WAGO I/O SYSTEM FIELD

2-Channel Analog Input; IO-Link Converter; 0 ... 10 V;
2 x M12 Connector

765-2702/200-000

Table of Contents

Provisions

This document applies to the following product:

⊕ **765-2702/200-000** (2AI FLD IOL CONV 0-10V) 2-Channel Analog Input;
IO-Link Con-verter; 0 ... 10 V; 2 x M12 Connector

Product detail page	⊕ **www.wago.com/765-2702/200-000**

The product must only be installed and operated in accordance with the operating instructions. Knowledge of the operating instructions is required for proper use. You can find all documents and information on the detailed product page.

Additional document

• 📖 **WAGO IO-Link Configurator**

1.1 Intended Use

The product 765-2702/200-000 is used to evaluate analog signals from connected sensors or other devices within a measuring range from 0 to 10 mA.
• The product is intended for indoor use.
• Operation of the product in other application areas is only permitted when corresponding approvals and labeling are present.

Improper Use

Improper use of the product is not permitted. The following cases in particular constitute improper use:
• Non-observance of the intended use
• Use without protective measures in an environment in which salt water, salt spray mist, icing, corrosive fumes, explosive gases, direct sunlight and ionizing radiation can occur
• Use of the product in areas with special risk that require continuous fault-free operation and in which failure of or operation of the product can result in an imminent risk to life, limb or health or cause serious damage to property or the environment (such as the operation of nuclear power plants, weapons systems, aircraft and motor vehicles)

Warranty and Liability

The terms set forth in the General Business and Contract Conditions for Delivery and Service of WAGO GmbH & Co. KG and the terms for software products and products with integrated software stated in the WAGO Software License Contract – both available at ⊕ **www.wago.com** – shall apply. In particular, the warranty is void if:
• The product is improperly used.
• The deficiency (hardware and software configurations) is due to special instructions.
• Modifications to the hardware or software have been made by the user or third parties that are not described in this documentation and that has contributed to the fault.

Individual agreements always have priority.

Obligations of Installers/Operators

The installers and operators bear responsibility for the safety of an installation or a system assembled with the products. The installer/operator is responsible for proper installation and safety of the system. All laws, standards, guidelines, local regulations and accepted technology standards and practices applicable at the time of installation, and the instructions in the the products' Instructions for Use, must be complied with. In addition, the Installation regulations specified by Approvals must be observed. In the event of non-compliance, the products may not be operated within the scope of the approval.

1.2 Typographical Conventions

Number Notation

100	Decimals: Normal notation
0x64	Hexadecimals: C-notation
'100'	Binary: In single quotation marks
'0110.0100'	Nibbles separated by a period

Text Formatting

italic	Names of paths or files
bold	Menu items, entry or selection fields, emphasis
Code	Sections of program code
>	Selection of a menu point from a menu
"Value"	Value entries
[F5]	Identification of buttons or keys

Cross References / Links

	Cross references/links to a topic in a document
	Cross references / links to a separate document
	Cross references / links to a website
	Cross references / links to an email address

Action Instructions

✓ This symbol identifies a precondition.

1. Action step

2. Action step

⇨ This symbol identifies an intermediate result.

⇨ This symbol identifies the result of an action.

• Individual action step

Lists

• Lists, first level
   – Lists, second level

Figures

Figures in this documentation are for better understanding and may differ from the actual product design.

Notes

⚠ **DANGER**

Type and source of hazard

Possible consequences of hazard that also include death or irreversible injury

- Action step to reduce risk

⚠ **WARNING**

Type and source of hazard

Possible consequences of hazard that also include severe injury

- Action step to reduce risk

⚠ **CAUTION**

Type and source of hazard

Possible consequences of hazard that include at least slight injury

- Action step to reduce risk

ⓘ *NOTICE*

Type and source of malfunction (property damage only)

Possible malfunctions that may restrict the product's scope of functions or ergonomics, but do not lead to foreseeable risks to persons

- Action step to reduce risk

ⓘ **Note**

Notes and information

Indicates information, clarifications, recommendations, referrals, etc.

1.3 Legal Information

Intellectual property

The intellectual property of this document belongs to WAGO GmbH & Co. KG. The reproduction and distribution of its content (in whole or in part) is prohibited, unless otherwise provided by statutory provisions, written agreements or this document. In case of doubt, the written consent of WAGO GmbH & Co. KG must be obtained in advance.

Third-party products are always mentioned without any reference to patent rights. WAGO GmbH & Co. KG, or the manufacturer of third-party products, retains all rights regarding patent, utility model or design registration.

Third-party trademarks are referred to in the product documentation. The "®" and "™" symbols are omitted hereinafter. The trademarks are listed in the Appendix: ⌐**Protected Rights [▶ 40]**.

Subject to Change

The instructions, guidelines, standards, etc., in this manual correspond to state of the art at the time the documentation was created and are not subject to updating service. The installer and operator bear sole responsibility to ensure they are complied with in their currently applicable form. WAGO GmbH & Co. KG retains the right to carry out technical changes and improvements of the products and the data, specifications and illustrations of this manual. All claims for change or improvement of products that have already been delivered – excepting change or improvement performed under guarantee agreement – are excluded.

Licenses

The products may contain open-source software. The requisite license information is saved in the products. This information is also available under: ⊕ **www.wago.com**.

Safety

2.1 General Safety Rules

- 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 of the product. In addition, ensure that any supplement to this documentation is included, if necessary.
- The product must only be installed and put into operation by qualified electrical specialists per EN 50110-1/-2 and IEC 60364.
- Comply with the laws, standards, guidelines, local regulations and accepted technology standards and practices applicable at the time of installation.

2.2 Electrical Safety

- Disconnect all power sources from the product before performing any installation, repair or maintenance.
- Make sure the product does not carry any voltage before starting work.

Power Supply

- Connecting impermissible current or frequency values may destroy the product.

Grounding/Protection/Fuses

- When handling the product, please ensure that environmental factors (personnel, work space and packaging) are properly equalized. Do not touch any conducting parts.
- The product does not contain internal overcurrent protection. Protect the product with an appropriate overcurrent protection device.

Cables

- Use appropriate strain relief.

2.3 Mechanical Safety

- Before startup, please check the product for any damage that may have occurred during shipping. Do not put the product into operation in the event of mechanical damage.
- Do not open the product housing.

2.4 Indirect Safety

- Only use a dry or cloth or a clothed dampened with water to clean the product. Do not use cleaning agents, e.g., abrasive cleaners, alcohols or acetone.
- Only permit skilled personnel approved by WAGO to perform repair work.
- Replace any defective or damaged devices.
- Use only UL-approved category CYJV 2/7/8 cables to connect the product in UL-approved systems.
- Only use accessories authorized by WAGO.

2.5 Thermal Safety

- Observe permissible temperature range of connecting cables.
- The conductor cross-sections must be designed for the maximum load current.

Overview

The Analog/IO-Link Converter provides an economical, compact solution for easily incorporating conventional analog sensors and actuators into an IO-Link-capable system like the WAGO I/O System Field, depending on their type. This allows reliable, cost-effective, interference-immune acquisition and output of analog signals. Digital communication can easily be introduced (retrofitted) when old systems are modernized. The converter can be configured via IO-Link. A compact design, IP67 protection and the high operating temperature range make the Analog/IO-Link Converter ideal for automation without control cabinets.

The product is used for signal acquisition for a connected sensor or another device with an analog output. The product has two analog voltage inputs.

The product functions as an analog/IO-Link converter.

Properties

4.1 View
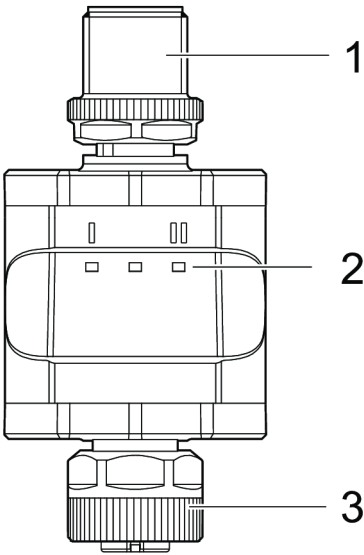
Figure 1: View

Table 1: Legend for Figure "View"

No.	Custom Name	
1	M12 A plug	⬆ **IO-Link Side [▶ 13]**
2	LEDs	⬆ **Indicators [▶ 12]**
3	M12 A socket	⬆ **Sensor Side [▶ 13]**

4.2 Indicators
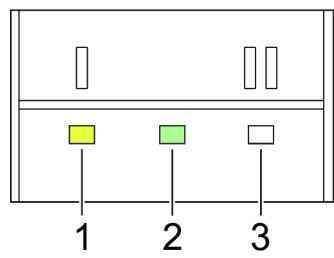
Figure 2: Indicators – LEDs

Table 2: Legend for Figure "Indicators – LEDs"

No.	LED		Color
1	I	IN1	Yellow
2	POWER		Green
3	II	IN2	Yellow

4.3 Connections
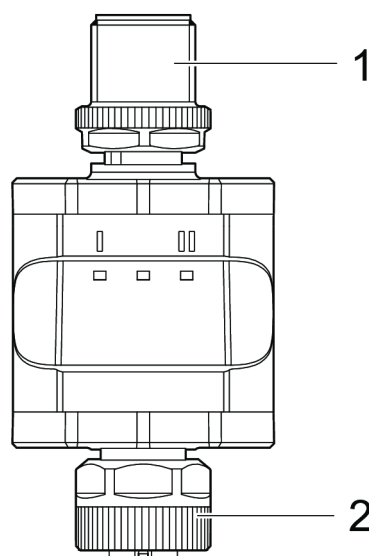
Figure 3: Connections

Table 3: Legend for Figure "Connections"

No.	Custom Name	
1	IO-Link side (M12 A plug)	⌁ **IO-Link Side [▶ 13]**
2	Sensor side (M12 A socket)	⌁ **Sensor Side [▶ 13]**

4.3.1 IO-Link Side

Table 4: IO-Link Side (M12 A Plug)

Connection	Pin	Signal	Description
⌀ 4 3 / 1 2	1	1L+	24 VDC supply
	2	-	Not assigned
	3	1L−	0 V power supply
M12 A plug, 4-pole	4	C/Q	IO-Link

4.3.2 Sensor Side

Table 5: Sensor Side (M12 A Socket)

Connection	Pin	Signal	Description
⌀ 3 4 / 2 5 1	1	1L+	Sensor power supply
	2	AI 0 ... 10 VAC	Analog input 2
	3	1L−	Sensor power supply
	4	AI 0 ... 10 VAC	Analog input 1
M12 A socket, 5-pole	5	-	Not assigned

4.4 Dimensional Drawings
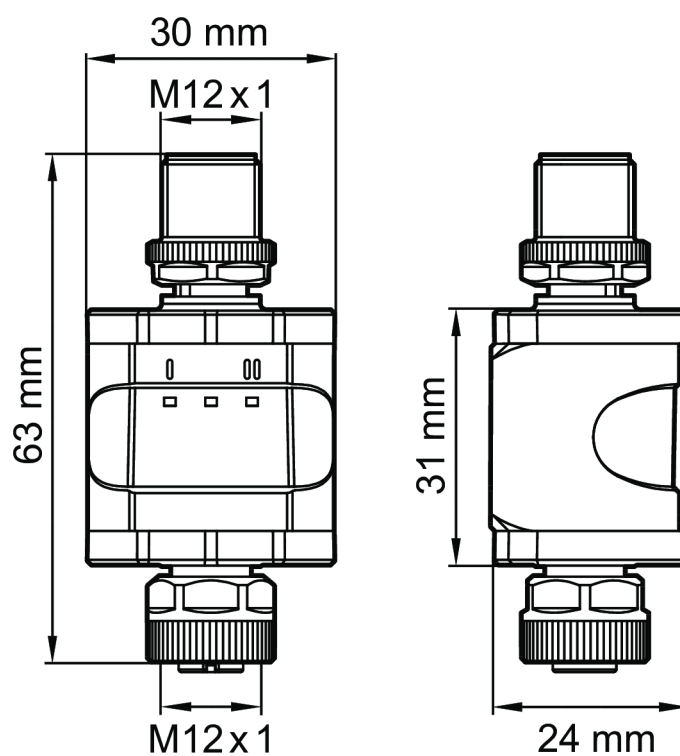
Figure 4: Dimensional Drawings

4.5 Circuit Diagram

IN1 (analogue)

IN2 (analogue)

765-2702/200-000

IO-Link C/Q
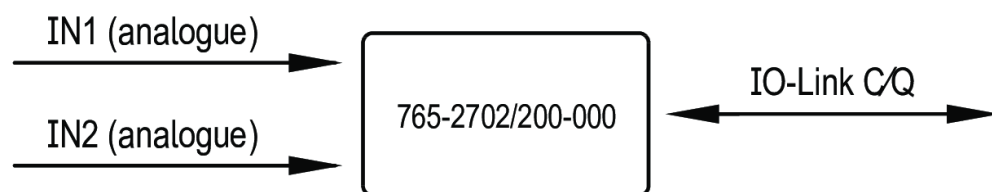
4.6 Technical Data

> ⓘ **Note**
>
> **Read technical data sheet!**
>
> You can find technical data on the product in the appendix under 🖰 **Technical Data, Approvals, Guidelines and Standards [▶ 41]**.

Table 6: Technical Data – Communication

Name	Value	Remark
Manufacturer ID	285 / 0x011D Bytes 01 29 / 0x01 0x1D	If the manufacturer ID and device ID are specified in the PLC system, this ensures that:
Device ID	8391310 / 0x800A8E Bytes 128 10 142 / 0x80 0x0A 0x8E	• The right product is connected • The IO-Link data management works • Operation of your application will still be possible even if the product is replaced by a successor model at a later date.
Manufacturer	WAGO GmbH & Co. KG	
Manufacturer text	WAGO IO-Link Converter	
Manufacturer URL	🌐 **https://www.wago.com/765-2702/200-000**	
IO-Link revision	V1.1	
Bit rate	COM2	
Minimum cycle time	4.6 ms	
SIO mode supported	No	
Block parameterization	Yes	
Data management	Yes	
Supported profiles	• Common Profile • Function Class Binary Data Channel (BDC) • Function Class Adjustable Switching Signal Channel	

Functions

5.1 Operating Modes

5.1.1 IO-Link Mode

IO-Link is a communication system for connecting intelligent sensors and actuators to automation systems. IO-Link is governed by the IEC 61131-9 standard.

The product has an IO-Link communication interface that requires an IO-Link-capable module (IO-Link master) for interoperation.

The IO-Link interface allows direct access to the process data and diagnostic data and allows product parameters to be set during operation.

For more information about IO-Link and all the necessary information about the required IO-Link hardware and software, see www.wago.com/<item number>.

IO Device Description (IODD)

The IODD (Input Output Device Description) required for configuration can be downloaded from the IO-Link community's website: ⊕ **www.io-link.com**.

5.2 Parameter Description

Parameters are set through the ISDU mechanism (ISDU = Indexed Service Data Units) described in the IO-Link specification. This allows read and write access to the ISDU objects.

The product is parameterized via an IO-Link tool (e.g., WAGO IO-Link Configurator),

The terms "index" and "subindex" used in the following tables refer to Indexed Service Data Units (ISDUs).

The following parameters are available.

You can find product diagnostic parameters in [⊕] **Diagnostics via IO-Link [▶ 34]**.

5.2.1 Default Command

Table 7: Variables – System Command – General

Index	2
Access rights	Write-only

Table 8: Variables – System Command

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
System Command	-	Sub 0	UIntegerT	8 bits	-	(1) Upload start – start of the block parameter upload
						(2) Upload end – end of the block parameter upload

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
						(3) Download start – start of the block parameter download
						(4) Download end – end of the block parameter download
						(5) Save – end of block parameterization and start of data storage
						(6) Cancel – cancel block parameterization
						(130) Set factory settings
						(240) IO-Link 1.1 system test command 240, event 8DFE appears
						(241) IO-Link 1.1 system test command 241, event 8DFE disappears
						(242) IO-Link 1.1 system test command 242, event 8DFF appears
						(243) IO-Link 1.1 system test command 243, event 8DFF disappears

5.2.2 Device Access

Table 9: Variables – Device Access – General

Index	12
Access rights	Read/write

Table 10: Variables – Device Access

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Device access blocks	-	0	RecordT	16 bits	-	-
Data management	-	bitOffs 1	BooleanT	1 bit	False	False (open)
						True (locked)

5.2.3 Manufacturer Name

Table 11: Variables – Manufacturer Name – General

Index	16
Access rights	Read-only

Table 12: Variables – Manufacturer Name

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Manufacturer	Manufacturer name assigned to a manufacturer ID	0	StringT	max. 18 bytes	WAGO GmbH & Co. KG	-

5.2.4   Manufacturer Text

Table 13: Variables – Manufacturer Text – General

Index	17
Access rights	Read-only

Table 14: Variables – Manufacturer Text

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Manufacturer text	Additional information on the manufacturer	0	StringT	max. 22 bytes	WAGO IO-Link Converter	-

5.2.5   Product name

Table 15: Variables – Product Name – General

Index	18
Access rights	Read-only

Table 16: Variables – Product Name

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Product name	Full product name	0	StringT	max. 18 bytes	765-2702/200-000	-

5.2.6   Product ID

Table 17: Variables – Product ID – General

Index	19
Access rights	Read-only

Table 18: Variables – Product ID

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Product ID	Manufacturer-specific product or type identification (e.g., item number or order number)	0	StringT	max. 8 bytes	765-2702	-

5.2.7   Product Text

Table 19: Variables – Product Text – General

Index	20
Access rights	Read-only

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Product Text	Additional product information	0	StringT	26 bytes	2AI FLD IOL CONV 0-10V	-

5.2.8 Serial Number

Table 21: Variables – Serial Number – General

Index	21
Access rights	Read-only

Table 22: Variables – Serial Number

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Serial number	Unique manufacturer-specific identifier of the individual product	0	StringT	12 bytes	-	-

5.2.9 Hardware Version

Table 23: Variables – Hardware Version – General

Index	22
Access rights	Read-only

Table 24: Variables – Hardware Version

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Hardware version	Unique manufacturer-specific identifier of the hardware version of the individual product	0	StringT	2 bytes	-	-

5.2.10 Firmware Version

Table 25: Variables – Firmware Version – General

Index	23
Access rights	Read-only

Table 26: Variables – Firmware Version

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Firmware Version	Unique manufacturer-specific identifier of the firmware version of the individual product	0	StringT	5 bytes	-	-

5.2.11 Application-Specific Attribute

Table 27: Variables – Application-Specific Attribute – General

Index	24
Access rights	Read/write

Table 28: Variables – Application-Specific Attribute

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Application-Specific Attribute	Option for tagging the product with user- or application-specific information	0	StringT	32 bytes	***	-

5.2.12 Function Tag

Function tag (customer-specific system ID), max. 32 characters long

Value: " *** " / freely definable by customer

Table 29: Variables – Function Tag – General

Index	25
Access rights	Read/write

Table 30: Variables – Function Tag

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Function Tag	Option for tagging the product with function-specific information	0	StringT	32 bytes	***	-

5.2.13 Location Tag

Location tag (customer-specific location ID), max. 32 characters long

Value: " *** " / freely definable by customer

Table 31: Variables – Location Tag – General

Index	26
Access rights	Read/write

Table 32: Variables – Location Tag

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Location Tag	Option for tagging the product with location-specific information	0	StringT	32 bytes	***	-

5.2.14 Device Access

Digital Output 1

Table 33: Variables – SSC1 Param – General

Index	60
Access rights	Read/write

Table 34: Variables – SSC1 Param

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [V]
SSC1 Param	Switching channel 1, parameter	0	RecordT	64 bits	-	-
SP1	Switching point 1	1	IntegerT	32 bits	2100	(201 ... 10000) * 0.001
SP2	Switching point 2	2	IntegerT	32 bits	2000	(200 ... 9999) * 0.001

Table 35: Variables – SSC1 Config – General

Index	61
Access rights	Read/write

Table 36: Variables – SSC1 Config

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
SSC1 Config	Switching channel 1, configuration	0	RecordT	32 bits	-	-
Logic	Switching point logic / status for detected object	1	UIntegerT	8 bits	1	0 (high active)
						1 (low active)
Mode	Switching point mode	2	UIntegerT	8 bits	3	1 (single-point)
						2 (window)
						3 (two-point)
						0 (deactivated)
Hyst	Switching point hysteresis	3	IntegerT	16 bits	20	(5 ... 100 %) * 0.1

Digital Output 2

Table 37: Variables – SSC2 Param – General

Index	62
Access rights	Read/write

Table 38: Variables – SSC2 Param

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [V]
SSC2 Param	Switching channel 2, parameter	0	RecordT	64 bits	-	-
SP1	Switching point 1	1	IntegerT	32 bits	2100	(201 ... 10000) * 0.001

WAGO

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [V]
SP2	Switching point 2	2	IntegerT	32 bits	2000	(200 ... 9999) * 0.001

Table 39: Variables – SSC2 Config – General

Index	63
Access rights	Read/write

Table 40: Variables – SSC2 Config

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
SSC2 Config	Switching channel 2, configuration	0	RecordT	32 bits	-	-
Logic	Switching point logic / status for detected object	1	UIntegerT	8 bits	1	0 (high active)
						1 (low active)
Mode	Switching point mode	2	UIntegerT	8 bits	3	1 (single-point)
						2 (window)
						3 (two-point)
						0 (deactivated)
Hyst	Switching point hysteresis	3	IntegerT	16 bits	20	(5 ... 100 %) * 0.1

Signal

Table 41: Variables – mEAn – General

Index	517
Access rights	Read/write

Table 42: Variables – mEAn

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [ms]
mEAn	Mean value filter	0	IntegerT	16 bits	50	(5 ... 1000) * 1

5.3 Function Diagrams

IO-Link allows you to specify limiting values for monitoring the measurement signals. Three settings (modes) are distinguished.

5.3.1 Single-Point Mode

"Single-point mode" signals when the value falls below a specified limiting value.

Figure 6: Make contact (IO-Link parameter LoGc: high active)

If a value falls below a voltage setting, this is reported in the input process data by a bit as Low.

Figure 7: Break contact (IO-Link parameter LoGc: low active)

If a value falls below a voltage setting, this is reported in the input process data by a bit as High.

5.3.2 Window Mode

"Window mode" reports a violation of a specified selection range.
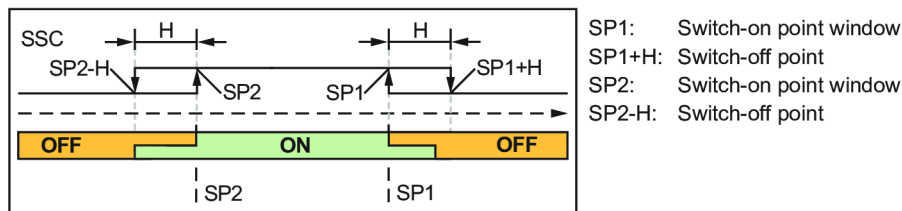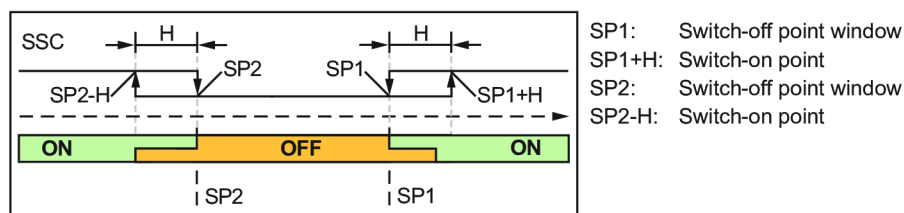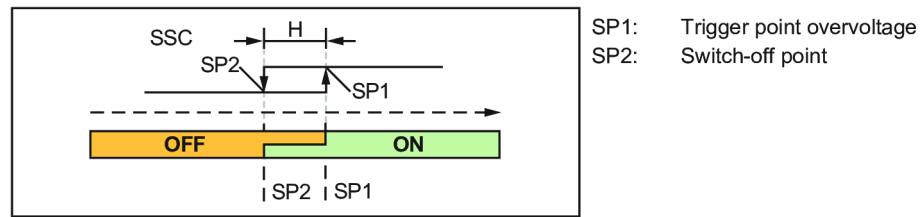

Figure 8: Make contact (IO-Link parameter LoGc: high active)

If a value violates the voltage window setting, this is reported in the input process data by a bit as Low.

Figure 9: Break contact (IO-Link parameter LoGc: low active)

If a value violates the voltage window setting, this is reported in the input process data by a bit as High.

5.3.3 Two-Point Mode

"Two-Point Mode" signals when the voltage falls below a specified value.

SP1: Trigger point overvoltage
SP2: Switch-off point

Figure 10: Make contact (IO-Link parameter LoGc: no/high)

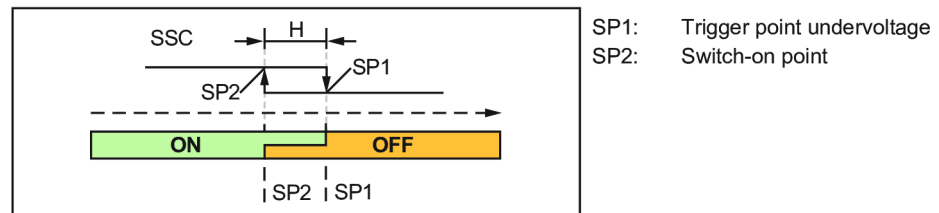If a value falls below a voltage setting, this is reported in the input process data by a bit as Low.

SP1: Trigger point undervoltage
SP2: Switch-on point

Figure 11: Break contact (IO-Link parameter LoGc: nc/low active)

If a value falls below a voltage setting, this is reported in the input process data by a bit as High.

5.3.4 Deactivated Mode

In "Deactivated Mode," the following specifications apply:
- Make contact (IO-Link parameter LoGc: high active)
- The signal bit in the input process data is always reported as Low.
- Break contact (IO-Link parameter LoGc: low active)
- The signal bit in the input process data is always reported as High.

5.4 Process Image

ⓘ **Note**

Process data is shown from the product's perspective!

The following process data is presented from the product's perspective. Some controllers swap the high and low byte when addressing byte by byte.
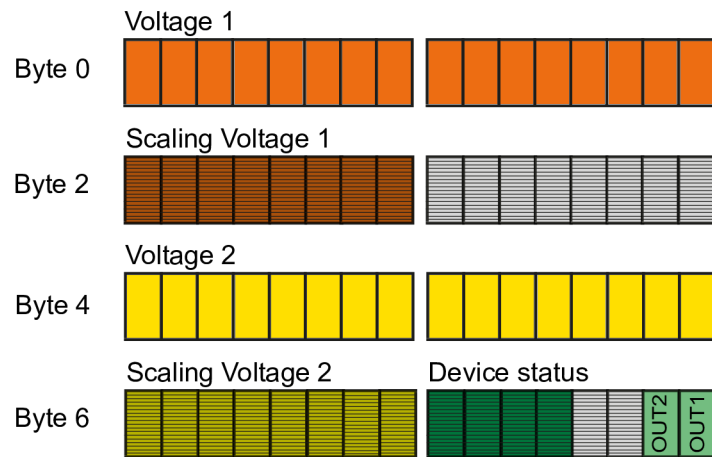
Figure 12: Input Process Data

5.4.1 Input Process Data

Table 43: Input Process Data

Byte	Data Type (Bits)	Bit Offset	Content	Value Range	Description	Factor	Unit
0	IntegerT (16)	0	Actual value Voltage 1	0 ... 11000	0 ... 11 VAC	0.001	V
				32760	Overvoltage		
2	- (8)	8	Scaling, voltage 1[1]			-	-
4	IntegerT (16)	0	Actual value Voltage 2	0 ... 11000	0 ... 11 VAC	0.001	V
				32760	Overvoltage		
6	Bool (1)	0	Status of OUT1	0	OFF	-	-
				1	ON		
6	Bool (1)	1	Status of OUT2	0	OFF	-	-
				1	ON		
6	- (2)	2	Reserved			-	-
6	UIntegerT (4)	4	Device status	0	OK	-	-
				1	Maintenance required		
				2	Outside specification		
				3	Function test		
				4	Error		
6	- (8)	8	Scaling, voltage 2[2]			-	-

[1] *Voltage 1 scaling: A function block in a PLC calculates voltage 1 of the process data (from WORD 2) with volt as the unit*
[2] *Voltage 2 scaling: A function block in a PLC calculates voltage 2 of the process data (from WORD 6) with volt as the unit*

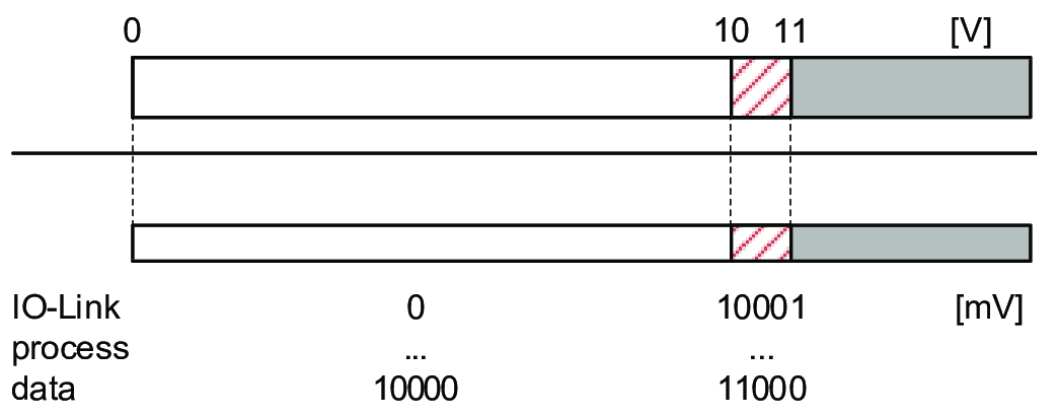### 5.4.2   Representation of the Voltage Value on the Input

Figure 13: Analog Value Representation

Planning

6.1 Structure Guidelines

6.1.1 Overcurrent Protection

Protecting Circuits against Overcurrent

Protect the circuits by using a fuse.

Table 44: Protecting Circuits against Overcurrent

Potential	M12 A plug	Fuse
1L+ / power supply	Pin 1	≤2 A
C/Q IO-Link (if not fused via IO-Link master)	Pin 4	≤2 A

Required trip characteristics of the fuses:
T_{fuse} ≤120 s at max. 6.25 A (fire protection)

Alternatively, the product can be powered by a limited-energy circuit per IEC 61010-1 or Class 2 per UL 1310.

> ⚠ **CAUTION**

The input current is unrestricted.

> no fire protection

- Protect circuits against overcurrent.

6.1.2 EMC Installation
- **Keep data and signal lines separate from interference sources.**
  Route data and signal lines separately from all power supply cables and other sources of high electromagnetic emissions (e.g., frequency converters or drives).
- **Observe maximum cable lengths**
  The maximum lengths of the connecting cables are as follows:
  - With IO-Link communication on the product master side: 20 m

6.1.3 Connection Example
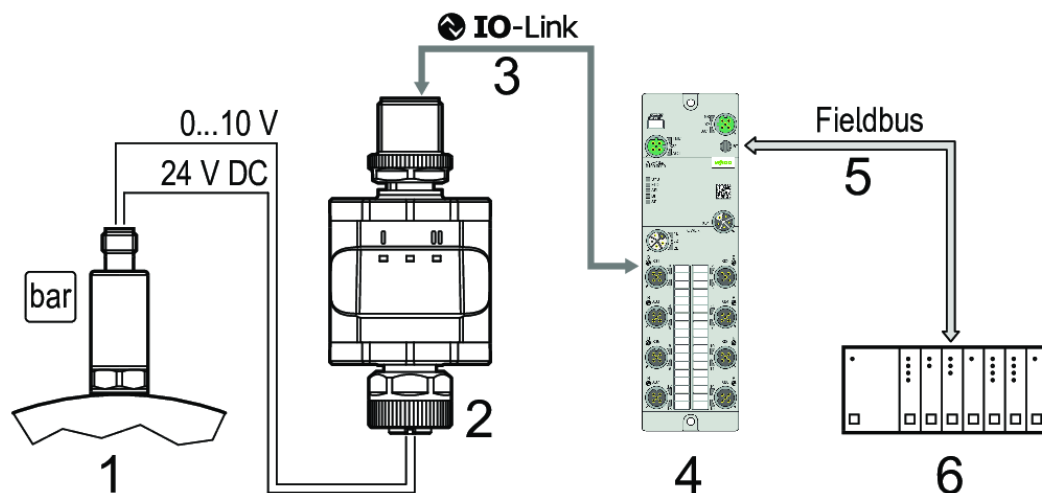
Figure 14: Connection Example with IO-Link Master

Table 45: Legend for Figure "Connection Example with IO-Link Master"

No.	Description
1	Sensor with analog output (e.g., pressure sensor)
2	WAGO Analog IO-Link Converter
3	Complete bidirectional IO-Link communication • Remote parameterization: Read and change parameter setting.
4	IO-Link master
5	Feldbus (Profinet, EtherCAT, EtherNet/IP etc.)
6	PLC

6.2 Behavior in the Event of a Communication Interruption

In case of communication interruption, the transmitted values are delivered to ZERO.

6.3 Examples and Aids

6.3.1 Aids

The parameters are set with an I/O-Link tool, e.g., WAGO IO-Link Configurator.

You can obtain the WAGO IO-Link Configurator software, as well as the associated product manual with a detailed description of the software, from 🌐 **www.wago.com**.

Installation and Removal

7.1 Mounting

7.1.1 Mounting the Product on a Mounting Clip

The product can be secured with a Mounting Clip.
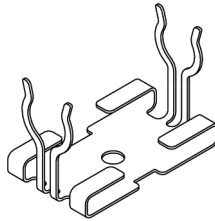
Figure 15: Mounting Clip (Secured with an M4 Screw or Cable Tie)
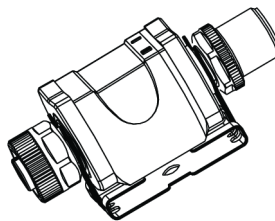
Figure 16: Mounting Clip with Product Attached

The Mounting Clip is not included upon delivery. You can find more information in ⌂ **Accessories [▶ 40]**.

Connection

8.1 Connecting the Plug

The mounting method must not cause mechanical stress on the M12 connection parts. Depending on the conditions of use, it may also be necessary to protect the product against mechanical stresses (shock/vibration) through appropriate mounting.

✓ The circuit must be protected by the use of a fuse or powered by a limited-energy circuit.

1. Connect the pluggable connectors of the connecting cables to the product.

2. Tighten the cap nut with a tightening torque of at least 1.0 Nm.

ⓘ **Note**

External power supply to sensor side not allowed

No external power may be supplied to the product at the 5-pin M12 input socket (sensor side).

Once the power supply is applied, the product is in the operating mode. It performs its measurement and evaluation functions and provides output signals according to the parameter settingss (see Parameter Description).

Commissioning

> ⓘ **Note**
>
> **Commissioning via parameter channel**
>
> The product is both commissioned and configured via the parameter channel.
>
> You can find the individual parameters and additional information in 🖱 **Parameter Description [▶ 17]**.

9.1 Configuration and Parameterization

> ⓘ **Note**
>
> **The product is in operating mode during parameterization**
>
> During the parameterization process, the product remains in operating mode. It continues to perform its monitoring functions with the existing parameters until the parameterization is completed.

WAGO

Transport and Storage

The original packaging offers optimal protection during transport and storage.

- Store the product in suitable packaging, preferably the original packaging.
- Only transport the product in suitable containers/packaging.
- Make sure the product contacts are not contaminated or damaged during packing or unpacking.
- Observe the specified ambient climatic conditions for transport and storage.

Diagnostics

11.1 Diagnostics via Indicators

Table 46: Diagnostics via Indicators

LED	LED State	Explanation
I	On	The analog value is in the normal range: 0 ... 100 % (0 ... 10 V)
	Flashing (2 Hz)	The analog value is in the range: 100 ... 110 % (10 ... 11 V)
Power	On	The supply voltage is OK. The product is in operating mode.
	Flashing (5 Hz)	The supply voltage is too low.
	Off	There is no supply voltage.
II	On	The analog value is in the normal range: 0 ... 100 % (0 ... 10 V)
	Flashing (2 Hz)	The analog value is in the range: 100 ... 110 % (10 ... 11 V)

11.2 Diagnostics via IO-Link

11.2.1 Diagnostics

Table 47: Variables – Diagnostics – General

Index	36
Access rights	Read-only

Table 48: Variables – Diagnostics

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Device status	Indicates the current product and diagnostic state	0	UIntegerT	8 bits	0	0 (Product is OK) 1 (Maintenance required) 2 (Outside specification) 3 (Function test) 4 (Failure) 5 ... 255 (Reserved)

11.2.2 Detailed Diagnostics

Table 49: Variables – Detailed Diagnostics – General

Index	37
Access rights	Read-only

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Detailed device status	List of all currently pending events of the product	0	Octet-StringT	3 bytes [7]	0x00, 0x00, 0x00	-

11.2.3 Operating Hours

Index	542
Access rights	Read-only

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [h]
Operating hours	Counter of operating hours since delivery	0	IntegerT	32 bits	0	(0 ... 1000000) * 1

11.2.4 Active Events

Index	545
Access rights	Read-only

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Active Events	Bit mask for currently pending events	0	RecordT	32 bits	-	-
Bit_31	Test Event 2. Product status = 1 (Maintenance required)	bitOffset 31	BooleantT	-	0	0 (noEv) / 1 (0x8DFF)
Bit_30	Test Event 1. Product status = 1 (Maintenance required)	bitOffset 30	BooleantT	-	0	0 (noEv) / 1 (0x8DFE)
Bit_15	Permissible product temperature exceeded	bitOffset 15	BooleantT	-	0	0 (noEv) / 1 (0x4210)
Bit_8	Process value outside valid range	bitOffset 8	BooleantT	-	0	0 (noEv) / 1 (0x8C10)
Bit_4	Temperature error	bitOffset 4	BooleantT	-	0	0 (noEv) / 1 (0x4000)
Bit_1	Parameter error	bitOffset 1	BooleantT	-	0	0 (noEv) / 1 (0x6320)
Bit_0	Hardware fault in product	bitOffset 0	BooleantT	-	0	0 (noEv) / 1 (0x5000)

11.2.5 Parameter Setting Errors

Table 55: Variables – Parameter Setting Errors – General

Index	546
Access rights	Read-only

Table 56: Variables – Parameter Setting Errors

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range
Parameter setting error	Indicates the parameter that was set incorrectly at the time of download	0	UIntegerT	32 bits [10]	0	0 (OK)
						786432 (device access blocks, index = 12)
						3997696 (SSC1 config, index = 61)
						3997697 (SSC1 config, index = 61, subindex = 1)
						3997698 (SSC1 config, index = 61, subindex = 2)
						3997699 (SSC1 config, index = 61, subindex = 3)
						3932160 (SSC1 param, index = 60)
						3932161 (SSC1 param, index = 60, subindex = 1)
						3932162 (SSC1 param, index = 60, subindex = 2)
						4128768 (SSC2 config, index = 63)
						4128769 (SSC2 config, index = 63, subindex = 1)
						4128770 (SSC2 config, index = 63, subindex = 2)
						4128771 (SSC2 config, index = 63, subindex = 3)
						4063232 (SSC2 param, index = 62)
						4063233 (SSC2 param, index = 62, subindex = 1)
						4063234 (SSC2 param, index = 62, subindex = 2)
						33882112 (mEAn, index = 517)

11.2.6 Temperature

Table 57: Variables – Temperature – General

Index	543
Access rights	Read-only

Table 58: Variables – Temperature

Name	Description	Subindex	Data Type	Length	Factory Setting	Value Range [°C]
Temperature	Current internal temperature	0	IntegerT	16 bits	0	(−40 ... 125) * 1

WAGO

11.2.7 Error Types

Table 59: Process Image – Error Types

Error Code	Name	Description
32768 d / 0x8000	Application error in product – no details	Access was denied by the product. No detailed information is available.
32785 d / 0x8011	Index does not exist	Access to an index that does not exist
32786 d / 0x8012	Subindex does not exist	Access to a subindex that does not exist
32800 d / 0x8020	Service is currently unavailable	The parameter cannot be accessed. The product does not allow this in its current state.
32801 d / 0x8021	Service currently unavailable – local operating mode	The parameter cannot be accessed, since the product is currently in local operating mode.
32802 d / 0x8022	Service currently unavailable – product operating mode	The parameter cannot be accessed, since the product is currently in remote operating mode.
32803 d / 0x8023	Access denied	Write access to a read-only parameter or read access to a write-only parameter
32816 d / 0x8030	Parameter value outside valid range	The parameter value that was written is outside the permissible value range.
32817 d / 0x8031	Parameter value above valid range	The parameter value that was written exceeds the permissible value range.
32818 d / 0x8032	Parameter value below valid range	The parameter value that was written falls below the permissible value range.
32819 d / 0x8033	Parameter length overrun	The length of the parameter that was written is greater than is allowed.
32820 d / 0x8034	Parameter length underrun	The length of the parameter that was written is less than is allowed.
32821 d / 0x8035	Function unavailable	The product does not support the command that was written
32822 d / 0x8036	Function currently unavailable	The product does not support the command that was written in the current state.
32832 d / 0x8040	Invalid parameter set	The individual parameter value that was written collides with the other parameter settings.
32833 d / 0x8041	Inconsistent parameter set	Inconsistencies were detected at the end of the block parameter transfer. The product plausibility check failed.
32898 d / 0x8082	Application not ready	Access was denied because the product is not currently ready.

11.2.8 Events

Table 60: Events

Code	Device status	PQ*	Name	Type	Description
16384 d 0x4000	3 (Function test)	Valid	Temperature error	Error	Overload
16912 d 0x4210	2 (Outside specification)	Valid	Permissible product temperature exceeded	Warning	Eliminate heat source
20480 d 0x5000	4 (Failure)	Invalid	Hardware fault in product	Error	Replace product
25376 d 0x6320	3 (Function test)	Invalid	Parameter error	Error	Check data sheet and values
35856 d 0x8C10	2 (Outside specification)	Valid	Process value outside valid range	Warning	Process value uncertain

Code	Device status	PQ*	Name	Type	Description
36350 d 0x8DFE	1 (Maintenance required)	Valid	Test Event 1. Product status = 1	Warning	Event appears when index 2 is set to value 240; event disappears when index 2 is set to value 241
36351 d 0x8DFF	1 (Maintenance required)	Valid	Test Event 2. Product status = 1	Warning	Event appears when index 2 is set to value 242; event disappears when index 2 is set to value 243

The product represents events to signal irregular product conditions
PQ = process data quality*

Decommissioning

12.1 Disposal and Recycling
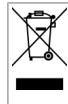
	WEEE Mark
	Electrical and electronic equipment may not be disposed of with household waste. This also applies to products without this mark.

Electrical and electronic equipment contain materials and substances that can be harmful to the environment and health. Electrical and electronic equipment must be disposed of properly after use. Environmentally friendly disposal benefits health, protects the environment from harmful substances in electrical and electronic equipment and enables sustainable and efficient use of resources.

- Observe the national and local regulations for the disposal of electrical and electronic equipment, lithium-ion batteries, lead–acid batteries and packaging.
- Clear any data stored on electrical and electronic equipment.
- Remove lithium-ion batteries, lead–acid batteries or memory cards that are added to the electrical and electronic equipment.
- Wear appropriate personal protective equipment when removing the lithium-ion batteries/lead–acid batteries.
- Dispose of the removed lithium-ion batteries/lead–acid batteries according to your local waste regulations (e. g. collection boxes at the retail or local collection points).
- Have electrical and electronic equipment sent to a local collection point.
- Dispose of all types of packaging to ensure a high level of recovery, reuse and recycling.
- Transport packages from the B2B area can be taken back free of charge via a return system in accordance with the Packaging Act. Please contact our service provider Interseroh directly. The corresponding certificate can be found at: **corporate-certificates**
- Throughout Europe, Directives 2006/66/EC, 94/62/EC and 2012/19/EU (WEEE) apply. National directives and laws may differ.

Appendix

13.1 Installation Regulations Specified by Approvals

For the Scope of cULus:

Electricity can only be supplied by via SELV/PELV circuits. Device powered according to "Limited Energy" per UL 61010-1, chapter 9.4. External circuits must be isolated per UL 61010-2-201, figure 102.

The device is safe at least under the following conditions:
- Indoor use
- Altitude up to 2000 m
- Maximum relative humidity of 90 %, non-condensing
- Pollution degree 3
- Use UL-certified category CYJV 2/7/8 connection cables with suitable data to connect the device to the IO-Link devices.
- No evaluation of the IP class has been performed by UL.
- No special treatment is required when cleaning the device.

13.2 Accessories

Table 61: Accessories

Item No.	Product
765-101/000-000	Mounting Clip

13.3 Protected Rights
- Adobe® and Acrobat® are registered trademarks of Adobe Systems Inc.
- Android™ is a trademark of Google LLC.
- Apple, the Apple logo, iPhone, iPad and iPod touch are registered trademarks of Apple Inc. registered in the USA and other countries. "App Store" is a service mark of Apple Inc.
- AS-Interface® is a registered trademark of the AS-International Association e.V.
- BACnet® is a registered trademark of the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE).
- *Bluetooth*® is a registered trademark of Bluetooth SIG, Inc.
- CiA® and CANopen® are registered trademarks of CAN in AUTOMATION – International Users and Manufacturers Group e.V.
- CODESYS is a registered trademark of CODESYS Development GmbH.
- DALI is a registered trademark of the Digital Illumination Interface Alliance (DiiA).
- EtherCAT® is a registered trademark and patented technology licensed by Beckhoff Automation GmbH, Germany.
- ETHERNET/IP™ is a registered trademark of the Open DeviceNet Vendor Association, Inc (ODVA).
- EnOcean® is a registered trademark of EnOcean GmbH.
- Google Play™ is a registered trademark of Google Inc.
- IO-Link is a registered trademark of PROFIBUS Nutzerorganisation e.V.
- KNX® is a registered trademark of the KNX Association cvba.

- Linux® is a registered trademark of Linus Torvalds.
- LON® is a registered trademark of the Echelon Corporation.
- Modbus® is a registered trademark of Schneider Electric, licensed for Modbus Organization, Inc.
- OPC UA is a registered trademark of the OPC Foundation.
- PROFIBUS® is a registered trademark of the PROFIBUS Nutzerorganisation e.V. (PNO).
- PROFINET® is a registered trademark of the PROFIBUS Nutzerorganisation e.V. (PNO).
- QR Code is a registered trademark of DENSO WAVE INCORPORATED.
- Subversion® is a trademark of the Apache Software Foundation.
- Windows® is a registered trademark of Microsoft Corporation.

13.4 Technical Data, Approvals, Guidelines and Standards

See also

⊟ Data_sheet_765-2702/200-000 [▶ 42]

> ### ⓘ Note
>
> **Subject to changes!**
>
> Please also observe the further product documentation! You can generate the current datasheet at any time at: ⊕ **www.wago.com** /<item number>.

13.4.1   Data_sheet_765-2702/200-000

765-2702/200-000

2-Channel Analog Input; IO-Link Converter; 0 … 10 V; 2 x M12 Connection

WAGO

M12-A plug; 4-pole

1: 24 VDC: Supply 1L+
2: not used
3: 0 V: Supply 1L–
4: C/Q IO-Link

M12-A socket; 5-pole

1: Sensor supply 1L+
2: Analog input 2 (0 … 10 V)
3: Sensor supply 1L–
4: Analog input 1 (0 … 10 V)
5: not used

IO-Link side

LED

Sensor side
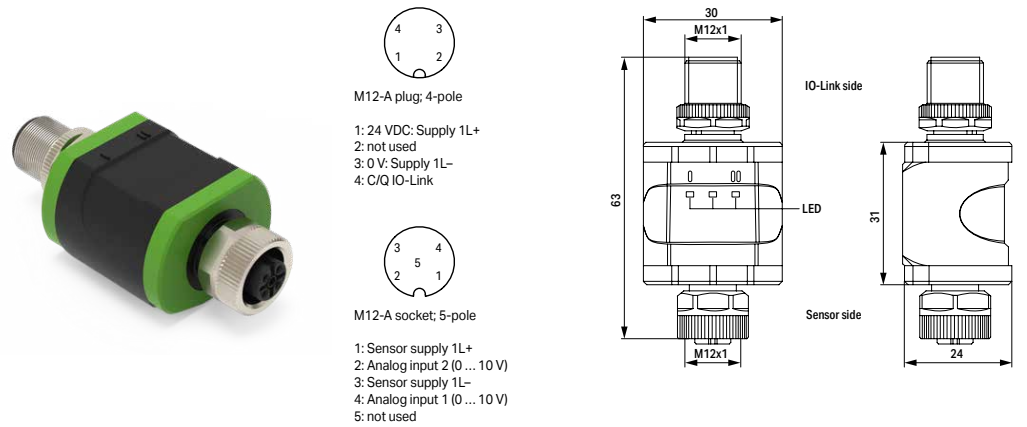
Application:
Decentralized preprocessing and conversion of analog signals

This device is used for signal acquisition of a connected sensor or any other unit that has an analog output (0 … 10 V).
The device has two analog voltage inputs.

Use as an IO-Link device:
The device has an IO-Link communication interface that requires an IO-Link-capable module (IO-Link master) for interoperation.
The IO-Link interface allows direct access to the process and diagnostic data and enables setting of the device parameters during operation.

Description	Item No.	PU
2AI FLD IOL CONV 0-10V	**765-2702/200-000**	1

Accessories	Item No.	PU
Mounting clip	**765-101/000-000**	1
IO Device Description (IODD)	**Download: www.wago.com**	

Approvals/Tests	
Conformity marking	CE
UL listed	Pending
IO-Link	
MTTF	504 years

Technical Data	
Ambient temperature (operation)	−25 … +70 °C
Surrounding air temperature (storage)	−25 … +70 °C
Relative humidity (without condensation)	max. 90 % (31 °C); linearly decreasing to 50 % (40 °C)
Operating altitude	0 … 4000 m
Protection type	IP67
Pollution degree	2
Weight	92 g
Dimensions	63 x 30 x 24 mm
Housing material	PA
Indicators	Analog input: 2 x LED, yellow; Power: 1 x LED, green
Length of connection cables	20 m

Technical Data	
Supply voltage	24 VDC; −25 … +25 %; (18 … 30 VDC)
Current consumption	< 380 mA
Inputs	
Number of analog inputs	2
Connection technology	M12-A socket; 5-pole
Signal type (voltage)	0 … 10 V
Current carrying capacity for all inputs	200 mA (max.)
Input resistance	> 100 kΩ
Precision	0.25 % of the upper-range value
IO-Link	
Communication interface	IO-Link Class A/B
Transmission type	COM2 (38.4 kBaud)
IO-Link revision	1.1
Process data	2 x 16-bit IN (analog)
Process cycle time (min.)	4.6 ms
Parameters via IO-Link	Application-specific identifier; plant identifier; location identifier; average filter

List of Figures

List of Tables