

WAGO → I/O → SYSTEM 750

**Fieldbus Independent
I/O Modules**

**2DO 230V AC 2.0 A/Relay 2NO/
750-513**



Manual

Version 1.0.3

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Every conceivable measure has been taken to ensure the correctness and completeness of this documentation. However, as errors can never be fully excluded, we would appreciate any information or ideas at any time.

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We wish to point out that the software and hardware terms as well as the trademarks of companies used and/or mentioned in the present manual are generally trademark or patent protected.

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1 Important Comments

To ensure fast installation and start-up of the units described in this manual, we strongly recommend that the following information and explanations are carefully read and abided by.

1.1 Legal Principles

1.1.1 Copyright

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1.1.2 Personnel Qualification

The use of the product detailed in this manual is exclusively geared to specialists having qualifications in PLC programming, electrical specialists or persons instructed by electrical specialists who are also familiar with the valid standards. WAGO Kontakttechnik GmbH & Co. KG declines all liability resulting from improper action and damage to WAGO products and third party products due to non-observance of the information contained in this manual.

1.1.3 Intended Use

For each individual application, the components supplied are to work with a dedicated hardware and software configuration. Modifications are only permitted within the framework of the possibilities documented in the manuals. All other changes to the hardware and/or software and the non-conforming use of the components entail the exclusion of liability on part of WAGO Kontakttechnik GmbH & Co. KG.

Please direct any requirements pertaining to a modified and/or new hardware or software configuration directly to WAGO Kontakttechnik GmbH & Co. KG.

1.2 Symbols



Danger

Always abide by this information to protect persons from injury.



Warning

Always abide by this information to prevent damage to the device.



Attention

Marginal conditions must always be observed to ensure smooth operation.



ESD (Electrostatic Discharge)

Warning of damage to the components by electrostatic discharge. Observe the precautionary measure for handling components at risk.



Note

Routines or advice for efficient use of the device and software optimization.



More information

References on additional literature, manuals, data sheets and INTERNET pages

1.3 Number Notation

Number Code	Example	Note
Decimal	100	normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	Within ', Nibble separated with dots

1.4 Safety Notes



Warning

Switch off the system prior to working on bus modules!

In the event of deformed contacts, the module in question is to be replaced, as its functionality can no longer be ensured on a long-term basis.

The components are not resistant against materials having seeping and insulating properties. Belonging to this group of materials is: e.g. aerosols, silicones, triglycerides (found in some hand creams).

If it cannot be ruled out that these materials appear in the component environment, then additional measures are to be taken:

- installation of the components into an appropriate enclosure
 - handling of the components only with clean tools and materials.
-



Attention

Cleaning of soiled contacts may only be done with ethyl alcohol and leather cloths. Thereby, the ESD information is to be regarded.

Do not use any contact spray. The spray may impair the functioning of the contact area.

The WAGO-I/O-SYSTEM 750 and its components are an open system. It must only be assembled in housings, cabinets or in electrical operation rooms. Access must only be given via a key or tool to authorized qualified personnel.

The relevant valid and applicable standards and guidelines concerning the installation of switch boxes are to be observed.



ESD (Electrostatic Discharge)

The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, e.g. gold contacts.

1.5 Scope

This manual describes the Digital Output Module **750-513 2DO 230V AC 2.0 A/Relay 2NO/** of the modular WAGO-I/O-SYSTEM 750.

Handling, assembly and start-up are described in the manual of the Fieldbus Coupler. Therefore this documentation is valid only in the connection with the appropriate manual.

2 I/O Modules

2.1 Digital Output Modules

2.1.1 750-513 [2DO 230V AC 2.0 A/Relay 2NO/Pot. Free]

2-Channel Relay Output Module AC 230 V, DC 30 V 2.0 A, isolated outputs, 2 make contacts

2.1.1.1 View

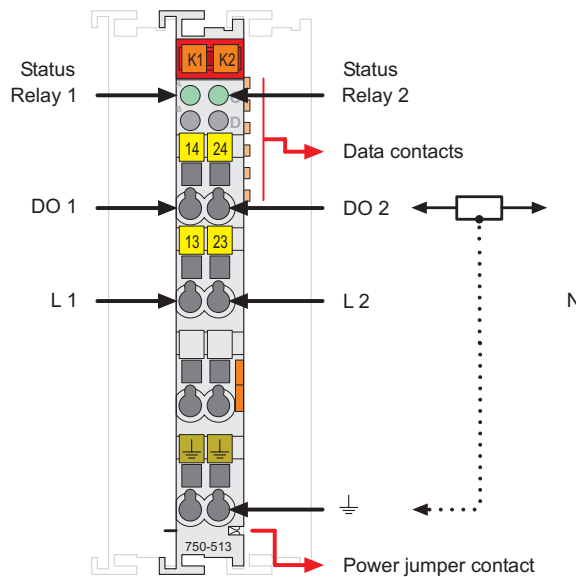


Fig. 2.1.1-1: 2-Channel Relay Output Module 750-513

g051300e

2.1.1.2 Variations

Item-No.	Designation	Description
750-513	2 DO 230 V AC 2.0 A	2-Channel Relay Output Module
750-513/000-001	2 DO 230 V AC 2.0 A (without power jumper contacts)	2-Channel Relay Output Module, (without power jumper contacts)

2.1.1.3 Description

The connected load is switched via the digital output (relay contacts) from the control system.

The module has two output channels. Two actuators with ground (earth) wire may be directly connected to signal output DO 1 and N signal output DO 2 and N.

The module has two make contact relay, i.e. only the connection points of the relay contacts are on the fieldside so that both sets of contacts can be connected to different voltages independent from each other.

Due to the isolated contacts, it is also possible, for example, to connect both relays in series or several relays can be connected in series by grouping these modules.

The relay contacts L1 and L2 are supplied with 230 V AC or 30 V DC external voltage.

By closing a relay, the power applied to L1 or L2 is switched to the second relay connection DO1 or DO2.

The internal system voltage is used to trigger the relays.

The switching status of the two relays is indicated via green status LEDs.

Any configuration of the output modules is possible when designing the field-bus node. Grouping of module types is not necessary.



Attention

The standard output module has only one built-in power jumper contact for the ground and the version 750-513/000-001 has no power jumper contacts. For field supply to downstream I/O modules, a supply module will be needed



Warning

The maximum current of the internal power jumper contacts is 10 A. When configuring the system it is important not to exceed the maximum/sum current. However, if such a case should occur, another supply module must be added.



Note

For the protection of relay coils and contacts, inductive loads must be dampened with an effective protection circuit!

Examples of protection circuits can be seen in the section **2.1.2 "Contact Protective Circuit for Relay Modules"**.

The output module 750-513 and its variations can be used with all couplers/controllers of the WAGO-I/O-SYSTEM 750.

2.1.1.4 Display Elements

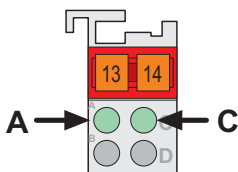


Fig. 2.1.1-2: Display Elements g050102x

LED	Channel	Designation	State	Function
A green	1	Status Relays 1	off	Make contact DO 1 opened
			on	Make contact DO 1 closed
C green	2	Status Relays 2	off	Make contact DO 2 opened
			on	Make contact DO 2 closed

2.1.1.5 Schematic Diagram

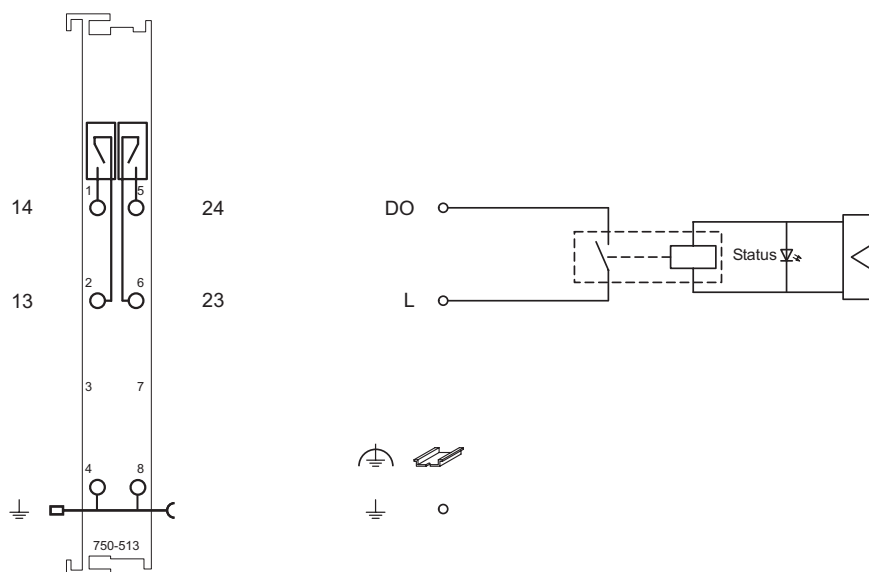












Fig. 2.1.1-3: 2-Channel Relay Output Module 750-513

g051301e

2.1.1.6 Technical Data

Module Specific Data	
Number of outputs	2 make contacts
Current consumption _{max.} (internal)	100 mA
Switching voltage relay	AC 250 V/DC 30 V
Switching power relay	500 VA/60 W $\cos\phi_{\max} = 0.4$; $L/R_{\max} = 7$ ms
Switching current _{max.}	AC/DC 2 A
Switching current _{min.}	10 mA at DC 5 V
Switching rate _{max.}	30/min (at nominal load))
Pull-in time _{max.}	10 ms
Bounce time _{typ.}	1.2 ms
Dropout time _{max.}	10 ms
Contact material	Silver alloy
Mechanical life _{max.}	2×10^7 switching operations
Electrical life _{min.}	3×10^5 switching operations (AC 2 A/250 V) or (DC 2 A/30V)
Isolation	1.5 kV _{eff.} (System/Field)* *2.5 kV rated surge voltage overvoltage category III
Internal bit width	2 bit out
Dimensions (mm) W x H x L	12 x 64* x 100 * from upper edge of 35 DIN rail
Weight	ca. 55 g

Standards and Regulations (cf. Chapter 2.2 of the Coupler/Controller Manual)		
EMC-Immunity to interference (CE)	acc. to EN 50082-2 (96)	
EMC-Emission of interference (CE)	acc. to EN 50081-1 (93)	
EMC-Immunity to interference (Ship building)	acc. to Germanischer Lloyd (97)	
EMC-Emission of interference (Ship building)	acc. to Germanischer Lloyd (97)	
Approvals (cf. Chapter 2.2 of the Coupler/Controller Manual)		
	cUL _{US} (UL508)	
	ABS (American Bureau of Shipping)	
	BV (Bureau Veritas)	(only for 750-513)
	DNV (Det Norske Veritas)	Cl. B (only for 750-513)
	GL (Germanischer Lloyd)	Cat. A, B, C, D (only for 750-513)
	KR (Korean Register of Shipping)	
	LR (Lloyd's Register)	Env. 1, 2, 3, 4 (only for 750-513)
	NKK (Nippon Kaiji Kyokai)	
	RINA (Registro Italiano Navale)	(only for 750-513)
	KEMA	II 3 G EEx nC II C T4
	Conformity Marking	



More Information

Detailed references to the approvals are listed in the document "Overview Approvals WAGO-I/O-SYSTEM 750", which you can find on the CD ROM ELECTRONICC Tools and Docs (Item-No.: 0888-0412) or in the internet under:

www.wago.com → Documentation → WAGO-I/O-SYSTEM 750 → System Description

2.1.1.7 Process Image

The output bits control the state of the outputs.

Output bit	B1	B0
Meaning	controls DO 2 Channel 2	controls DO 1 Channel 1

2.1.1.8 Load limiting value graph of the relay

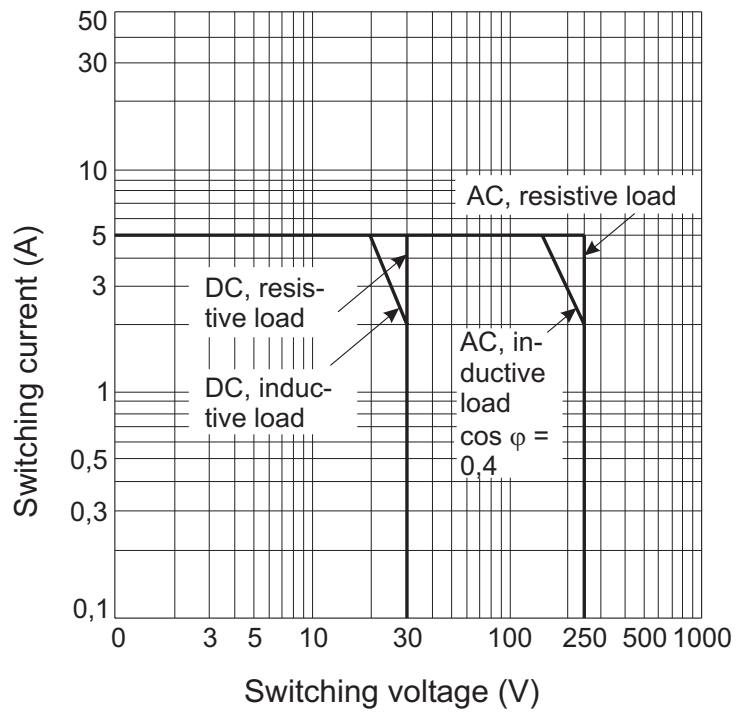


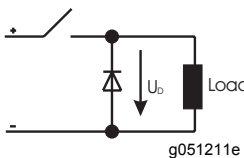
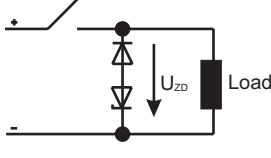
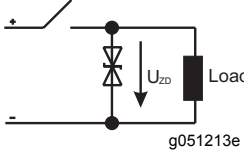
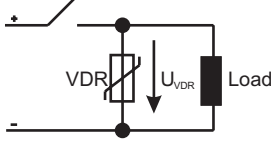
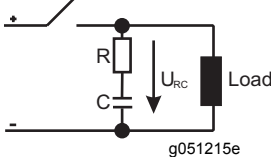
Fig. 2.1.1-4: Load limiting value graph of the relay

g051202e

2.1.2 Contact Protective Circuit for Relay Modules

Switching off inductive loads such as contactors and solenoid valves can generate transients with voltage peaks of up to several thousand volts. Very often, these transients exceed the permissible limits specified in the EMC standards. They must therefore be limited by using external circuits. Furthermore, they cause an arc, which may destroy the switching contact, and have a significant impact on the lifetime and safety of the relay.

The following protective circuits, which are directly connected to the source of the interference in parallel with the consumer, have proved successful in practice:

Load Protection	Additional Off Delay	Defined Induction Voltage Limitation	Bipolar Effective Attenuation	Advantages/Disadvantages
Diode  g051211e	long	yes (U_D)	no	<u>Advantages:</u> - easy implementation - cost-effective, reliable - uncritical dimensioning - low induction voltage <u>Disadvantages:</u> - attenuation only via load resistor - long off delay
Series connection diode/zenner diode  g051212e	medium to short	yes (U_{zD})	no	<u>Advantages:</u> - uncritical dimensioning <u>Disadvantages:</u> - attenuation only above U_{zD}
Suppressor diode  g051213e	medium to short	yes (U_{zD})	yes	<u>Advantages:</u> - cost-effective - uncritical dimensioning - limitation of positive)/ negative peaks - suitable for A.C. voltage <u>Disadvantages:</u> - attenuation only above U_{zD}
Varistor  g051214e	medium to short	yes (U_{VDR})	yes	<u>Advantages:</u> - high power absorption - uncritical dimensioning - suitable for A.C. voltage <u>Disadvantages:</u> - attenuation only above U_{VDR}
R/C combination  g051215e	medium to short	no	yes	<u>Advantages:</u> - HF attenuation via power storage - suitable for A.C. voltage - level-independent attenuation <u>Disadvantages:</u> - exact dimensioning required - high inrush current



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