



Operating instructions
Converter 2 x 0...10 V / IO-Link

GB

DP1222



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1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at www.ifm.com.

1.1 Symbols used

- ✓ Requirement
- ▶ Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance may result in malfunction or interference.
-  Information
Supplementary note

1.2 Warnings used



CAUTION

Warning of personal injury

- ▷ Slight reversible injuries may result.

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
 - The system architect is responsible for the safety of the system.
 - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units and cables against damage.
- Replace damaged units, otherwise the technical data and safety will be impaired.
- Observe applicable documents.

3 Intended use

The unit is used to detect signals from a connected sensor or another device with an analogue output (0...10 V). It has two analogue voltage inputs.



Fig. 1: Inputs/outputs of the unit

The unit operates as an "analogue/IO-Link converter".



A maximum of 11 V may be applied to each input. Otherwise, the accuracy of the respective other channel will be negatively affected.

If the LED IN1 / IN2 flashes and the IO-Link event "Process value above valid range" (0x8C10) is present, the accuracy of the other channel can no longer be guaranteed.



The unit is not suited for environments with particular requirements on mechanical stability (e.g. shock/vibration).

The unit is intended for indoor use only.

► Observe the operating conditions (→ Technical data at www.ifm.com).

4 Function

The unit provides the IO-Link process data according to the analogue input signals.

The unit is designed for half-duplex communication. So the following options are possible:

- Remote display: reading and displaying the current voltage value
- Remote parameter setting: reading and changing the current parameter setting
- IO-Link parameter setting: IO Device Description (IODD) (→ [7](#))

4.1 Operating modes

The following operating modes are available:

Operating mode 1	
Description	Operating mode for backwards compatibility Please note that this operating mode does not support all functionalities described in the instructions.
Application	To ensure compatibility if sensors are replaced
IODD designation	DP1222
IO-Link device ID	613d / 00 02 65 h

Operating mode 2 (default)	
Description	Operating mode on delivery
Application	Standard application
IODD designation	DP1222_Status_B
IO-Link device ID	1428 d / 00 05 94 h

4.2 Application as an IO-Link device

4.2.1 General information

The unit has an IO-Link communication interface which requires an IO-Link capable module (IO-Link master).

The IO-Link interface allows direct access to the process and diagnostic data and enables setting of the parameters of the unit during operation.

You will find further information about IO-Link and all the necessary information about the required IO-Link hardware and software at:

www.ifm.com/gb/io-link

4.2.2 Application example

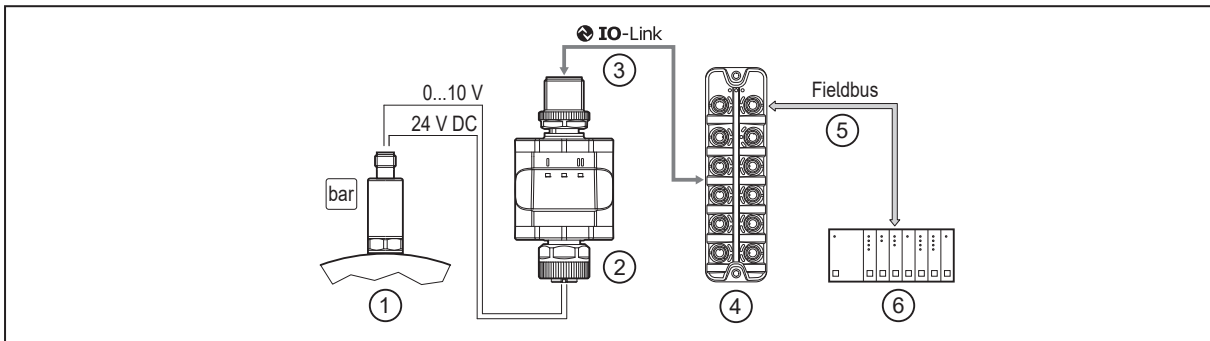


Fig. 2: Application example with IO-Link master

- | | | | |
|----|---|----|----------------------------------|
| 1: | Analogue sensor | 2: | Converter 2 x 0...10 V / IO-Link |
| 3: | Fully bidirectional IO-Link communication
- Remote parameter setting: reading and changing the parameter setting | 4: | IO-Link master |
| 5: | Fieldbus (e.g. Profibus, Profinet etc.) | 6: | PLC |

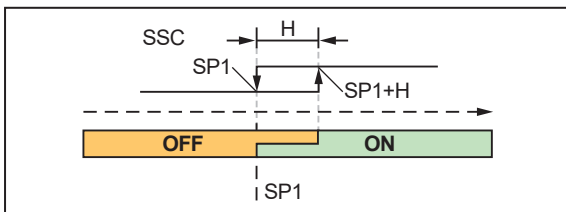
4.2.3 IO Device Description (IODD)

You will find the IODDs necessary for the configuration of the IO-Link device and detailed information about process data structure, diagnostic information and parameter addresses at:

www.ifm.com

4.3 Function diagrams

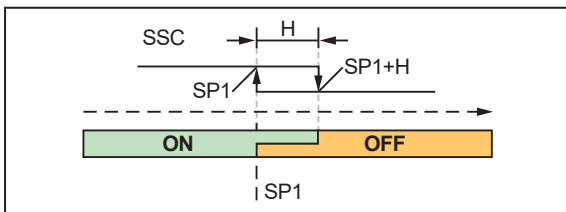
4.3.1 Single point mode



- SP1: Switch-off point
- SP1+H: Trigger point overvoltage

Fig. 3: NO (IO-Link parameter LoGc: high active)

If a set voltage is not reached, this is signalled as “low” by a bit in the input process data.



- SP1: Switch-on point
- SP1+H: Trigger point undervoltage

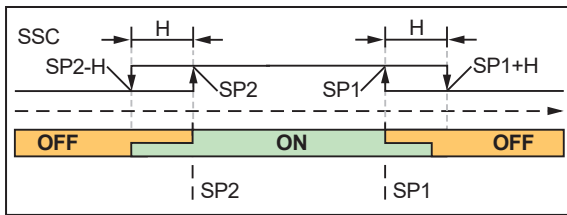
Fig. 4: NC (IO-Link parameter LoGc: low active)

If a set voltage is not reached, this is signalled as “high” by a bit in the input process data.



In operating mode 1, this function is not available.

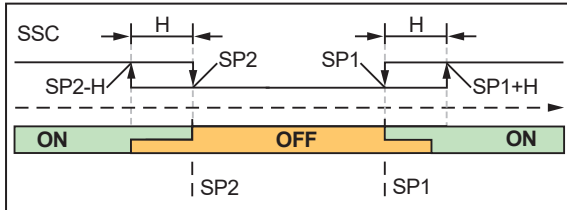
4.3.2 Window mode



- SP1: Switch-on point window
- SP1+H: Switch-off point
- SP2: Switch-on point window
- SP2-H: Switch-off point

Fig. 5: NO (IO-Link parameter LoGc: high active)

If the set voltage window is not complied with, this is signalled as “low” by a bit in the input process data.



- SP1: Switch-off point window
- SP1+H: Switch-on point
- SP2: Switch-off point window
- SP2-H: Switch-on point

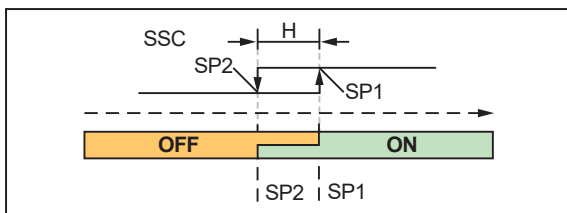
Fig. 6: NC (IO-Link parameter LoGc: low active)

If the set voltage window is not complied with, this is signalled as “high” by a bit in the input process data.



In operating mode 1, this function is not available.

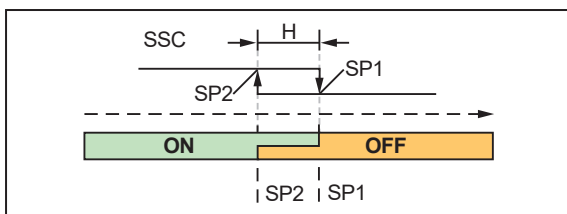
4.3.3 Two point mode



- SP1: Trigger point overvoltage
- SP2: Switch-off point

Fig. 7: NO (IO-Link parameter LoGc: no / high active)

If a set voltage is not reached, this is signalled as “low” by a bit in the input process data.



- SP1: Trigger point undervoltage
- SP2: Switch-on point

Fig. 8: NC (IO-Link parameter LoGc: nc / low active)

If a set voltage is not reached, this is signalled as “high” by a bit in the input process data.



In operating mode 1, this function is not available.

4.3.4 Deactivated mode

NO (IO-Link parameter LoGc: high active)

The signal bit in the input process data is always signalled as “low”.

NC (IO-Link parameter LoGc: low active)

The signal bit in the input process data is always signalled as “high”.



In operating mode 1, this function is not available.

5 Installation

- ▶ Install the unit so that the M12 connection parts and the unit are protected from mechanical stress such as shock and vibration.
- ▶ If necessary, fix the unit with a clamp (use M4 screw or cable tie).

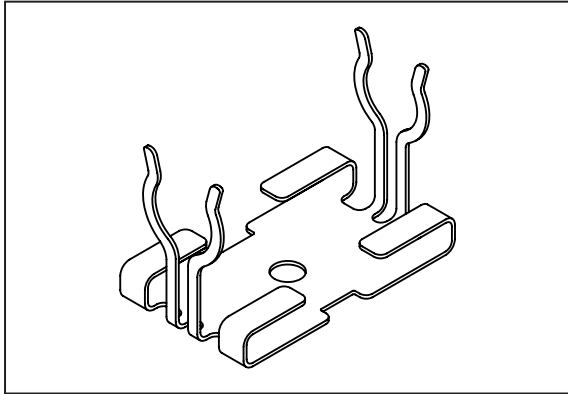


Fig. 9: Mounting clip

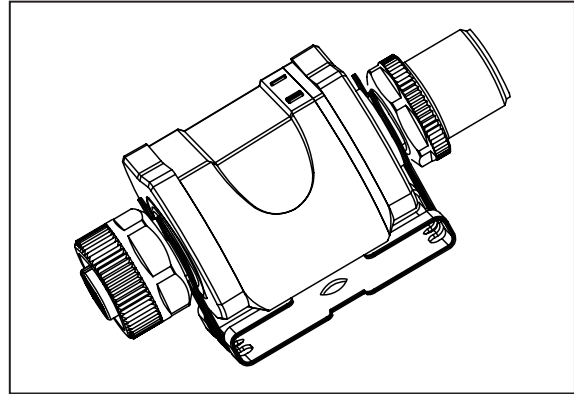


Fig. 10: Mounting clip with attached unit



The mounting clip is not supplied with the unit. More information about available accessories at www.ifm.com.

6 Electrical connection



The device must be connected by a qualified electrician.

Observe the national and international regulations for the installation of electrical equipment.

Voltage supply according to EN 50178, SELV, PELV.



CAUTION

Input current is not limited.

▷ No fire protection.

▶ Protect circuits.

▶ Protect circuits.

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

Required tripping characteristic of the fuses:

$T_{fuse} \leq 120$ s at max. 6.25 A (fire protection)

▶ Alternatively supply the unit via a limited energy circuit according to IEC 61010-1 or class 2 according to UL1310.

For use in USA and Canada: For connecting the unit and the IO-Link devices, use UL-certified cables of category CYJV 2/7/8 having suitable ratings.

▶ Disconnect power.

▶ Connect the unit as follows:

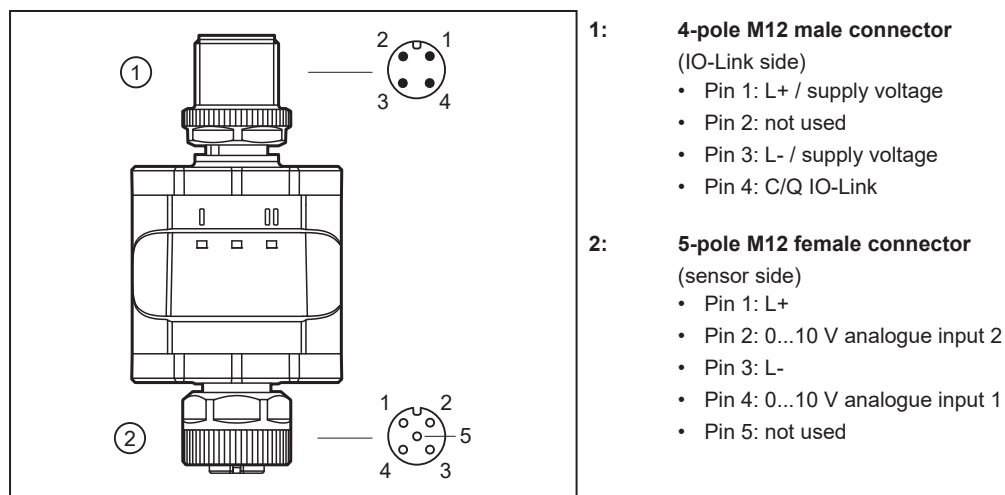


Fig. 11: Electrical connection



The unit must not be externally supplied via the 5-pole M12 input socket ② .



Always use the provided connection cables to connect other devices.

See also application examples (→ Intended use)

6.1 Mounting the connector

To achieve the protection rating indicated in the data sheet, the following has to be observed:

- ▶ Use IO-Link cable with IP class.
- ▶ Connect the connector with the unit. The arrow indicates the position of the coding.
- ▶ Tighten the coupling nut.
 - Minimum tightening torque: 0.6 Nm (tightening by hand)
 - Maximum tightening torque: 1.5 Nm (using a torque wrench).



If used in harsh environments:

- ▷ Further tighten the coupling nut by another notch using a torque wrench (across the flats 14).

6.2 Removing the connector

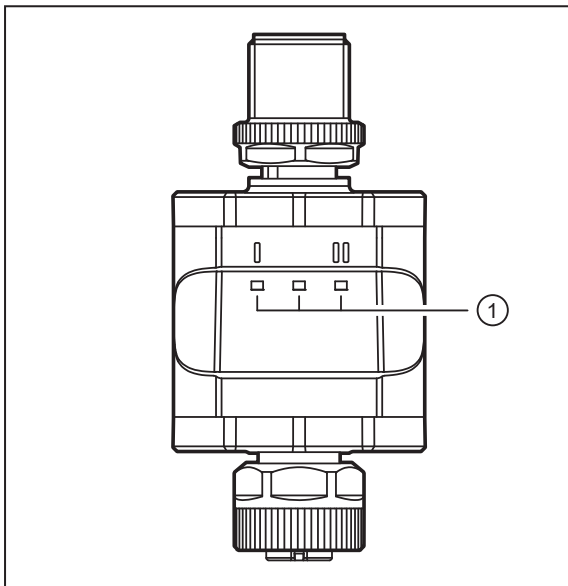
- ▶ Press the connector against the unit and simultaneously loosen the coupling nut.

6.3 Cable length

With IO-Link communication: 20 m on the master side

- ▶ Provide all input and output side cables with a strain relief approx. 200 mm behind the connectors.

7 Operating and display elements



1: LEDs

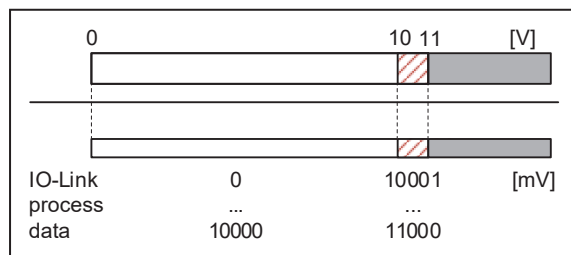
7.1 LEDs

LED		Colour	Status	Designation
I	IN1	yellow	on	Analogue value in the standard range: 0...100 % (0...10 V)
			flashing (2 Hz)	Analogue value in the range: >100 % (>10 V)*
Power		green	on	Voltage supply OK. Unit in operating mode
			flashing (5 Hz)	Device supply undervoltage
			off	Voltage supply off
II	IN2	yellow	on	Analogue value in the standard range: 0...100 % (0...10 V)
			flashing (2 Hz)	Analogue value in the range: >100 % (>10 V)*

Error signals and diagnostics → Troubleshooting

* Via IO-Link, an error signal is transmitted if value <11 V.

7.1.1 Visualisation of the voltage value at the input



8 Parameter setting



During parameter setting the unit remains in the operating mode. It continues its functions with the existing parameters until the parameter setting has been completed.

8.1 Parameters via IO-Link

8.1.1 Application-specific tag

Customer-specific application description, max. 32 characters long.

Value: “ *** ” / can be freely defined by the customer

8.1.2 Function Tag

Customer-specific application description, max. 32 characters long.

Value: “ *** ” / can be freely defined by the customer

8.1.3 Location Tag

Customer-specific application description, max. 32 characters long.

Value: “ *** ” / can be freely defined by the customer

8.1.4 internal_temperature – operating temperature microcontroller

Reads the data from the internal temperature sensor of the microcontroller.



In operating mode 1, this parameter is not available.

8.1.5 operation_hours – operating hours

Only counts full operating hours. Operating times of less than one full hour are not saved. Counter values are saved permanently.



In operating mode 1, this parameter is not available.

8.1.6 ModE – switch point mode

Setting of the switch point mode

- Single point mode (→ [7](#))
- Window mode (→ [8](#))
- Two point mode (→ [8](#))
- Deactivated mode (→ [8](#))



In operating mode 1, this parameter is not available.

8.1.7 LoGc – switch point logic

Setting of the switch point logic: Function diagrams (→ [7](#))

- High active = status bit is set to "high" (if "High active" activated)
- Low active = status bit is set to "low" (if "Low active" activated)



In operating mode 1, this parameter is not available.

8.1.8 SP1 — switch point 1

Threshold for the upper switch point

It always applies: $SP1 > SP2$



In operating mode 1, this parameter is not available.

8.1.9 SP2 — switch point 2

Threshold for the lower switch point

It always applies: $SP2 < SP1$



In operating mode 1, this parameter is not available.

8.1.10 HyS — switch points hysteresis

Setting of the hysteresis with respect to switch points SP1 and SP2: Function diagrams (→  7).

Only active in the switch point modes "Single point mode" and "Window mode".



In operating mode 1, this parameter is not available.

8.1.11 Mean filter

Indicates the time during which the mean value of the measured value is generated. Duration in ms, min. 5 ms, max. 1000 ms.

9 Operation

The unit provides the IO-Link process data according to the analogue input signals.

10 Troubleshooting

LED	Status	Error	Troubleshooting
Power	flashing (5 Hz)	Supply voltage too low	Check/correct the supply voltage. → Electrical connection
	off	No supply voltage	Check/correct the supply voltage. → Electrical connection

11 Maintenance, repair and disposal

Cleaning the unit:

- ▶ Disconnect the unit from the voltage supply.
- ▶ Clean the unit from dirt using a soft, chemically untreated and dry micro-fibre cloth.

The operation of the unit is maintenance-free.

Only the manufacturer is allowed to repair the unit.

- ▶ After use dispose of the device in an environmentally friendly way in accordance with the applicable national regulations.

12 Factory settings

Parameter		Factory settings	User settings
mEAn	Averaging	50 ms	
SSC1.ModE*	Switch point mode	Two point	<ul style="list-style-type: none"> • Deactivated • Single point • Window • Two point
SSC1.LoGc*	Switch point logic	Low active	<ul style="list-style-type: none"> • High active • Low active
SSC1.SP1*	Switch point 1	2.1	
SSC1.SP2*	Switch point 2	2	
SSC1.HyS*	Switch point hysteresis	2 %	
SSC2.ModE*	Switch point mode	Two point	<ul style="list-style-type: none"> • Deactivated • Single point • Window • Two point
SSC2.LoGc*	Switch point logic	Low active	<ul style="list-style-type: none"> • High active • Low active
SSC2.SP1*	Switch point 1	2.1	
SSC2.SP2*	Switch point 2	2	
SSC2.HyS*	Switch point hysteresis	2 %	

* Not available in operating mode 1.