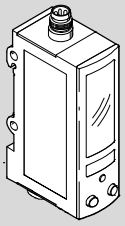
Pressure sensor SDE3



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Operating instructions
Original instructions

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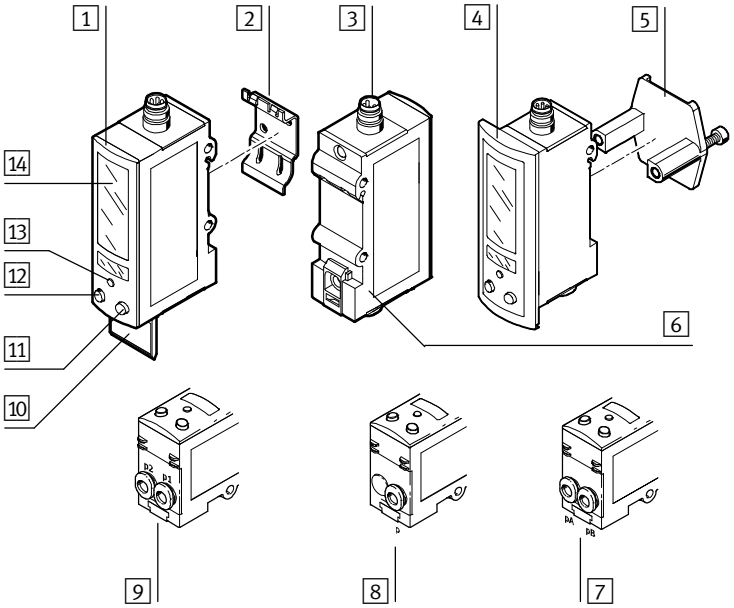
2017-09f
[8078145]

English

For all available product documentation ➔ www.festo.com/pk

1 Operating elements and connections



1 SDE3 for mounting onto a wall or H-rail
2 Adapter plate for wall mounting
3 Electrical connection
4 SDE3 for front panel mounting
5 Clamping plate for front panel mounting
6 Mounting slide (rear)
7 Compressed air or vacuum connections (only SDE3-...D and SDE3-...M)
8 Compressed air or vacuum connection (only SDE3-...S)
9 Compressed air or vacuum connections (only SDE3-...Z)
10 Label holder
11 B pushbutton
12 A pushbutton
13 Edit button
14 Display

Fig. 1

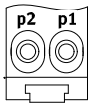
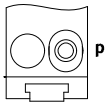
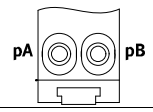
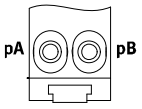
Key feature	Order code	Type
Function	SDE3	Pressure sensor
Pressure measuring range	-V1	0 ... –1
	-B2	–1 ... +1
	-D2	0 ... 2
	-D6	0 ... 6
	-D10	0 ... 10
	-D12 [1]	0 ... 12
Supply port	S	1x relative pressure
	D	2x relative pressure
	Z	1x differential pressure
	M	2x relative pressure, 1x differential pressure analysis
Display	-B	Values in bar
	-P	Values in psi
	-K [2]	Values in kPa
	-H	Values in inches of mercury
	-W [3]	Values in inches of water
Mounting/pneumatic connection	-HQ4	H-rail mounting, push-in connector 4 mm
	-WQ4	Wall mounting, push-in connector 4 mm
	-FQ4	Front panel mounting, push-in connector 4 mm
	-HT532	H-rail mounting, push-in connector 5/32"
	-WT532	Wall mounting, push-in connector 5/32"
	-FT532	Front panel mounting, push-in connector 5/32"
Electrical output	-2P	2 switching outputs PNP
	-2N	2 switching outputs NPN
Electrical connection	-M8	Plug connector M8x1
	-M12	Plug connector M12, A-coded
	-K	Cable 2.5 m
Electrical accessories [4]	-G	Connecting cable, straight socket, cable length 2.5 m
	-W	Connecting cable, angled plug socket, cable length 2.5 m
	-G5	Connecting cable, straight socket, cable length 5 m
	-W5	Connecting cable, angled plug socket, cable length 5 m

1) Key feature only on request
2) Not for SDE3-D12M
3) Not for SDE3-D6M, SDE3-D10M, SDE3-D12M
4) Only in combination with key feature -M8 or -M12

Fig. 2

2 Function and application

The SDE3 has been designed for monitoring changes in pressure in the compressed air system or terminals. Variants for relative pressure measurement and differential pressure measurement are available:

Type	Description		Input values[1]	Switching outputs
SDE3-...Z	1x differential pressure p1 – p2 [2]		In A	Out A, Out B
SDE3-...S	1x relative pressure		In A	Out A, Out B
SDE3-...D	1x relative pressure pA		In A	Out A
	1x relative pressure pB		In B	Out B
SDE3-...M	1x relative pressure pA		In A	Out A
	1x relative pressure pB		In B	–
	1x differential pressure analysis pB – pA		In C	Out B
SDE3-...V1M	1x differential pressure analysis pA – pB		In C	Out B

1) In A/B: input value for sensor element A/B. In C: calculated
2) Measuring pressure p1 – reference pressure p2

Fig. 3

3 Requirements for product use

Warning

Depending on the functions of the machine/system, the manipulation of signal statuses can cause serious injury to people or material damage.
- Note that if the switching characteristics of the switching outputs is modified in EDIT mode, the new status becomes effective immediately.
  Enable the password protection option (security code) to prevent accidental alteration by an unauthorised third party (➔ Chapter 5.3 section Set security code).

Warning

The usage of the SDE3 in combination with impermissible media can lead to personal injury or material damage.
- Use the SDE3 only with compressed air
- Observe the specified air quality class (➔ Chapter 11 Technical data).

Note

Improper handling can result in malfunctions.
- Make sure that the following specifications are always observed.

- Compare the limit values contained in these operating instructions with those of your application (e.g. operating media, pressures, forces, torques, temperatures, masses, speeds, voltages).
- Take the ambient conditions at the location of use into consideration.
- Comply with the regulations of the workers' compensation trade association, the German Technical Control Board (TÜV), of the VDE or relevant national regulations.
- Remove all transport packing, such as protective wax, foils (polyamide), caps (polyethylene), cardboard boxes (except for the sealing elements of the pneumatic connections).
- The material used in the packaging has been specifically chosen for its recyclability (exception: oiled paper = residual waste).
- Use the product in its original status. Unauthorised modification is not permitted.
- The device is intended for use in an industrial environment. Measures may need to be implemented in residential areas for interference suppression.

Range of applications and certifications

The information in this section, in combination with the UL marking on the product, must be observed in order for there to be compliance with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada. Observe the following English-language remarks from UL:
This device is intended to be used with a Class 2 power source or Class 2 transformer in accordance with UL1310 or UL1585.
As an alternative a LV/C (Limited Voltage/Current) power source with one of the following properties can be used:
– This device shall be used with a suitable isolating source such that the maximum open circuit voltage potential available to the product is not more than 30 V DC and the current is limited to a value not exceeding 8 amperes measured after 1 minute of operation.
– This device shall be used with a suitable isolating source in conjunction with a fuse in accordance with UL248. The fuse shall be rated max. 3.3 A and be installed in the 30 V DC power supply to the device in order to limit the available current.

Note that, when more than one power supply or isolating device is used, connection in parallel is not permitted.
In determining the acceptability of the combination, the following details are to be examined:
– The suitability of the final mounting is to be determined.
– The devices are to be mounted in an enclosure with adequate strength and thickness.
– The devices have not been investigated for field wiring. The suitability of the final application is to be determined.

UL approval information	
Product category code	NRNT2 (USA) or NRNT8 (Canada)
File number	E253738
Considered standards	UL 508, 17th edition, C22.2 No. 14-95
UL mark	c UL us

Fig. 4

4 Installation

4.1 Mechanical system

Note

- Mount the SDE3 and connect the tubing so that no condensation from the compressed air lines can gather in the device.

It can be mounted in any position. Mount the SDE3 as follows:

H-rail (manifold assembly)

1. Hang the SDE3 into the H-rail.
2. Press the SDE3 in the direction of the arrow until the mounting slide catches ➔ Fig. 5.

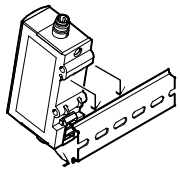


Fig. 5

Wall mounting

Observe the hole pattern (➔ Fig. 24)

1. Attach the adapter plate, for example, with two screws M3.
2. Hang the SDE3 into the adapter plate.
3. Press the SDE3 in the direction of the arrow until the mounting slide catches ➔ Fig. 6.

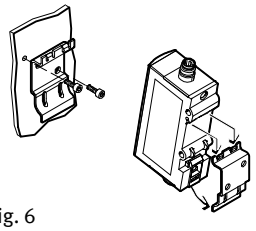


Fig. 6

Plate mounting (threaded mounting)

Observe the hole pattern (➔ Fig. 24)

- Mount the SDE3 with washers and screws M3 (➔ Fig. 7).
  Max. tightening torque 0.5 Nm

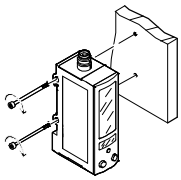


Fig. 7

Front panel mounting

1. Push the SDE3 into the recess (70 x 22 mm) in the front panel.
2. Hang the clamping plate and press it until the mounting slide locks into place.
3. Screw in the screws M3 with washers (➔ Fig. 8).
   Max. tightening torque 0.3 Nm
   In case of thin front panels (s ‹ 2 mm), washers might not be necessary.

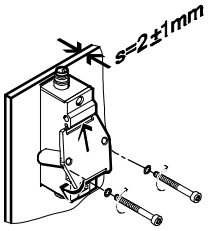


Fig. 8

4.2 Pneumatic system

Connect the tubing of SDE3 as follows:

- Insert the tube into the push-in fittings. Make sure the system is connected correctly (➔ Fig. 3).

4.3 Electrical system

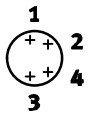
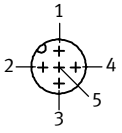
Warning

- Use only power sources which guarantee reliable electrical isolation of the operating voltage as per IEC/EN 60204-1. Observe also the general requirements for PELV power circuits as per IEC/EN 60204-1.

Note

Long signal lines pick up more interference.
- Make sure that the signal lines are always shorter than 30 m.

- Wire the SDE3 as follows:

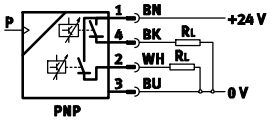
Pin	Allocation	Core colours[1)]	Plug connectors[2)]
1	Supply voltage +24 V DC	Brown (BN)	4-pin M8  5-pin M12x1 
2	Switching output B (Out B)	White (WH)	
3	0 V	Blue (BU)	
4	Switching output A (Out A)	Black (BK)	
5	n.c.	–	

1) In case of SDE3-...-K and/or the usage of the plug socket with the cable (➔ www.festo.com/catalogue)
2) Tightening torque for the union nut on plug connector M8: max. 0.3 Nm; on plug connector M12: max. 0.5 Nm.

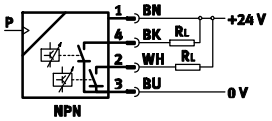
Fig. 9

Circuit diagrams

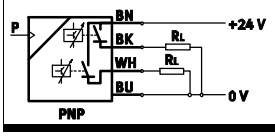
SDE3-...-2P-M8-.../SDE3-...-2P-M12-... [1)]
Switching output plug connection



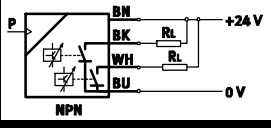
SDE3-...-2N-M8-.../SDE3-...-2N-M12-... [1)]
Switching output plug connection



SDE3-...-2P-K-...
Switching output cable connection



SDE3-...-2N-K-...
Switching output cable connection



1) Plug connector M12: pin 5 not connected

Fig. 10

5 Commissioning

- Define the desired switching characteristics of the switching outputs.

Switching point (SP) and hysteresis (Hy)

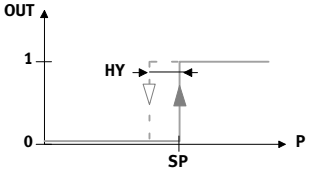
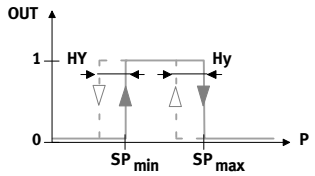
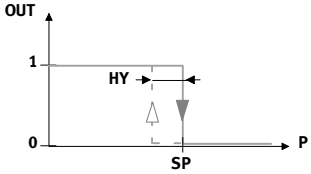
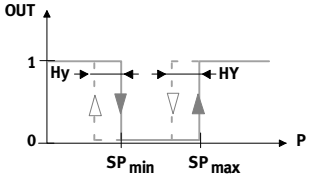
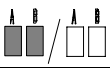
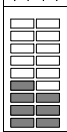
Threshold value comparator	Window comparator
Switching element function NO (normally open contact)	
	
Switching element function NC (normally closed contact)	
	

Fig. 11

Symbols on the display

Symbols	Description
	– RUN mode: switching output set/not set – SHOW and EDIT mode: switching output selected/not selected
	Threshold value comparator
	Window comparator
[SP]	Switching point
[SP min]	Lower switching point (switching point – minimum)
[SP max]	Upper switching point (switching point – maximum)
[HY]	Hysteresis
[NO]	Switching characteristic of normally open contact
[NC]	Switching characteristic of normally closed contact
[min] / [max]	Extreme values: minimum/maximum input measured value (In A/B/C)
[TeachIn]	TeachIn mode active
[Option]	Option (On/Off) – measured value smoothing on/off
[LOCK]	Security code active (block to prevent unauthorised parameterisation)
	Special menu (SPEC) is active [1)]
	– RUN mode: Graphic display of the current measured value related to the maximum measured value of the measuring range. The left-hand segment row shows the measured value of In A, the right-hand segment row shows the measured value of In B. – Significance in other modes: ➔ Fig. 13

1) The segment bars also show special symbols ➔ Fig. 13

Fig. 12

Special symbols of the segment bars

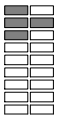
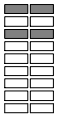
Symbols	Description
	Marked segments illuminate: – SHOW mode active – Diagnostics: 7-segment display shows error number (e.g. Er01)
	Marked segments illuminate and [Option] flashes: – EDIT mode active – Special menu (SPEC) is open; 7-segments display shows the set filter option
	Marked segments illuminate and [Lock] flashes: – EDIT mode active – Special menu (SPEC) is open; 7-segments display shows the security code

Fig. 13

Preparing commissioning

In the basic status, the product is in RUN mode. The current measured values are displayed permanently. The basic status can be reached from other modes by:

– Pressing the Edit button for 3 seconds or
– Expiration of a monitoring time, timeout

1. Switch on the operating voltage.
   The SDE3 is in RUN mode.
2. Check the SDE3 settings (➔ Chapter 5.2 SHOW mode).

If the SDE3 has several input values (➔ Fig. 3), you can switch between the input values at the press of a button as follows:

Pushbutton	Input value
A pushbutton	In A
B pushbutton	In B
C pushbutton (press the A and B pushbuttons at the same time)	In C

Fig. 14

Factory setting

The SDE3 is available with the following factory setting;

- Switching characteristics: Threshold value comparator
- Switching point: 20 % FS
- Switching characteristic: NO (normally open contact)
- Hysteresis: 0.5 % FS
- Options: OFF
- Security code: OFF

Symbols for representing the menu structure

Symbol	Significance
	Automatic return to the basic status (RUN mode) when the monitoring time has expired (here 80 seconds)
	In order to return manually to the basic status (RUN mode), press the EDIT button for 3 seconds
	Create pressure (for teaching the measured value – TP1 here)
	Symbol on the display flashes (here Out A)
	Security code active (lock – blocked against unauthorised programming)
	Security code inactive (Lock)
	Press pushbutton (A pushbutton here)
	Press A pushbutton or B pushbutton and thus set the desired value
	Press pushbutton (here B pushbutton) and the Edit button simultaneously
	C pushbutton: Press A pushbutton and B pushbutton simultaneously
	Press the Edit button
	Display of current errors
	Delete minimum/maximum value
	Branching in the menu system

Fig. 15

5.1 RUN mode

In RUN mode, the following are displayed:
– The measured values (relative pressure, differential pressure) and
– The signal statuses of the switching outputs Out A, Out B (set, not set).

Note

A flashing value means:
– Measurement outside permitted measuring range.

5.2 SHOW mode

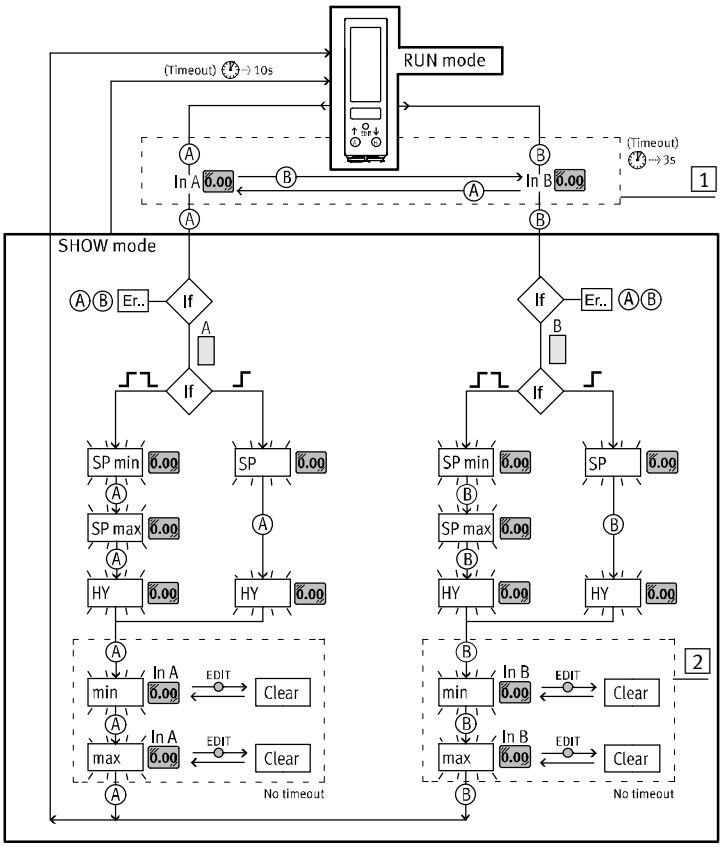
In SHOW mode, the current settings for the switching outputs Out A and Out B are displayed.
If the SDE3 has several input values (➔ Fig. 3), the corresponding input values will be displayed at the press of a button first (➔ Fig. 14).
The SDE3 must be in RUN mode.

- Pressing the A pushbutton (switching output Out A) or the B pushbutton (switching output Out B) starts SHOW mode for the respective switching output.
- Only for SDE3-...M: pressing the C pushbutton (press the A and B pushbuttons at the same time) displays the extreme values of In C.

Note

If there are errors, pressing the A/B/C pushbutton first displays corresponding error numbers.

- Repeated pressing of the A/B/C pushbutton one after another displays the settings of the respective switching output and, after that, the extreme values of the input values.
- When all settings have been displayed, the SDE3 goes back into RUN mode when the A/B/C pushbuttons are pressed again and displays the current measurement value for the corresponding output.



1 Switch over displayed input value
For SDE3-...D: In A/B
For SDE3-...M: In A/B/C
(not shown in graphic)

2 For SDE3-...D: display/delete minimum/maximum value of In B
For SDE3-...M: display/delete minimum/maximum value of In C
(not shown in graphic)

Fig. 16

The following settings and values are indicated in the SHOW mode:
Settings for Out A/Out B:
– Switching function (threshold value or window comparator)
– Switching point [SP] or switching points [SP min] and [SP max]
– Hysteresis [HY]
– Switching element function [NO]/[NC] (N/O contact/N/C contact)
Extreme values of input values (➔ Fig. 3)
– Minimum pressure value [min]
  In order to delete the minimum value, press the EDIT button briefly.
– Maximum pressure value [max]
  In order to delete the maximum value, press the EDIT button briefly.
The extreme values are lost when the supply voltage is switched off.
– The SDE3-...D and SDE3-...M save an extreme value for each sensor element (A and B).
– The SDE3-...M also saves an extreme value for the differential pressure signal pB-pA.

5.3 Edit mode

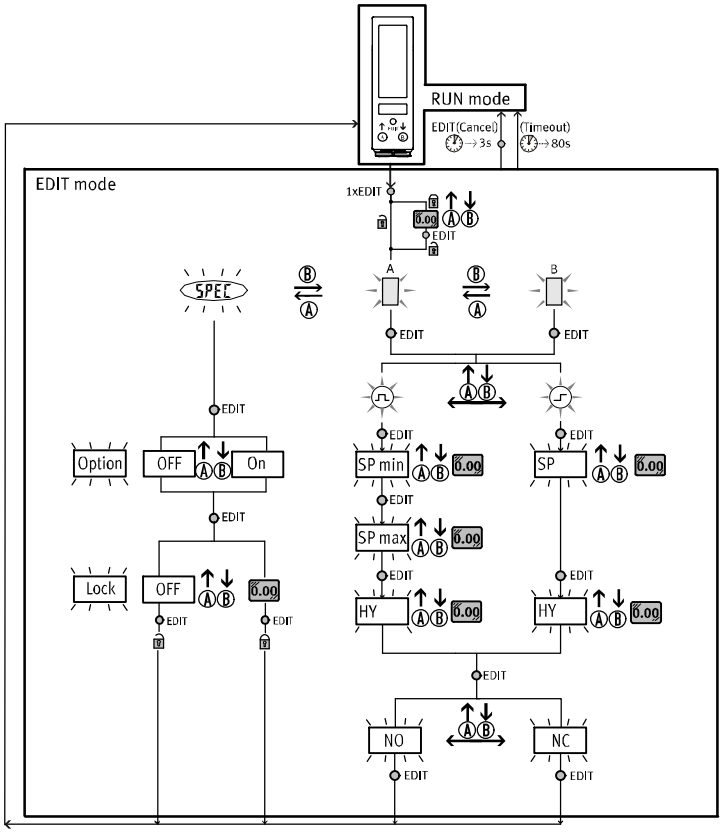


Fig. 17

The EDIT mode enables the following settings:
– Switching function (threshold value or window comparator)
– Switching point [SP] or switching points [SP min] and [SP max]
– Hysteresis [HY]
– Switching element function [NO]/[NC] (N/O contact/N/C contact)
– Filter option [ON/OFF] (smoothing of measured values)
– Security code [Lock]

Start EDIT mode

Warning

Manipulation of signal statuses may cause serious personal injury, depending on the functioning of the machine/system.
- Note that if the switching status of the outputs is modified in EDIT mode, the new status will be effective immediately.

Various settings can be selected with the operating keys (A/B pushbuttons).
– Switching output for which the characteristics is to be set
– Special menu

1. Press the Edit button.
   The EDIT mode is active and [Out A] flashes or, if there is an active security lock, [Lock] flashes.
2. Press the A/B pushbuttons until the chosen security code is set.
3. Press the Edit button.
   The EDIT mode is active and [Out A] flashes.

Setting the switching characteristics of the switching outputs

Note

The process for setting the switch outputs for Out A (A pushbutton) and Out B (B pushbutton) is fundamentally the same. In the following, the process is described using the switching output Out A.

The SDE3 is in EDIT mode and [Out A] flashes ➔ Chapter Start EDIT mode.
- To set Out A, proceed as follows:

1. Press the Edit button to confirm the selection.
   The currently set switching function flashes.
2. Select the desired switching function with the A/B pushbuttons.
3. Press the Edit button to confirm the selection.
   [SP] and/or [SP] [min] flashes.
4. Select the desired switching point using the A/B pushbuttons.
5. Press the Edit button to confirm the selection.
   Only with window comparator switching function:
   [SP max] flashes.
   - Set the desired value for (SP_{max}) with the A/B pushbuttons.
   - Press the EDIT button to confirm the set value.
     [Hy] flashes.
6. Set the desired value for the hysteresis (Hy) using the A/B pushbuttons.
7. Press the Edit button to confirm the set value.
   [NO] or [NC] flashes.
8. Select the switching element function (NO/NC) with the A/B pushbuttons.
9. Press the EDIT button to confirm the set value.
   The SDE3 is in RUN mode.

Carry out a test run with various pressures to ascertain whether the SDE3 switches as desired (switching function, switching points and hysteresis).

Set special menu [SPEC]

The following settings can be undertaken in the special menu:
– Filter option [ON/OFF] (smoothing of the measured value)
– Removal of the security blocking [Lock] with security code

This is how you reach the special menu:
The SDE3 is in EDIT mode and [Out A] flashes; ➔ Chapter Start EDIT mode.

1. Press the A or B pushbutton until the menu (SPEC) is selected.
   [SPEC] flashes.
2. Press the Edit button to confirm the selection.
   [Option] flashes and the filter option (ON/OFF) can be set.

a) Set filter option

3. Set the desired value for the filter option (ON/OFF) using the A/B pushbuttons.
   ON: Smoothing of the measured values (In A/B) is active, time constant approx. 500 ms
   OFF: Smoothing of the measured values (In A/B) is inactive
4. Press the Edit button to confirm the selection.
   [Lock] flashes. The security code can be set.

b) Setting the security code

The settings can be protected from unauthorised access by setting a numerical code which is up to 4 digits in length. The security code must be entered each time the settings are changed (EDIT mode and TEACH mode).

Note

Keep the security code where it can be found. If the security code has been forgotten ➔ Chapter 6.1 Resetting SDE3 to factory setting.

5. Set the desired security code with the A/B pushbuttons.
6. Press the Edit button to confirm the selection.
   The SDE3 is in RUN mode.

5.4 TEACH mode

The switching points can be learned in TEACH mode.

Note

The process is the same for teaching the switching outputs Out A (A button) and Out B (B button). In the following, the process is described using the switching output Out A.

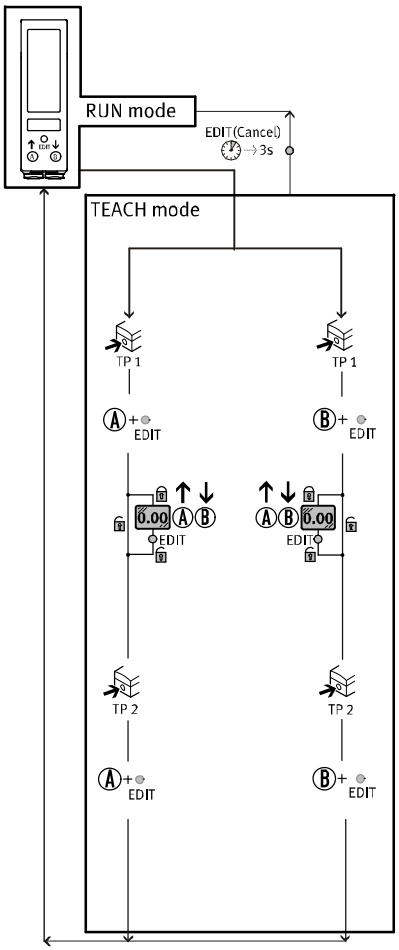


Fig. 18

1. Before teaching in EDIT mode, select the desired switching function (threshold value or window comparator) ➔ Chapter 5.3 EDIT mode.

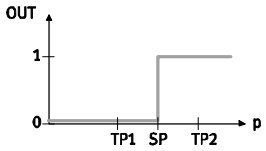
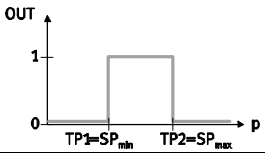
Threshold value comparator	**Window comparator**
The (taught) switching point is derived from the average value of both measured values SP = 1/2 (TP1 + TP2) Special case: SP = TP1 = TP2	The taught switching window is derived from the measured values: SP_{min} = smaller teach point (TP1 or TP2) SP_{max} = larger teach point (TP1 or TP2)
Position of the teach points (example): 	Position of the teach points (example): 

Fig. 19

For teaching the switching variables:

2. Apply the first measuring pressure (relative/differential pressure p_1-p_2 and/or p_B-p_A)
3. First press the A pushbutton and then also the Edit button.
   Switching output symbol [A] and [TeachIn] flash. The measured value is assumed as the first teach point (TP1).
   In case of active security blocking, [Lock] flashes.

Only in case the security lock is active [Lock]:

- Press the A/B pushbuttons until the chosen security code is set.
- Press the Edit button.
  Switching output symbol [A] and [TeachIn] flash. The measured value is assumed as the first teach point (TP1).

4. Apply the first second pressure (relative/differential pressure p1-p2 and/or p_B-p_A).
5. First press the A pushbutton and then also the Edit button.
   The second teach point is taken over and the new switching point (SP) or the switching points (SP_{min} and SP_{max}) become valid.
   The SDE3 is in RUN mode.

Conduct a test run with variable pressures to see whether the SDE3 switches as desired.

6 Operation

Attention!

Excessive internal heat will damage the SDE3.

- Avoid high cycle rates with large pressure amplitudes.

6.1 Resetting SDE3 to factory setting

(even if the security code cannot be found)

Note

By resetting to factory settings, the current settings are lost.

- If required, make a note of these settings before resetting.

To reset the SDE3 to the factory setting, proceed as follows:

1. Switch off the operating voltage.
2. Press all three setting elements (A pushbutton, B pushbutton, Edit button) simultaneously and keep them depressed.
3. Switch the operating voltage off and then on again.
   The SDE3 is in RUN mode.

7 Maintenance and care

- Switch off the following energy sources before cleaning the exterior of the device:
  - Operating voltage
  - Compressed air/vacuum
- If necessary, clean the SDE3 from the outside.
  Soap suds (max. +60 °C), petroleum ether and all non-abrasive cleaning agents may be used.

8 Disassembly

1. Switch off the following energy sources before disassembly:
   - Operating voltage
   - Compressed air/vacuum
2. Disconnect the respective connections from the SDE3.
3. Disassemble the SDE3 as follows:

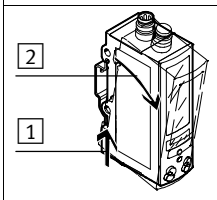
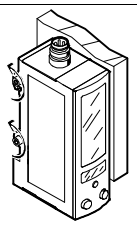
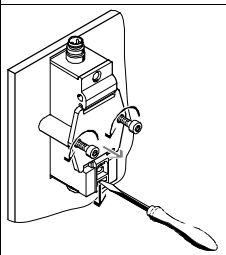
Disassembly for ...		
H-rail or wall mounting	Plate mounting	Front panel mounting
		
1. Lift the SDE3. 2. Tip the SDE3 forward.	• Loosen both screws.	1. Loosen both screws. 2. Press down the mounting slide with a screwdriver. 3. Lift off the clamping plate.

Fig. 20

9 Fault clearance

Malfunction	Possible cause	Remedy
No indication on display	No supply voltage	Switch on supply voltage
	Faulty electrical connection	Correctly wire the SDE3 (➔ Chapter 4.3 Electrical system)
	SDE3 defective	Send SDE3 to Festo
Incomplete display	Display defective	Send SDE3 to Festo
Incorrect measured value	Only for SDE3-...D, SDE3-...M, SDE3-...Z: Pneumatic connections swapped	Connect tubing of SDE3 correctly (➔ Chapter 4.2 Pneumatic system)
	SDE3 operated with non-permitted medium	Replace the SDE3 and operate only with compressed air
Settings cannot be edited (Lock)	Access protection active	Enter security code (➔ Chapter 5.3 section Setting the security code).
Outputs do not switch corresponding to the setting	Short circuit or overload at corresponding output	Eliminate short circuit/overload
	SDE3 defective	Send SDE3 to Festo
Pressure indicator flashes	Pressure outside measuring range	Comply with permissible measuring range
	Pressure above permissible maximum value (SDE3 damaged)	Replace SDE3
Er01[2)]	SDE3 defective	Send SDE3 to Festo
Er09[1)]	Measuring range undershot with In A	Comply with permissible measuring range. After the permissible maximum values are exceeded, exchange SDE3.
Er10[1)]	Measuring range exceeded with In A	
Er11[1)]	Measuring range undershot with In B	
Er12[1)]	Measuring range exceeded with In B	
Er17[2)3)]	Undervoltage	Maintain operating voltage

1) 7-segments display flashes. Error display in SHOW mode (➔ Chapter 5.2 SHOW mode)
2) 7-segments display flashes. The currently smallest error number is shown
3) Outputs are reset automatically (0 signal)

Fig. 21

10 Accessories

Please select the corresponding accessories from our catalogue.
➔ www.festo.com/catalogue/SDE3

11 Technical data

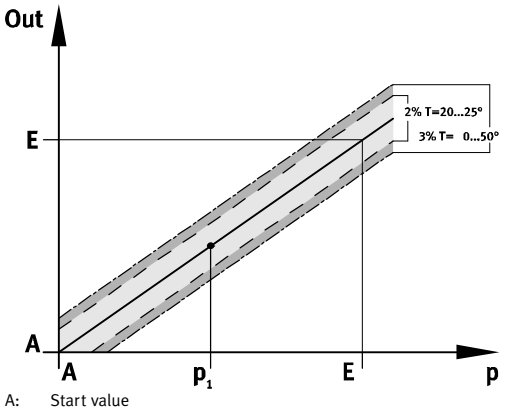
Type SDE3		-V1	-B2	-D2	-D6	-D10	-D12
General information							
Certification		RCM, c UL us – Recognized (OL) [1)]					
CE marking (➔ Declaration of conformity)		In accordance with EU EMC Directive					
Information on materials		Copper- and PTFE-free, RoHS-compliant					
Input signal/measuring element							
Measured variable		Differential pressure, relative pressure (according to type ➔ Fig. 3)					
Pressure measuring range Start value ... end value	[bar]	0 ... –1	–1 ... +1	0 ... 2	0 ... 6	0 ... 10	0 ... 12
Pressure measuring range Start value ... end value	[MPa]	0 ... –0.1	–0.1 ... 0.1	0 ... 0.2	0 ... 0.6	0 ... 1	0 ...1.2
Overload range Start value ... end value	[bar]	0 ... 5	1 ... 5	2 ... 6	6 ... 15	10 ... 15	12 ... 15
Start value ... end value (for SDE3-...Z)		0 ... 5	1 ... 5	2 ... 6	6 ... 16	10 ... 20	12 ... 20
Overload range Start value ... end value	[MPa]	0...0.5	0.1...0.5	0.2...0.6	0.6...1.5	1...1.5	1.2...1.5
Start value ... end value (for SDE3-...Z)		0...0.5	0.1...0.5	0.2...0.6	0.6...1.6	1...2	1.2...2
Operating medium		Compressed air according to ISO8573-1:2010 [7:4:4]					
Temperature of medium	[°C]	0 ... 50					
Ambient temperature	[°C]	0 ... 50					
Output, general [2)]							
Accuracy ±FS (➔ Fig. 23 with examples)	[%]	Max. 2 (at T= 20 ... 25 °C) Max. 3 (at T= 0 ... 50 °C)					
Repetition accuracy ±FS	[%]	Max. 0.3					
Switching output							
Switch-on time[3)]	[ms]	3 (typical)/6 (max.)					
Switch-off time[3)]	[ms]	3 (typical)/6 (max.)					
Max. Output current	[mA]	100					
Capacitive load maximum DC	[nF]	Max. 100					
Voltage drop	[V]	Max. 1.5					
Inductive protective circuit		Adapted to MZ, MY, ME coils					

Type SDE3		-V1	-B2	-D2	-D6	-D10	-D12
Measured value indicator							
Display range Start value ... end value	[bar]	–.000... –.999	–.999... 1.000	0.000... 2.000	0.00 ... 6.00	0.00 ... 10.00	0.00 ... 12.00
Start value... end value (Differential pressure SDE3-...M)		–.999... 1.000	–2.00... 2.00	–2.00 ... 2.00	–6.00... 6.00	–9.99 ... 10.00	–12.0 ... 12.0
Display range Start value... end value	[MPa]	–.000... –.0999	–.099... 0.100	0.000... 0.200	0.00... 0.60	0.00... 1.00	0.00... 1.20
Start value end value (Differential pressure SDE3-...M)		–.099... 0.100	–0.20... 0.20	–0.20... 0.20	–0.60... 0.60	–0.99... 1.00	–1.20... 1.20
Output, additional data							
Short circuit protection		Yes, pulsed					
Overload protection		Yes, pulsed					
Electronics							
Operating voltage range DC	[V]	15 ... 30					
No-load supply current	[mA]	Max. 45					
Ready-state delay	[ms]	Max. 500					
Reverse polarity protection		For all electrical connections					
Electromechanics							
Max. cable length	[m]	30					
Information on cable sheath materials		PU					
Information on plug connector housing materials		Brass (nickel-plated)					
Mechanical system							
Mounting position		Any, avoid condensation gathering in the pressure sensor					
Product weight	[g]	37 (without adapter plate) 61 (key feature -FQ4 with clamping plate)					
Note on materials							
– Housing		PA reinforced					
– Pushbuttons		TPE-U					
– Display		PC					
– Supply ports		POM, brass (nickel-plated)					
Display/operation							
Displayable units		bar, psi, kPa, inch of mercury, inch of water (depending on type ➔ Fig. 2)					
Threshold value setting range		0 % FS ... 100 % FS					
Hysteresis setting range		0 % FS ... 90 % FS					
Immissions/emissions							
Operating temperature range	[°C]	0 ... +50					
Storage temperature	[°C]	–20 ... +80					
Degree of protection		IP65					
Protection class		III					
Shock resistance		Severity level 2 (as per EN 60068-2-27)					
Vibration resistance		Severity level 2 (as per EN 60068-2-6)					

1) Does not apply to key feature -FQ4
2) % FS = % of the end value in the measuring range (full-scale)
3) If the filter function is not activated

Fig. 22

Example of accuracy



A: Start value
E: End value
Out: Display value

Fig. 23

Example for SDE3-D10 at p_1 = 5 bar (0.5 MPa):
Display value in case of accuracy ±2 % FS: 5 ± 0.2 bar (0.5 ± 0.02 MPa)

Example for SDE3-B2 at p1 = 0 bar (0 MPa):
Display value in case of accuracy ±3 % FS: 0 ± 0.06 bar (0 ± 0.006 MPa)

12 Appendix

Adapter plate hole patterns

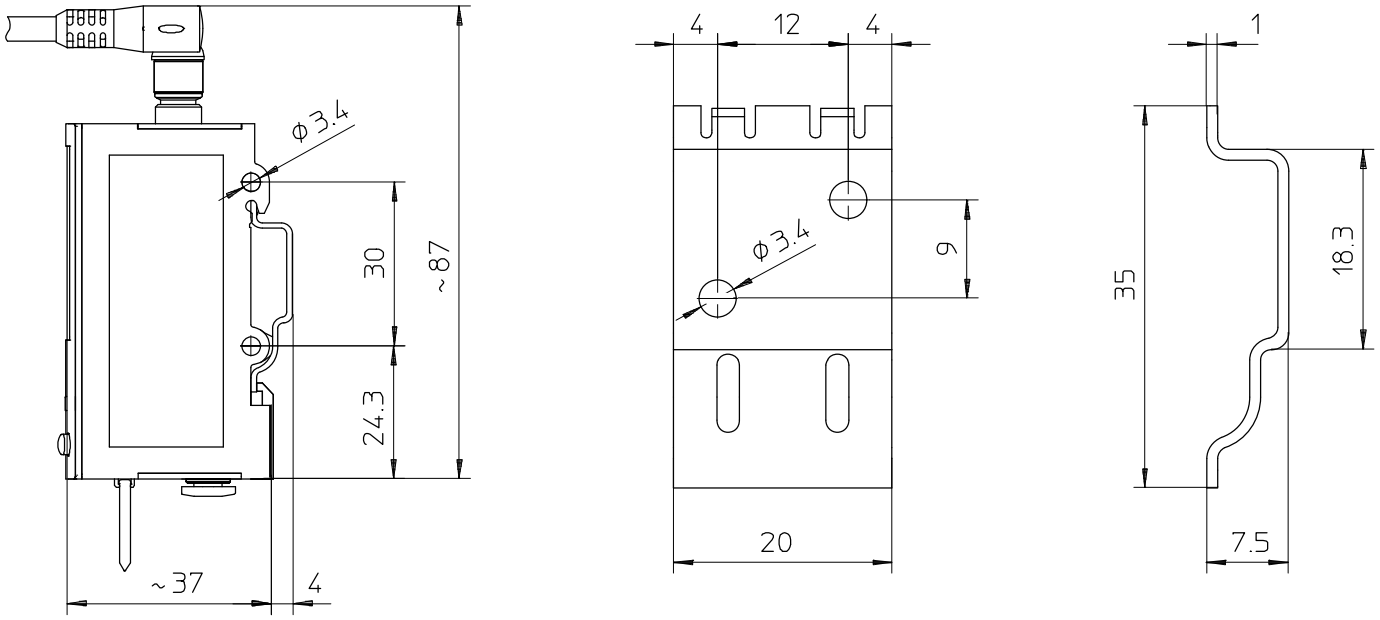


Fig. 24