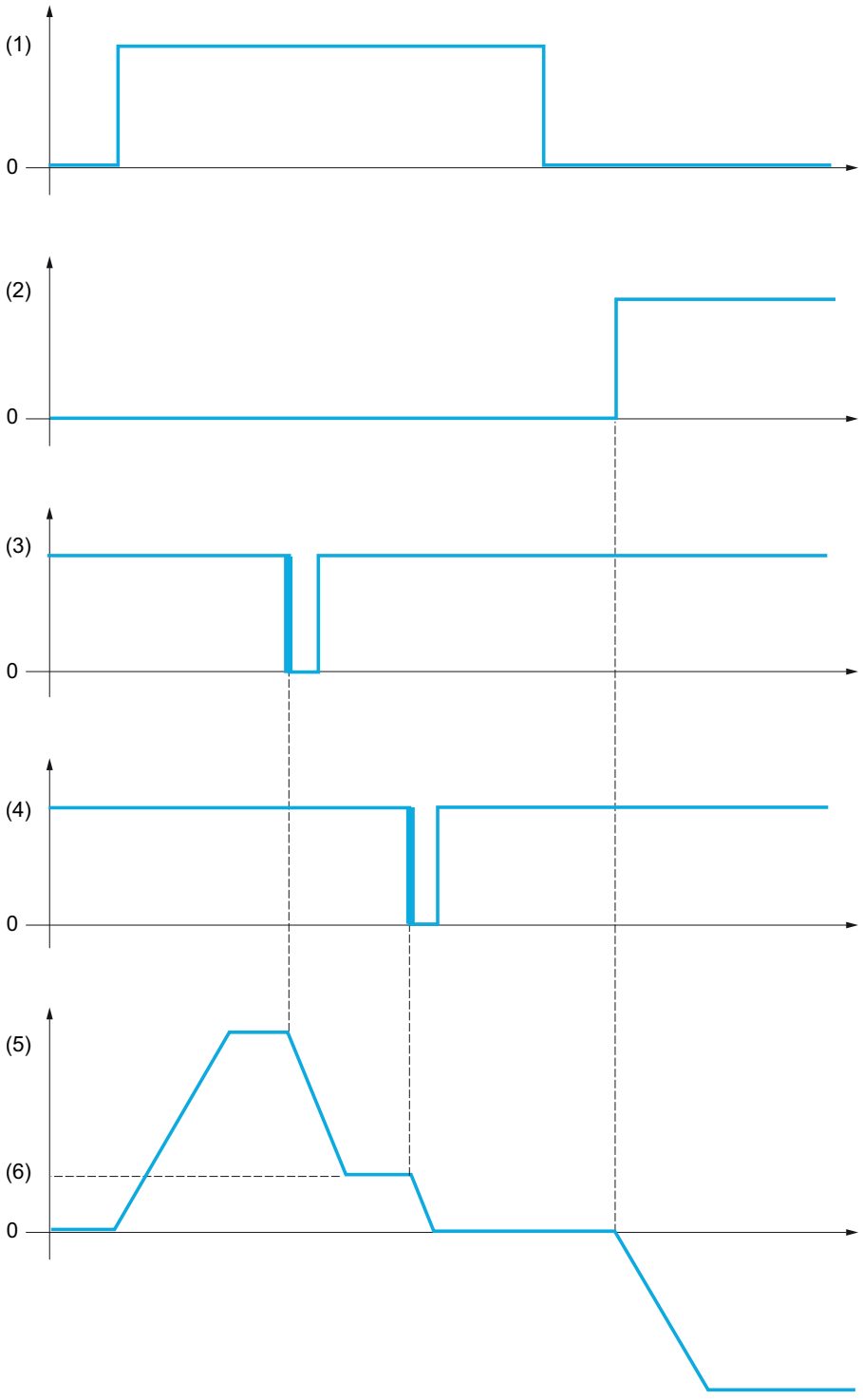
[Positioning by sensors] L P o —

Positioning by sensors

This function is used for managing positioning using position sensors or limit switches linked to logic inputs or using control word bits:

- Slowing down
- Stopping

The activation level 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 falling edge:



1. Forward run command
2. Reverse run command

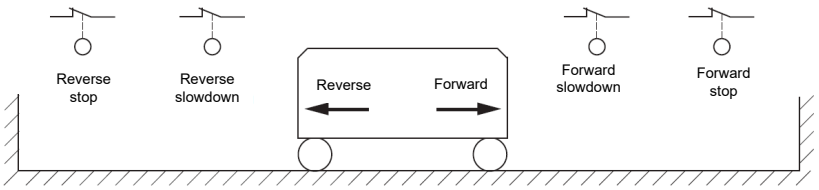
3. **[Forward Slowdown]**
4. **[Stop FW limit sw.]**
5. Speed
6. **[Low Speed]** L S P

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, described below.

Example: Forward slowdown, on falling edge

- The forward slowdown takes place on a falling edge (switch from 1 to 0) of the input assigned to forward slowdown if it occurs in forward direction. The reference frequency value is limited to **[Low Speed]** L S P.
- In the forward slowdown area, the movement in the opposite direction is authorized at high speed.
- The slowdown command is deleted on a rising edge (switch from 0 to 1) of the input assigned to forward slowdown if it occurs in reverse direction.
- A forward slowdown is stored, even in the event of a power outage.

Example: Positioning on a limit switch, on falling edge



⚠WARNING

LOSS OF CONTROL

- Verify correct connection of the limit switches.
- Verify the correct installation of the limit switches. The limit switches must be mounted in a position far enough away from the mechanical stop to allow for an adequate stopping distance.
- You must release the limit switches before you can use them.
- Verify the correct function of the limit switches.

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

Operation with short cams:

After the switches have been configured, the drive does not yet have a valid position.

⚠WARNING

LOSS OF CONTROL

- Verify that the drive is between the reverse deceleration switch and the forward deceleration switch before you enable the drive for the first time if you have configured deceleration switches and stop switches.
- Verify that the drive is between the reverse stop switch and the forward stop switch before you enable the drive for the first time if you have configured stop switches, but no deceleration switches.
- If you have configured switches, verify that the drive is within the permissible movement range before you use the function for the first time.

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

⚠WARNING

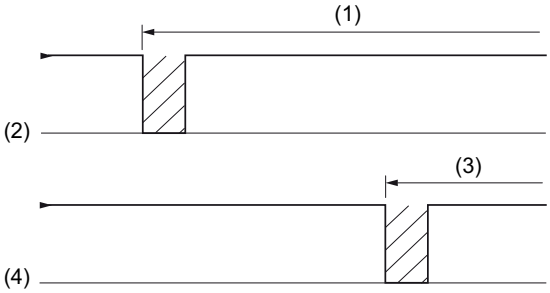
LOSS OF CONTROL

When the drive is switched off, it stores the range which it is currently in.

- If the system is moved manually while the drive is off, you must restore the original position before switching it on again.

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

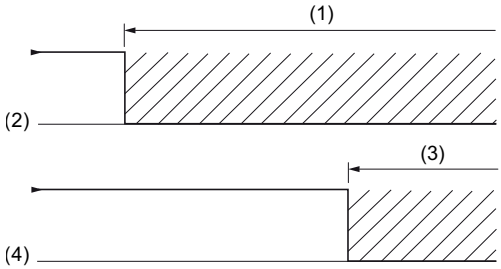
In this instance, when operating for the first time or after restoring the factory settings, the drive must initially be started outside the slowdown and stop zones to initialize the function.



1. Forward slowdown zone
2. Forward slowdown
3. Forward stop zone
4. Forward stop

Operation with long cams

In this instance, there is no restriction, which means that the function is initialized across the whole trajectory.



1. Forward slowdown zone
2. Forward slowdown
3. Forward stop zone
4. Forward stop

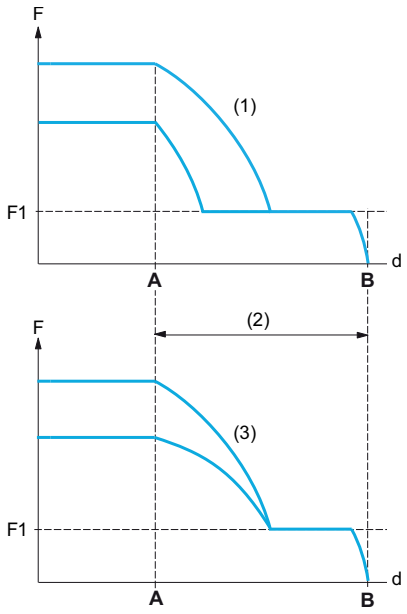
Stop at distance calculated after deceleration limit switch

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 drive when the slowdown limit switch is tripped, the drive induces the stop at the configured distance.

This function is useful in applications where one manual-reset overtravel limit switch is common to both directions. It is then only respond to help management if the distance is exceeded. The stop limit switch retains priority in respect of the function.

The **[Deceleration type]** d S F parameter can be configured to obtain either of the functions described below:



A: Slowdown limit switch reached
B: Automatic stop at a distance

F: Frequency

F1: Slowdown frequency

d: Distance

1. **[Deceleration type]** d S F = **[Standard]** S t d
2. **[Stop distance]** S t d
3. **[Deceleration type]** d S F = **[Optimized]** o P t

NOTE:

- If the deceleration ramp is modified while stopping at a distance is in progress, this distance is not observed.
- If the direction is modified while stopping at a distance is in progress, this distance is not observed.

⚠WARNING

LOSS OF CONTROL

This function does not replace the limit switch.

- Verify that the configured distance is actually possible.

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

Access

Parameters described below can be accessed by: drI ➡ ConF ➡ FuLL ➡ Fun ➡ LPo

Parameters list

HMI label	Settings	Factory setting
[Positioning by sensors] LPo —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[Stop FW limit sw.] SAF	—	**[No]** no
Fwd stop limit input assig • **[No]** no: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions (If **[Profile]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP then **[CD11]** Cd11 up to **[CD15]** Cd15, **[C111]** C111 up to **[C115]** C115, **[C211]** C211 up to **[C215]** C215 and **[C311]** C311 up to **[C315]** C315 are not available).		
[Stop RV limit sw.] SAr	—	**[No]** no
RV stop limit input assign Identical to **[Stop FW limit sw.]** SAF above.		
[Stop limit config.] SAL ★	0.05 to 60 s	**[Active low]** Lo
Stop limit configuration If the parameter **[Stop limit config.]** SAL is set to **[Active high]** HIG, the signal for stopping is triggered with a rising edge. If the signal cable to the switch is interrupted or if the switch becomes inoperative, no stop command is triggered.		

⚠WARNING

LOSS OF CONTROL

In your risk assessment, take into account all potential consequences of triggering a signal with a rising edge.

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

HMI label	Settings	Factory setting
This parameter can be accessed if at least one limit switch or one stop sensor has been assigned. • **[Active low]** LO: ***Active low***, stop triggered by on a falling edge (change from 1 to 0) of the assigned bits or inputs. • **[Active high]** HIG: ***Active high***, stop triggered by on a rising edge (change from 0 to 1) of the assigned bits or inputs.		
[Forward Slowdown] dAF	—	**[No]** NO
Forward slowdown limit Identical to **[Stop FW limit sw.]** SAF above.		
[Reverse Slowdown] dAr	—	**[No]** NO
Reverse slowdown limit Identical to **[Stop FW limit sw.]** SAF above.		
[Slowdown limit cfg.] dAL ★	—	**[Active low]** LO
Slowdown limit config. If the parameter **[Slowdown limit cfg.]** DAL is set to **[Active high]** HIG, the signal for deceleration is triggered with a rising edge. If the signal cable to the switch is interrupted or if the switch becomes inoperative, no deceleration command is triggered. **⚠WARNING** **LOSS OF CONTROL** In your risk assessment, take into account all potential consequences of triggering a signal with a rising edge. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** This parameter can be accessed if at least one limit switch or one slowdown sensor has been assigned. • **[Active low]** LO: ***Active low***, deceleration triggered by on a falling edge (change from 1 to 0) of the assigned bits or inputs. • **[Active high]** HIG: ***Active high***, deceleration triggered by on a rising edge (change from 0 to 1) of the assigned bits or inputs.		
[Disable limit sw.] CLS ★	—	**[No]** NO
Disable limit switch **⚠WARNING** **LOSS OF CONTROL** If **[Disable limit sw.]** CLS is set to an input and activated, the limit switch management will be disabled. • Verify that activating this function does not result in unsafe conditions. **Failure to follow these instructions can result in death, serious injury, or equipment damage.** This parameter can be accessed if at least one limit switch or one sensor has been assigned. The action of the limit switches is disabled when the assigned bit or input is at 1. If, at this time, the drive is stopped or being slowed down by limit switches, it restarts up to its speed reference. • **[No]** NO: ***No***, not assigned • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Stop type] PAS ★	—	**[On Ramp]** rMP
Stop type		

HMI label	Settings	Factory setting
This parameter can be accessed if at least one limit switch or one sensor has been assigned. • **[On Ramp]** r M P: ***On ramp***, follow ramp • **[Fast stop]** F S t: ***Fast stop***, fast stop (ramp time reduced by **[Ramp Divider]** d C F, see **[Ramp Divider]** d C F) • **[Freewheel Stop]** n S t: ***Freewheel stop***		
[Deceleration type] d S F ★	—	**[Standard]** S t d
Deceleration type This parameter can be accessed if at least one limit switch or one sensor has been assigned. • **[Standard]** S t d: ***Standard***, uses the **[Deceleration]** d E C or **[Deceleration 2]** d E 2 ramp (depending on which has been enabled) • **[Optimized]** o P t: ***Optimized***, the ramp time is calculated on the basis of the actual speed when the slowdown contact switches, to limit the operating time at low speed (optimization of the cycle time: the slowdown time is constant regardless of the initial speed).		
[Stop distance] S t d ★	—	**[No]** n o
Stop distance This parameter can be accessed if at least one limit switch or one sensor has been assigned. Activation and adjustment of the "Stop at distance calculated after the slowdown limit switch" function. • **[No]** n o: Function inactive (the next two parameters are, therefore, be inaccessible) • **[-] 0.01 to 10.00**: Stop distance range in meters		
[Nom linear speed] n L S ★	0.20 to 5.00 m/s	1.00 m/s
Rated linear speed This parameter can be accessed if at least one limit switch or one sensor has been assigned and **[Stop distance]** S t d is not set to **[No]** n o . Rated linear speed in meters/second.		
[Stop corrector] S F d ★	50 to 200%	100%
Distance stop corrector This parameter can be accessed if at least one limit switch or one sensor has been assigned and **[Stop distance]** S t d is not set to **[No]** n o . Scaling factor applied to the stop distance to compensate, for example, a non-linear ramp.		
[Memo Stop] M S t P ★	—	**[Yes]** y E S
Memo stop This parameter can be accessed if at least one limit switch or one sensor has been assigned. With or without memorisation stop switch • **[No]** n o: ***No***, no memorisation of limit switch • **[Yes]** y E S: ***Yes***, memorisation of limit switch		
[Priority restart] P r S t ★	—	**[No]** n o
Priority restart This parameter can be accessed if at least one limit switch or one sensor has been assigned. Priority given to the starting even if switch stop is activated. • **[No]** n o: ***No***, no priority restart if stop switch is activated • **[Yes]** y E S: ***Yes***, priority to restart even if stop switch is activated		

HMI label	Settings	Factory setting
This parameter is forced to **[No]** nO if **[Memo Stop]** MSTP is set to **[Yes]** YES.		
[Memo Slowdown] MSLo ★	—	**[Yes]** YES
Memo slowdown Slowdown switch memorization. This parameter can be accessed if at least one limit switch or one sensor has been assigned. • **[No]** nO: ***No***, no memorization of the slowdown switch. • **[Yes]** YES: ***Yes***, memorization of the slowdown switch. This parameter is forced to **[No]** nO if **[Memo Stop]** MSTP is set to **[Yes]** YES.		

★ : 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.

[Parameters switching] n L P —

Introduction

A set of 1 to 15 parameters from the **[Settings]** S E t — menu **[Settings]** S E t - parameters, page 104 can be selected and 2 or 3 different values assigned. These 2 or 3 sets of values can then be switched using 1 or 2 logic inputs or control word bits. This switching can be performed during operation (motor running).
It can also be controlled on the basis of 1 or 2 frequency thresholds, whereby each threshold acts as a logic input (0 = threshold not reached, 1 = threshold 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
Input LI or bit or frequency threshold 2 values	0	1	0 or 1
Input LI or bit or frequency threshold 3 values	0	0	1

NOTE: Do not modify the parameters in the **[Settings]** S E t — menu, because any modifications made in this menu (**[Settings]** S E t —) is lost on the next power-up. The parameters can be adjusted during operation in the **[Parameters switching]** n L P — menu, on the active configuration.

NOTE: Parameter set switching cannot be configured from the integrated display terminal.

Parameters can only be adjusted on the integrated display terminal if the function has been configured previously via the graphic display terminal, by PC Software or via the bus or communication network. If the function has not been configured, the **[Parameters switching]** n L P — menu and the **[Set 1]** P S 1 —, **[Set 2]** P S 2 —, **[Set 3]** P S 3 — submenus do not appear.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[Parameters switching]** NLP

Parameters list

HMI label	Settings	Factory setting
[Parameters switching] NLP —		
[2 Parameter sets] CHA1	—	**[No]** no
Parameter set sel 1 Switching 2 parameter sets. • **[No]** no: ***No***, not assigned • **[Mot Freq High Thd]** FTA: ***Motor frequency high threshold reached***, switching via **[Motor Freq Thd]** FTd • **[Mot Freq High Thd 2]** F2A: ***Motor frequency high threshold 2 reached***, switching via **[Freq. threshold 2]** F2d • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[3 Parameter sets] CHA2	—	**[No]** no
Parameter set sel 2 Identical to **[2 Parameter sets]** CHA1. Switching 3 parameter sets. **NOTE:** To obtain 3 parameter sets, **[2 Parameter sets]** CHA1 must also be configured.		
[Parameter Selection] SPS	—	—
This parameter can only be accessed on the graphic display terminal if **[2 Parameter sets]** CHA1 is not set to **[No]** no. Making an entry in this parameter opens a window containing all the adjustment parameters that can be accessed. Select 1 to 15 parameters using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT. Example: PARAMETER SELECTION SETTINGS Ramp increment ✓ -------- -------- --------✓		
[Set 1] PS1 — ★ ()		
This parameter can be accessed if at least 1 parameter has been selected in **[Parameter Selection]** SPS. Making an entry in this parameter opens a settings window containing the selected parameters in the order in which they were selected.		

HMI label	Settings	Factory setting

With the graphic display terminal:

RDY	Term	+0.0 Hz	0.0 A
SET1			
Acceleration :			9.51 s
Deceleration :			9.67 s
Acceleration 2 :			12.58 s
Deceleration 2 :			13.45 s
Begin Acc round :			2.3 s
Code			Quick

ENT →

RDY	Term	+0.0 Hz	0.0 A
Acceleration			
		9.51 s	
Min = 0.1			Max = 999.9
	<<	>>	Quick

With the integrated display terminal:

Proceed as in the Settings menu using the parameters that appear.

- **[Parameter Set 1 Value 1]** S 1 0 1: ***Parameter set 1 value 1***

...

- **[Parameter Set 1 Value 15]** S 1 1 5: ***Parameter set 1 value 15***

[Set 2] P S 2 — ★ ()

This parameter can be accessed if at least 1 parameter has been selected in **[Parameter Selection]** S P S.

Identical to **[Set 1]** P S 1 —.

- **[Parameter Set 2 Value 1]** S 2 0 1: ***Parameter set 2 value 1***

...

- **[Parameter Set 2 Value 15]** S 2 1 5: ***Parameter set 2 value 15***

[Set 3] P S 3 — ★ ()

This parameter can be accessed if **[3 Parameter sets]** C H A 2 is not **[No]** n o and if at least 1 parameter has been selected in **[Parameter Selection]** S P S.

Identical to **[Set 1]** P S 1 —.

- **[Parameter Set 3 Value 1]** S 3 0 1: ***Parameter set 3 value 1***

...

- **[Parameter Set 3 Value 15]** S 3 1 5: ***Parameter set 3 value 15***

★ : 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.

() : Setting of this parameter can be done during operation or when stopped.

NOTE: We recommend that a parameter set switching test is carried out while stopped and a check is made to verify that it has been performed correctly.

Some parameters are interdependent and in this case may be restricted at the time of switching. Interdependencies between parameters must be respected, **even between different sets**.

Example: The highest **[Low Speed]** L S P must be below the lowest **[High Speed]** H S P.

[Multimotors config] MMC —

Motor or configuration switching

[Multimotors config] MMC —

The drive may contain up to 3 configurations, which can be saved using the **[Factory settings]** FCS — menu , page 90.
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 (drive locked). If a switching request is sent during operation, it is not 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 drive 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 modules). If you do not to follow this instruction, the drive locks on an **[Incorrect Config]** CFF state.

Menus and parameters switched in multimotor mode

- **[Settings]** SET —
- **[Motor control]** drC —
- **[Inputs / Outputs]** I_O —
- **[Command]** CTL —
- **[Application function]** FUN — with the exception of the **[Multimotors config]** MMC — function (to be configured once only)
- **[FAULT MANAGEMENT]** FLT —
- **[My menu]** MYMN —
- **[USER CONFIG.]**: The name of the configuration specified by the user in the **[Factory settings]** FCS — menu

Menus and parameters switched in multiconfiguration mode

As in multimotor mode, except for the motor parameters that are common to the 3 configurations:

- Rated current
- Thermal current
- Rated voltage
- Rated frequency
- Rated speed
- Rated power
- IR compensation
- Slip compensation

- Synchronous motor parameters
- Type of thermal protection
- Thermal state
- The auto-tuning parameters and motor parameters that can be accessed in expert mode
- Type of motor control

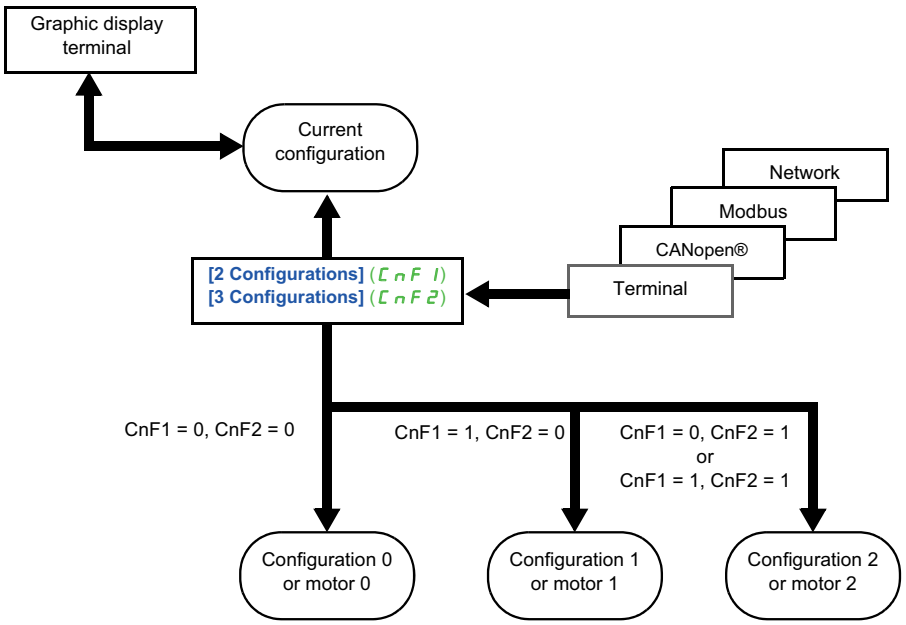
NOTE: No other menus or parameters can be switched.

Transfer of a drive configuration to another one, with graphic display terminal, when the drive uses [Multimotors config] MMC — function

Let A be the source drive and B the drive addressed. In this example, switching is controlled by logic input.

1. Connect graphic display terminal to the drive A.
2. Put logic input LI (**[2 Configurations]** CNF 1) and LI (**[3 Configurations]** CNF 2) to 0.
3. Download configuration 0 in a file of graphic display terminal (example: file 1 of the graphic display terminal).
4. Put logic input LI (**[2 Configurations]** CNF 1) to 1 and leave logic input LI (**[3 Configurations]** CNF 2) to 0.
5. Download configuration 1 in a file of graphic display terminal (example: file 2 of the graphic display terminal).
6. Put logic input LI (**[3 Configurations]** CNF 2) to 1 and leave logic input LI (**[2 Configurations]** CNF 1) to 1.
7. Download configuration 2 in a file of graphic display terminal (example: file 3 of the graphic display terminal).
8. Connect graphic display terminal to the drive B.
9. Put logic input LI (**[2 Configurations]** CNF 1) and LI (**[3 Configurations]** CNF 2) to 0.
10. Make a factory setting of the drive B.
11. Download the configuration file 0 in the drive (file 1 of graphic display terminal in this example).
12. Put logic input LI (**[2 Configurations]** CNF 1) to 1 and leave logic input LI (**[3 Configurations]** CNF 2) to 0.
13. Download the configuration file 1 in the drive (file 2 of graphic display terminal in this example).
14. Put logic input LI (**[3 Configurations]** CNF 2) to 1 and leave logic input LI (**[2 Configurations]** CNF 1) to 1.
15. Download the configuration file 2 in the drive (file 3 of graphic display terminal in this example).

NOTE: Steps 6, 7, 14 et 15 are necessary only if **[Multimotors config]** MMC — function is used with 3 configurations or 3 motors.

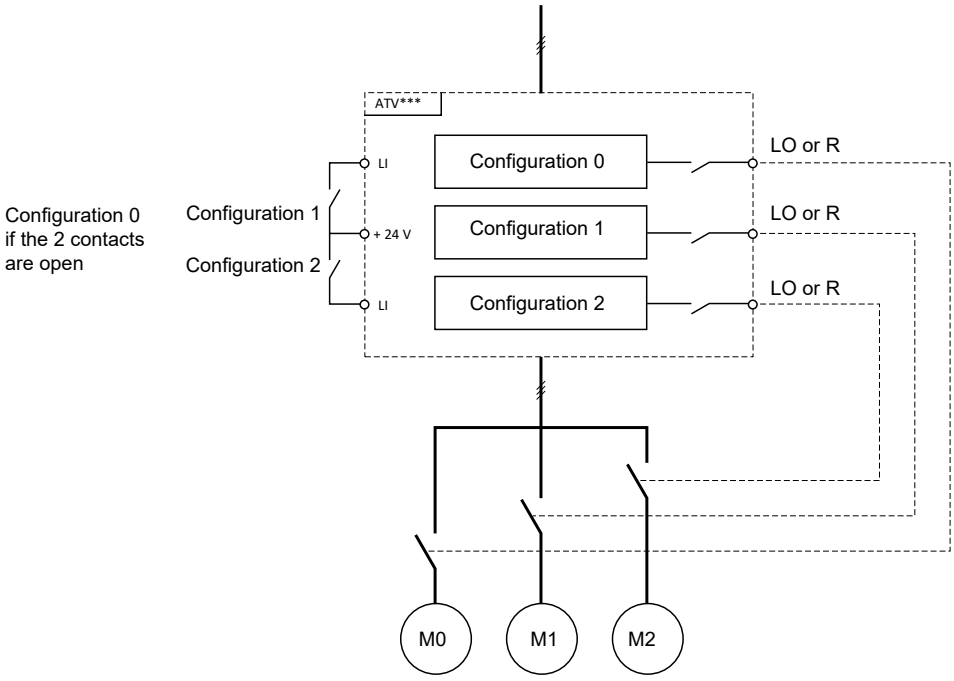


Switching command

Depending on the number of motors or selected configurations (2 or 3), the switching command is sent using one or two logic inputs. The table below lists the possible combinations.

LI 2 motors or configurations	LI 3 motors or configurations	Number of configurations or active motors
0	0	0
1	0	1
0	1	2
1	1	2

Schematic diagram for multimotor mode



Auto-tuning in multimotor mode

On Multi-Motor mode, autotuning parameters for each motor are handled and stored. However, it is necessary to firstly perform autotuning on each motor. This auto-tuning can be performed:

- Manually using a Digital input when the motor changes.
- Automatically on the selected motor at drive power-up if the **[Automatic autotune]** A u t on is set to **[Yes]** Y E S.

Motor thermal states in multimotor mode

The drive helps to protect the three motors individually. Each thermal state takes into account all stop times, if the drive power is not switched off.

NOTICE
MOTOR OVERHEATING When the drive is switched off, the thermal states of the connected motors are not saved. When the drive is switched on again, the drive is not aware of the thermal states of the connected motors. • Use separate temperature sensors for each connected motor for thermal monitoring. **Failure to follow these instructions can result in equipment damage.**

Configuration information output

In the **[Inputs / Outputs]** I _ O — menu, a logic output can be assigned to each configuration or motor (2 or 3) for remote information transmission.

NOTE: As the **[Inputs / Outputs]** I _ O — menu is switched, these outputs must be assigned in all configurations in which information is required.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUn ➜ **[Multimotors config]** MMC

Parameters list

HMI label	Settings	Factory setting
[Multimotors config] MMC —		
[Multimotors] CHM	—	**[No]** no
Multimotors selection		

NOTICE

MOTOR OVERHEATING

When the drive is switched off, the thermal states of the connected motors are not saved. When the drive is switched on again, the drive is not aware of the thermal states of the connected motors.

- Use separate temperature sensors for each connected motor for thermal monitoring.

Failure to follow these instructions can result in equipment damage.

Switching 2 parameter sets.

- **[No]** no: ***No***, multiconfiguration possible
- **[Yes]** YES: ***Yes***, multimotor possible

[2 Configurations] CNF1	—	**[No]** no
2 configurations assignt.		

Switching of 2 motors or 2 configurations.

- **[No]** no: ***No***, no switching
- **[DI1]** LI1: ***Digital input 1***
- **[...] ...**: See the assignment conditions

(**[CD00]** CD00 up to **[CD15]** CD15, **[C101]** C101 up to **[C110]** C110, **[C201]** C201 up to **[C210]** C210 and **[C301]** C301 up to **[C310]** C310 are not available).

[3 Configurations] CNF2	—	**[No]** no
3 configurations assignt.		

Switching of 3 motors or 3 configurations.

Identical to **[2 Configurations]** CNF1.

NOTE: To obtain 3 motors or 3 configurations, **[2 Configurations]** CNF1 must also be configured.

[Autotuning by DI] t n L —

Access

Parameters described below can be accessed by: **[Drive menu]** d r i ➜ **[Configuration]** C o n F ➜ **[Full]** F u L L ➜ **[Application function]** F u n ➜ **[Autotuning by DI]** t n L

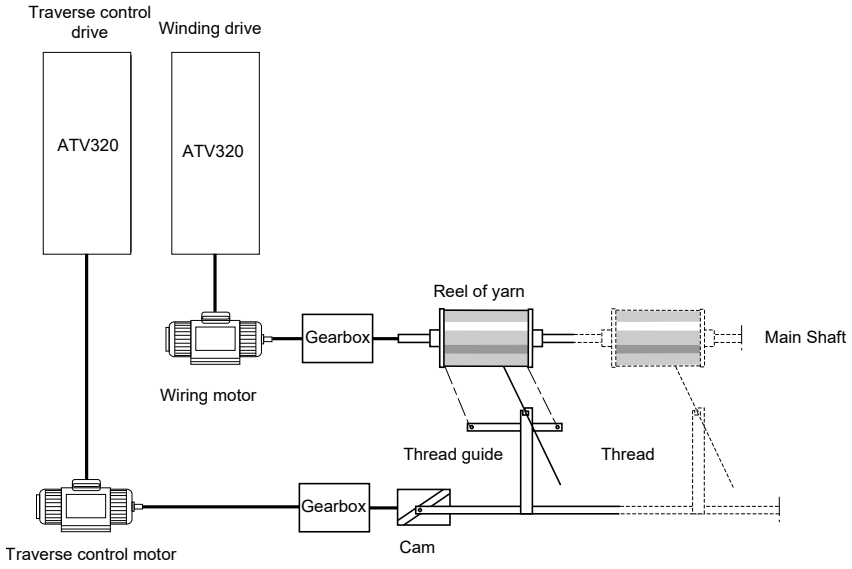
Parameters list

HMI label	Settings	Factory setting
[Autotuning by DI] t n L —		
[Autotuning Assign] t u L	—	**[No]** n o
Autotuning input assignment Auto-tuning is performed when the assigned input or bit changes to 1. **NOTE:** Auto-tuning causes the motor to start up. • **[No]** n o: ***No***, not assigned • **[DI1]** L i 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		

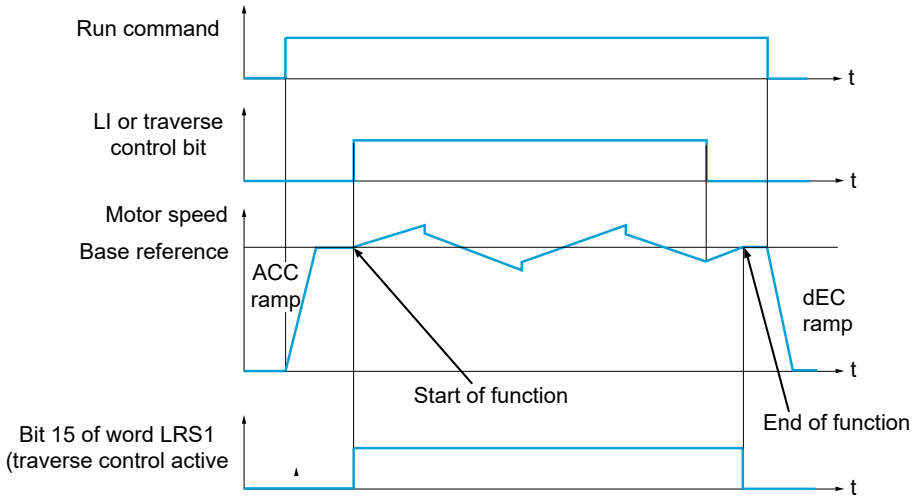
[Traverse control] trO —

Traverse Control

Function for 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:



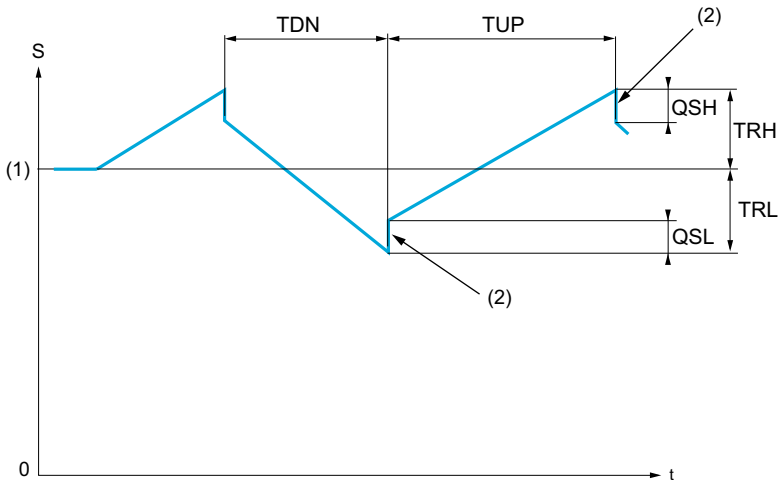
The function starts when the drive has reached its base reference and the traverse control command has been enabled.

When the traverse control command is disabled, the drive returns to its base reference, following the ramp determined by the traverse control function. 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 diagram below:

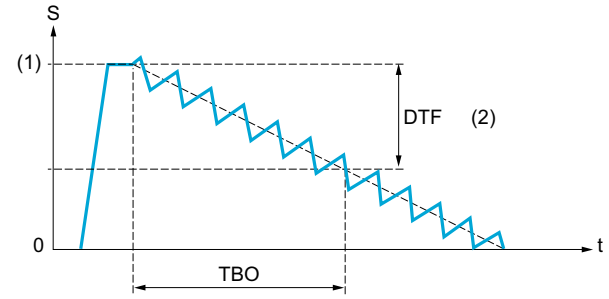
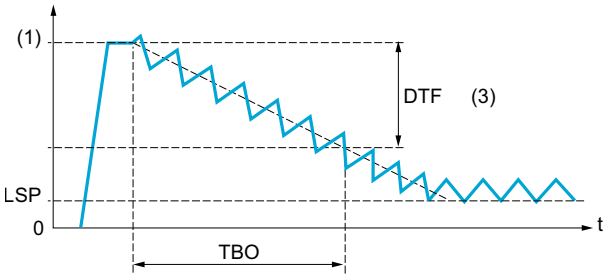


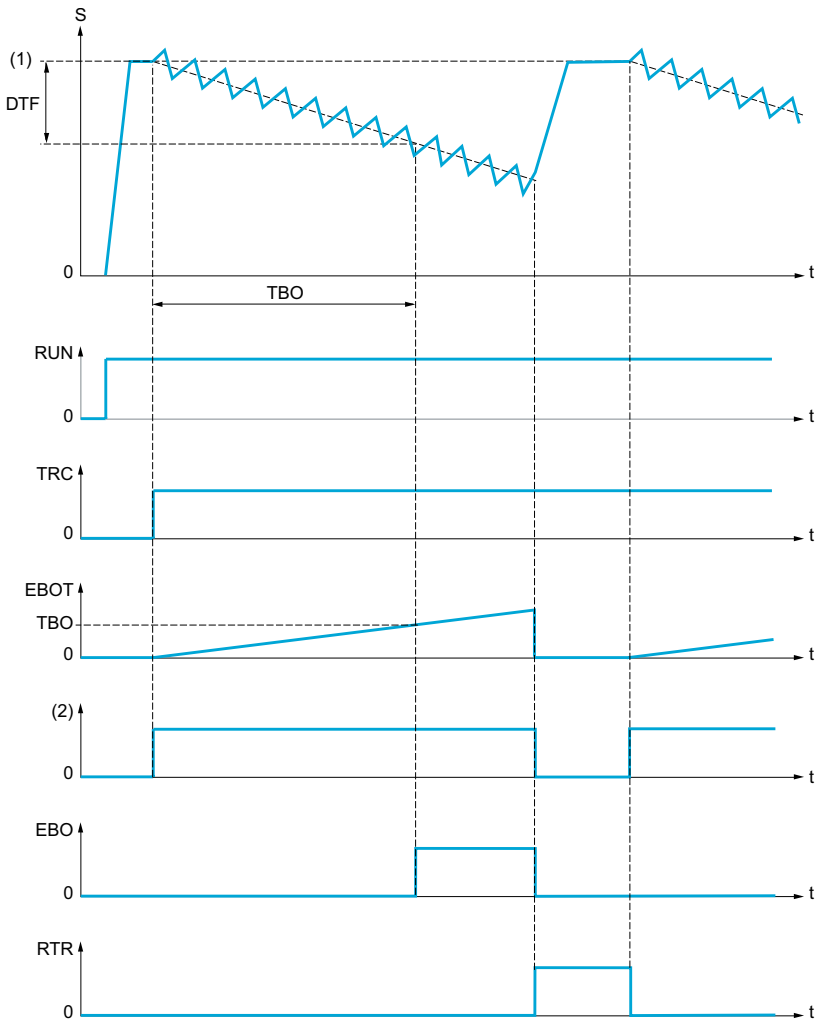
S: Motor speed

1. Base reference
2. Frequency jump

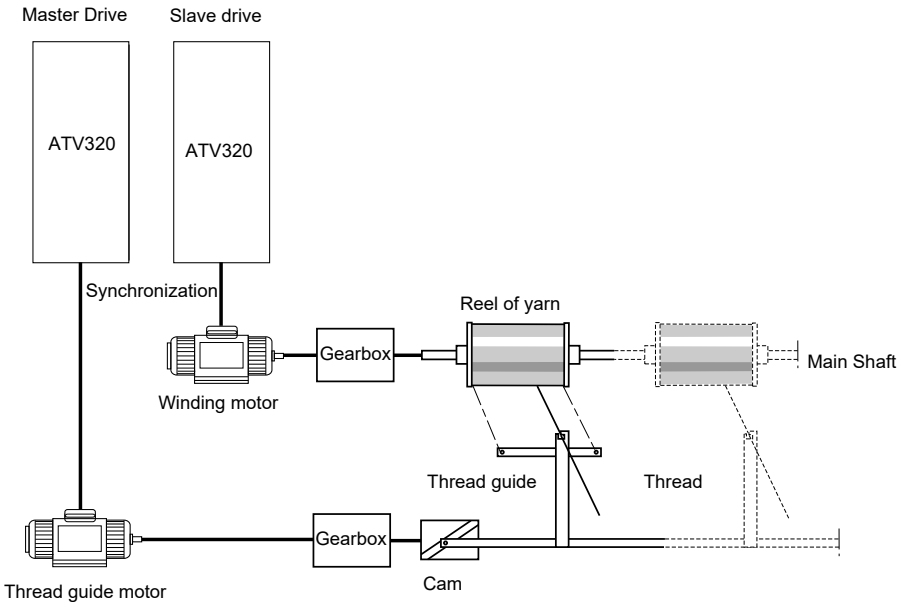
t r C	**[Yarn control]** t r C : Assignment of the traverse control command to a logic input or to a communication bus control word bit
t r H	**[Traverse freq. high]** t r H: in Hertz
t r L	**[Traverse freq. Low]** t r L : in Hertz
q S H	**[Quick step High]** q S H: in Hertz
q S L	**[Quick step Low]** q S L : in Hertz
t u P	**[TraverseCtrl Acc]** t u P: time, in seconds
t d n	**[Traverse ctrl. decel]** t d n: time, in seconds

Real parameters:

tbo	**[Reel time]** tbo: Time taken to make a reel, in minutes. This parameter is intended to signal the end of winding. When the traverse control operating time since 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 **[End reel]** Ebo has been assigned. The traverse control operating time **EBOT** can be monitored online by a communication bus.
dtF	**[Decrease Ref Freq]** dtF: Decrease in the base reference. In certain cases, the base reference has to be reduced as the reel increases in size. The **[Decrease Ref Freq]** dtF value 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 at 0, the speed reaches 0 Hz, the drive stops and must be reset by a new run command. If low speed **[Low Speed]** LSP is not 0, the traverse control function continues to operate above **[Low Speed]** LSP.   **S**: Motor speed 1. Base reference 2. LSP = 0 3. LSP > 0

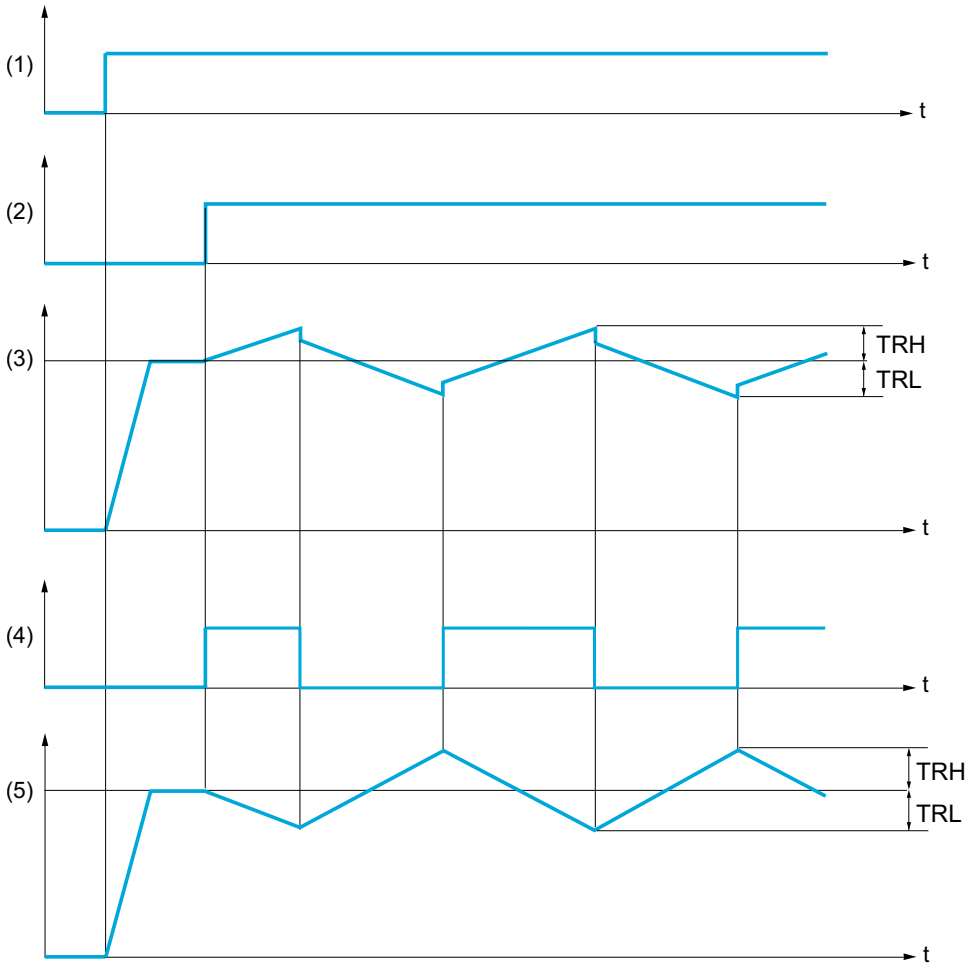
r t r	**[Traverse Ctrl OFF]** r t r : Reinitialize traverse control. This command can be assigned to a logic input or to a communication bus control word bit. It resets the **[End reel]** E b o alarm and the **EBOT** operating time to 0 and reinitializes the reference to the base reference. As long as **[Traverse Ctrl OFF]** r t r remains at 1, the traverse control function is disabled and the speed remains the same as the base reference. This command is used primarily when changing reels.  **S**: Motor speed 1. Base reference 2. Bit 15 of LRS1

Counter wobble



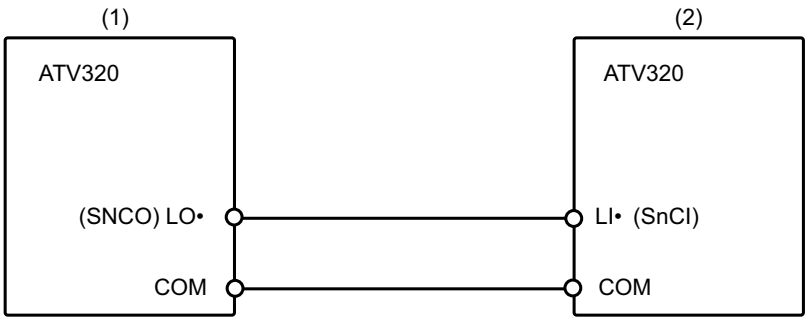
The Counter wobble function is used in certain applications to obtain a constant yarn tension when the Traverse control function is producing considerable variations in speed on the yarn guide motor **[Traverse freq. high]** ErH and **[Traverse freq. Low]** ErL , see **[Traverse freq. high]** ErH .

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 assigns the slave a speed profile, which is in antiphase to that of the master. This means that synchronization is required, using one of the master's logic outputs and one of the slave's logic inputs.



1. Run command on master and slave
2. Traverse control command on master and slave
3. Yarn guide motor speed (master drive)
4. tSY/SnC synchronization
5. Winding motor speed (slave drive)

Connection of synchronization I/O



1. Master drive
2. Slave drive

The starting conditions for the function are:

- Base speeds reached on both drives
- **[Yarn control]** t r C input activated
- Synchronization signal present

NOTE: The **[Quick step High]** 9SH and **[Quick step Low]** 9SL parameters should generally be kept at 0.

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUN ➡ **[Traverse control]** trO

Parameters list

HMI label	Settings	Factory setting
[Traverse control] trO —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in compatibility of functions .		
[Yarn control] trC	—	**[No]** no
Yarn control input The Traverse control cycle starts when the assigned input or bit changes to 1 and stops when it changes to 0. • **[No]** no: ***No***, function inactive, thereby helping to prevent access to other parameters • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Traverse freq. high] trH ★ (1)	0 to 10 Hz	4 Hz
Traverse frequency high		
[Traverse freq. Low] trL ★ (1)	0 to 10 Hz	4 Hz
Traverse frequency low		
[Quick step High] 9SH ★ (1)	0 to **[Traverse freq. high]** trH	0 Hz
Quick step high		
[Quick step Low] 9SL ★ (1)	0 to **[Traverse freq. Low]** trL	0 Hz
Quick step low		
[TraverseCtrl Acc] tUP ★	0.1 to 999.9 s	4 s
Traverse control acceleration		
[Traverse ctrl. decel] tdn ★	0.1 to 999.9 s	4 s
Traverse ctrl decel time		
[Reel time] tbo ★	0 to 9,999 min	0 min
Time to make a reel		
[End reel] Ebo ★	—	**[No]** no
End of reel The assigned output or relay changes to state 1 when the traverse control operating time reaches the **[Reel time]** tbo. • **[No]** no: ***No***, not assigned • **[R2]** r2: ***Relay R2***		

HMI label	Settings	Factory setting
• **[LO1]** L o 1: ***Logic output 1*** • **[DQ1]** d o 1: ***DQ1 digital output***, analog output AO1 functioning as a logic output. Selection can be made if **[AQ1 assignment]** A o 1 is set to **[No]** n o.		
[Counter wobble] S n C ★	—	**[No]** n o
Counter wobble synchronization To be configured on the winding drive (slave) only. • **[No]** n o: ***No***, function inactive, thereby helping to prevent access to other parameters • **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Sync. wobble] t S Y ★	—	**[No]** n o
Sync. wobble output To be configured on the yarn guide drive (master) only. • **[No]** n o: ***No***, function not assigned • **[LO1]** L o 1: ***Logic output 1*** • **[R2]** r 2: ***Relay R2*** • **[DQ1]** d o 1: ***DQ1 digital output***, analog output AO1 functioning as a logic output. Selection can be made if **[AQ1 assignment]** A o 1 is set to **[No]** n o.		
[Decrease Ref Freq] d t F ★ ( )	0 to 599 Hz	0 Hz
Decrease ref frequency, decrease in the base reference during the traverse control cycle.		
[Traverse Ctrl OFF] r t r ★	—	**[No]** n o
Traverse control disabled When the state of the assigned input or bit changes to 1, the traverse control operating time is reset to 0, along with **[Decrease Ref Freq]** d t F. • **[No]** n o: ***No***, function not assigned • **[DI1]** L I 1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		

(1) The parameter can also be accessed in the **[Settings]** S E t — menu.

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[High Speed Switching] CHS —

Access

Parameters described below can be accessed by: **[Drive menu]** drI ➜ **[Configuration]** CONF ➜ **[Full]** FULL ➜ **[Application function]** FUN ➜ **[High Speed Switching]** CHS

Parameters list

HMI label	Settings	Factory setting
[High Speed Switching] CHS —		
[2 High speed] SH2	—	**[No]** nO
2 high speed assign. • **[No]** nO: ***No***, function not assigned • **[Mot Freq High Thd]** FtA: ***Motor frequency high threshold reached*** • **[Mot Freq High Thd 2]** F2A: ***Motor frequency high threshold 2 reached*** • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[4 High speed] SH4	—	**[No]** nO
4 high speed assign. **NOTE:** To obtain 4 High speed, **[2 High speed]** SH2 must also be configured. Identical to **[2 High speed]** SH2 .		
[High Speed] HSP	0 to 599 Hz	50 Hz
High speed Motor frequency at maximum reference, can be set between **[Low Speed]** LSP and **[Max Frequency]** tFr . The factory setting changes to 60 Hz if **[Motor Standard]** bFr is set to **[60 Hz]** 60. To help prevent detected **[Motor Overspeed]** SOF error, it is recommended to have **[Max Frequency]** tFr equal to or higher than 110% of **[High Speed]** HSP.		
[High speed 2] HSP2 ★	0 to 599 Hz	50 Hz
High speed 2 Visible if **[2 High speed]** SH2 is not set to **[No]** nO. Identical to **[High Speed]** HSP .		
[High speed 3] HSP3 ★	0 to 599 Hz	50 Hz
High speed 3 Visible if **[4 High speed]** SH4 is not set to **[No]** nO. Identical to **[High Speed]** HSP .		
[High speed 4] HSP4 ★	0 to 599 Hz	50 Hz
High speed 4 Visible if **[4 High speed]** SH4 is not set to **[No]** nO. Identical to **[High Speed]** HSP .		

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

[DC bus] dCC —

Access

Parameters described below can be accessed by: **[Drive menu]** dr1 ➡ **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[DC bus]** dCC

Parameters list

HMI label	Settings	Factory setting
[DC bus] dCC —		
[DC Bus chaining] dCCM	—	**[No]** no
DC Bus chaining mode • **[No]** no: ***No***, not assigned • **[Bus & Mains]** MAin: ***Bus and Mains***, the drive is supplied by both DC Bus and supply mains. • **[Only Bus]** bus: ***Only Bus***, the drive is supplied by DC Bus only. **⚠⚠DANGER** **GROUND FAULT MONITORING DISABLED, NO ERROR DETECTION** Setting this parameter to Main deactivates ground fault monitoring. • Only use this parameter after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application. • Implement alternative ground fault monitoring functions that do not trigger automatic error responses of the drive, but allow for adequate, equivalent responses by other means in compliance with all applicable regulations and standards as well as the risk assessment. • Commission and test the system with ground fault monitoring enabled. • During commissioning, verify that the drive and the system operate as intended by performing tests and simulations in a controlled environment under controlled conditions. **Failure to follow these instructions will result in death or serious injury.**		
[DC Bus compat.] dCCC ★	—	**[Altivar]** ATV
DC Bus compatibility Visible if **[DC Bus chaining]** dCCM above is not set to **[No]** no. **[Altivar]** ATV: Only ATV 320 drives are on the DC Bus chain. **[Lexium]** LHM: At least one Lexium 32 drive is on the DC Bus chain. • For ATV•••M2 or ATV320•••M3 or ATV320•••S6, not depending on **[DC Bus compat.]** dCCC the parameters **[Mains voltage]** urES, **[Braking level]** Vbr are forced to their default value. • For ATV•••N4, if **[DC Bus compat.]** dCCC is set to **[Altivar]** ATV the parameters **[Mains voltage]** urES, **[Braking level]** Vbr are forced to their default value. • For ATV•••N4, if **[DC Bus compat.]** dCCC is set to **[Lexium]** LHM, **[Mains voltage]** urES is forced to its default value, **[Braking level]** Vbr is forced to 780 Vdc and the drive triggers in **[Overbraking level]** VobF at a DC Bus level of 820 Vdc instead of 880 Vdc to be compatible with Lexium 32 drives.		
[InPhaseLoss Assign] iPL ★	—	According to drive rating.
Input Phase Loss assignment, drive behaviour in case of input phase loss detected error. Cannot be accessed if drive rating is ATV•••M2.		

HMI label	Settings	Factory setting
Visible if **3.1 [Access Level]** LAC is set to **[Expert]** EPR and **[DC Bus chaining]** dCCN above is set to **[No]** nO. • **[Ignore]** nO: ***Ignore***, detected error ignored • **[Freewheel Stop]** YES: ***Freewheel stop***, detected error with freewheel stop **[Input phase loss]** IPL is forced to **[Ignore]** nO if **[DC Bus chaining]** dCCN above is set to **[Only Bus]** bUS . (See **[Input phase loss]** IPL in the Programming Manual (DRI- > CONF > FULL > FLT- > IPL-).		
[Ground short circuit] SCL3 ★	—	**[Freewheel Stop]** YES

Ground short circuit detection

Can be accessed for drives rating ATV320U55••• … D15•••.

Visible if **3.1 [Access Level]** LAC is set to **[Expert]** EPR and **[DC Bus chaining]** dCCN above is set to **[No]** nO.

- **[Ignore]** nO: ***Ignore***, detected error ignored
- **[Freewheel Stop]** YES: ***Freewheel stop***, detected error with freewheel stop

[Ground short circuit] SCL3 is forced to **[Ignore]** nO for ATV320U55••• … D15••• drives if **[DC Bus chaining]** dCCN above is set to **[Bus & Mains]** MAIn.

NOTE: if **[Ground short circuit]** SCL3 is set to **[Ignore]** nO, integrated safety functions (except Safe Torque Off) for ATV320U55••• … D15••• drives cannot be used, otherwise the drive triggers in **[Safety Function Error]** SAFF state.

⚠⚠DANGER

GROUND FAULT MONITORING DISABLED, NO ERROR DETECTION

Setting this parameter to **[Ignore]** NO deactivates ground fault monitoring.

- Only use this parameter after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Implement alternative ground fault monitoring functions that do not trigger automatic error responses of the drive, but allow for adequate, equivalent responses by other means in compliance with all applicable regulations and standards as well as the risk assessment.
- Commission and test the system with ground fault monitoring enabled.
- During commissioning, verify that the drive and the system operate as intended by performing tests and simulations in a controlled environment under controlled conditions.

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

[Mains voltage] UrES ★	According to drive voltage rating	According to drive voltage rating

Evacuation mains voltage

Visible if **3.1 [Access Level]** LAC is set to **[Expert]** EPR and **[DC Bus chaining]** dCCN above is set to **[No]** nO.

For ATV320•••M2• or ATV320•••M3•:

- **[200 Vac]** 200: 200 Volts AC
- **[220 Vac]** 220: 220 Volts AC
- **[230 Vac]** 230: 230 Volts AC
- **[240 Vac]** 240: 240 Volts AC (factory setting)
- **[Lexium]** LHM: **[Mains voltage]** UrES, **[Undervoltage level]** USL, **[Braking level]** Vbr are forced to their default value.

For ATV320•••N4•:

- **[380 Vac]** 380: 380 Volts AC
- **[400 Vac]** 400: 400 Volts AC
- **[460 Vac]** 460: 460 Volts AC

HMI label	Settings	Factory setting
• **[500Vac]** 500: 500 Volts AC (factory setting) • **[Lexium]** LHM: **[Mains voltage]** urES, **[Undervoltage level]** USL are forced to their default value, **[Braking level]** Vbr is forced to 780 Vdc and the drive triggers in **[Overbraking level]** VobF at a DC Bus level of 820 Vdc instead of 880 Vdc. For ATV320•••S6•: • **[525 Vac]** 525: 525 Volts AC • **[600 Vac]** 600: 600 Volts AC (factory setting) • **[Lexium]** LHM: **[Mains voltage]** urES, **[Undervoltage level]** USL , **[Braking level]** Vbr are forced to their default value.		
[Undervoltage level] USL ★	100 to 304 Vac	According to drive rating

Undervoltage level

Visible if 3.1 **[Access Level]** LAC is set to **[Expert]** EPr .

The factory setting is the maximal value of the adjustment range (see the table below).
The adjustment range is determined by the the following table:

		Adjustment range		
		Minimum Value		
Drive voltage rating	[Mains voltage] (urES)	[DC-Bus chaining] (dCCM) = [No] (nO)	[DC-Bus chaining] (dCCM) = [MAin](Bus & Main) or [buS] (Only Bus)	**Maximum value**
ATV320•••M2• ATV320•••M3•	[200V ac] (200)	100 Vac	100 Vac	141 Vac
	[220V ac] (220)	120 Vac		
	[230V ac] (230)	131 Vac		
	[240V ac] (240) or [Lexium] (LHM)	141 Vac		
ATV320•••N4•	[380V ac] (380)	190 Vac	190 Vac	276 Vac
	[400V ac] (400)	204 Vac		
	[440V ac] (440)	233 Vac		
	[460V ac] (460)	247 Vac		
	[500V ac] (500) or [Lexium] (LHM)	276 Vac		
ATV320•••S6•	[525V ac] (525)	266 Vac	266 Vac	304 Vac
	[600V ac] (600) or [Lexium] (LHM)	304 Vac		

This parameter is also visible in (DRI- > CONF > FULL > FLT- > USB-).

HMI label	Settings	Factory setting
[Braking level] Vbr ★ (↻)	335 to 995 Vdc	According to drive rating

Braking level

Visible if 3.1 **[Access Level]** LAC is set to **[Expert]** EPr .

The factory setting is determined by the drive voltage rating :

- For ATV320●●●M2● : 395 Vdc
- For ATV320●●●M3● : 395 Vdc
- For ATV320●●●N4● : 820 Vdc
- For ATV320●●●S6● : 995 Vdc

The adjustment range is determined by the the following table:

		Adjustment range	
Drive voltage rang	[Mains voltage](urES)	minimum value	maximal value
ATV320●●●M2● ATV320●●●M3●	[200V ac] (200)	335 Vdc	395 Vdc
	[220V ac] (220)	365 Vdc	
	[230V ac] (230)	380 Vdc	
	[240V ac] (240) or [Lexium] (LHM)	395 Vdc	
ATV320●●●N4●	[380V ac](380)	698 Vdc	820 Vdc
	[400V ac](400)	718 Vdc	
	[440V ac](440)	759 Vdc	
	[460V ac](460)	779 Vdc	
	[500V ac](500)	820 Vdc	
	[Lexium](LHM)	780 Vdc	780 Vdc
ATV320●●●S6●	[525V ac](525)	941 Vdc	995 Vdc
	[600V ac](600) or [Lexium] (LHM)	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.

(↻) : Setting of this parameter can be done during operation or when stopped.

[Time delay control] t d C –

In the case of configuring translational movement, refer to hoisting note : Altivar Application Note for Hoisting (NHA80973).

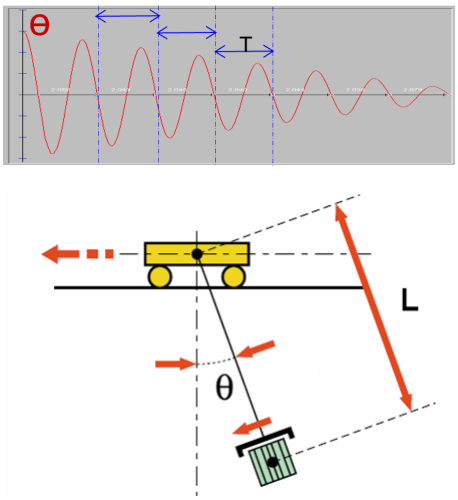
About [Time delay control] t d C

The main goal of this function is to assist the operator in correcting the load sway of the crane. The function uses knowledge of pendulum movement to correct the drive's acceleration and deceleration, ensuring smooth movements and avoiding load sway.

During trolley or translation movement, the load which is suspended tends to sway. The swaying may cause damage to the load or surrounding structures. The swaying can additionally increase the time required by the operator to adjust the load to the correct position when setting it down.

The function is to reduce the sway oscillation frequency generated by the speed variation for a fixed cable length without any supplementary sensor on the crane.

The sway effect implies a periodic movement following the pendulum formula.



$T = 2\pi\sqrt{(L/g)}$

T: Oscillating period

L: Length of the pendulum (variable)

g: Gravity of the earth (~ 9.81 m/s²)

θ: Angle between the cable and the vertical axis

The load mass does not affect the computation of the periodic movement of the pendulum.

To avoid load oscillations, the **[Time delay control]** t d C goal is to minimize theta (θ) as much as possible.

Advantages and Limitations

Advantages of the function **[Time delay control]** t d C are:

- Cost-effectiveness: Cost effective compared to advanced control system based on PLCs communication and speed drives centric architecture.
- Ease to use: This function uses the minimum possible number of parameters and works without external anti-sway sensors and trolley.
- Increased Machine Life Cycle: Less sway means less mechanical shock and stress on the crane mechanism and structure.

Limitations:

- For indoor operation only : This function should not be used on an outdoor machine because it does not compensate the effect of the wind.
- No movement at start-up.

- **No modification of the length (L) during the movement.**
- No compatibility with **[Positioning by sensors]** LPO.

⚠WARNING

LOSS OF CONTROL

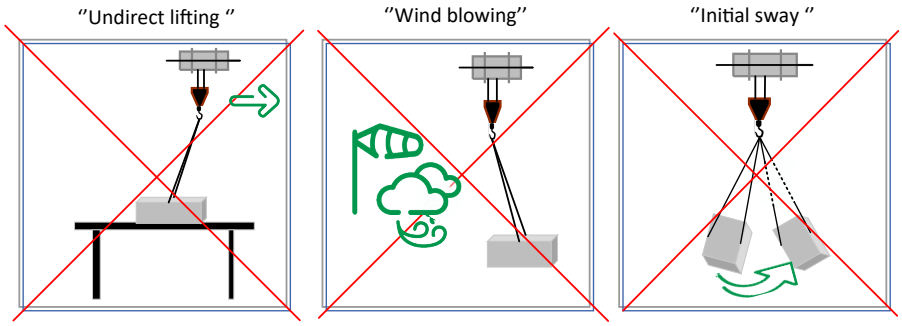
Never use the **[Time delay control]** and **[Positioning by sensors]** functions together.

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

It is important that you should have the same length of the cable in the launch and the end of the movement operation.

NOTE:

- As a consequence of the **[Time delay control]** TDC function, stop order induces longer delays before the motor completely stops.
- To ensure the good operation of the function, we must complete the whole **[TDC Acceleration]** ACCT and **[TDC Deceleration]** dECT ramps.



⚠WARNING

UNCONTROLLED MOVEMENT OF THE TROLLEY

- Only start the machine/process if there are no personnel or obstructions in the operational zone.
- Ensure that the limitations for the Time Delay function are followed as outlined in the document.
- Only make modifications if you fully understand their effects, including parameter values, settings, configurations, and hardware changes.
- Verify the correct operation and effectiveness of the Time Delay function by conducting comprehensive tests for all operating states, the defined safe state, and all potential error scenarios.

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

Access

Parameters described below can be accessed by: **[Configuration]** CONF ➡ **[Full]** FULL ➡ **[Application function]** FUn ➡ **[Time delay control]** tdC

NOTE:

- The access level required to access this menu must be standard or higher.
- The **[Time delay control]** tdC function only works with a command coming from the terminal.
- The **[Time delay control]** tdC parameters can be modified with HMI only if the function is activated, but the configuration with the modified parameters can be transferred to a drive where the function is not activated.

Parameters of the function

HMI label	Settings	Factory setting
[TDC Assignment] tdCA	—	**[Not Assigned]** nO
Time delay control assignment. • **[Not Assigned]** nO: Not active • **[Yes]** YES: Active • **[DI1]** LI1...**[DI6]** LI6: Assigned to logical input LI1…LI6 • **[DAI1]** LAI1: Logical input AI1 • **[DAI2]** LAI2: Logical input AI2 • **[CD11]**Cd11…**[CD15]**Cd15: Virtual logical input CMD.11…CD15 • **[C111]**C111…**[C115]**C115: Virtual logical input CMD1.11…CMD1.15 • **[C211]**C211…**[C215]**C215: Virtual logical input CMD2.11…CD2.15		
[TDC Activate Freq] tCSH	0 to 599 Hz	0 Hz
Time delay control activation frequency during ACC (No limitation by LSP or HSP).		
[TDC Deactivate Freq] tCSL	0 to 599 Hz	0 Hz
Time delay control deactivation frequency during DEC (No limitation by LSP or HSP).		
[TDC Rope Length] tdCL	0 to 20 m	0 m
Time delay control wire rope length (in 0,1 m).		
[TDC Acceleration] ACCt	1 to 999,9 s	5 s
Time delay control acceleration ramp time, acceleration time between 0 and FRS.		
[TDC Deceleration] dECt	1 to 999,9 s	5 s
Time delay control deceleration ramp time, deceleration time between FRS and 0.		
[Deceleration] dEC	1 to 999,9 s	3 s
Deceleration ramp time, deceleration time between FRS and 0.		
[TDC Pendul. Period] tdCP	0 to 10000 ms	0 ms
Time delay control pendulum time period (in ms)		
[TDC Spd Damp Coef] tdCr	0 to 100%	50%
Time delay control speed damping coefficient in %)		
[TDC Min Ramp Time] rNPN	0 to 6553,5 s	-
Time delay control minimum ramp time, minimum ACC and DEC possible value.		

HMI label	Settings	Factory setting
[TDC State] t d C n	0 to 65535	-
Time delay control state.		

Communication Parameters

HMI label	Logic address	CANopen address
[TDC Assignment] t d C A	29300	16#2107/1
[TDC Activate Freq] t C S H	29301	16#2107/2
[TDC Deactivate Freq] t C S L	29302	16#2107/3
[TDC Rope Length] t d C L	29303	16#2107/4
[TDC Acceleration] A C C t	29305	16#2107/6
[TDC Deceleration] d E C t	29306	16#2107/7
[TDC Min Ramp Time] r n P n	29322	16#2107/17
[TDC Pendul. Period] t d C P	29307	16#2107/8
[TDC Spd Damp Coef] t d C r	29308	16#2107/9
[TDC State] t d C n	29321	16#2107/16

Monitoring parameters

[Time delay control] t d C can be assigned to:

- **[DQ1]** d o 1, **[R1]** r 1 and **[R2]** r 2.
- **[OL01]** o L 0 1…**[OL10]** o L 1 0: Functions blocks: Logical Output 01…10

The output is active as long as the algorithm of this function is processing.

Parameter Description

[TDC Activate Freq] t C S H

HMI label	Settings	Factory setting
[TDC Activate Freq] t C S H	0 to 599 Hz	0 Hz
Time delay control activation frequency during acceleration (No limitation by LSP or HSP).		

[TDC Activate Freq] t C S H is the speed threshold from which TDC function can be activated along with the specific deceleration ramp set within TDC. If this threshold is not reached, then the motor stops according to the deceleration ramp **[Deceleration]** d E C set in the drive.

NOTE: If you want to avoid to enable TDC algorithm on a positioning movement, this parameter must be set to a higher value than the positioning speed value.

Setting this parameter ensures greater reactivity during short-distance crane movements.

[Time delay control] t d C is always activated during acceleration (with ramp time defined by **[TDC Acceleration]** A C C t)

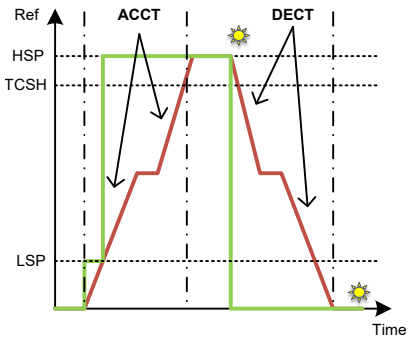
On a stop order:

- Case 1: If the speed reference is greater than **[TDC Activate Freq]** t C S H, then **[Time delay control]** t d C is activated during deceleration.

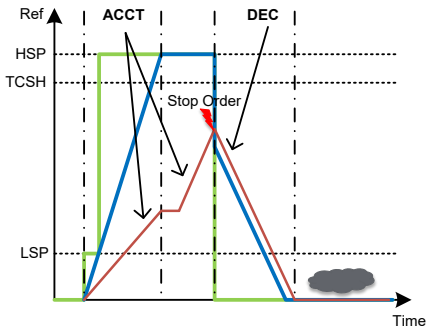
  (**[TDC Deceleration]** d E C t is the deceleration time from FRS to 0 in case of asynchronous motor and from FRSS to 0 in synchronous motor).
- Case 2: If the speed reference is lower than **[TDC Activate Freq]** t C S H, then **[Time delay control]** t d C is not activated during deceleration.

  (**[Deceleration]** d E C deceleration time from FRS to 0 in case of asynchronous motor and from FRSS to 0 in synchronous motor).

Example for case 1



Example for case 2



Ramp without TDC

Speed set point

Ramp with TDC

HSP : **[High Speed]**

LSP : **[Low Speed]**

DECT : **[TDC Deceleration]**

DEC : **[Deceleration]**

[TDC Deactivate Freq] t C S L

HMI label	Settings	Factory setting
[TDC Deactivate Freq] t C S L	0 to 599 Hz	0 Hz
Time delay control deactivation frequency during deceleration (No limitation by LSP or HSP).		

It is the speed threshold from which the **[Time delay control]** t d C function is deactivated. This threshold determine whether you want a TDC-controlled stop or a standard stop. If the speed is higher than **[TDC Deactivate Freq]** t C S L , you have a TDC stop, otherwise you have a standard stop.

NOTE: If you want to avoid to enable TDC algorithm on a positioning movement, this parameter must be set to a higher value than the positioning speed value.

[Time delay control] t d C is always activated during acceleration (with ramp time defined by **[TDC Acceleration]** A C C t).

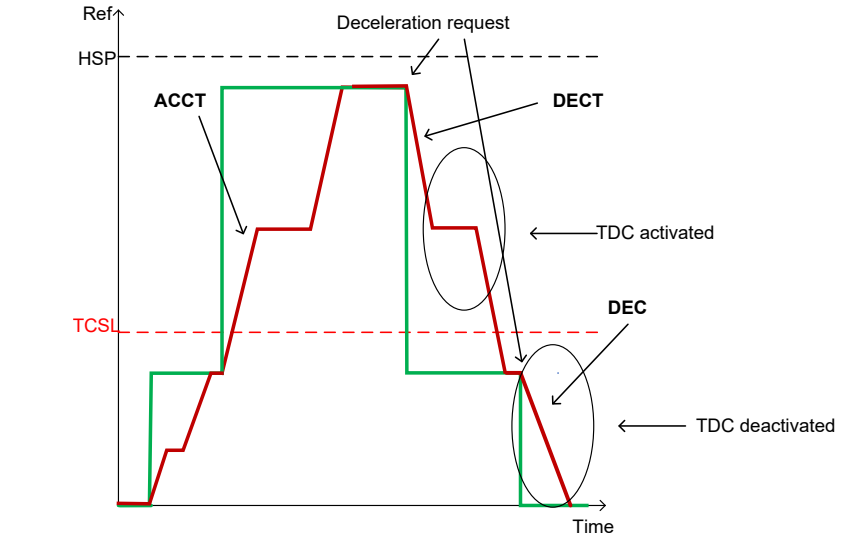
[TDC Deactivate Freq] t C S L changes the behavior only for deceleration phase (after a stop order).

On deceleration requests:

- **Case 1:** Deceleration requested below **[TDC Deactivate Freq]** t C S L

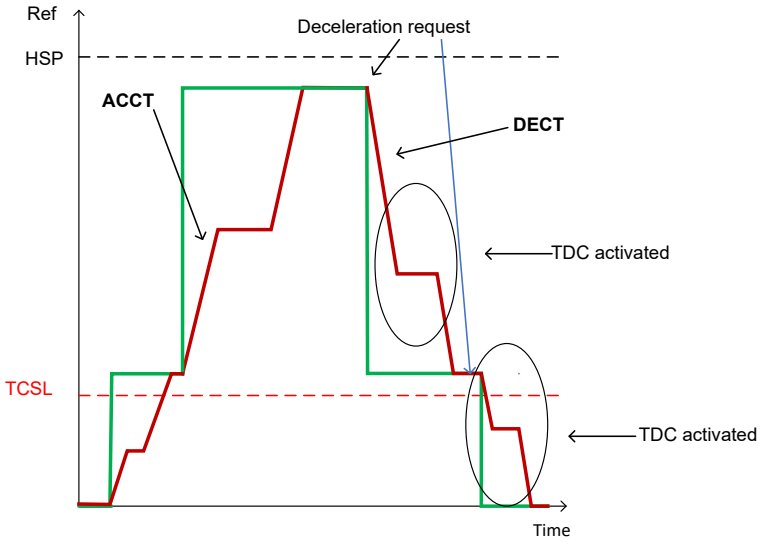
  If the speed reference r F r < t C S L , you have **[Time delay control]** t d C not activated and a deceleration following **[Deceleration]** d E C .

  In the example below, after the second deceleration request, the deceleration is done without **[Time delay control]** t d C .



- **Case 2:** Deceleration requested above **[TDC Deactivate Freq]** t C S L

  If the speed reference r F r > t C S L, the **[Time delay control]** t d C is activated during the two deceleration periods and the deceleration is following **[TDC Deceleration]** d E C t.



[TDC Rope Length] t d C L

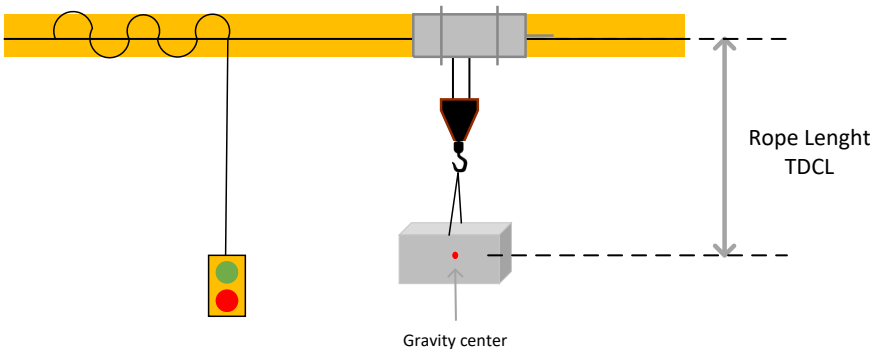
HMI label	Settings	Factory setting
[TDC Rope Length] t d C L	0 to 20 m	0 m
Time delay control wire rope length (in 0,1 m).		

This function is designed to operate independently without knowledge of the actual distance of the load. Therefore, it is necessary to set the length to the maximum or near-maximum possible value to simulate the least favorable conditions.

NOTE: The efficiency of the **[Time delay control]** t d C function is directly based on the effective length of the wire rope.

If the length of the load is higher or lower than the configured one, load sway may increase but in lesser proportions than without **[Time delay control]** t d C function active.

In any case, the load behaves better with the **[Time delay control]** t d C function than without it.



[TDC Acceleration] A C C t and [TDC Deceleration] d E C t

HMI label	Settings	Factory setting
[TDC Acceleration] A C C t	1 to 999,9 s	5 s
Time delay control acceleration ramp time, acceleration time between 0 and FRS.		
[TDC Deceleration] d E C t	1 to 999,9 s	5 s
Time delay control deceleration ramp time, deceleration time between FRS and 0.		

These parameters define the acceleration and deceleration time of the motor from 0 to FRS and FRS to 0 while the **[Time delay control]** t d C is active.

(FRSS in case of synchronous motor)

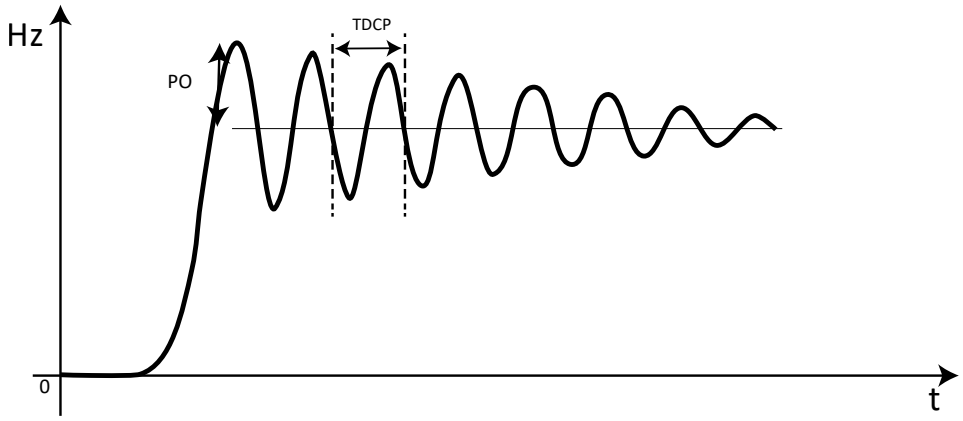
NOTE: The minimum value of **[TDC Acceleration]** A C C t and **[TDC Deceleration]** d E C t is **[TDC Min Ramp Time]** r M P M + 0.1 (s).

[TDC Pendul. Period] t d C P

HMI label	Settings	Factory setting
[TDC Pendul. Period] t d C P	0 to 10000 ms	0 ms
Time delay control pendulum time period (in ms)		

This parameter defines the oscillation period of the load (in milliseconds).

It is automatically calculated from the total wire rope length (**[TDC Rope Length]** t d C L). This parameter should be changed only by expert users.



[TDC Spd Damp Coef] tdCr

HMI label	Settings	Factory setting
[TDC Spd Damp Coef] tdCr	0 to 100%	50%
Time delay control speed damping coefficient in %		

[TDC Spd Damp Coef] tdCr is a percentage compensation factor for **[Time delay control]** tdC.

The parameter can be calculated with the following relation:

tdCr = 1/2 + ln(*PO*)/(2*π)

Where PO is the Percentage Overshoot, i.e. the ratio between the speed overshoot at the first oscillation and the reference speed.

The damping effect can be observed through the time needed by the charge to stop swinging after an initial pulse.

It is important to remember that the less the system is damped, the closer the value will be to 50%.

As an example, with a slightly more damped system (PO = 0.8) a value of tdCr = 46% can be used.

NOTE: Default value is set to 50% and should be suitable for most of the applications. This parameter should be changed only by expert users.

[TDC Min Ramp Time] rMPM

HMI label	Settings	Factory setting
[TDC Min Ramp Time] rMPM	0 to 6553,5 s	-
Time delay control minimum ramp time, minimum ACCT and DECT possible value.		

This parameter is the minimum value for **[TDC Acceleration]** ACCt and **[TDC Deceleration]** dECt (delay needed by the function).

In **[TDC Acceleration]** ACCt, you must set a ramp higher than that appears in **[TDC Min Ramp Time]** rMPM (limit value).

[TDC Min Ramp Time] rMPM value corresponds to the half of the oscillation period with is used to compensate acceleration and deceleration time defined by **[TDC Acceleration]** ACCt and **[TDC Deceleration]** dECt .

NOTE: [TDC Min Ramp Time] rMPM is calculated automatically when you put the **[TDC Rope Length]** tdCL .

[TDC State] tdCM

HMI label	Settings	Factory setting
[TDC State] tdCM	0 to 65535	-
Time delay control state.		

Configuration following the bits:

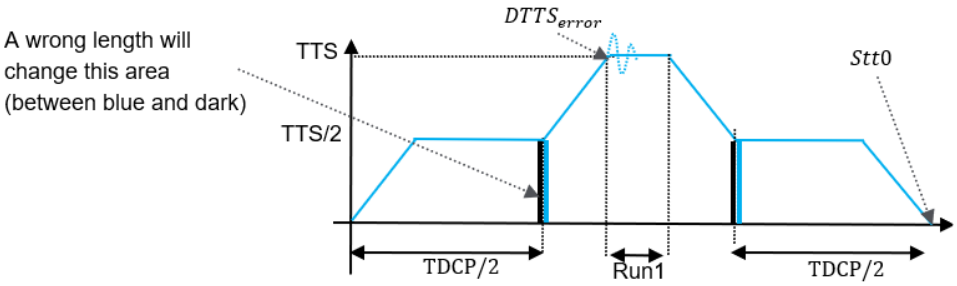
- b00: Time Delay Control function is configured (tdCA = YES or DI).
- b01: Time Delay Control function is requested.
- b02: Time Delay Control function is activated.

- b15: Time Delay Control specific ramps are used. (TDC is activated and ramps are applied)

  NOTE: If there are priority functions that modify ramps, bit 15 remains in its previous state, but the ramp will not be taken into account.

How to Evaluate the Sway Generated by a Wrong Height ?

NOTE: This analysis is available just for tdCr = 50%.



Depending on the running time “Run1”, the total error (Stt0) will be:

$DTTS_{error} < Stt0 < 2 * DTTS_{error}$

To calculate the $DTTS_{error}$, use below formula:

$DTTS_{error} = tdCP_{error} * TTS/2$

$tdCP_{error} = (tdCP/2) - \sqrt{tdCL_{error}}$

Example:

With Trolley 20 m /min and 5 meters with an error of 1 meter:

$tdCP_{error} = 2.236068 - \sqrt{(5 - 1)} = 0.236068$

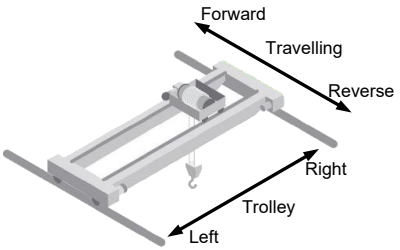
20 m / min = 33.33 cm/s

$DTTS_{error} = 0.236068 * (33.33/2) = 3.93$ cm

Then you get the following result:

$DTTS_{error} < Stt0 < 2 * DTTS_{error}$

3.93 cm < *Stt0* < 7.86 cm



NOTE: The drive controls the mechanical speed of the motor by compensating the slip, so motor speed can be faster than when connected directly to the mains.

ATV320 Step-by-Step Configuration

In the case of configuring translational movement, refer to hoisting note : Altivar Application Note for Hoisting (NHA80973).

The following table shows the step-by-step configuration to operate in the desired direction:

Step	Action
1	Activate **[Time delay control]** t d C .
2	Adjust **[TDC Rope Length]** t d C L to frequently used value.
3	Set **[TDC Acceleration]** A C C t and **[TDC Deceleration]** d E C t to the desired values.
4	Set **[TDC Activate Freq]** t C S H and **[TDC Deactivate Freq]** t C S L to the desired value.

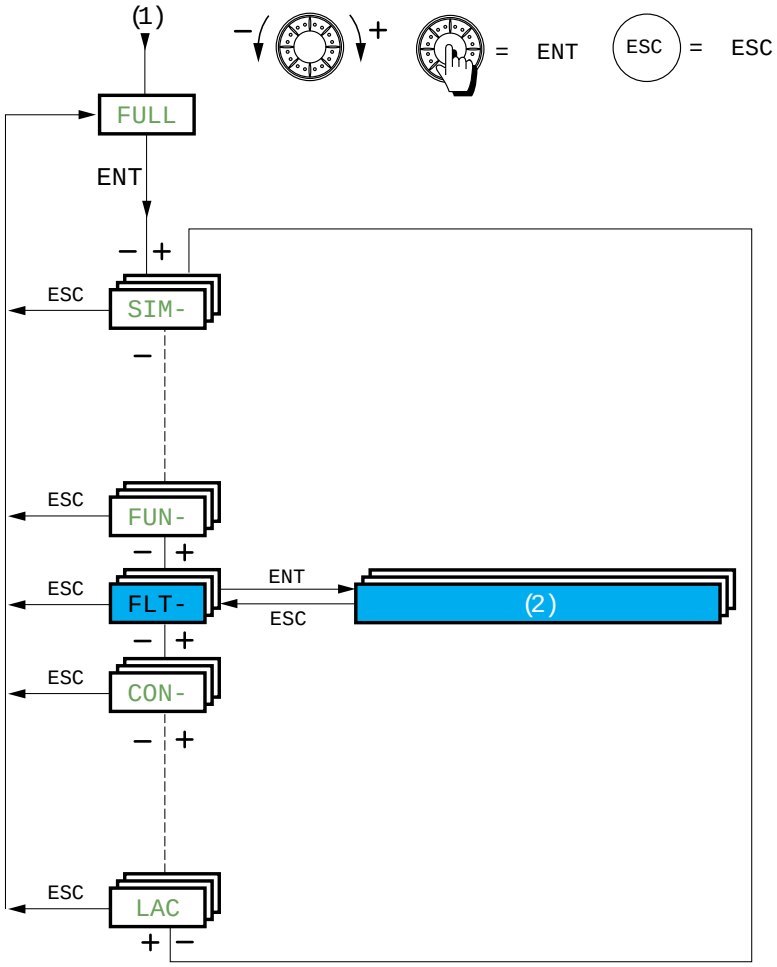
1.3.4.8 [Full] Full – – [FAULT MANAGEMENT] FLt –

What's in This Chapter

With integrated display terminal

Summary of functions:

Code	Name
P t C —	**[PTC management]**
r S t —	**[Fault reset]**
A t r —	**[Auto Fault Reset]**
A L S —	**[Warning setting]**
F L r —	**[Catch on the fly]**
t H t —	**[Motor thermal monit]**
o P L —	**[Output phase loss]**
i P L —	**[Input phase loss]**
o H L —	**[Drive overheat]**
S A t —	**[Thermal warning stop]**
E t F —	**[External error]**
u S b —	**[Undervoltage handling]**
t i t —	**[IGBT tests]**
L F L —	**[4-20 mA loss]**
i n H —	**[Error detect disabling]**
C L L —	**[Fieldbus monitoring]**
S d d —	**[Encoder monitoring]**
t i d —	**[Torque or I limit detect]**
F q F —	**[Frequency meter]**
d L d —	**[Dynamic load detect.]**
t n F —	**[Autotuning error]**
P P i —	**[Boards pairing]**
u L d —	**[Process underload]**
o L d —	**[Process overload]**
L F F —	**[Fallback speed]**
F S t —	**[Ramp divider]**
d C i —	**[DC injection]**



1. From CONF — menu
2. Detected error management

The parameters in the **[FAULT MANAGEMENT]** FLt — menu can only be modified when the drive is stopped and there is no run command, except for parameters with a ( ) symbol in the code column, which can be modified with the drive running or stopped.

[PTC management] P t C —

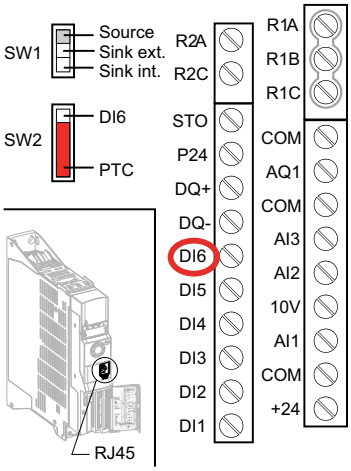
PTC probe

1 set of PTC probe can be managed by the drive to help to protect the motor: on logic input LI6 converted for this use by switch SW2 on the control block.
The PTC probe is monitored for the following detected errors:

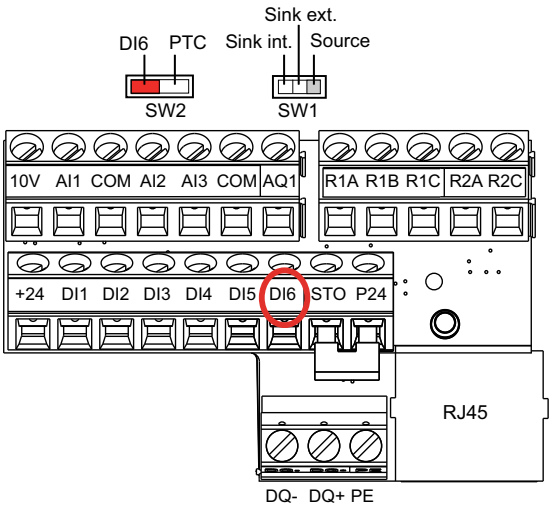
- Motor overheating
- Sensor break
- Sensor short-circuit

Protection via PTC probe does not disable protection via I^2t calculation performed by the drive (the two types of protection can be combined).

ATV320●●●●●B



ATV320●●●●●C



NOTE:

DIx =LX

DQx = LOx

AQ1 = AO1

Access

Parameters described below can be accessed by: d r i ➡ C o n F ➡ F u L L ➡ F L t ➡ P t C

Parameters list

HMI label	Settings	Factory setting
[PTC management] P t C —		
[PTC Fdbk Handling] P t C L	—	**[No]** n o
PTC probe feedback handling Check first that the switch SW2 on the control block is set to PTC. • **[No]** n o: ***No management***, not used • **[Always]** A S: ***Always***, PTC probe are monitored permanently, even if the power supply is not connected (as long as the control remains connected to the power supply) • **[Power ON]** r d S: ***Power ON***, PTC probe are monitored while the drive power supply is connected • **[Motor ON]** r S: ***Motor ON***, PTC probe are monitored while the motor power supply is connected		

[Fault reset] rSt —

Access

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ rSt

Parameters list

HMI label	Settings	Factory setting
[Fault reset] rSt —		
[Fault Reset Assign] rSF	—	**[No]** no

Fault reset input assignment

Detected errors are cleared manually when the assigned input or bit changes to 1, if the cause of the detected error has disappeared.

The STOP/RESET key on the graphic display terminal performs the same function.

Following detected errors can be cleared manually : ASF, brF, 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.

NOTE: If **[Extended Fault Reset]** HrFC is set to **[Yes]** YES, the additional following detected error can be cleared manually: oCF, SCF1, SCF3.

- **[No]** no: ***No***, function inactive
- **[DI1]** LI1: ***Digital input 1***
- **[...] ...**: See the assignment conditions

(If **[Profile]** CHCF is set to **[Not separ.]** SIM or **[Separate]** SEP then **[CD11]** Cd11 up to **[CD15]** Cd15, **[C111]** C111 up to **[C115]** C115, **[C211]** C211 up to **[C215]** C215 and **[C311]** C311 up to **[C315]** C315 are not available).

[Prod Restart Assign] rPA ★	—	**[No]** no

Product restart assignment
The Restart function performs a Fault Reset and then restarts the device. During this Restart procedure, the device goes through the same steps as if it had been switched off and on again. Depending on the wiring and the configuration of the device, this may result in immediate and unanticipated operation.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

The Restart function performs a Fault Reset and restarts the device.

- Verify that activating this function does not result in unsafe conditions.

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

This parameter can only be modified if 3.1 **[Access Level]** LAC is set to **[Expert]** EPr mode.

Drive reinitialization via logic input. Can be used to reset all detected errors without having to disconnect the drive from the power supply. The drive is reinitialized on a rising edge (change from 0 to 1) of the assigned input. The drive can only be reinitialized when locked.

To assign reinitialization, press and hold down the ENT key for 2 s.

- **[No]** no: ***No***, function inactive
- **[DI1]** LI1: ***Digital input 1***

[...] ...

HMI label	Settings	Factory setting
• **[DI6]** L i 6: ***Digital input 6*** • **[DAI1]** L A i 1: ***Digital input AI1*** • **[DAI2]** L A i 2: ***Digital input AI2*** • **[OL01]** o L 0 1: ***OL01***, function blocks: Logical Output 01 **[...] ...** • **[OL10]** o L 1 0: ***OL10***, function blocks: Logical Output 10		
[Product restart] r P ★	—	**[No]** n o

Product restart
The Restart function performs a Fault Reset and then restarts the device. During this Restart procedure, the device goes through the same steps as if it had been switched off and on again. Depending on the wiring and the configuration of the device, this may result in immediate and unanticipated operation.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

The Restart function performs a Fault Reset and restarts the device.

- Verify that activating this function does not result in unsafe conditions.

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

This parameter can only be modified if 3.1 **[Access Level]** L A C is set to **[Expert]** E P r mode.

Drive reinitialization. Can be used to reset all detected errors without having to disconnect the drive from the power supply.

- **[No]** n o: ***No***, function inactive
- **[Yes]** y E S: ***Yes***, Reinitialization. Press and hold down the ENT key for 2 s. The parameter changes back to **[No]** n o automatically as soon as the operation is complete. The drive can only be reinitialized when locked.

[Extended Fault Reset] H r F C ★	—	**[No]** n o

Extended fault reset activation

NOTICE

INOPERATIVE DRIVE

- Verify that enabling this parameter does not result in equipment damage.
- Before resetting the detected error, identify and correct the cause of the error.

Failure to follow these instructions can result in equipment damage.

This parameter can only be modified if **[3.1] [Access Level]** L A C is set to **[Expert]** E P r mode.

Can be used to select the access level of **[Fault Reset Assign]** r S F to reset detected errors without having to disconnect the drive from the power supply.

NOTE: If **[Extended Fault Reset]** H r F C is set to **[Yes]** y E S , the additional following detected error can be cleared manually: o C F , S C F 1, S C F 3.

- **[No]** n o: ***No***, function inactive
- **[Yes]** y E S: ***Yes***, function active

[Auto Fault Reset] Atr —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ FLt ➜ Atr

Parameters list

HMI label	Settings	Factory setting
[Auto Fault Reset] Atr —		
[Auto Fault Reset] Atr ⏳ 2 s	—	**[No]** no

Automatic fault reset
This function can be used to automatically perform individual or multiple Fault Resets. If the cause of the error that has triggered the transition to the operating state Fault disappears while this function is active, the device resumes normal operation. While the Fault Reset attempts are performed automatically, the output signal "Operating state Fault" is not available. If the attempts to perform the Fault Reset are not successful, the device remains in the operating state Fault and the output signal "Operating state Fault" becomes active.

⚠WARNING

UNANTICIPATED EQUIPMENT OPERATION

- Verify that activating this function does not result in unsafe conditions.
- Verify that the fact that the output signal "Operating state Fault" is not available while this function is active does not result in unsafe conditions.

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

The error relay remains activated if this function is active. The speed reference and the operating direction must be maintained. Use 2-wire control **[2/3-Wire Control]** tCC is set to **[2-Wire Control]** 2C and **[2-wire type]** tCt is set to **[Level]** LEL, see **[2/3-Wire Control]** tCC , page 97.

If the restart has not taken place once the configurable time **[Fault Reset Time]** tAr has elapsed, the procedure is aborted and the drive remains locked until it is turned off and then on again.

The error codes , page 420, which permit this function, are listed.

- **[No]** no: ***No***, function inactive
- **[Yes]** YES: ***Yes***, automatic restart, after locking in detected error state, if the detected error has disappeared and the other operating conditions permit the restart. The restart is performed by a series of automatic attempts separated by increasingly longer waiting periods: 1 s, 5 s, 10 s, then 1 minute for the following attempts.

[Fault Reset Time] tAr ★	—	**[5 minutes]** 5

HMI label	Settings	Factory setting
Fault Reset time		
This parameter appears if **[Auto Fault Reset]** A t r is set to **[Yes]** y E S. It can be used to limit the number of consecutive restarts on a recurrent detected error. • **[5 minutes]** 5 : ***5 minutes*** • **[10 minutes]** 1 0 : ***10 minutes*** • **[30 minutes]** 3 0 : ***30 minutes*** • **[1 hour]** 1 H : ***1 hour*** • **[2 hours]** 2 H : ***2 hours*** • **[3 hours]** 3 H : ***3 hours*** • **[Unlimited]** C t : ***Unlimited***		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Warning setting] ALS —

Access

Parameters described below can be accessed by: dr1 ➔ ConF ➔ FULL ➔ FLt ➔ ALS

Parameters list

HMI label	Settings	Factory setting
[Warning setting] ALS —		
[High Current Thd] CtD (1)	0 to 1.5 In (1)	INV
High current threshold		
[Motor Freq Thd] FtD	0 to 599 Hz	50 Hz
Motor frequency threshold		
[Freq. threshold 2] F2D	0 to 599 Hz	50 Hz
Frequency threshold 2		
[High torque thd.] ttH	-300 to 300%	100%
High torque threshold		
[Low torque thd.] ttL	-300 to 300%	50%
Low torque threshold		
[Pulse warning thd.] F9L ★	0 to 20,000 Hz	0 Hz
Pulse warning threshold Visible if **[Frequency meter]** F9F is not **[No]** no.		

(1) In corresponds to the rated drive current indicated in the Installation manual and on the drive 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Catch on the fly] FLr —

Access

Parameters described below can be accessed by: drI ➜ ConF ➜ FULL ➜ FLt ➜ FLr

Parameters list

HMI label	Settings	Factory setting
[Catch on the fly] FLr —		
NOTE: This function cannot be used with certain other functions. Follow the instructions in **[Application function]** Fun — Summary of **[Application function]** Fun–, page 203.		
[Catch On Fly] FLr	—	**[No]** no
Catch on fly Used to enable a smooth restart if the run command is maintained after the following events: • Loss of supply mains or disconnection. • Clearance of current detected error or automatic restart. • Freewheel stop. The speed given by the drive resumes from the estimated speed of the motor at the time of the restart, then follows the ramp to the reference speed. This function requires 2-wire level control. When the function is operational, it activates at each run command, resulting in a slight delay of the current (0.5 s max). **[Catch On Fly]** FLr is forced to **[Not Configured]** no if brake logic control **[Brake assignment]** bLC is assigned or if **[Auto DC Injection]** AdC is set to **[Continuous]** Ct . If the speed of the motor drops to zero before increasing to reference speed after a catch on the fly use, slightly increasing **[Current Filter Time]** CrtF allows the drive to restart at it's current speed. • **[No]** no: ***No***, function inactive • **[Yes]** YES: ***Yes***, function active		

[Motor thermal monit] t H t —

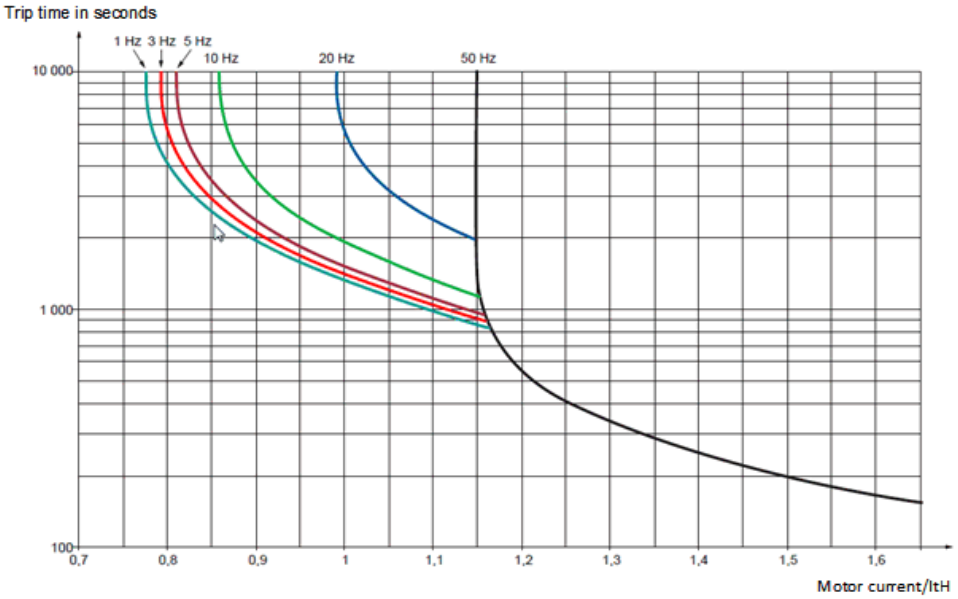
Motor thermal protection function

Thermal protection by calculating the I^2t.

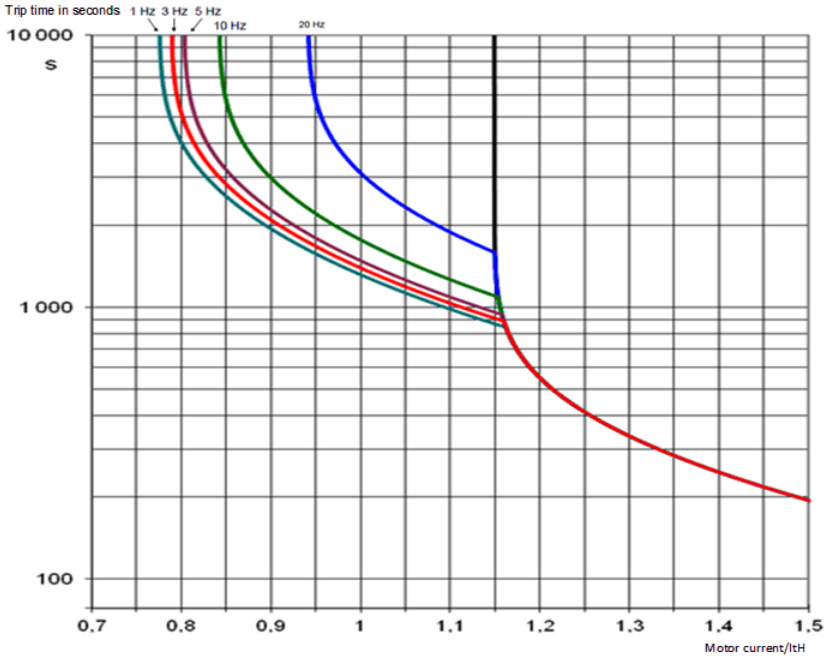
NOTE: The motor thermal state is not saved when the drive is switched off.

- Self-cooled motors: The tripping curves depend on the motor frequency.
- Force-cooled motors: Only the 50 Hz tripping curve needs to be considered, regardless of the motor frequency.

The following curves represent the triggering time in seconds: (50Hz)



The following curves represent the triggering time in seconds: (60Hz)



NOTICE
MOTOR OVERHEATING Install external thermal monitoring equipment under the following conditions: • If a motor with a nominal current of less than 20% of the nominal current of the drive is connected. • If you use the function Motor Switching. **Failure to follow these instructions can result in equipment damage.**

Access

Parameters described below can be accessed by: d r ı ➡ C o n F ➡ F u L L ➡ F L t ➡ t H t

Parameters list

HMI label	Settings	Factory setting
[Motor thermal monit] t H t —		
[Motor Thermal Mode] t H t	—	**[Self cooled]** A C L
Motor thermal monitoring mode **NOTE:** The detected error occurs when the thermal state reaches 118% of the rated state and reactivation occurs when the state falls back below 100%. • **[No]** n o : ***No thermal monitoring***, no protection • **[Self cooled]** A C L : ***Self cooled motor***, for self-cooled motors • **[Force-cool]** F C L : ***Force cooled motor***, for force-cooled motors		
[Motor Therm Thd] t t d (1)	0 to 118%	100%
Motor thermal threshold, threshold for motor thermal alarm (logic output or relay).		
[Motor2 Therm Thd] t t d 2	0 to 118%	100%
Motor 2 thermal threshold, threshold for motor 2 thermal alarm (logic output or relay).		
[Motor3 Therm Thd] t t d 3	0 to 118%	100%
Motor 3 thermal threshold, threshold for motor 3 thermal alarm (logic output or relay).		
[MotorTemp ErrorResp] o L L	—	**[Freewheel Stop]** y E S
Motor overtemp error response **NOTICE** **OVERHEATING** Depending on the settings of this parameter, the error response to detected errors is disabled or the transition to the operating state Fault is suppressed if an error is detected. • Verify that the settings of this parameter do not result in equipment damage. • Implement alternative, equivalent monitoring functions for disabled monitoring functions. **Failure to follow these instructions can result in equipment damage.** Type of stop in the event of a detected motor thermal error. • **[Ignore]** n o : ***Ignore***, detected error ignored		

HMI label	Settings	Factory setting
• **[Freewheel Stop]** y E S: ***Freewheel stop*** • **[Configured Stop]** S t t: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** S t t , without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** t C C and **[2-wire type]** t C t , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop. • **[Fallback Speed]** L F F: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (2) • **[Speed maintained]** r L S: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (2) • **[Ramp stop]** r M P: ***Ramp stop*** • **[Fast stop]** F S t: ***Fast stop*** • **[DC injection]** d C I: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .		
[Motor Th State Memo] M t M	—	**[No]** n o
Motor thermal state memo • **[No]** n o: ***No***, motor thermal state is not stored at power off • **[Yes]** y E S: ***Yes***, motor thermal state is stored at power off		

[Output phase loss] oPL —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FLt ➡ oPL

Parameters list

HMI label	Settings	Factory setting
[Output phase loss] oPL —		
[OutPhaseLoss Assign] oPL ⏳ 2 s	—	**[OPF Error Triggered]** YES
Output Phase Loss assignment		

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

If output phase monitoring is disabled, phase loss and, by implication, accidental disconnection of cables, are not detected.

- Verify that the setting of this parameter does not result in unsafe conditions.

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

NOTE: [OutPhaseLoss Assign] oPL is set to **[Function Inactive]** no when **[Motor control type]** Ctt , page 121 is set to **[Sync. mot.]** SYn. For other **[Motor control type]** Ctt configurations, **[OutPhaseLoss Assign]** oPL is forced to **[OPF Error Triggered]** YES if brake logic control is configured.

- **[Function Inactive]** no: ***Function inactive***
- **[OPF Error Triggered]** YES: ***OPF error Triggered***, tripping on **[OutPhaseLoss Assign]** oPL with freewheel stop
- **[No Error Triggered]** oAC: ***No error triggered***, no event triggered, but management of the output voltage to avoid an overcurrent when the link with the motor is re-established and catch on the fly performed (even if this function has not been configured.

The drive switches to **[Output cut]** SoC state after **[OutPhaseLoss Delay]** odt time. Catch on fly is possible as soon as the drive is in Stand by output cut **[Output cut]** SoC state.

[OutPhaseLoss Delay] odt ↻	0.5 to 10 s	0.5 s
Output Phase Loss delay		

Time delay for taking the **[OutPhaseLoss Assign]** oPL detected error into account.

[Full] iPL —

Access

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ iPL

Parameters list

HMI label	Settings	Factory setting
[Input phase loss] iPL —		
[InPhaseLoss Assign] iPL ★ ⏳ 2 s	—	According to drive rating
Input Phase Loss assignment Cannot be accessed if drive rating is ATV320●●●M2●. In this case, no factory settings value. Factory setting : **[Freewheel Stop]** YES for drive rating ATV320●●●N4●. If 1 phase disappears and if this leads to performance decrease, the drive switches to detected error mode **[Input Phase Loss]** PHF. If 2 or 3 phases disappear, the drive trips in **[Input Phase Loss]** PHF. • **[Ignore]** nO: ***Ignore***, detected error ignored • **[Freewheel Stop]** YES: ***Freewheel stop***, detected error with freewheel stop		

[Drive overheat] oHL —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FLT ➡ oHL

Parameters list

HMI label	Settings	Factory setting
[Drive overheat] oHL —		
[DriveTemp ErrorResp] oHL	—	**[Freewheel Stop]** YES
Drive overtemp error response		

NOTICE

OVERHEATING

Depending on the settings of this parameter, the error response to detected errors is disabled or the transition to the operating state Fault is suppressed if an error is detected.

- Verify that the settings of this parameter do not result in equipment damage.

Failure to follow these instructions can result in equipment damage.

Behavior in the event of the drive overheating.

NOTE: An error occurs when the thermal state reaches 118% of the rated state and reactivation occurs when the state falls back below 90%.

- **[Ignore]** no: ***Ignore***, detected error ignored
- **[Freewheel Stop]** YES: ***Freewheel stop***
- **[Configured Stop]** STT: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** STT , without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop.
- **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (2)
- **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (2)
- **[Ramp stop]** rMP: ***Ramp stop***
- **[Fast stop]** FST: ***Fast stop***
- **[DC injection]** dC1: ***DC injection***. This type of stop cannot be used with certain other functions. See the table.

[Dev Thermal Warning] tHA	0 to 118%	100%
Device thermal state warning		

Threshold for drive thermal alarm (logic output or relay).

(1) The parameter can also be accessed in the **[Settings]** SEt menu.

(2) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

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

[Thermal warning stop] SAt —

Deferred stop on thermal alarm

This function helps to prevent the drive stopping between two steps of the process if the drive or motor overheats, by authorizing operation until the next stop. At the next stop, the drive is locked until the thermal state falls back to a value, which undershoots the set threshold by 20%. Example: A threshold set at 80% enables reactivation at 60%.
One thermal state threshold must be defined for the drive, and one thermal state threshold for the motor(s), which triggers the deferred stop.

Access

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ SAt

Parameters list

HMI label	Settings	Factory setting
[Thermal warning stop] SAt —		
[Thermal Warn stop] SAt	—	**[No]** no
Thermal warning stop Thermal alarm stop function allow to set a custom alarm thermal level for the drive or the motor. When one of these levels is reached, the drive trips in freewheel stop. • **[No]** no: ***No***, function inactive (in this case, the following parameters cannot be accessed) • **[Yes]** YES: ***Yes***, freewheel stop on drive or motor thermal alarm		
[Dev Thermal Warning] tHA	0 to 118%	100%
Device thermal state warning, thermal state threshold of the drive tripping the deferred stop.		
[Motor Therm Thd] ttd	0 to 118%	100%
Motor thermal threshold, thermal state threshold of the motor tripping the deferred stop.		
[Motor2 Therm Thd] tHd2	0 to 118%	100%
Motor 2 thermal threshold, thermal state threshold of the motor 2 tripping the deferred stop.		
[Motor3 Therm Thd] tHd3	0 to 118%	100%
Motor 3 thermal threshold, thermal state threshold of the motor 3 tripping the deferred stop.		

[External error] EtF —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FLt ➡ EtF

Parameters list

HMI label	Settings	Factory setting
[External error] EtF —		
[Ext Error assign] EtF	—	**[No]** no
External error assignment If the assigned bit is at 0, there is no external error detected. If the assigned bit is at 1, there is an external error detected. Logic can be configured via **[Ext Error Condition]** LEt if a logic input has been assigned. • **[No]** no: ***No***, function inactive • **[DI1]** LI1: ***Digital input 1*** • **[...] ...**: See the assignment conditions		
[Ext Error Condition] LEt ★	—	**[Active high]** HIG
External error condition Parameter can be accessed if the detected external error has been assigned to a logic input. It defines the positive or negative logic of the input assigned to the detected error. • **[Active low]** LO: ***Active low***, triggering on falling edge (change from 1 to 0) of the assigned input • **[Active high]** HIG: ***Active high***, triggering on rising edge (change from 0 to 1) of the assigned input		
[Ext Error Resp] EPL	—	**[Freewheel Stop]** YES
Device response to external error Type of stop in the event of a detected external error. • **[Ignore]** no: ***Ignore***, detected external error ignored • **[Freewheel Stop]** YES: ***Freewheel stop*** • **[Configured Stop]** Stt: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** Stt , without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop. • **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1) • **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1) • **[Ramp stop]** rMP: ***Ramp stop*** • **[Fast stop]** FSt: ***Fast stop*** • **[DC injection]** dCI: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .		

[Undervoltage handling] u S b —

Access

Parameters described below can be accessed by: d r ➔ C o n F ➔ F u L L ➔ F L t ➔ u S b

Parameters list

HMI label	Settings	Factory setting
[Undervoltage handling] u S b —		
[Undervoltage Resp] u S b	—	**[Error Triggered]** 0
Response to undervoltage, behavior of the drive in the event of an undervoltage. • **[Error Triggered]** 0: ***Error triggered***, the drive trips and the detected external error signal is triggered (the fault relay assigned to **[No drive flt] FLT** is opened) • **[Error Triggered w/o Relay]** 1: ***Error triggered w/o relay***, the drive trips but the detected external error signal is not triggered (the fault relay assigned to **[No drive flt] FLT** remains closed) • **[Warning Triggered]** 2: ***Warning Triggered***, alarm and fault relay remain closed. The alarm can be assigned to a logic output or a relay		
[Mains voltage] u r E S	According to drive voltage rating	According to drive voltage rating
Evacuation mains voltage See **[Mains voltage]** u r E S .		
[Undervoltage level] u S L	100 to 304 V	According to drive rating
Undervoltage level, detected undervoltage error level setting in Volts. The factory setting is determined by the drive voltage rating. See **[Undervoltage level]** u S L .		
[UnderVolt timeout] u S t	0.2 s to 999.9 s	0.2 s
Undervoltage timeout, time delay for taking undervoltage detected error into account.		
[UnderV. prevention] S t P	—	**[Inactive]** n o
Ctrld stop on power loss, behavior in the event of the undervoltage prevention level being reached. • **[Inactive]** n o: ***Inactive*** • **[Maintain DC Bus]** M M S: ***Maintain DC Bus***, this stop mode uses the inertia to maintain the DC bus voltage as long as possible • **[Ramp Stop]** r M P: ***Ramp Stop***, stop following an adjustable ramp **[Max stop time]** S t M • **[Freewheel Stop]** L n F: ***Locked in freewheel stop without error***, lock (freewheel stop) without detected error		
[UnderV. restart tm] t S M ★ ❮❯	1.0 s to 999.9 s	1.0 s
Undervolt. restart time Time delay before authorizing the restart after a complete stop for **[UnderV. prevention]** S t P = **[Ramp Stop]** r M P, if the voltage has returned to normal.		
[Prevention level] u P L ★	141 to 368 V	According to drive rating
Under V prevention level Undervoltage prevention level setting in Volts, which can be accessed if **[UnderV. prevention]** S t P is not **[Inactive]** n o. The adjustment range and factory setting are determined by the drive voltage rating and the **[Mains voltage]** u r E S value.		

HMI label	Settings	Factory setting
[Max stop time] S t n ★ ( )	0.01 to 60.00 s	1.00 s
Maximum stop time Ramp time if **[UnderV. prevention]** S t P is set to **[Ramp Stop]** r n P.		
[DC bus maintain time] t b S ★ ( )	1 to 9,999 s	9,999 s
DC bus maintain time DC bus maintain time if **[UnderV. prevention]** S t P is set to **[Maintain DC Bus]** n n S.		

[IGBT tests] tIt —

Access

Parameters described below can be accessed by: drI ➜ ConF ➜ FULL ➜ FLt ➜ tIt

Parameters list

HMI label	Settings	Factory setting
[IGBT tests] tIt —		
[Output Short Circuit Test] Strt	—	**[No]** no
Output short circuit test • **[No]** no: ***No***, no test • **[Yes]** YES: ***Yes***, the IGBTs are tested on power up and every time a run command is sent. These tests cause a slight delay (a few ms). In the event of a detected error, the drive locks. The following errors can be detected: ◦ Drive output short-circuit (terminals U-V-W): SCF display. ◦ IGBT inoperable: xtF, where x indicates the number of the IGBT concerned. ◦ IGBT short-circuited: x2F, where x indicates the number of the IGBT concerned.		

(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

[4-20 mA loss] LFL —

Access

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FLt ➡ LFL

Parameters list

HMI label	Settings	Factory setting
[4-20 mA loss] LFL —		
[AI3 4-20mA loss] LFL3	—	**[Ignore]** no
Response to 4-20mA loss on AI3		

- **[Ignore]** no: ***Ignore***, detected error ignored. This is the only possible configuration if **[AI3 Min. Value]** CrL3 is not greater than 3 mA
- **[Freewheel Stop]** YES: ***Freewheel stop***
- **[Configured Stop]** Stt: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** Stt , without interruption. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop.
- **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
- **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1)
- **[Ramp stop]** rMP: ***Ramp stop***
- **[Fast stop]** FSt: ***Fast stop***
- **[DC injection]** dC1: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .

(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[Error detect disabling] inH —

Access

Parameter can be accessed in [Expert] EPr mode

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ inH

Parameters list

HMI label	Settings	Factory setting
[Error detect disabling] inH —		
[Disable Error Detect] inH ★ ⏳ 2 s	—	**[No]** no

Disable error detection

In rare cases, the monitoring functions of the device may be unwanted because they impede the purpose of the application. A typical example is a smoke extractor fan operating as a part of a fire protection system. If a fire occurs, the smoke extractor fan should operate as long as possible, even if, for example, the permissible ambient temperature of the device is exceeded. In such applications, damage to or destruction of the device may be acceptable as collateral damage, for example, to keep other damage from occurring whose hazard potential is assessed to be more severe.

A parameter is provided to disable certain monitoring functions in such applications so that automatic error detection and automatic error responses of the device are no longer active. You must implement alternative monitoring functions for disabled monitoring functions that allow operators and/or master control systems to adequately respond to conditions which correspond to detected errors. For example, if overtemperature monitoring of the device is disabled, the device of a smoke extractor fan may itself cause a fire if errors go undetected. An overtemperature condition can be, for example, signaled in a control room without the device being stopped immediately and automatically by its internal monitoring functions.

⚠DANGER

ERROR DETECTION FUNCTIONS DISABLED, NO ERROR DETECTION

- Only use this parameter after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Implement alternative monitoring functions for disabled monitoring functions that do not trigger automatic error responses of the device, but allow for adequate, equivalent responses by other means in compliance with all applicable regulations and standards as well as the risk assessment.
- Commission and test the system with the monitoring functions enabled.
- During commissioning, verify that the device and the system operate as intended by performing tests and simulations in a controlled environment under controlled conditions.

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

If the assigned input or bit is at 0, detected error monitoring is active. If the assigned input or bit is at 1, detected error monitoring is inactive. Active detected errors are cleared on a rising edge (change from 0 to 1) of the assigned input or bit.

NOTE: The Safe Torque Off function and any detected errors that help to prevent any form of operation are not affected by this function.

Following detected errors can be cleared manually : AnF, CnF, CoF, CrF, 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 inactive
- **[DI1]** LI1: ***Digital input 1***
- **[...] ...**: See the assignment conditions

★ : 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[Fieldbus monitoring] CLL —

Access

Parameter can be accessed in [Expert] EPr mode

Parameters described below can be accessed by: dr1 ➡ ConF ➡ FULL ➡ FLt ➡ CLL

Parameters list

HMI label	Settings	Factory setting
[Fieldbus monitoring] CLL —		
[Fieldbus Interrupt Resp] CLL	—	**[Freewheel Stop]** YES
Response to Fieldbus module communication interruption		

⚠WARNING

LOSS OF CONTROL

If this parameter is set to **[Ignore]**, fieldbus module communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

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

Behavior of the drive in the event of a communication interruption with a communication module.

- **[Ignore]** nO: ***Ignore***, detected error ignored
- **[Freewheel Stop]** YES: ***Freewheel stop***
- **[Configured Stop]** StT: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** StT , without interruption. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop
- **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
- **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1)
- **[Ramp stop]** rMP: ***Ramp stop***
- **[Fast stop]** FSt: ***Fast stop***
- **[DC injection]** dC1: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .

[CANopen Error Resp] CoL	—	**[Freewheel Stop]** YES
Response to CANopen error		

HMI label	Settings	Factory setting

⚠WARNING

LOSS OF CONTROL

If this parameter is set to **[Ignore]** nO, CANopen communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

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

Behavior of the drive in the event of a communication interruption with integrated CANopen®.

- **[Ignore]** n o: ***Ignore***, detected error ignored
- **[Freewheel Stop]** y E S: ***Freewheel stop***
- **[Configured Stop]** S t t: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** S t t , without interruption. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** t C C and **[2-wire type]** t C t , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop.
- **[Fallback Speed]** L F F: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
- **[Speed maintained]** r L S: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1)
- **[Ramp stop]** r M P: ***Ramp stop***
- **[Fast stop]** F S t: ***Fast stop***
- **[DC injection]** d C i: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .

[Modbus Error Resp] S L L	—	**[Freewheel Stop]** y E S

HMI label	Settings	Factory setting

Response to Modbus interruption

⚠WARNING

LOSS OF CONTROL

If this parameter is set to **[Ignore]**, Modbus communication monitoring is disabled.

- Only use this setting after a thorough risk assessment in compliance with all regulations and standards that apply to the device and to the application.
- Only use this setting for tests during commissioning.
- Verify that communication monitoring has been re-enabled before completing the commissioning procedure and performing the final commissioning test.

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

Behavior of the drive in the event of a communication interruption with integrated Modbus.

- **[Ignore]** n o : ***Ignore***, detected error ignored
- **[Freewheel Stop]** Y E S : ***Freewheel stop***
- **[Configured Stop]** S t t : ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** S t t , without interruption. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** t C C and **[2-wire type]** t C t , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop.
- **[Fallback Speed]** L F F : ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
- **[Speed maintained]** r L S : ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1)
- **[Ramp stop]** r M P : ***Ramp stop***
- **[Fast stop]** F S t : ***Fast stop***
- **[DC injection]** d C i : ***DC injection***. This type of stop cannot be used with certain other functions. See the table.

[Encoder monitoring] S d d —

Access

Parameter can be accessed in [Expert] E P r **mode**

Parameters described below can be accessed by: d r i ➡ C o n F ➡ F u L L ➡ F L t ➡ S d d

Parameters list

HMI label	Settings	Factory setting
[Encoder monitoring] S d d —		
[Load slip detection] S d d	—	**[Yes]** y E S
Load slip detection • **[No]** n o: ***No***, detected error ignored • **[Yes]** y E S: ***Yes***, freewheel stop The event is triggered by comparison with the output frequency and the speed feedback according to the related parameters configuration F A n F, L A n F, d A n F and t A n F. The event is also triggered as soon as a RUN order is received, if the sign of the output frequency and the speed feedback are in opposite way during t A n F. In case of a detected error, the drive switch to a freewheel stop, and if the brake logic control function has been configured, the brake command is set to 0.		
[ANF Frequency Thd] F A n F ★	—	—
ANF error detection frequency Visible if **[Encoder usage]** E n u is set to **[Speed Monitoring]** S E C. Refer to **[ANF Frequency Thd]** (F A n F .		
[ANF Detection level] L A n F ★	—	—
ANF error detection level Visible if **[Encoder usage]** E n u is set to **[Speed Monitoring]** S E C. Refer to **[ANF Detection level]** L A n F .		
[ANF Direction check] d A n F ★	—	—
Available ANF detection direction Visible if **[Encoder usage]** E n u is set to **[Speed Monitoring]** S E C. Refer to **[ANF Direction check]** d A n F .		
[ANF Time Thd.] t A n F ★	—	—
Detection time of ANF detected fault Visible if **[Encoder usage]** E n u is set to **[Speed Monitoring]** S E C. Refer to **[ANF Time Thd.]** t A n F .		

[Torque or I limit detect] tId —

Access

Parameter can be accessed in [Expert] EPr mode

Parameters described below can be accessed by: drI ➡ ConF ➡ FULL ➡ FLt ➡ tId

Parameters list

HMI label	Settings	Factory setting
[Torque or I limit detect] tId —		
[Trq/I limit. stop] SSb	—	**[Ignore]** no
Stop type - torque/I limit, behavior in the event of switching to torque or current limitation. • **[Ignore]** no: ***Ignore***, detected error ignored • **[Freewheel Stop]** YES: ***Freewheel stop*** • **[Configured Stop]** Stt: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** Stt , without interruption. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop. • **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1) • **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1) • **[Ramp stop]** rMP: ***Ramp stop*** • **[Fast stop]** FSt: ***Fast stop*** • **[DC injection]** dCI: ***DC injection***. This type of stop cannot be used with certain other functions. See the table .		
[Trq/I Limit Timeout] Sto	0 to 9,999 ms	1,000 ms
Torque/I limit. timeout (If **[Trq/I limit. stop]** SSb has been configured) Time delay for taking SSF limitation into account.		

(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

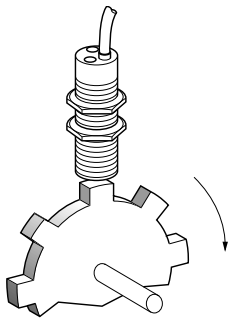
[Frequency meter] F 9 F —

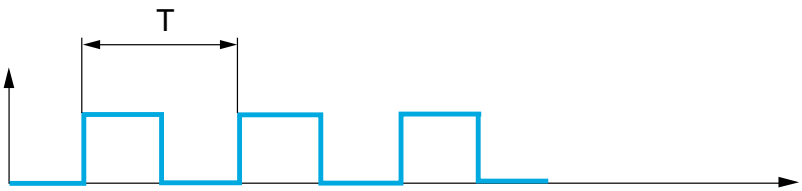
Use of the "Pulse input" input to measure the speed of rotation of the motor

This function uses the "Pulse input" input and can only be used if the "Pulse input" input is not being used for another function.

Example of use

An indexed disk driven by the motor and connected to a proximity sensor can be used to generate a frequency signal that is proportional to the speed of rotation of the motor.





Time in seconds

When applied to the "Pulse input" input, this signal supports:

- Measurement and display of the motor speed: signal frequency = 1/T. This frequency is displayed by means of the **[Measured Freq]** F 9 S parameter , page 49.
- Overspeed detection (if the measured speed exceeds a preset threshold, the drive triggers a detected error).
- Brake failure detection, if brake logic control has been configured: If the speed does not drop sufficiently quickly following a command to engage the brake, the drive triggers a detected error. This function can be used to detect worn brake linings.
- Detection of a speed threshold that can be adjusted using **[Pulse warning thd.]** F 9 L and is assignable to a relay or logic output .

Access

Parameters described below can be accessed by: d r 1 ➡ C o n F ➡ F u L L ➡ F L t ➡ F 9 F

Parameters list

HMI label	Settings	Factory setting
[Frequency meter] F9F —		
[Frequency meter] F9F	—	**[No]** nO
Frequency meter, activation of the speed measurement function. • **[No]** nO: ***No***, function inactive. In this case, none of the function parameters can be accessed • **[Yes]** YES: ***Yes***, function active, assignment only possible if no other functions have been assigned to the "Pulse input" input		
[Pulse scal. divider] F9C	1.0 to 100.0	1.0
Pulse scaling divisor The frequency measured is displayed by means of the **[Measured Freq]** F95 parameter , page 49.		
[Overspd. pulse thd.] F9A	—	**[No]** nO
Overspd. pulse threshold Activation and adjustment of overspeed monitoring: **[Motor Overspeed]** SOF. • **[No]** nO: No overspeed monitoring • **[1 Hz to 20.00 kHz] -**: Adjustment of the frequency tripping threshold on the "Pulse input" input divided by **[Pulse scal. divider]** F9C.		
[Pulse overspd delay] tdS	0.0 s to 10.0 s	0.0 s
Pulse Overspeed delay, time delay for taking overspeed detected error into account.		
[Level fr. pulse ctrl] Fdt	—	**[No]** nO
Level freq. pulse ctrl Activation and adjustment of monitoring for the Pulse input (speed feedback): **[Encoder Feedback Loss]** SPF. • **[No]** nO: No monitoring of speed feedback • **[0.1 Hz to 599 Hz] -**: Adjustment of the motor frequency threshold for tripping a speed feedback detected error (difference between the estimated frequency and the measured speed).		
[Pulse thd. wo Run] F9t	—	**[No]** nO
Pulse threshold wo Run Activation and adjustment of brake monitoring: **[Brake Feedback]** brF. If brake logic control **[Brake assignment]** bLC is not configured, this parameter is forced to **[No]** nO. • **[No]** nO: No brake monitoring • **[1 Hz to 1,000 Hz] -**: Adjustment of the motor frequency threshold.		
[Pulse wo Run delay] t9b	0.0 s to 10.0 s	0.0 s
Pulse without Run delay		

[Dynamic load detect.] dLd —

Load variation detection

This detection is only possible with the High-speed hoisting function. It can be used to detect if an obstacle has been reached, triggering a sudden (upward) increase or (downward) decrease in the load.
Load variation detection triggers a **[Dynamic Load Error]** dLF. The **[Dyn. load Mgt.]** dLb parameter can be used to configure the response of the drive in the event of this detected error.

Load variation detection can also be assigned to a relay or a logic output.

There are two possible detection modes, depending on the configuration of high-speed hoisting:

- Speed reference mode
  [High speed hoisting] HSo is set to **[Reference Frequency]** SSo.
  Torque variation detection.
  During high-speed operation, the load is compared to that measured during the speed step. The permissible load variation and its duration can be configured. If exceeded, the drive switches to detected error mode.
- Current limitation mode
  [High speed hoisting] HSo is set to **[Current Limit]** CSo.
  On ascend, during high-speed operation, an increase in load results in a drop in speed. Even if highspeed operation has been activated, if the motor frequency drops below the **[I Limit. frequency]** SCL threshold the drive switches to detected error mode. The detection is realised only for a positive variation of the load and only in the high speed area (area upper to **[I Limit. frequency]** SCL).
  On descend, operation takes the form of Speed reference mode.

Access

Parameters described below can be accessed by: drI ➡ ConF ➡ FULL ➡ FLt ➡ dLd

Parameters list

HMI label	Settings	Factory setting
[Dynamic load detect.] dLd —		
Load variation detection. This can be accessed if **[High speed hoisting]** HSo is not **[No]** no.		
[Dynamic load time] tLd	—	**[No]** no
Dynamic load time Activation of load variation detection and adjustment of time delay for taking load variation detected error **[Dynamic Load Error]** dLF into account. • **[No]** no: No load variation detection • **[0.00 s to 10.00 s]** -: Adjustment of the time delay for taking detected error into account. The time delay considered by the drive is multiplied by 2.		
[Dyn. load threshold] dLd	1 to 100%	100%
Dynamic load threshold, adjustment of the threshold for load variation detection, as a % of the load measured during the speed step.		

HMI label	Settings	Factory setting
[Dyn. load Mgt.] dLb	—	**[Freewheel Stop]** YES

Dynamic load Mgt., behavior of the drive in the event of a load variation detected error.

- **[Ignore]** nO: ***Ignore***, detected external error ignored
- **[Freewheel Stop]** YES: ***Freewheel stop***
- **[Configured Stop]** Stt: ***Configured stop [STT] parameter***, stop according to configuration of **[Type of stop]** Stt , without tripping. In this case, the fault relay does not open and the drive is ready to restart as soon as the detected error disappears, according to the restart conditions of the active command channel (for example, according to **[2/3-Wire Control]** tCC and **[2-wire type]** tCt , page 146 if control is via the terminals). Configuring an alarm for this detected error is recommended (assigned to a logic output, for example) to indicate the cause of the stop.
- **[Fallback Speed]** LFF: ***Fallback speed***, change to fallback speed, maintained as long as the detected error persists and the run command has not been removed (1)
- **[Speed maintained]** rLS: ***Speed maintained***, the drive maintains the speed being applied when the detected error occurred, as long as the detected error is present and the run command has not been removed (1)
- **[Ramp stop]** rMP: ***Ramp stop***
- **[Fast stop]** FSt: ***Fast stop***

[Autotuning error] tnF —

Access

Parameters described below can be accessed by: dr1 ➔ ConF ➔ FULL ➔ FLt ➔ tnF

Parameters list

HMI label	Settings	Factory setting
[Autotuning error] tnF —		
[Tuning Error Resp] tnL	—	**[Freewheel Stop]** YES
Response to Autotuning error • **[Ignore]** no: ***Ignore***, detected error ignored • **[Freewheel Stop]** YES: ***Freewheel stop***		

(1) Because, in this case, the detected error does not trigger a stop, it is recommended to assign a relay or logic output to its indication.

★ : 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.

: Setting of this parameter can be done during operation or when stopped.

[Boards pairing] PPI —

Card pairing

Function can only be accessed in **[Expert]** EPr mode.
This function is used to detect whenever a module has been replaced or the software has been modified in any way.
When a pairing password is entered, the parameters of the module currently inserted are stored. On every subsequent power-up, these parameters are verified and, in the event of a discrepancy, the drive locks in detected HCF error mode. Before the drive can be restarted, you must revert to the original situation or re-enter the pairing password.
The following parameters are verified:

- The type of module for: all modules.
- The software version for: the control block, the communication modules.
- The serial number for: the control block.

Access

Parameters described below can be accessed by: drI ➡ ConF ➡ FULL ➡ FLt ➡ PPI

HMI label	Settings	Factory setting
[Boards pairing] PPI —		
[Pairing password] PPI ★	**[OFF]** oFF to 9,999	**[OFF]** oFF
Pairing password • **[OFF]** oFF: value signifies that the module pairing function is inactive • **-**: The **[ON]** on value signifies that module pairing is active and that an access code must be entered to start the drive in the event of a module pairing detected error . As soon as the code has been entered, the drive is unlocked and the code changes to **[ON]** on. The PPI code is an unlock code known only to Schneider Electric Product Support.		

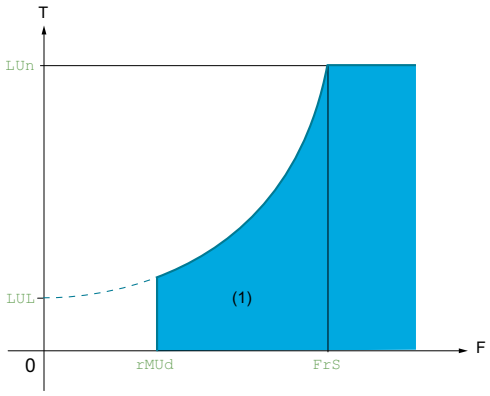
★ : These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

[Process underload] uLd —

Process underload detected error

A process underload is detected when the next event occurs and remains pending for a minimum time **[UnId Detect Delay]** uLt), which is configurable:

- The motor is in steady state and the torque is below the set underload limit (**[UnId.Thr.0.Speed]** LuL, **[UnId.Thr.Nom.Speed]** Lun, **[UnId. FreqThr. Det.]** rMud parameters).
- The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq]** Srb.



Between zero frequency and the rated frequency, the curve reflects the following equation:
torque = LuL + ((Lun — LuL) x frequency)^2)/ (rated frequency)^2

The underload function is not active for frequencies below **[UnId. FreqThr. Det.]** rMud.

T: Torque as a % of the rated torque

F: Frequency

1. Underload zone

A relay or a logic output can be assigned to the signaling of this detected error in the **[Inputs / Outputs]** I_O — menu.

Access

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ uLd

Parameters list

HMI label	Settings	Factory setting
[Process underload] uLd —		
[UnId Detect Delay] uLt	0 to 100 s	0 s
Underload detection delay A value of 0 deactivates the function and makes the other parameters inaccessible.		
[UnId.Thr.Nom.Speed] Lun ★ ( )	20 to 100%	60%
UnId.Thr. at Nom. speed Underload threshold at rated motor frequency (**[Nominal Motor Freq]** Frs , page 99), as a % of the rated motor torque.		

HMI label	Settings	Factory setting
[Unld.Thr.0.Speed] L u L ★ (↻)	0 to **[Unld.Thr.Nom.Speed]** L u n	0%
Unld.Thr. at O speed, underload threshold at zero frequency, as a % of the rated motor torque.		
[Unld. FreqThr. Det.] r N u d ★ (↻)	0 to 599 Hz	0 Hz
Unld. Freq.Thr. Detection, minimum frequency underload detection threshold.		
[Hysteresis Freq] S r b ★ (↻)	0.3 to 599 Hz	0.3 Hz
Hysteresis frequency, maximum deviation between the frequency reference and the motor frequency, which defines steady state operation.		
[Underload ErrorResp] u d L ★	—	**[Freewheel Stop]** Y E S
Response to underload error • **[Ignore]** n o: ***Ignore***, detected error ignored • **[Freewheel Stop]** Y E S: ***Freewheel stop*** • **[Ramp stop]** r M P: ***Ramp stop*** • **[Fast stop]** F S t: ***Fast stop***		
[Underload T.B.Rest.] F t u ★ (↻)	0 to 6 min	0 min
Unld time Before Restart This parameter cannot be accessed if **[Underload ErrorResp]** u d L is set to **[Ignore]** n o. Minimum time permitted between an underload being detected and any automatic restart. To allow an automatic restart, the value of **[Fault Reset Time]** t A r , page 329 must exceed this parameter by at least one minute.		

★ : 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.

(↻) : Setting of this parameter can be done during operation or when stopped.

[Process overload] o L d —

Process overload detected error

A process overload is detected when the next event occurs and remains pending for a minimum time **[OvId Detection Delay]** t o L , which is configurable:

- The drive is in current limitation mode.
- The motor is in steady state and the current is above the set overload threshold **[Overload Threshold]** L o C .

The motor is in steady state when the offset between the frequency reference and motor frequency falls below the configurable threshold **[Hysteresis Freq]** S r b.

A relay or a logic output can be assigned to the signaling of this detected error in the **[Inputs / Outputs]** I _ O — menu.

Access

Parameters described below can be accessed by: d r I ➡ C o n F ➡ F u L L ➡ F L t ➡ o L d

Parameters list

HMI label	Settings	Factory setting
[Process overload] o L d —		
[OvId Detection Delay] t o L	0 to 100 s	0 s
Overload detection delay A value of 0 deactivates the function and makes the other parameters inaccessible.		
[Overload Threshold] L o C ★ ( ) (1)	70 to 150%	110%
Current overload threshold Overload detection threshold, as a % of the rated motor current **[Nom Motor Current]** n C r , page 99. This value must be less than the limit current for the function to work.		
[Hysteresis Freq] S r b ★ ( ) (1)	0 to 599 Hz	0.3 Hz
Hysteresis frequency, maximum deviation between the frequency reference and the motor frequency, which defines steady state operation.		
[Overload ErrorResp] o d L ★	—	**[Freewheel Stop]** Y E S
Response to overload error • **[Ignore]** n o: ***Ignore***, detected error ignored • **[Freewheel Stop]** Y E S: ***Freewheel stop*** • **[Ramp stop]** r M P: ***Ramp stop*** • **[Fast stop]** F S t: ***Fast stop***		

HMI label	Settings	Factory setting
[Overload T.B.Rest.] F t o ★ (1)	0 to 6 min	0 min
Ovld time Before Restart This parameter cannot be accessed if **[Overload ErrorResp]** o d L is set to **[Ignore]** n o . Minimum time permitted between an overload being detected and any automatic restart. To allow an automatic restart, the value of **[Fault Reset Time]** t A r must exceed this parameter by at least one minute.		

[Fallback speed] L F F —

Access

Parameters described below can be accessed by: d r i → C o n F → F u L L → F L t → L F F

Parameters list

HMI label	Settings	Factory setting
[Fallback speed] L F F —		
[FallbackSpeed] L F F	0 to 599 Hz	0 Hz
Fall back speed		

[Ramp divider] FSt —

Access

Parameters described below can be accessed by: drI ➜ ConF ➜ FULL ➜ FLt ➜ FSt

Parameters list

HMI label	Settings	Factory setting
[Ramp divider] FSt —		
[Ramp Divider] dCF ★ (1)	0 to 10	4
Fast Stop ramp Divider The ramp that is enabled (**[Deceleration]** dEC or **[Deceleration 2]** dE2) is then divided by this coefficient when stop requests are sent. Value 0 corresponds to a minimum ramp time.		

[DC injection] d C i —

Access

Parameters described below can be accessed by: d r i ➡ C o n F ➡ F u L L ➡ F L t ➡ d C i

Parameters list

HMI label	Settings	Factory setting
[DC injection] d C i —		
[DC Inj Level 1] i d C ★ ( ) (1) (3)	0.1 to 1.41 In (2)	0.64 In (2)
DC injection level 1		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Level of DC injection braking current activated via logic input or selected as stop mode.		
[DC Inj Time 1] t d i ★ ( ) (1) (3)	0.1 to 30 s	0.5 s
DC injection time 1		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Maximum current injection time **[DC Inj Level 1]** i d C. After this time, the injection current becomes **[DC Inj Level 2]** i d C 2.		
[DC Inj Level 2] i d C 2 ★ ( ) (1) (3)	0.1 In (2) to **[DC Inj Level 1]** i d C	0.5 In (2)
DC injection level 2		
NOTICE **OVERHEATING** Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time. **Failure to follow these instructions can result in equipment damage.**		
Injection current activated by logic input or selected as stop mode, once period of time **[DC Inj Time 1]** t d i has elapsed.		
[DC Inj Time 2] t d C ★ ( ) (1) (3)	0.1 to 30 s	0.5 s

HMI label	Settings	Factory setting

DC injection time 2

NOTICE

OVERHEATING

Verify that the connected motor is properly rated for the DC injection current to be applied in terms of amount and time.

Failure to follow these instructions can result in equipment damage.

Maximum injection time **[DC Inj Level 2]** I d C 2 for injection, selected as stop mode only.

This parameter can be accessed if **[Type of stop]** S t t is set to **[DC injection]** d C I.

(1) The parameter can also be accessed in the **[Settings]** S E t — and **[Application function]** F u n — menus.

(2) In corresponds to the rated drive current indicated in the Installation manual and on the drive nameplate.

(3) These settings are independent of the **[Auto DC injection]** A d C — function.

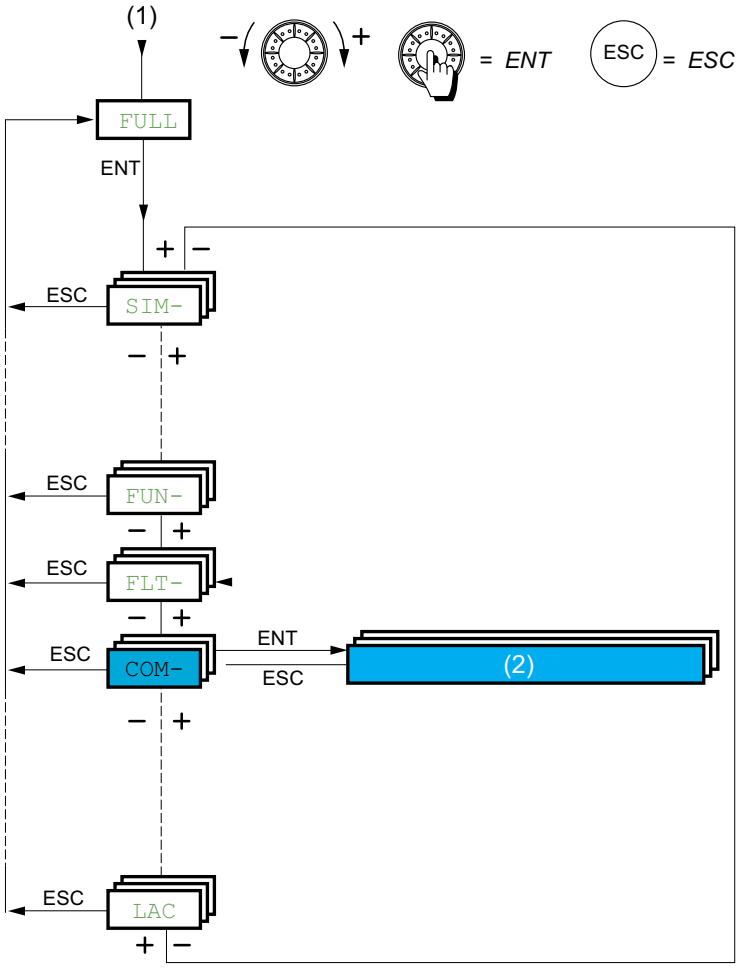
★ : These parameters only appear if the corresponding function has been selected in another menu. When the parameters can also be accessed and adjusted from within the configuration menu for the corresponding function, their description is detailed in these menus, on the pages indicated, to aid programming.

: Setting of this parameter can be done during operation or when stopped.

1.3.4.9 [Full] F u L L – – [Communication] C o M –

What's in This Chapter

With integrated display terminal



1. From CONF — menu
2. Communication

[Com. scanner input] ICS —

Access

Parameters described below can be accessed by: dr1 ➡ CONF ➡ FULL ➡ FLT ➡ COM

Parameters list

HMI label	Settings	Factory setting
[Com. scanner input] ICS —		
[Scan. IN1 address] NMA1 to **[Scan. IN4 address]** NMA4 could be used for Fast Task of the communication scanner (see Modbus & CANopen® communication manual).		
[Scan. IN1 address] NMA1	—	3,201
Scan input 1 address, address of the 1st input word.		
[Scan. IN2 address] NMA2	—	8,604
Scan input 2 address, address of the 2nd input word.		
[Scan. IN3 address] NMA3	—	0
Scan input 3 address, address of the 3rd input word.		
[Scan. IN4 address] NMA4	—	0
Scan input 4 address, address of the 4th input word.		
[Scan. IN5 address] NMA5	—	0
Scan input 5 address, address of the 5th input word.		
[Scan. IN6 address] NMA6	—	0
Scan input 6 address, address of the 6th input word.		
[Scan. IN7 address] NMA7	—	0
Scan input 7 address, address of the 7th input word.		
[Scan. IN8 address] NMA8	—	0
Scan input 8 address, address of the 8th input word.		

[Com. scanner output] oCS —

Access

Parameters described below can be accessed by: dr1 ➜ ConF ➜ FULL ➜ FLt ➜ oCS

Parameters list

HMI label	Settings	Factory setting
[Com. scanner output] oCS —		
[Scan.Out1 address] nCA1 to **[Scan.Out4 address]** nCA4 could be used for Fast Task of the communication scanner (see Modbus & CANopen® communication manual).		
[Scan.Out1 address] nCA1	—	8,501
Scan output 1 address, address of the 1st output word.		
[Scan.Out2 address] nCA2	—	8,602
Scan output 2 address, address of the 2nd output word.		
[Scan.Out3 address] nCA3	—	0
Scan output 3 address, address of the 3rd output word.		
[Scan.Out4 address] nCA4	—	0
Scan output 4 address, address of the 4th output word.		
[Scan.Out5 address] nCA5	—	0
Scan output 5 address, address of the 5th output word.		
[Scan.Out6 address] nCA6	—	0
Scan output 6 address, address of the 6th output word.		
[Scan.Out7 address] nCA7	—	0
Scan output 7 address, address of the 7th output word.		
[Scan.Out8 address] nCA8	—	0
Scan output 8 address, address of the 8th output word.		

★ : 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.

[Modbus Fieldbus] n d I —

Access

Parameters described below can be accessed by: d r I ➡ C o n F ➡ F u L L ➡ F L t ➡ n d I

Parameters list

HMI label	Settings	Factory setting
[Modbus Fieldbus] n d I —		
[Modbus Address] A d d	**[OFF]** o F F to 247	**[OFF]** o F F
Device modbus address **[OFF]** o F F **-** 1 to 247		
[Modbus add Com.C.] A n o C ★	**[OFF]** o F F to 247	**[OFF]** o F F
Mdb add comm. module **[OFF]** o F F **-** 1 to 247		
[Modbus Baud Rate] t b r	—	**[19.2 Kbps]** 19 2
Modbus baud rate 4 8 - 9 6 - 19 2 - 38 4 kbps on the integrated display terminal. 4800, 9600, 19200 or 38400 bauds on the graphic display terminal.		
[Modbus Format] t F o	—	**[8-E-1]** 8 E I
Modbus format 8O1 - 8E1 - 8n1, 8n2		
[ModbusTimeout] t t o	0.1 to 30 s	10.0 s
Modbus timeout 0.1 to 30 s		
[Mdb com stat] C o n I	—	—
Modbus com. status • **[R0T0]** r 0 t 0: ***R0T0***, Modbus no reception, no transmission = communication idle • **[R0T1]** r 0 t I: ***R0T1***, Modbus no reception, transmission • **[R1T0]** r I t 0: ***R1T0***, Modbus reception, no transmission • **[R1T1]** r I t I: ***R1T1***, Modbus reception and transmission		

★ : 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.

[CANopen] CNO —

Access

Parameters described below can be accessed by: dr1 ➡ CONF ➡ FULL ➡ FLT ➡ CNO

Parameters list

HMI label	Settings	Factory setting
[CANopen] CNO —		
[CANopen Address] ADCO	**[OFF]** OFF to 127	**[OFF]** OFF
Device CANopen address **[OFF]** OFF: OFF - 1 to 127		
[CANopen Baudrate] BDCO	—	**[250 kbps]** 250K
CANopen baudrate • **[50 kbps]** 50K: 50,000 Bauds • **[125 kbps]** 125K: 125,000 Bauds • **[250 kbps]** 250K: 250,000 Bauds • **[500 kbps]** 500K: 500,000 Bauds • **[1 Mbps]** 1M: 1 MBauds		
[CANopen Error] ERCO	0 to 5	—
CANopen error. Read-only parameter, cannot be modified.		

[Communication module] CBD —

Access

Parameters described below can be accessed by: dr1 ➡ CONF ➡ FULL ➡ FLT ➡ CNO

Parameters list

HMI label	Settings	Factory setting
[Communication module] CBD —		
See the specific documentation for the module used.		

[Forced local] L C F —

Access

Parameters described below can be accessed by: d r ➔ C o n F ➔ F u L L ➔ F L t ➔ L C F

Parameters list

HMI label	Settings	Factory setting
[Forced local] L C F —		
[Forced Local Assign] F L o	—	**[No]** n o
Forced local assignment, forced local mode is active when the input is at state 1. **[Forced Local Assign]** F L o is forced to **[No]** n o if **[Profile]** C H C F is set to **[I/O profile]** i o , page 189. • **[No]** n o: ***No***, Function inactive • **[DI1]** L i 1: ***Digital input 1*** **[...] ...** • **[DI6]** L i 6: ***Digital input 6*** • **[DAI1]** L A i 1: ***Digital input AI1*** • **[DAI2]** L A i 2: ***Digital input AI2*** • **[OL01]** o L 0 1: ***OL01***, function blocks: Logical Output 01 **[...] ...** • **[OL10]** o L 1 0: ***OL10***, function blocks: Logical Output 10		
[Forced Local Chan] F L o C	—	**[No]** n o
Forced Local channel assignment • **[No]** n o: ***No***, not assigned (control via the terminals with zero reference) • **[AI1]** A i 1: ***AI1***, Analog input • **[AI2]** A i 2: ***AI2***, Analog input • **[AI3]** A i 3: ***AI3***, Analog input • **[HMI]** L C C: ***Local HMI***, assignment of the reference and command to the graphic display terminal or remote display terminal. Reference: **[Ref Frequency]** L F r , page 49. Command: RUN/STOP/FWD/REV keys. **[RP]** P i: ***Pulse input*** **[OA01]** o A 0 1: ***OA01***, Function blocks: Analog Output 01 ... **[OA10]** o A 1 0: ***OA10***, Function blocks: Analog Output 10		
[Time-out forc. local] F L o t ★	0.1 to 30 s	10.0 s
Time-out forc. local 0.1 to 30 s. This parameter can be accessed if **[Forced Local Assign]** F L o is not set to **[No]** n o. Time delay before communication monitoring is resumed on leaving forced local mode.		

[Fieldbus Identifier Sel] nt id

Access

Parameters described below can be accessed by: dr i ➡ ConF ➡ FULL ➡ FLt ➡ CoM

Parameters list

HMI label	Settings	Factory setting
[Fieldbus Identifier Sel] nt id	—	—
Fieldbus identifier selection • This parameter allows to the ATV320 drive to be identified as an ATV320 or an ATV32 drive by the network. • The modification of the setting value is effective when you restart the drive. • This parameter is not part of a drive configuration. This parameter cannot be transfered. • A factory setting does not modify the setting value of this parameter. **[ATV320]** 320: Network identifies the drive as an ATV320. **[ATV32]** 32: Network identifies the drive as an ATV32.		

★ : 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.

[Access Level] LAC

See **[3.1] [Access Level]** LAC **[Access Level]** LAC, page 376 .

2. [Interface] iEF-

What's in This Chapter

[Access Level] LAC

Access

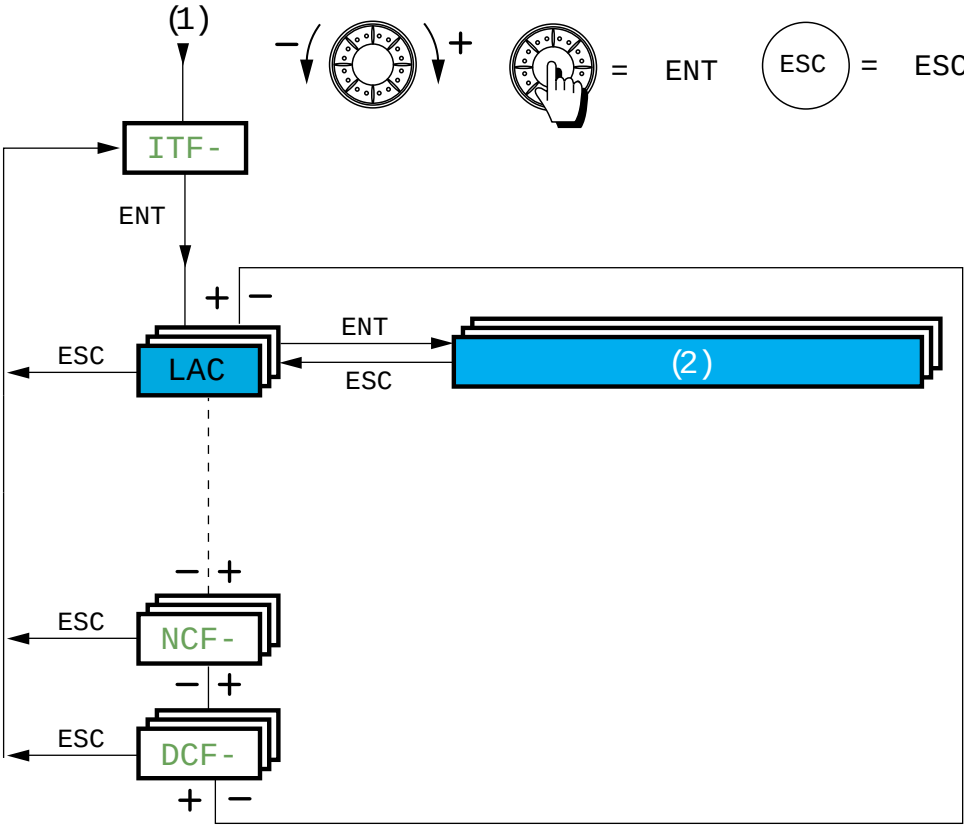
Parameters described below can be accessed by: **[Interface]**.

About This Menu

Displayed parameters depend on drive settings.

(↻): Setting of this parameter can be done during operation or when stopped.

With Integrated Display Terminal



1. From ıtF- menu
2. Access level

3.1 [Access Level] LAC

HMI Label	Settings	Factory setting
[Access Level] LAC	–	**[Standard]** Std
Access level		
[Basic] bAS: Limited access to **[Simply start]** SIM-, **1.2 [MONITORING]** MON-, **[Settings]** SET-,		
[Factory settings] FCS-, **5 [Password]** COD and **3.1 [Access Level]** LAC- menus. Only one function can be assigned to each input.		
[Standard] Std: Access to all menus on the integrated display terminal. Only one function can be assigned to each input.		
[Advanced] AdV: Access to all menus on the integrated display terminal. Several functions can be assigned to each input.		
[Expert] EPr: Access to all menus on the integrated display terminal and access to additional parameters. Several functions can be assigned to each input.		

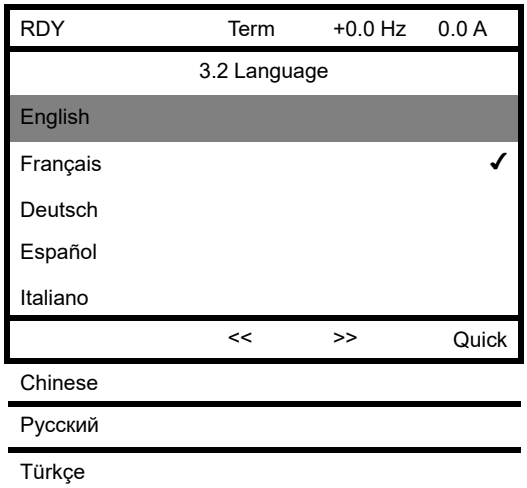
Comparison of the menus that can be accessed on the graphic display terminal/integrated display terminal

				Access level			
				[Basic] bAS	[Standard] Std	[Advanced] AdV	[Expert] EPr
1 [Drive menu] drı-							
	1.1 [Reference speed] rEF-						
	1.2 [MONITORING] Mon-						
		[MONIT. MOTOR] MMo-					
		[I/O Map] ıoM-					
		[MONIT. SAFETY] SAF-					
		[Monit. Fun. Blocks] MFb-					
		[Communication map] CMM-					
		[MONIT. PI] MPı-					
		[Power-On time] PEt-					
		[Warnings] ALr-(1)					
		[Other State] SSt-(1)					
		[Warnings] Cod-					
	1.3 [Configuration] Conf						
		[My menu] MYMn-					
		[Factory settings] FCS-					
		[Full] FULL-					
			[Simply start] SımP-				
			[Settings] SEt-				
			[Function Blocks] FbM-				
2[Identification] oId- (1)							
3[Interface] ıtF- (1)							
	3.1 [Access Level] LAC-						
	3.2 [LANGUAGE] LnG-						
4[Open / Save as] trA- (1)							
5[Password] Cod- (1)							
A single function can be assigned to each input.							
1 [Drive menu] drı-	**1.2 [MONITORING]** Mon-	**[Diagnostics]** dGt-					
	1.3 [Configuration] Conf	**[Full]** FULL-					
			[Motor control] drC-				
			[Input/Output] ıo-				
			[Command] CtL-				
			[Application function] Fun-				
			[FAULT MANAGEMENT] FLt-				
			[Communication] CoM-				
3[Interface] ıtF- (1)	**3.3 [MONITORING CONFIG.]** MCF-						

A single function can be assigned to each input.	
	3.4 [Display config.] d C F - (1)
Several functions can be assigned to each input.	
Expert parameters	
Several functions can be assigned to each input.	

(1) Can be accessed only with graphic display terminal.

[LANGUAGE] LnG



When only one selection is possible, the selection made is indicated by ✓

Example: Only one language can be chosen.

About This Menu

Displayed parameters depend on drive settings.

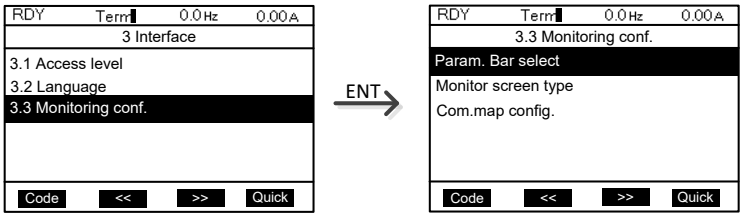
(↻) : Setting of this parameter can be done during operation or when stopped.

3.2 [LANGUAGE] LnG

HMI Label	Settings	Factory setting
[LANGUAGE] LnG (↻)	–	**[Language 0]** LnG0
Language selection Current language index. **[Language 0]** LnG0 ... **[Language 9]** LnG9		

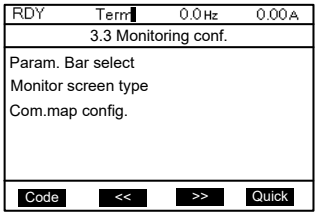
[MONITORING CONFIG.] nCF

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 displayed on the top line (the first 2 cannot be modified).



[MONITOR SCREEN TYPE]: Selection of parameters displayed in the centre of the screen and the display mode (digital values or bar graph format).

[Com. map config.]: Selection of the words displayed and their format.

Access

Parameters described below can be accessed by: **[Interface]** ➡ **[MONITORING CONFIG.]**

About This Menu

Displayed parameters depend on drive 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.

( ) : Setting of this parameter can be done during operation or when stopped.

[MONITORING CONFIG.] nCF —

HMI Label	Settings	Factory setting
3.3 [MONITORING CONFIG.] nCF -		

[Param. Bar Select]

HMI Label	Settings	Factory setting
[Param. Bar Select] PbS-		
[AI1]	in V	
[AI2]	in V	
[AI3]	in mA	
[AO1]	in V	
[ETA state world]		
[Alarm groups]		
[Frequency ref.]	in Hz: parameter displayed in factory configuration	
[Output frequency]	in Hz	
[Motor current]	in A: parameter displayed in factory configuration	
[Motor speed]	in rpm	
[Motor voltage]	in V	
[Motor power]	in W	
[Motor torque]	as a %	
[Mains voltage]	in V	
[Motor thermal state]	as a %	
[Drv. thermal state]	as a %	
[Consumption]	in Wh or kWh depending on drive rating	
[Run time]	in hours (length of time the motor has been switched on)	
[Power on time]	in hours (length of time the drive has been switched on)	
[IGBT alarm counter]	in seconds (total time of IGBT overheating alarms)	
[Min. freq time]	in seconds	
[PID reference]	as a %	
[PID feedback]	as a %	
[PID error]	as a %	
[PID Output]	in Hz	
[Config. active]	CNF0, 1 or 2	
[Utilised param. set]	SET1, 2 or 3	

Select the parameter using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT.

1 or 2 parameters can be selected.

Example:

PARAM. BAR SELECT
MONITORING
----✓

----✓

HMI Label	Settings	Factory setting

Access

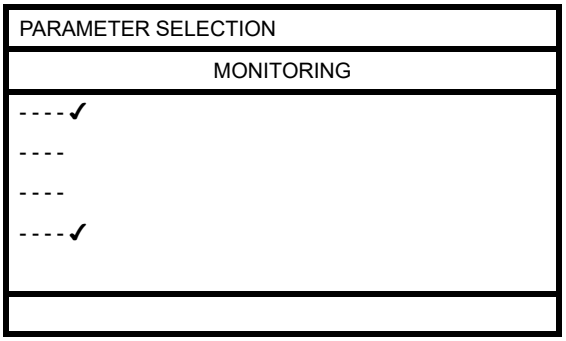
Parameters described below can be accessed by: **[Interface]** ➡ **[MONITORING CONFIG.]** ➡ **[MONITOR SCREEN TYPE]**

[MONITOR SCREEN TYPE]

HMI Label	Settings	Factory setting
[Display value type] MdE	–	**[Digital]** dEC
HMI displayed value type		
[Digital] dEC		
[Bar graph] bAr		
[List] LiSt		
[Motor param choice] MPC ★		
[AI1]	in V	
[AI2]	in V	
[AI3]	in mA	
[AO1]	in V	
[ETA state world]		
[Alarm groups]		
[Frequency ref.]	in Hz: parameter displayed in factory configuration	
[Output frequency]	in Hz	
[Pulse in. work. freq.]	in A: parameter displayed in factory configuration	
[Motor current]	in Hz	
[Motor speed]	in rpm	
[Motor voltage]	in V	
[Motor power]	in W	
[Motor torque]	as a %	
[Mains voltage]	in V	
[Motor thermal state]	as a %	
[Drv. thermal state]	as a %	
[Consumption]	in Wh or kWh depending on drive rating	
[Run time]	in hours (length of time the motor has been switched on)	
[Power on time]	in hours (length of time the drive has been switched on)	
[IGBT alarm counter]	in seconds (total time of IGBT overheating alarms)	

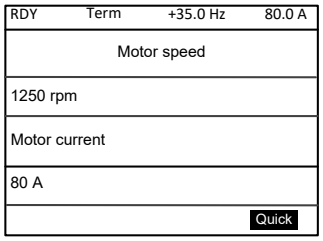
HMI Label	Settings	Factory setting
[Min. freq time]	in seconds	
[PID reference]	as a %	
[PID feedback]	as a %	
[PID error]	as a %	
[PID Output]	in Hz	

Select the parameter(s) using ENT (a ✓ then appears next to the parameter). Parameter(s) can also be deselected using ENT.

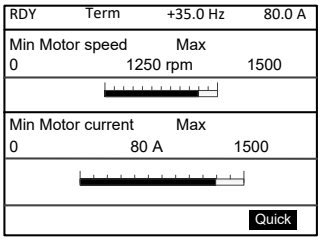


Examples include:

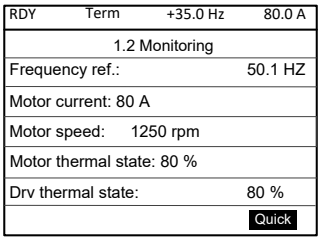
Display of 2 digital values



Display of 2 bar graphs



Display of a list of 5 values



Access

Parameters described below can be accessed by: **[Interface]** ➡ **[MONITORING CONFIG.]** ➡ **[Com. map config.]**

[Com. map config.]

HMI Label	Settings	Factory setting
[Com. map config.] AdL-		
[Word 1 add. select.] iAd1	—	0
HMI logical address 1 sel. Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.		
[Format word 1] FAd1	—	**[Hex]** HEX
Format address 1 Format of word 1.		

HMI Label	Settings	Factory setting
[Hex] HEX **[Signed]** SIG **[Unsigned]** nSG		
[Word 2 add. select.] iAd2	—	0
HMI logical address 2 sel. Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.		
[Format word 2] FAd2	—	**[Hex]** HEX
Format address 2 Format of word 2. **[Hex]** HEX **[Signed]** SIG **[Unsigned]** nSG		
[Word 3 add. select.] iAd3	—	0
HMI logical address 3 sel. Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.		
[Format word 3] FAd3	—	**[Hex]** HEX
Format address 3 Format of word 3. **[Hex]** HEX **[Signed]** SIG **[Unsigned]** nSG		
[Word 4 add. select.] iAd4	—	0
HMI logical address 4 sel. Select the address of the word to be displayed by pressing the << and >> (F2 and F3) keys and rotating the jog dial.		

HMI Label	Settings	Factory setting
[Format word 4] FAd4	—	**[Hex]** HEX

Format address 4

Format of word 4.

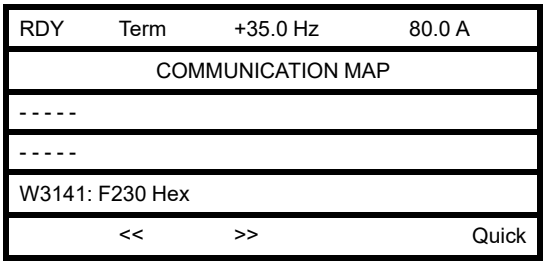
[Hex] HEX

[Signed] SIG

[Unsigned] nSG

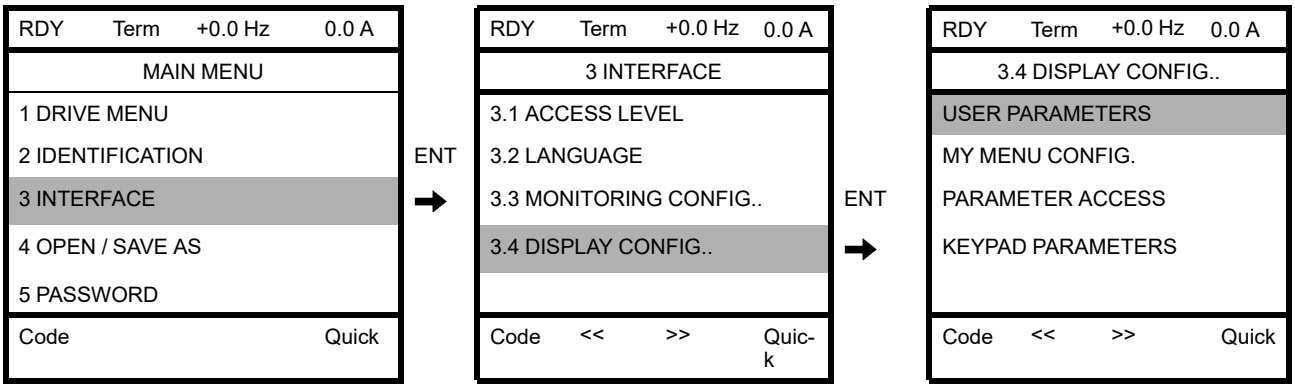
It is possible to view the selected words in the **[Communication map]** submenu of the **1.2 [MONITORING]** menu.

Example:



[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.

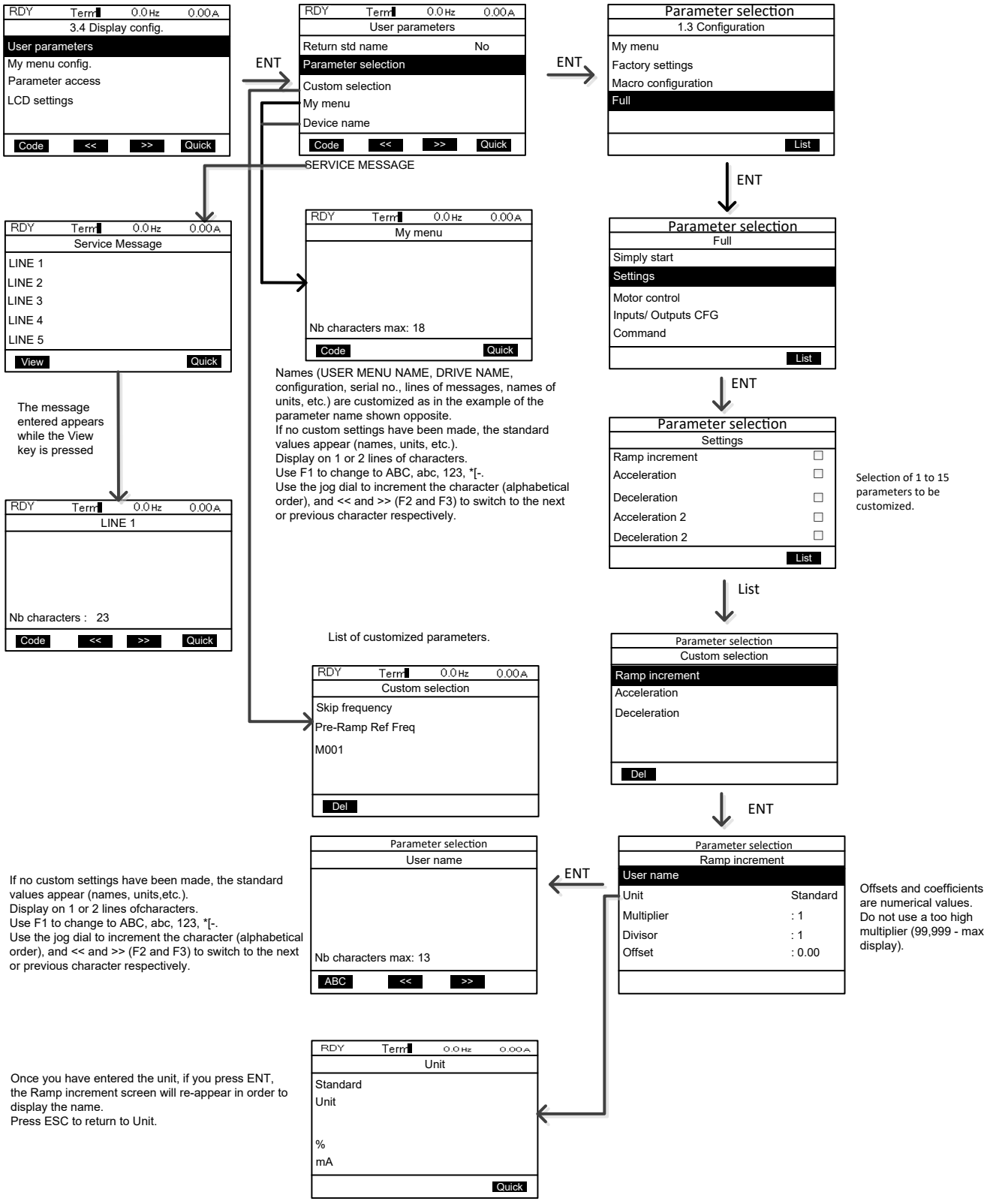


- **USER PARAMETERS**: Customization of 1 to 15 parameters.
- **MY MENU**: Creation of a customized menu.
- **PARAMETER ACCESS**: Customization of the visibility and protection mechanisms of menus and parameters.
- **KEYPAD PARAMETERS**: Adjustment of the contrast and stand-by mode of the graphic display terminal (parameters stored in the terminal rather than in the drive).

HMI Label	Settings	Factory setting
3.4[Display config.] dCF-		

[User parameters]

If **[Return std name]** is set to **[Yes]**, the display reverts to standard but the custom settings remain stored.



Access

Parameters described below can be accessed by: **[Interface]** ➡ **[Display config.]** ➡ **[User parameters]**

About This Menu

Displayed parameters depend on drive settings.

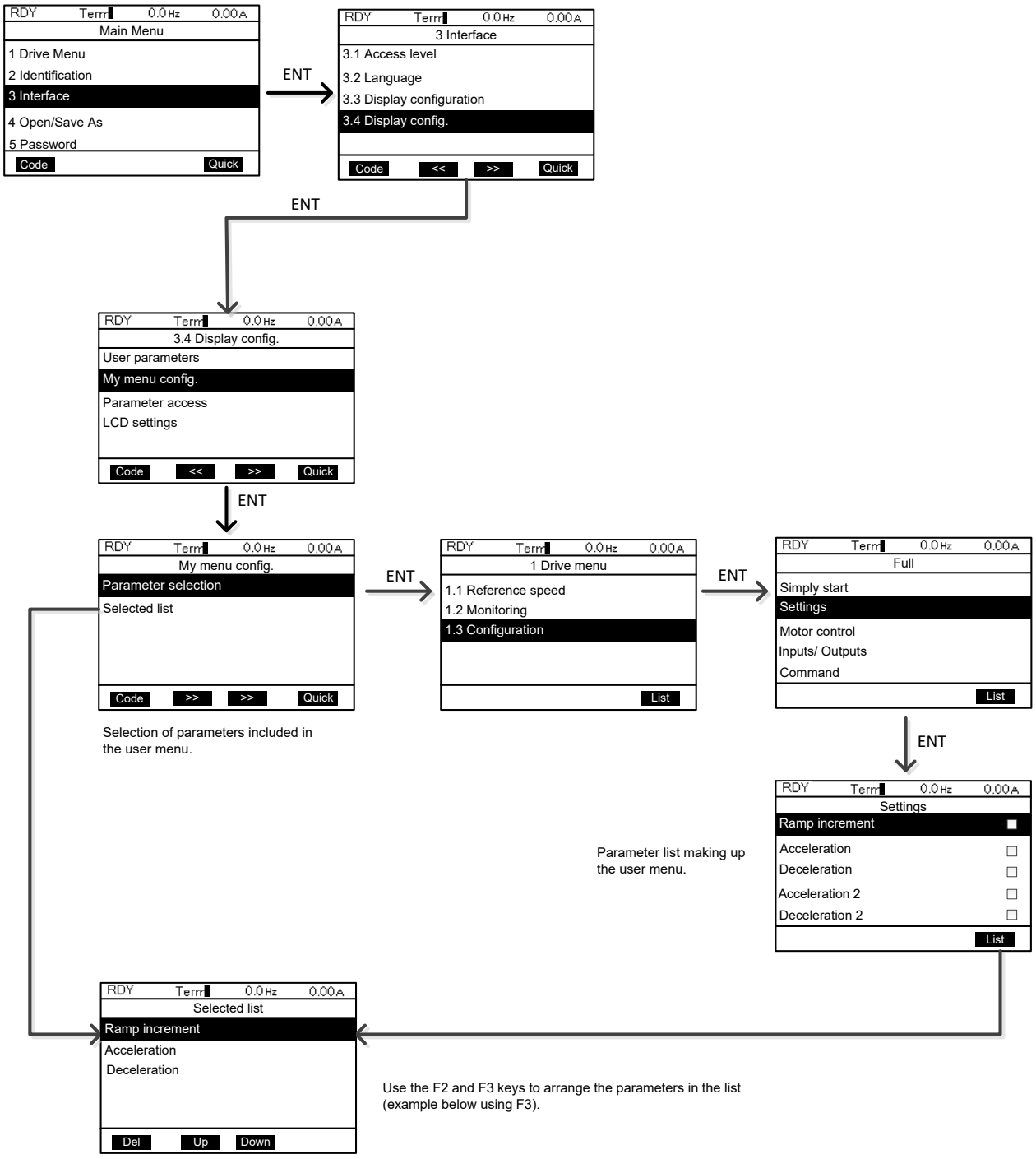
(): Setting of this parameter can be done during operation or when stopped.

[User parameters] CUP-

HMI Label	Settings	Factory setting
[User parameters] CUP-		
[Return std name] GSP ()	—	**[No]** nO
Return standard name Display standard parameters instead of customised ones. **[No]** nO **[Yes]** YES		
[My menu] MYMn		
[Device Name] PAn		
[Service Message] SEr-		
[LINE 1] SML01		
[LINE 2] SML02		
[LINE 3] SML03		
[LINE 4] SML04		
[LINE 5] SML05		
[CONFIGURATION 0] CFN01		
[CONFIGURATION 1] CFN02		
[CONFIGURATION 2] CFN03		
[SERIAL NUMBER] PSN		

[My menu config.] MYC-

NOTE: This parameter is only accessible in expert level.

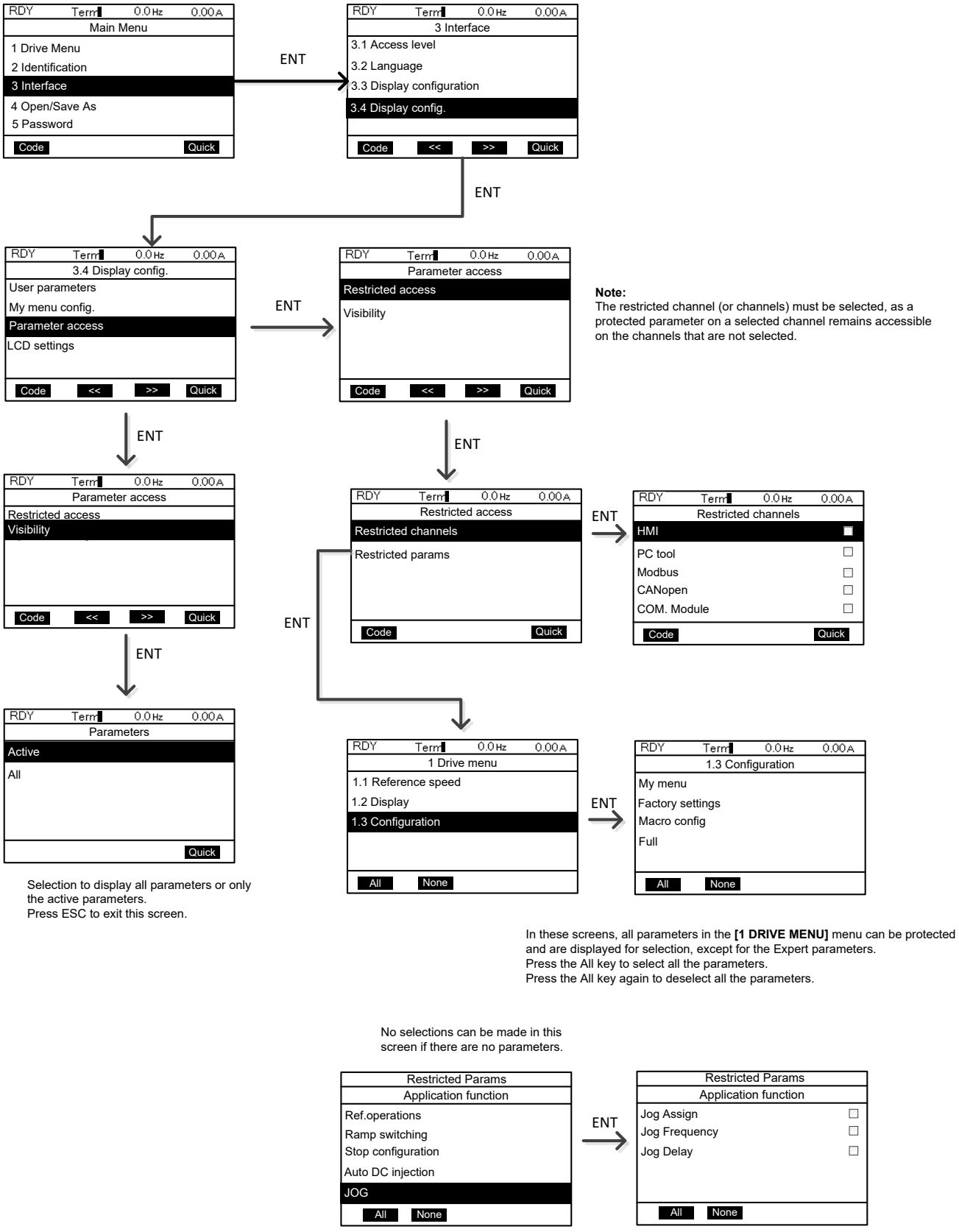


HMI Label	Settings	Factory setting
[My menu config.] nyC-		

Access

Parameters described below can be accessed by: **[Interface]** ➡ **[Display config.]** ➡ **[Parameter access]** ➡ **[Restricted access]** ➡ **[Restricted channels]**

[Parameter access] PAC-



Note:
The restricted channel (or channels) must be selected, as a protected parameter on a selected channel remains accessible on the channels that are not selected.

Selection to display all parameters or only the active parameters.
Press ESC to exit this screen.

In these screens, all parameters in the **[1 DRIVE MENU]** menu can be protected and are displayed for selection, except for the Expert parameters.
Press the All key to select all the parameters.
Press the All key again to deselect all the parameters.

No selections can be made in this screen if there are no parameters.

NOTE:

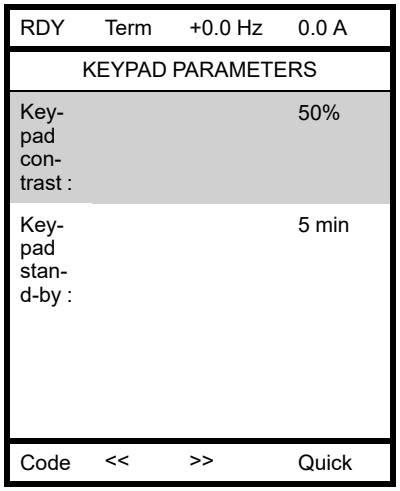
The protected parameters are no longer accessible and are not, therefore, displayed for the selected channels.

HMI Label	Settings	Factory setting
[Parameter access] PAC-		
[Restricted access] Pro-		
[Restricted channels] PCd-		
[HMI] Com: Graphic display terminal or remote display terminal **[PC TOOL]** PWS: PC Software **[MODBUS]** Mdb: Integrated Modbus **[CANopen]** CAn: Integrated CANopen® **[COM. Module]** nEt: Communication module (if inserted)		
[Visibility] Vis-		
[Parameters] PVis	—	**[Active]** ACt
Parameters Parameter visibility: only active ones, or all parameters. **[Active]** ACt **[All]** ALL		

Access

Parameters described below can be accessed by: **[Interface]** ➡ **[Display config.]** ➡ **[LCD settings]**

[LCD settings] CnL-



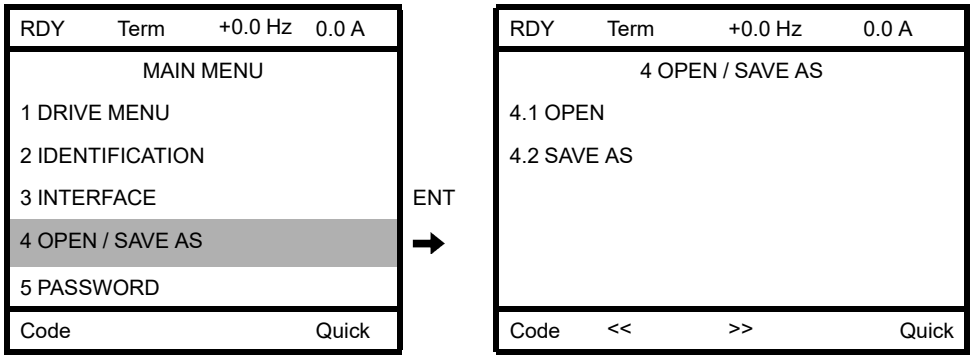
[LCD settings] CnL-

HMI Label	Settings	Factory setting
[LCD settings] CnL-		
[Screen contrast] CrSt	0 to 100%	50%
Screen contrast		

HMI Label	Settings	Factory setting
[Stand-by Delay] CSby	**[No]** no to 10 min	5 min
Stand-by delay Graphic keypad standby delay. **[No]** no		

3. [Open / Save as] Ł r A-

This menu can only be accessed with the graphic display terminal.



[4.1 OPEN]: To download one of the 4 files from the graphic display terminal to the drive.

[4.2 SAVE AS]: To download the current drive configuration to the graphic display terminal.

4 OPEN / SAVE AS				
4,1 OPEN				
File 1			Used	
	None All Drive configura-tion			
		VERIFY THAT THE DRIVE WIRING IS OK ESC = abort ENT = continue		
			TRANSFER IN PROGRESS	
				DONE
	Motor parameters Communi-cation			
File 2			Empty	
File 3			Empty	
File 4			Empty	
4.2 SAVE AS				
File 1			Used	
File 2			Free	
	TRANSFER IN PRO-GRESS			
		DONE		
File 3			Free	
File 4			Free	

NOTE: Opening an empty file has no effect.

NOTE: Opening an empty file has no effect.

Saving to a used file deletes and replaces the configuration contained in this file.

Various messages may appear when the download is requested:

- **[TRANSFER IN PROGRESS]**
- **Error messages if download not possible**
- **[DONE]**
- **[Motor parameters are NOT COMPATIBLE. Do you want to continue?]**: In this case, the download is possible, but the parameters are restricted.

Download Group

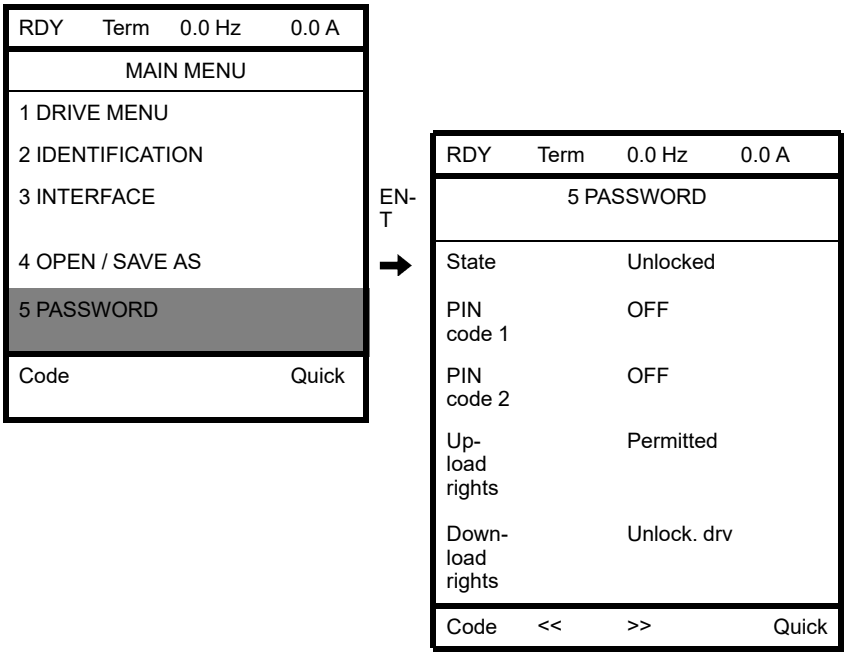
[None]:		No parameters
[All]:		All parameters in all menus
[Drive configuration]:		The entire **1 [Drive menu]** without **[Communication]**
[Motor parameters]:	**[Nom Motor Voltage]** u n S	In the **[Motor control]** d r C - menu
	[Nominal Motor Freq] F r S	
	[Nom Motor Current] n C r	
	[Nominal Motor Speed] n S P	
	[Motor 1 Cosinus Phi] C o S	
	[Nominal Motor Power] n P r	
	[Motor param choice] M P C	
	[Tune selection] S t u n	
	[Motor Th Current] I t H	
	[IR compensation] u F r	
	[Slip compensation] S L P	
	[AsyncMotor R Stator] r S A	
	[AsyncMotor Lf Induct] L F A	
	[Rotor Time Const] t r A	
	[Sync Nominal I] n C r S	
	[Nom SyncMotor Speed] n S P S	
	[Pole pairs] P P n S	
	[Syn. EMF constant] P H S	
	[Autotune L d-axis] L d S	
	[Autotune L q-axis] L q S	
	[Sync Nominal Freq] F r S S	
	[SyncMotor Stator R] r S A S	
	[Nom Motor torque] t q S	
	[U1] u 1	
	[F1] F 1	
	[U2] u 2	
	[F2] F 2	
	[U3] u 3	
	[F3] F 3	
	[U4] u 4	
	[F4] F 4	
	[U5] u 5	

	[F5] F5	
	The motor parameters that can be accessed in **[Expert]** EPr mode .	
	[Motor Th Current] ItH	
[Communication] :		All the parameters in the **[Communication]** menu

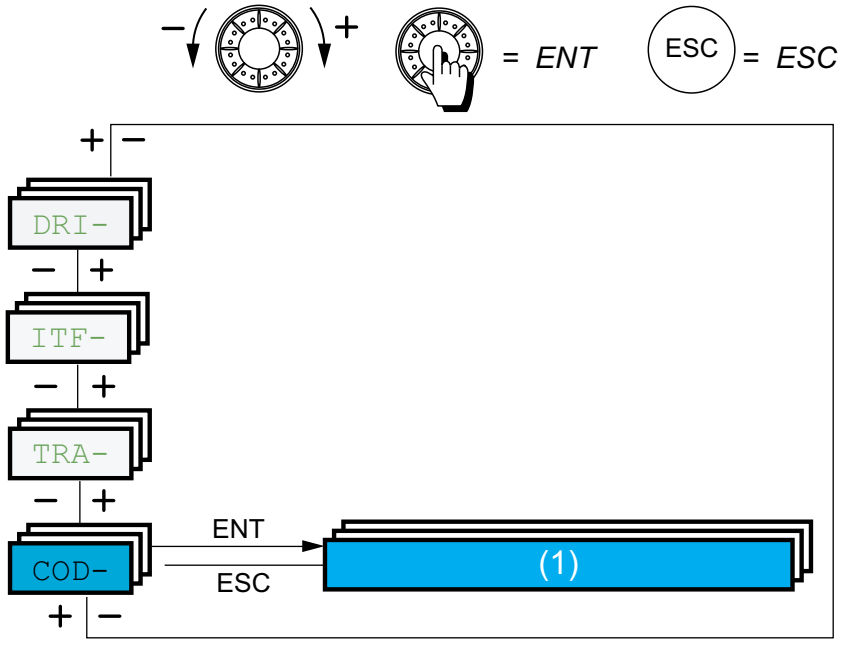
4. [Password] COD-

What's in This Chapter

With Graphic Display Terminal



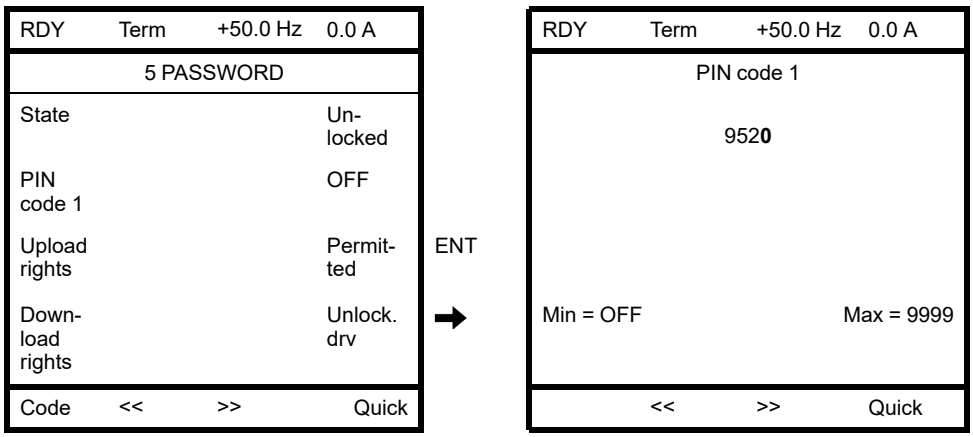
With Integrated Display Terminal



1. Password

Enables the configuration to be protected with an access code or a password to be entered to access a protected configuration.

Example with graphic display terminal:



- The drive is unlocked when the PIN codes are set to **[Unlocked]** OFF (no password) or when the correct code has been entered. All menus are visible.
- Before protecting the configuration with an access code, you must:
  - Define the **[Upload rights]** uLr and **[Download rights]** dLr.
  - Make a note of the code and keep it in a place where you are able to find it.
- The drive has 2 access codes, enabling 2 access levels to be set up:
  - PIN code 1 is a public unlock code: 6969.
  - PIN code 2 is an unlock code known only to Schneider Electric Product Support. It can only be accessed in **[Expert]** EPr mode.
  - Only one PIN1 or PIN2 code can be used, the other must remain set to **[OFF]** oFF.

NOTE: When the unlock code is entered, the user access code appears.

The following items are access-protected:

- Return to factory settings **[Factory settings]** (FCS-) menu.
- The channels and parameters protected by the **[My menu]** MYMn- as well as the menu itself.
- The custom display settings (**3.4 [Display config.]** dCF- menu).

Access

Parameters described below can be accessed by: **[Drive menu]** ➡ **[MONITORING]**➡ **[Password]**

[Password] COD-

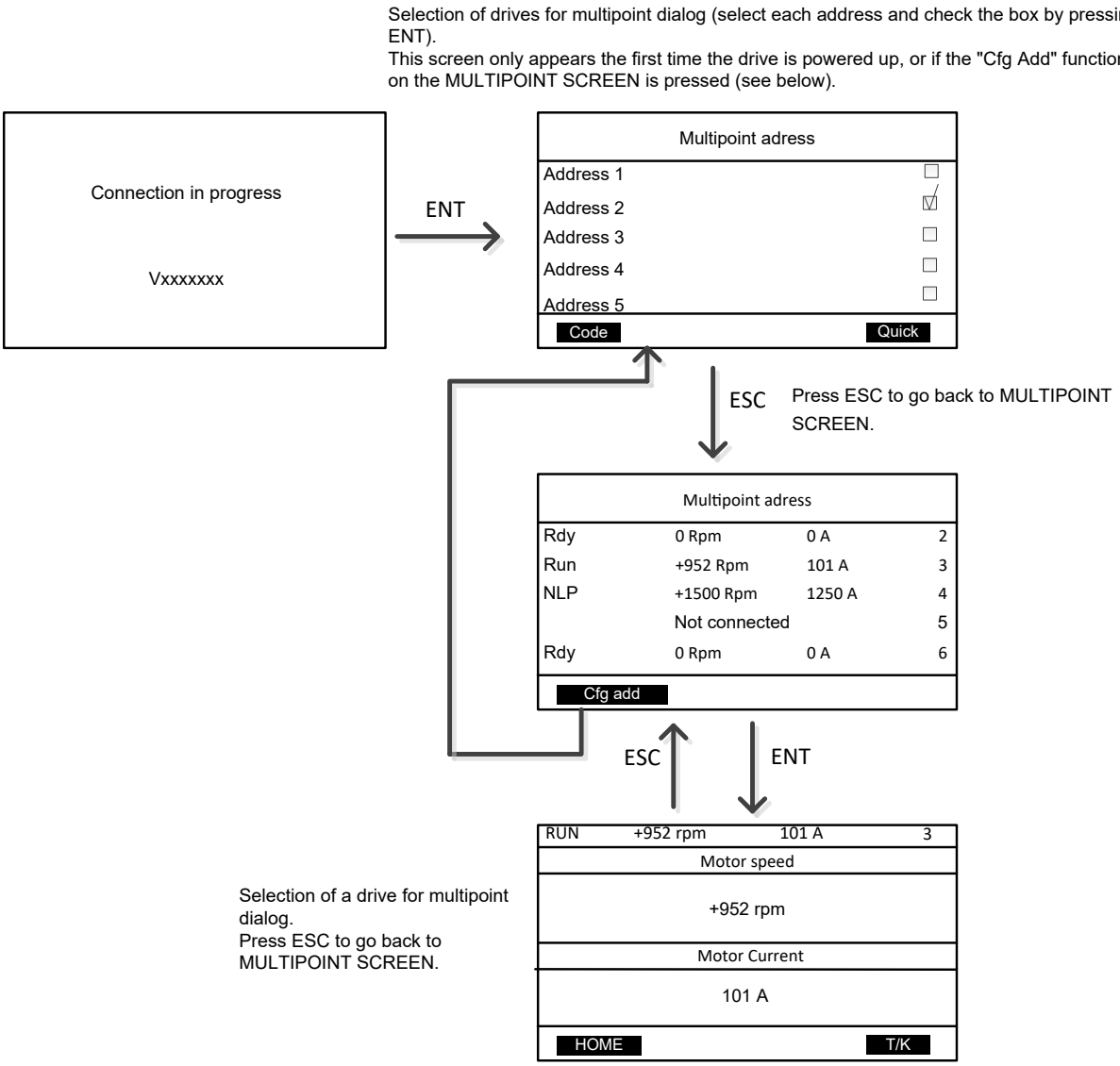
HMI label	Setting	Factory setting
[State] CST	–	**[Unlocked]** ULCK
CST Status of the drive (lock/unlock). Information parameter, cannot be modified. **[Locked]** LCK : The drive is locked by a password. **[Unlocked]** uLCK : The drive is not locked by a password. **NOTE:** If the drive is locked, the downloading or uploading of the configuration is not allowed.		
[PIN code 1] Cod	**[OFF]** oFF to 9999	**[OFF]** oFF

HMI label	Setting	Factory setting
Password code 1 1st access code. The value **[OFF]** oFF indicates that no password has been set **[Unlocked]** ULCK. The value **[ON]** on indicates that the drive is protected and an access code must be entered to unlock it. After the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. PIN code 1 is a public unlock code: 6969.		
[PIN code 2] Cod2	**[OFF]** oFF to 9999	**[OFF]** oFF
Password code 2 This parameter can only be accessed in **[Expert]** EPr mode. 2nd access code. The value **[OFF]** oFF indicates that no password has been set **[Unlocked]** ULCK. The value **[ON]** on indicates that the drive is protected and an access code must be entered to unlock it. After the correct code has been entered, it remains on the display and the drive is unlocked until the next time the power supply is disconnected. PIN code 2 is an unlock code known only to Schneider Electric Product Support. When **[PIN code 2]** Cod2 is not set to **[OFF]** oFF, the **1.2 [MONITORING]** Mon- menu is the only one visible. Then if **[PIN code 2]** Cod2 is set to **[OFF]** oFF (drive unlocked), all menus are visible. If the display settings are modified in **3.4 [Display config.]** dCF- menu, and if **[PIN code 2]** Cod2 is not set to **[OFF]** oFF, the visibility configured is kept. Then if **[PIN code 2]** Cod2 is set to OFF (drive unlocked), the visibility configured in **3.4 [Display config.]** dCF- menu is kept.		
[Upload rights] uLr	–	**[Permitted]** uLr0
Upload rights Reads or copies the current configuration to the drive. **[Permitted]** uLr0: The current drive configuration can be uploaded to the graphic display terminal or PC Software. **[Not allowed]** uLr1: The current drive configuration can only be uploaded to the graphic display terminal or PC Software if the drive is not protected by an access code or if the correct code has been entered.		
[Download rights] dLr	–	**[Unlock. drv]** dLr1
Download rights Writes the current configuration to the drive or downloads a configuration to the drive. **[Locked drv]** dLr0: A configuration file can only be downloaded to the drive if the drive is protected by an access code, which is the same as the access code for the configuration to be downloaded. **[Unlock. drv]** dLr1: A configuration file can be downloaded to the drive or a configuration in the drive can be modified if the drive is unlocked (access code entered) or is not protected by an access code. **[Not allowed]** dLr2: Download is not authorized. **[Lock/unlock]** dLr3: Combination of **[Locked drv]** dLr0 and **[Unlock. drv]** dLr1.		

Multipoint Screen

Communication is possible between a graphic display terminal and a number of drives connected on the same bus. The addresses of the drives must be configured in advance in the **[Communication]** COM- menu using the **[Modbus Address]** Add parameter .

When a number of drives are connected to the same graphic display terminal, it automatically displays the following screens:



In multipoint mode, the command channel is not displayed. From left to right, the state, then the 2 selected parameters, and finally the drive address appear.

All menus can be accessed in multipoint mode. Only drive control via the graphic display terminal is not authorized, apart from the Stop key, which locks all the drives.

If there is an error detected on a drive, this drive is displayed.

Maintenance and Diagnostics

What's in This Part

Diagnostics and Troubleshooting

What's in This Chapter

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Product Related Information** chapter before performing any procedure in this chapter.

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

Error Code

Introduction

- If the display does not light up, verify the supply mains to the drive.
- The assignment of the fast stop or freewheel functions help to prevent the drive starting if the corresponding digital inputs are not switched on. The drive then displays **[Freewheel]** nSt in freewheel stop and **[Fast stop]** FSt in fast stop. This is a normal behavior since these functions are active at zero so that the drive is stopped if there is a wire break.
- Verify that the run command input is activated in accordance with the selected control mode (**[2/3-Wire Control]** tCC , page 97 and **[2-wire type]** tCt parameters).
- If an input is assigned to the limit switch function and this input is at zero, the drive can only be started up by sending a command for the opposite direction. See Positioning by sensors .
- If the reference channel or command channel is assigned to a fieldbus, when the supply mains is connected, the drive displays **[Freewheel]** nSt. It remains in stop mode until the fieldbus sends a command.

HMI Label	Settings	Factory setting
[Diagnostics] dGt-		
This menu can only be accessed with the graphic display terminal. It displays detected errors and their cause in plain text and can be used to carry out tests, see Diagnostics **[Diagnostics]** dGt-, page 70.		

Clearing the Detected error

Follow these steps in the event of a non resettable detected error:

Step	Action
1	Disconnect all power, including external control power that may be present.
2	Lock all power disconnects in the open position.
3	Wait 15 minutes to allow the DC bus capacitors to discharge (the drive LEDs are not indicators of the absence of DC bus voltage).
4	Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
5	If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.
6	Find and correct the cause of the detected error.
7	Restore power to the drive to confirm that the detected error has been rectified.

In the event of a resettable detected error, the drive can be reset after the cause is cleared:

- By switching off the drive until the display disappears completely, then switching on again.
- Automatically in the scenarios described for the **[Auto Fault Reset]** $AtrS$-function.
- By means of a logic input or control bit assigned to the **[Fault reset]** rSt-function.
- By pressing the **STOP**/**RESET** key on the graphic display terminal if the active channel command is the HMI (see **[Cmd Channel 1]** $Cd1$, page 189).

How To Clear the Error Codes?

The following table summarizes the possibilities to clear a detected error:

How to clear the error code	List of the cleared detected errors
Error detection codes which require a power reset after the detected error is cleared The cause of the detected error must be removed before resetting by turning off and then back on. ASF, brF, SoF, SPF and EnF detected errors can also be cleared remotely by means of a logic input or control bit (**[Fault Reset Assign]** rSF parameter).	AnF, ASF, bLF, brF, $CrF1$, $EEF1$, $EEF2$, $FCF1$, HdF, iLF, $inF1$, $inF2$, $inF3$, $inF4$, $inF6$, $inF9$, $inFA$, $inFb$, $inFE$, $SAFF$, SoF, SPF
Error detection codes that can be cleared with the automatic restart function after the cause has disappeared These detected errors can also be cleared by turning on and off or by means of a logic input or control bit (**[Fault Reset Assign]** rSF parameter.	CnF, CoF, $EPF1$, $EPF2$, $FbES$, $FCF2$, LCF, $LFF3$, obF, oHF, oLF, oLC, $oPF1$, $oPF2$, oSF, $otFL$, $PtFL$, $SCF4$, $SCF5$, $SLF1$, $SLF2$, $SLF3$, SSF, tJF, EnF, uLF
Error detection codes that are cleared as soon as their cause disappears	CFF, CFI, $CFI2$, CSF, dLF, FbE, HCF, PHF, uSF
If **[Extended Fault Reset]** HRFC is set to YES: • Use the digital input or the control bit assigned to **[Fault Reset Assign]** RSF.	oCF, $SCF1$, $SCF3$

[Load slipping] AnF

Load slipping error

 Probable Cause	The difference between the output frequency and the speed feedback is not correct.
 Remedy	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor/drive/load. • Check the encoder's mechanical coupling and its wiring. • Check the setting of parameters.
 Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Angle Error] AnF

Angle error

 Probable Cause	It occurs during the phase-shift angle measurement, if the motor phase is disconnected or if the motor inductance is too high.
 Remedy	Check the motor phases and the maximum current allowed by the drive.
 Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtrAtr or manually with the **[Fault Reset Assign]** rSFrSF parameter after its cause has been removed.

[Brake Control] bLF

Brake control error

 Probable Cause	• Brake release current not reached. • Brake engage frequency threshold **[Brake engage freq]** bEnbEn only regulated when brake logic control is assigned.
 Remedy	• Check the drive/motor connection. • Check the motor windings. • Check the **[Brk Release Current]** IbrIbr and **[Brake release I Rev]** IrdIrd settings. • Apply the recommended settings for **[Brake engage freq]** bEnbEn.
 Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Brake Feedback] bRF

Brake feedback error

Probable Cause	• The brake feedback contact does not match the brake logic control. • The brake does not stop the motor quickly enough (detected by measuring the speed on the Pulse input input).
Remedy	• Check the feedback circuit and the brake logic control circuit. • Check the mechanical state of the brake. • Check the brake linings.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Incorrect Config] CFF

Incorrect configuration error

Probable Cause	• Option module changed or removed. • Control block replaced by a control block configured on a drive with a different rating. • The current configuration is inconsistent.
Remedy	• Check that there are no detected module errors. • In the event of the option module being changed/removed deliberately, see the remarks below. • Return to factory settings 1.3.2 **[Factory settings]** FCS-, page 90 or retrieve the backup configuration, if it is valid.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[Invalid Configuration] CF1

Invalid configuration error

Probable Cause	Invalid configuration. The configuration loaded in the drive via the bus or communication network is inconsistent.
Remedy	• Check the configuration loaded previously. • Load a compatible configuration.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[Conf Transfer Error] CF12

Configuration transfer error

Probable Cause	Invalid configuration. The configuration loaded in the drive via the bus or communication network is inconsistent.
Remedy	• Check the configuration loaded previously. • Load a compatible configuration.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[Fieldbus Com Interrupt] CnF

Fieldbus module communication interruption error

Probable Cause	Communication interruption on communication module.
Remedy	• Check the environment (electromagnetic compatibility). • Check the wiring. • Check the time-out. • Replace the option module. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[CANopen Com Interrupt] CoF

CANopen communication interruption error

Probable Cause	Communication interruption on the CANopen® bus.
Remedy	• Check the communication bus. • Check the time-out. • Refer to the CANopen® User manual.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Precharge Capacitor] CrF1

Precharge capacitor error

Probable Cause	Charging relay control detected error or charging resistor damaged.
Remedy	• Turn the drive off and then turn on again. • Check the internal connections. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Ch Switch Error] CSF

Channel switching detected error

Probable Cause	Switch to not valid channels.
Remedy	Check the function parameters.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[Dynamic Load Error] dLF

Dynamic load detected error

Probable Cause	Abnormal load variation.
Remedy	• Check that the load is not blocked by an obstacle. • Removal of a run command causes a reset.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[EEprom Control] EEF1

EEprom control error

Probable Cause	Internal memory detected error, control block.
Remedy	• Check the environment (electromagnetic compatibility). • Turn off, reset, return to factory settings • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[EEprom Power] EEF2

EEprom power error

Probable Cause	Internal memory detected error, power board.
Remedy	• Check the environment (electromagnetic compatibility). • Turn off, reset, return to factory settings • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[External Error] EPF1

External error

Probable Cause	Event triggered by an external device, depending on user.
Remedy	Check the device which caused the triggering and reset.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Fieldbus External Error] E P F 2

Fieldbus external detected error

Probable Cause	Event triggered by a communication network.
Remedy	Check for the cause of the triggering and reset.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after its cause has been removed.

[Fct Block Error] F b E

Function block error

Probable Cause	Function block detected error.
Remedy	See **[FB Error]** F b F t for more details.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[Fct Block StopError] F b E S

Function block stop error

Probable Cause	Function blocks have been stopped while motor was running.
Remedy	Check **[FB Motor Stop Type]** F b S M configuration.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** A t r or manually with the **[Fault Reset Assign]** r S F parameter after its cause has been removed.

[Out Contact Closed] F C F I

Output contactor closed error

Probable Cause	The output contactor remains closed although the opening conditions have been met.
Remedy	• Check the contactor and its wiring. • Check the feedback circuit.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Out Contact Opened] FCF2

Output contactor opened error

Probable Cause	The output contactor remains open although the closing conditions have been met.
Remedy	• Check the contactor and its wiring. • Check the feedback circuit.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Boards Compatibility] HCF

Boards compatibility error

Probable Cause	The **[Boards pairing]** PPI- function has been configured and a drive card has been changed.
Remedy	• In the event of a card error, reinsert the original card. • Confirm the configuration by entering the **[Pairing password]** PPI if the card was changed deliberately.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[IGBT Desaturation] HdF

IGBT desaturation error

Probable Cause	Short-circuit or grounding at the drive.
Remedy	Check the cables connecting the drive to the motor, and the motor insulation.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Link Error] ILF

Internal link error

Probable Cause	Communication interruption between option module and drive.
Remedy	• Check the environment (electromagnetic compatibility). • Check the connections. • Replace the option module. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 1] inF 1

Internal error 1 (Rating)

Probable Cause	The power board is different from the board stored.
Remedy	Check the reference of the power board.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 2] inF 2

Internal error 2 (Soft)

Probable Cause	The power board is incompatible with the control block.
Remedy	Check the reference of the power board and its compatibility.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 3] inF 3

Internal error 3 (Intern Comm)

Probable Cause	Communication interruption between the internal cards.
Remedy	• Check the internal connections. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 4] inF 4

Internal error 4 (Manufacturing)

Probable Cause	Internal data inconsistent.
Remedy	Re-calibrate the drive (performed by Schneider Electric Product Support).
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 6] inF6

Internal error 6 (Option)

Probable Cause	The option installed in the drive is not recognized.
Remedy	• Check the reference and compatibility of the option. • Check that the option is well inserted into the ATV320.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 9] inF9

Internal error 9 (Measure)

Probable Cause	The current measurements are incorrect.
Remedy	• • Replace the current sensors or the power board. • • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 10] inFA

Internal error 10 (Mains)

Probable Cause	The input stage is not operating correctly.
Remedy	Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 11] inFb

Internal error 11 (Temperature)

Probable Cause	The drive temperature sensor is not operating correctly.
Remedy	• Replace the drive temperature sensor. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Internal Error 14] ınFE

Internal error 14 (CPU) error

Probable Cause	Internal microprocessor detected error.
Remedy	• Turn off and reset. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Input Contactor] LCF

Input contactor error

Probable Cause	The drive is not turned on even though **[Mains V. time out]** LCt has elapsed.
Remedy	• Check the contactor and its wiring. • Check the time-out. • Check the supply mains /contactor /drive connection.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[AI3 4-20mA loss] LFF3

AI3 4-20mA loss error

Probable Cause	Loss of the 4-20 mA reference on analog input AI3.
Remedy	Check the connection on the analog inputs.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[DC Bus Overvoltage] obF

DC bus overvoltage error

Probable Cause	• Braking too sudden or driving load. • Supply voltage too high.
Remedy	• Increase the deceleration time. • Install a braking resistor if necessary. • Activate the **[Dec.Ramp Adapt]** brA function, if it is compatible with the application. • Check the supply voltage.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Overcurrent] oCF

Overcurrent error

Probable Cause	• Parameters in the **[Settings]** SEt- and **[Motor control]** drC- menus are not correct. • Inertia or load too high. • Mechanical locking.
Remedy	• Check the parameters. • Check the size of the motor/drive/load. • Check the state of the mechanism. • Decrease **[Current Limitation]** CLI. • Increase the switching frequency.
Clearing the Error Code	● If the parameter **[Extended Fault Reset]** HrFC is set to **[No]** no : This detected error requires a power reset. ● If the parameter **[Extended Fault Reset]** HrFC is set to **[Yes]** YES : This detected error can be cleared manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Drive Overheating] oHF

Drive overheating error

Probable Cause	Drive temperature too high.
Remedy	Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Process Overload] oLC

Process overload error

Probable Cause	Process overload.
Remedy	• Check and remove the cause of the overload. • Check the parameters of the **[Process overload]** oLd- function.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Motor Overload] oLF

Motor overload error

Probable Cause	Triggered by excessive motor current.
Remedy	Check the setting of the motor thermal protection, check the motor load. Wait for the motor to cool down before restarting.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Single Output Phase Loss] oPF1

Single output phase loss error

Probable Cause	Loss of one phase at drive output.
Remedy	Check the connections from the drive to the motor.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Output Phase Loss] oPF2

Output phase loss error

Probable Cause	• Motor not connected or motor power too low. • Output contactor open. • Instantaneous instability in the motor current.
Remedy	• Check the connections from the drive to the motor. • If an output contactor is being used, set **[Output phase loss]** oPL to **[No Error Triggered]** oAC. • • Test on a low power motor or without a motor: In factory settings mode, motor phase loss detection is active **[Output phase loss]** oPL = **[Yes]** YES. To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive (in particular for high power drives), deactivate motor phase loss detection **[Output phase loss]** oPL = **[No]** no. • Check and optimize the following parameters: **[IR compensation]** UFr , page 105, **[Nom Motor Voltage]** UnS and **[Nom Motor Current]** nCr , page 99 and perform **[Autotuning]** tUn , page 100.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Supply Mains Overvoltage] oSF

Supply mains overvoltage error

Probable Cause	• Supply voltage too high. • Disturbed mains supply.
Remedy	Check the supply voltage.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[DI6=PTC Overheat] oHFL

DI6=PTC overheat error

Probable Cause	Overheating of PTC probes detected on input DI6.
Remedy	• Check the motor load and motor size. • Check the motor ventilation. • Wait for the motor to cool before restarting. • Check the type and state of the PTC probes.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Input Phase Loss] PhF

Input phase loss error

Probable Cause	• Drive incorrectly supplied or a fuse blown. • One phase missing. • 3-phase ATV320 used on a single-phase supply mains. • Unbalanced load. This protection only operates with the drive on load.
Remedy	Check the power connection and the fuses. Use a 3-phase supply mains. Disable the detected error by **[InPhaseLoss Assign]** iPL , page 98 = **[No]** nO.
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

[DI6=PTC Probe Error] PtFL

DI6=PTC probe error

Probable Cause	PTC probe on input DI6 open or short-circuited.
Remedy	Check the PTC probe and the wiring between it and the motor/drive.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtrP or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Safety fct error] SAFF

Safety function detected error

 Probable Cause	• Debounce time exceeded. • SS1 threshold exceeded. • Incorrect configuration. • SLS type overspeed detected.
 Remedy	• Check the safety functions configuration. • Check the ATV320 Integrated safety Functions manual • Contact Schneider Electric Product Support.
 Clearing the Error Code	This detected error requires a power reset of the device after its cause has been removed.

[Motor short circuit] SCF1

Motor short circuit error

 Probable Cause	Short-circuit or grounding at the drive output.
 Remedy	• Check the cables connecting the drive to the motor, and the motor insulation. • Reduce the switching frequency. • Connect chokes in series with the motor. • Check the adjustment of speed loop and brake. • Increase the **[Time to restart]** tAr , page 115. • Increase the switching frequency.
 Clearing the Error Code	● If the parameter **[Extended Fault Reset]** rFC is set to **[No]** no : This detected error requires a power reset. ● If the parameter **[Extended Fault Reset]** rFC is set to **[Yes]** YES : This detected error can be cleared manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Ground Short Circuit] SCF3

Ground short circuit error

 Probable Cause	Significant earth leakage current at the drive output if several motors are connected in parallel.
 Remedy	• Check the cables connecting the drive to the motor, and the motor insulation. • Reduce the switching frequency. • Connect chokes in series with the motor. • Check the adjustment of speed loop and brake. • Increase the **[Time to restart]** tAr , page 115. • Reduce the switching frequency.
 Clearing the Error Code	● If the parameter **[Extended Fault Reset]** rFC is set to **[No]** no : This detected error requires a power reset. ● If the parameter **[Extended Fault Reset]** rFC is set to **[Yes]** YES : This detected error can be cleared manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[IGBT Short Circuit] SCF4

IGBT short circuit error

Probable Cause	Power component detected error.
Remedy	Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Motor Short Circuit] SCF5

Motor short circuit error

Probable Cause	Short-circuit at drive output.
Remedy	• Check the cables connecting the drive to the motor, and the motor insulation. • Contact Schneider Electric Product Support.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Modbus Com Interrupt] SLF1

Modbus communication interruption error

Probable Cause	Communication interruption on the Modbus bus.
Remedy	• Check the communication bus. • Check the time-out. • Refer to the Modbus User manual.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[PC com Interruption] SLF2

PC communication interruption error

Probable Cause	Communication interruption with PC Software.
Remedy	• Check the PC Software connecting cable. • Check the time-out.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[HMI com Interruption] SLF3

HMI communication interruption error

Probable Cause	Communication interruption with the graphic display terminal or remote display terminal.
Remedy	• Check the terminal connection. • Check the time-out.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Motor Overspeed] SoF

Motor overspeed error

Probable Cause	• Instability or driving load too high. • If a downstream contactor is used, the contacts between the motor and the drive have not been closed before applying a Run command. • The overspeed threshold (corresponding to 110 % of **[Max Frequency]** tFr) has been reached.
Remedy	• • Check the motor, gain and stability parameters. • • Add a braking resistor. • • Check the size of the motor/drive/load. • • Check the parameters settings for the **[Frequency meter]** F9F - function, if it is configured. • • Verify and close the contacts between the motor and the drive before applying a Run command. • • Verify the consistency between **[Max Frequency]** tFr and **[High Speed]** HSP. It is recommended to have at least **[Max Frequency]** tFr ≥ 110% * **[High Speed]** HSP.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Encoder Feedback Loss] SPF

Encoder feedback loss error

Probable Cause	• Signal on Pulse input missing, if the input is used for speed measurement. • Encoder feedback signal missing.
Remedy	• Check the wiring of the input cable and the detector used. • Check the configuration parameters of the encoder. • Check the wiring between the encoder and the drive. • Check the encoder.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** AtR or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Torque Limitation Error] tSF

Torque limitation error

Probable Cause	Switch to torque or current limitation.
Remedy	• Check if there are any mechanical problems. • Check the parameters of **[Torque limitation]** tOL- and the parameters of the **[Torque or I limit detect]** tId-.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[IGBT Overheating] tJF

IGBT overheating

Probable Cause	Drive overheated.
Remedy	• Check the size of the load/motor/drive. • Reduce the switching frequency. • Wait for the motor to cool before restarting.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Autotuning Error] tnF

Autotuning detected error

Probable Cause	• Special motor or motor whose power is not suitable for the drive. • Motor not connected to the drive. • Motor not stopped
Remedy	• Check that the motor/drive are compatible. • Check that the motor is present during auto-tuning. • If an output contactor is being used, close it during auto-tuning. • Check that the motor is stopped during tune operation.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Process Underload] uLF

Process underload error

Probable Cause	Process underload.
Remedy	Check and remove the cause of the underload. Check the parameters of the **[Process underload]** uLd- function.
Clearing the Error Code	This detected error can be cleared with the **[Auto Fault Reset]** Atr or manually with the **[Fault Reset Assign]** rSF parameter after its cause has been removed.

[Supply Mains UnderV] uSF

Supply mains undervoltage error

Probable Cause	• Supply mains too low. • Transient voltage dip.
Remedy	Check the voltage and the parameters of **[Undervoltage handling]** uSb- .
Clearing the Error Code	This detected error is cleared as soon as its cause has been removed.

Error detection codes Displayed on the Remote Display Terminal

HMI label	Name	Description
InIt	**[Initialization in progress]**	The microcontroller is initializing. Search underway for communication configuration.
COM.E (1)	**[Communication error]**	Time out detected error (50 ms). This message is displayed after 20 attempts at communication.
A-17 (1)	**Alarm button]**	A key has been held down for more than 10 seconds. The keypad is disconnected. The keypad wakes up when a key is pressed.
CLr (1)	**Confirmation of detected error faukreset]**	This is displayed when the STOP key is pressed once if the active command channel is the remote display terminal.
dEU.E (1)	**[Drive disparity]**	The drive brand does not match that of the remote display terminal.
rOM.E (1)	**[ROM anomaly]**	The remote display terminal detects a ROM anomaly on the basis of checksum calculation.
rAM.E (1)	**[RAM anomaly]**	The remote display terminal detects a RAM anomaly.
CPU.E (1)	**Other detected errors]**	Other detected errors.
(1) - Flashing		

Option Module Changed or Removed

When an option module is removed or replaced by another, the drive locks in detected **[Incorrect Config]** CFF error mode at power-on. If the module has been deliberately changed or removed, the detected error can be cleared by pressing the **ENT** key twice, which causes the factory settings 1.3.2 **[Factory settings]** FCS-, page 90 to be restored for the parameter groups affected by the module. This can be done using a module replaced by a module of the same type.

Example: Communication modules: only the parameters that are specific to communication modules.

Control Block Changed

When a control block is replaced by a control block configured on a drive with a different rating, the drive locks in detected **[Incorrect Config]** CFF error mode at power-on. If the control block has been deliberately changed, the detected error can be cleared by pressing the **ENT** key twice, which causes all the factory settings to be restored.

Maintenance

Limitation of Warranty

The warranty does not apply if the product has been opened, except by Schneider Electric services.

Servicing

⚠⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Read and understand the instructions in **Safety Information** chapter before performing any procedure in this chapter.

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

The temperature of the products described in this manual may exceed 80 °C (176 °F) during operation.

⚠WARNING

HOT SURFACES

- Ensure that any contact with hot surfaces is avoided.
- Do not allow flammable or heat-sensitive parts in the immediate vicinity of hot surfaces.
- Verify that the product has sufficiently cooled down before handling it.
- Verify that the heat dissipation is sufficient by performing a test run under maximum load conditions.

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

⚠WARNING

INSUFFICIENT MAINTENANCE

Verify that the maintenance activities described below are performed at the specified intervals.

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

Adherence to the environmental conditions must be ensured during operation of the drive. In addition, during maintenance, verify and, if appropriate, correct all factors that may have an impact on the environmental conditions.

Optimizing the continuity of operation

Environment	Part concerned	Action	Interval (1)
Knock on the product	Housing - control block (LED - display)	Perform a visual inspection	At least every year
Corrosion	Terminals - connector - screws - EMC plate	Inspect and clean if required	
Dust	Terminals - fans - blowholes		

Environment	Part concerned	Action	Interval (1)
Temperature	Around the product	Check and correct if required	
Cooling	Fan	Check the fan operation	
		Replace the fan	After 3 to 5 years, depending on the operating conditions
Vibration	Terminal connections	Check tightening at recommended torque	At least every year
(1) – Maximum maintenance intervals from the date of commissioning. Reduce the intervals between maintenance to adapt maintenance to the environmental conditions, the operating conditions of the drive, and to any other factor that may influence the operation and/ or maintenance requirements of the drive.			

NOTE: The fan operation depends on the drive thermal state. The drive may be running and the fan does not.

Spares and Repairs

Serviceable product. Please contact your Customer Care Center on:

www.se.com/CCC.

Long Time Storage

If the drive was not connected to mains for an extended period of time, the capacitors must be restored to their full performance before the motor is started.

Refer Initial steps, page 41 for more details.

Fan Replacement

It is possible to order a new fan for the drive maintenance, see the catalog numbers on www.se.com.

Fans may continue to run for a certain period of time even after power to the product has been disconnected.

⚠WARNING

RUNNING FANS

Verify that fans have come to a complete standstill before handling them.

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

Annex

What's in This Part

Index of Functions

The following table represents the parameter codes:

Function	Page
[2-Wire Control] 2 C	**[2/3-Wire Control]** t C C , page 97
[2nd current limit.]	**[2nd current limit.]** C L 1-
[3-Wire Control] 3 C	**[2/3-Wire Control]** t C C , page 97
[+/- speed]	**[+/- speed]** u P d-
[+/- speed around ref]	**[+/- speed around ref]** S r E-
[Auto DC injection]	**[Auto DC injection]** A d C-
[Automatic restart]	**[Auto Fault Reset]** A t r-
[Autotuning]	**[Autotuning]** t u n , page 100
[Autotuning by DI]	**[Autotuning by DI]** t n L-
[DC bus]	**[DC bus]** d C C-
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[Encoder configuration]	**[Encoder configuration]** 1 E n-
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[Jog]	**[Jog]** J o G-
Line contactor command	Line contactor command
Load measurement	Load measurement
[Load sharing]	**[Load sharing]** L b A
Load variation detection	Load variation detection
Motor or configuration switching **[Multimotors config]** M M C-	Motor or configuration switching **[Multimotors config]** M M C-
Motor thermal protection	Motor thermal protection
[Noise Reduction]	**[Noise Reduction]** n r d
[Output contactor cmd]	**[Output contactor cmd]** o C C-
[Overload ErrorResp]	**[Overload ErrorResp]** o d L
[Parameters switching]	**[Parameters switching]** M L P-
5 **[Password]**	**[Password]** COD- **[Password]** COD-, page 398
[PID controller]	**[PID controller]** P 1 d-
Positioning by sensors	Positioning by sensors
Preset speeds	Preset speeds
PTC probe	PTC probe
[Ramp switching]	**[Ramp switching]** r P t-

Index of Parameter Codes

The following table represents the parameter codes:

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
AC2						Yes					Yes Yes Yes			
ACC					Yes, page 100	Yes					Yes			
AdC											Yes			
Ad-Co													Yes	
Add													Yes	
A-I1A		Yes, page 51						Yes						
A-I1C		Yes, page 51												
A-I1E								Yes						
A-I1F		Yes, page 52						Yes						
A-I1S								Yes						
A-I1t								Yes						
A-I2A			Yes, page 52					Yes						
A-I2C			Yes, page 52											
A-I2E								Yes						
A-I2F			Yes, page 53					Yes						
A-I2S								Yes						
A-I2t								Yes						
A-I3A		Yes, page 53						Yes						
A-I3C		Yes, page 53												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
A-I3E								Yes						
A-I3F		Yes, page 53						Yes						
A-I3L								Yes						
A-I3S								Yes						
A-I3t								Yes						
AI-C2								Yes			Yes			
AI-VI	Yes, page 46	Yes, page 49												
ALGr		Yes, page 67												
AMoC													Yes	
AoI		Yes, page 54						Yes						
AoIC		Yes, page 54												
AoIF		Yes, page 54						Yes						
AoIt								Yes						
AoFI								Yes						
AoHI		Yes, page 54						Yes						
AoLI		Yes, page 54						Yes						
APH		Yes, page 66												
ASHI		Yes, page 54						Yes						
ASLI		Yes, page 54						Yes						
AStr							Yes				Yes			
Atr												Yes		
Aut							Yes Yes							

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
AV1A								Yes						
AV2A								Yes						
bCI											Yes			
bd-Co													Yes	
bEd											Yes			
bEn						Yes					Yes			
bEt						Yes					Yes			
bFr					Yes, page 98		Yes							
biP											Yes			
bIr						Yes					Yes			
bLC											Yes			
bMP									Yes, page 192					
bnS		Yes, page 57								Yes				
bnV		Yes, page 57								Yes				
boA							Yes							
boo							Yes							
brA											Yes			
br-HO											Yes			
br-HI											Yes			
br-H2											Yes			
brr											Yes			
brt						Yes					Yes			
bSP								Yes						
bSt											Yes			
bV-Er		Yes, page 57								Yes				
CC-FG					Yes, page 98									
CCS									Yes, page 189					

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
Cd1									Yes, page 189					
Cd2									Yes, page 190					
CFG				Yes, page 93	Yes, page 98									
CF-PS		Yes, page 67												
CH-A1											Yes			
CH-A2											Yes			
CH-CF									Yes, page 189					
CHM											Yes			
CL2						Yes					Yes			
CL1						Yes	Yes				Yes			
CLL												Yes		
CLo											Yes			
CLS											Yes			
CM-dC		Yes, page 58												
Cn-F1											Yes			
Cn-F2											Yes			
Cn-FS		Yes, page 67												
Cod		Yes, page 85												
Co-d2		Yes, page 85												
CoF											Yes			
CoL												Yes		
CoP									Yes, page 191					
Cor											Yes			
CoS							Yes							
CP1											Yes			
CP2											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
Cr-H3		Yes, page 53						Yes						
Cr-L3		Yes, page 53						Yes						
Cr-St														Yes, page 392
Cr-tF							Yes							
CS-by														Yes, page 393
CSt		Yes, page 85												Yes, page 398
Ctd						Yes						Yes		
Ctt							Yes							
CtV		Yes, page 58								Yes				
dA2											Yes			
dA3											Yes			
dAF											Yes			
dAL											Yes			
dA-nF								Yes				Yes		
dAr											Yes			
dAS											Yes			
db S											Yes			
dC-CC											Yes			
dC-CM											Yes			
dC-CI		Yes, page 72												
dCF						Yes					Yes	Yes		
dC I											Yes			
dE2						Yes					Yes Yes			
dEC					Yes, page 101	Yes					Yes			
dLb												Yes		
dLd												Yes		

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
dLr		Yes, page 86												Yes, page 399
do I								Yes						
d-o Id								Yes						
d-o IH								Yes						
d-o IS								Yes						
dP 1		Yes, page 70												
dP2		Yes, page 73												
dP3		Yes, page 73												
dP4		Yes, page 73												
dP5		Yes, page 73												
dP6		Yes, page 74												
dP7		Yes, page 74												
dP8		Yes, page 74												
dr-CI		Yes, page 72												
dSF											Yes			
dS I											Yes			
dSP											Yes			
dtF											Yes			
Ebo											Yes			
EPL												Yes		
Enu								Yes						
EnS								Yes						
Er-Co													Yes	
EtF												Yes		
F I							Yes							
F2							Yes							

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S,M-	[Settings] SEt-	[Motor control] drC-	[Input/Output] ,o-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ,tF-
F2d							Yes							
F3							Yes							
F4							Yes							
F5							Yes							
FAb							Yes							
FA-d1														Yes, page 384
FA-d2														Yes, page 385
FA-d3														Yes, page 385
FA-d4														Yes, page 386
FA-nF								Yes				Yes		
Fb-Cd										Yes				
Fb-dF										Yes				
Fb-Ft		Yes, page 57								Yes, page 195				
Fb-rM										Yes				
Fb-SM										Yes				
Fb-St		Yes, page 57								Yes, page 195				
FC-S,			Yes, page 90											
FdE												Yes		
FFH							Yes							
FFM						Yes								
FFt						Yes					Yes			
FL,											Yes			
FLo													Yes	
FL-oC													Yes	
FL-ot													Yes	
FLr												Yes		
FLu						Yes	Yes				Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] FUn-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
Fn1									Yes, page 192					
Fn2									Yes, page 192					
Fn3									Yes, page 192					
Fn4									Yes, page 192					
FPI											Yes			
F9A												Yes		
F9C												Yes		
F9F												Yes		
F9L						Yes						Yes		
F9S		Yes, page 49												
F9t												Yes		
Fr1									Yes, page 188					
F-rIb											Yes			
Fr2									Yes, page 190					
FrH	Yes, page 46	Yes, page 49 Yes, page 59												
Fr1							Yes							
FrS					Yes, page 99		Yes							
Fr-SS							Yes							
Frt											Yes			
FrY			Yes, page 90											
FSt											Yes			
Ftd						Yes						Yes		
Fto						Yes						Yes		
Ftu						Yes						Yes		

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S1n-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
GFS			Yes, page 90											
GSP														Yes, page 389
HF1							Yes							
H1r							Yes							
HrFC												Yes		
HSo											Yes			
HSP					Yes, page 101	Yes					Yes			
HS-P2						Yes					Yes			
HS-P3						Yes					Yes			
HS-P4						Yes					Yes			
I2-tA											Yes			
I2-tM		Yes, page 50												
I2-t1											Yes			
I2-tt											Yes			
I-AO1										Yes				
I-AO2										Yes				
I-AO3										Yes				
I-AO4										Yes				
I-AO5										Yes				
I-AO6										Yes				
I-AO7										Yes				
I-AO8										Yes				
I-AO9										Yes				
I-A10										Yes				
IA-dI														Yes, page 384

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
iA-d2														Yes, page 385
iA-d3														Yes, page 385
iA-d4														Yes, page 385
ibr						Yes					Yes			
ib-rA											Yes			
idA							Yes							
idC						Yes					Yes	Yes		
id-C2						Yes					Yes	Yes		
I-LO1										Yes				
I-LO2										Yes				
I-LO3										Yes				
I-LO4										Yes				
I-LO5										Yes				
I-LO6										Yes				
I-LO7										Yes				
I-LO8										Yes				
I-LO9										Yes				
I-L10										Yes				
iLr							Yes							
inH												Yes		
inr						Yes					Yes			
in-tP											Yes			
IPL					Yes, page 98						Yes	Yes		
ird						Yes					Yes			
itH					Yes, page 100	Yes								
JdC						Yes					Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S1n-	[Settings] SEt-	[Motor control] drC-	[Input/Output] I-O-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
JF2						Yes					Yes			
JF3						Yes					Yes			
JFH						Yes					Yes			
JGF						Yes					Yes			
JGt						Yes					Yes			
JoG											Yes			
JPF						Yes					Yes			
L1A		Yes, page 50						Yes						
L1d								Yes						
L2A		Yes, page 51						Yes						
L2d								Yes						
L3A		Yes, page 51						Yes						
L3d								Yes						
L4A		Yes, page 51						Yes						
L4d								Yes						
L5A		Yes, page 51						Yes						
L5d								Yes						
L6A		Yes, page 51						Yes						
L6d								Yes						
LA01										Yes				
LA02										Yes				
LA03										Yes				
LA04										Yes				
LA05										Yes				
LA06										Yes				
LA07										Yes				
LA08										Yes				
L-A1A		Yes, page 51						Yes						
L-A1d								Yes						
L-A2A		Yes, page 51						Yes						

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
L-A2d								Yes						
LA-nF								Yes				Yes		
LAC														Yes, page 377
LbA							Yes							
LbC						Yes	Yes							
Lb-C1							Yes							
Lb-C2							Yes							
Lb-C3							Yes							
LbF							Yes							
LC2											Yes			
LCr		Yes, page 50												
LCt											Yes			
LdS							Yes							
LES											Yes			
LEt												Yes		
LFA							Yes							
LFF												Yes		
LF-L3												Yes		
LFr	Yes, page 46	Yes, page 49												
LF-r1		Yes, page 63												
LF-r2		Yes, page 63												
LF-r3		Yes, page 64												
LIS1		Yes, page 51												
LIS2														
LLC											Yes			
LnG														Yes, page 380
Lol									Yes					

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
L-old									Yes					
L-olF									Yes					
L-olH									Yes					
L-olS									Yes					
LoC						Yes						Yes		
LP1											Yes			
LP2											Yes			
L9S							Yes							
LSP					Yes, page 101	Yes								
LuL						Yes						Yes		
Lun						Yes						Yes		
MO-01										Yes				
MO-02										Yes				
MO-03										Yes				
MO-04										Yes				
MO-05										Yes				
MO-06										Yes				
MO-07										Yes				
MO-08										Yes				
MI-Ct		Yes, page 62												
MI-EC		Yes, page 62												
MS-Lo											Yes			
MS-tP											Yes			
MA2											Yes			
MA3											Yes			
MCr							Yes							
Mdt														Yes, page 383

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
MFr	Yes, page 46	Yes, page 49				Yes								
MMF		Yes, page 49												
MPC							Yes							
MtM												Yes		
nb-rP		Yes, page 66												
nb-tP		Yes, page 65												
nC1		Yes, page 62												
nC2		Yes, page 62												
nC3		Yes, page 63												
nC4		Yes, page 63												
nC5		Yes, page 63												
nC6		Yes, page 63												
nC7		Yes, page 63												
nC8		Yes, page 63												
nC-A1													Yes	
nC-A2													Yes	
nC-A3													Yes	
nC-A4													Yes	
nC-A5													Yes	
nC-A6													Yes	
nC-A7													Yes	
nC-A8													Yes	

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
nCr					Yes, page 99		Yes							
nC-rS							Yes							
nLS											Yes			
nM1		Yes, page 62												
nM2		Yes, page 62												
nM3		Yes, page 62												
nM4		Yes, page 62												
nM5		Yes, page 62												
nM6		Yes, page 62												
nM7		Yes, page 62												
nM8		Yes, page 62												
nM-A1													Yes, page 369	
nM-A2													Yes, page 369	
nM-A3													Yes, page 369	
nM-A4													Yes, page 369	
nM-A5													Yes, page 369	
nM-A6													Yes, page 369	
nM-A7													Yes, page 369	
nM-A8													Yes, page 369	

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
nM-tS		Yes, page 65												
nPr					Yes, page 99		Yes							
nrd							Yes							
nSP					Yes, page 99		Yes							
nS-PS							Yes							
nSt											Yes			
nt-id													Yes	
ntJ		Yes, page 84												
oCC											Yes			
odL												Yes		
odt												Yes		
oHL												Yes		
oLL												Yes		
oPL												Yes		
oPr		Yes, page 50												
oSP											Yes			
otr		Yes, page 50												
PAH						Yes					Yes			
PAL						Yes					Yes			
PAS											Yes			
PAu											Yes			
PCd														Yes, page 392
PEr						Yes					Yes			
PES											Yes			
PFI		Yes, page 55						Yes						
PFr		Yes, page 55						Yes						
PGI								Yes						
PHS							Yes							

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
PIA		Yes, page 55						Yes						
PIC											Yes			
PIF											Yes			
PI-F1											Yes			
PI-F2											Yes			
PII											Yes			
PIL		Yes, page 55						Yes						
PIM											Yes			
PI-P1											Yes			
PI-P2											Yes			
PIS											Yes			
PoH						Yes					Yes			
PoL						Yes					Yes			
PPI												Yes		
PP-nS							Yes							
Pr2											Yes			
Pr4											Yes			
Pr-St											Yes			
PrP						Yes					Yes			
P-S16											Yes			
PS2											Yes			
PS4											Yes			
PS8											Yes			
PSr						Yes					Yes			
PSt									Yes, page 188					
Pt-CL												Yes		
PtH		Yes, page 67												
PV-IS														Yes, page 392
9SH						Yes					Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
9SL						Yes					Yes			
r1								Yes						
r1d								Yes						
r1F								Yes						
r2F								Yes						
r1H								Yes						
r1S								Yes						
r2								Yes						
r2d								Yes						
r2H								Yes						
r2S								Yes						
rCA											Yes			
rCb											Yes			
rd-AE							Yes							
rdG						Yes					Yes			
rE-C1		Yes, page 66												
rFC									Yes, page 190					
rF-CC		Yes, page 59												
rF-Lt		Yes, page 84												
rFr		Yes, page 49												
riG						Yes					Yes			
rin									Yes, page 188					
rM-ud						Yes						Yes		
rP												Yes		
r-P11		Yes, page 64												
r-P12		Yes, page 64												
r-P13		Yes, page 64												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MON-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SET-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] FUn-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
r-P14		Yes, page 64												
rP2						Yes					Yes			
r-P21		Yes, page 64												
r-P22		Yes, page 64												
r-P23		Yes, page 65												
r-P24		Yes, page 65												
rP3						Yes					Yes			
r-P31		Yes, page 65												
r-P32		Yes, page 65												
r-P33		Yes, page 65												
r-P34		Yes, page 65												
rP4						Yes					Yes			
rPA												Yes		
rPC	Yes, page 46	Yes, page 66												
rPE		Yes, page 66												
rPF		Yes, page 66												
rPG						Yes					Yes			
rPI	Yes, page 46	Yes, page 66									Yes			
rPo		Yes, page 66												
rPr		Yes, page 67												
rPS											Yes			
rPt											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
rrS								Yes, page 147						
rSA							Yes							
rS-AS							Yes							
rSd											Yes			
rSF												Yes		
rSL											Yes			
rS-tL											Yes			
rtH		Yes, page 66												
rtr											Yes			
run								Yes, page 146						
SI-01											Yes			
SI-02											Yes			
SI-03											Yes			
SI-04											Yes			
SI-05											Yes			
SI-06											Yes			
SI-07											Yes			
SI-08											Yes			
SI-09											Yes			
SI-10											Yes			
SI-11											Yes			
SI-12											Yes			
SI-13											Yes			
SI-14											Yes			
SI-15											Yes			
S2-01											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S in-	[Settings] SEt-	[Motor control] drC-	[Input/Output] io-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] itF-
S2-02											Yes			
S2-03											Yes			
S2-04											Yes			
S2-05											Yes			
S2-06											Yes			
S2-07											Yes			
S2-08											Yes			
S2-09											Yes			
S2-11											Yes			
S2-12											Yes			
S2-13											Yes			
S2-14											Yes			
S2-15											Yes			
S3-01											Yes			
S3-02											Yes			
S3-03											Yes			
S3-04											Yes			
S3-05											Yes			
S3-06											Yes			
S3-07											Yes			
S3-08											Yes			
S3-09											Yes			
S3-10											Yes			
S3-11											Yes			
S3-12											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
S3-13											Yes			
S3-14											Yes			
S3-15											Yes			
SA2											Yes			
SA3											Yes			
SA-F1		Yes, page 77												
SA-F2		Yes, page 77												
SAL											Yes			
SAr											Yes			
SAt												Yes		
SCL											Yes			
SC-L3											Yes			
SC-S1			Yes, page 91											
Sd-C1						Yes					Yes Yes			
Sd-C2						Yes					Yes			
Sdd												Yes		
Sd-1F		Yes, page 49												
SdS						Yes								
S-F00		Yes, page 78												
S-F01		Yes, page 78												
S-F02		Yes, page 79												
S-F03		Yes, page 79												
S-F04		Yes, page 80												
S-F05		Yes, page 80												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
S-F06		Yes, page 81												
S-F07		Yes, page 81												
S-F08		Yes, page 82												
S-F09		Yes, page 82												
S-F10		Yes, page 83												
S-F11		Yes, page 83												
SFC						Yes	Yes							
SFd											Yes			
SF-FE		Yes, page 56												
SFr						Yes	Yes							
SFt							Yes							
SH2											Yes			
SH4											Yes			
Sir							Yes							
SIt						Yes	Yes							
SLL												Yes		
SLP						Yes	Yes							
SL-SS		Yes, page 55												
SM-ot							Yes							
SnC											Yes			
SoP							Yes							
S-P10						Yes					Yes			
S-P11						Yes					Yes			
S-P12						Yes					Yes			
S-P13						Yes					Yes			
S-P14						Yes					Yes			
S-P15						Yes					Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SET-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
S-P16						Yes					Yes			
SP2						Yes					Yes			
SP3						Yes					Yes			
SP4						Yes					Yes			
SP5						Yes					Yes			
SP6						Yes					Yes			
SP7						Yes					Yes			
SP8						Yes					Yes			
SP9						Yes					Yes			
SPb							Yes							
SP-d1		Yes, page 67												
SP-d2		Yes, page 67												
SP-d3		Yes, page 67												
SPF							Yes							
SPG						Yes	Yes							
SP-Gu						Yes	Yes							
SPn											Yes			
S-r11		Yes, page 72												
S-r12 to S-r18		Yes, page 73												
S-r21		Yes, page 72												
S-r22 to S-r28		Yes, page 73												
Sr-A1		Yes, page 72												
Sr-A2 to Sr-A8		Yes, page 74												
Sr-b1		Yes, page 73												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
Sr-b2 to Sr-b8		Yes, page 74												
Sr-C1		Yes, page 73												
Sr-C2 to Sr-C8		Yes, page 73												
Sr-d1		Yes, page 73												
Sr-d2 to Sr-d8		Yes, page 73												
Sr-E1		Yes, page 73												
Sr-E2 to Sr-E8		Yes, page 73												
Sr-F1		Yes, page 73												
Sr-F2 to Sr-F8		Yes, page 73												
Sr-G1		Yes, page 73												
Sr-G2 to Sr-G8		Yes, page 73												
Sr-H1		Yes, page 73												
Sr-H2 to Sr-H8		Yes, page 73												
Sr-I1		Yes, page 73												
Sr-I2 to Sr-I8		Yes, page 73												
Sr-J1		Yes, page 73												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
Sr-J2 to Sr-J8		Yes, page 73												
Sr-K1		Yes, page 73												
Sr-K2 to Sr-K8		Yes, page 73												
Sr-L1		Yes, page 73												
Sr-L2 to Sr-L8		Yes, page 73												
Srb						Yes						Yes Yes		
SrP						Yes					Yes			
S-S15		Yes, page 56												
SSb												Yes		
Std											Yes			
St-Fr		Yes, page 49												
StM												Yes		
Sto												Yes		
St-oS		Yes, page 55												
StP												Yes		
Str											Yes			
St-rt												Yes		
Stt											Yes			
St-un					Yes, page 100		Yes Yes							
SVL							Yes							
tA1						Yes					Yes			
tA2						Yes					Yes			
tA3						Yes					Yes			
tA4						Yes					Yes			
tAA											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] S IM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
tAC		Yes, page 84												
tA-C2		Yes, page 84												
tA-nF								Yes				Yes		
tAr												Yes		
tbE						Yes					Yes			
tbo											Yes			
tbr													Yes	
tbS												Yes		
tCC					Yes, page 97			Yes, page 145						
tCt								Yes, page 146						
tdC						Yes					Yes	Yes		
td-C1						Yes					Yes			
td-C2						Yes					Yes			
tdI						Yes					Yes	Yes		
tdn											Yes			
tdS												Yes		
tE-C1		Yes, page 66												
tFo													Yes	
tFr					Yes, page 100			Yes						
tHA												Yes Yes		
tHd		Yes, page 50												
tHr		Yes, page 50												
tHt												Yes		
tLA											Yes			
tLC											Yes			
tLd												Yes		
tL-IG						Yes					Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
tL-IM						Yes					Yes			
tnL						Yes					Yes			
tLS												Yes		
toL												Yes		
toS											Yes			
t-P11		Yes, page 64												
t-P12		Yes, page 64												
t-P13		Yes, page 64												
t-P14		Yes, page 64												
t-P21		Yes, page 65												
t-P22		Yes, page 65												
t-P23		Yes, page 65												
t-P24		Yes, page 65												
t-P31		Yes, page 65												
t-P32		Yes, page 65												
t-P33		Yes, page 65												
t-P34		Yes, page 65												
t96												Yes		
t95							Yes							
trA							Yes							
trC											Yes			
trH						Yes					Yes			
trL						Yes					Yes			
tSM												Yes		
tSY											Yes			

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] Mon-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
tbd						Yes						Yes Yes		
tb-d2												Yes Yes		
tb-d3												Yes Yes		
tbH						Yes						Yes		
tbL						Yes						Yes		
tbo												Yes		
tbr						Yes				Yes				
tuL										Yes				
tun					Yes, page 100		Yes Yes							
tu-nu							Yes Yes							
tuP										Yes				
tuS					Yes, page 100		Yes Yes							
u1							Yes							
u2							Yes							
u3							Yes							
u4							Yes							
u5							Yes							
Vbr											Yes		Yes	
udL												Yes		
uFr						Yes	Yes							
ui-H1		Yes, page 52						Yes						
ui-H2		Yes, page 52						Yes						
ui-L1		Yes, page 52						Yes						
ui-L2		Yes, page 52						Yes						
uLn		Yes, page 49												
ulr		Yes, page 85												

Code	1.1 [Reference speed] rEF-	1.2 [MONITORING] MOn-	[Factory settings] FCS-	[Macro Config] CFG-	[Simply start] SIM-	[Settings] SEt-	[Motor control] drC-	[Input/Output] IO-	[Command] CtL-	[Function Blocks] FbM-	[Application function] Fun-	[FAULT MANAGEMENT] FLt-	[Communication] CoM-	3 [Interface] ItF-
uLt												Yes		
unS					Yes, page 99		Yes							
uo-Hi		Yes, page 54						Yes						
uo-Li		Yes, page 54						Yes						
uoP		Yes, page 50												
uPL												Yes		
ur-ES											Yes	Yes		
uSb												Yes		
uSi											Yes			
uSL											Yes	Yes		
uSP											Yes			
uSt												Yes		

Glossary

D

Display terminal:

The display terminal menus are shown in square brackets.

For example: **[Communication]**

The codes are shown in round brackets.

For example: COM-

Parameter names are displayed on the display terminal in square brackets.

For example: **[Fallback Speed]**

Parameter codes are displayed in round brackets.

For example: LFF

E

Error :

Discrepancy between a detected (computed, measured, or signaled) value or condition and the specified or theoretically correct value or condition.

F

Factory setting:

Machine status in factory settings when the product was shipped.

Fault Reset:

A function used to restore the drive to an operational state after a detected error is cleared by removing the cause of the error so that the error is no longer active.

Fault:

Fault is an operating state. If the monitoring functions detect an error, a transition to this operating state is triggered, depending on the error class. A "Fault reset" is required to exit this operating state after the cause of the detected error has been removed. Further information can be found in the pertinent standards such as IEC 61800-7, ODVA Common Industrial Protocol (CIP).

M

Monitoring function:

Monitoring functions acquire a value continuously or cyclically (for example, by measuring) in order to check whether it is within permissible limits. Monitoring functions are used for error detection.

P

Parameter:

Device data and values that can be read and set (to a certain extent) by the user.

PELV:

Protective Extra Low Voltage, low voltage with isolation. For more information: IEC 60364-4-41.

PLC:

Programmable logic controller.

Power stage:

The power stage controls the motor. The power stage generates current for controlling the motor.

W

Warning:

If the term is used outside the context of safety instructions, a warning alerts to a potential error that was detected by a monitoring function. A warning does not cause a transition of the operating state.

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