

WAGO-I/O-SYSTEM 750

Manual



750-597
8AO 0-10V/±10V DC
8-Channel Analog Output Module 0 ... 10 V/±10 V

Version 1.0.0

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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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 protected by trademark or patent.

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1 Notes about this Documentation



Note

Always retain this documentation!

This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

1.1 Validity of this Documentation

This documentation is only applicable to the I/O module 750-597 (8AO 0-10V/±10V DC).

The I/O module 750-597 shall only be installed and operated according to the instructions in this manual and in the manual for the used fieldbus coupler/controller.

NOTICE

Consider power layout of the WAGO-I/O-SYSTEM 750!

In addition to these operating instructions, you will also need the manual for the used fieldbus coupler/controller, which can be downloaded at www.wago.com. There, you can obtain important information including information on electrical isolation, system power and supply specifications.

1.2 Copyright

This Manual, including all figures and illustrations, is copyright-protected. Any further use of this Manual by third parties that violate pertinent copyright provisions is prohibited. Reproduction, translation, electronic and phototechnical filing/archiving (e.g., photocopying) as well as any amendments require the written consent of WAGO Kontakttechnik GmbH & Co. KG, Minden, Germany. Non-observance will involve the right to assert damage claims.

1.3 Symbols

 **DANGER****Personal Injury!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **DANGER****Personal Injury Caused by Electric Current!**

Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING****Personal Injury!**

Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **CAUTION****Personal Injury!**

Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE**Damage to Property!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

NOTICE**Damage to Property Caused by Electrostatic Discharge (ESD)!**

Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

Note**Important Note!**

Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.



Information

Additional Information:

Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.4 Number Notation

Table 1: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.5 Font Conventions

Table 2: Font Conventions

Font Type	Indicates
<i>italic</i>	Names of paths and data files are marked in italic-type. e.g.: <i>C:\Program Files\WAGO Software</i>
Menu	Menu items are marked in bold letters. e.g.: Save
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: File > New
Input	Designation of input or optional fields are marked in bold letters, e.g.: Start of measurement range
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under Start of measurement range .
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: [Input]
[Key]	Keys are marked with bold letters in square brackets. e.g.: [F5]

2 Important Notes

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

2.1 Legal Bases

2.1.1 Subject to Changes

WAGO Kontakttechnik GmbH & Co. KG reserves the right to provide for any alterations or modifications that serve to increase the efficiency of technical progress. WAGO Kontakttechnik GmbH & Co. KG owns all rights arising from the granting of patents or from the legal protection of utility patents. Third-party products are always mentioned without any reference to patent rights. Thus, the existence of such rights cannot be excluded.

2.1.2 Personnel Qualifications

All sequences implemented on WAGO-I/O-SYSTEM 750 devices may only be carried out by electrical specialists with sufficient knowledge in automation. The specialists must be familiar with the current norms and guidelines for the devices and automated environments.

All changes to the coupler or controller should always be carried out by qualified personnel with sufficient skills in PLC programming.

2.1.3 Use of the WAGO-I/O-SYSTEM 750 in Compliance with Underlying Provisions

Fieldbus couplers, fieldbus controllers and I/O modules found in the modular WAGO-I/O-SYSTEM 750 receive digital and analog signals from sensors and transmit them to actuators or higher-level control systems. Using programmable controllers, the signals can also be (pre-) processed.

The devices have been developed for use in an environment that meets the IP20 protection class criteria. Protection against finger injury and solid impurities up to 12.5 mm diameter is assured; protection against water damage is not ensured. Unless otherwise specified, operation of the devices in wet and dusty environments is prohibited.

Operating the WAGO-I/O-SYSTEM 750 devices in home applications without further measures is only permitted if they meet the emission limits (emissions of interference) according to EN 61000-6-3. You will find the relevant information in the section “Device Description” > “Standards and Guidelines” in the manual for the used fieldbus coupler/controller.

Appropriate housing (per 94/9/EG) is required when operating the WAGO-I/O-SYSTEM 750 in hazardous environments. Please note that a prototype test certificate must be obtained that confirms the correct installation of the system in a housing or switch cabinet.

2.1.4 Technical Condition of Specified Devices

The devices to be supplied ex works are equipped with hardware and software configurations, which meet the individual application requirements. WAGO Kontakttechnik GmbH & Co. KG will be exempted from any liability in case of changes in hardware or software as well as to non-compliant usage of devices.

Please send your request for modified and new hardware or software configurations directly to WAGO Kontakttechnik GmbH & Co. KG.

2.2 Safety Advice (Precautions)

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:



DANGER

Do not work on devices while energized!

All power sources to the device shall be switched off prior to performing any installation, repair or maintenance work.

DANGER

Install the device only in appropriate housings, cabinets or in electrical operation rooms!

The WAGO-I/O-SYSTEM 750 and its components are an open system. As such, install the system and its components exclusively in appropriate housings, cabinets or in electrical operation rooms. Allow access to such equipment and fixtures to authorized, qualified staff only by means of specific keys or tools.

NOTICE

Replace defective or damaged devices!

Replace defective or damaged device/module (e.g., in the event of deformed contacts), since the long-term functionality of device/module involved can no longer be ensured.

NOTICE

Protect the components against materials having seeping and insulating properties!

The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

NOTICE

Clean only with permitted materials!

Clean soiled contacts using oil-free compressed air or with ethyl alcohol and leather cloths.

NOTICE**Do not use any contact spray!**

Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

NOTICE**Do not reverse the polarity of connection lines!**

Avoid reverse polarity of data and power supply lines, as this may damage the devices involved.

NOTICE**Avoid electrostatic discharge!**

The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per DIN EN 61340-5-1/-3. When handling the devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

3 Device Description

The 750-597 I/O module (8AO 0-10V/±10V DC) generates standardized values of 0 V ... +10 V or -10 V ... +10 V for the field range.

The I/O module has 8 output channels for field signals.

The actuators are connected to push-in CAGE CLAMP® terminals AO1 and ground or AO2 ... AO8 and respective ground.

The ground connections are available for all 8 channels on a common 0V ground potential.

The assignment of the connections is described in the “Connectors” section.

Connection examples are shown in section “Connecting Devices” > ... > “Connection Example(s)”.

The I/O module outputs are short-circuit-proof. However, a short circuit in an output causes interruption in the other outputs of the I/O module.

The Output signal is electrically isolated and will be transmitted with a resolution of 12 bits.

The operational readiness and the trouble-free internal data bus communication of the channels are indicated via a green function LED.

A red error LED displays the status of the field-side power supply voltage.

The meaning of the LEDs is described in the “Display Elements” section.

Power to the internal electronics is supplied via internal data bus.

The I/O module 750-597 (8AO 0-10V/±10V DC) receives the 24 V voltage supply for the field level from an upstream I/O module or from the fieldbus coupler/controller via blade-formed power jumper contacts. It then provides these potentials to subsequent I/O modules via spring-formed power jumper contacts.

NOTICE

Do not exceed maximum current via power jumper contacts!

The maximum current to flow through the power jumper contacts is 10 A.

Greater currents can damage the contacts.

When configuring your system, ensure that this current is not exceeded. If exceeded, insert an additional supply module.

With consideration of the power jumper contacts, the individual modules can be arranged in any combination when configuring the fieldbus node. An arrangement in groups within the group of potentials is not necessary.

The 750-597 module can be used with the fieldbus couplers and controllers of the WAGO-I/O-SYSTEM 750 of the specified version or higher listed in the “Compatibility list” table.

Table 3: Compatibility List 750-597

Bus System	Fieldbus Couplers/Controllers	Item No.	Firmware Revision Status
PROFINET	Fieldbus coupler	750-375	03
		750-377	03
PROFIBUS	Fieldbus coupler	750-333	17
	Controller	750-833	16
ETHERNET	Fieldbus coupler	750-342	18
		750-352	04
	Controller	750-841	20
		750-842	19
		750-843	03
		750-852	01
		750-871	08
		750-872	04
		750-873	04
		750-880	04
		750-881	04
		750-882	04
		750-885	04
PFC200 fieldbus controller	750-82xx	01	
BA application controller	750-884	05	
DeviceNet	Fieldbus coupler	750-306	4L
	ECO Fieldbus Coupler	750-346	11
	Controller	750-806	11
CANopen	Fieldbus coupler	750-337	20
		750-338	20
	ECO fieldbus coupler	750-347	10
		750-348	10
	Controller	750-837	15
		750-838	15
Modbus	Fieldbus coupler	750-315/300-000	01
		750-316/300-000	01
	Controller	750-815/300-000	01
		750-816/300-000	01
EtherCat	Fieldbus coupler	750-354	03
CC-Link	Fieldbus coupler	750-310	03
BACnet	Controller	750-831	03
KNX	Controller	750-889	07
LonWorks®	Controller	750-819	09

The 750-597 I/O module cannot be operated on the following fieldbus couplers:

- 750-320
- 750-323
- 750-324
- 750-327
- 750-343
- 750-351

3.1 View

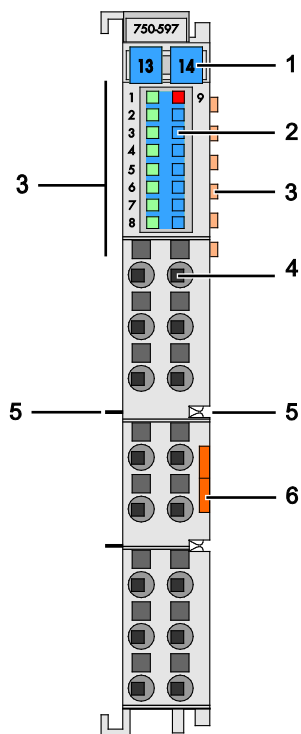


Figure 1: View of Device

Table 4: Legend for Figure “View”

Pos.	Description	Details See Section
1	Marking possibility with Mini-WSB	---
2	Status LEDs	“Device Description” > “Display Elements”
3	Data contacts	“Device Description” > “Connectors”
4	Push-in CAGE CLAMP [®] connectors	“Device Description” > “Connectors”
5	Power jumper contacts	“Device Description” > “Connectors”
6	Release tab	“Mounting” > “Inserting and Removing Devices”

3.2 Connectors

3.2.1 Data Contacts/Internal Bus

Communication between the fieldbus coupler/controller and the I/O modules as well as the system supply of the I/O modules is carried out via the internal bus. It is comprised of 6 data contacts, which are available as self-cleaning gold spring contacts.

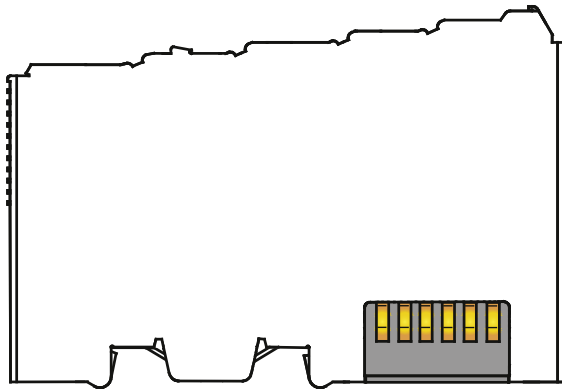


Figure 2: Data Contacts

NOTICE

Do not place the I/O modules on the gold spring contacts!

Do not place the I/O modules on the gold spring contacts in order to avoid soiling or scratching!

NOTICE



Ensure that the environment is well grounded!

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

3.2.2 Power Jumper Contacts/Field Supply

CAUTION

Risk of injury due to sharp-edged blade contacts!

The blade contacts are sharp-edged. Handle the I/O module carefully to prevent injury.

The I/O module 750-597 has 2 self-cleaning power jumper contacts that supply and transmit power for the field side. The contacts on the left side of the I/O module are designed as blade contacts and those on the right side as spring contacts.

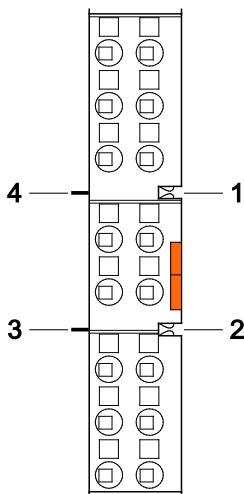


Figure 3: Power Jumper Contacts

Table 5: Legend for Figure “Power Jumper Contacts”

Contact	Type	Function
1	Spring contact	Potential transmission (U_V) for field supply
2	Spring contact	Potential transmission (0 V) for field supply
3	Blade contact	Potential feed-in (0 V) for field supply
4	Blade contact	Potential feed-in (U_V) for field supply

NOTICE

Do not exceed maximum current via power jumper contacts!

The maximum current to flow through the power jumper contacts is 10 A. Greater currents can damage the contacts.

When configuring your system, ensure that this current is not exceeded. If exceeded, insert an additional supply module.



Note

Use supply modules for ground (earth)!

The I/O module has no power jumper contacts for receiving and transmitting the earth potential. Use a supply module when an earth potential is needed for the subsequent I/O modules.

3.2.3 Push-in CAGE CLAMP® Connectors

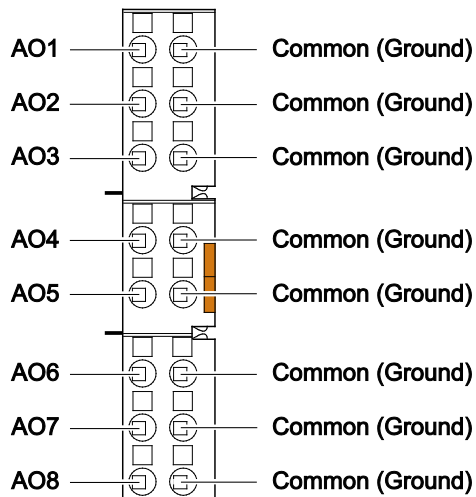


Figure 4: Push-in CAGE CLAMP® Connections

Table 6: Legend for the “Push-in CAGE CLAMP® Connections” – 8-Channel, 2-Wire

Channel	Designation	Connection	Function
1	AO1	1	Analog output 1: Signal
	Ground	9	Common 0V ground potential
2	AO2	2	Analog output 2: Signal
	Ground	10	Common 0V ground potential
3	AO3	3	Analog output 3: Signal
	Ground	11	Common 0V ground potential
4	AO4	4	Analog output 4: Signal
	Ground	12	Common 0V ground potential
5	AO5	5	Analog output 5: Signal
	Ground	13	Common 0V ground potential
6	AO6	6	Analog output 6: Signal
	Ground	14	Common 0V ground potential
7	AO7	7	Analog output 7: Signal
	Ground	15	Common 0V ground potential
8	AO8	8	Analog output 8: Signal
	Ground	16	Common 0V ground potential

Note



Use shielded signal lines!

Only use shielded signal lines for analog signals and I/O modules which are equipped with shield clamps. Only then can you ensure that the accuracy and interference immunity specified for the respective I/O module can be achieved even in the presence of interference acting on the signal cable.

3.3 Display Elements

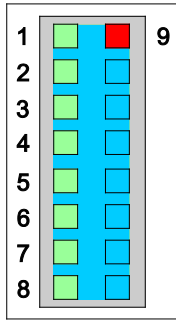


Figure 5: Display Elements

Table 7: Legend for Figure “Display Elements”

Channel	Designation	LED	State	Function
1	Function AO1	1	Off	Not ready for operation or no/faulty internal bus communication
			Green	Ready for operation and undisturbed internal bus communication
2	Function AO2	2	(see Channel 1)	
3	Function AO3	3	(see Channel 1)	
4	Function AO4	4	(see Channel 1)	
5	Function AO5	5	(see Channel 1)	
6	Function AO6	6	(see Channel 1)	
7	Function AO7	7	(see Channel 1)	
8	Function AO8	8	(see Channel 1)	
all	General Error	9	Off	No error or diagnostics deactivated, or channel deactivated
			Red	Field supply undervoltage or General Error

3.4 Operating Elements

The I/O module 750-597 has no operating elements.

3.5 Schematic Diagram

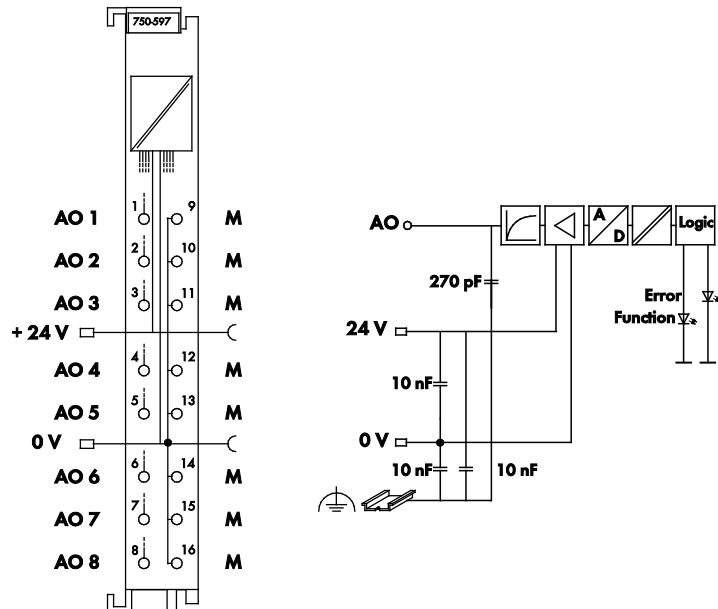


Abbildung 6: Schematic Diagram

3.6 Technical Data

3.6.1 Device Data

Table 8: Technical Data — Device

Width	12 mm
Height (from top edge of DIN rail)	64 mm
Depth	100 mm
Weight	50 g

3.6.2 Power Supply

Table 9: Technical Data – Power Supply

Power supply	Via system voltage internal bus (5 VDC) and power jumper contacts (24 VDC)
Current consumption, system voltage _{typ.} (5 VDC)	61 mA
Current consumption, power jumper contact _{max.} (24 VDC)	72 mA
Isolation (peak value)	500 V system/supply

3.6.3 Communication

Table 10: Technical Data – Communication

Data width, internal (internal data bus)	8 × 16 bit data 8 × 8 bit control/status (optional)
--	--

3.6.4 Outputs

Table 11: Technical Data – Outputs

No. of outputs	8 (short-circuit-protected)
Signal connection	2-wire connection
Signal voltage	-10 ... +10 V
	0 ... 10 V ^{*)}
Signal voltage _{max.}	-11 ... +11 V
	0 ... 11 V
Load impedance	≥ 2 kΩ
Conversion time _{max.}	13 ms
Feedback voltage	up to +26.2 V
Resolution of the A/D converter	12 bit
Measuring error at 25 °C	< ±0.1% of the output area
Temperature coefficient	< ±10 ppm/K of the output area
Diagnostics	Undervoltage field supply
Signaling at diagnostics	Status byte channel 1
	LED

^{*)} Factory setting

3.6.5 Connection Type

Table 12: Technical Data – Field Wiring

Wire connection	Push-in CAGE CLAMP [®]
Cross section, solid wire	0.08 mm ² ... 1.5 mm ² / AWG 28 ... 16
Cross section, fine-stranded wire	0.25 mm ² ... 1.5 mm ² / AWG 22 ... 16
Stripped lengths	8 mm ... 9 mm / 0.33 in

Table 13: Technical Data – Power Jumper Contacts

Power jumper contacts	Blade/spring contact, self-cleaning
-----------------------	-------------------------------------

Table 14: Technical Data – Data Contacts

Data contacts	Slide contact, hard gold plated, self-cleaning
---------------	--

3.6.6 Climatic Environmental Conditions

Table 15: Technical Data – Climatic Environmental Conditions

Operating temperature range	0 °C ... 55 °C
Storage temperature range	-25 °C ... +85 °C
Relative humidity without condensation	Max. 95 %
Resistance to harmful substances	Acc. to IEC 60068-2-42 and IEC 60068-2-43
Maximum pollutant concentration at relative humidity < 75 %	SO ₂ ≤ 25 ppm H ₂ S ≤ 10 ppm
Special conditions	Ensure that additional measures for components are taken, which are used in an environment involving: – dust, caustic vapors or gases – ionizing radiation

3.7 Approvals

The following approvals have been granted to 750-597 I/O modules:

 Conformity Marking

3.8 Standards and Guidelines

750-597 I/O modules meet the following requirements on emission and immunity of interference:

EMC CE-Immunity to interference acc. to EN 61000-6-2

EMC CE-Emission of interference acc. to EN 61000-6-3

4 Process Image

Note



Mapping of process data in the process image of fieldbus systems

The representation of the process data of some I/O modules or their variants in the process image depends on the fieldbus coupler/controller used. Please take this information from the section “Fieldbus Specific Design of the Process Data” included in the description concerning the process image of the corresponding fieldbus coupler/controller.

The 750-597 I/O module provides 1 status byte (8 bit) and 1 data word (16 bit) per channel.

The digitized process value is output in a data word via the process image of the fieldbus coupler/controller as output byte “0” (low) and output byte “1” (high).

The process value is displayed at the following resolution:

- Signal type „0-10 V”: 15 bit (bit B0 ... B14)
- Signal type “+/- 10 V”: 16 bit (bit B0 ... B15)

4.1 Overview



Note

Presentation of control/status bytes a function of fieldbus coupler/controller!

The I/O module always makes a complete process image incl. control/status bytes available to the fieldbus coupler/controller. The **WAGO-I/O-CHECK** startup tool accesses the startup process image.

The fieldbus coupler/controller uses a different process image, in which display of control/status bytes can be supported, to stage cyclic process data via the fieldbus.

Table 16: Process Image – I/O Module 750-597

Process Image			
Output ¹⁾		Input ²⁾	
Byte 0	Status byte CH1_S0	Byte 0	Control byte CH1_C0
Byte 1	Function of status byte: Process value CH1_D0	Byte 1	Function of control byte: Reserved
Byte 2	Function of status byte: Process value CH1_D1	Byte 2	Function of control byte: Reserved
Byte 3	Control byte CH2_S1	Byte 3	Control byte CH2_C1
Byte 4	Function of status byte: Process value CH2_D0	Byte 4	Function of control byte: Reserved
Byte 5	Function of status byte: Process value CH2_D1	Byte 5	Function of control byte: Reserved
...
Byte 21	Control byte CH8_S7	Byte 21	Control byte CH8_C7
Byte 22	Function of status byte: Process value CH8_D0	Byte 22	Function of control byte: Reserved
Byte 23	Function of status byte: Process value CH8_D1	Byte 23	Function of control byte: Reserved

- 1) CH_x_S_x = Status byte x from channel x
 CH_x_D0 = Low byte for process value for channel x
 CH_x_D1 = High byte for process value for channel x
- 2) CH_x_C_x = Control byte x from channel x

4.2 Status Bytes

The status byte for channel 1 displays the diagnoses “Undervoltage field supply” and “General Error”.

Table 17: Status Byte CH1_S0

Status byte CH1_S0, Byte 0							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RegCom	General Error	Power Supply	–	–	–	–	–
Power Supply		Undervoltage field supply					
		0	Voltage for the field supply is adequate.				
		1	Voltage for the field supply is too low.				
General Error		General Error					
		0	No error present.				
		1	There is a general error.				
RegCom		Register communication					
		0:	Register communication is disabled (normal mode).				
		1:	Register communication is enabled.				

The status byte for channels 2 to 8 are implemented identically and only display the “General Error” diagnosis.

The following table describes the status byte of channel 2.

Table 18: Status Byte CH2_S1

Status byte CH2_S1, Byte 3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
RegCom	General Error	–	–	–	–	–	–
General Error		General Error					
		0	No error present.				
		1	There is a general error.				
RegCom		Register communication					
		0:	Register communication is disabled (normal mode).				
		1:	Register communication is enabled.				

4.3 Process Data

4.3.1 Overview of Signal Types

The following table serves as an overview of all supported signal types. The following sections contain detailed information about the individual signal types. The information provided in the respective tables on the resolution of the voltage values and the raw value ranges yielded from this are based on manufacturer scaling with user scaling disabled.

ID	Signal type	Voltage range	Voltage value resolution
0	0-10 V	0 ... +10 V	2.44 mV per 1 digit
1	+/- 10 V	-10 ... +10 V	2.44 mV per 1 digit

4.3.2 Signal Type „0-10 V”, ID0

4.3.2.1 Amount/Sign Format

For the power supply with signal type „0-10 V”, the numerical range of 0x0000 ... 0x7FFF is scaled to the output voltage range of 0 V ... +10 V. The value is mapped at a process value resolution of 0.305 mV per 1 digit.

Table 19: Process Image, Signal Type „0-10 V”, Amount/Sign Format

Voltage V	Numeric value			Status Byte Hex.	Error LED
	Binary	Hex.	Dec.		
0.0	'0000.0000.0000.0000'	0x0000	0	0x00	OFF
2.5	'0001.1111.1111.1111'	0x1FFF	8191	0x00	OFF
5.0	'0011.1111.1111.1111'	0x3FFF	16383	0x00	OFF
7.5	'0101.1111.1111.1111'	0x5FFF	24575	0x00	OFF
10.0	'0111.1111.1111.1111'	0x7FFF	32767	0x00	OFF
Undervoltage field supply				0x60	ON

4.3.2.2 Two's Complement Representation

For the power supply with signal type „0-10 V”, the numerical range of 0x0000 ... 0x7FFF is scaled to the output voltage range of 0 V ... +10 V. The value is mapped at a process value resolution of 0.305 mV per 1 digit.

Table 20: Process Image, Signal Type „0-10 V”, Two's Complement Representation

Voltage V	Numeric value			Status Byte Hex.	Error LED
	Binary	Hex.	Dec.		

0.0	'0000.0000.0000.0000'	0x0000	0	0x00	OFF
2.5	'0010.0000.0000.0000'	0x2000	8192	0x00	OFF
5.0	'0100.0000.0000.0000'	0x4000	16384	0x00	OFF
7.5	'0110.0000.0000.0000'	0x6000	24576	0x00	OFF
10.0	'0111.1111.1111.1111'	0x7FFF	32767	0x00	OFF
Undervoltage field supply				0x60	ON

4.3.3 Signal Type “+/- 10 V”, ID1

4.3.3.1 Amount/Sign Format

For the power supply with signal type “+/- 10 V”, the numerical range of 0xFFFF ... 0x7FFF is scaled to the output voltage range of -10 V ... +10 V. The value is mapped at a process value resolution of 0.305 mV per 1 digit.

Table 21: Process Image, Signal Type “+/- 10 V”, Amount/Sign Format

Voltage V	Numeric value			Status Byte Hex.	Error LED
	Binary	Hex.	Dec.		
-10.0	'1111.1111.1111.1111'	0xFFFF	-32767	0x00	OFF
-7.5	'1101.1111.1111.1111'	0xDFFF	-24575	0x00	OFF
-5.0	'1011.1111.1111.1111'	0xBFFF	-16383	0x00	OFF
-2.5	'1001.1111.1111.1111'	0x9FFF	-8191	0x00	OFF
0.0	'1000.0000.0000.0000'	0x8000	0	0x00	OFF
0.0	'0000.0000.0000.0000'	0x0000	0	0x00	OFF
2.5	'0001.1111.1111.1111'	0x1FFF	8191	0x00	OFF
5.0	'0011.1111.1111.1111'	0x3FFF	16383	0x00	OFF
7.5	'0101.1111.1111.1111'	0x5FFF	24575	0x00	OFF
10.0	'0111.1111.1111.1111'	0x7FFF	32767	0x00	OFF
Undervoltage field supply				0x60	ON

4.3.3.2 Two's Complement Representation

For the power supply with signal type “+/- 10 V”, the numerical range of 0x8000 ... 0x7FFF is scaled to the output voltage range of -10 V ... +10 V. The value is mapped at a process value resolution of 0.305 mV per 1 digit.

Table 22: Process Image, Signal Type “+/- 10 V”, Two's Complement Representation

Voltage V	Numeric value			Status Byte Hex.	Error LED
	Binary	Hex.	Dec.		
-10.0	'1000.0000.0000.0000'	0x8000	-32768	0x00	OFF
-10.0	'1000.0000.0000.0001'	0x8001	-32767	0x00	OFF
-7.5	'1010.0000.0000.0000'	0xA000	-24576	0x00	OFF
-5.0	'1100.0000.0000.0000'	0xC000	-16384	0x00	OFF
-2.5	'1110.0000.0000.0000'	0xE000	-8192	0x00	OFF
0.0	'0000.0000.0000.0000'	0x0000	0	0x00	OFF
2.5	'0010.0000.0000.0000'	0x2000	8192	0x00	OFF
5.0	'0100.0000.0000.0000'	0x4000	16384	0x00	OFF
7.5	'0110.0000.0000.0000'	0x6000	24576	0x00	OFF
10.0	'0111.1111.1111.1111'	0x7FFF	32767	0x00	OFF
Undervoltage field supply				0x60	ON

5 Mounting

5.1 Mounting Sequence

Fieldbus couplers/controllers and I/O modules of the WAGO-I/O-SYSTEM 750/753 are snapped directly on a carrier rail in accordance with the European standard EN 50022 (DIN 35).

The reliable positioning and connection is made using a tongue and groove system. Due to the automatic locking, the individual devices are securely seated on the rail after installation.

Starting with the fieldbus coupler/controller, the I/O modules are mounted adjacent to each other according to the project design. Errors in the design of the node in terms of the potential groups (connection via the power contacts) are recognized, as the I/O modules with power contacts (blade contacts) cannot be linked to I/O modules with fewer power contacts.

CAUTION

Risk of injury due to sharp-edged blade contacts!

The blade contacts are sharp-edged. Handle the I/O module carefully to prevent injury.

NOTICE

Insert I/O modules only from the proper direction!

All I/O modules feature grooves for power jumper contacts on the right side. For some I/O modules, the grooves are closed on the top. Therefore, I/O modules featuring a power jumper contact on the left side cannot be snapped from the top. This mechanical coding helps to avoid configuration errors, which may destroy the I/O modules. Therefore, insert I/O modules only from the right and from the top.

Note



Don't forget the bus end module!

Always plug a bus end module 750-600 onto the end of the fieldbus node! You must always use a bus end module at all fieldbus nodes with WAGO-I/O-SYSTEM 750 fieldbus couplers/controllers to guarantee proper data transfer.

5.2 Inserting and Removing Devices

NOTICE

Perform work on devices only if they are de-energized!

Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

5.2.1 Inserting the I/O Module

1. Position the I/O module so that the tongue and groove joints to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are engaged.

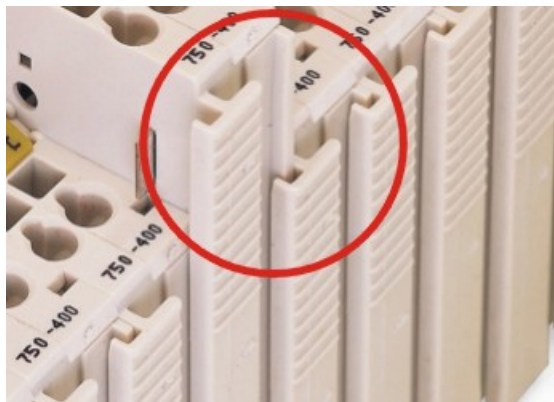


Figure 7: Insert I/O Module (Example)

2. Press the I/O module into the assembly until the I/O module snaps into the carrier rail.

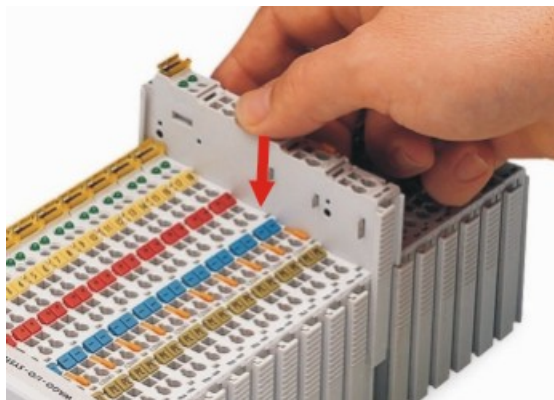


Figure 8: Snap the I/O Module into Place (Example)

With the I/O module snapped in place, the electrical connections for the data contacts and power jumper contacts (if any) to the fieldbus coupler/controller or to the previous or possibly subsequent I/O module are established.

5.2.2 Removing the I/O Module

1. Remove the I/O module from the assembly by pulling the release tab.

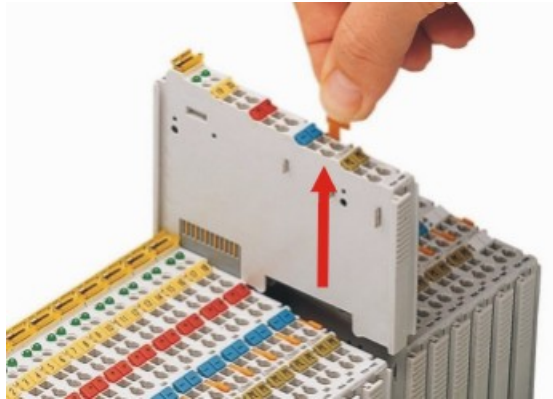


Figure 9: Removing the I/O Module (Example)

Electrical connections for data or power jumper contacts are disconnected when removing the I/O module.

6 Connect Devices

6.1 Connecting a Conductor to the Push-in CAGE CLAMP®

The Push-in CAGE CLAMP® connection is appropriate for solid, stranded and finely stranded conductors.



Note

Only connect one conductor to each Push-in CAGE CLAMP® connection!
Only one conductor may be connected to each Push-in CAGE CLAMP® connection.

Do not connect more than one conductor at one single connection!

If more than one conductor must be routed to one connection, these must be connected in an up-circuit wiring assembly, for example using WAGO feed-through terminals.

Terminate both solid and stranded or ferruled conductors by simply pushing them in - no tool required. For all other types of conductors, Push-in CAGE CLAMP® must be opened for connection with an operating tool with a 2.5 mm blade (order no. 210-719).

1. To open the Push-in CAGE CLAMP® insert the actuating tool into the opening above the connection.
2. Insert the conductor into the corresponding connection opening.
3. To close the Push-in CAGE CLAMP® simply remove the tool - the conductor is then clamped firmly in place.

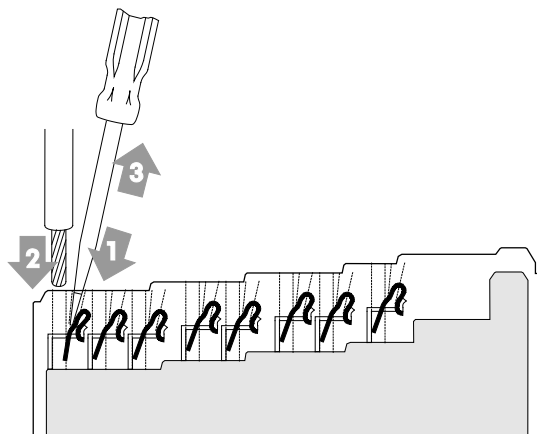


Figure 10: Connecting a Conductor to a Push-in CAGE CLAMP®

6.2 Connection Example

Note



Use shielded signal lines!

Only use shielded signal lines for analog signals and I/O modules which are equipped with shield clamps. Only then can you ensure that the accuracy and interference immunity specified for the respective I/O module can be achieved even in the presence of interference acting on the signal cable.

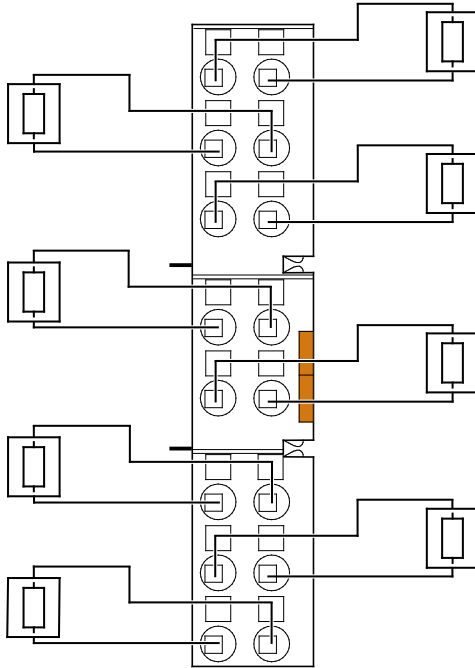


Figure 11: Connection Example – 2-Wire Connection

7 Commissioning

7.1 Parameterization with **WAGO-I/O-CHECK**

The *WAGO-I/O-CHECK* software from WAGO Kontakttechnik GmbH & Co. KG can be used to conveniently and completely configure and parameterize the I/O module. You have the following options.

- Graphical display of bus nodes
- Display of process values
- Settings for the application
- Configuration of the I/O module operating modes
- Parameterization of module, channel and scaling settings
- Calibration of channels and adjustment of analog outputs
- Monitoring

Information



WAGO-I/O-CHECK

You can obtain the *WAGO-I/O-CHECK* software on a CD under Item No. 759-302. This CD contains all the application program files and an explanation. You can find a description at the internet page at <http://www.wago.com>

Note



Save settings before you begin parameterization

You should always save your current settings to a parameter file before you begin parameterization. This enables you to always use the original values, should any parameters you are defining not be correct.

Note



Disable active mode before access to parameterization dialog

Monitor and Control modes must be disabled before opening the parameterization dialog.

To open specific parameterization dialogs for the I/O module 750-597, proceed as follows:

1. If enabled, disable Monitor or Control mode. Click the respective button in the toolbar, so that it is no longer highlighted. This step is unnecessary if configuring for the first time.
2. Click the I/O module and then the **Settings** button.

Or:

Right-click on the I/O module and then click the **Settings** menu item (see the figure below).

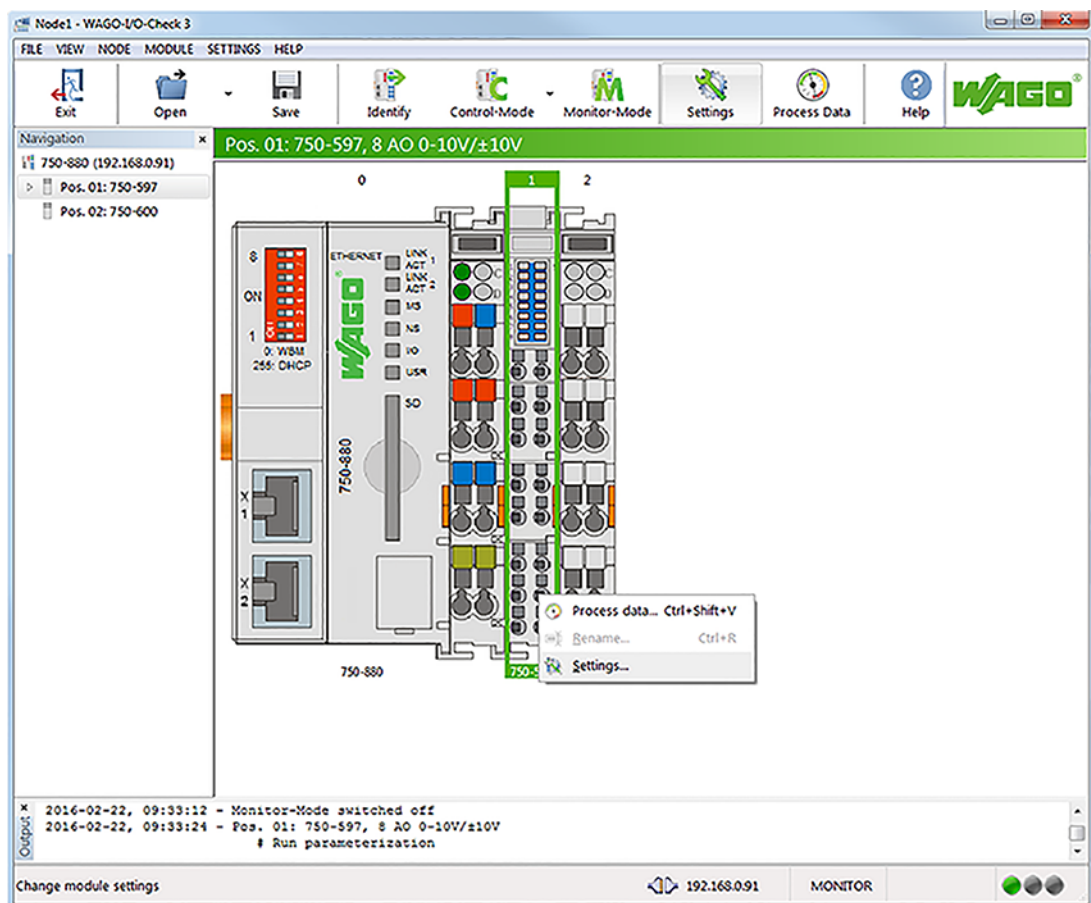


Figure 12: WAGO-I/O-CHECK User Interface

The parameterization dialog appears, which forms the basis for the following description. This forms the basis for the subsequent explanation.

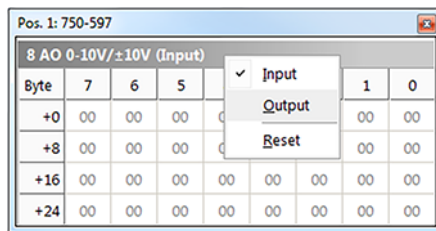
To display the process data for the configured 750-597 I/O module, proceed as follows:

1. Click the I/O module and then the **Process data** button.

Or:

Right-click on the I/O module and then click the **Process data** menu item (see figure).

2. Right-click on the gray table header.
3. Click the **Output data** menu item.



Byte	7	6	5	4	3	2	1	0
+0	00	00	00	00	00	00	00	00
+8	00	00	00	00	00	00	00	00
+16	00	00	00	00	00	00	00	00
+24	00	00	00	00	00	00	00	00

Figure 13: Display of Process Data

7.1.1 Parameterization Dialog

The parameterization dialog is divided into the following areas:

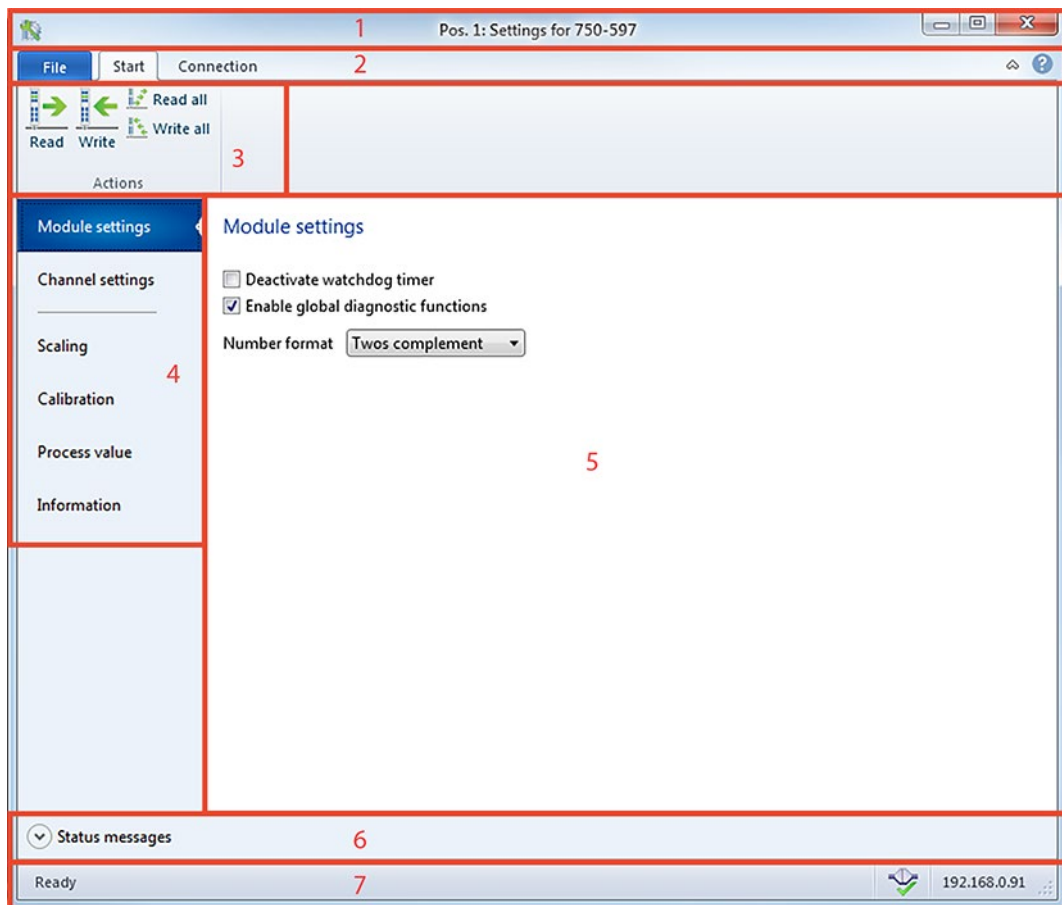


Figure 14: Parameterization Dialog for the I/O Module 750-597

- 1 Title bar
- 2 Horizontal tab menu
- 3 Main menu
- 4 Vertical tab menu
- 5 Display range
- 6 Status messages
- 7 Status bar

The individual areas are explained in more detail in the following sections.

7.1.1.1 Title Bar

The title bar in the parameterization dialog contains the program icon, a window title and buttons for exiting, minimizing and maximizing the application window.




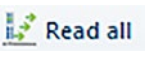


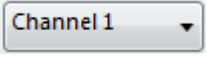


Figure 15: Title Bar in the Parameterization Dialog

The window title provides information about the position of the selected I/O module within the fieldbus node used and the item number of the selected I/O module.

7.1.1.2 Main Menu

Table 23: Buttons on the Main Menu

Button	Function	Description
 Connect	[Connect]	Creates a connection to the I/O module
 Disconnect	[Disconnect]	Interrupts an existing connection to the I/O module
 Read	[Read]	Reads all parameters of the currently displayed view in the display area of the I/O module.
 Read all	[Read all]	Reads all parameters from the I/O module including module, channel, scaling and calibration settings.
 Schreiben	[Write]	Writes all parameters of the currently displayed view in the display area of the I/O module.
 Write all	[Write all]	Writes all parameters to the I/O module including module, channel, scaling and calibration settings.
 Channel 1	[Channel x]	Opens the channel selection list.

7.1.1.3 Horizontal Tab Menu

The horizontal tab menu contains the following tabs:



Figure 16: Horizontal Tab Menu

Click one of the tabs to display the respective selection options in the main menu.

The individual tabs are explained in the following sections.

7.1.1.3.1 “File” Tab

The **File** tab opens the application menu. It contains the following buttons:

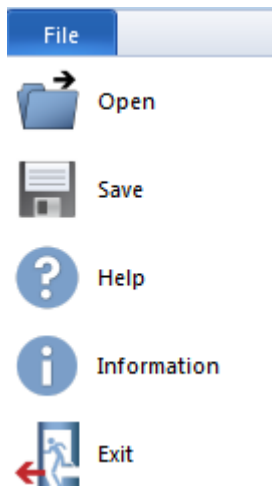







Figure 17: Buttons in the Application Menu

Table 24: Buttons in the Application Menu

Button	Function	Description
 Open	[Open]	Opens the dialog for loading a parameter file.
 Save	[Save]	Opens the dialog for saving a parameter file.
 Help	[Help]	Opens the manual for the I/O module 750-597 in PDF format.
 Information	[Information]	Opens the information dialog with details about the version of the software used and the manufacturer's contact information.
 Exit	[Exit]	Closes the parameterization dialog and disconnects the I/O module.
Recent parameter files		Lists the last used parameter files (max. 15): you can open the files from this area directly.

Select one of the menu items to execute the respective action.

7.1.1.3.1.1 “Open” Menu Item



Note

Only open parameter files created with WAGO-I/O-CHECK!

Please note that only parameter files created with WAGO-I/O-CHECK can be opened. The parameter files have the extension ***.ao**.

In this menu item you can open and load an existing parameter file. Proceed as follows:

1. Click the **[Open]** button in the main menu.
A Windows standard dialog window for selecting the source directory then opens.
2. Select the parameter file that you wish to open.
3. Click **[Open]** in the Windows standard dialog window.

The parameter file is opened.

7.1.1.3.1.2 “Save” Menu Item

Note



The calibration settings are not saved!

Please note that the calibration settings cannot be saved in the parameter file.

Note



Note the memory range!

Please note that only the settings are saved in the parameter file that you have already transferred to the I/O module by clicking the **[Write]** or **[Write all]** buttons in the main menu.

In this menu item you can save the changes you have made in a parameter file. Proceed as follows:

1. Click the **[Save]** button in the main menu.

A Windows standard dialog window for selecting the target directory then opens.

2. Select the target directory in which you want to save the new parameter file.
3. Click **[Save]** in the Windows standard dialog window.

The parameter file is saved to the target directory selected.

7.1.1.3.2 “Start” Tab

Click the **Start** tab in the horizontal tab menu to display the following selection options in the main menu.



Figure 18: Contents of the Horizontal Tab **Start**

If you select the **Channel settings** menu item in the vertical tab menu, you can also choose the required I/O module channel in the main menu.

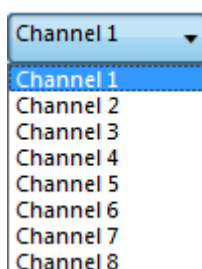


Figure 19: Start > Main Menu > Channel Selection List

The exact meaning of the individual selection options is described in the “Main Menu” section.

7.1.1.3.3 “Connection” Tab

Click the **Connection** tab in the horizontal tab menu to display the following selection options in the main menu.

If there is no connection to the I/O module, the following button appears:



Figure 20: **Connection** Tab for Disconnected I/O Module

Click the [**Connect**] button to establish a connection to the I/O module.

If there is a connection to the I/O module, the following button appears:



Figure 21: **Connection** Tab for Connected I/O Module

Click the [**Disconnect**] button to interrupt the connection to the I/O module.

The exact meaning of the individual selection options is described in the “Main Menu” section.

7.1.1.4 Vertical Tab Menu

In the vertical tab menu, you can select the individual module- and channel-specific menu items.

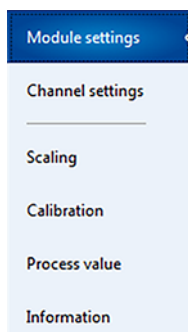


Figure 22: Overview of the Vertical Tab Menu

Click one of the menu items to call up the related parameterization options in the display area.

The exact meaning of the individual selection options is described in the following sections.

7.1.1.4.1 “Module settings” Menu Item

Note



Save settings!

Click the [Write] or [Write all] button to write any settings you have made to the I/O module.

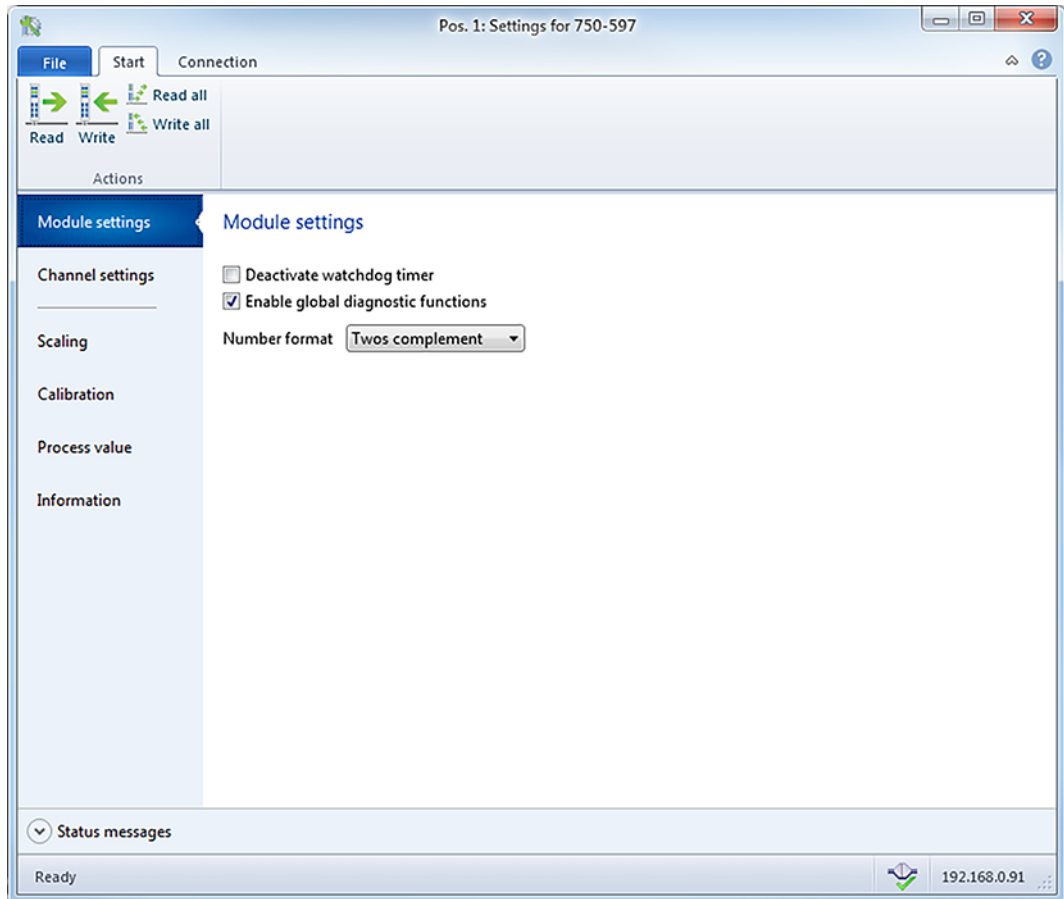


Figure 23: Module settings Menu Item View

Table 25: Module settings Menu Item

Option	Description
Watchdog Timer	
Disable watchdog timer	<input type="checkbox"/> *) The watchdog timer is enabled.
	<input checked="" type="checkbox"/> The watchdog timer is disabled. The green LEDs illuminate continuously.
Diagnostic functions	
Enable diagnostic functions globally	<input type="checkbox"/> Diagnostic functions are disabled.
	<input checked="" type="checkbox"/> *) Diagnostic functions are enabled.
Process value format	
Display Mode	Two's complement representation *)
	Amount/sign format

*) Factory setting

7.1.1.4.2 “Channel settings” Menu Item

Note



Save settings!

Click the [Write] or [Write all] button to write any settings you have made to the I/O module.

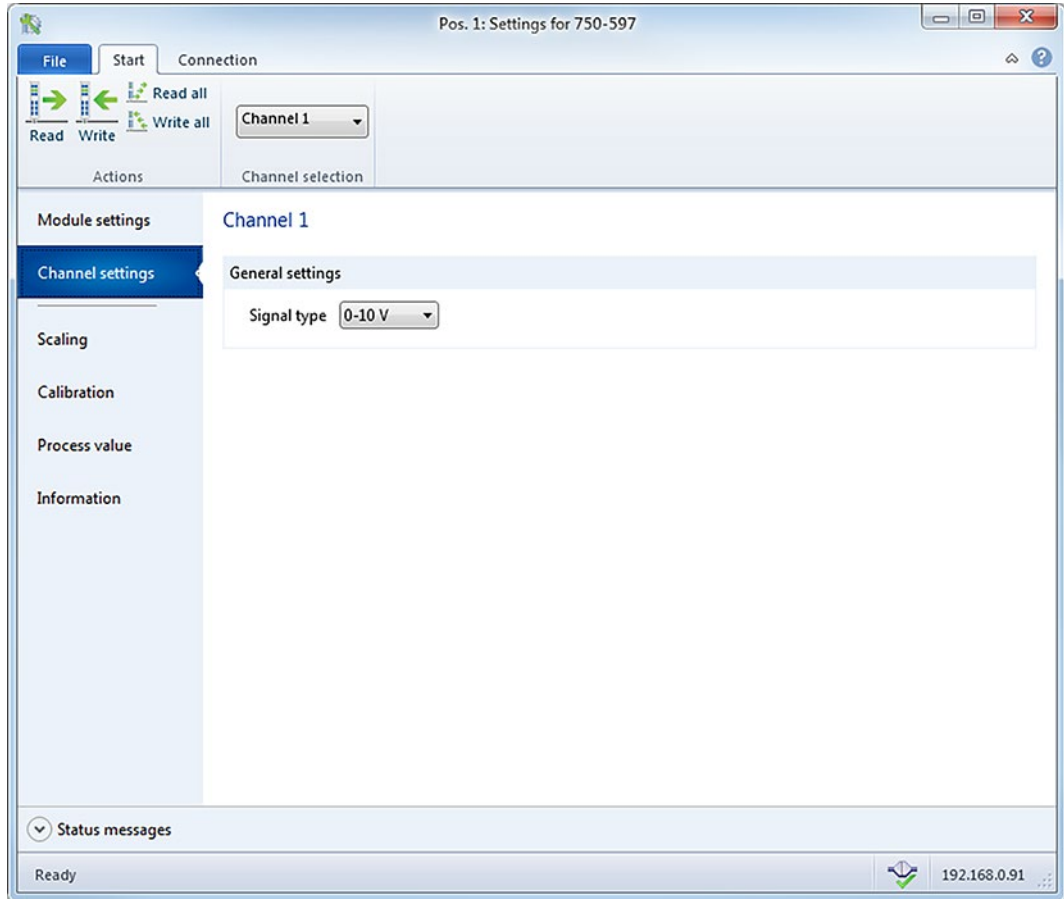


Figure 24: Channel settings Menu Item View

Table 26: Channel settings Menu Item

Option	Description	
General Settings		
Signal type	0-10 V ^{*)}	Measurement range 0 V ... +10 V
	+/- 10 V	Measurement range -10 V ... +10 V

^{*)} Factory setting

7.1.1.4.3 “Scaling” Menu Item

Note



Save settings!

Click the [Write] or [Write all] button to write any settings you have made to the I/O module.

Note



Selecting the scaling method!

If user scaling is enabled, enabling or disabling manufacturer scaling has no effect.

Note



Scaling method is carried out by channel!

Select the respective channel before applying the settings to the I/O module.

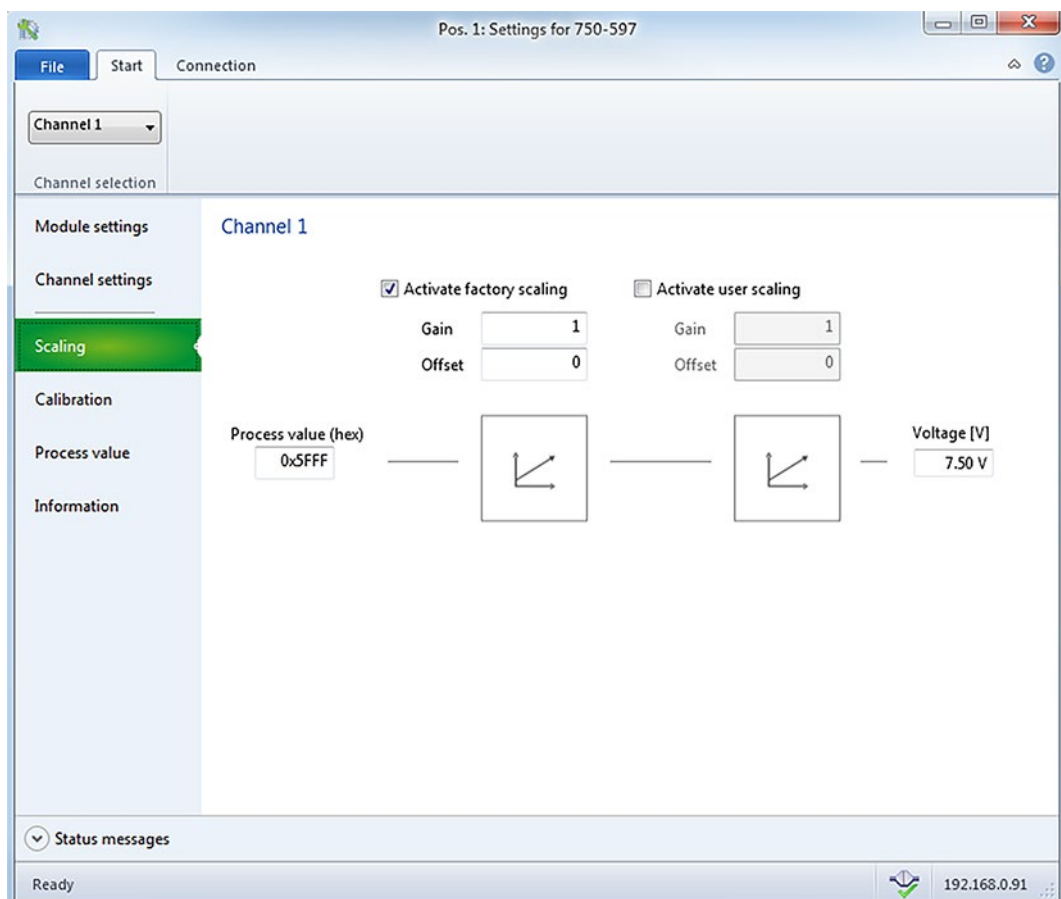


Figure 25: Scaling Menu Item View

Table 27: **Scaling** Menu Item

Option	Description
Channel x	
Enable manufacturer scaling	<input checked="" type="checkbox"/> Manufacturer scaling is enabled (no scaling of Gain and Offset).
	<input type="checkbox"/> ^{*)} Manufacturer scaling is disabled (no scaling of Gain and Offset).
	Gain The Gain value is specified by the manufacturer.
	Offset The Offset value is specified by the manufacturer.
Enable user scaling	<input checked="" type="checkbox"/> User scaling is enabled. By enabling this setting you can also specify the individual gain and offset values.
	<input type="checkbox"/> ^{*)} User scaling is disabled. Individually specified gain and offset values cannot be entered.
	Gain Enter the Gain value for the user scaling. The Gain value is used as a gain factor on the process value. The resolution is 1/1024. The value entered must fall in the value range of 0 ... 63999.
	Offset Enter the Offset value for the user scaling. The Offset value causes a zero offset of the process value (shift along the Y axis). The resolution is 1 mV per digit. The value entered must fall in the value range of -32768 ... 32767.
Process value (hex)	Display of the process value for the channel selected in hexadecimal notation. The process value is read cyclically from the I/O module.
Voltage [V]	Display of the scaled expected voltage output value. The expected voltage output value is read cyclically from the I/O module.

*) Factory setting

7.1.1.4.4 “Calibration” Menu Item

Note



Save settings!

Click the [Write] or [Write all] button to write any settings you have made to the I/O module.

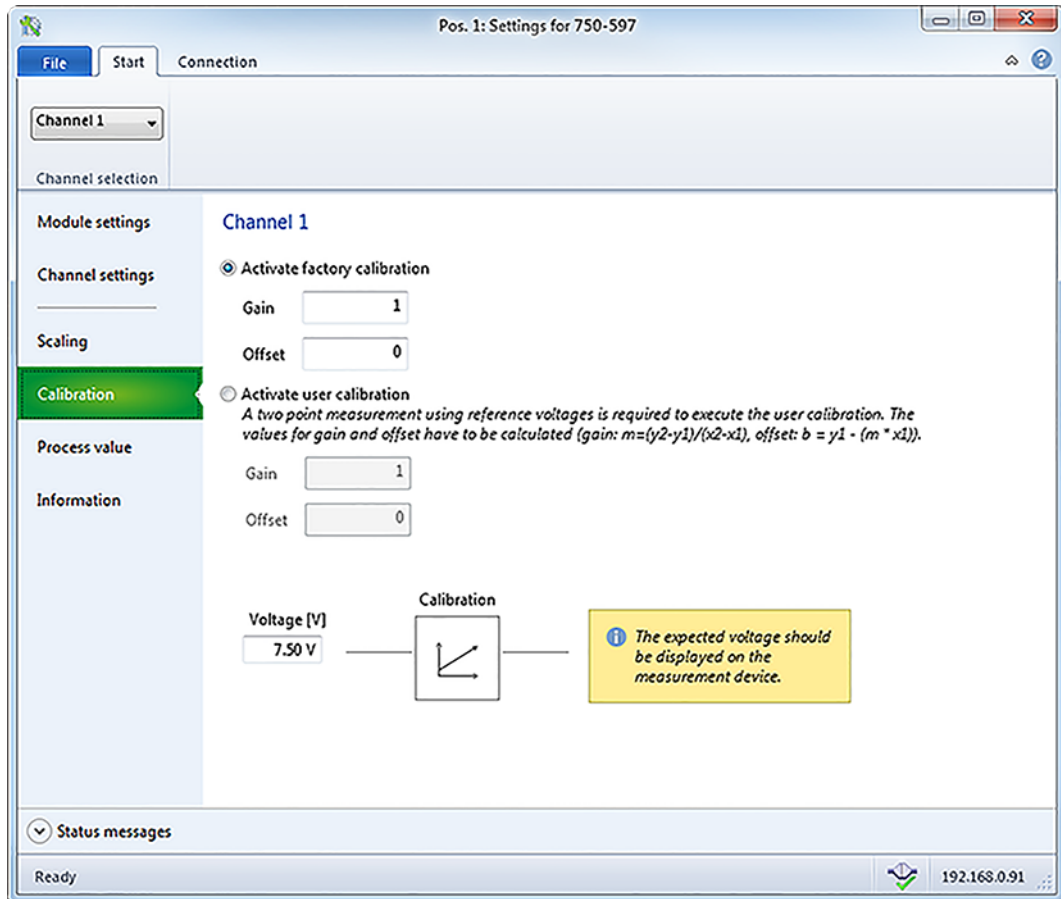


Figure 26: Calibration Menu Item View

Table 28: Calibration Menu Item

Option	Description
Selection of the calibration method	Enable factory configuration
	Enable factory configuration
	Gain
	Offset
	Enable user calibration
	Enable user calibration
	Offset
Voltage [V]	Display of the process value in volts (V). This is a 16-bit value. The process value is read cyclically from the I/O module.

*) Factory setting

7.1.1.4.5 “Process Value” Menu Item

In this area, an overview of all I/O module channels and the respective process value are displayed.

Note



Save settings!

Click the [Write] or [Write all] button to write any settings you have made to the I/O module.

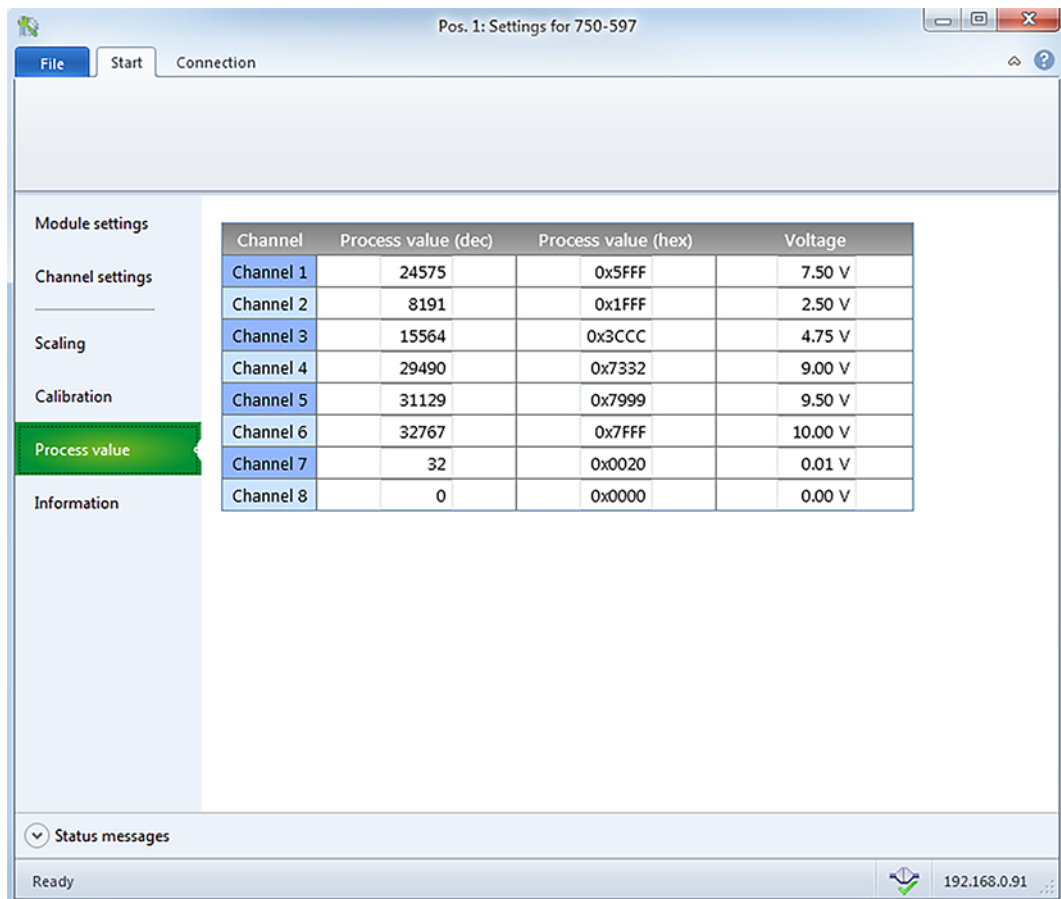


Figure 27: Process Value Menu Item View

Table 29: Process Value Menu Item

Option	Description
Process value overview	
Channel	Display of the I/O module channel
Process value (dec)	Display of the process value in decimal notation. The process value is read cyclically from the I/O module.
Process value (hex)	Display of the process value in hexadecimal notation. The process value is read cyclically from the I/O module.
Voltage	Display of the process value in volts (V). This is a 16-bit value. The process value is read cyclically from the I/O module.

7.1.1.4.6 “Information” Menu Item

This area provides an overview of the specifications for the I/O module used. You obtain information about the following points:

- Article number
- Description
- Software version
- Hardware version

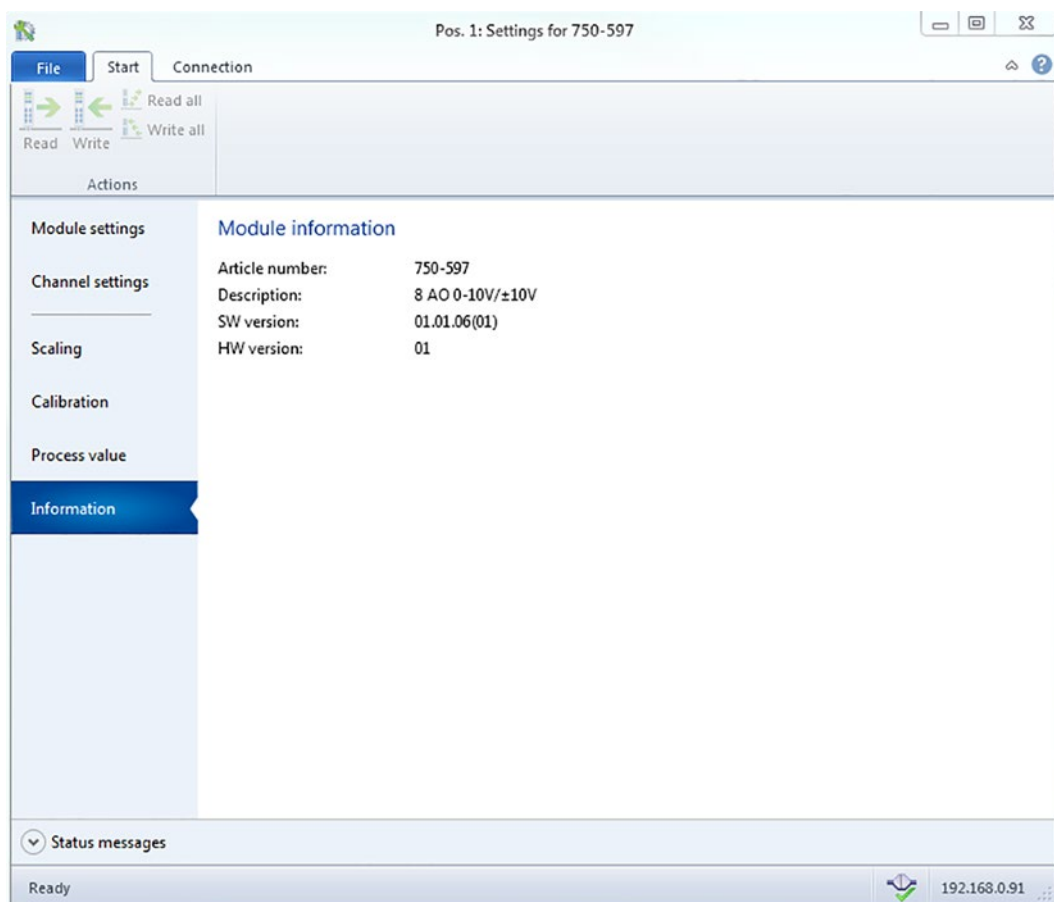


Figure 28: **Information** Menu Item View

7.1.1.5 Display Area

Click one of the menu items in the vertical tab menu to call up the related parameterization options in the display area.

7.1.1.6 Status Messages

This area provides information about occurring undervoltages of the field supply. A requirement for displaying status message is that the checkbox for the “Enable diagnostic functions globally” function is activated in the **Module Settings** menu item.

The status messages are determined for all channels from the status byte of channel 1.

Click the button to expand the **Status Messages** window at the bottom of the parameterization dialog to display the status messages.

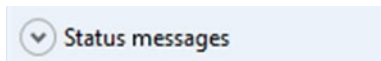


Figure 29: Expanding the Status Messages Window

The following status messages with corresponding additional information are displayed:

Table 30: Status Messages – Possible Status Messages with Additional Information

Status message	Error type	Channel	Status byte
Undervoltage field supply	Error	x	0x60
No error	Information	x	0x00

Click the **[Delete]** button to clear the status message history. The history is automatically deleted if you interrupt the connection to the I/O module or close the parameterization dialog.

7.1.1.7 Status Bar

The following information is displayed in the status bar:

- Status indication with display of the currently executed action as text or the respective error message if an error occurs
- A progress bar is displayed as the actions are executed
- Online status
- IP address or COM interface

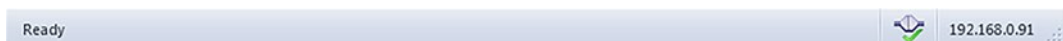


Figure 30: Status Bar in the Parameterization Dialog

7.2 Calibrating Process Values

Manufacturer calibration serves to compensate for tolerances in electrical components of the I/O module. User calibration allows you to compensate for the tolerances of electrical components of both the I/O module and connected devices and to take into account factors such as component age and different ambient temperatures at the installation site.



Note

User calibration by channel required!

Perform the calibration for each channel individually to achieve the greatest possible measurement accuracy for each channel.

The following signal types are specified:

Table 31: Signal Types

ID	Signal type	Voltage range
1	0-10 V	0 V ... +10 V
2	+/- 10 V	-10 V ... +10 V

The variables in the following equations have the following meaning:

Table 32: Variable Legend – Calibrating Measured Values

Variable	Explanation
m	Calibration gain (gain factor)
b	Calibration offset (offset)
x1	Expected output voltage 1
x2	Expected output voltage 2
y1	Process value 1
y2	Process value 2

The “Gain” and “Offset” values are required to perform user calibration. The calibration gain is the factor by which the process value is amplified. The calibration offset is the offset of the process value on the y axis.

The following general calibration equation applies:

$$y = (x + b) \times m$$

The general calibration equation yields the following two equations for calculating the two values sought:

$$\text{Calibration gain: } m = (y_2 - y_1) / (x_2 - x_1)$$

$$\text{Calibration offset: } b = y_1 - (m \times x_1)$$

7.2.1 Example of Determining Gain and Offset

A two-point calibration method is used.

Perform the following steps in *WAGO-I/O-CHECK*:

1. Select a channel and signal type under **Channel settings**.
In this example, signal type „0-10 V” has been selected.
2. Enable user calibration under **Calibration**.
3. Set the value for the calibration offset to “0”.
4. Set the value for the calibration gain to “1”.
5. Specify the 1st process value.
6. Read the expected output voltage on the measuring instrument.
Example:

$$\text{Process value 1 (y1)} = \underline{1 \text{ V}}$$

$$\text{At 1 V, the expected output voltage (x1)} = \underline{0.97 \text{ V}}$$

7. Specify the 2nd process value.
8. Read the expected output voltage on the measuring instrument.
Example:

$$\text{Process value 2 (y2)} = \underline{9 \text{ V}}$$

$$\text{At 9 V, the expected output voltage (x2)} = \underline{9.05 \text{ V}}$$

9. Insert all calculated values into the respective equations.
You obtain the values for the calibration gain and offset sought as the result.
Example:

Calibration gain:

$$m = (y2 - y1) / (x2 - x1)$$

$$\rightarrow m = (9 \text{ V} - 1 \text{ V}) / (9.05 \text{ V} - 0.97 \text{ V}) = \underline{0.99}$$

Calibration offset:

$$b = y1 - (m \times x1)$$

$$\rightarrow b = 1 \text{ V} - (0.99 \times 0.97 \text{ V}) = \underline{0.04 \text{ V}}$$

10. Enter the calculated gain value (“0.99”) in *WAGO-I/O-CHECK*.
11. Convert the result for the calibration offset based on the process value resolution:

$$0.04 \text{ V} / 0.000305 \text{ V per digit} = \underline{131 \text{ digit}}$$

12. Enter the calculated offset value (“131”) in *WAGO-I/O-CHECK*.

7.3 Scaling Process Values

User scaling allows you to scale the process value application specific with the following voltage ranges by means of parameterizing the Gain and Offset values:

- Signal type „0-10 V”: 0 V ... +11 V
- Signal type “+/- 10 V”: -11 V ... +11 V

User scaling is optional.

The values for “Gain” and “Offset” are required to perform user scaling. The scaling gain is the gain factor. The scaling offset is the offset on the y axis. When these two values are input, a scaled process value is yielded as the result. The following general scaling equation applies:

- $y = (x + \text{Offset}) \times (\text{Gain} / 1024)$

The variables have the following meaning:

Table 33: Variable Legend – Scaling Process Values

Variable	Meaning/function
x	Unscaled process value
y	Scaled process value
Gain	Scaling gain (gain factor)
Offset	Scaling offset (offset)
1024	Resolution 1/1024

The x value (unscaled process value) serves as the input value for the user scaling. With user scaling switched off, the x value is transferred unchanged to y.

8 Diagnostics

The response of the I/O module if a diagnostic is present depends on the configuration. You can enable or disabled these diagnostics separately in WAGO-I/O-CHECK (see section “Startup” > ... > “Parameterization with WAGO-I/O-CHECK”).

The I/O module allows a field supply undervoltage to be displayed. A dedicated bit in the status byte for channel 1 is assigned to the error for the entire module. The associated status bit is set if an error status is detected.

A general error indicates a diagnosed field supply undervoltage. If this diagnostic is present, the bit for the general error is always set.

Note



Note how long diagnostics are displayed!

A diagnosed error status is displayed at least 100 ms even if the detected error status is no longer present in this period.

9 Appendix

9.1 Configuration and Parameterization using a GSD File with PROFIBUS DP and PROFINET IO

9.1.1 Configuration 8 AO 0-10 V, ±10 V DC S.E.

9.1.1.1 PROFIBUS DP Fieldbus Coupler/Controller 750-333(/0xx-000), 750-833(/0xx-000)

When using the aforementioned PROFIBUS DP fieldbus devices, the process image size is configured by selecting the corresponding GSD entry.

Table 34: Configuration PROFIBUS DP

GSD Entry		PI-Length/[byte]		Data Type	Inst.
Module	Submodule	I	O		
750-597 8AO/+/-10V/SE	n/a	n/a	16	INT16	8
750-597 8AO/+/-10V/SE RA		24	24	{UINT8, INT16}	
PFC 750-597 8AO/+/-10V/SE		n/a	n/a	n/a	n/a

9.1.1.2 PROFINET IO Fieldbus Coupler 750-370, 750-375(/025-000), 750-377(/025-000)

When using the aforementioned PROFINET IO fieldbus couplers, the process image size is configured by selecting the corresponding GSD entry.

Table 35: Configuration 750-370

GSD Entry		PI-Length/[byte]		Data Type	Inst.
Module	Submodule	I	O		
750-597 8AO, 0-10 V, +/-10 V	n/a	n/a	16	INT16	8
750-597 8AO, 0-10 V, +/-10 V, EM		24	24	{UINT8, INT16}	

Table 36: Configuration 750-375(/025-000), 750-377(/025-000)

GSD Entry		PI-Length/[byte]		Data Type	Inst.
Module	Submodule	I	O		
750-597 8AO, 0-10 V, +/-10 V	INT16[8] O	n/a	16	INT16	8
	{UINT8, INT16}[8] I/O	24	24	{UINT8, INT16}	

9.1.2 Parameterization 8 AI 0-10 V, ±10 V DC S.E.

The GSD file can be used to provide the I/O module on the PROFIBUS DP and PROFINET IO fieldbus coupler with all operating parameters.

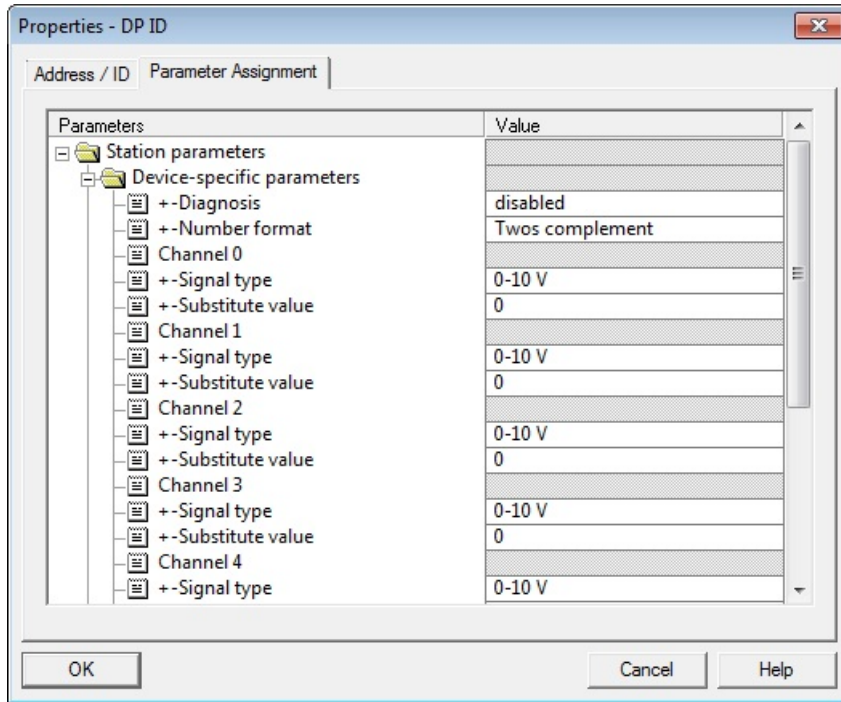


Figure 31: Example of the PROFIBUS DP fieldbus coupler parameterization dialog

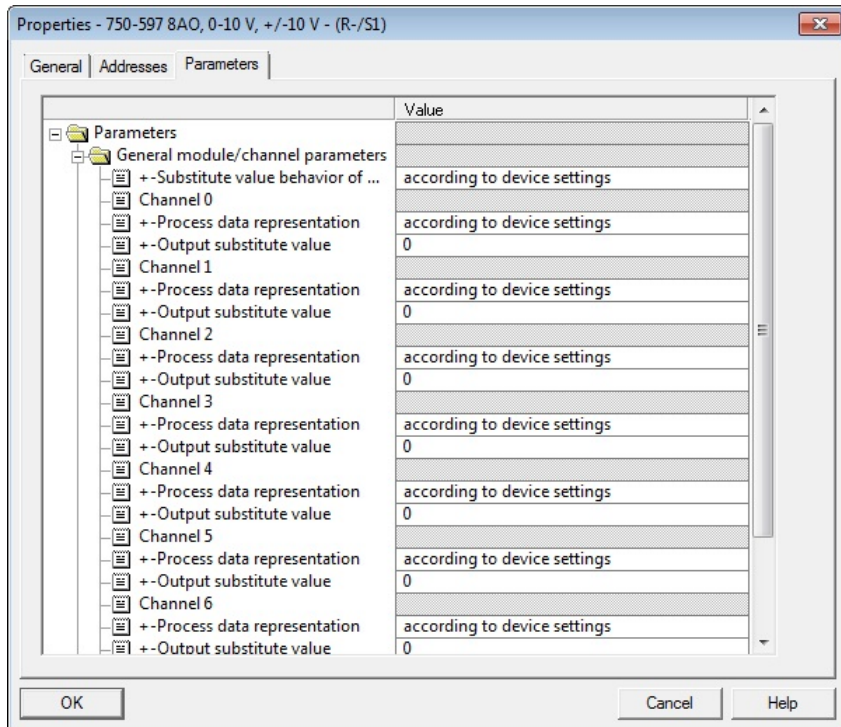


Figure 32: Example of the 750-370 fieldbus coupler parameterization dialog part 1

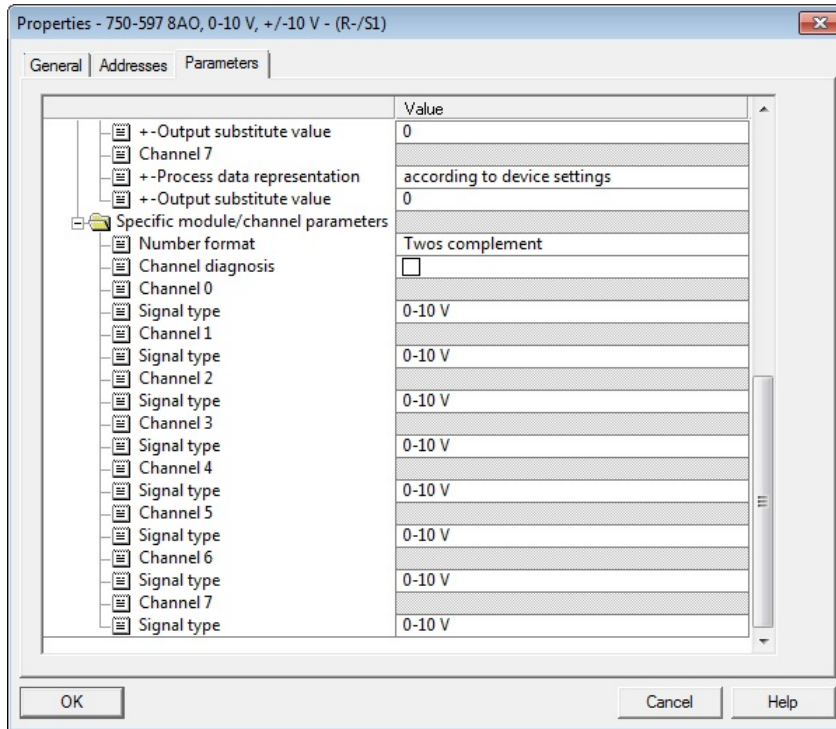


Figure 33: Example of the 750-370 fieldbus coupler parameterization dialog part 2

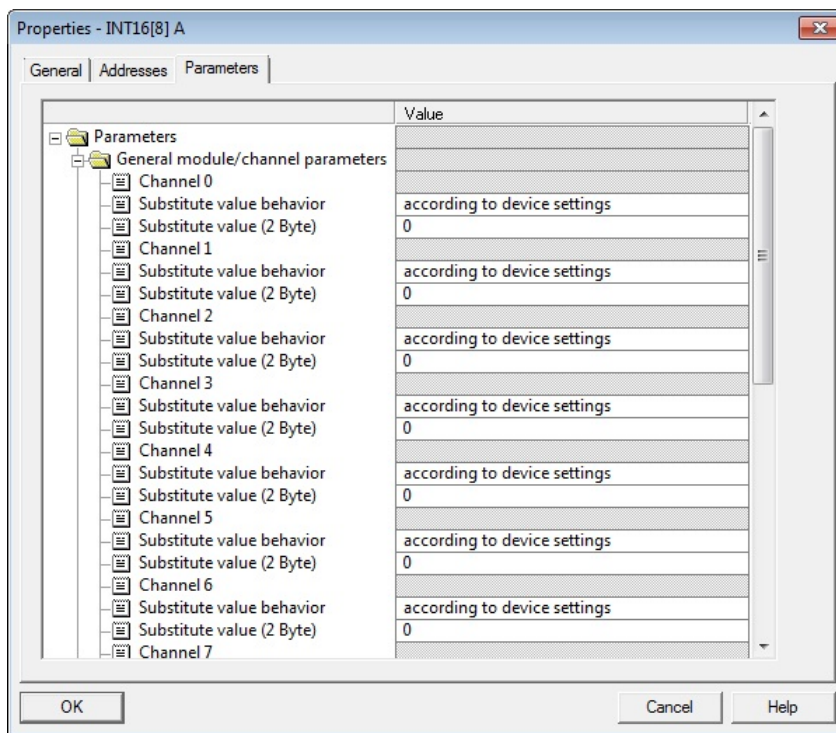


Figure 34: Example of the 750-375(/025-000) and 750-377(/025-000) fieldbus coupler parameterization dialog part 1

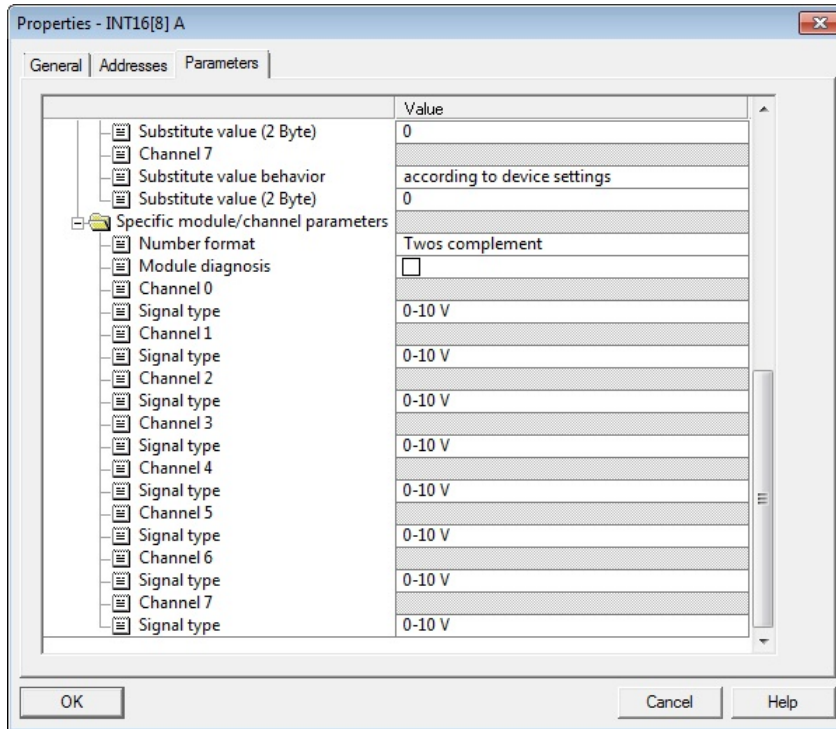


Figure 35: Example of the 750-375(/025-000) and 750-377(/025-000) fieldbus coupler parameterization dialog part 2

9.1.2.1 All PROFIBUS DP and PROFINET IO Fieldbus Couplers

The following assignment applies to the parameters of the I/O module when using PROFIBUS DP and PROFINET IO fieldbus devices.

Table 37: Specific module / channel parameters for 750-597

GSD File		WAGO-I/O-CHECK	
Description	Value	Selection box	Value
Number format	Twos complement ^{*)}	Number format	Twos complement ^{*)}
	Sign magnitude		Sign magnitude
Signal type Channel x (x = 0...7)	0-10 V ^{*)}	Signal type	0-10 V ^{*)}
	+/- 10 V		+/- 10 V

^{*)} Default setting

9.1.2.2 PROFIBUS DP Fieldbus Coupler 750-333(/0xx-000), 750-833(/0xx-000)

The aforementioned fieldbus couplers or controllers allow module-specific parameterization of diagnosis behavior as well as channel-specific parameterization of a substitute value.

Table 38: General module / channel parameters

Parameter	Value	Explanation
Diagnosis	The fieldbus coupler signals a diagnosis if an undervoltage of I/O module's field side power supply arises. This kind of module diagnosis is referred to channel 0.	
	0 (disabled) ^{*)}	Diagnostics reported by the I/O module do not lead to the signaling of a diagnosis by the fieldbus coupler.
	1 (enabled)	Diagnostics reported by the I/O module lead to the signaling of a diagnosis by the fieldbus coupler.
Substitute value ¹⁾ Channel x (x = 0...7)	-32767 ... 0 ^{*)} ... 32767	If, in the event of a PROFIBUS DP fault, the switching of substitute values is enabled within fieldbus coupler's parameterization, this value is transmitted to the periphery in the event of a fault.

^{*)} Default setting

¹⁾ A substitute value unequal 0 can only be selected using firmware versions as from FW17 for 750-833(/0xx-000) or FW18 for 750-333(/0xx-000)

9.1.2.3 PROFINET IO Fieldbus Coupler 750-370

The aforementioned fieldbus coupler allows module-specific parameterization of diagnosis and the substitute value behavior of the outputs as well as channel-specific parameterization of the process data representation and the output substitute value.

Table 39: General module / channel parameters

Parameter	Value	Explanation
Channel diagnosis	An external fault on the I/O module, in this case an undervoltage of the field side power supply,	
	0 (false) ^{*)}	does neither cause a transmission of a diagnostic alarm nor an entry in the diagnostics database of the station proxy.
	1 (true)	entails transmission of a diagnostic alarm. This external fault leads to an entry in the diagnostics database of the station proxy.
Substitute value behavior of outputs	If an established connection (AR), to which the submodule is assigned, is disconnected or if the status of the "Provider State Flag" changes from "RUN" to "STOP" in the APDU status of the consumer telegram,	
	according to device settings ^{*)}	the parameterized substitute value behavior of the station proxy is applied. The parameterized substitute value of the respective output channel has no meaning in this context.
	Outputs are set to 0	the data of all output channels is set to 0.
	Outputs are set to last valid values.	the last valid status of the respective output channel is maintained. The parameterized substitute value of the respective output channel has no meaning in this context.
	Outputs are set to substitute values	the parameterized substitute value of the respective output channel is output.
Process data representation	Process data is represented	
	according to device settings ^{*)}	according to setting of station proxy (DAP)
	INTEL (LSB-MSB)	in „Little Endian“ format
	MOTOROLA (MSB-LSB)	in „Big Endian“ format“
Output substitute value ¹⁾ Channel x (x = 0...7)	-32767 ... 0 ^{*)} ... 32767	In the state of missing output data, the set substitute value is output on the respective output channel if the substitute value behavior is set to "Outputs are set to substitute values".

^{*)} Default setting

¹⁾ A substitute value less than 0 can only be selected using firmware versions as from FW08 for 750-370

9.1.2.4 PROFINET IO Fieldbus Coupler 750-375(/025-000), 750-377(/025-000)

The aforementioned fieldbus couplers allow module-specific parameterization of behavior at diagnosis.

Table 40: General module / channel parameters

Parameter	Value	Explanation
Module diagnosis	An undervoltage of the I/O module's field side power supply	
	0 (false) ^{*)}	does neither cause a transmission of a diagnostic alarm nor an entry in the diagnostics database of the station proxy.
	1 (true)	entails transmission of a diagnostic alarm. This external fault leads to an entry in the diagnostics database of the station proxy.
Substitute value behavior	If an established AR, to which the submodule is assigned, is disconnected or if the status of the "Provider State Flag" changes from "RUN" to "STOP" in the APDU status of the consumer telegram,	
	according to device settings ^{*)}	the parameterized substitute value behavior of the station proxy is applied for the duration of missing output data. The parameterized substitute value of the respective output channel has no meaning in this context.
	keep last valid value	the last valid status of the respective output channel is retained for the duration of the missing output data. The parameterized substitute value of the respective output channel has no meaning in this context.
	set substitute value	the parameterized substitute value of the respective output channel is output for the duration of the missing output data.
Substitute value Channel x (x = 0...7)	-32767 ... 0 ^{*)} ... 32767	In the state of missing output data, the set substitute value is output on the respective output channel with the set substitute value behavior "set substitute value".

^{*)} Default settings

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