Operating instructions

Cube-Shaped Vacuum/Pressure Switch, VS-V/VP10-W-D...IOL

WWW.SCHMALZ.COM

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Translation of the original operating instructions

Note

The Operating instructions were originally written in German. Store in a safe place for future reference. Subject to technical changes without notice. No responsibility is taken for printing or other types of errors.

Published by

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www.schmalz.com/salesnetwork

Contents

1 Important Information

1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in this document.

The document contains important notes and information about the different operating phases of the product:

- Transport, storage, start of operations and decommissioning
- Safe operation, required maintenance, rectification of any faults

The document describes the product at the time of delivery by Schmalz and is intended for:

- Installers who are trained in handling the product and can operate and install it
- Technically trained service personnel performing the maintenance work
- Technically trained persons who work on electrical equipment

The displayed figures are only examples. Depending on the particular design, they can differ from the product.

1.2 The technical documentation is part of the product

1. For problem-free and safe operation, follow the instructions in the documents.
2. Keep the technical documentation in close proximity to the product. The documentation must be accessible to personnel at all times.
3. Pass on the technical documentation to subsequent users.

⇨ Failure to follow the instructions in these Operating instructions may result in injuries!

⇨ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

If you still have questions after reading the technical documentation, contact Schmalz Service at:

www.schmalz.com/services

1.3 Type Plate

The type plate is permanently attached to the product and must always be clearly legible.
It contains product identification data and important technical information.

The QR code enables access to the digital technical documentation for the product.

- For spare parts orders, warranty claims or other inquiries, have the information on the type plate on hand.

1.4 Symbols

This symbol indicates useful and important information.

✓ This symbol represents a prerequisite that must be met before an action is performed.

▸ This symbol represents an action to be performed.

⇨ This symbol represents the result of an action.

Actions that consist of more than one step are numbered:

1. First action to be performed.
2. Second action to be performed.

2 Fundamental Safety Instructions

2.1 Intended use

The device measures and monitors system pressure in machines and systems.

Any other use is considered improper by the manufacturer and is deemed as contrary to the designated use.

The product is built in accordance with the latest standards of technology and is delivered in a safe operating condition; however, hazards may arise during use.

The product is intended for industrial and commercial applications.

Intended use includes observing the technical data and the installation and operating instructions in this manual.

2.2 Area of Application

Pressure type: Relative pressure

⚠ CAUTION

Static and dynamic overpressure

Destruction of the device if the specified burst pressure is even briefly exceeded. Risk of injury!

- Ensure that the compressive strength and burst pressure values specified in the technical data are not exceeded.

The device is vacuum-tight.

Pressure Equipment Directive (PED):

The device complies with the Pressure Equipment Directive; it is designed for stable gases in fluid group 2 and manufactured according to good engineering practice.

For cables longer than 30 m or when the device is used outside of buildings, there is a risk of overvoltage pulses from external sources.
We recommend using the device in protected operating environments where overvoltage pulses are restricted to a maximum of 500 V.

2.3 Non-Intended Use

Schmalz accepts no liability for damages caused by the use of the product for purposes other than those described under "Intended Use."

Non-intended use includes the following:

- Use in potentially explosive atmospheres

2.4 Personnel Qualification

Unqualified personnel cannot recognize dangers and are therefore exposed to higher risks!

The operating company must ensure the following points:

- The personnel must be commissioned for the activities described in these operating instructions.
- The staff must be at least 18 years of age and physically and mentally capable.
- The operating staff have been instructed in the operation of the product and have read and understood the operating instructions.
- Work on electrical equipment must be carried out only by qualified electrical specialists.
- Installation, maintenance, and repairs must be carried out only by specialists or by persons who can prove that they have undergone appropriate training.

Applicable for Germany:

A qualified employee is defined as an employee who has received technical training and has the knowledge and experience – including knowledge of applicable regulations – necessary to enable him or her to recognize possible dangers and implement the appropriate safety measures while performing tasks. Qualified employees must observe the relevant industry-specific rules and regulations.

2.5 Warnings in This Document

Warnings warn against hazards that may occur when handling the product. The signal word indicates the level of danger.

Signal word	Meaning
⚠ WARNING	Indicates a medium-risk hazard that could result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a low-risk hazard that could result in minor or moderate injury if not avoided.
NOTE	Indicates a danger that leads to property damage.

2.6 Residual Risks

⚠ WARNING

Serious injuries due to improper mounting!

- Carry out mounting and removal only when the device is in an idle, depressurized state.
- Use only the connectors, mounting holes and attachment materials that have been provided.

⚠ WARNING

Uncontrolled movements of system components or falling objects caused by incorrect activation and switching of the Vacuum/pressure switch while persons are in the plant (safety door opened and actuator circuit switched off)

Serious injury

- Ensure that the components are enabled via the actuator voltage by installing a potential separation between the sensor and actuator voltage.
- Wear the required personal protective equipment (PPE) when working in the danger zone.

⚠ CAUTION

Noise pollution from leakage

Hearing damage

- Correct position.
- Wear ear protectors.

NOTE

Incorrect power supply

Destruction of the integrated electronics

- Operate the product using a power supply unit with protected extra-low voltage (PELV).
- The system must incorporate safe electrical cut-off of the power supply in compliance with EN60204.
- Do not connect or disconnect the connector under tension and/or when voltage is applied.

2.7 Modifications to the Product

Schmalz assumes no liability for consequences of modifications over which it has no control:

1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

3 Product description

3.1 Function

- The device monitors system pressure with a silicon measuring cell.
- The device measures the media temperature and internal device temperature and provides the two values acyclically via the IO-Link interface.
- The unit can be operated in SIO (Standard Input/Output) mode and in IO-Link mode.
  The basic operating mode is SIO. When connected to an IO-Link master, the device switches to IO-Link mode independently. It does not need to be switched manually.
- The device shows the current process value on the display.
- The device generates two output signals according to the parameterization.

Variant with analog output	**Variant with two digital outputs**
Output OUT1:	Output OUT1:
• Pressure switching signal • IO-Link	• Pressure switching signal • IO-Link
Output OUT2:	Output OUT2:
• Pressure analog signal	• Pressure switching signal

4 Technical Data

4.1 Technical Data

Property	10.06.02.00862	10.06.02.00883	10.06.02.00861
Product properties			
Number of inputs and outputs	Digital OUT: 1	Digital OUT: 2	Digital OUT: 2
	Analog OUT: 1	—	—
Measuring range	-1 to 10 bar (-0.1 to 1 MPa)		-1 to 0 bar (-0.1 to 0 MPa)
Area of application			
Media	Compressed air; nitrogen (N2)		
Can conditionally be used for	Other media on request		
Medium temperature	0 to 60 °C		
Min. burst pressure	30 bar (3 MPa)		
Compressive strength	20 bar (2 MPa)		
Electrical data			
Operating voltage	18 to 30 V_{DC}		
Current consumption	< 30 mA		
Protection class	III		
Polarity reversal protection	Yes		
Overvoltage protection	Yes (<40 V)		
Standby delay time	0.3 s		
Outputs			
Output signal	Switching signal; analog signal; IO-Link (configurable)	Switching signal; IO-Link (configurable)	
Number of digital outputs	1	2	
Permanent current rating of the DC switching output	100 mA		
Analog output current	4 to 20 mA, invertible (scalable)	—	
Max. burden	500 Ω	—	
Analog output voltage	0 to 10 V / 1 to 5 V, invertible (scalable)	—	
Min. load resistance	2000 Ω	—	
Short circuit protection	Yes		
Overload-proof	Yes		

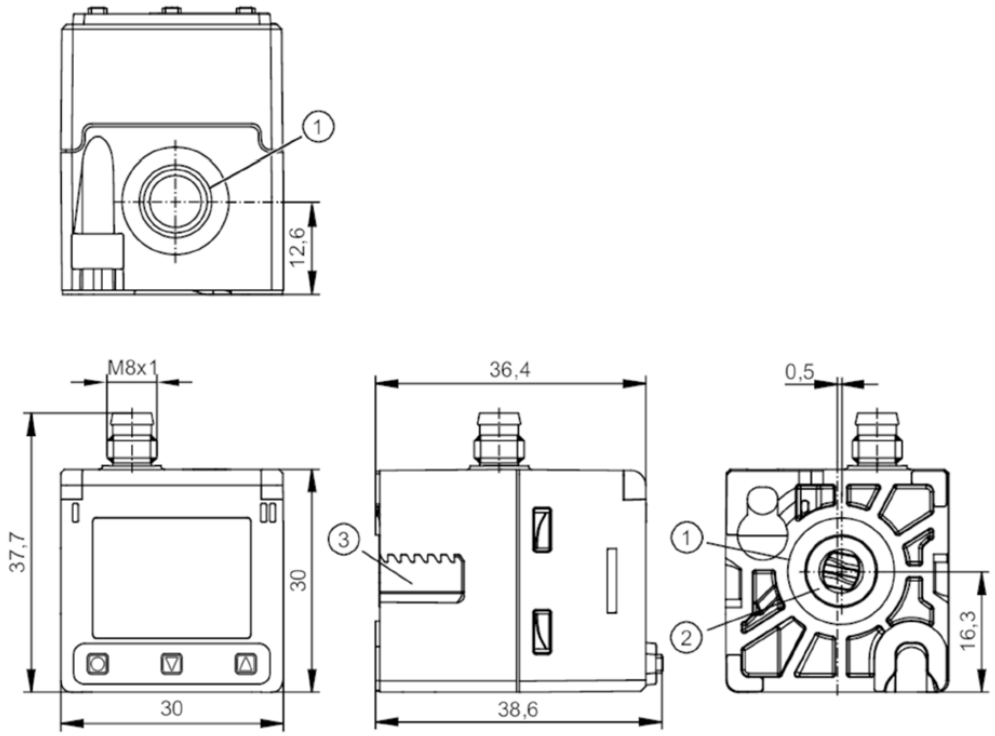
Property	10.06.02.00862	10.06.02.00883	10.06.02.00861
Measuring/adjustment range			
Measuring range	-1 to 10 bar (-0.1 to 1 MPa)		-1 to 0 bar (-0.1 to 0 MPa)
Analog start point	-1 to 8 bar (-0.1 to 0.8 MPa)	—	
Analog end point	1 to 10 bar (0.1 to 1 MPa)	—	
Accuracy/deviations			
Switching point accuracy	< ± 0.5% of the range (turn down 1:1)		< ± 1% of the range (turn down 1:1)
Repeatability	< ± 0.1% of the range (with temperature fluctuations < 10 K: turn down 1:1)		
Characteristic deviation	< ± 0.5% of the range (turn down 1:1; including linearity, hysteresis and repeatability)		< ± 1% of the range (turn down 1:1; including linearity, hysteresis and repeatability)
Temperature coefficient	0.4% of the range / 10 K (turn down 1:1)		
Response time	6 ms		
Interfaces			
Communication interface	IO-Link		
Transmission type	COM3 (230.4 kBd)		
IO-Link revision	1.1.3		
SIO mode	Yes		
Min. process cycle time	0.6 ms		
Pressure IO-Link resolution	0.001 bar		0.0001 bar
Supported device IDs	100618		100617
Environmental conditions			
Ambient temperature	0 to 60 °C		
Storage temperature	-25 to 85 °C		
Degree of protection	IP 65 (M8/M12 plugged in)		
Approvals / tests			
MTTF	392 years	508 years	
Mechanical data			
Weight	53.1 g	52.9 g	53.05 g
Materials	PBT; PC; TPE; NBR; FKM; brass; silicon (coated)		
Materials in contact with the medium	PBT; FKM; brass; silicon (coated)		

Property	10.06.02.00862	10.06.02.00883	10.06.02.00861
Min. pressure cycles	50 million		

Display / control elements			
Display	1" display; 128 x 96 pixels		
	Switching state; 1 x LED, yellow	Switching state; 2 x LED, yellow	
Display unit	bar; MPa; mmHg; kgf/cm²		

Electrical connection	Plug connection: 1 x M8; coding: A; contacts: gold plated

4.2 Dimensions



1	1/8" main pressure connection, tightening torque < 8 Nm, screw-in depth < 6.8 mm
2	When the product is delivered, the rear connection is sealed with a blind plug
3	Mounting for the retaining bracket for panel mounting

4.3 Factory Settings

Parameter	10.06.02.00862	10.06.02.00861	10.06.02.00883
Vendor ID	0x00EA		
Device ID	0x01 89 0A	0x01 89 09	0x01 89 0B
Vendor Name	J. Schmalz GmbH		
Vendor Text	Innovative Vacuum Solutions		
Product Name	VS_W		
Product ID	VS_W		
Product Text	VS-VP10-W-D M8-4 IOL	VS-V-W-D M8-4 IOL	VS-VP10-W-D M8-4 IOL
Product URI	The same as the QR code including serial number		
ou2	0 to 10 V	—	
SSC1.1 SP1	5.5 bar	-750 mbar	-850 mbar
SSC1.1 SP2	5 bar	-600 mbar	-750 mbar
SSC1.1 Config.Hys	0.5 bar	100 mbar	
SSC1.1 Mode	—		two point
SSC1.1 Logic	—		low active
SSC1.2 SP1	5 bar	-550 mbar	-600 mbar
SSC1.2 SP2	4.5 bar	-500 mbar	50 mbar
SSC1.2 Config.Hys	0.5 bar	50 mbar	—
SSC1.2 Mode	—		window mode
diS.L	BGrP		
diS.B	100%		

5 Installation

5.1 Responsibility of the System Creator

The described device is installed as a subcomponent in a system.

The system creator is obliged to carry out a risk assessment and to create and enclose documentation on that basis for the operator and user of the system in accordance with the legal and normative requirements. This documentation must include all the necessary information and safety instructions for the operator, the user and, if necessary, the service personnel authorized by the system creator.

5.2 Mounting

⚠ CAUTION

Danger due to escaping compressed air.

Injury while mounting the device

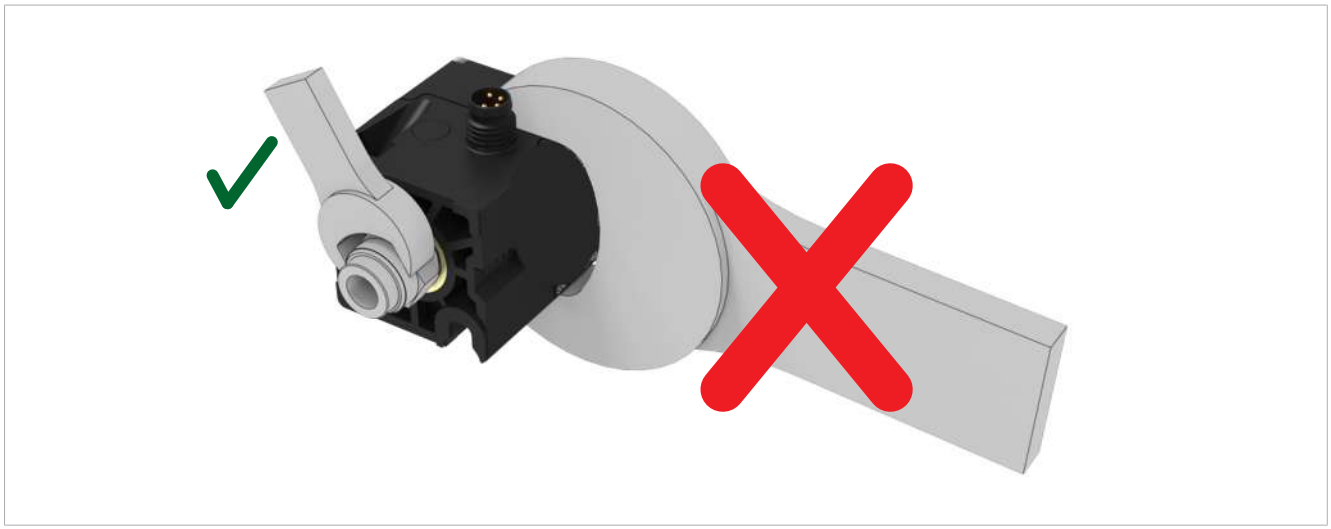
- Before installing and removing the device, ensure that the system is de-pressurized.

NOTE

Device damage caused by a wrench

Holding the device in place with a wrench while screwing in the process connection or plug may damage the device casing.

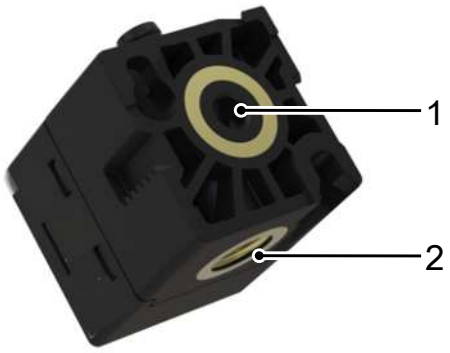
- While screwing in, hold the device with your hand in the rear area, near the pressure connection.



You can find information about available accessories at www.schmalz.com.

5.3 Process Connection

The device has two process connections, both of which lead to the same side of the silicon measuring cell. This allows the device to be screwed backward or downward into the process. The unused device connection is sealed with a plug.



1	Rear integrated process connection (1/8" threaded connection)	2	Lower process connection (1/8" threaded connection)

When the device is delivered, a plug is screwed into the rear process connection.

If necessary, change the position of the plug:

✓ Make sure that the seal is fitted correctly.

1. Screw the pressure connection of the process or an adapter into the process connection of the device and tighten with a maximum torque of 8 Nm.
2. Seal the unused process connection on the device with a plug:
   - with a maximum tightening torque of 8 Nm and
   - with a maximum screw-in depth of 6.8 mm.

5.3.1 Connection as a Pneumatic Distributor

Connecting both process connections allows you to use the device as a pneumatic distributor.

1. Unscrew the plugs.
2. Screw the process or adapter pressure connections into the two process connections on the device and tighten:
   - with a maximum tightening torque of 8 Nm and
   - with a maximum screw-in depth of 6.8 mm.

5.3.2 Assembly Examples

Pipe Assembly

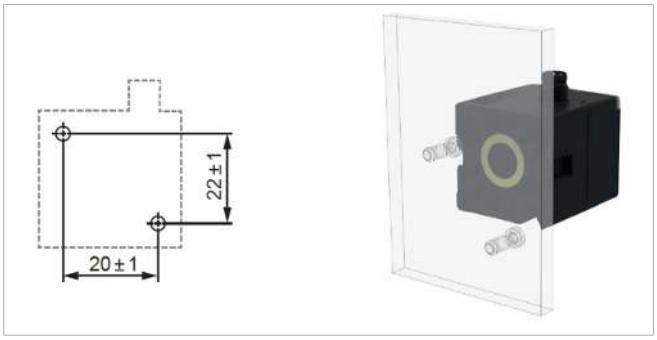
Maintenance Unit

Rear Wall Mounting

The device is fastened to the rear wall using two M3 x 8 mm machine screws (included in delivery).

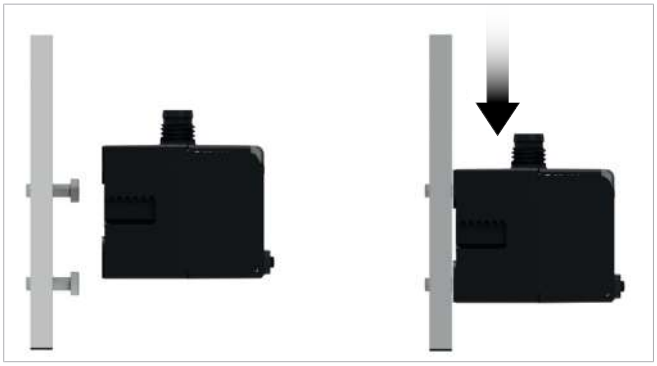
1. Use the supplied machine screws and observe the maximum tightening torque.

2. Prepare two M3 screw-in threads with the following dimensions in the rear wall.



3. Screw the machine screws into the wall until the screw head protrudes approx. 4 mm from the wall.

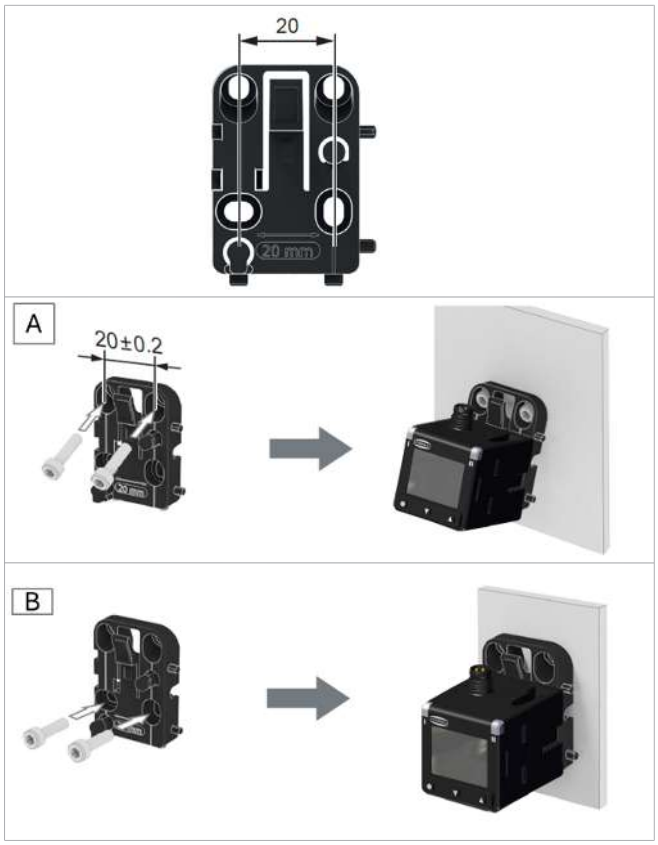
4. Attach the device and push it down to lock it in place.



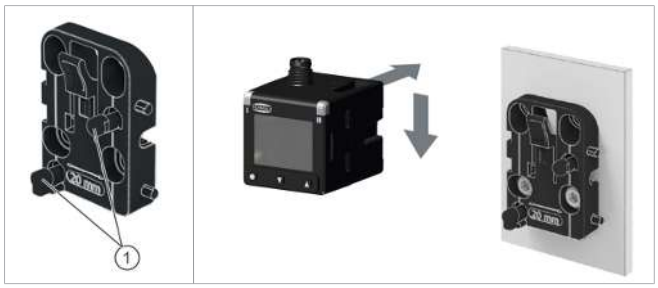
5. Tighten the machine screws alternately until the device is flush against the rear wall. Maximum tightening torque: 0.4 Nm

Rear Wall Mounting with Mounting Bracket

The device can be attached to a rear wall using a mounting bracket.

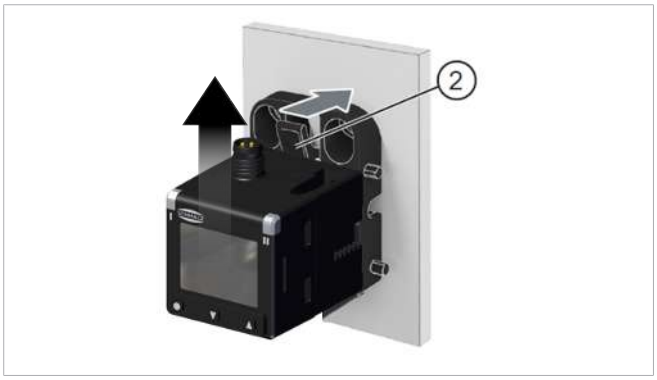


1. Hold the mounting bracket against the rear wall and mark the position of the holes.
   A: Use the two upper holes if you want to attach the device to the rear wall at an angle for better visibility when mounted at a low height.
   B: Use the two lower holes if you want the device to lie flush against the rear wall.
2. Prepare two M4 screw-in threads at the marked positions in the rear wall.
3. Secure the mounting bracket to the rear wall using two M4 machine screws (not included in delivery).



4. Push the device onto the attachment pin (1) on the mounting bracket and push it down to lock it in place.

Disassembly

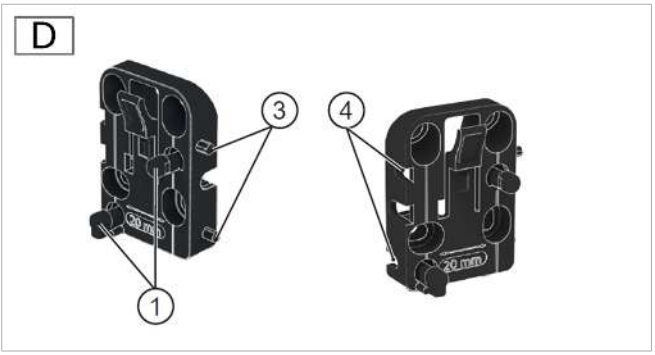


- Push the upper lever on the mounting bracket (2) in the direction of the arrow and pull the device upward to remove it.

Mounting Multiple Devices in a Row

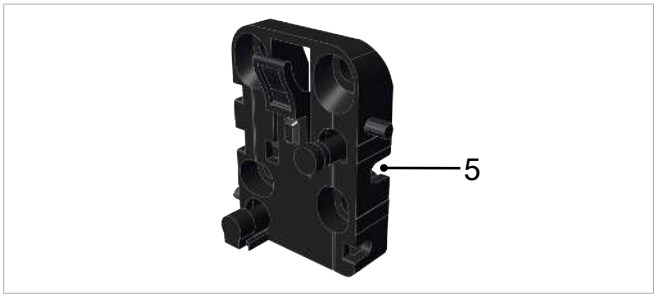
The mounting brackets can be plugged into each other using a pin on the side. This stabilizes the seat of the brackets and eliminates the need to make holes in the rear wall.

1. Attach the first mounting bracket to the rear wall.



2. Plug additional mounting brackets into each other using the side pins (3) and holes (4).
3. If required, attach the additional mounting brackets to the rear wall using one or two holes as well.
4. Push the devices onto the attachment pin (1) on the mounting brackets and push them down to lock them in place.

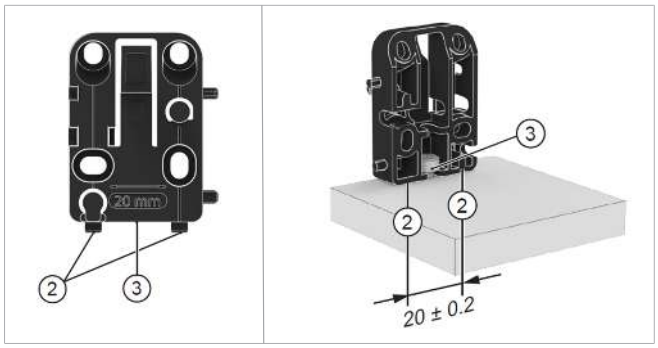
Additional stabilization may be required for a long row of devices.



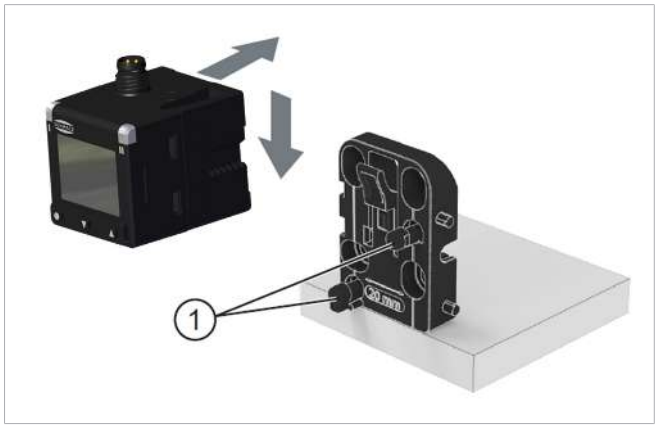
- Guide an M4 threaded rod (not included in delivery) through the recess (5). Fasten both sides using a washer and nut.

Table Mounting

The device can be attached to a table top using a mounting bracket.

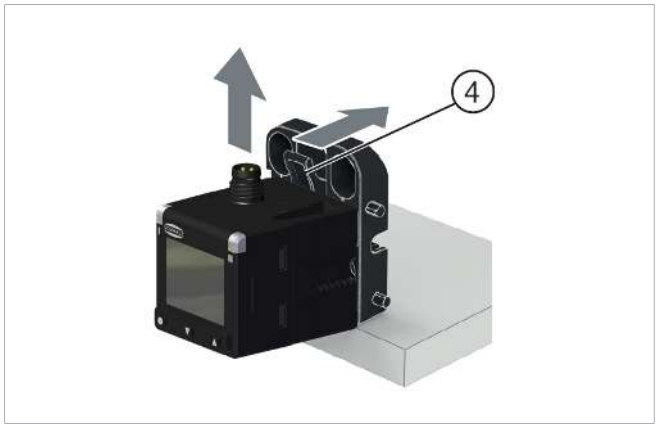


1. Prepare three holes in the table top.
   Two drilled holes for the lower pin (2) with a spacing of 20 mm and a diameter of 4 mm.
   An M4 screw-in thread in the center of the two drilled holes (3).
2. Insert the mounting bracket with the two lower pins (2) into the prepared drilled holes.
3. Secure the mounting bracket to the table top using an M4 machine screw (not included in delivery) (3).



4. Attach the device to the two attachment pins (1) on the mounting bracket and push it down to lock it in place.

Disassembly

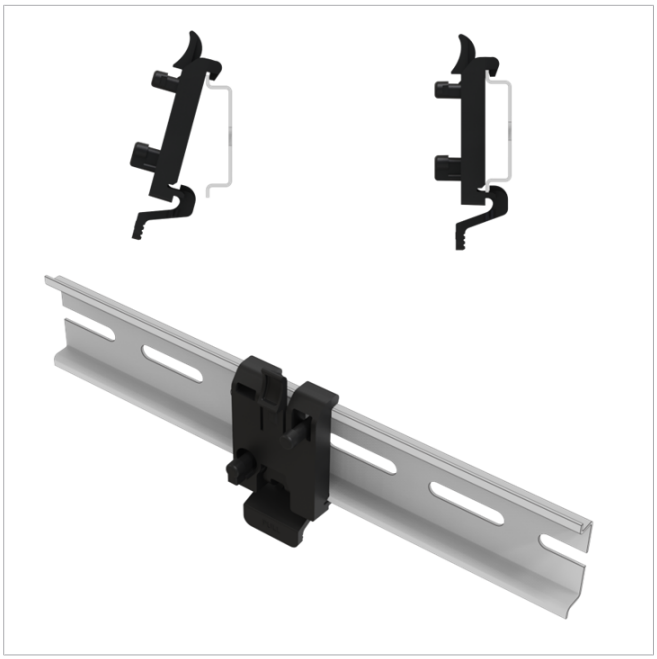


- Push the upper lever on the mounting bracket (2) in the direction of the arrow and pull the device upward to remove it.

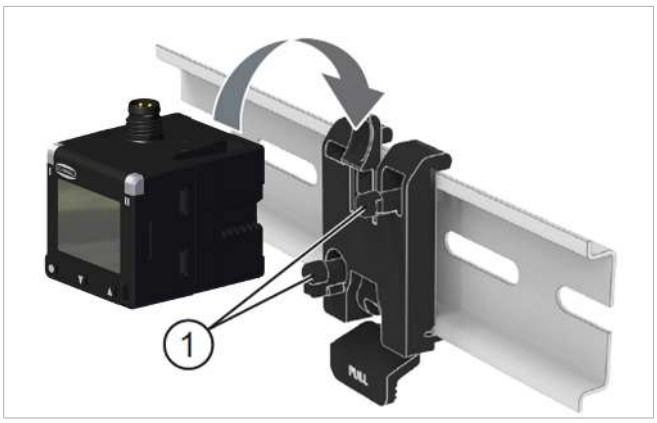
DIN Rail Mounting

The device can be attached to a DIN rail using a mounting bracket.

1. Hang the mounting bracket on a 35 mm DIN rail and lock it into place.

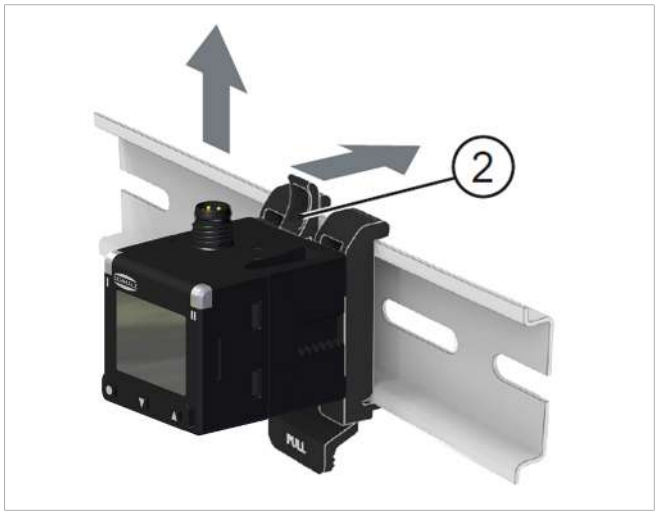


2. Attach the device to the two attachment pins (1) on the mounting bracket and push it down to lock it in place.

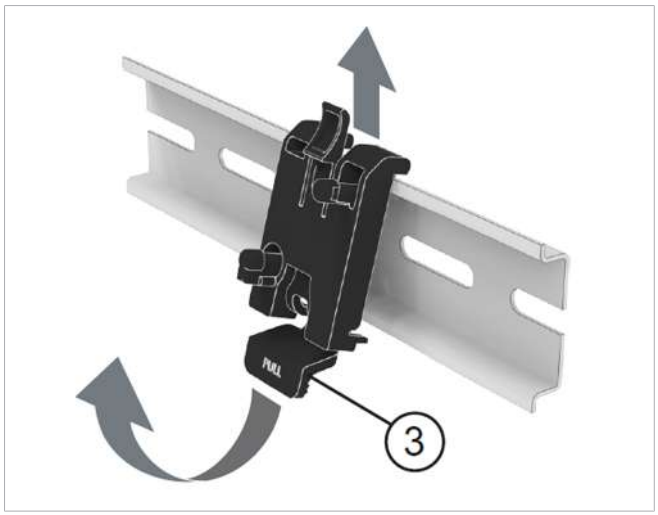


Disassembly

1. Push the upper lever on the mounting bracket (2) in the direction of the arrow and pull the device upward to remove it.

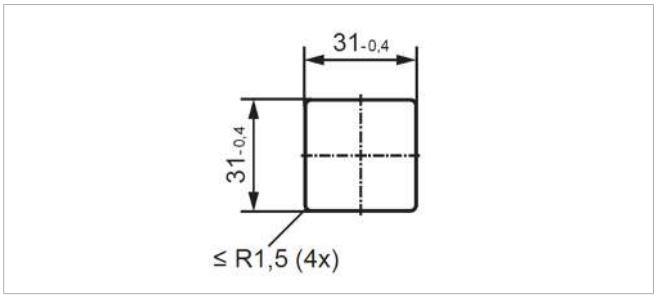


2. Pull the lower lever on the mounting bracket (3) upward and remove the mounting bracket from the DIN rail.

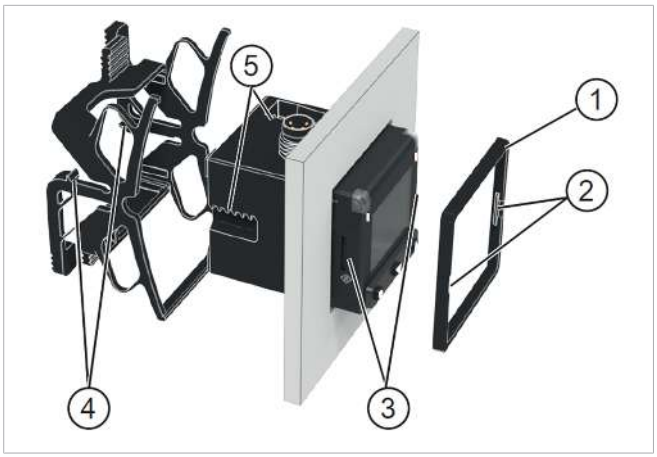


Switch Panel Installation

The device can be installed in a switch panel using a mounting kit. The mounting kit is not included in the scope of delivery.

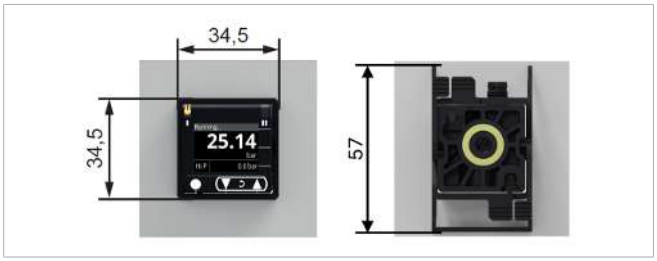


1. In a switch panel with a maximum thickness of 6 mm, add a cut-out with a size of 31 mm x 31 mm (-0.4 mm tolerance each).
2. Insert the device into the cut-out of the switch panel from the rear.
3. Slide the frame of the mounting kit (1) over the device from the front and engage the two protrusions on the sides (2) into the recesses (3) on both sides of the device to lock in place.



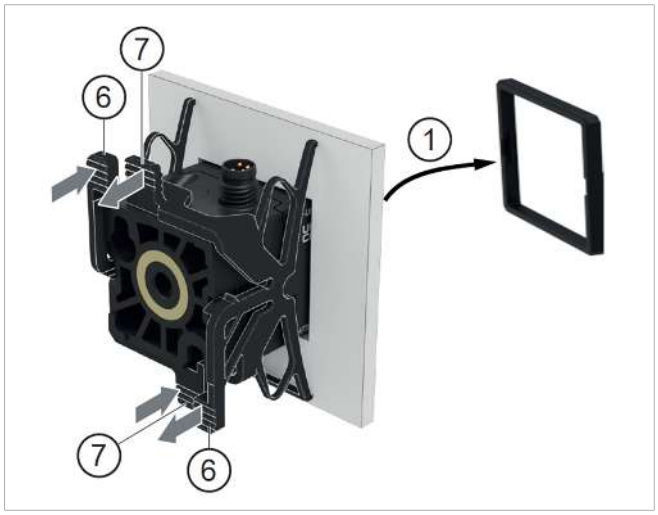
4. Slide the retaining bracket from the mounting kit onto the device from the rear. The notches of the retaining bracket (4) latch into the toothed recesses on both sides of the device (5). Push until the device is firmly seated.

⇨ Installation dimensions: front and rear view



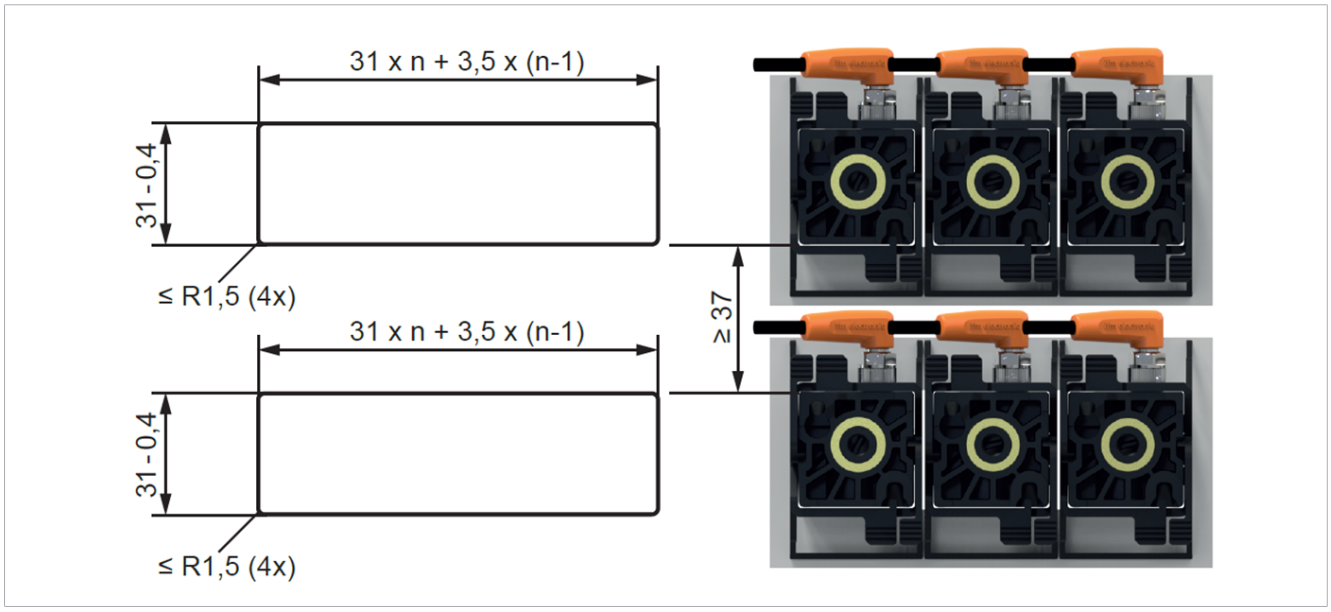
Disassembly:

1. On both sides, press levers (6) and (7) on the retaining bracket in the direction of the arrow and remove the retaining bracket.



2. Pry the frame (1) off at the front.
3. Pull the device out of the wall bracket.

Installing Several Devices in One Switch Panel:



Horizontal installation for devices with M8 plug; n = number of devices

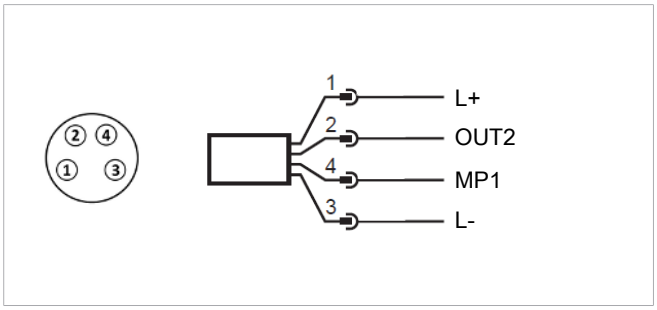
The dimensions apply to the use of plug connections with angled M8 cable sockets.
When using straight cable sockets, the distance must be increased.

5.4 Electrical Connection

The device may only be installed by an electrician.

Comply with national and international regulations on the installation of electrical equipment. Voltage supply based on SELV, PELV.

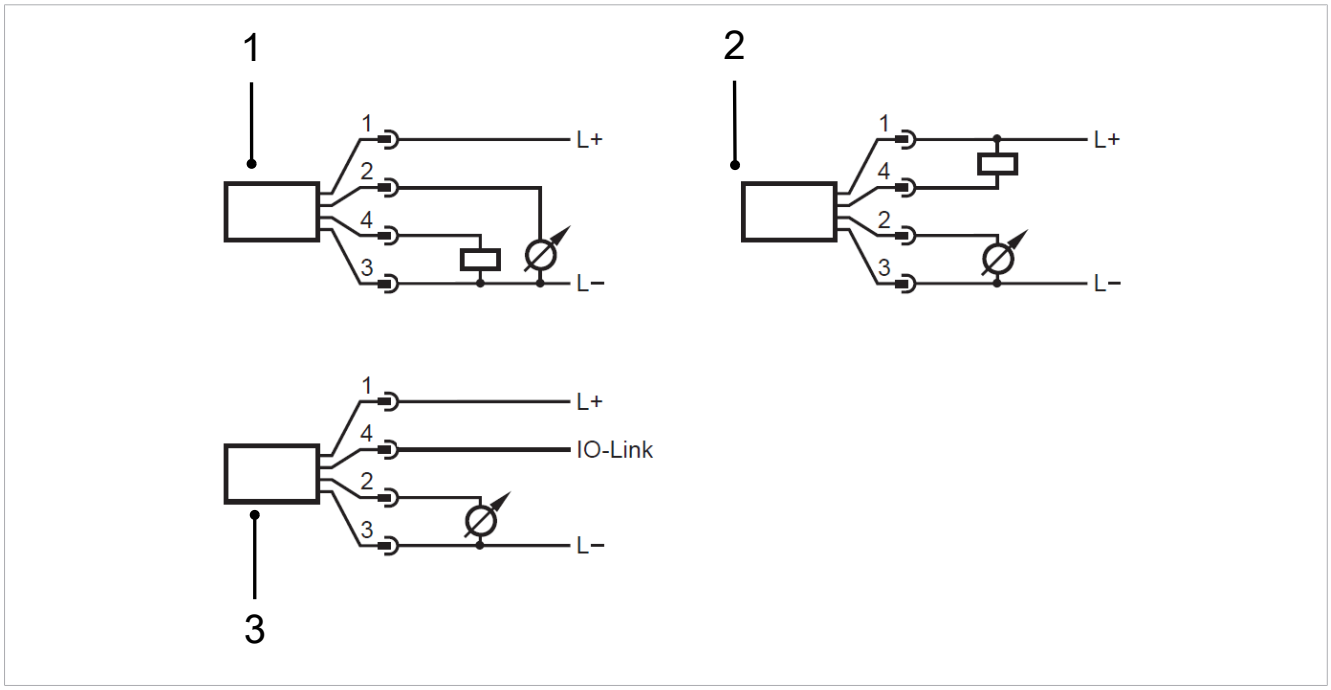
1. Disconnect the system from the power supply.
2. Connect the device as follows:



Pin Assignment

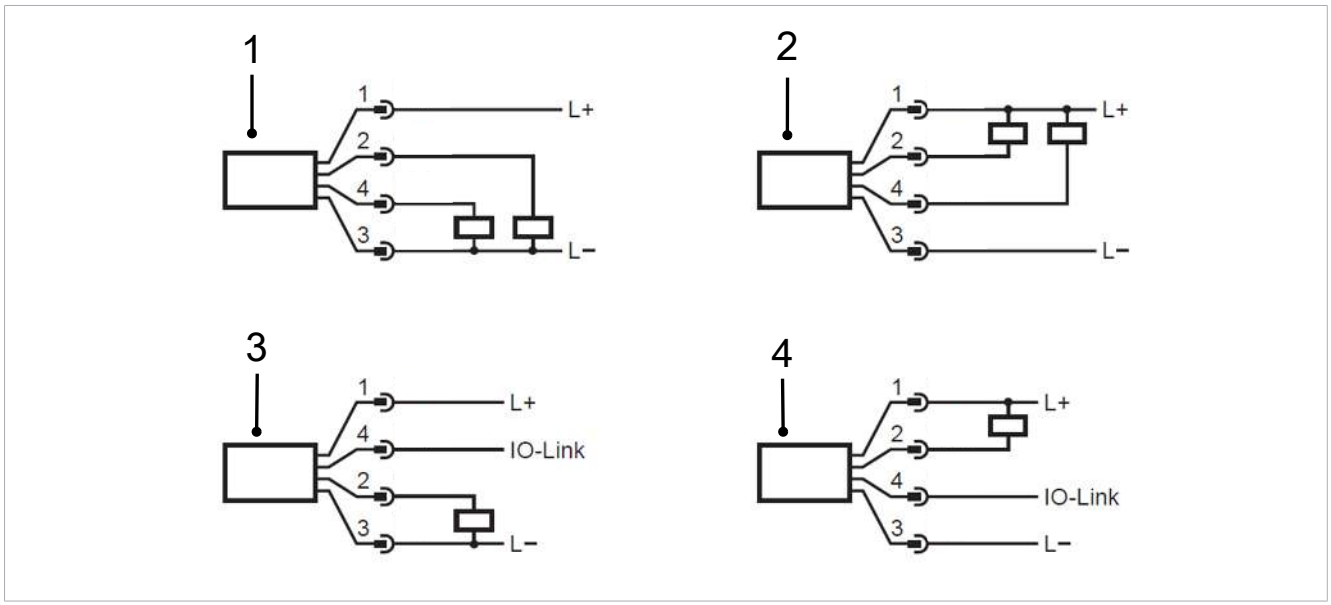
Pin	Assignment	
	Analog variant	**2x digital variant**
1	L+	L+
3	L-	L-
4 (MP1) MP = multi-function	• Pressure switching signal • IO-Link • OFF (output switched to high-impedance) • Deactivated (switching channel permanently high or low depending on the switching point logic)	• Pressure switching signal • IO-Link
2 (OUT2)	• Pressure analog signal • OFF (output switched to high-impedance) • Deactivated (switching channel permanently high or low depending on the switching point logic)	• Pressure switching signal

Sample Circuits for Analog Variant:



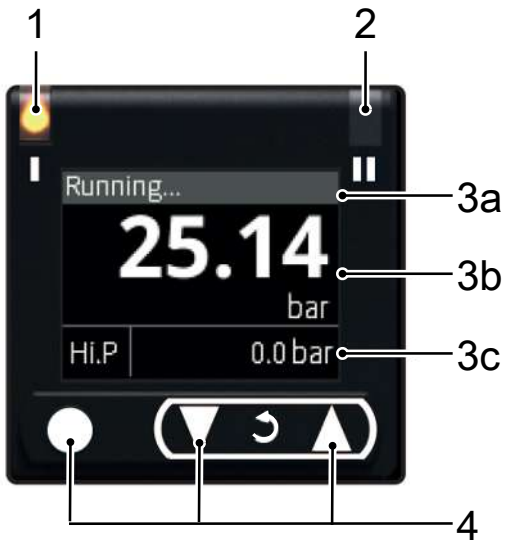
1	1x p-switching (PnP) / 1x analog	3	IO-Link / 1x analog
2	1x n-switching (nPn) / 1x analog		

Sample Circuits for 2x Digital Variant:



1	2 x p-switching	3	IO-Link / 1 x p-switching
2	2 x n-switching	4	IO-Link / 1 x n-switching

6 Operating and Display Elements



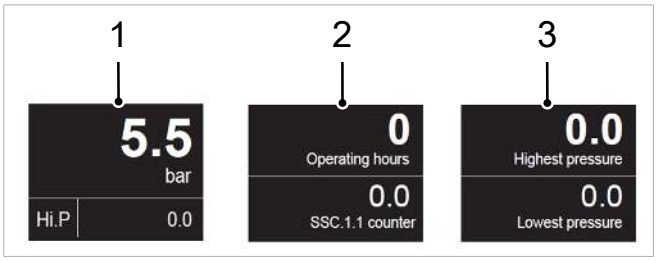
1	Switching state LED for OUT1 (illuminated when output 1 is active)	3	TFT display 3a: Title line 3b: Process value line 3c: Additional information depending on the setting for [dis.L]
2	2x digital variant only: Switching state LED for OUT2 (illuminated when output 2 is active)	4	Buttons for changing the displays and for parameterization

If the device measures a high internal temperature, the display brightness is automatically adjusted:
Internal temperature > 67 °C: The brightness is reduced to 25%.
Internal temperature > 80 °C: The display is switched off. Activation by pressing a button.
See warning messages and error messages for more information.

Switching between displays:

You can access additional information during operation using the device buttons:

- Press the ▲ or ▼ button multiple times.
  1: User-defined display layout
  2: Display of the operating hours and counter reading SSC1.1
  3: Display of the highest and lowest measured pressure values

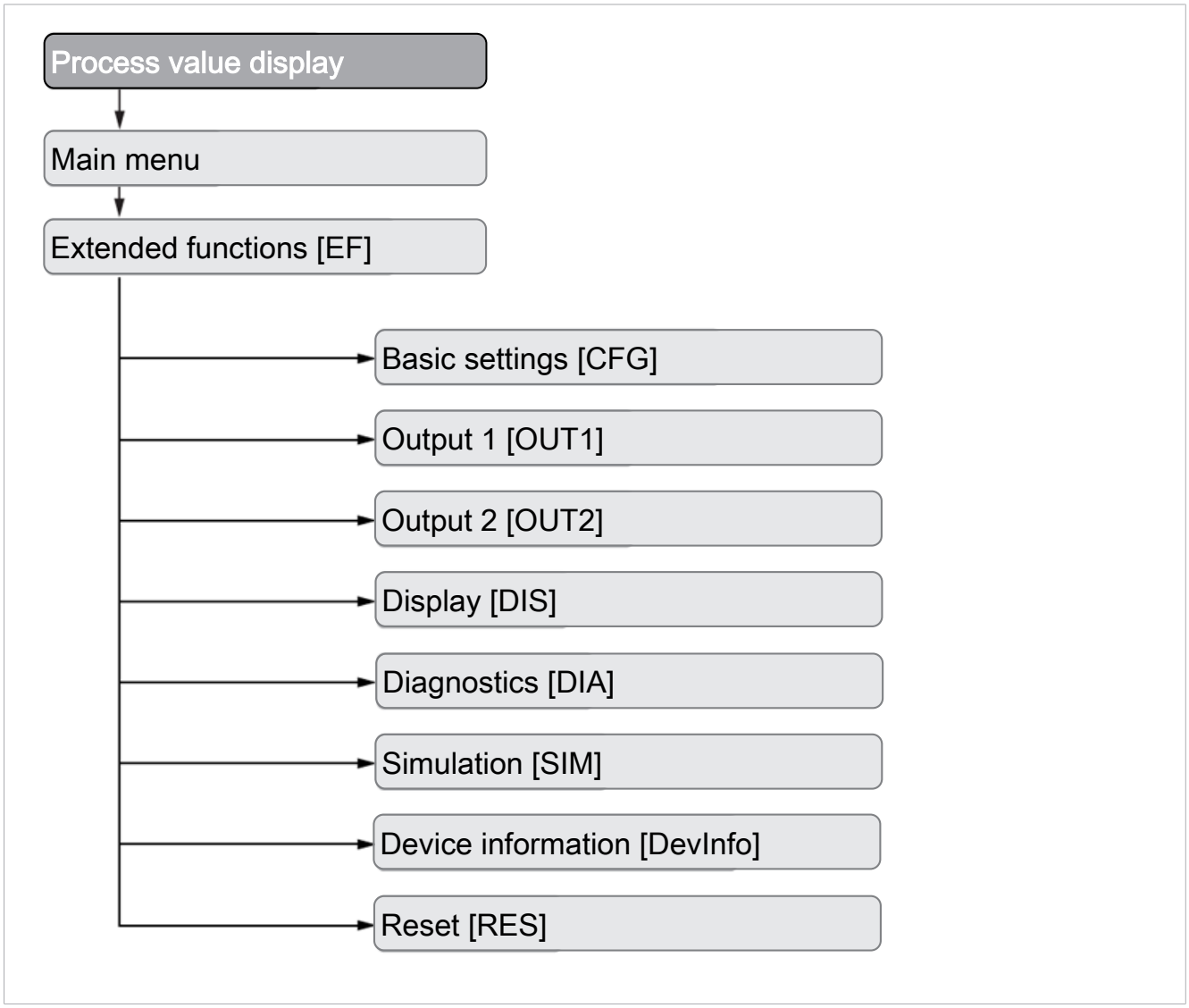


⇨ The display switches between various views.

⇨ After 30 seconds, the device automatically switches back to the user-defined layout.

7 Menu

The menu figures show the parameters that can be set on the device by making entries using the buttons. These parameters and other functions are also available via the IO-Link interface.



7.1 Main Menu and Submenus

The displayed parameters change when the factory settings are changed. The maximum available parameters are shown in the menu illustrations below.

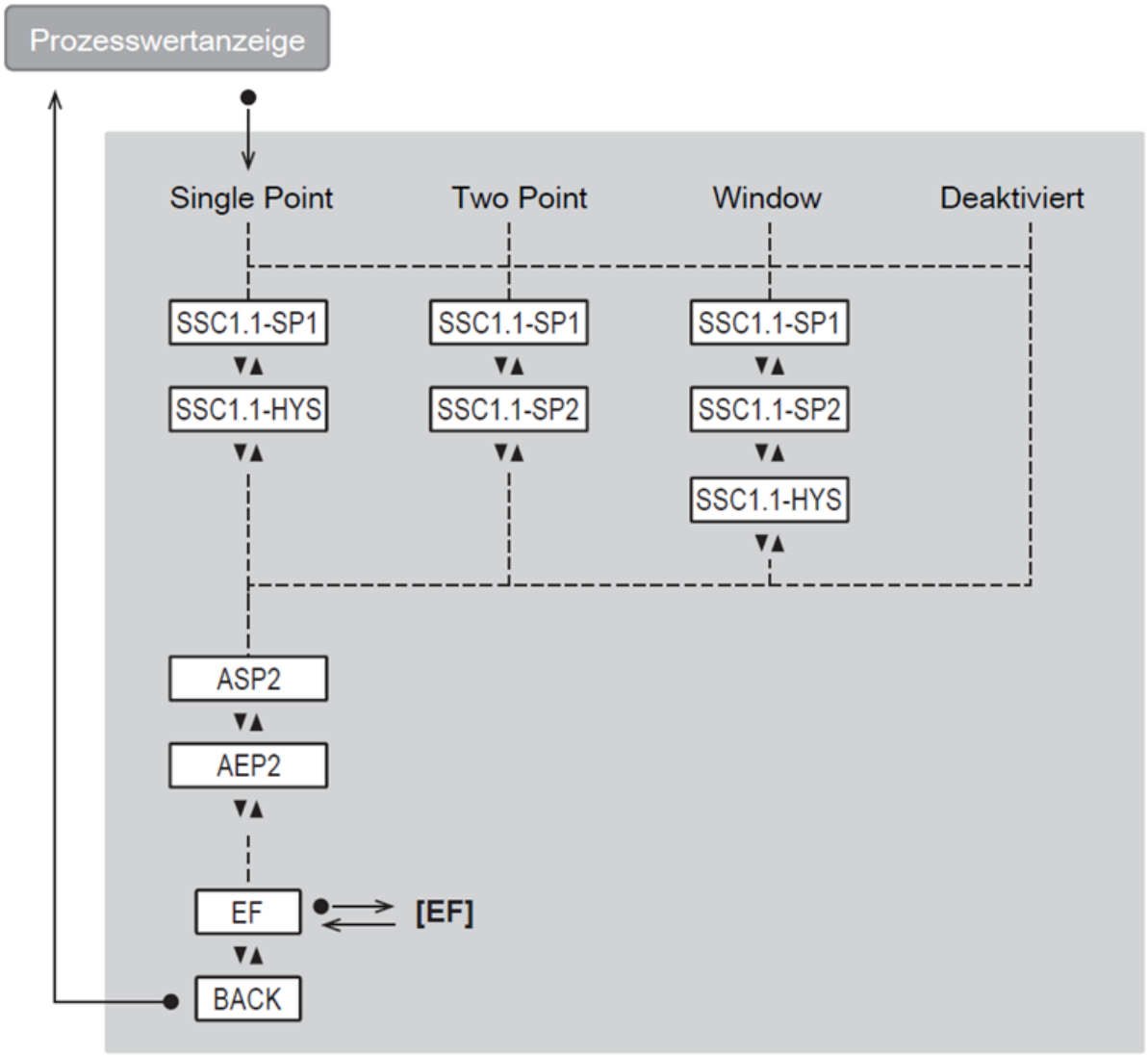
The main menu displays the set limit values for compressed air monitoring. The parameters are displayed based on the selected switching point mode.

When the switching point mode [OFF] is set, no parameters are displayed for the relevant switching channel.

The switching point mode is set in the [OUTx] submenu.

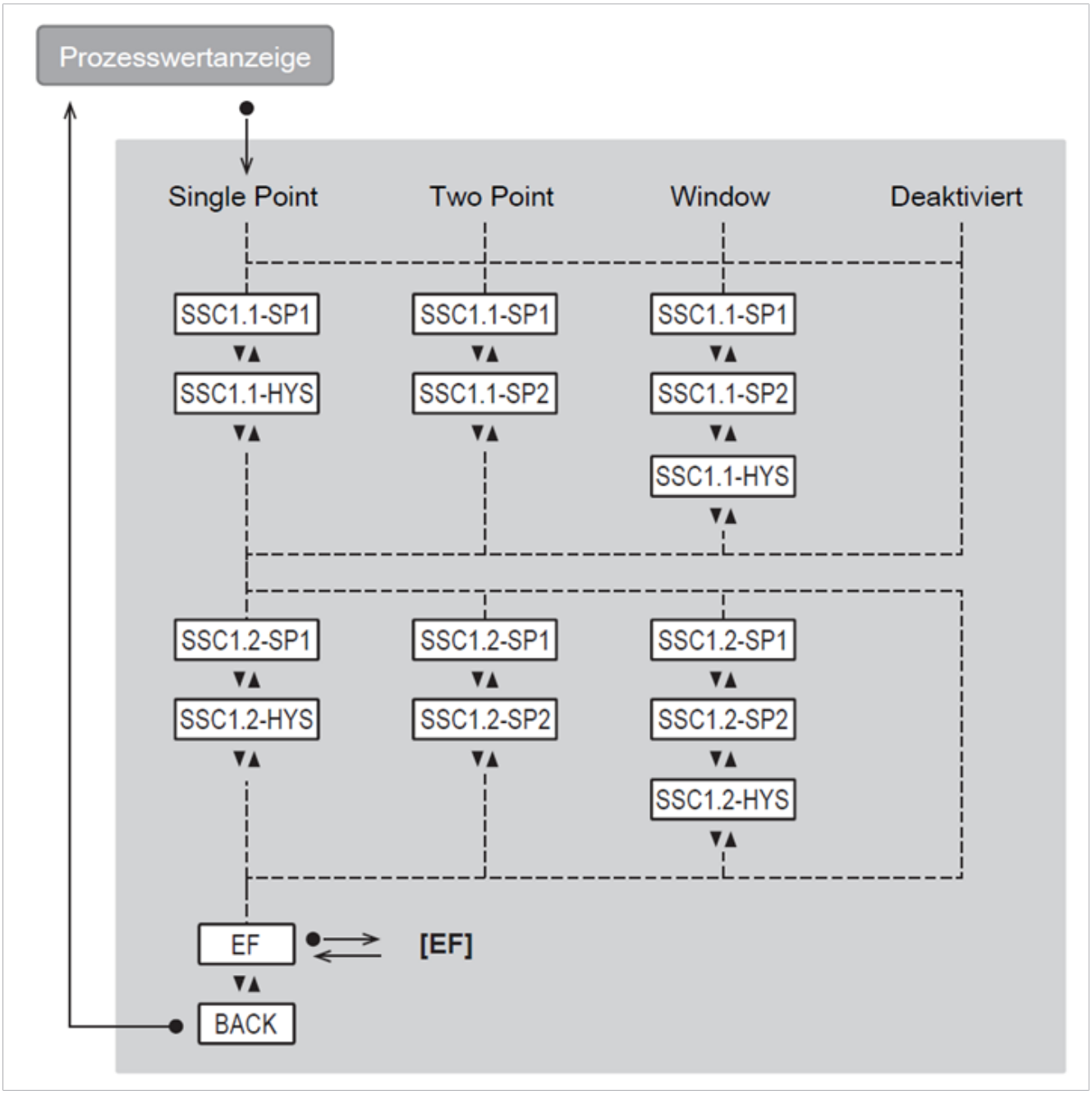
The switching points and hysteresis can be changed in both the [OUTx] submenu and the main menu if they are displayed in the main menu.

Analog Variant: Main Menu



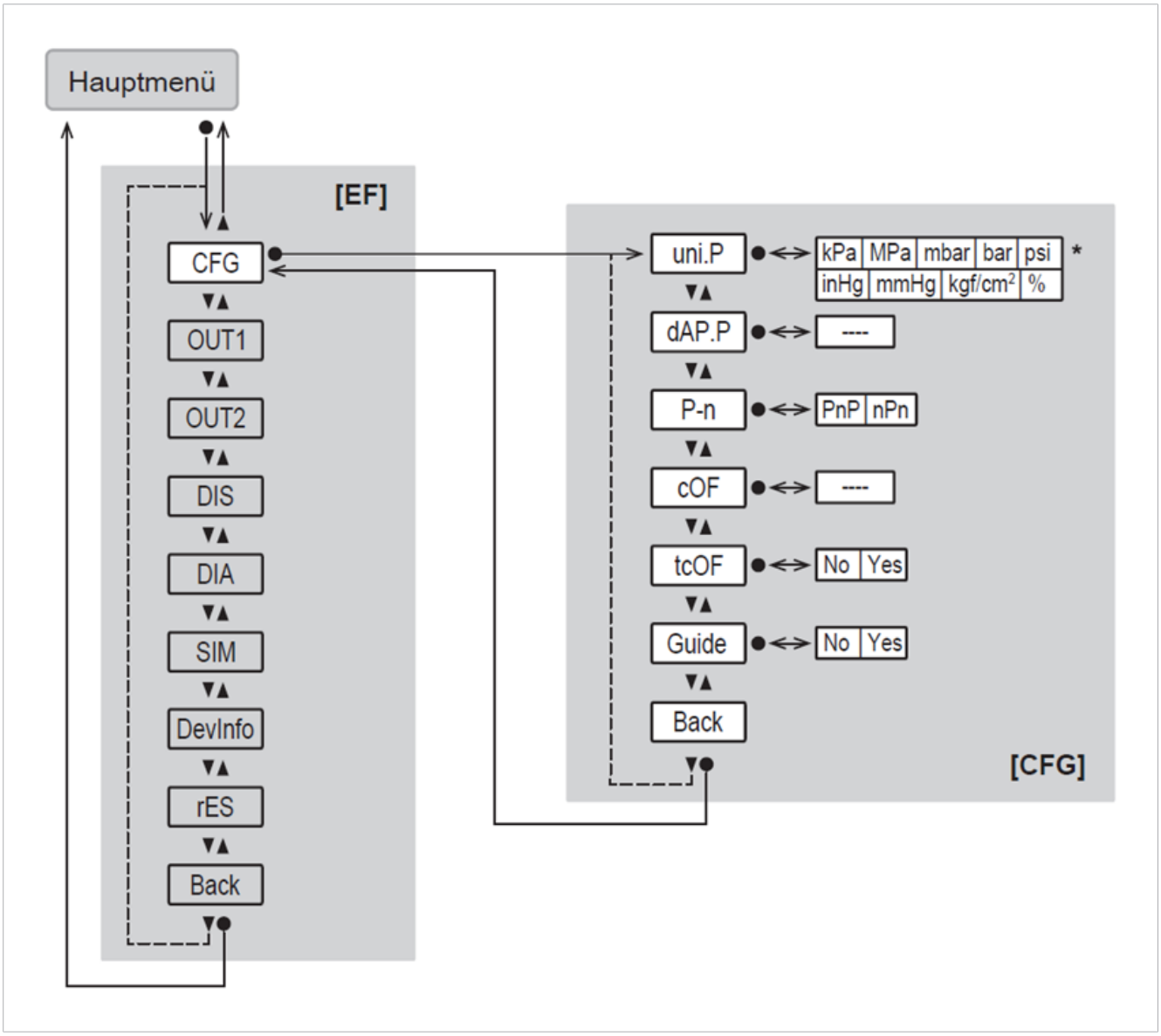
Parameter	Explanation
SSC1.1-SP1	Switching point 1 for switching channel SSC1.1
SSC1.1-SP2	Switching point 2 for switching channel SSC1.1
SSC1.1-HYS	Hysteresis for switching channel SSC1.1
ASP2	Analog start point for OUT2
AEP2	Analog end point for OUT2
EF	Go to the EF (extended functions) submenu

2x Digital Variant: Main Menu



Parameter	Explanation
SSC1.x-SP1	Switching point 1 for switching channel SSC1.x
SSC1.x-SP2	Switching point 2 for switching channel SSC1.x
SSC1.x-HYS	Hysteresis for switching channel SSC1.x
EF	Go to the EF (extended functions) submenu

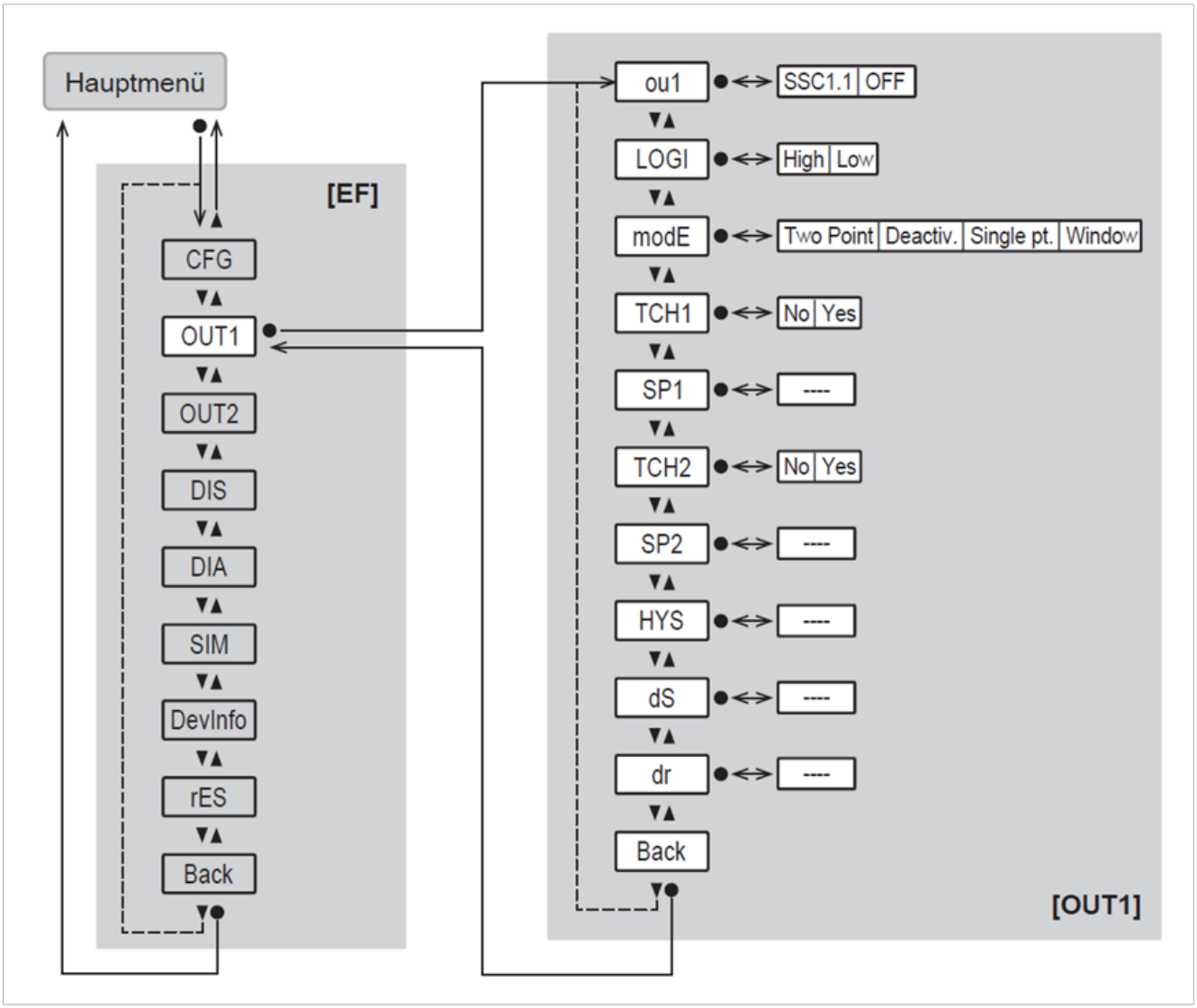
Basic Settings [CFG] Menu:



* The choice of units depends on the type of device. See "Default Unit of Measure".

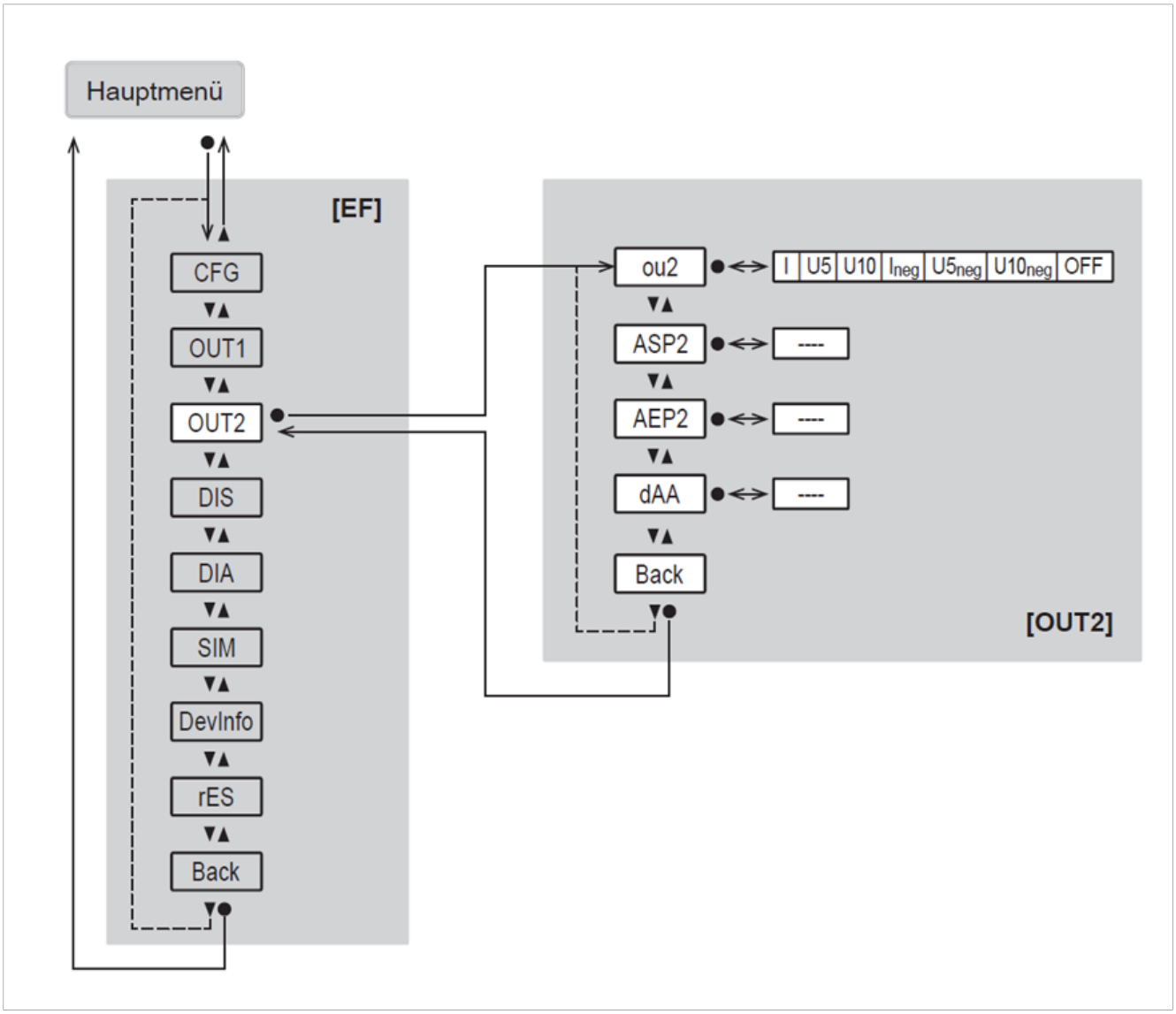
Parameter	Explanation
CFG	Go to the CFG (basic settings) submenu
uni.P	Default unit of measure for pressure
dAP.P	Damping constant in seconds for pressure (63% rise time τ)
P-n	Output polarity of the switching outputs
cOF	Correction factor for zero point calibration
tcOF	Teach correction factor for zero point calibration
Guide	Activate the guided installation (wizard)

Output Configuration [OUT1] Menu:



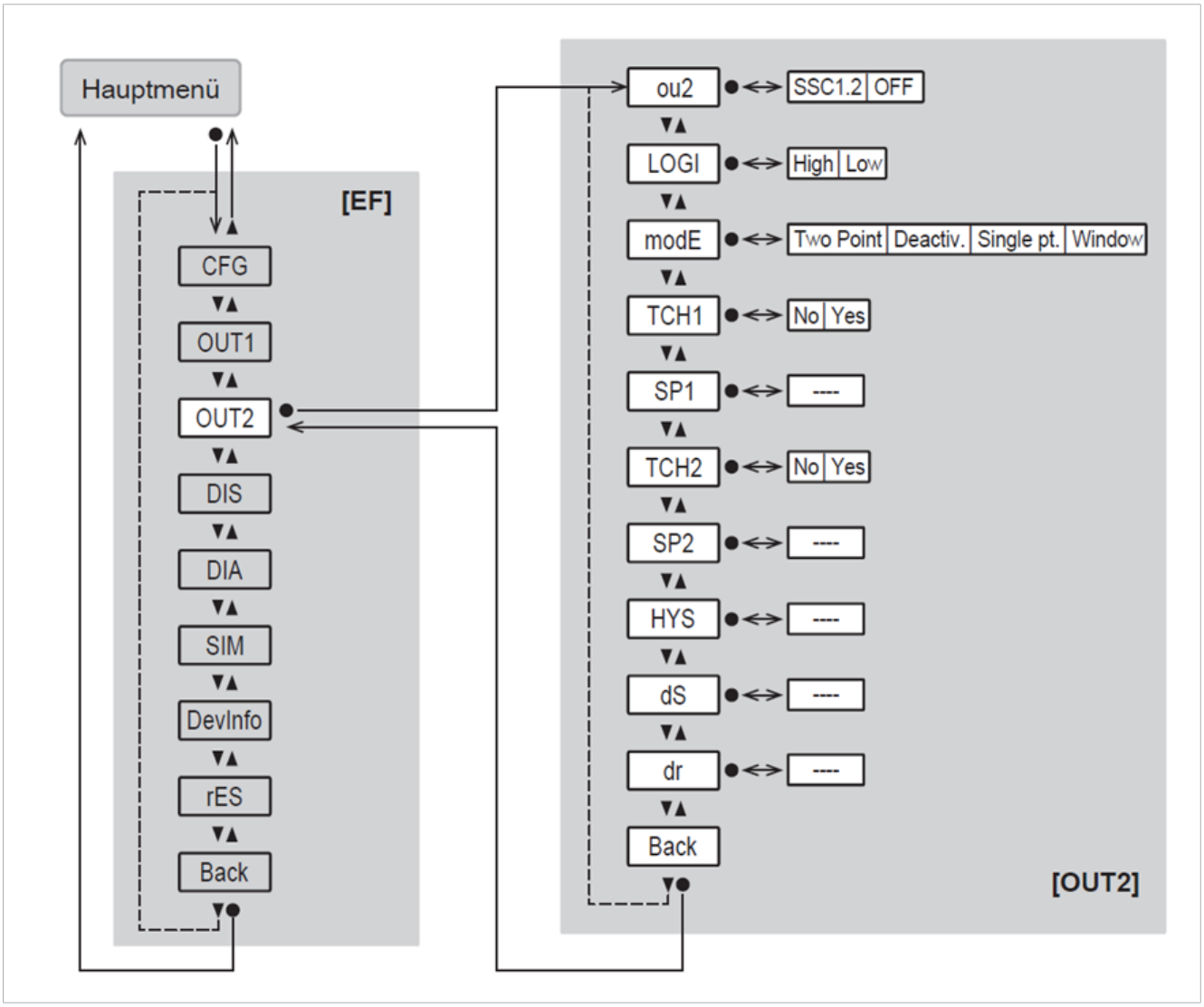
Parameter	Explanation
OUT1	Go to the OUT1 submenu (output configuration for output 1)
ou1	Output function for output OUT1
LOGI	Switching point logic: [high active] or [low active]
modE	Switching point mode: [Single Point], [Two Point], [Window], [Deactivated]
TCH1	Teach switching point SP1
TCH2	Teach switching point SP2
SP1	Switching point 1
SP2	Switching point 2
HYS	Hysteresis
dS	Switching delay for switching to active state (in seconds)
dr	Reset delay for switching to inactive state (in seconds)

Analog Variant: Output Configuration [OUT2] Menu



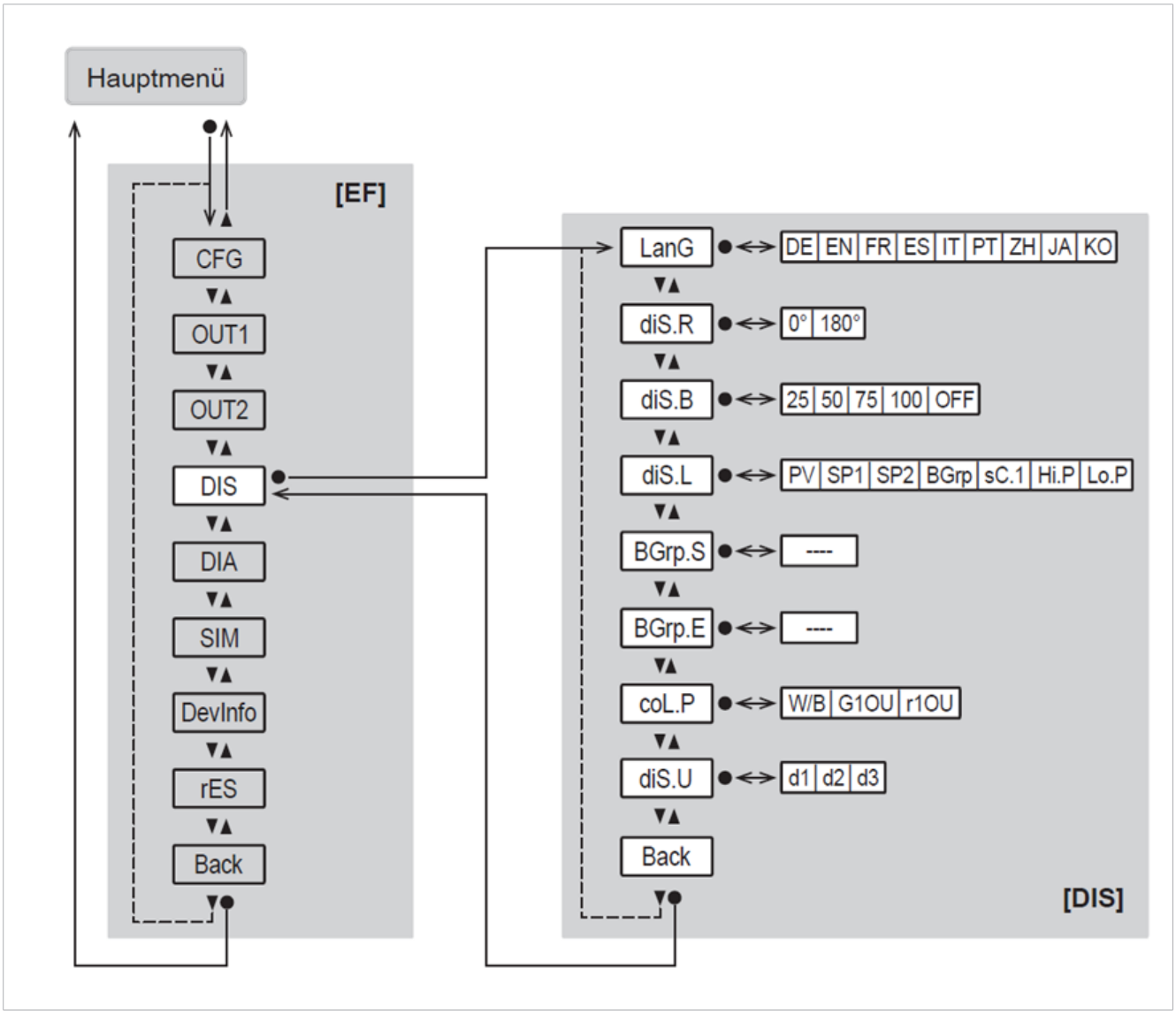
Parameter	Explanation
OUT2	Go to the OUT2 submenu (output configuration for output 2)
ou2	Output function for output OUT2
ASP2	Analog start point for OUT2
AEP2	Analog end point for OUT2
dAA	Damping time in seconds for the analog signal

2x Digital Variant: Output Configuration [OUT2] Menu



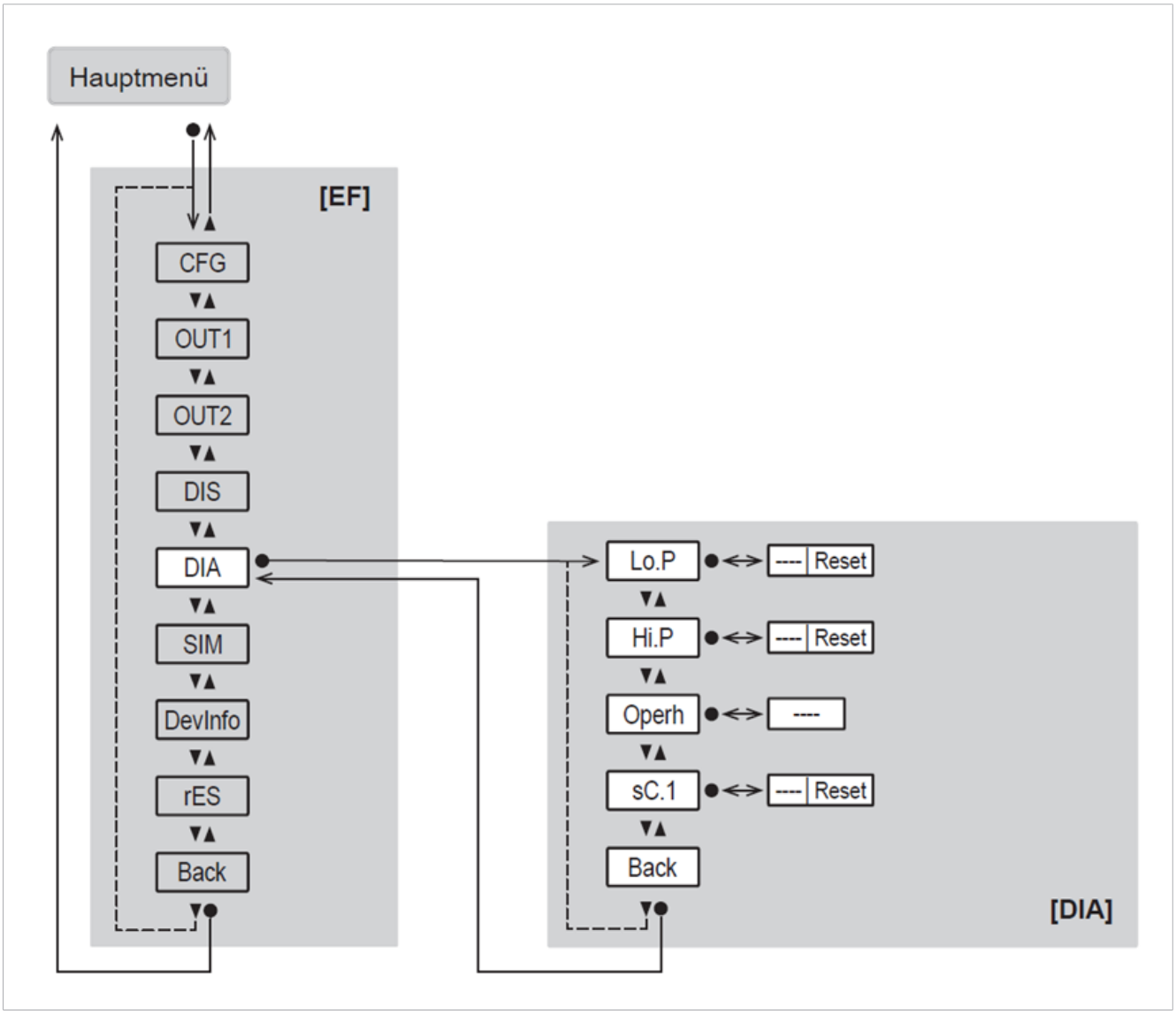
Parameter	Explanation
OUT2	Go to the OUT2 submenu (output configuration for output 2)
ou2	Output function for output OUT2
LOGI	Switching point logic: [high active] or [low active]
modE	Switching point mode: [Single Point], [Two Point], [Window], [Deactivated]
TCH1	Teach switching point SP1
TCH2	Teach switching point SP2
SP1	Switching point 1
SP2	Switching point 2
HYS	Hysteresis
dS	Switching delay for switching to active state (in seconds)
dr	Reset delay for switching to inactive state (in seconds)

Display [DIS] Menu:



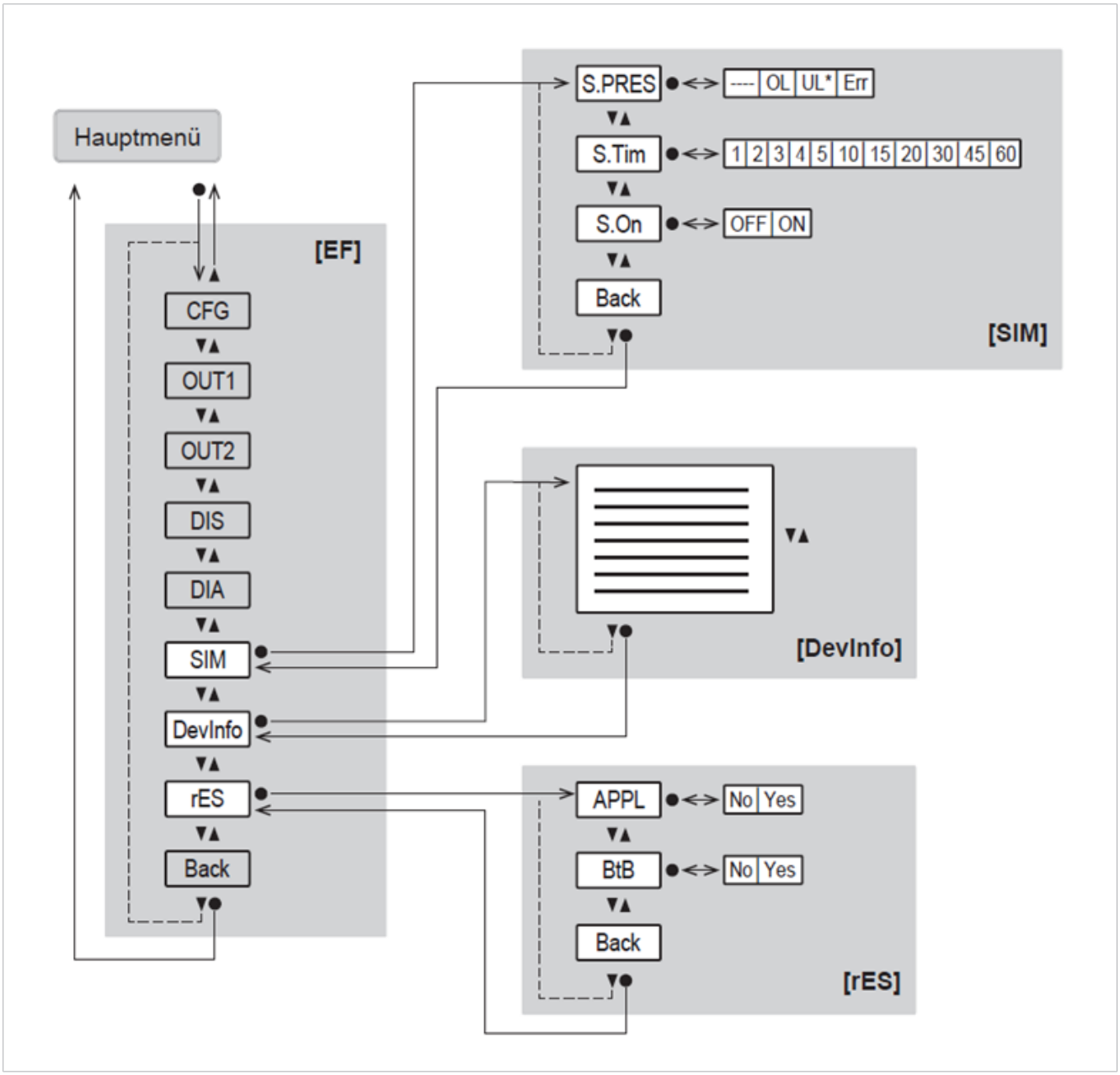
Parameter	Explanation
DIS	Go to the DIS (Display) submenu.
LanG	Language selection for the display
diS.R	Orientation of the display
diS.B	Display brightness
diS.L	Display layout
BGrp.S	Start point for bar graph scaling
BGrp.E	End point for bar graph scaling
col.P	Font color for pressure
diS.U	Refresh rate for the display

Diagnose [DIA] Menu:



Parameter	Explanation
DIA	Go to the DIA (diagnose) submenu
Lo.P	Minimum measured pressure value
Hi.P	Maximum measured pressure value
Operh	Operating hours since initial start of operations
sC.1	Counter for the switching cycles on output OUT1
Only 2x digital variant	
sC.2	Counter for the switching cycles on output OUT2

Simulation [SIM], Device Information [DevInfo] and Reset Device [RES] Menus:



Parameter	Explanation
SIM	Go to the SIM submenu (simulation)
S.PRS	Simulated pressure value in simulation mode *
S.Tim	Simulation duration in minutes
S.On	Start simulation mode
DevInfo	Go to the DevInfo (Device info) submenu: Device information
rES	Go to the Reset (Reset device) submenu
APPL	Application reset (resets the application-specific parameter settings)
BtB	Back-to-box reset (resets the factory settings)

* "SIM" menu -> parameter "S.PRS --> UL", depending on the device

8 Start of Operations

When the power supply is turned on, the device enters its normal operating mode at the end of the standby delay time. It performs its measurement and evaluation functions and generates output signals in accordance with the set parameters.

During the standby delay time, the outputs are in the following state, based on the parameterization:

Analog Variant	2x Digital Variant
Switching output:	**Switching outputs:**
• Active ("high" for normally open function; "low" for normally closed function)	• Active ("high" for normally open function; "low" for normally closed function)
Analog output:	
• 0 mA for current output (I or I_{neg}) • 0 V for voltage output (U5, $U5_{neg}$, U10, $U10_{neg}$)	

When an IO-Link master is connected, the device switches from SIO mode (Standard Input Output) to IO-Link mode automatically, if the port of the master is set to IO-Link mode.

9 Guided Installation via an Installation Wizard

When the device is put into operation for the first time – unless the device has already been parameterized via IO-Link – or after a back-to-box reset, the display asks whether you want a guided installation when changing from the process value display to the main menu.

- ▸ Choose [Yes] or [No].
- ⇨ If you choose [Yes], parameters, questions and required actions are displayed in sequence. You can use the ▲ and ▼ buttons to select an option and the ● button to confirm the selection.
- ⇨ If you choose [No], the main menu appears and the sensor operates using the factory settings. Change the parameter settings if required; see the chapter "Parameterization".

You can start the guided installation again at any time using the parameter [EF] > [CFG] > [Guide].

After the message stating that the guided installation is complete, the system asks whether you want to begin the measurement.

- ▸ Choose [Yes] or [No].
- ⇨ If you select [Yes], the display reports the successful completion of the installation and switches to the process value display.
- ⇨ If you select [No], you can call up and change the individual parameters again or carry out the guided installation again using the [Restart guide] command.
- ⇨ If you select [Info], the device displays the device configuration set previously.

10 Parameterization

You can carry out parameterization via the IO-Link interface or using the operating elements on the device.

You can set parameters before you install and begin using the device or during operation.

Changing parameters during operation affects how the system works.

- Ensure that no malfunctions occur in the system.

During the parameterization process, the device remains in the operating mode. It continues to perform its monitoring functions with the existing parameter until the parameterization is completed.

Depending on the parameter setting, the available parameters in the menu may change.

10.1 Parameterization Using the Device Buttons

⚠ CAUTION

Touching hot surfaces

Touching hot surfaces may cause injury from burns.

- Wear work gloves.
- Do not touch heated components or surfaces.

At high media or ambient temperatures, some areas of the housing may become very hot. If necessary, use a blunt object to help you configure settings on the device.

General Parameterization Process:

Intention	Change action with
Change from process value display to main menu	●
Switch to submenu	Press ▼ to go to the submenu (e.g. [EF]), then ●
Select the required parameter	▲ or ▼
Switch to configuration mode	●
Change the parameter value	▲ or ▼
Apply the set parameter	●
Leave the parameter setting without saving	▲ + ▼
Return to the next menu up (repeat several times to reach the process value display)	▲ + ▼ - or - Press ▲ or ▼ to go to [Back], then ●
Return to the process value display	> 30 seconds (timeout)

See also: (> See ch. 9 Guided Installation via an Installation Wizard, p. 40)

10.2 Parameterization via IO-Link

You can find the information required to operate the device under www.schmalz.com or by entering the part no. in the Schmalz "ControlRoom" app. The app is available free of charge for Android and iOS devices.

Prerequisites for parameterization via the IO-Link interface:

- ✓ Suitable parameterization software
- ✓ The Input Output Device Description (IODD) for the device
- ✓ An IO-Link master

1. Connect the IO-Link Master to the parameterization software.
2. Set the port of the master to the IO-Link operating mode.
3. Connect the device to a free port on the IO-Link master.
   ⇨ The device switches to IO-Link mode.
4. Change the parameter settings in the software.
5. Write the parameter settings to the device.

10.3 Output Configuration

10.3.1 Digital Switching Signal

The device provides digital switching signals via switching channels (SSC = Switching Signal Channel).

The device has 2 digital switching channels SSC1.1 and SSC1.2, through which the process value can be output.

Explanation of the numbering for the switching channels SSCx.y: x = process value; y = switching channel

The switching channels can be evaluated via the IO-Link interface and the hardware output(s).

The switching channel SSC1.1 is permanently assigned to the physical hardware output OUT1.

Analog Variant	2x Digital Variant
The switching channel SSC1.2 can only be read out via the IO-Link interface.	The switching channel SSC1.2 is permanently assigned to the physical hardware output OUT2.

Each switching channel can be parameterized individually.

When parameterizing the switching channels, you set the switching point mode, switching points and switching point logic.

Switching Point Mode

You can choose between the following switching point modes based on the IO-Link smart sensor profile – Function Class "Quantity Detection" –:

- [Deactivated]
- [Single Point Mode]
- [Two Point Mode]
- [Window Mode]

The switching channel changes to the active state depending on the process data value (PDV).

In [Single Point Mode] and [Two Point Mode], the active state is above the switching point; in [Window Mode], it is within the window range.

Switching Point Logic

Setting the [High active] or [Low active] switching point logic allows you to specify the value of the switching channel in the active state:

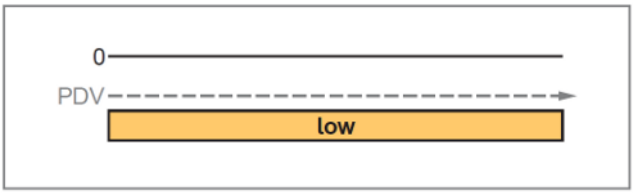
- [High active]: The switching channel is in the "high" active state (= ON = normally open = Normally open = 1)
- [Low active]: The switching channel is in the "low" active state (= ON = normally closed = Normally closed = 0)

The following figures show the state of the switching channels based on the switching point mode, switching point logic and process data value (PDV).

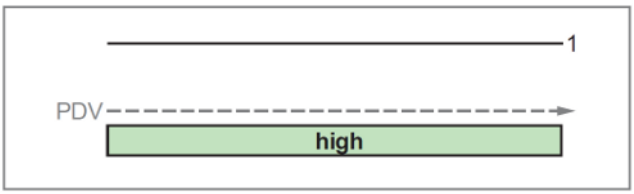
Deactivated

If you set the [Deactivated] switching point mode for a switching channel, then the switching channel permanently has the following value regardless of the process value:

- For [High active] switching point logic: permanently "low".
- For [Low active] switching point logic: permanently "high".



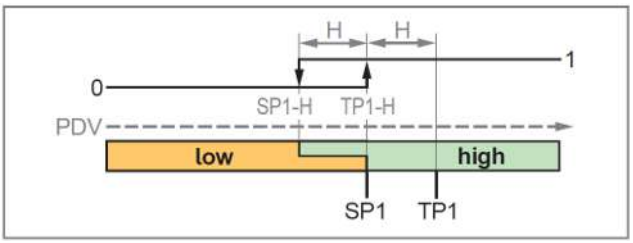
[Deactivated] / [High active]



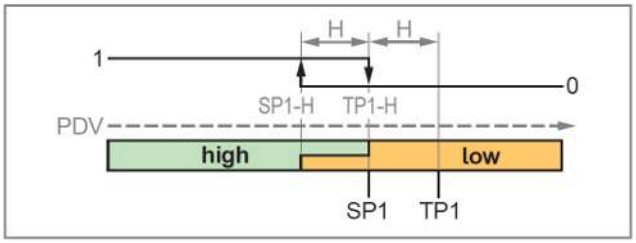
[Deactivated] / [Low active]

Single Point Mode

Only one switching point (SP1) is manually set or taught.
The reset point (SP1-H) is calculated based on the switching point and the set hysteresis.
During teaching, the switching point is set below the taught process value (TP1) by the value of the hysteresis.



[Single Point Mode] / [High active]
H: Hysteresis
SP1: Switching point
TP1: Teach point
TP1-H: Switching point during teaching (= SP1)
SP1-H: Reset point



[Single Point Mode] / [Low active]
H: Hysteresis
SP1: Switching point
TP1: Teach point
TP1-H: Switching point during teaching (= SP1)
SP1-H: Reset point

For devices with a negative measuring range up to zero (vacuum devices with a measuring range of -1 bar to 0 bar), the following applies in contrast to all other devices:
The switching point logic is preset to [Low active] at the factory.

Two Point Mode

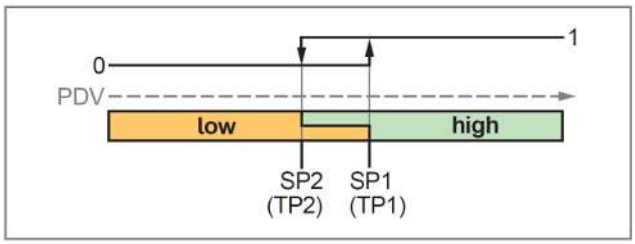
A switching point SP1 and a switching point SP2 are manually set or taught.

You can freely select the position of the switching points via IO-Link during parameterization: SP1 can be either below or above SP2. The lower switching point is the reset point. In the example shown, SP1 is the switching point and SP2 is the reset point.

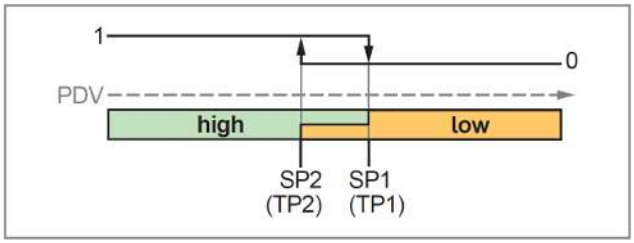
When carrying out parameterization using the device buttons, SP1 must be higher than SP2.

With teaching, the switching point is set directly to the applicable taught process value. The following applies: [Teach SP1] sets SP1, [Teach SP2] sets SP2.

The hysteresis is ignored in Two Point Mode.



[Two Point Mode] / [High active]
SP1: Switching point 1
SP2: Switching point 2
TP1: Teach point 1 (= SP1)
TP2: Teach point 2 (= SP2)



[Two Point Mode] / [Low active]
SP1: Switching point 1
SP2: Switching point 2
TP1: Teach point 1 (= SP1)
TP2: Teach point 2 (= SP2)

For devices with a negative measuring range up to zero (vacuum devices with a measuring range of -1 bar to 0 bar), the following applies in contrast to all other devices:
The switching point logic is preset to [Low active] at the factory.

Window Mode

Two switching points (SP1) and (SP2) are manually set or taught.

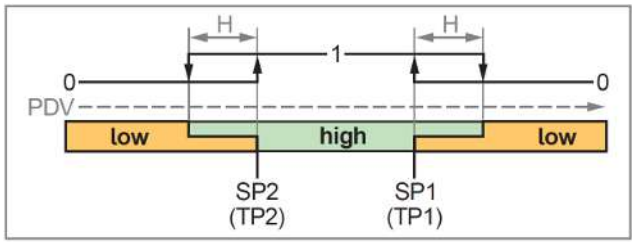
The two switching points delimit a window range.

The position of the switching points can be freely selected: SP1 can be either below or above SP2. The lower switching point is the lower limit value and the higher switching point is the upper limit value of the window range.

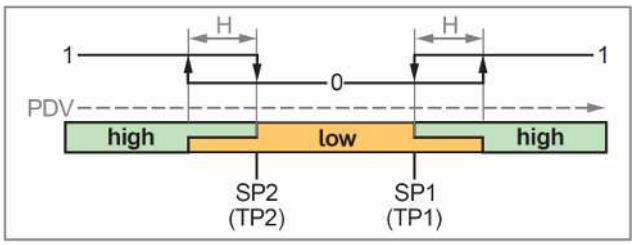
With teaching, the switching point is set directly to the applicable taught process value. The following applies: [Teach SP1] sets SP1, [Teach SP2] sets SP2.

When the process data value enters the window range, the state of the switching channel changes immediately when the switching points are exceeded/fallen below.

If the process data value leaves the window range, the state of the switching channel changes when the switching point plus the hysteresis value (SP1+H or SP2-H) is exceeded/fallen below.



[Window Mode] / [High active]
H: Hysteresis
SP1: Switching point 1
SP2: Switching point 2
TP1: Teach point 1 (= SP1)
TP2: Teach point 2 (= SP2)



[Window Mode] / [Low active]
H: Hysteresis
SP1: Switching point 1
SP2: Switching point 2
TP1: Teach point 1 (= SP1)
TP2: Teach point 2 (= SP2)

For devices with a negative measuring range up to zero (vacuum devices with a measuring range of -1 bar to 0 bar), the following applies in contrast to all other devices:
The switching point logic is preset to [Low active] at the factory.

Note on Hysteresis

The hysteresis must not exceed 10% of the measured end value (MEV). If the switching point and reset point for the application are then not far enough apart in [Single Point] switching point mode, the [Two Point] switching point mode should be selected.

If you select the [Auto] setting for the hysteresis, the following value is set for the hysteresis:

Measuring range	Hysteresis [Single Point]	Hysteresis [Window]
-1 to 0 bar	0.02 bar	0.002 bar
-1 to 1 bar	0.04 bar	0.004 bar
-1 to 10 bar	0.2 bar	0.02 bar, 0 to 16

Hysteresis with [Auto] setting based on the measuring range of the device and the selected switching point mode.

Parameterization Using Device Buttons: Switching Signal

Using the device buttons, only the switching channel SSC1.1 can be set.

- ✓ The default unit of measure is selected: [EF] > [CFG] > [uni.P].
- ✓ For output 1, the switching signal is selected: [EF] > [OUT1] > [ou1] = [SSC1.1]
- ✓ The switching point logic is selected: [EF] > [OUT1] > [LOGI]
- ▸ Open the menu [EF] > [OUT1] to configure output OUT1.

Single Point Mode:

1. Select [modE] and set the switching point mode: [Single Point].
2. Select [SP1] and set switching point 1.
3. Select [HYS] and set the hysteresis.

Two Point Mode:

1. Select [modE] and set the switching point mode: [Two Point].
2. Select [SP1] and set switching point 1.
3. Select [SP2] and set switching point 2.

Window Mode:

1. Select [modE] and set the switching point mode: [Window].
2. Select [SP1] and set switching point 1.
3. Select [SP2] and set switching point 2.
4. Select [HYS] and set the hysteresis.

Teaching using Device Buttons: Switching Signal

Using the device buttons, only the switching channel SSC1.1 can be set.

- ✓ The default unit of measure is selected: [EF] > [CFG] > [uni.P].
- ✓ For output 1, the switching signal is selected: [EF] > [OUT1] > [ou1] = [SSC1.1]
- ✓ The switching point logic is selected: [EF] > [OUT1] > [LOGI]
- ▸ Open the menu [EF] > [OUT1] to configure output OUT1.

Single Point Mode:

1. Select [modE] and set the switching point mode: [Single Point].
2. Move to the system pressure at which the output is to be switched and keep it constant.
3. Select [TCH1] and set [Yes].
   ⇨ The current value minus the hysteresis is adopted as switching point SP1.
4. Select [HYS] and set the hysteresis.

Two Point Mode:

1. Select [modE] and set the switching point mode: [Two Point].
2. Move to the system pressure at which the output is to be switched and keep it constant.
3. Select [TCH1] and set [Yes].
   ⇨ The current value is adopted as switching point SP1.
4. Move to the system pressure at which the output is to be switched back and keep it constant.
5. Select [TCH2] and set [Yes].
   ⇨ The current value is adopted as switching point SP2.

Window Mode:

1. Select [modE] and set the switching point mode: [Window].
2. Select [HYS] and set the hysteresis.
3. Move to the system pressure for the upper limit value of the window range and keep it constant.
4. Select [TCH1] and set [Yes].
   ⇨ The current value is adopted as switching point SP1.
5. Move to the system pressure for the lower limit value of the window range and keep it constant.
6. Select [TCH2] and set [Yes].
   ⇨ The current value is adopted as switching point SP2.

Parameterization via IO-Link: Switching Signal

Both switching channels can be set via the IO-Link interface.

- ✓ The default unit of measure is selected: [Parameters] > [Basic settings] > [uni.P].
- ✓ For output x, the switching signal is selected: [Parameters] > [Output configuration] > [oux] = [SSC1.x]
- ✓ The switching point logic is selected: [Parameters] > [SSC1.x] > [SSC1.1 Config.Logic]
- ▸ Open [Parameters] > [SSC1.x] to configure output OUT1.

Single Point Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Single Point].
2. Select [SSC1.x Param. SP1] and set switching point 1.
3. Select [SSC1.x Config. Hyst] and set the hysteresis.

Two Point Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Two Point].
2. Select [SSC1.x Param. SP1] and set switching point 1.
3. Select [SSC1.x Param. SP2] and set switching point 2.

Window Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Window].
2. Select [SSC1.x Param. SP1] and set switching point 1.
3. Select [SSC1.x Param. SP2] and set switching point 2.
4. Select [SSC1.x Config. Hyst] and set the hysteresis.

Teaching via IO-Link: Switching Signal

Both switching channels can be set via the IO-Link interface.

- ✓ The default unit of measure is selected: [Parameters] > [Basic settings] > [uni.P].
- ✓ For output x, the switching signal is selected: [Parameters] > [Output configuration] > [oux] = [SSC1.x]
- ✓ The switching point logic is selected: [Parameters] > [SSC1.x] > [SSC1.1 Config.Logic]
- ▸ Open [Parameters] > [SSC1.x] to configure output OUT1.

Single Point Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Single Point].
2. Select [SSC1.x Config. Hyst] and set the hysteresis.
3. Move to the system pressure for the desired switching point and keep it constant.
4. Open [Parameters] > [Teach].
5. Select [TI Select] and specify the switching channel: [SSC1.1] or [SSC1.2].
6. Execute the command: [Teach SP1].
   ⇨ The current value minus the hysteresis is adopted as switching point SP1.

Two Point Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Two Point].
2. Move to the system pressure for the desired switching point and keep it constant.
3. Open [Parameters] > [Teach].
4. Select [TI Select] and specify the switching channel: [SSC1.1] or [SSC1.2].
5. Execute the command: [Teach SP1].
   ⇨ The current value is adopted as switching point SP1.
6. Move to the system pressure for the desired switching point and keep it constant.
7. Execute the command: [Teach SP2].
   ⇨ The current value is adopted as switching point SP2.

Window Mode:

1. Select [SSC1.x Config. Mode] and set the switching point mode: [Window].
2. Select [SSC1.x Config. Hyst] and set the hysteresis.
3. Move to the system pressure for the desired switching point and keep it constant.
4. Open [Parameters] > [Teach].

5. Select [TI Select] and specify the switching channel: [SSC1.1] or [SSC1.2].
6. Execute the command: [Teach SP1].
   ⇨ The current value is adopted as switching point SP1.
7. Move to the system pressure for the desired switching point and keep it constant.
8. Execute the command: [Teach SP2].
   ⇨ The current value is adopted as switching point SP2.

10.3.2 Analog Signal

The device outputs an analog signal that is proportional to the process value.

The analog signal can be output as a current or voltage signal.

In addition, the analog signal can be inverted (e.g. I = 4 to 20 mA and I_{neg} = 20 to 4 mA).

The analog signal is set using the parameter [ou2] (see table).

The measurement range can be restricted via the parameters [ASP2] and [AEP2]:

- [ASP2] = analog start value = measurement value at which the analog signal ① is output.
- [AEP2] = analog value = measurement value at which the output signal ② is output.

Minimum distance between [ASP2] and [AEP2] = 20% of the measurement range end value.

The table shows the options for [ou2]. Dependent on them: ① Analog signal for [ASP2], ② analog signal for [AEP2]:

Setting for [ou2]	①	②	Analog signal in the event of an error
I	4 mA	20 mA	> 21 mA
I_{neg}	20 mA	4 mA	< 3.6 mA
U5	1 V	5 V	> 5.25 V
$U5_{neg}$	5 V	1 V	< 0.75 V
U10	0 V	10 V	> 11 V
$U10_{neg}$	10 V	0 V	> 11 V

Parameterization Using Device Buttons: Analog Signal

✓ Default unit of measure is selected: [EF] > [CFG] > [uni.x].

1. Open the menu [EF] > [OUT2] to configure output OUT2.
2. Select [ou2] and set the function: I, Ineg, U5, $U5_{neg}$, U10 or $U10_{neg}$.
3. Select [ASP2] and set the measurement value for the analog start point.
4. Select [AEP2] and set the measurement value for the analog end point.

The parameter settings [ASP] and [AEP] can be changed later directly in the main menu.

Parameterization via IO-Link: Analog Signal

✓ Default unit of measure is selected: [Parameters] > [Basic settings] > [uni.x].

1. Open the menu [Parameters] > [Output configuration].
2. Select [ou2] and set the function: I, I_{neg}, U5, $U5_{neg}$, U10 or $U10_{neg}$.
3. Open [Parameters] > [Analog output 2] > [Pressure].
4. Select [ASP2] and set the measurement value for the analog start point.
5. Select [AEP2] and set the measurement value for the analog end point.

10.3.3 Output Off

The output signal for output OUT1 or output OUT2 can be turned off in two ways:

- [OFF]: The physical output OUTx becomes high-impedance, so no signal can be output. The status of the SSC1.x switching channels is still transmitted via the IO-Link interface.
- [Deactivated]: The switching channel is deactivated (i.e. the switching state is permanently in the inactive state): With the [High active] setting, permanently "low"; with the [Low active] setting, permanently "high".

Parameterization Using Device Buttons: Output Off

1. Open the menu [EF] > [OUTx].
2. Select [oux] and set [OFF].

or

▸ Select [modE] and set [Deactivated].

Parameterization via IO-Link: Output Off

1. Open [Parameters] > [Output configuration].
2. Select [oux] and set [OFF].

- or -

1. Open [Parameters] > [SSC1.x].
2. Select [SSC1.x Config. Mode] and set [Deactivated].

10.4 Application Configuration

10.4.1 Default Unit of Measure

You can choose the unit of measure that is used to show the process value in the display by default. All other parameter settings are based on this unit.

The conversion of the unit has no effect on the transmission of the IO-Link process value. This value is always transmitted in the SI unit.

Values that can be selected:

- Pressure:
  - V = kPa, mbar, mmHg, kgf/cm², %
  - VP10 = MPa, bar, mmHg, kgf/cm²
- Temperature: in °C

For the temperature, the unit can only be set via the IO-Link interface.

The default unit of measure for temperature applies to both the media temperature and the internal device temperature. The two values are only available acyclically via the IO-Link interface.

Parameterization Using Device Buttons: Default Unit of Measure

1. Open the menu [EF] > [CFG].
2. Select [uni.P] and set the unit of measure.

Parameterization via IO-Link: Default Unit of Measure

1. Open [Parameters] > [Basic settings].
2. Select [uni.P] and set the unit of measure.
3. Select [uni.T] and set unit of measure.

10.4.2 Damping

The set damping constant causes the output signals to stabilize. Physical process value changes that occur abruptly are smoothed out.

This applies to the outputs, the display and the process value transmission via the IO-Link interface.

The damping constant is added to the sensor response time (technical data).

The UL and OL signals are determined taking into account the damping constant.

Measured value damping affects only the pressure process value.

Values that can be selected:

- [dAP] = damping time for switching signal, display and IO-Link signal (63% rise time)
- [dAA] = damping time for analog signal (63% rise time)

Parameterization Using Device Buttons: Damping

Switching output:

1. Open the menu [EF] > [CFG].
2. Select [dAP.P] and set the damping time in seconds.

Analog output:

1. Open the menu [EF] > [OUT2].
2. Select [dAA] and set the damping time in seconds.

Parameterization via IO-Link: Damping

Switching Output:

1. Open [Parameters] > [Damping].
2. Select [dAP.P] and set the damping time in seconds.

Analog Output:

1. Open [Parameters] > [Damping].
2. Select [dAA] and set the damping time in seconds.

10.4.3 Output Polarity of the Switching Outputs

You can use the [P-n] parameter to select whether the outputs are PNP or NPN.

Parameterization Using Device Buttons: Output Polarity

1. Open the menu [EF] > [CFG].
2. Select [P-n] and set [PnP] or [nPn].

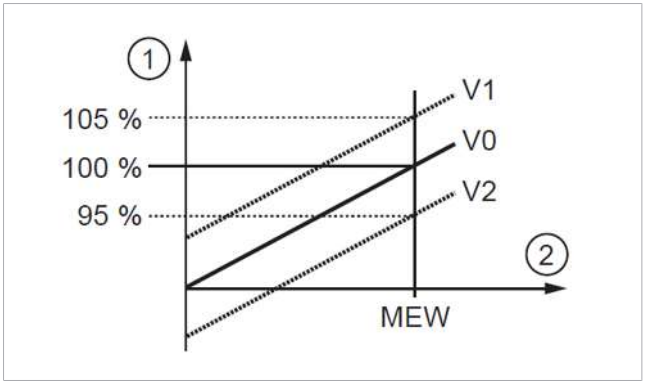
Parameterization via IO-Link: Output Polarity

1. Open [Parameters] > [Basic settings].
2. Select [P-n] and set [PnP] or [nPn].

10.4.4 Zero Point Calibration (Calibration Offset)

If there is a systematic deviation between the measured value and the actual process value, you can correct this measurement inaccuracy using the correction factor [cOF] or [tcOF].

- [cOF]: Set correction factor for zero point calibration
- [tcOF]: Taught zero calibration correction factor



1	Output signal
2	Process value
V0	Measured value curve with factory setting
V1	Measured value curve after offset +5% MEV
V2	Measured value curve after offset -5% MEV

The value for [cOF] or [tcOF] can be in the following range:

The table shows the adjustment range for the correction factor based on the measuring range of the device:

Measuring range	[cOF] or [tcOF] -1
-1 to 0 bar	-0.05 bar to +0.05 bar
-1 to 1 bar	-0.1 bar to +0.1 bar
-1 to 10 bar	-0.5 bar to +0.5 bar

Parameterization Using Device Buttons: Zero Point Calibration

1. Open the menu [EF] > [CFG].
2. Select [cOF] and set the value.
   ⇨ The internal zero point is moved by the set value.

Teaching Zero Point Calibration:

1. Keep the system pressure constant at 0.
2. Open the menu [EF] > [CFG].
3. Select [tcOF] and set [Yes].
   ⇨ The current measurement value is adopted as the new internal zero point, provided that the deviation is in a range of ±5% of the MEV.

Parameterization via IO-Link: Zero Point Calibration

1. Open [Parameters] > [Application configuration].
2. Select [cOF] and set the value.
   ⇨ The internal zero point is moved by the set value.

Teaching Zero Point Calibration:

1. Keep the system pressure constant at 0.
2. Open [Parameters] > [Application configuration].
3. Execute the command: [Teach tcoF].
   ⇨ The current measurement value is adopted as the new internal zero point, provided that the deviation is in a range of ±5% of the MEV.

10.4.5 Switching Point Logic

You can adjust the switching point logic of the switching outputs.

Values that can be selected:

- [High active] = normally open = normally open
- [Low active] = normally closed = normally closed

Parameterization Using Device Buttons: Switching Point Logic

1. Open the menu [EF] > [OUTx].
2. Select [LOGI] and set the switching point logic.

Parameterization via IO-Link: Switching Point Logic

1. Open [Parameters] > [SSC1.x].
2. Select [SSC1.x Config. Logic] and set the switching point logic for the switching channel SSC1.x.

10.4.6 Switching Delay

For the switching output, you can set a delay time that is used to switch the output back and forth.

Parameterization Using Device Buttons: Switching Delay

1. Open the menu [EF] > [OUTx].
2. Select [dSx] and set the delay for switching OUTx in seconds.
3. Select [drx] and set the delay for switching OUTx back in seconds.

Parameterization via IO-Link: Switching Delay

1. Open [Parameters] > [SSC1.x].
2. Select [SSC1.x Delay dS] and set the delay for switching OUTx in seconds.
3. Select [SSC1.x Delay dr] and set the delay for switching OUTx back in seconds.

10.5 Display Settings

10.5.1 Display Layout

You can use the [diS.L] parameter to set the default view for the display.

If you set PV, only the pressure process value is displayed. For all the other settings, additional information is displayed below the process value based on the selection.

The following table explains the display layouts (DIS.L) shown above:

No.	Device button	IO-Link	Description
1	[PV]	[PV]	Current pressure process value
2	[SP1]	[SSC1.1-Param_SP1]	Switching point 1 set for switching channel SSC1.1
3	[SP2]	[SSC1.1-Param_SP2]	Switching point 2 set for switching channel SSC1.1. Not available with the [Single Point] setting. 4
4	[BGrp]	[Bargraph SSC1.1]	Switching channel SSC1.1 as Bargraph
5	[sC.1]	[SSC Counter1]	Switching cycle counter SSC1.1
6	[Hi.P]	[Hi.P]	Display of the maximum measured process value for the pressure
7	[Lo.P]	[Lo.P]	Display of the minimum measured process value for the pressure
8	Not available	[App.Spec.Tag]	Display of the application-specific tag. See the device information

Parameterization Using Device Buttons: Display Layout

1. Open the menu [EF] > [DIS].
2. Select [diS.L] and set the layout.

Parameterization via IO-Link: Display Layout

1. Open [Parameters] > [Display settings].
2. Select [diS.L] and set the layout.

10.5.2 Bar Graph Scaling Display

If you select the [BGrp] setting as the display layout, the switching channel SSC1.1 is displayed as the bar graph (See "Display Layout").

With the factory setting, the bar graph bar displays the entire measuring range. However, it may be useful to restrict the measurement range to be displayed so that the switching points and the process value bar are visually easier to distinguish:

Example 1: Bar Graph with Factory Setting*

- [BGrp.S] = 0 bar = measuring range starting value MSV
- [BGrp.E] = 16 bar = measuring range end value MEV

*For devices with a negative measuring range up to zero (vacuum devices with measuring range of -1 bar to 0 bar), the factory setting is reversed:

- [BGrp.S] = 0 bar = measuring range end value MEV
- [BGrp.E] = -1 bar = measuring range starting value MSV

Example 2: Bar Graph with Scaling

- [BGrp.S] = 3 bar
- [BGrp.E] = 8 bar

Parameterization Using Device Buttons: Bar Graph Scaling

1. Open the menu [EF] > [DIS].
2. Select [BGrp.S] and set the minimum pressure value for the bar graph bar.
3. Select [BGrp.E] and set the maximum pressure value for the bar graph bar.

Parameterization via IO-Link: Bar Graph Scaling

1. Open [Parameters] > [Display settings].
2. Select [BGrp.S] and set the minimum pressure value for the bar graph bar.
3. Select [BGrp.E] and set the maximum pressure value for the bar graph bar.

10.5.3 Refresh Rate Display

You can use the [diS.U] parameter to set how often the display is refreshed.
Values that can be selected:

- d1: fast
- d2: medium
- d3: slow

Parameterization Using Device Buttons: Refresh Rate Display

1. Open the menu [EF] > [DIS].
2. Select [diS.U] and set the refresh rate.

Parameterization via IO-Link: Refresh Rate Display

1. Open [Parameters] > [Display settings].
2. Select [diS.U] and set the refresh rate.

10.5.4 Display Language

You can use the [LanG] parameter to set the language on the display.
Languages that can be selected:

- DE: German
- EN: English
- FR: French
- ES: Spanish
- IT: Italian
- PT: Portuguese
- ZH: Chinese
- JA: Japanese
- KO: Korean

Parameterization Using Device Buttons: Display Language

1. Open the menu [EF] > [DIS].
2. Select [LanG] and set the language.

Parameterization via IO-Link: Display Language

1. Open [Parameters] > [Basic settings].
2. Select [LanG] and set the language.

10.5.5 Display Brightness

You can use the [diS.B] parameter to set the brightness of the display.
Values that can be selected:

- 25%
- 50%
- 75%
- 100%
- OFF Energy-saving mode. The display is deactivated during operation. The display is activated by pressing any button. After 30 seconds of inactivity, the display is switched off again.

If warning or error messages are issued and during optical localization, the display comes back on even when the setting is [OFF].

If the device measures a high internal temperature, the display brightness is automatically adjusted:
Internal temperature > 67 °C: The brightness is reduced to 25%.
Internal temperature > 80 °C: The display is switched off. Activation by pressing a button. See warning messages and error messages for more information.

Parameterization Using Device Buttons: Display Brightness

1. Open the menu [EF] > [DIS].
2. Select [diS.B] and set the brightness of the display.

Parameterization via IO-Link: Display Brightness

1. Open [Parameters] > [Display settings].
2. Select [diS.B] and set the brightness of the display.

10.5.6 Display Rotation

You can use the [diS.R] parameter to rotate the text on the display clockwise so that it is easier to read.
Values that can be selected:

- [0°] not rotated
- [90°] *
- [180°]
- [270°] *

* In contrast to the [180°] setting, only the process value display, not the parameter display, is rotated with the [90°] and [270°] settings.

Parameterization Using Device Buttons: Display Alignment

1. Open the menu [EF] > [DIS].
2. Select [diS.R] and set the rotation of the display.

Parameterization via IO-Link: Display Alignment

1. Open [Parameters] > [Display settings].
2. Select [diS.R] and set the rotation of the display.

10.5.7 Display Color Setting

You can use the [coL.P] parameter to set the color shown on the display.

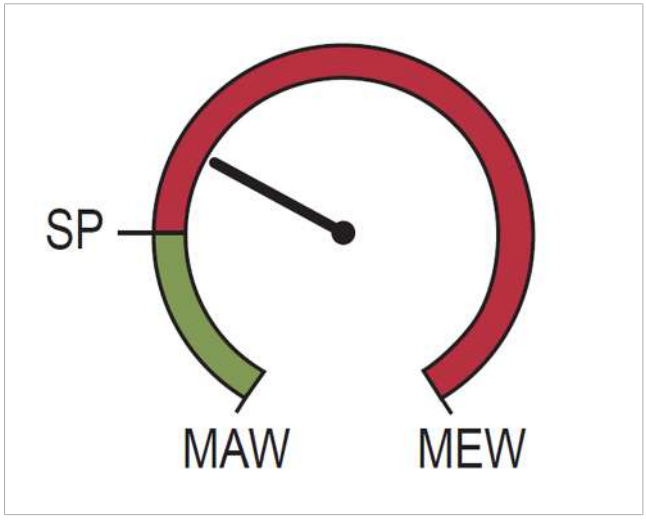
This function is available only for output OUT1.

With the [W/B] parameter setting, the display is permanently set to a white font and black background.

With the [r1ou] and [G1ou] parameter settings, the font color is black and the background changes color depending on the process value:

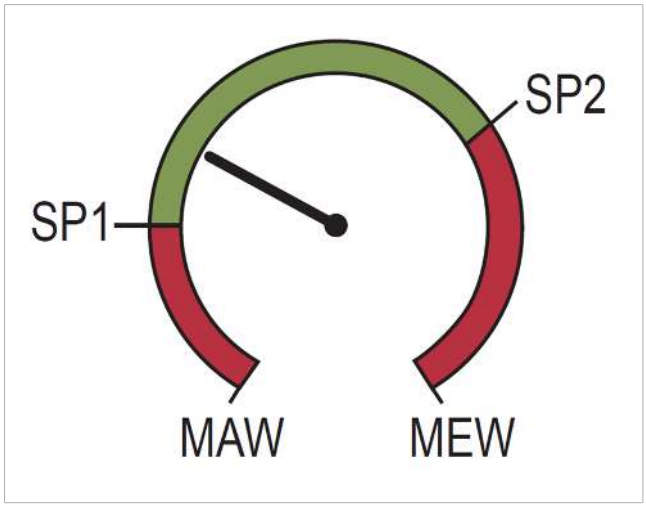
In [Single Point Mode] and [Two Point Mode], the color changes if the process value is above the switching point:

Color change with [Single Point] / [Two Point] setting; example: coLr = r1ou; normally open



In [Window Mode], the color changes if the process value is within the window range:

Color change with [Window] setting; example: coLr = G1ou; normally open



Values that can be selected:

- [W/B]: Regardless of the switching state, the font color is always white and the background is black.
- [r1ou]: The display background changes from green to red.
- [G1ou]: The display background changes from red to green.

The color changes taking into account the switching point logic and the hysteresis.

Parameterization Using Device Buttons: Display Color Setting

1. Open the menu [EF] > [DIS].
2. Select [coL.P] and set the display color.

Parameterization via IO-Link: Display Color Setting

1. Open [Parameters] > [Display settings].
2. Select [coL.P] and set the display color.

10.6 Diagnostic Functions

10.6.1 Memory

The device stores the maximum and minimum measured process values. You can read the current value from the device or via the IO-Link interface.
Values that can be selected:

- [Lo.P]: Minimum value stored for pressure
- [Hi.P]: Maximum value stored for pressure

It is useful to clear the memories as soon as the device begins to function under normal operating conditions.

Reading Values using Device Buttons: Memory

1. Open the menu [EF] > [DIA].
2. Select [Lo.P] or [Hi.P] and read the minimum or maximum stored process value.

Deleting the Memory:

1. Open the menu [EF] > [DIA].
2. Select [Lo.P] or [Hi.P] and select [Reset] > Set [Yes].

Reading Values via IO-Link: Memory

1. Open [Parameters] > [Memory].
2. Select [Lo.P] or [Hi.P] and read the minimum or maximum stored process value.

Deleting the Memory:

1. Open [Parameters] > [Memory].
2. Execute the command:
   - [Reset Hi.x and Lo.x memory]
   - [Reset Lo.x memory]
   - [Reset Hi.x memory]

10.6.2 Operating Hours Counter

The device saves the operating hours since the initial start of operations.

You can read the current value from the device or via the IO-Link interface.

If the power supply is interrupted, at most the count for the last hour may be lost.

Reading Values using Device Buttons: Operating Hours Counter

1. Open the menu [EF] > [DIA].
2. Select [Operating hours] and read the value.

Reading Values via IO-Link: Operating Hours Counter

1. Open [Diagnose].
2. Select [Operating hours] and read the value.

10.6.3 Overpressure Events Counter

The device has a counter for overpressure events. The value from which the pressure is evaluated as overpressure (pressure threshold) can be set using the [HIPS parameter. It must be exceeded for at least 0.5 ms.

The number of upper pressure threshold violations can be displayed using the [HIPC] parameter.

This function is only available via the IO-Link interface.

If the power supply is interrupted, the events from the last 10 minutes may be lost.

Parameterization via IO-Link: Pressure Threshold

1. Open [Diagnose] > [Pressure].
2. Select [HIPS-PRES] and set the pressure threshold value.

Reading Values via IO-Link: Overpressure Events

1. Open [Diagnose] > [Pressure].
2. Select [HIPC] to display the number of overpressure events.

Deleting the Memory:

- Execute the command: [Reset HIPC].

10.6.4 Switching Cycles Counter

The device stores the number of switching cycles for the two switching channels SSC1.1 and SSC1.2.
You can read the current value from the device or via the IO-Link interface.

If the power supply is interrupted, the events from the last 10 minutes may be lost.

Reading Values using Device Buttons: Switching Cycles

In the analog variant, only the switching cycles of SSC1.1 can be read off using the device buttons.

1. Open the menu [EF] > [DIA].
2. Select [sC.x] and read the number of switching cycles for the switching channel SSC1.x.

Deleting the Memory:

1. Open the menu [EF] > [DIA].
2. Select [sC.x] and set [Reset] > [Yes].

Reading Values via IO-Link: Switching Cycles

1. Open [Parameters] > [Counter configuration].
2. Select [SSC Counter.SSC1.x] and read the number of switching cycles for the switching channel SSC1.x .

Deleting the Memory:

1. Open [Parameters] > [Counter configuration].
2. Execute the command: [Reset counter to zero].

10.6.5 Temperature

The device measures the internal device temperature and the media temperature.
Both values are provided acyclically via the IO-Link interface and can be read **via IO-Link**:

1. Open [Parameters] > [Diagnose] > [Temperature].
2. Read the [Internal temperature] or [Media temperature].

10.7 Service Functions

10.7.1 Simulation

This function simulates process values and checks their signal chain.

It is also possible to simulate process values that lead to an error or warning message (e.g. OL).

The title line on the display shows that the simulation is active.

Parameterization Using Device Buttons: Simulation

1. Open the menu [EF] > [SIM].
2. Select [S.PRS] and set the pressure value to be simulated or a diagnostics incident (e.g. OL).
3. Select [S.Tim] and set the simulation duration in minutes.
4. Select [S.On] and set the function:
   ■ [On]: The simulation starts. The values are simulated for the duration set under [S.Tim]. Cancel by pressing any button.
   [OFF]: Simulation not active.

Parameterization via IO-Link: Simulation

1. Open [Parameters] > [Simulation] > [Pressure].
2. Select [S.PRS] and set the pressure value to be simulated or a diagnostics incident (e.g. OL).
3. Open [Parameters] > [Simulation].
4. Select [S.Tim] and set the simulation duration in minutes.
5. Select [Write to device].
   ⇨ The changed values are transferred to the device.
6. Open [Parameters] > [Simulation].
7. Execute the command: [Start Simulation].
   ⇨ The simulation starts with the set values.
8. To end the simulation: Execute the command: [Stop Simulation].

10.7.2 Device Information

The following device information is stored for the device:

Readout on the device	Readout via IO-Link
Part number	Product name
—	Family
—	Description
—	Manufacturer
—	Manufacturer ID
—	Device ID
—	Hardware revision
—	Firmware revision
EEPROM version	—
Software version	—
Serial number	
Application tag *	
Location tag *	
Function tag *	

* Freely editable via IO-Link, maximum length of 32 characters.

Reading Values using Device Buttons: Device Information

1. Open the menu [EF] > [DevInfo].
2. Read the device information.

Reading Values or Parameterization via IO-Link: Device Information

1. Open [Identification].
2. Read the device information or edit the editable parameters.

10.7.3 Binary Data Transfer (BLOB)

The device provides a function that can be used to read out binary data from the device as a large file (BLOB = Binary Large Object).

The data is exported as a CSV file.

A software tool (e.g. Schmalz ControlRoom app) that supports the IO-Link BLOB interface is required to do so.

The CSV file contains the following log book information:

- Device information for identification
- Number of operating hours
- Event logging
  - Event history with timestamp
  - Event code
  - Event description
  - Frequency of certain events
  - Device restarts

Only the last 50 events are saved.

If the power supply is interrupted, the events from the last 10 minutes may be lost.

Exporting Binary Data

The section below describes the parameterization process using Schmalz software. The parameterization process may differ if you use another software.

- ✓ The [Configure devices] view is open.
- ✓ A connection to the device is established.
- ✓ The device parameter values editor is open.
- ✓ The device supports the BLOB function.

1. Click the vertical bar at the right edge of the screen.
2. Open the [File transfer (BLOB)] tab.
3. In the [Selected function] list, select the desired BLOB function.
4. Execute the command: [Export data from device].
5. Click [Save file] and select the file name and path.
   ⇨ moneo stores the selected data on the PC.

10.7.4 Optical Localization

The sensor can be localized remotely in the system via the IO-Link interface.

When you use the command, the switching status LEDs flash and the IO-Link symbol flashes on the display.

1. Open [Identification].
2. Execute the command: [Locator Start].
3. To stop flashing: Execute the command: [Locator Stop].

The flashing process can also be ended by pressing any button on the device.

10.7.5 Locking/Unlocking the Device

The device can be locked electronically to prevent incorrect entries.

This lock prevents the device settings from being changed using the buttons on the device.

Factory setting: Not locked.

Parameterization Using Device Buttons: Locking/Unlocking the Device

Locking:

1. Ensure that the device is in normal operating mode.
2. Press down ▲ and ▼ simultaneously for 10 seconds until [Loc] is displayed.
   ⇨ The device is locked for parameterization using the device buttons. If you try to change a parameter value, the 🔒 symbol appears on the display.

The lock can only be released using the device buttons. You can still change the parameter setting via the IO-Link interface.

Unlock:

1. Ensure that the device is in normal operating mode.
2. Press down ▲ and ▼ simultaneously for 10 seconds until [uLoc] is displayed.
   ⇨ The device buttons are unlocked.

Parameterization via IO-Link: Locking/Unlocking the Device

1. Ensure that the device is in normal operating mode.
2. Open [Parameters] > [Other settings].
3. Select [Device access locks.Local user interface] and set [Locked].
   ⇨ The device is locked for parameterization using the device buttons. If you try to change a parameter value, the 🔒 symbol appears on the display.

The lock can be released using the IO-Link parameter [Unlocked].

10.7.6 Resetting the Device

The device can be reset in two ways.

With both reset applications, the operating hours since the initial start of operations are not reset.

[APPL] = application reset

The following is reset:

- All changed application-specific parameters.

If IO-Link data storage is enabled, this triggers a parameter update in the master. This rewrites the parameters configured in the master to the device. An application reset may therefore be ineffective.

[BtB] = back to box

The following is reset:

- All changed application-specific parameters.
- All writable device identification parameters, such as [Application tag], [Function tag] or [Location tag].
- Diagnostic parameters, status parameters, events.
- Number of Switching Cycles
- Minimum and maximum memory value for pressure

After the back to box reset, the sensor ceases communication and measurements until the power supply is interrupted. IO-Link data storage is not triggered.

Parameterization Using Device Buttons: Resetting the Device

1. Open the menu [EF] > [rES].
2. Select [APPL] or [BtB] and set [Yes].

Only with the selection of [BtB]:

- Interrupt and restore the power supply.
  ⇨ The device reboots.

Parameterization via IO-Link: Resetting the Device

1. Open [Parameters] > [Basic settings].
2. Execute the command: [Reset application] or [Back-to-box].

Only with the selection of [BtB]:

- Interrupt and restore the power supply.
  ⇨ The device reboots.

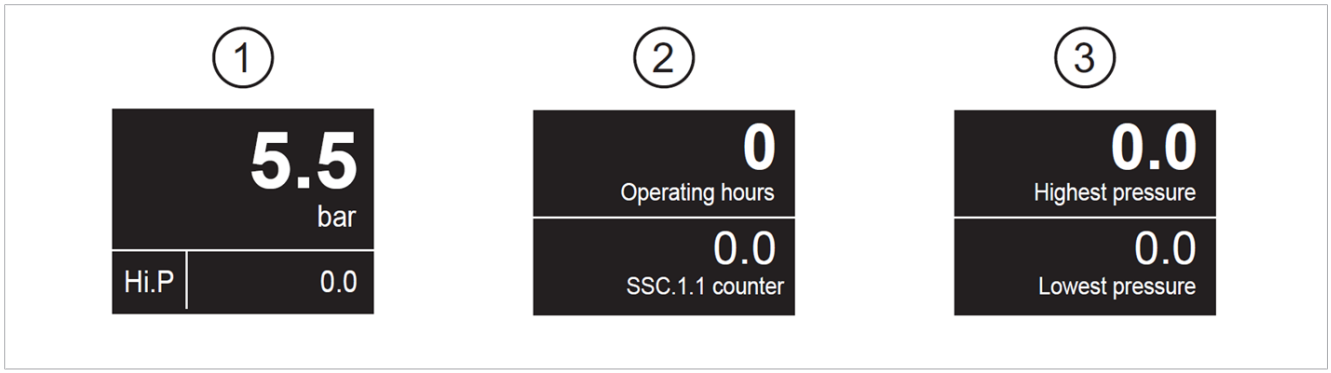
11 Operation

When the power supply is turned on, the device enters its normal operating mode at the end of the standby delay time.

It performs its measurement and evaluation functions and generates output signals in accordance with the set parameters.

You can access additional information during operation using the device buttons:

- Press the ▲ or ▼ button multiple times.
  - ⇨ The display switches between various views.
  - ⇨ After 30 seconds, the device automatically switches back to the user-defined layout.



1. User-defined display layout
2. Display of the operating hours and counter reading SSC1.1
3. Display of the highest and lowest measured pressure values

12 Troubleshooting

The device has self-diagnostic capabilities. It monitors itself automatically during operation.

Warnings and errors are shown on the display, even when the display is deactivated.

When multiple diagnostic events occur simultaneously, only the diagnostic message for the event with the highest priority is displayed.

Via IO-Link, you can access additional diagnostic functions.
Go to the description of the IO-Link interface at schmalz.com.

12.1 Warning messages

Display	LED*	Problem	Solution
Title line: Internal temperature (symbol: yellow triangle) Display with reduced brightness.	Switching state displayed by LED1	Internal temperature over 67 °C.	▸ Cool down the device.
Display off. ▸ Activation by pressing a button ⇨ Process value line: Message "Temp. (symbol: thermometer)" for 5 seconds. ⇨ After 10 seconds of inactivity, the display goes off again.	Switching state displayed by LED1	Internal temperature over 80 °C.	▸ Cool down the device.
Display off. ▸ Activation by pressing a button ⇨ Title line: Internal temperature (symbol: yellow triangle) ⇨ After 10 seconds of inactivity, the display goes off again.	Switching state displayed by LED1	Internal temperature over 92 °C.	▸ Cool down the device.
Title line: Over limit (symbol: yellow triangle) Process value line: OL	Switching state displayed by LED1	Measurement range exceeded: Measured value > 105% of the measuring range end value	▸ Check the measuring range (see datasheet).
Title line: Under limit (symbol: yellow triangle) Process value line: UL	Switching state displayed by LED1	Measurement range fallen below: Measured value < -5% of the measurement range starting value	▸ Check the measuring range (see datasheet).
Title line: Locked using buttons Process value line: 🔒	Switching state displayed by LED1	Setting buttons on the device locked; parameter change denied.	▸ Unlock the device using the buttons.

Display	LED*	Problem	Solution
Title line: Locked by system Process value line: 🔒	Switching state displayed by LED1	Setting buttons locked via parameterization software; parameter change denied.	▸ Unlock device via IO-Link interface using parameterization software.
Title line: Locked by com. Process value line:	Switching state displayed by LED1	Parameterization using buttons is locked; parameterization via IO-Link communication is active.	▸ Complete parameterization via IO-Link communication.
Title line: Locator Process value line: IO-Link symbol (flashing green)	Both LEDs flashing	IO-Link function for optical device localization active.	▸ Deactivate optical localization via IO-Link.
Title line: Active simulation symbol: yellow triangle	Switching state displayed by LED1 according to the simulated parameters	Simulation mode is active.	▸ Exit simulation mode.

12.2 Error Messages

Display	LED	Problem	Solution
Display off.	Off	Supply voltage is too low.	▸ Check/correct supply voltage.
Display off. ▸ Activation by pressing a button. ⇨ Title line: Temperature error (symbol: orange triangle) ⇨ After 10 seconds of inactivity, the display goes off again.	Off	Internal temperature over 97 °C. The outputs are deactivated.	▸ Cool down the device.
		Internal device temperature over 102 °C. IO-Link communication is switched off.	▸ Cool down the device.
Title line: ERROR (symbol: red circle with white cross)	LED1 lights up or both LEDs light up	Device defective / hardware error / functional error	▸ Replace the device.
Title line: Parameterization error (symbol: red circle) Process value line: PARA (symbol: red circle with white cross)		Parameterization outside of valid range.	▸ Check parameter settings.
Title line: Short circuit OUTx (symbol: yellow triangle) Process value line: ---	LEDx flashes	Short circuit at OUTx.	▸ Check OUTx for short circuit or overcurrent.
2xdigi. variant only: Title line: Short circuit (symbol: yellow triangle) Process value line: ---	Both LEDs flashing	Short circuit at OUT1 and OUT2.	▸ Check OUT1 and OUT2 for short circuit or overcurrent.

Analog variant: In the event of a fault, output OUT1 is closed (ON) and output OUT2 outputs a defined analog signal; see the chapter "Analog Signal".

2x digital variant: In the event of an error, both inputs are closed (ON).

13 Maintenance and Repair

Device operation is maintenance-free.

The device may only be repaired by the manufacturer.

14 Cleaning the Product

1. For cleaning, do not use aggressive cleaning agents such as industrial alcohol, white spirit or thinners. Only use cleaning agents with a pH between 7 and 12.
2. Remove dirt on the exterior of the device with a soft cloth and soap suds at a maximum temperature of 60° C. Make sure that the silencer in the exhaust outlet is not soaked in soapy water.
3. Ensure that no moisture can reach the electrical connection or other electrical components.

15 Disposing of the Product

The components may only be prepared for disposal by qualified specialists.

1. Dispose of the product properly after replacement or decommissioning.
2. Observe the country-specific guidelines and legal obligations for waste prevention and disposal.

16 EU Declaration of Conformity

The manufacturer Schmalz confirms that the product Vacuum/pressure switch described in these operating instructions fulfills the following applicable EU directives:

2014/30/EU	Electromagnetic Compatibility
2011/65/EU	Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment

The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN 61326-1:2021	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

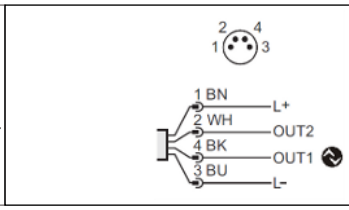
The EU Declaration of Conformity valid at the time of product delivery is delivered with product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.

IO-Link Interface Description

VS_W

EN

Device variant

VS_W **Electronic pressure sensor, -100000...0 Pa / -1000...0 mbar**		

Vendor ID	234 / Bytes 234 (hex: EA)
Device ID	100617 / Bytes 0-1-137-9 (hex: 00-01-89-09)
Bit rate	COM3
Minimum cycle time	0.6 ms
Process Data	4 Bytes (Input 4 Bytes / Output 0 Bytes)
SIO mode supported	Yes
Block parameterization	Yes
Data storage	Yes

Supported profiles

16	/ hex: 0x10	Smart Sensor - SSP 4.1.1
48	/ hex: 0x30	BLOB transfer
16384	/ hex: 0x4000	Identification and Diagnosis
32788	/ hex: 0x8014	Function - Quantity detection
33025	/ hex: 0x8101	Locator
33026	/ hex: 0x8102	Product URI

NOTE:
If the Vendor ID and Device ID are specified in your PLC system, it is ensured that
- the correct device is connected,
- the IO-Link data storage is enabled,
- your application is still able to function, even if your device is replaced by a successor model at a later date

For the process value update rate, as well as further information regarding sensor performance, see data sheet.

Unit conversion

This list provides conversion formulas to convert the transmitted IO-Link raw data into physical units.

Pressure

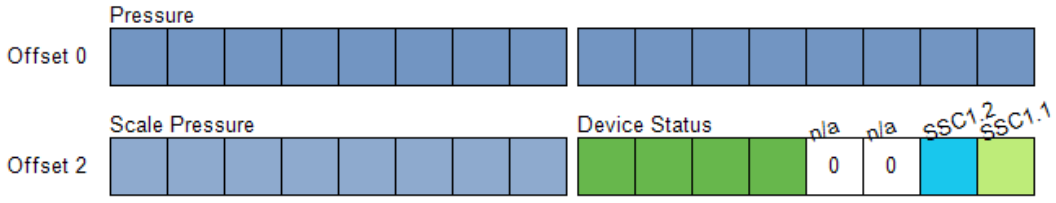
Value in [mbar]	=	Transferred value	*	0.1
Value in [%]	=	Transferred value	*	-0.01
Value in [kgf/cm²]	=	Transferred value	*	0.00010197
Value in [mmHg]	=	Transferred value	*	0.0750064
Value in [kPa]	=	Transferred value	*	0.01

Process data

Process data

Process data input: 4 Bytes
Process data output: 0 Byte

Process data input		RecordT (32 Bit)
Pressure		IntegerT (16 Bit)
Current pressure		
Value range [Pa]	(-10000 to 500) * 10 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC
Device Status		UIntegerT (4 Bit)
Current device status, a copy of the parameter [Device Status, Index 36] in the process data channel		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)
SSC1.2		BooleanT
Current status of the digital signal [SSC1.2]		
Value range	false true	(OFF) (On)
SSC1.1		BooleanT
Current status of the digital signal [SSC1.1]		
Value range	false true	(OFF) (On)



Scale Pressure: A PLC function block calculates the process data (from WORD 0) into the profiled unit [Pa]

Data is transmitted in BigEndian format.
The position of the process data bytes is shown according to the device transmission sequence.
The content ofyour PLCs input buffer may vary according to your PLCs data format.
Please do not apply any byte swap feature.

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Device Access Locks	12		RecordT (16 Bit)	false (Unlocked)	12
Local Parameterizat...	12		BooleanT		
Vendor name	16		StringT (15 Byte)	J. Schmalz GmbH	11
Vendor text	17		StringT (27 Byte)	Innovative Vacuum Solutions	11
Product Name	18		StringT (4 Byte)	VS_W	11
Product ID	19		StringT (4 Byte)	VS_W	11
Product Text	20		StringT (17 Byte)	VS-V-W-D M8-4 IOL	11
Serial Number	21		StringT (12 Byte)		11
Hardware Revision	22		StringT (2 Byte)		11
Firmware Revision	23		StringT (5 Byte)		11
Application-specific Tag	24		StringT (32 Byte)	***	11
Function Tag	25		StringT (32 Byte)	***	11
Location Tag	26		StringT (32 Byte)	***	11
Product URI	27		StringT (100 Byte)		11
Device Status	36		UIntegerT (8 Bit)	0 (Device is OK)	18
Detailed Device Status	37		OctetStringT (3 Byte) [11]	0x00,0x00,0x00	18
Process data input	40		RecordT (32 Bit)		4
Pressure	40		IntegerT (16 Bit)		4
Device Status	40		UIntegerT (4 Bit)		4
SSC1.2	40		BooleanT		4
SSC1.1	40		BooleanT		4
BLOB ID	49		IntegerT (16 Bit)	0 (Idle / Idle)	12
Teach Select	58		UIntegerT (8 Bit)	1 (SSC1.1)	12
Teach Result	59		RecordT (8 Bit)		12
State	59		UIntegerT (4 Bit)		12
SSC1.1 Param	60		RecordT (64 Bit)		12
SP1	60	1	IntegerT (32 Bit)	-7500	12
SP2	60	2	IntegerT (32 Bit)	-6000	12
SSC1.1 Config	61		RecordT (48 Bit)		13
Logic	61	1	UIntegerT (8 Bit)	1 (Low active)	13
Mode	61	2	UIntegerT (8 Bit)	1 (Single point)	13
Hyst	61	3	IntegerT (32 Bit)	1000	13
SSC1.2 Param	62		RecordT (64 Bit)		13
SP1	62	1	IntegerT (32 Bit)	-5500	13
SP2	62	2	IntegerT (32 Bit)	-5000	13
SSC1.2 Config	63		RecordT (48 Bit)		13
Logic	63	1	UIntegerT (8 Bit)	1 (Low active)	13
Mode	63	2	UIntegerT (8 Bit)	1 (Single point)	13
Hyst	63	3	IntegerT (32 Bit)	500	14
SSC1.1 Delay	320		RecordT (32 Bit)		14
Switching delay	320	1	UIntegerT (16 Bit)	0	14
Reset delay	320	2	UIntegerT (16 Bit)	0	14
SSC1.2 Delay	321		RecordT (32 Bit)		14
Switching delay	321	1	UIntegerT (16 Bit)	0	14
Reset delay	321	2	UIntegerT (16 Bit)	0	14

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
SSC Counter	349		RecordT (64 Bit)		14
SSC1.1	349	1	IntegerT (32 Bit)		14
SSC1.2	349	2	IntegerT (32 Bit)		14
P-n	500		UIntegerT (8 Bit)	0 (PnP)	8
dAP.P	510		UIntegerT (16 Bit)	60	14
Media temperature	537		IntegerT (16 Bit)		19
Operating hours	542		IntegerT (32 Bit)		18
Internal temperature	543		IntegerT (16 Bit)		19
Active Events	545		RecordT (32 Bit)		18
Bit_31	545		BooleanT		18
Bit_30	545		BooleanT		18
Bit_16	545		BooleanT		18
Bit_15	545		BooleanT		18
Bit_14	545		BooleanT		18
Bit_9	545		BooleanT		18
Bit_8	545		BooleanT		18
Bit_4	545		BooleanT		18
Bit_2	545		BooleanT		18
Bit_1	545		BooleanT		18
Bit_0	545		BooleanT		18
Param configuration fault	546		UIntegerT (32 Bit) [10]	0 (OK)	19
Loc	550		UIntegerT (8 Bit)	1 (uLoc)	15
uni.P	551		UIntegerT (8 Bit)	1 (mbar)	8
Hi.P	560		IntegerT (16 Bit)		15
Lo.P	561		IntegerT (16 Bit)		15
S.On	570		UIntegerT (8 Bit)	0 (OFF)	15
S.Tim	571		UIntegerT (8 Bit)	2 (3 min)	15
S.PRS	572		IntegerT (16 Bit)	-5000	15
ou1	580		UIntegerT (8 Bit)	32 (SSC1.1)	15
ou2	590		UIntegerT (8 Bit)	33 (SSC1.2)	16
diS.U	800		UIntegerT (8 Bit)	1 (d2 / medium)	16
diS.R	801		UIntegerT (8 Bit)	0 (0 °)	16
diS.B	802		UIntegerT (8 Bit)	100 (100 %)	16
diS.L	803		UIntegerT (8 Bit)	4 (Bargraph SSC1.1)	16
coL.P	810		UIntegerT (8 Bit)	16 (bk/wh / Value black and white)	16
uni.T	841		UIntegerT (8 Bit)	0 (°C)	8
LanG	923		UIntegerT (8 Bit)	0 (EN)	8
Bargraph start	936		IntegerT (32 Bit)	0	16
Bargraph end	937		IntegerT (32 Bit)	-10000	17
coF	5001		IntegerT (16 Bit)	0	17
HIPS	5003		IntegerT (16 Bit)		19
HIPC	5004		UIntegerT (32 Bit)	0	19
MDC Descriptor	16512		RecordT (88 Bit)		17
Lower Value	16512		IntegerT (32 Bit)	-10000 (-10000)	17
Upper Value	16512		IntegerT (32 Bit)	0 (0)	17

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Unit Code	16512		UIntegerT (16 Bit)	1130 (Pa)	17
Scale	16512		IntegerT (8 Bit)	1 (1)	17

Basic settings

P-n	Index 500	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output polarity for the switching outputs.				
Factory setting	**0**	**(PnP)**		
Value range	0 1	(PnP) (nPn)		

uni.P	Index 551	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of pressure unit.				
Factory setting	**1**	**(mbar)**		
Value range	0 1 2 3 4	(kPa) (mbar) (mmHg) (kgf/cm²) (%)		

uni.T	Index 841	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of temperature unit.				
Factory setting	**0**	**(°C)**		
Value range	0	(°C)		

LanG	Index 923	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Select device menu language.				
Factory setting	**0**	**(EN)**		
Value range	0 1 2 3 4 5 6 7 9	(EN) (DE) (IT) (FR) (ES) (PT) (JA) (KO) (ZH)		

System Command

Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

System Command information:
- Address: Index 2, Subindex 0
- Datatype: UInteger (8 Bit)
- AccessRight: Write Only

#	Text	Description
1	Upload Start	Start block parameter upload
2	Upload End	End block parameter upload
3	Download Start	Start block parameter download
4	Download End	Stop block parameter download
5	Store	Finalize block parameterization and start Data Storage
6	Break	Cancel block parameterization
65	Teach SP1	Determine setpoint 1 in a single teach procedure.
66	Teach SP2	Determine setpoint 2 in a single teach procedure.
126	Locator Start	The visual indicators of the device are switched to the localization display pattern, which makes it easier to spot a device in an application.
127	Locator Stop	The localization indication pattern is stopped. The optical indicators of the device will show again the device specific states of operation.
129	Application Reset	The parameter of the technology-specific application are set to default values. Identification parameter remain unchanged. An upload to the data storage of the master will be executed, if activated in the port configuration of the master.
131	Back-to-box	The parameter of the device are set to factory default values and communication will be inhibited until the next power cycle. Note: Directly detach the device from the master port!
161	Reset [Hi.P] and [Lo.P] memory	
162	Reset [Lo.P] memory	
163	Reset [Hi.P] memory	
169	Reset overload counter [HIPC]	
175	BLOB-Reset / Event Log	

System Command

176	Start simulation	
177	Stop simulation	
194	Teach tcoF	Teaches the zero-point offset. Command will be rejected, if current process data is out of range of parameter coF
228	Reset counter to zero	
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	

Identification

Vendor name	Index 16	Subindex 0	StringT (15 Byte)	ReadOnly
The vendor name that is assigned to a Vendor ID.				
Factory setting	**J. Schmalz GmbH**			

Vendor text	Index 17	Subindex 0	StringT (27 Byte)	ReadOnly
Additional information about the vendor.				
Factory setting	**Innovative Vacuum Solutions**			

Product Name	Index 18	Subindex 0	StringT (4 Byte)	ReadOnly
Complete product name.				
Factory setting	**VS_W**			

Product ID	Index 19	Subindex 0	StringT (4 Byte)	ReadOnly
Vendor-specific product or type identification (e.g., item number or model number).				
Factory setting	**VS_W**			

Product Text	Index 20	Subindex 0	StringT (17 Byte)	ReadOnly
Additional product information for the device.				
Factory setting	**VS-V-W-D M8-4 IOL**			

Serial Number	Index 21	Subindex 0	StringT (12 Byte)	ReadOnly
Unique, vendor-specific identifier of the individual device.				

Hardware Revision	Index 22	Subindex 0	StringT (2 Byte)	ReadOnly
Unique, vendor-specific identifier of the hardware revision of the individual device.				

Firmware Revision	Index 23	Subindex 0	StringT (5 Byte)	ReadOnly
Unique, vendor-specific identifier of the firmware revision of the individual device.				

Application-specific Tag	Index 24	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with user- or application-specific information.				
Factory setting	***			

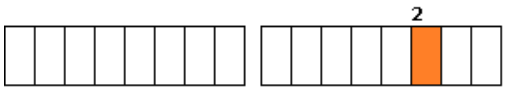
Function Tag	Index 25	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with function-specific information.				
Factory setting	***			

Location Tag	Index 26	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with location-specific information.				
Factory setting	***			

Product URI	Index 27	Subindex 0	StringT (100 Byte)	ReadOnly
Provides a unique instance identification compliant to DIN-SPEC 91406.				

Parameters

Device Access Locks	Index 12	Subindex 0	RecordT (16 Bit)	ReadWrite
The access to the device parameters can be restricted by setting appropriate flags within this parameter.				
Factory setting	**false**			
Bit offset 2	Local Parameterization	This lock prevents the device settings from being changed via local operating elements on the device.		
Value range	true	(Locked)		
	false	(Unlocked)		



BLOB ID	Index 49	Subindex 0	IntegerT (16 Bit)	ReadOnly
ID of the BLOB that is currently transferred.				
Factory setting	**0**	**(Idle / Idle)**		
Value range	0 -5001	(Idle / Idle) (Read_Event-Log / Read event log)		

Teach Select	Index 58	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selects the switching signal channel for which a teach procedure will be applied.				
Factory setting	**1**	**(SSC1.1)**		
Value range	1 2	(SSC1.1) (SSC1.2)		

Teach Result	Index 59	Subindex 0	RecordT (8 Bit)	ReadOnly
Shows the complete result information of the teach procedure including current state and result flags.				
State		Bit offset 0	UIntegerT (4 Bit)	
Indicates the current state of the teach procedure.				
Value range	0 1 2 5 7	(Idle / Idle) (SP1 success) (SP2 success) (Busy / Busy) (Error / Error)		

SSC1.1 Param	Index 60	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1 of sensor 1.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	**-7500**			
Value range [Pa]	(-10000 to 0) * 10			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	**-6000**			
Value range [Pa]	(-10000 to 0) * 10			

Parameters

SSC1.1 Config	Index 61	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	**1**	**(Low active)**		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	**1**	**(Single point)**		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	**1000**			
Value range [Pa]	(20 to 1000) * 10 0	 (Auto)		

SSC1.2 Param	Index 62	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 1.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	**-5500**			
Value range [Pa]	(-10000 to 0) * 10			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	**-5000**			
Value range [Pa]	(-10000 to 0) * 10			

SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	**1**	**(Low active)**		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	**1**	**(Single point)**		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		

Parameters

SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	**500**			
Value range [Pa]	(20 to 1000) * 10 0	(Auto)		

SSC1.1 Delay	Index 320	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.1.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			

SSC1.2 Delay	Index 321	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.2.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			

SSC Counter	Index 349	Subindex 0	RecordT (64 Bit)	ReadOnly
Available switching signal counters. Counts the SSC transitions from 0 to 1.				
SSC1.1		Subindex 1	IntegerT (32 Bit)	
SSC1.1 counter				
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC1.2		Subindex 2	IntegerT (32 Bit)	
SSC1.2 counter				
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		

dAP.P	Index 510	Subindex 0	UIntegerT (16 Bit)	ReadWrite
Damping of the pressure signal.				
Factory setting	**60**			
Value range [s]	(0 to 4000) * 0.001			

Parameters

Loc	Index 550	Subindex 0	UIntegerT (8 Bit)	ReadWrite
[Loc] locks the local user interface to prevent unintentional changes, [Loc] is resettable at the device.				
Factory setting	**1**	**(uLoc)**		
Value range	0 1	(Loc) (uLoc)		

Hi.P	Index 560	Subindex 0	IntegerT (16 Bit)	ReadOnly
Maximum memory value for pressure.				
Value range [Pa]	(-10000 to 500) * 10 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC		

Lo.P	Index 561	Subindex 0	IntegerT (16 Bit)	ReadOnly
Minimum memory value for pressure.				
Value range [Pa]	(-10000 to 500) * 10 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC		

S.On	Index 570	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Simulation state.				
Factory setting	**0**	**(OFF)**		
Value range	0 1	(OFF) (On)		

S.Tim	Index 571	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Simulation duration.				
Factory setting	**2**	**(3 min)**		
Value range	0 1 2 3 4 5 6 7 8 9 10	(1 min) (2 min) (3 min) (4 min) (5 min) (10 min) (15 min) (20 min) (30 min) (45 min) (60 min)		

S.PRS	Index 572	Subindex 0	IntegerT (16 Bit)	ReadWrite
Simulation of pressure.				
Factory setting	**-5000**			
Value range [Pa]	(-10000 to 500) * 10 32760 32764	 (OL - overload) 0x7FF8 (Err) 0x7FFC		

ou1	Index 580	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 1].				
Factory setting	**32**	**(SSC1.1)**		
Value range	32 16	(SSC1.1) (OFF / Output Off)		

Parameters

ou2	Index 590	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 2].				
Factory setting	**33**	**(SSC1.2)**		
Value range	33 16	(SSC1.2) (OFF / Output Off)		

diS.U	Index 800	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display update rate.				
Factory setting	**1**	**(d2 / medium)**		
Value range	0 1 2	(d1 / fast) (d2 / medium) (d3 / slow)		

diS.R	Index 801	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display rotation clockwise.				
Factory setting	**0**	**(0 °)**		
Value range	0 1 2 3	(0 °) (90 °) (180 °) (270 °)		

diS.B	Index 802	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display brightness.				
Factory setting	**100**	**(100 %)**		
Value range	25 50 75 100 0	(25 %) (50 %) (75 %) (100 %) (OFF)		

diS.L	Index 803	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current layout of the display.				
Factory setting	**4**	**(Bargraph SSC1.1)**		
Value range	0 1 2 3 4 5 6 7	(PV) (App.Spec.Tag) (SSC1.1-Param_SP1) (SSC1.1-Param_SP2) (Bargraph SSC1.1) (SSC Counter1) (Hi.P) (Lo.P)		

coL.P	Index 810	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Colour configuration pressure.				
Factory setting	**16**	**(bk/wh / Value black and white)**		
Value range	16 4 5	(bk/wh / Value black and white) (r1ou / Value red when OUT1 switches) (G1ou / Value green when OUT1 switches)		

Bargraph start	Index 936	Subindex 0	IntegerT (32 Bit)	ReadWrite
Start of the bargraph scaling.				
Factory setting	**0**			
Value range [Pa]	(-9980 to 0) * 10			

Parameters

Bargraph end	Index 937	Subindex 0	IntegerT (32 Bit)	ReadWrite
End of the bargraph scaling.				
Factory setting	**-10000**			
Value range [Pa]	(-10000 to -20) * 10			

coF	Index 5001	Subindex 0	IntegerT (16 Bit)	ReadWrite
Zero-point calibration (Calibration offset) .				
Factory setting	**0**			
Value range [%]	(-500 to 500) * 0.01			

MDC Descriptor	Index 16512	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel (process data MV).				
Lower Value		Bit offset 56	IntegerT (32 Bit)	
Shows the lower value of measurement range.				
Factory setting	**-10000**	**(-10000)**		
Value range	-10000	(-10000)		
Upper Value		Bit offset 24	IntegerT (32 Bit)	
Shows the upper value of measurement range.				
Factory setting	**0**	**(0)**		
Value range	0	(0)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
Factory setting	**1130**	**(Pa)**		
Value range	1130	(Pa)		
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - 10exp(scale).				
Factory setting	**1**	**(1)**		
Value range	1	(1)		

Diagnosis

Device Status	Index 36	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Indicator for the current device condition and diagnosis state.				
Factory setting	**0**	**(Device is OK)**		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)		

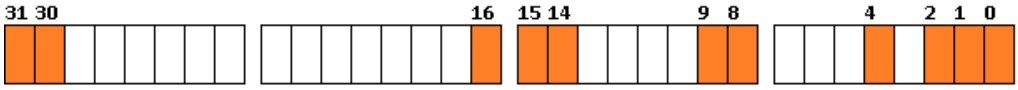
Detailed Device Status	Index 37	Subindex 0	OctetStringT (3 Byte) [11]	ReadOnly
List of all currently pending events in the device.				
Factory setting	**0x00,0x00,0x00**			

Operating hours	Index 542	Subindex 0	IntegerT (32 Bit)	ReadOnly
Counter of the operating hours since delivery.				
Value range [h]	(0 to 2147482880) * 1 2147483644	(NoData) 0x7FFFFFFC		

Active Events	Index 545	Subindex 0	RecordT (32 Bit)	ReadOnly
Bit mask for current pending events.				

Bit offset 31	(0x8DFF)	Test Event 2. Device Status = 1 (Maintenance required)
Bit offset 30	(0x8DFE)	Test Event 1. Device Status = 1 (Maintenance required)
Bit offset 16	(0x8C01)	Simulation active
Bit offset 15	(0x4210)	Device temperature overrun
Bit offset 14	(0x4220)	Device temperature underrun
Bit offset 9	(0x8C30)	Process variable range underrun
Bit offset 8	(0x8C10)	Process variable range overrun
Bit offset 4	(0x4000)	Temperature fault
Bit offset 2	(0x7710)	Short circuit
Bit offset 1	(0x6320)	Parameter error
Bit offset 0	(0x5000)	Device hardware fault

Value range	true	Event active
	false	Event inactive



Diagnosis

Param configuration fault	Index 546	Subindex 0	UIntegerT (32 Bit) [10]	ReadOnly
Displays the incorrectly set parameters.				
Factory setting	**0**	**(OK)**		
Value range	0	(OK)		
	786432	(Device Access Locks, Index = 12)		
	38010880	(ou1, Index = 580)		
	36110336	(uni.P, Index = 551)		
	33423360	(dAP.P, Index = 510)		
	32768000	(P-n, Index = 500)		
	327745536	(coF, Index = 5001)		
	37486592	(S.PRS, Index = 572)		
	37421056	(S.Tim, Index = 571)		
	60489728	(LanG, Index = 923)		
	52494336	(diS.R, Index = 801)		
	52559872	(diS.B, Index = 802)		
	52625408	(diS.L, Index = 803)		
	61341696	(Bargraph start, Index = 936)		
	61407232	(Bargraph end, Index = 937)		
	53084160	(coL.P, Index = 810)		
	52428800	(diS.U, Index = 800)		
	38666240	(ou2, Index = 590)		
	327876608	(HIPS, Index = 5003)		
	36044800	(Loc, Index = 550)		
	3997696	(SSC1.1 Config, Index = 61)		
	3997697	(SSC1.1 Config, Index = 61, Subindex = 1)		
	3997698	(SSC1.1 Config, Index = 61, Subindex = 2)		
	3997699	(SSC1.1 Config, Index = 61, Subindex = 3)		
	20971520	(SSC1.1 Delay, Index = 320)		
	20971521	(SSC1.1 Delay, Index = 320, Subindex = 1)		
	20971522	(SSC1.1 Delay, Index = 320, Subindex = 2)		
	3932160	(SSC1.1 Param, Index = 60)		
	3932161	(SSC1.1 Param, Index = 60, Subindex = 1)		
	3932162	(SSC1.1 Param, Index = 60, Subindex = 2)		
	4128768	(SSC1.2 Config, Index = 63)		
	4128769	(SSC1.2 Config, Index = 63, Subindex = 1)		
	4128770	(SSC1.2 Config, Index = 63, Subindex = 2)		
	4128771	(SSC1.2 Config, Index = 63, Subindex = 3)		
	21037056	(SSC1.2 Delay, Index = 321)		
	21037057	(SSC1.2 Delay, Index = 321, Subindex = 1)		
	21037058	(SSC1.2 Delay, Index = 321, Subindex = 2)		
	4063232	(SSC1.2 Param, Index = 62)		
	4063233	(SSC1.2 Param, Index = 62, Subindex = 1)		
	4063234	(SSC1.2 Param, Index = 62, Subindex = 2)		
	3801088	(Teach Select, Index = 58)		
	55115776	(uni.T, Index = 841)		

HIPC	Index 5004	Subindex 0	UIntegerT (32 Bit)	ReadOnly
Pressure overload counter.				
Factory setting	**0**			
Value range	(0 to 4294967295) * 1			

HIPS	Index 5003	Subindex 0	IntegerT (16 Bit)	ReadWrite
Configuration of pressure overload counter switch point.				
Value range [Pa]	(-10000 to 500) * 10			

Internal temperature	Index 543	Subindex 0	IntegerT (16 Bit)	ReadOnly
Current internal temperature of the device.				
Value range [°C]	(0 to 92) * 1			
	-32760	(UL - underload) 0x8008		
	32760	(OL - overload) 0x7FF8		
	32764	(NoData) 0x7FFC		

Media temperature	Index 537	Subindex 0	IntegerT (16 Bit)	ReadOnly
Current media temperature.				
Value range [°C]	(0 to 60) * 1			
	-32760	(UL - underload) 0x8008		
	32760	(OL - overload) 0x7FF8		
	32764	(NoData) 0x7FFC		

Events

Code	Device status	PQ *	Class	Name	Description
0x4000 16384d	3 (Functional check)	valid	Error	Temperature fault	Overload
0x4210 16912d	2 (Out of specification)	valid	Warning	Device temperature overrun	Clear source of heat
0x4220 16928d	2 (Out of specification)	valid	Warning	Device temperature underrun	Insulate device
0x5000 20480d	4 (Failure)	invalid	Error	Device hardware fault	Exchange device
0x6320 25376d	3 (Functional check)	invalid	Error	Parameter error	Check datasheet and values
0x7710 30480d	3 (Functional check)	valid	Error	Short circuit	Check installation
0x8C01 35841d	3 (Functional check)	valid	Warning	Simulation active	Check operating mode
0x8C10 35856d	2 (Out of specification)	valid	Warning	Process variable range overrun	Process data uncertain
0x8C30 35888d	2 (Out of specification)	valid	Warning	Process variable range underrun	Process data uncertain
0x8DFE 36350d	1 (Maintenance required)	valid	Warning	Test Event 1. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
0x8DFF 36351d	1 (Maintenance required)	valid	Warning	Test Event 2. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243

Events are reported by the device itself to signal irregular device states.
PQ* = Process data quality.

Error types

Code	Name	Description
0x8000 32768d	Device application error - no details	Service was denied by the technology-specific application. No detailed root-cause information is available.
0x8011 32785d	Index not available	Read or write access attempt to a non-existing index.
0x8012 32786d	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
0x8020 32800d	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
0x8021 32801d	Service temporarily unavailable - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
0x8022 32802d	Service temporarily unavailable - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
0x8023 32803d	Access denied	Write access to a read-only parameter or read access to write-only parameter.
0x8030 32816d	Parameter value out of range	Written parameter value is outside of the permitted value range.
0x8031 32817d	Parameter value above limit	Written parameter value is above its specified value range.
0x8032 32818d	Parameter value below limit	Written parameter value is below its specified value range.
0x8033 32819d	Parameter length overrun	Written parameter is longer than specified.
0x8034 32820d	Parameter length underrun	Written parameter is shorter than specified.
0x8035 32821d	Function unavailable	Written command is not supported by the technology-specific application.
0x8036 32822d	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
0x8040 32832d	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
0x8041 32833d	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.
0x8082 32898d	Application not ready	Read or write access denied. The technology-specific application is temporarily unavailable.

Error types are used for the ISDU response. Values unequal to '0' indicate the cause of a failed ISDU read or write procedure.

ErrorTypes

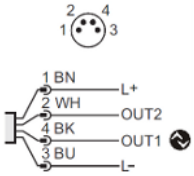
The table shows all IO-Link ISDU error codes.
The device does not need to support all listed error types.

IO-Link Interface Description

VS_W

EN

Device variant

VS_W **Electronic pressure sensor, -100000...1000000 Pa / -1.00...10.00 bar**		

Vendor ID	234 / Bytes 234 (hex: EA)		
Device ID	100618 / Bytes 0-1-137-10 (hex: 00-01-89-0A)		
Bit rate	COM3		
Minimum cycle time	0.6 ms		
Process Data	4 Bytes (Input 4 Bytes / Output 0 Bytes)		
SIO mode supported	Yes		
Block parameterization	Yes		
Data storage	Yes		
Supported profiles	16	/ hex: 0x10	Smart Sensor - SSP 4.1.1
	48	/ hex: 0x30	BLOB transfer
	16384	/ hex: 0x4000	Identification and Diagnosis
	32788	/ hex: 0x8014	Function - Quantity detection
	33025	/ hex: 0x8101	Locator
	33026	/ hex: 0x8102	Product URI

NOTE:
If the Vendor ID and Device ID are specified in your PLC system, it is ensured that
- the correct device is connected,
- the IO-Link data storage is enabled,
- your application is still able to function, even if your device is replaced by a successor model at a later date

For the process value update rate, as well as further information regarding sensor performance, see data sheet.

Unit conversion

This list provides conversion formulas to convert the transmitted IO-Link raw data into physical units.

Pressure

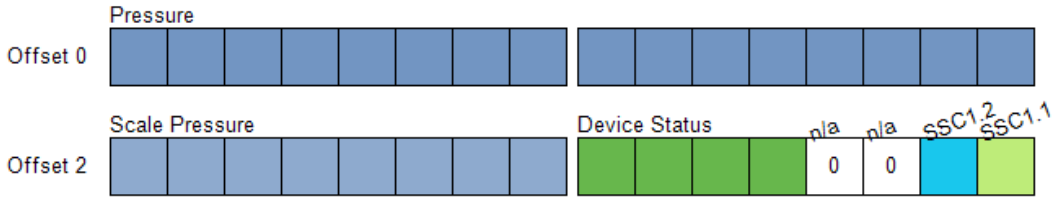
Value in [bar]	=	Transferred value	*	0.001
Value in [kgf/cm²]	=	Transferred value	*	0.00101972
Value in [mmHg]	=	Transferred value	*	0.750064
Value in [MPa]	=	Transferred value	*	0.0001

Process data

Process data

Process data input: 4 Bytes
Process data output: 0 Byte

Process data input		RecordT (32 Bit)
Pressure		IntegerT (16 Bit)
Current pressure		
Value range [Pa]	(-1000 to 10500) * 100 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC
Device Status		UIntegerT (4 Bit)
Current device status, a copy of the parameter [Device Status, Index 36] in the process data channel		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)
SSC1.2		BooleanT
Current status of the digital signal [SSC1.2]		
Value range	false true	(OFF) (On)
SSC1.1		BooleanT
Current status of the digital signal [SSC1.1]		
Value range	false true	(OFF) (On)



Scale Pressure: A PLC function block calculates the process data (from WORD 0) into the profiled unit [Pa]

Data is transmitted in BigEndian format.
The position of the process data bytes is shown according to the device transmission sequence.
The content ofyour PLCs input buffer may vary according to your PLCs data format.
Please do not apply any byte swap feature.

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
Device Access Locks	12		RecordT (16 Bit)	false (Unlocked)	12
Local Parameterizat...	12		BooleanT		
Vendor name	16		StringT (15 Byte)	J. Schmalz GmbH	11
Vendor text	17		StringT (27 Byte)	Innovative Vacuum Solutions	11
Product Name	18		StringT (4 Byte)	VS_W	11
Product ID	19		StringT (4 Byte)	VS_W	11
Product Text	20		StringT (20 Byte)	VS-VP10-W-D M8-4 IOL	11
Serial Number	21		StringT (12 Byte)		11
Hardware Revision	22		StringT (2 Byte)		11
Firmware Revision	23		StringT (5 Byte)		11
Application-specific Tag	24		StringT (32 Byte)	***	11
Function Tag	25		StringT (32 Byte)	***	11
Location Tag	26		StringT (32 Byte)	***	11
Product URI	27		StringT (100 Byte)		11
Device Status	36		UIntegerT (8 Bit)	0 (Device is OK)	19
Detailed Device Status	37		OctetStringT (3 Byte) [11]	0x00,0x00,0x00	19
Process data input	40		RecordT (32 Bit)		4
Pressure	40		IntegerT (16 Bit)		4
Device Status	40		UIntegerT (4 Bit)		4
SSC1.2	40		BooleanT		4
SSC1.1	40		BooleanT		4
BLOB ID	49		IntegerT (16 Bit)	0 (Idle / Idle)	12
Teach Select	58		UIntegerT (8 Bit)	1 (SSC1.1)	12
Teach Result	59		RecordT (8 Bit)		12
State	59		UIntegerT (4 Bit)		12
SSC1.1 Param	60		RecordT (64 Bit)		12
SP1	60	1	IntegerT (32 Bit)	5500	12
SP2	60	2	IntegerT (32 Bit)	5000	12
SSC1.1 Config	61		RecordT (48 Bit)		13
Logic	61	1	UIntegerT (8 Bit)	0 (High active)	13
Mode	61	2	UIntegerT (8 Bit)	1 (Single point)	13
Hyst	61	3	IntegerT (32 Bit)	500	13
SSC1.2 Param	62		RecordT (64 Bit)		13
SP1	62	1	IntegerT (32 Bit)	5000	13
SP2	62	2	IntegerT (32 Bit)	4500	13
SSC1.2 Config	63		RecordT (48 Bit)		13
Logic	63	1	UIntegerT (8 Bit)	0 (High active)	13
Mode	63	2	UIntegerT (8 Bit)	1 (Single point)	13
Hyst	63	3	IntegerT (32 Bit)	500	14
SSC1.1 Delay	320		RecordT (32 Bit)		14
Switching delay	320	1	UIntegerT (16 Bit)	0	14
Reset delay	320	2	UIntegerT (16 Bit)	0	14
SSC1.2 Delay	321		RecordT (32 Bit)		14
Switching delay	321	1	UIntegerT (16 Bit)	0	14
Reset delay	321	2	UIntegerT (16 Bit)	0	14

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
SSC Counter	349		RecordT (64 Bit)		14
SSC1.1	349	1	IntegerT (32 Bit)		14
SSC1.2	349	2	IntegerT (32 Bit)		14
P-n	500		UIntegerT (8 Bit)	0 (PnP)	8
dAP.P	510		UIntegerT (16 Bit)	60	14
dAA	512		UIntegerT (16 Bit)	6	15
Media temperature	537		IntegerT (16 Bit)		21
Operating hours	542		IntegerT (32 Bit)		19
Internal temperature	543		IntegerT (16 Bit)		20
Active Events	545		RecordT (32 Bit)		19
Bit_31	545		BooleanT		19
Bit_30	545		BooleanT		19
Bit_16	545		BooleanT		19
Bit_15	545		BooleanT		19
Bit_14	545		BooleanT		19
Bit_9	545		BooleanT		19
Bit_8	545		BooleanT		19
Bit_4	545		BooleanT		19
Bit_2	545		BooleanT		19
Bit_1	545		BooleanT		19
Bit_0	545		BooleanT		19
Param configuration fault	546		UIntegerT (32 Bit) [10]	0 (OK)	20
Loc	550		UIntegerT (8 Bit)	1 (uLoc)	15
uni.P	551		UIntegerT (8 Bit)	1 (bar)	8
Hi.P	560		IntegerT (16 Bit)		15
Lo.P	561		IntegerT (16 Bit)		15
S.On	570		UIntegerT (8 Bit)	0 (OFF)	15
S.Tim	571		UIntegerT (8 Bit)	2 (3 min)	15
S.PRS	572		IntegerT (16 Bit)	5000	15
ou1	580		UIntegerT (8 Bit)	32 (SSC1.1)	16
ou2	590		UIntegerT (8 Bit)	2 (U / Analog signal 0...10 V)	16
ASP2	630		IntegerT (16 Bit)	-1000	16
AEP2	631		IntegerT (16 Bit)	10000	16
diS.U	800		UIntegerT (8 Bit)	1 (d2 / medium)	16
diS.R	801		UIntegerT (8 Bit)	0 (0 °)	16
diS.B	802		UIntegerT (8 Bit)	100 (100 %)	16
diS.L	803		UIntegerT (8 Bit)	4 (Bargraph SSC1.1)	17
coL.P	810		UIntegerT (8 Bit)	16 (bk/wh / Value black and white)	17
uni.T	841		UIntegerT (8 Bit)	0 (°C)	8
LanG	923		UIntegerT (8 Bit)	0 (EN)	8
Bargraph start	936		IntegerT (32 Bit)	-1000	17
Bargraph end	937		IntegerT (32 Bit)	10000	17
coF	5001		IntegerT (16 Bit)	0	17
HIPS	5003		IntegerT (16 Bit)	10000	20
HIPC	5004		UIntegerT (32 Bit)	0	20

Parameter overview

Parameter	Index	Subindex	Type	Factory setting	Page
MDC Descriptor	16512		RecordT (88 Bit)		17
Lower Value	16512		IntegerT (32 Bit)	-1000 (-1000)	17
Upper Value	16512		IntegerT (32 Bit)	10000 (10000)	17
Unit Code	16512		UIntegerT (16 Bit)	1130 (Pa)	17
Scale	16512		IntegerT (8 Bit)	2 (2)	18

Basic settings

P-n	Index 500	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output polarity for the switching outputs.				
Factory setting	**0**	**(PnP)**		
Value range	0 1	(PnP) (nPn)		

uni.P	Index 551	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of pressure unit.				
Factory setting	**1**	**(bar)**		
Value range	0 1 2 3	(MPa) (bar) (mmHg) (kgf/cm²)		

uni.T	Index 841	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selection of temperature unit.				
Factory setting	**0**	**(°C)**		
Value range	0	(°C)		

LanG	Index 923	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Select device menu language.				
Factory setting	**0**	**(EN)**		
Value range	0 1 2 3 4 5 6 7 9	(EN) (DE) (IT) (FR) (ES) (PT) (JA) (KO) (ZH)		

System Command

Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

System Command information:
- Address: Index 2, Subindex 0
- Datatype: UInteger (8 Bit)
- AccessRight: Write Only

#	Text	Description
1	Upload Start	Start block parameter upload
2	Upload End	End block parameter upload
3	Download Start	Start block parameter download
4	Download End	Stop block parameter download
5	Store	Finalize block parameterization and start Data Storage
6	Break	Cancel block parameterization
65	Teach SP1	Determine setpoint 1 in a single teach procedure.
66	Teach SP2	Determine setpoint 2 in a single teach procedure.
126	Locator Start	The visual indicators of the device are switched to the localization display pattern, which makes it easier to spot a device in an application.
127	Locator Stop	The localization indication pattern is stopped. The optical indicators of the device will show again the device specific states of operation.
129	Application Reset	The parameter of the technology-specific application are set to default values. Identification parameter remain unchanged. An upload to the data storage of the master will be executed, if activated in the port configuration of the master.
131	Back-to-box	The parameter of the device are set to factory default values and communication will be inhibited until the next power cycle. Note: Directly detach the device from the master port!
161	Reset [Hi.P] and [Lo.P] memory	
162	Reset [Lo.P] memory	
163	Reset [Hi.P] memory	
169	Reset overload counter [HIPC]	
175	BLOB-Reset / Event Log	

System Command

176	Start simulation	
177	Stop simulation	
194	Teach tcoF	Teaches the zero-point offset. Command will be rejected, if current process data is out of range of parameter coF
228	Reset counter to zero	
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	

Identification

Vendor name	Index 16	Subindex 0	StringT (15 Byte)	ReadOnly
The vendor name that is assigned to a Vendor ID.				
Factory setting	**J. Schmalz GmbH**			

Vendor text	Index 17	Subindex 0	StringT (27 Byte)	ReadOnly
Additional information about the vendor.				
Factory setting	**Innovative Vacuum Solutions**			

Product Name	Index 18	Subindex 0	StringT (4 Byte)	ReadOnly
Complete product name.				
Factory setting	**VS_W**			

Product ID	Index 19	Subindex 0	StringT (4 Byte)	ReadOnly
Vendor-specific product or type identification (e.g., item number or model number).				
Factory setting	**VS_W**			

Product Text	Index 20	Subindex 0	StringT (20 Byte)	ReadOnly
Additional product information for the device.				
Factory setting	**VS-VP10-W-D M8-4 IOL**			

Serial Number	Index 21	Subindex 0	StringT (12 Byte)	ReadOnly
Unique, vendor-specific identifier of the individual device.				

Hardware Revision	Index 22	Subindex 0	StringT (2 Byte)	ReadOnly
Unique, vendor-specific identifier of the hardware revision of the individual device.				

Firmware Revision	Index 23	Subindex 0	StringT (5 Byte)	ReadOnly
Unique, vendor-specific identifier of the firmware revision of the individual device.				

Application-specific Tag	Index 24	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with user- or application-specific information.				
Factory setting	***			

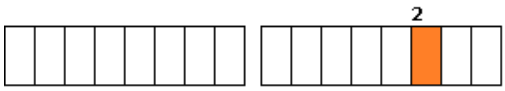
Function Tag	Index 25	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with function-specific information.				
Factory setting	***			

Location Tag	Index 26	Subindex 0	StringT (32 Byte)	ReadWrite
Possibility to mark a device with location-specific information.				
Factory setting	***			

Product URI	Index 27	Subindex 0	StringT (100 Byte)	ReadOnly
Provides a unique instance identification compliant to DIN-SPEC 91406.				

Parameters

Device Access Locks	Index 12	Subindex 0	RecordT (16 Bit)	ReadWrite
The access to the device parameters can be restricted by setting appropriate flags within this parameter.				
Factory setting	**false**			
Bit offset 2	Local Parameterization	This lock prevents the device settings from being changed via local operating elements on the device.		
Value range	true	(Locked)		
	false	(Unlocked)		



BLOB ID	Index 49	Subindex 0	IntegerT (16 Bit)	ReadOnly
ID of the BLOB that is currently transferred.				
Factory setting	**0**	**(Idle / Idle)**		
Value range	0 -5001	(Idle / Idle) (Read_Event-Log / Read event log)		

Teach Select	Index 58	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Selects the switching signal channel for which a teach procedure will be applied.				
Factory setting	**1**	**(SSC1.1)**		
Value range	1 2	(SSC1.1) (SSC1.2)		

Teach Result	Index 59	Subindex 0	RecordT (8 Bit)	ReadOnly
Shows the complete result information of the teach procedure including current state and result flags.				
State		Bit offset 0	UIntegerT (4 Bit)	
Indicates the current state of the teach procedure.				
Value range	0 1 2 5 7	(Idle / Idle) (SP1 success) (SP2 success) (Busy / Busy) (Error / Error)		

SSC1.1 Param	Index 60	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 1 of sensor 1.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	**5500**			
Value range [Pa]	(-1000 to 10000) * 100			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	**5000**			
Value range [Pa]	(-1000 to 10000) * 100			

Parameters

SSC1.1 Config	Index 61	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 1 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	**0**	**(High active)**		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	**1**	**(Single point)**		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	**500**			
Value range [Pa]	(20 to 1000) * 100 0	 (Auto)		

SSC1.2 Param	Index 62	Subindex 0	RecordT (64 Bit)	ReadWrite
Defines the setpoint values for switching signal channel 2 of sensor 1.				
SP1		Subindex 1	IntegerT (32 Bit)	
Defines the setpoint 1 value for the switching signal channel.				
Factory setting	**5000**			
Value range [Pa]	(-1000 to 10000) * 100			
SP2		Subindex 2	IntegerT (32 Bit)	
Defines the setpoint 2 value for the switching signal channel.				
Factory setting	**4500**			
Value range [Pa]	(-1000 to 10000) * 100			

SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Defines the configuration parameter for switching signal channel 2 of sensor 1.				
Logic		Subindex 1	UIntegerT (8 Bit)	
Defines the logical representation of the switching signal SSC in the process data.				
Factory setting	**0**	**(High active)**		
Value range	0 1	(High active) (Low active)		
Mode		Subindex 2	UIntegerT (8 Bit)	
Defines the evaluation mode for the switching signal SSC.				
Factory setting	**1**	**(Single point)**		
Value range	0 1 2 3	(Deactivated) (Single point) (Window) (Two point)		

Parameters

SSC1.2 Config	Index 63	Subindex 0	RecordT (48 Bit)	ReadWrite
Hyst		Subindex 3	IntegerT (32 Bit)	
Defines the hysteresis at the switchpoint. A higher hysteresis may help to increase stability in critical applications.				
Factory setting	**500**			
Value range [Pa]	(20 to 1000) * 100 0	(Auto)		

SSC1.1 Delay	Index 320	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.1.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			

SSC1.2 Delay	Index 321	Subindex 0	RecordT (32 Bit)	ReadWrite
Delays for the switching signal channel 1.2.				
Switching delay		Subindex 1	UIntegerT (16 Bit)	
Set delay time for the switching.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			
Reset delay		Subindex 2	UIntegerT (16 Bit)	
Set delay time for the reset.				
Factory setting	**0**			
Value range [s]	(0 to 9999) * 0.01			

SSC Counter	Index 349	Subindex 0	RecordT (64 Bit)	ReadOnly
Available switching signal counters. Counts the SSC transitions from 0 to 1.				
SSC1.1		Subindex 1	IntegerT (32 Bit)	
SSC1.1 counter				
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		
SSC1.2		Subindex 2	IntegerT (32 Bit)	
SSC1.2 counter				
Value range	(0 to 2147482880) 2147483644	(NoData) 0x7FFFFFFC		

dAP.P	Index 510	Subindex 0	UIntegerT (16 Bit)	ReadWrite
Damping of the pressure signal.				
Factory setting	**60**			
Value range [s]	(0 to 4000) * 0.001			

Parameters

dAA	Index 512	Subindex 0	UIntegerT (16 Bit)	ReadWrite
Response time between process value change and change of the analog output.				
Factory setting	**6**			
Value range [s]	(0 to 9999) * 0.01			

Loc	Index 550	Subindex 0	UIntegerT (8 Bit)	ReadWrite
[Loc] locks the local user interface to prevent unintentional changes, [Loc] is resettable at the device.				
Factory setting	**1**	**(uLoc)**		
Value range	0 1	(Loc) (uLoc)		

Hi.P	Index 560	Subindex 0	IntegerT (16 Bit)	ReadOnly
Maximum memory value for pressure.				
Value range [Pa]	(-1000 to 10500) * 100 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC		

Lo.P	Index 561	Subindex 0	IntegerT (16 Bit)	ReadOnly
Minimum memory value for pressure.				
Value range [Pa]	(-1000 to 10500) * 100 32760 32764	 (OL - overload) 0x7FF8 (NoData) 0x7FFC		

S.On	Index 570	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Simulation state.				
Factory setting	**0**	**(OFF)**		
Value range	0 1	(OFF) (On)		

S.Tim	Index 571	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Simulation duration.				
Factory setting	**2**	**(3 min)**		
Value range	0 1 2 3 4 5 6 7 8 9 10	(1 min) (2 min) (3 min) (4 min) (5 min) (10 min) (15 min) (20 min) (30 min) (45 min) (60 min)		

S.PRS	Index 572	Subindex 0	IntegerT (16 Bit)	ReadWrite
Simulation of pressure.				
Factory setting	**5000**			
Value range [Pa]	(-1000 to 10500) * 100 32760 32764	 (OL - overload) 0x7FF8 (Err) 0x7FFC		

Parameters

ou1	Index 580	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 1].				
Factory setting	**32**	**(SSC1.1)**		
Value range	32 16	(SSC1.1) (OFF / Output Off)		

ou2	Index 590	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Output configuration [OUT 2].				
Factory setting	**2**	**(U / Analog signal 0...10 V)**		
Value range	16 1 40 2 10 41 11	(OFF / Output Off) (I / Analog signal 4...20 mA) (U5 / Analogue signal 1...5 V) (U / Analog signal 0...10 V) (InEG / Analog signal 20...4 mA) (U5nEG / Analogue signal 5...1 V) (UnEG / Analog signal 10...0 V)		

ASP2	Index 630	Subindex 0	IntegerT (16 Bit)	ReadWrite
Analogue start point 2 / Pressure. Measured value for the minimum value of the analogue signal at the output 2 / Pressure. For details, see operating manual.				
Factory setting	**-1000**			
Value range [Pa]	(-1000 to 8000) * 100			

AEP2	Index 631	Subindex 0	IntegerT (16 Bit)	ReadWrite
Analogue end point 2 / Pressure. Measured value for the maximum value of the analogue signal at the output 2 / Pressure. For details, see operating manual.				
Factory setting	**10000**			
Value range [Pa]	(1000 to 10000) * 100			

diS.U	Index 800	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display update rate.				
Factory setting	**1**	**(d2 / medium)**		
Value range	0 1 2	(d1 / fast) (d2 / medium) (d3 / slow)		

diS.R	Index 801	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display rotation clockwise.				
Factory setting	**0**	**(0 °)**		
Value range	0 1 2 3	(0 °) (90 °) (180 °) (270 °)		

diS.B	Index 802	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current display brightness.				
Factory setting	**100**	**(100 %)**		
Value range	25 50 75 100 0	(25 %) (50 %) (75 %) (100 %) (OFF)		

Parameters

diS.L	Index 803	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Current layout of the display.				
Factory setting	**4**	**(Bargraph SSC1.1)**		
Value range	0 1 2 3 4 5 6 7	(PV) (App.Spec.Tag) (SSC1.1-Param_SP1) (SSC1.1-Param_SP2) (Bargraph SSC1.1) (SSC Counter1) (Hi.P) (Lo.P)		

coL.P	Index 810	Subindex 0	UIntegerT (8 Bit)	ReadWrite
Colour configuration pressure.				
Factory setting	**16**	**(bk/wh / Value black and white)**		
Value range	16 4 5	(bk/wh / Value black and white) (r1ou / Value red when OUT1 switches) (G1ou / Value green when OUT1 switches)		

Bargraph start	Index 936	Subindex 0	IntegerT (32 Bit)	ReadWrite
Start of the bargraph scaling.				
Factory setting	**-1000**			
Value range [Pa]	(-1000 to 9980) * 100			

Bargraph end	Index 937	Subindex 0	IntegerT (32 Bit)	ReadWrite
End of the bargraph scaling.				
Factory setting	**10000**			
Value range [Pa]	(-980 to 10000) * 100			

coF	Index 5001	Subindex 0	IntegerT (16 Bit)	ReadWrite
Zero-point calibration (Calibration offset) .				
Factory setting	**0**			
Value range [%]	(-500 to 500) * 0.01			

MDC Descriptor	Index 16512	Subindex 0	RecordT (88 Bit)	ReadOnly
Descriptor for the characteristic of the measurement data channel (process data MV).				
Lower Value		Bit offset 56	IntegerT (32 Bit)	
Shows the lower value of measurement range.				
Factory setting	**-1000**	**(-1000)**		
Value range	-1000	(-1000)		
Upper Value		Bit offset 24	IntegerT (32 Bit)	
Shows the upper value of measurement range.				
Factory setting	**10000**	**(10000)**		
Value range	10000	(10000)		
Unit Code		Bit offset 8	UIntegerT (16 Bit)	
Shows the unique code for the physical unit.				
Factory setting	**1130**	**(Pa)**		
Value range	1130	(Pa)		

Parameters

MDC Descriptor	Index 16512	Subindex 0	RecordT (88 Bit)	ReadOnly
Scale		Bit offset 0	IntegerT (8 Bit)	
Shows the multiplier for measurement value - 10exp(scale).				
Factory setting	**2**	**(2)**		
Value range	2	(2)		

Diagnosis

Device Status	Index 36	Subindex 0	UIntegerT (8 Bit)	ReadOnly
Indicator for the current device condition and diagnosis state.				
Factory setting	**0**	**(Device is OK)**		
Value range	0 1 2 3 4	(Device is OK) (Maintenance required) (Out of specification) (Functional check) (Failure)		

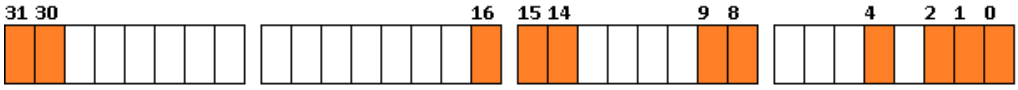
Detailed Device Status	Index 37	Subindex 0	OctetStringT (3 Byte) [11]	ReadOnly
List of all currently pending events in the device.				
Factory setting	**0x00,0x00,0x00**			

Operating hours	Index 542	Subindex 0	IntegerT (32 Bit)	ReadOnly
Counter of the operating hours since delivery.				
Value range [h]	(0 to 2147482880) * 1 2147483644	(NoData) 0x7FFFFFFC		

Active Events	Index 545	Subindex 0	RecordT (32 Bit)	ReadOnly
Bit mask for current pending events.				

Bit offset 31	(0x8DFF)	Test Event 2. Device Status = 1 (Maintenance required)
Bit offset 30	(0x8DFE)	Test Event 1. Device Status = 1 (Maintenance required)
Bit offset 16	(0x8C01)	Simulation active
Bit offset 15	(0x4210)	Device temperature overrun
Bit offset 14	(0x4220)	Device temperature underrun
Bit offset 9	(0x8C30)	Process variable range underrun
Bit offset 8	(0x8C10)	Process variable range overrun
Bit offset 4	(0x4000)	Temperature fault
Bit offset 2	(0x7710)	Short circuit
Bit offset 1	(0x6320)	Parameter error
Bit offset 0	(0x5000)	Device hardware fault

Value range	true	Event active
	false	Event inactive



Diagnosis

Param configuration fault	Index 546	Subindex 0	UIntegerT (32 Bit) [10]	ReadOnly
Displays the incorrectly set parameters.				
Factory setting	**0**	**(OK)**		
Value range	0	(OK)		
	786432	(Device Access Locks, Index = 12)		
	38010880	(ou1, Index = 580)		
	36110336	(uni.P, Index = 551)		
	33423360	(dAP.P, Index = 510)		
	32768000	(P-n, Index = 500)		
	327745536	(coF, Index = 5001)		
	37486592	(S.PRS, Index = 572)		
	37421056	(S.Tim, Index = 571)		
	60489728	(LanG, Index = 923)		
	52494336	(diS.R, Index = 801)		
	52559872	(diS.B, Index = 802)		
	52625408	(diS.L, Index = 803)		
	61341696	(Bargraph start, Index = 936)		
	61407232	(Bargraph end, Index = 937)		
	53084160	(coL.P, Index = 810)		
	52428800	(diS.U, Index = 800)		
	41287680	(ASP2, Index = 630)		
	41353216	(AEP2, Index = 631)		
	38666240	(ou2, Index = 590)		
	33554432	(dAA, Index = 512)		
	327876608	(HIPS, Index = 5003)		
	36044800	(Loc, Index = 550)		
	3997696	(SSC1.1 Config, Index = 61)		
	3997697	(SSC1.1 Config, Index = 61, Subindex = 1)		
	3997698	(SSC1.1 Config, Index = 61, Subindex = 2)		
	3997699	(SSC1.1 Config, Index = 61, Subindex = 3)		
	20971520	(SSC1.1 Delay, Index = 320)		
	20971521	(SSC1.1 Delay, Index = 320, Subindex = 1)		
	20971522	(SSC1.1 Delay, Index = 320, Subindex = 2)		
	3932160	(SSC1.1 Param, Index = 60)		
	3932161	(SSC1.1 Param, Index = 60, Subindex = 1)		
	3932162	(SSC1.1 Param, Index = 60, Subindex = 2)		
	4128768	(SSC1.2 Config, Index = 63)		
	4128769	(SSC1.2 Config, Index = 63, Subindex = 1)		
	4128770	(SSC1.2 Config, Index = 63, Subindex = 2)		
	4128771	(SSC1.2 Config, Index = 63, Subindex = 3)		
	21037056	(SSC1.2 Delay, Index = 321)		
	21037057	(SSC1.2 Delay, Index = 321, Subindex = 1)		
	21037058	(SSC1.2 Delay, Index = 321, Subindex = 2)		
	4063232	(SSC1.2 Param, Index = 62)		
	4063233	(SSC1.2 Param, Index = 62, Subindex = 1)		
	4063234	(SSC1.2 Param, Index = 62, Subindex = 2)		
	3801088	(Teach Select, Index = 58)		
	55115776	(uni.T, Index = 841)		

HIPC	Index 5004	Subindex 0	UIntegerT (32 Bit)	ReadOnly
Pressure overload counter.				
Factory setting	**0**			
Value range	(0 to 4294967295) * 1			

HIPS	Index 5003	Subindex 0	IntegerT (16 Bit)	ReadWrite
Configuration of pressure overload counter switch point.				
Factory setting	**10000**			
Value range [Pa]	(-1000 to 10000) * 100			

Internal temperature	Index 543	Subindex 0	IntegerT (16 Bit)	ReadOnly
Current internal temperature of the device.				
Value range [°C]	(0 to 92) * 1			
	-32760	(UL - underload) 0x8008		
	32760	(OL - overload) 0x7FF8		
	32764	(NoData) 0x7FFC		

Diagnosis

Media temperature	Index 537	Subindex 0	IntegerT (16 Bit)	ReadOnly
Current media temperature.				
Value range [°C]	(0 to 60) * 1 -32760 32760 32764	 (UL - underload) 0x8008 (OL - overload) 0x7FF8 (NoData) 0x7FFC		

Events

Code	Device status	PQ *	Class	Name	Description
0x4000 16384d	3 (Functional check)	valid	Error	Temperature fault	Overload
0x4210 16912d	2 (Out of specification)	valid	Warning	Device temperature overrun	Clear source of heat
0x4220 16928d	2 (Out of specification)	valid	Warning	Device temperature underrun	Insulate device
0x5000 20480d	4 (Failure)	invalid	Error	Device hardware fault	Exchange device
0x6320 25376d	3 (Functional check)	invalid	Error	Parameter error	Check datasheet and values
0x7710 30480d	3 (Functional check)	valid	Error	Short circuit	Check installation
0x8C01 35841d	3 (Functional check)	valid	Warning	Simulation active	Check operating mode
0x8C10 35856d	2 (Out of specification)	valid	Warning	Process variable range overrun	Process data uncertain
0x8C30 35888d	2 (Out of specification)	valid	Warning	Process variable range underrun	Process data uncertain
0x8DFE 36350d	1 (Maintenance required)	valid	Warning	Test Event 1. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 240, Event disappears by setting index 2 to value 241
0x8DFF 36351d	1 (Maintenance required)	valid	Warning	Test Event 2. Device Status = 1 (Maintenance required)	Event appears by setting index 2 to value 242, Event disappears by setting index 2 to value 243

Events are reported by the device itself to signal irregular device states.
PQ* = Process data quality.

Error types

Code	Name	Description
0x8000 32768d	Device application error - no details	Service was denied by the technology-specific application. No detailed root-cause information is available.
0x8011 32785d	Index not available	Read or write access attempt to a non-existing index.
0x8012 32786d	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
0x8020 32800d	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
0x8021 32801d	Service temporarily unavailable - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
0x8022 32802d	Service temporarily unavailable - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
0x8023 32803d	Access denied	Write access to a read-only parameter or read access to write-only parameter.
0x8030 32816d	Parameter value out of range	Written parameter value is outside of the permitted value range.
0x8031 32817d	Parameter value above limit	Written parameter value is above its specified value range.
0x8032 32818d	Parameter value below limit	Written parameter value is below its specified value range.
0x8033 32819d	Parameter length overrun	Written parameter is longer than specified.
0x8034 32820d	Parameter length underrun	Written parameter is shorter than specified.
0x8035 32821d	Function unavailable	Written command is not supported by the technology-specific application.
0x8036 32822d	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
0x8040 32832d	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
0x8041 32833d	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.
0x8082 32898d	Application not ready	Read or write access denied. The technology-specific application is temporarily unavailable.

Error types are used for the ISDU response. Values unequal to '0' indicate the cause of a failed ISDU read or write procedure.

ErrorTypes

The table shows all IO-Link ISDU error codes.
The device does not need to support all listed error types.

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