

Electronic Sensors For Automation

Precise Feedback and Monitoring

Proximity Sensors

- Threaded barrel and rectangular designs
- Solid state (NPN, PNP)
- Analog, reduction factor 1, corrosion resistant versions
- High switching distance



Optical Sensors

- Diffuse, retro-reflective and through beam designs
- Polymer or glass fiber-optic cables
- Laser types for displacement and long distances
- Teach-in, color sensing, background suppression



Pressure/Vacuum Sensors

- Programmable and configurable
- LCD Displays and high contrast LEDs
- Relative, relative x2, and differential pressure sensing
- Adjustable hysteresis, analog and digital outputs



Flow Sensors

- Measure flow and consumption
- Wide measuring range of flow
- Integrated or remote display
- Ultrafast response times and high accuracy



Actuator Feedback

- Quick installation in profile barrel slot
- End of stroke and displacement types
- High reliability and service life
- For slotted, round, and tie rod cylinders



Electronic Sensors For Automation



Festo has a wide range of sensors to fit all of your automation needs.

Object Detection

Festo carries several hundred optical and inductive sensors to detect the presence of objects made of most materials, including metals, plastic, paper, etc. Innovative designs allow for the detection of most metals without variances in distance, optical detection of overlapped parts with low contrast, objects of different colors, and variable displacements of objects from the sensor. Sensors made of stainless steel, polyamide, or with weld immune designs are suitable for food, packaging, and automotive applications.



Pressure and Flow Sensors

A wide range of pressure, vacuum, and flow sensors from Festo allows you to completely monitor your compressed air system. These sensors can provide a visual readout in various units for easy detection, and have digital and analog outputs for integration into your control system. These electronic sensors are easy to configure. Applications can include measuring consumption to determine energy costs, detecting the presence of a part in a suction cup, monitoring the force of a cylinder, or indicating the pressure output of a service unit.

Actuator Feedback

Festo cylinder switches are guaranteed to work with all Festo actuators. These sensors integrate into Festo grippers and actuators for the easiest possible installation. Reed and electronic types are available for all of your control system needs. Innovations include end of stroke measurement for diagnosing part placement, flush mounting for improved cylinder installation, and various connector options.

Accessories

Festo also carries a full range of accessories including cables, distribution blocks, mounting hardware, reflectors, etc. for all your sensor needs. These accessories complete Festo as your single source supplier for your automation needs.

Festo...Your Automation Partner Worldwide

As a global leader in industrial automation components and systems, with over \$1.8 billion sales worldwide, Festo has the resources and application experience to be your long term partner for cost-effective automation solutions.

- 55 independent subsidiaries worldwide
- Representation in 180 countries
- Worldwide networking for consistent standards of products, consultancy, sales and services.
- Worldwide support provided by over 11,000 team members

Festo Quality Assurance, ISO 9001 Certification

Festo Corporation is committed to provide Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.



All Festo locations within the United States are registered to ISO 9001.

Online Literature

Literature in PDF format is available for download at: www.festo.com/us/sensors

Proximity Sensors						1 Page 5	
Standard Switching SIEN, SIED	Standard Switching SIES	Corrosion Resistant SIEN, SIED, SIEH	Increased Switching SIEH	Analog Output SIEA	For All Metals SIEF, SIEF-W		
Section 1.1 Page 11	Section 1.2 Page 27	Section 1.3 Page 35	Section 1.4 Page 49	Section 1.5 Page 55	Section 1.6 Page 61		
Optical Sensors							2 Page 73
Diffuse SOEG-RT	Retro Reflective SOEG-RSP	Through Beam SOEG-S/E	Fiber Optic SOEG-L	Laser Diffuse SOEL-RT / SOEL-RSP	For Color Detection SOEC-RT		
Section 2.1 Page 79	Section 2.2 Page 97	Section 2.3 Page 109	Section 2.4 Page 119	Section 2.5 Page 125	Section 2.6 Page 139		
Pressure and Vacuum Sensors						3 Page 145	
Mechanical Pressure PEV	Pressure/Vacuum SDE5	Pressure/Vacuum LCD SDE3	Pressure/Vacuum LCD SDE1	Analog Pressure SDE			
Section 3.1 Page 149	Section 3.2 Page 159	Section 3.3 Page 169	Section 3.4 Page 177	Section 3.5 Page 189			
Flow Sensors							4 Page 197
With Digital Display SFE3	Analog Output SFET-F	Vacuum/Analog SFET-R	With Digital Display SFEV-F, SFEV-R	With Digital Display SFE1	With Digital Display MS6 SFE		
Section 4.1 Page 201	Section 4.2 Page 207	Section 4.3 Page 213	Section 4.4 Page 219	Section 4.5 Page 225	Section 4.6 Page 231		
Actuator Feedback						5 Page 239	
For Slot Type 8 SMT-8/SME-8	For Slot Type 10 SMT-10/SME-10	Position Transmitter SMAT-8E					
Section 5.1 Page 245	Section 5.2 Page 271	Section 5.3 Page 279					
Accessories						6 Page 285	
For Proximity Sensors	For Optical Sensors	For Pressure/Vacuum Sensors	For Flow Sensors	For Actuator Feedback	Multipin Distributors		
Section 6.1 Page 287	Section 6.2 Page 291	Section 6.3 Page 297	Section 6.4 Page 309	Section 6.5 Page 315	Section 6.6 Page 325		

For general ordering information and for information regarding the configuration of Type SDE5, SDE3 and SDE1 Pressure/Vacuum Sensors, see page 4.

Configuring Pressure/Vacuum Sensors

Online Catalog at www.festo.com/us

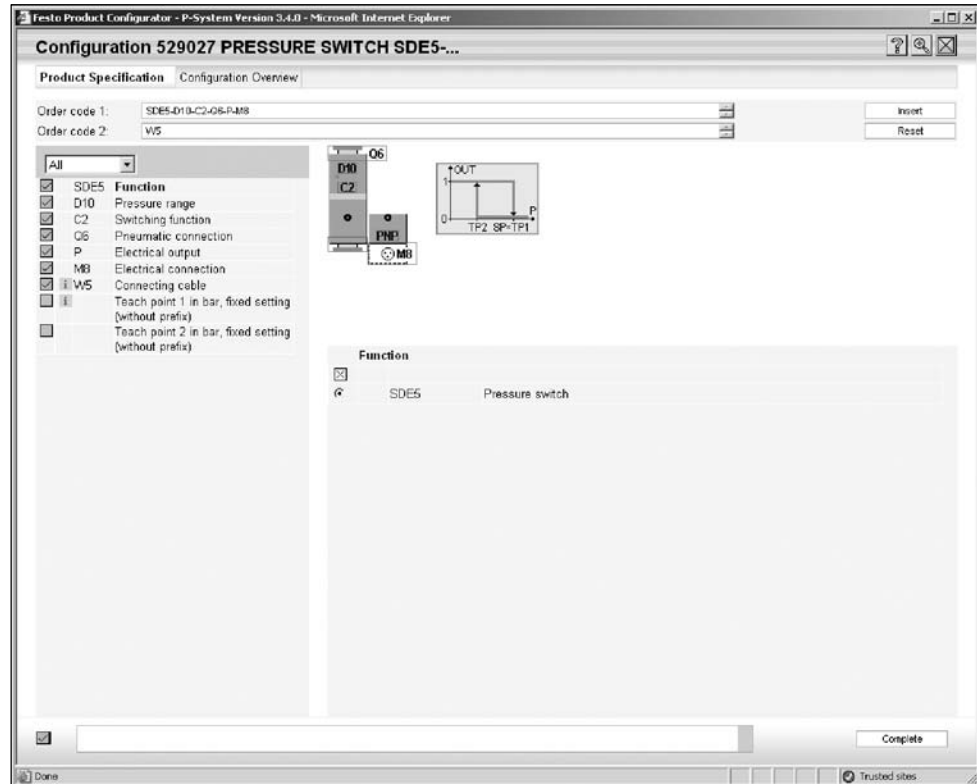
A product configurator is available to help you configure a suitable pressure/vacuum sensor for your application.

All pressure/vacuum sensors can be ordered individually, or if desired, they can be configured according to your specific application. They are ordered via a modular order code, and in this instance, the order code is defined by the type.

The configurable ordering system for the SDE5 pressure/vacuum sensor is found on page 167; for type SDE3, it is on page 175; and for type SDE1, on page 187.

Note

All other products within this catalog are non-configurable, and are easily found within designated ordering tables. For these items, the order code consists of a part number and a type.



The illustration above provides an example of an SDE5 vacuum/pressure sensor configuration.

The following steps explain how you use the product configurator to arrive at the order code for the SDE5 pressure/vacuum sensor.

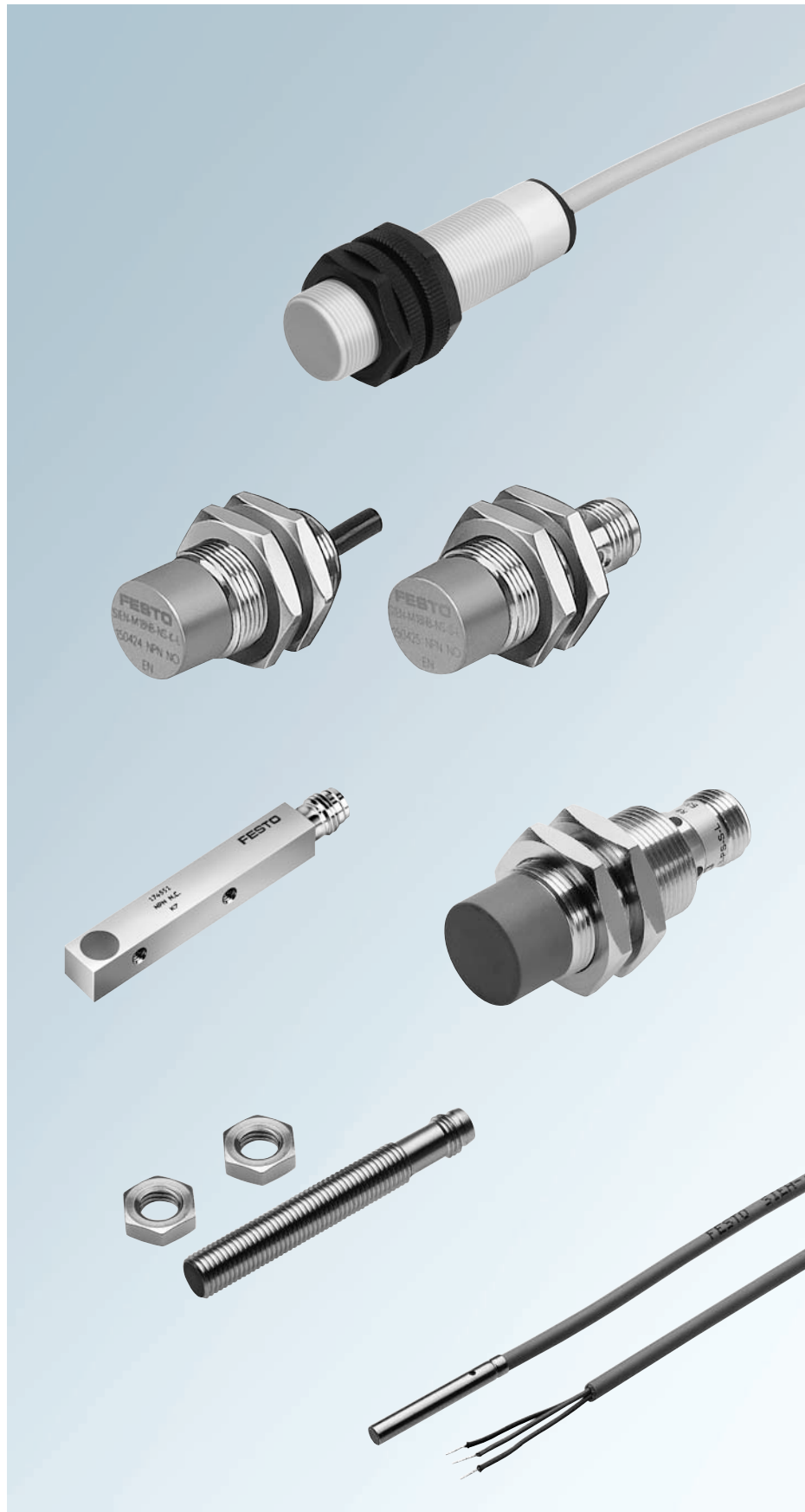
Once you have called up the Festo USA home page, go to the “Industrial Automation” page and click on the Online Catalog “Go” link, or on the “Login” link, if you are already registered. This will bring you to the Online Catalog home page.

In the Products column, select “Sensors and Monitoring Devices”, then “Pressure Switches”, and finally “Electronic Switches”. An SDE5 vacuum/pressure sensor will be shown. Click on the “Show products” box next. The line item with the blue shopping basket icon is configurable. Click on this basket icon; this will add your selection to the shopping basket (this does not initiate an order).

In the right column of the screen, click on “Login basket” to open the shopping basket, then on the “Configurable” symbol to start the configuration process. You can then configure the SDE5 step by step (from the top down) according to your requirements. Press on the “Complete” button, then on the “Continue” link to continue on with the ordering process.

This same configuration/ordering process also applies to type SDE3 and SDE1 pressure/vacuum sensors.

SIE... Proximity Sensors



1

1.0

Inductive proximity sensors to fulfill a broad field of metal sensing applications in all industry segments

Small size, Factor 1 for improved sensing ranges

Various electronic outputs, including VDC/VAC, digital PNP/NPN, and analog

Application specific units for food, packaging, and automotive applications

Standard Switching Distance – SIEN, SIED	Section 1.1 → Page 11
<ul style="list-style-type: none"> ■ Round design ■ Sizes: \varnothing 4 and 6.5 mm, M5, M8x1 to M30x1.5 ■ For DC or AC voltage ■ Switching distances from 0.8 to 15 mm ■ PNP or NPN switch output ■ Normally open and normally closed (NO/NC) 	
Standard Switching Distance – SIES	Section 1.2 → Page 27
<ul style="list-style-type: none"> ■ Block shaped design ■ Sizes: 5x5x25 mm to 40x40x120 mm ■ For DC voltage ■ Switching distances from 0.8 to 15 mm ■ PNP or NPN switch output ■ Normally open, normally closed (NO/NC) and changeover 	
Corrosion-resistant – SIEN, SIED, SIEH-CR	Section 1.3 → Page 35
<ul style="list-style-type: none"> ■ Round design ■ Sizes: M12x1 to M30x1.5 ■ Polyamide or stainless steel housing ■ For DC and AC voltage ■ Switching distances from 2 to 15 mm ■ PNP or NPN switch output ■ Normally open and normally closed (NO/NC) 	
Increased Switching Distance – SIEH	Section 1.4 → Page 49
<ul style="list-style-type: none"> ■ Round design ■ Sizes: \varnothing 3 mm, M12x1, M18x1 ■ For DC and AC voltage ■ Switching distances from 2 to 15 mm ■ PNP or NPN switch output ■ Normally open and normally closed (NO/NC) 	
Analog Output – SIEA	Section 1.5 → Page 55
<ul style="list-style-type: none"> ■ Round design ■ Sizes: M8x1 to M30x1.5 ■ For DC voltage ■ Range: from 0 to 20 mm ■ Analog output 	
Reduction Factor 1 For All Metals – SIEF, SIEF-W	Section 1.6 → Page 61
<ul style="list-style-type: none"> ■ Round and block design ■ Sizes: M8x1 to M30x1.5; block form: 40x40x60 mm ■ For DC voltage ■ Switching distances from 3 to 35 mm ■ PNP or NPN switch output ■ Normally open (NO) and changeover 	

SIE... Proximity Sensors

Complete Product Type Code Overview

		SIE	N	-	M	30	NB	-	P	S	-	K	-	2L	-	
Type																
SIE	Sensors/inductive/electronic															
Construction																
A	Sensors with analog output															
D	Sensors for DC and AC															
F	Sensors with reduction factor 1 for all metals															
H	Sensors with increased switching distance															
N	Sensors with standard switching distance															
S	Special sensor designs															
Z	Accessories															
Design																
	Round															
M	Metric parallel thread															
Q	Block-shaped															
V3	V3 shape (similar to valve V-3-M5)															
Size																
Type of Installation																
B	Flush															
NB	Non-flush															
S	Non-flush															
Electrical Output																
P	PNP switch output															
PU	Analog output 0 ... 10 V															
UI	Analog output 0 ... 10 V and 4 ... 20 mA															
N	NPN switch output															
Z	2-wire output															
Switching Element Function																
S	NO contact															
O	NC contact															
A	Changeover switch															
Electrical Connection																
K	Cable															
S	Plug															
X	Terminals															
Switching Status Display/Ready Status Display																
	Without LED															
L	LED for indicating switching status															
2L	LED for indicating switching status and operating voltage															
Options																
	Standard															
PA	Polyamide															
WA	Welding field immune design															
CR	Corrosion resistant															

Inductive Sensors

Inductive sensors are signal generators which, by contactless means, detect functional motions of processing and production machinery, robots, production lines, conveyor systems, etc. and convert these into electrical signals.

Signal generators of this type have the following characteristics:

- Inductive sensors detect and acquire all electrically conductive

objects which pass through or remain within the high-frequency magnetic field of the oscillator, without making contact with the sensor.

- Inductive sensors function in a contactless fashion, i.e. no mechanical force acts upon the control device or the parts to be sensed.
- Inductive sensors do not require any sensing mechanisms such as

rollers, stems or lever arms commonly used for mechanical limit switches.

- Inductive sensors operate without mechanically actuated electrical contacts. Switching is accomplished by means of electronic components.

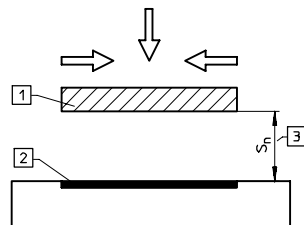
This has the following benefits:

- No mechanical wear and tear, resulting in long service life

- No downtime due to dirty or welded-together contacts
- No contact bounce, and thus no switching errors
- Switching frequencies of up to 3000 Hz
- Vibration-resistant
- Any mounting position
- Fully encapsulated, providing a high degree of protection

Operational Principle

An electrical signal is generated when a metallic object approaches the active surface of the inductive sensor and is situated within the specified switching distance.



- 1 Test plate (steel) St 37
- 2 Active surface
- 3 Switching distance

Types of Installation

Flush Mounting

Flush-mounted sensors can be surrounded by metal right up to the level of the active surface.

Non-flush Mounting

Non-flush-mounted sensors require a metal-free zone around their active surface.

Switching Distances

Nominal Switching Distance S_n

Characteristic value with no allowance for production tolerances or deviations due to temperature or voltage.

Real Switching Distance S_r

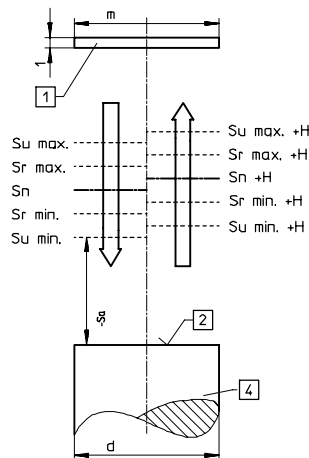
The real switching distance is determined at the rated operating voltage and at an ambient temperature of 293 K (20 °C). It may deviate from the nominal switching distance by a maximum of $\pm 10\%$.

Useful Switching Distance S_u

This is the switching distance for a given sensor within defined voltage and temperature ranges. It may deviate from the actual switching distance by a maximum of $\pm 10\%$.

Assured Switching Distance S_a

This is the switching distance at which the sensor will operate throughout the entire range of permissible operating conditions. Lies between 0 and the lowest value for useful switching distance.



- 1 Test plate
 - 2 Active surface
 - 4 Sensor
- H = Hysteresis

Switching Element Functions

A distinction is made between the following functions:

NO Contact

When the sensor is attenuated, current flows through the load; when the sensor is not attenuated, the current flow is interrupted.

NC Contact

When the sensor is attenuated, the current flow is interrupted; when the sensor is not attenuated, current flows through the load.

Changeover Switch

Both outputs (NC and NO contacts) are available.

Attachment

Sensors without threads should, if possible, be bonded in with adhesive. Sensors can be clamped in

with moderate pressure, which should be distributed over as large an area as possible.

Concentrated pressure, e.g. produced by screws, can easily cause damage to sensors.

Note

Inductive sensors must not be used as end stops.

SIEF-... Proximity Sensors

Properties

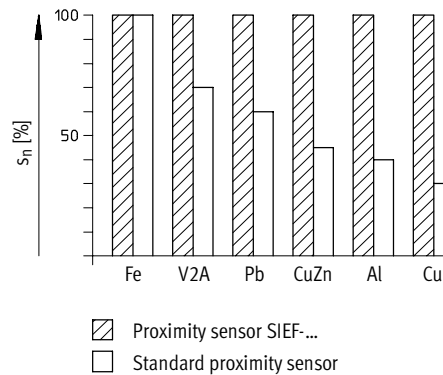
Like all inductive proximity sensors, proximity sensors SIEF-... are able to sense metals without contact and therefore without wear. SIEF proximity sensors have a special structure with a ferrite-free 3-coil system, they have properties that in many applications offer decisive advantages in comparison with conventional inductive sensors.

Extremely Long Switching Distance

Proximity sensors SIEF-... offer a particularly long switching distance, without restricting installability.

Reduction Factor 1

Proximity sensors SIEF-... have the same long switching distance for all metals. In installations that frequently sense aluminum or stainless steel, this translates into an additional switching distance of up to 400% with aluminum.



Magnetic Field Immune

The omission of the ferrite core means that proximity sensors SIEF-... are immune to interference caused by strong magnetic fields such as are found in electronic welding and electronic furnaces.

Large Temperature Range

The ambient temperature range of -30 ... +85 °C means that the proximity sensors can be used at extreme temperature.

High Switching Frequency

The fast air-core coils mean that a SIEF-... is up to 500% faster than a conventional sensor – vital for machines and systems that are becoming increasingly faster.

Excellent EMC Resistance

As well as meeting the requirements of the current standard EN 50082-2, all proximity sensors SIEF-... exceed the stringent requirements of EN 61000-4-6 (these requirements are expected to be incorporated into the standard for proximity sensors from 2005 on).

The proximity sensor SIEF-... is therefore optimally protected, particularly against conducted interference (e.g. by means of frequency converters), ensuring that your systems are equipped for the future.

Mounting

Flush Mounting

Flush mounting means that proximity sensors SIEF-... do not require a metal-free zone around their active surface. Most designs can even be reset by 1 ... 2 mm to protect against mechanical damage. Unlike partially flush devices, flush proximity sensors type SIEF-... can therefore be installed fully flush.

Non-flush Mounting

An integrated pre-attenuation protection system means that non-flush proximity sensors will never be as flexible in terms of installation as flush proximity sensors. The protective effect is produced by means of self-compensation in the innovative multi-coil system.

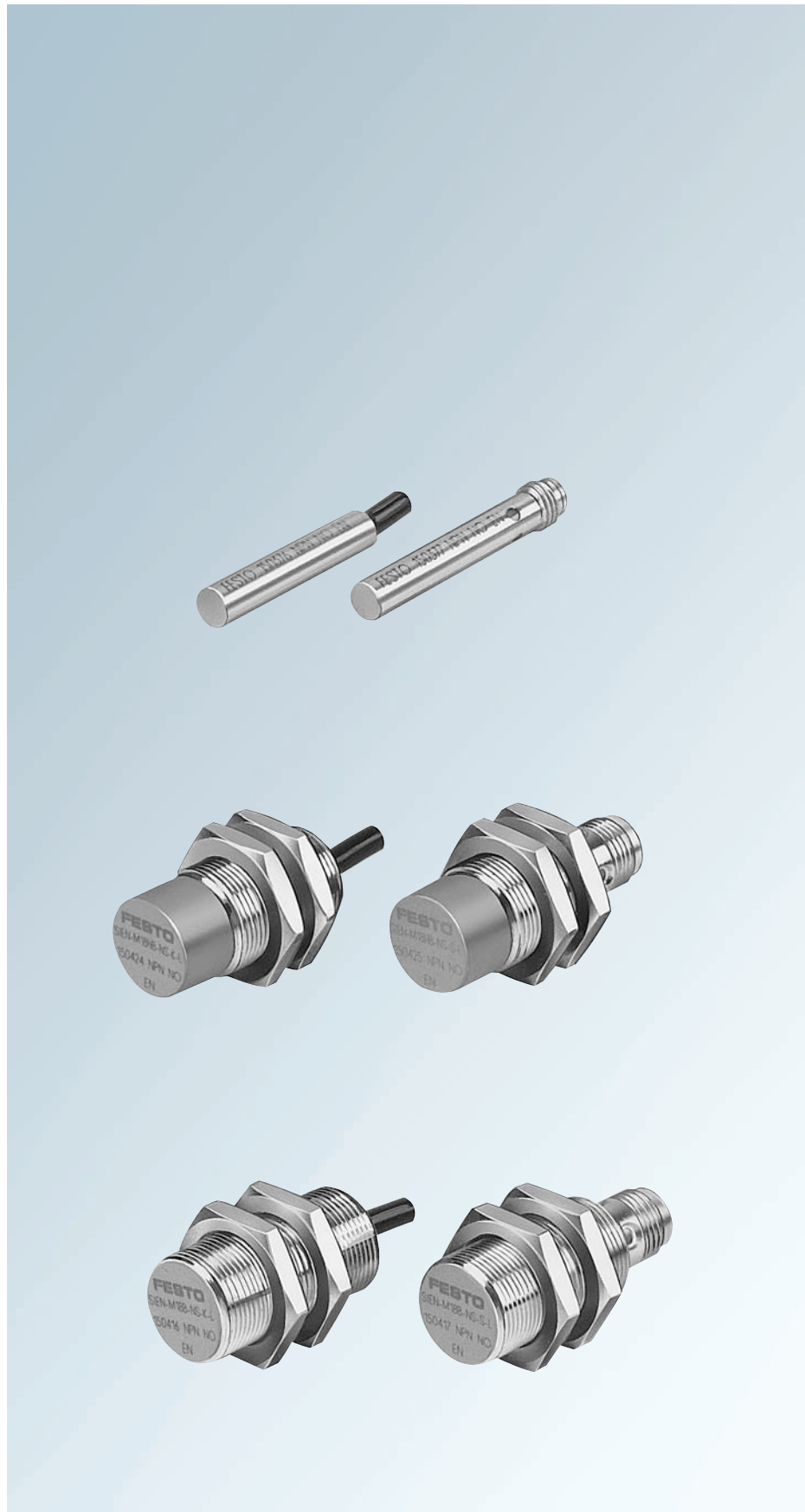
In practice this means that in contrast to conventional sensors with a ferrite core, the metal-free zones can be significantly smaller. Some designs can even be mounted with metal on three sides. The self-compensator automatically compensates the pre-attenuation.

With conventional, non-flush ferrite core sensors, this type of partially flush installation leads to uncontrolled switching. For non-flush proximity sensors SIEF-..., the integrated self-compensator means maximum switching distance without compromise.

SIEN-.../SIED-... Proximity Sensors, Standard Switching Distance

1

1.1



Round design

Sizes: Ø 4 and 6 mm, M5,
M8x1 to M30x1.5

For DC and AC voltage

Switching distances
from 0.8 to 15 mm

Solid State (PNP, NPN)

Normally open and
normally closed (NO/NC)

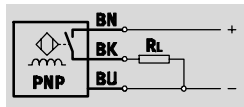
1
1.1

		SIE	N	-			M	30	NB	-		P	S	-		K	-	L
Type																		
SIE	Sensors/inductive/electronic																	
Construction																		
D	Sensors for DC and AC																	
N	Sensors with standard switching distance																	
Design																		
	Round																	
M	Metric parallel thread																	
Size																		
4	∅ 4 mm																	
5	M5																	
6.5	∅ 6.5 mm																	
8	M8x1																	
12	M12x1																	
18	M18x1																	
30	M30x1.5																	
Type of Installation																		
B	Flush																	
NB	Non-flush																	
Electrical Output																		
P	PNP switch output																	
N	NPN switch output																	
Z	2-wire output																	
Switching Element Function																		
S	NO contact																	
O	NC contact																	
Electrical Connection																		
K	Cable																	
S	Plug																	
Switching Status Display/Ready Status Display																		
L	LED for indicating switching status																	

Technical Data

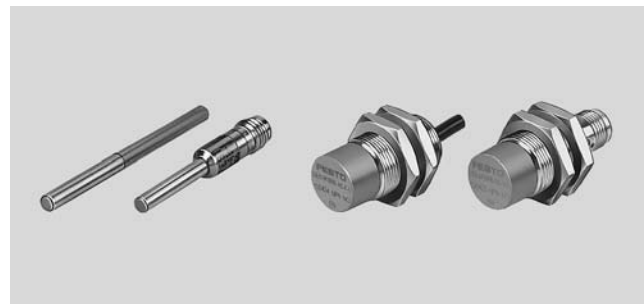
SIEN-... Inductive Proximity Sensors

Function¹⁾



1) e.g. NO contact with PNP output and cable

- Standard Switching Distance
- For DC Voltage
- Round Design



General Technical Data									
Size			∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Type of installation			flush			flush or non-flush			
Nominal switching distance S_n	flush	[mm]	0.8	0.8	1.5	1.5	2.0	5.0	10.0
	non-flush	[mm]	–	–	–	2.5	4.0	8.0	15.0
Assured switching distance S_a	flush	[mm]	0.64	0.64	1.21	1.21	1.62	4.05	8.1
	non-flush	[mm]	–	–	–	2.03	3.24	6.48	12.15
Repeatability	flush	[mm]	±0.04	±0.04	±0.075	±0.075	±0.1	±0.15	±0.3
	non-flush	[mm]	–	–	–	±0.125	±0.2	±0.2	±0.4
Type of mounting			Clamped	Via lock nut	Clamped	Via lock nut			
Tightening torque	[Nm]		–	2	–	5	12	25	50
Ready status display			–						
Switching status display			Yellow LED						
Conforms to			DIN EN 60947-5-2						

Electrical Data									
Size			∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Switch output			PNP or NPN						
Switching element function			NC or NO contact						
Electrical connection	Plug		M8x1, 3-pin				M12x1, 3-pin		
	Cable		3-core						
Cable length	[m]		2.5						
Operating voltage range	[V DC]		10 ... 30			15 ... 34			
Residual ripple	[%]		10						
Max. switching frequency	flush	[Hz]	3000	3000	1500	1500	1200	800	350
	non-flush	[Hz]	–	–	–	900	800	300	300
Max. output current as a function of temperature	[mA]		200 at ≤ 70 °C			150 at ≤ 85 °C			
	[mA]					200 at ≤ 50 °C			
Voltage drop	[V]		2.0			3.2			
Idle current	[mA]		10			30			
Protection against short circuit			Yes, auto recover						
Protection against polarity reversal			For all electrical connections						
Resistance to interference from magnetic fields			–						
Protection class to EN 60529			IP67						
CE symbol			89/336/EEC (EMC)						

1

1.1

Reduction Factors of Nominal Switching Distance S_n							
Size	∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Flush Mounting							
Steel St 37	1.0						
Stainless steel St 18/8	0.7	0.7	0.78	0.78	0.7	0.7	0.7
Brass	0.4	0.4	0.45	0.45	0.5	0.4	0.4
Aluminum	0.4	0.4	0.38	0.38	0.4	0.4	0.4
Copper	0.3	0.3	0.2	0.2	0.2	0.3	0.3
Non-flush Mounting							
Steel St 37	–	–	–	1.0			
Stainless steel St 18/8	–	–	–	0.7	0.8	0.7	0.7
Brass	–	–	–	0.4	0.5	0.4	0.4
Aluminum	–	–	–	0.4	0.5	0.4	0.4
Copper	–	–	–	0.3	0.4	0.3	0.3

Materials							
Size	∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Housing	High-alloy stainless steel				Nickel plated brass		
Cable sheath	Polyurethane						
Note on materials	Free of copper, PTFE and silicone						

Operating and Environmental Conditions							
Size	∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	–25 ... +70		–25 ... +85				

Weight [g]							
Size	∅ 4 mm	M5	∅ 6.5 mm	M8x1	M12x1	M18x1	M30x1.5
Plug version	9	9	20	20	30	40	100
Cable version	48	48	60	60	80	120	170

Technical Data – Dimensions

SIEN-... Inductive Proximity Sensors

Dimensions – Ø 4 mm Download CAD data → www.festo.com/en/engineering

Cable	Plug	Installation	
			<ul style="list-style-type: none"> 1 Connecting cable 2 Active surface 3 Light emitting diode (LED) 4 Light emitting diode (LED) 5 Metal-free zone

Dimensions – M5 Download CAD data → www.festo.com/en/engineering

Cable	Plug	Installation	
			<ul style="list-style-type: none"> 1 Connecting cable 2 Active surface 3 Light emitting diode (LED) 4 Light emitting diode (LED) 5 Metal-free zone

Dimensions – Ø 6.5 mm Download CAD data → www.festo.com/en/engineering

Cable	Plug	Installation	
			<ul style="list-style-type: none"> 1 Connecting cable 2 Active surface 3 Light emitting diode (LED) 4 Light emitting diode (LED) 5 Metal-free zone

1

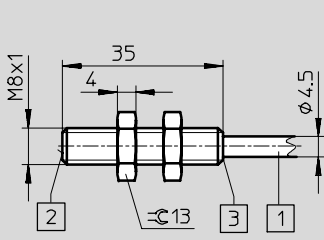
1.1

Dimensions – M8x1

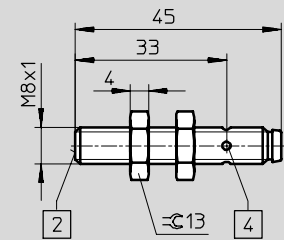
Download CAD data → www.festo.com/en/engineering

Flush Mounting

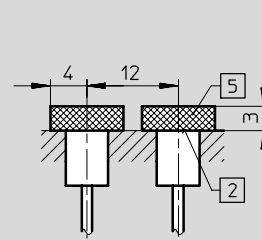
Cable



Plug



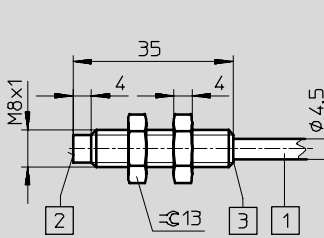
Installation



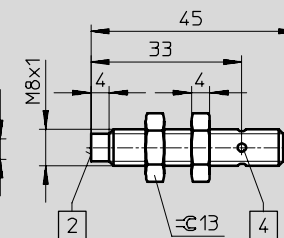
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

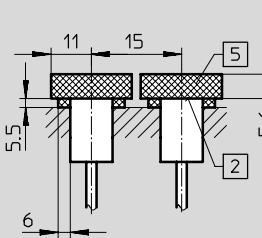
Cable



Plug



Installation



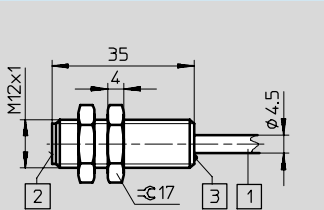
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M12x1

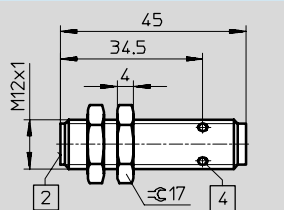
Download CAD data → www.festo.com/en/engineering

Flush Mounting

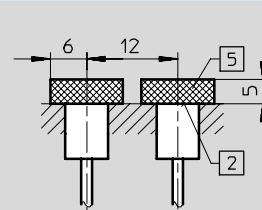
Cable



Plug



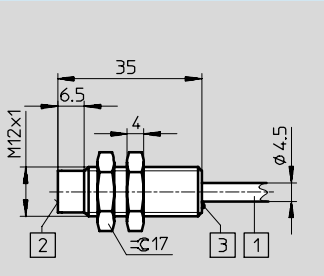
Installation



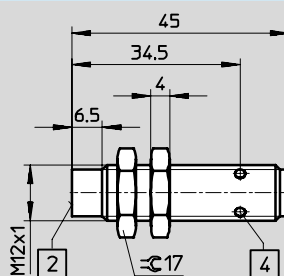
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

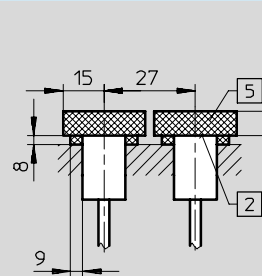
Cable



Plug



Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M18x1 Download CAD data → www.festo.com/en/engineering

Flush Mounting

Cable Plug Installation

1 Connecting cable
2 Active surface
3 Light emitting diode (LED)
4 Light emitting diode (LED)
5 Metal-free zone

Non-flush Mounting

Cable Plug Installation

1 Connecting cable
2 Active surface
3 Light emitting diode (LED)
4 Light emitting diode (LED)
5 Metal-free zone

Dimensions – M30x1.5 Download CAD data → www.festo.com/en/engineering

Flush Mounting

Cable Plug Installation

1 Connecting cable
2 Active surface
3 Light emitting diode (LED)
4 Light emitting diode (LED)
5 Metal-free zone

Non-flush Mounting

Cable Plug Installation

1 Connecting cable
2 Active surface
3 Light emitting diode (LED)
4 Light emitting diode (LED)
5 Metal-free zone

Ordering Data

SIEN-... Inductive Proximity Sensors

1

1.1

Ordering Data – Ø 4 mm						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150362	SIEN-4B-PS-K-L
	■	–	–	■	150363	SIEN-4B-PS-S-L
NPN	■	–	■	–	150360	SIEN-4B-NS-K-L
	■	–	–	■	150361	SIEN-4B-NS-S-L
NC Contact						
PNP	■	–	■	–	150366	SIEN-4B-PO-K-L
	■	–	–	■	150367	SIEN-4B-PO-S-L
NPN	■	–	■	–	150364	SIEN-4B-NO-K-L
	■	–	–	■	150365	SIEN-4B-NO-S-L

Ordering Data – Ø 6.5 mm						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150378	SIEN-6.5B-PS-K-L
	■	–	–	■	150379	SIEN-6.5B-PS-S-L
NPN	■	–	■	–	150376	SIEN-6.5B-NS-K-L
	■	–	–	■	150377	SIEN-6.5B-NS-S-L
NC Contact						
PNP	■	–	■	–	150382	SIEN-6.5B-PO-K-L
	■	–	–	■	150383	SIEN-6.5B-PO-S-L
NPN	■	–	■	–	150380	SIEN-6.5B-NO-K-L
	■	–	–	■	150381	SIEN-6.5B-NO-S-L

Ordering Data – M5						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150370	SIEN-M5B-PS-K-L
	■	–	–	■	150371	SIEN-M5B-PS-S-L
NPN	■	–	■	–	150368	SIEN-M5B-NS-K-L
	■	–	–	■	150369	SIEN-M5B-NS-S-L
NC Contact						
PNP	■	–	■	–	150374	SIEN-M5B-PO-K-L
	■	–	–	■	150375	SIEN-M5B-PO-S-L
NPN	■	–	■	–	150372	SIEN-M5B-NO-K-L
	■	–	–	■	150373	SIEN-M5B-NO-S-L

Ordering Data

SIEN-... Inductive Proximity Sensors

1
1.1

Ordering Data – M8x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150386	SIEN-M8B-PS-K-L
	■	–	–	■	150387	SIEN-M8B-PS-S-L
	–	■	■	–	150394	SIEN-M8NB-PS-K-L
	–	■	–	■	150395	SIEN-M8NB-PS-S-L
NPN	■	–	■	–	150384	SIEN-M8B-NS-K-L
	■	–	–	■	150385	SIEN-M8B-NS-S-L
	–	■	■	–	150392	SIEN-M8NB-NS-K-L
	–	■	–	■	150393	SIEN-M8NB-NS-S-L
NC Contact						
PNP	■	–	■	–	150390	SIEN-M8B-PO-K-L
	■	–	–	■	150391	SIEN-M8B-PO-S-L
	–	■	■	–	150398	SIEN-M8NB-PO-K-L
	–	■	–	■	150399	SIEN-M8NB-PO-S-L
NPN	■	–	■	–	150388	SIEN-M8B-NO-K-L
	■	–	–	■	150389	SIEN-M8B-NO-S-L
	–	■	■	–	150396	SIEN-M8NB-NO-K-L
	–	■	–	■	150397	SIEN-M8NB-NO-S-L

Ordering Data – M12x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150402	SIEN-M12B-PS-K-L
	■	–	–	■	150403	SIEN-M12B-PS-S-L
	–	■	■	–	150410	SIEN-M12NB-PS-K-L
	–	■	–	■	150411	SIEN-M12NB-PS-S-L
NPN	■	–	■	–	150400	SIEN-M12B-NS-K-L
	■	–	–	■	150401	SIEN-M12B-NS-S-L
	–	■	■	–	150408	SIEN-M12NB-NS-K-L
	–	■	–	■	150409	SIEN-M12NB-NS-S-L
NC Contact						
PNP	■	–	■	–	150406	SIEN-M12B-PO-K-L
	■	–	–	■	150407	SIEN-M12B-PO-S-L
	–	■	■	–	150414	SIEN-M12NB-PO-K-L
	–	■	–	■	150415	SIEN-M12NB-PO-S-L
NPN	■	–	■	–	150404	SIEN-M12B-NO-K-L
	■	–	–	■	150405	SIEN-M12B-NO-S-L
	–	■	■	–	150412	SIEN-M12NB-NO-K-L
	–	■	–	■	150413	SIEN-M12NB-NO-S-L

Ordering Data

SIEN-... Inductive Proximity Sensors

1

1.1

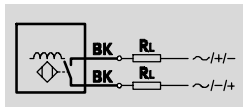
Ordering Data – M18x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150418	SIEN-M18B-PS-K-L
	■	–	–	■	150419	SIEN-M18B-PS-S-L
	–	■	■	–	150426	SIEN-M18NB-PS-K-L
	–	■	–	■	150427	SIEN-M18NB-PS-S-L
NPN	■	–	■	–	150416	SIEN-M18B-NS-K-L
	■	–	–	■	150417	SIEN-M18B-NS-S-L
	–	■	■	–	150424	SIEN-M18NB-NS-K-L
	–	■	–	■	150425	SIEN-M18NB-NS-S-L
NC Contact						
PNP	■	–	■	–	150422	SIEN-M18B-PO-K-L
	■	–	–	■	150423	SIEN-M18B-PO-S-L
	–	■	■	–	150430	SIEN-M18NB-PO-K-L
	–	■	–	■	150431	SIEN-M18NB-PO-S-L
NPN	■	–	■	–	150420	SIEN-M18B-NO-K-L
	■	–	–	■	150421	SIEN-M18B-NO-S-L
	–	■	■	–	150428	SIEN-M18NB-NO-K-L
	–	■	–	■	150429	SIEN-M18NB-NO-S-L

Ordering Data – M30x1.5						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150434	SIEN-M30B-PS-K-L
	■	–	–	■	150435	SIEN-M30B-PS-S-L
	–	■	■	–	150442	SIEN-M30NB-PS-K-L
	–	■	–	■	150443	SIEN-M30NB-PS-S-L
NPN	■	–	■	–	150432	SIEN-M30B-NS-K-L
	■	–	–	■	150433	SIEN-M30B-NS-S-L
	–	■	■	–	150440	SIEN-M30NB-NS-K-L
	–	■	–	■	150441	SIEN-M30NB-NS-S-L
NC Contact						
PNP	■	–	■	–	150438	SIEN-M30B-PO-K-L
	■	–	–	■	150439	SIEN-M30B-PO-S-L
	–	■	■	–	150446	SIEN-M30NB-PO-K-L
	–	■	–	■	150447	SIEN-M30NB-PO-S-L
NPN	■	–	■	–	150436	SIEN-M30B-NO-K-L
	■	–	–	■	150437	SIEN-M30B-NO-S-L
	–	■	■	–	150444	SIEN-M30NB-NO-K-L
	–	■	–	■	150445	SIEN-M30NB-NO-S-L

Technical Data

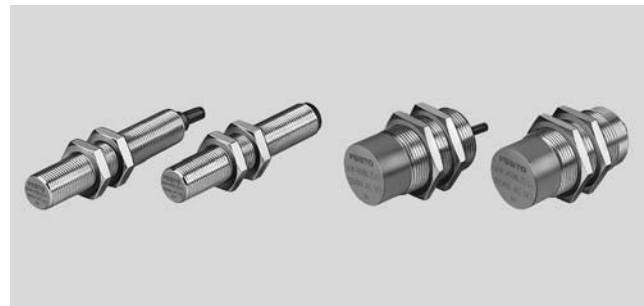
SIED-... Inductive Proximity Sensors

Function¹⁾



- Standard Switching Distance
- For DC and AC
- Round Design

1) e.g. NO contact and cable



General Technical Data			M12x1	M18x1	M30x1.5
Size			M12x1	M18x1	M30x1.5
Type of installation	flush or non-flush				
Nominal switching distance S_n	flush	[mm]	2.0	5.0	10.0
	non-flush	[mm]	4.0	8.0	15.0
Assured switching distance S_a	flush	[mm]	1.62	4.05	8.1
	non-flush	[mm]	3.24	6.5	12.15
Repeatability	flush	[mm]	±0.1	±0.15	±0.3
	non-flush	[mm]	±0.2	±0.2	±0.4
Type of mounting	Via lock nut				
Tightening torque	[Nm]		10	20	40
Ready status display	-				
Switching status display	Yellow LED				
Conforms to	DIN EN 60947-5-2				

Electrical Data			M12x1	M18x1	M30x1.5
Size			M12x1	M18x1	M30x1.5
Switching element function	NC or NO contact				
Electrical connection	Plug		M12x1, 2-pin		
	Cable		2-core		
Cable length	[m]		2.5		
Operating voltage range	[V DC]		20 ... 320		
	[V AC]		20 ... 265		
Max. switching frequency DC	flush	[Hz]	1200	490	220
	non-flush	[Hz]	900	340	200
Max. switching frequency AC	flush	[Hz]	25		
	non-flush	[Hz]	25		
Max. output current	[mA]		200	300	
Minimum load current	[mA]		5.0		
Mains frequency	[Hz]		50		
Voltage drop	[V]		≤ 8.0		
Idle current	[mA]		≤ 1.5		
Protection against short circuit	No				
Protection against polarity reversal	For all electrical connections				
Protection against overloading	Not available				
Resistance to interference from magnetic fields	-				
Inductive protective circuit	Integrated				
Protection class to EN 60529	IP67				
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)				

Reduction Factors of Nominal Switching Distance S_n			
Size	M12x1	M18x1	M30x1.5
Flush Mounting			
Steel St 37	1.0		
Stainless steel St 18/8	0.9	0.7	0.7
Brass	0.6	0.4	0.4
Aluminum	0.5	0.4	0.4
Copper	0.4	0.3	0.3
Non-flush Mounting			
Steel St 37	1.0		
Stainless steel St 18/8	0.9	0.7	0.8
Brass	0.6	0.4	0.5
Aluminum	0.6	0.5	0.5
Copper	0.5	0.3	0.4

Materials			
Size	M12x1	M18x1	M30x1.5
Housing	Nickel plated brass, Polyamide		
Cable sheath	Polyurethane		
Note on materials	Free of copper, PTFE and silicone		

Operating and Environmental Conditions			
Size	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	-25 ... +85		
Ambient temperature with flexible cable installation [°C]	-5 ... +50		
Corrosion resistance class CRC ¹⁾	1		

1) Corrosion resistance class 1 according to Festo standard 940070. Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

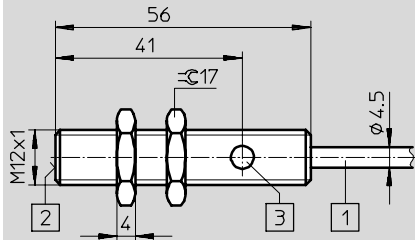
Weight [g]			
Size	M12x1	M18x1	M30x1.5
Plug version	20	50	140
Cable version	90	110	190

Dimensions – M12x1

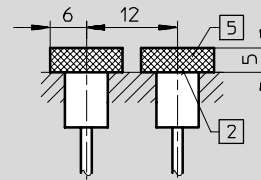
Download CAD data → www.festo.com/en/engineering

Flush Mounting

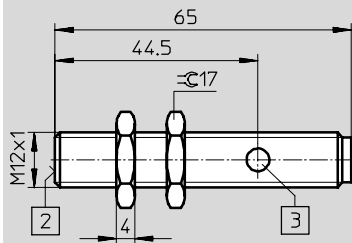
Cable



Installation



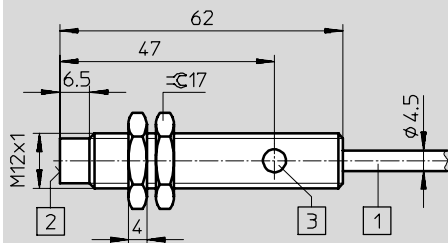
Plug



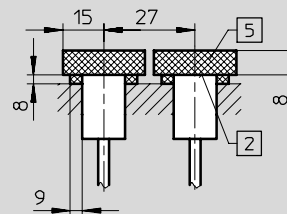
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

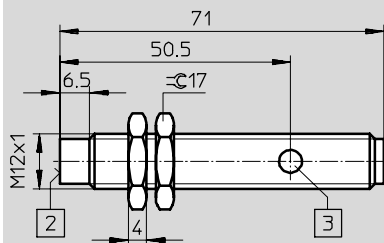
Cable



Installation



Plug



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

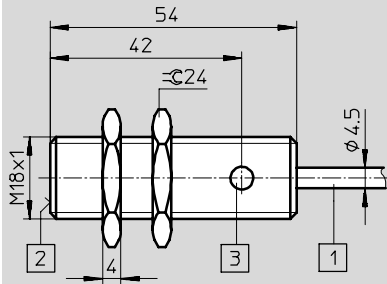
1

1.1

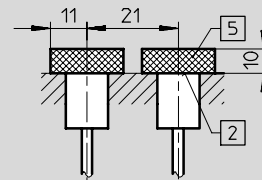
Dimensions – M18x1

Flush Mounting

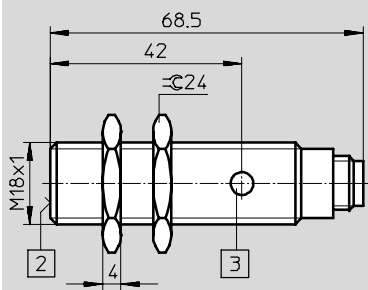
Cable



Installation



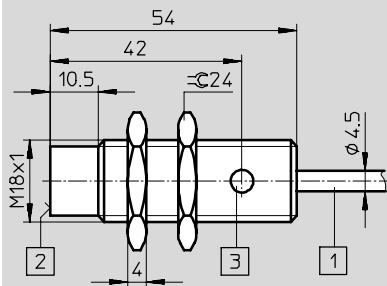
Plug



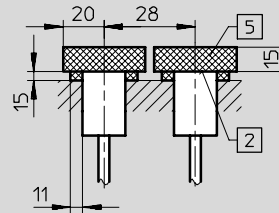
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

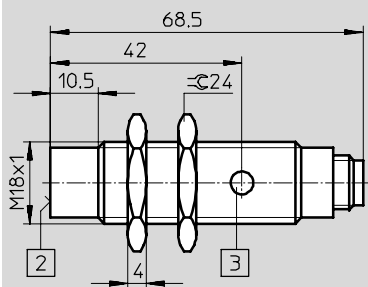
Cable



Installation



Plug



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M30x1.5

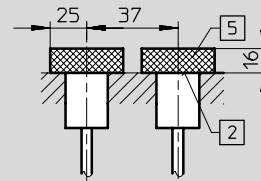
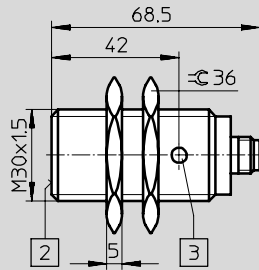
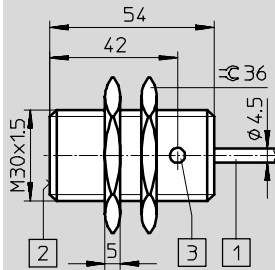
Download CAD data → www.festo.com/en/engineering

Flush Mounting

Cable

Plug

Installation



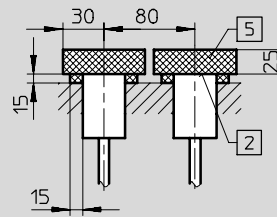
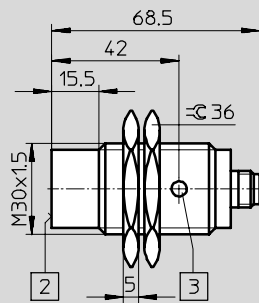
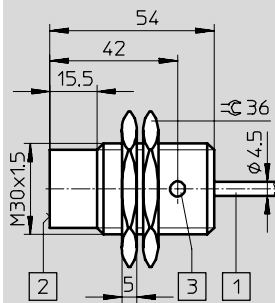
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

Cable

Plug

Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data

SIED-... Inductive Proximity Sensors

1

1.1

Ordering Data – M12x1					
Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO Contact					
■	-	■	-	538272	SIED-M12B-ZS-K-L
■	-	-	■	538271	SIED-M12B-ZS-S-L
-	■	■	-	538268	SIED-M12NB-ZS-K-L
-	■	-	■	538267	SIED-M12NB-ZS-S-L
NC Contact					
■	-	■	-	538274	SIED-M12B-ZO-K-L
■	-	-	■	538273	SIED-M12B-ZO-S-L
-	■	■	-	538270	SIED-M12NB-ZO-K-L
-	■	-	■	538269	SIED-M12NB-ZO-S-L

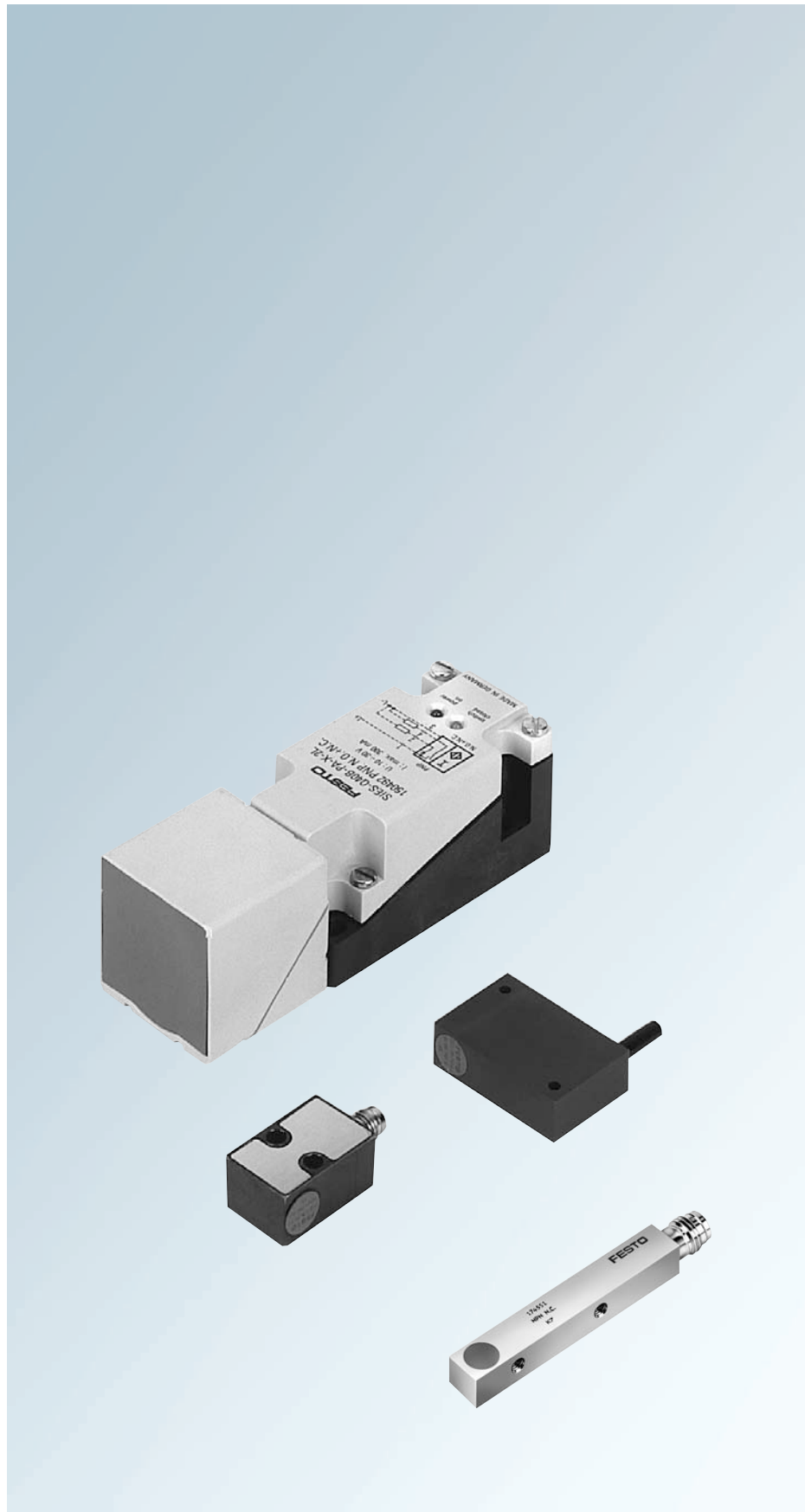
Ordering Data – M18x1					
Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO Contact					
■	-	■	-	538280	SIED-M18B-ZS-K-L
■	-	-	■	538279	SIED-M18B-ZS-S-L
-	■	■	-	538276	SIED-M18NB-ZS-K-L
-	■	-	■	538275	SIED-M18NB-ZS-S-L
NC Contact					
■	-	■	-	538282	SIED-M18B-ZO-K-L
■	-	-	■	538281	SIED-M18B-ZO-S-L
-	■	■	-	538278	SIED-M18NB-ZO-K-L
-	■	-	■	538277	SIED-M18NB-ZO-S-L

Ordering Data – M30x1.5					
Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO Contact					
■	-	■	-	538288	SIED-M30B-ZS-K-L
■	-	-	■	538287	SIED-M30B-ZS-S-L
-	■	■	-	538284	SIED-M30NB-ZS-K-L
-	■	-	■	538283	SIED-M30NB-ZS-S-L
NC Contact					
■	-	■	-	538290	SIED-M30B-ZO-K-L
■	-	-	■	538289	SIED-M30B-ZO-S-L
-	■	■	-	538286	SIED-M30NB-ZO-K-L
-	■	-	■	538285	SIED-M30NB-ZO-S-L

SIES-... Proximity Sensors, Standard Switching Distance

1

1.2



Block-shaped design

Sizes: 5x5x25 mm to
40x40x120 mm

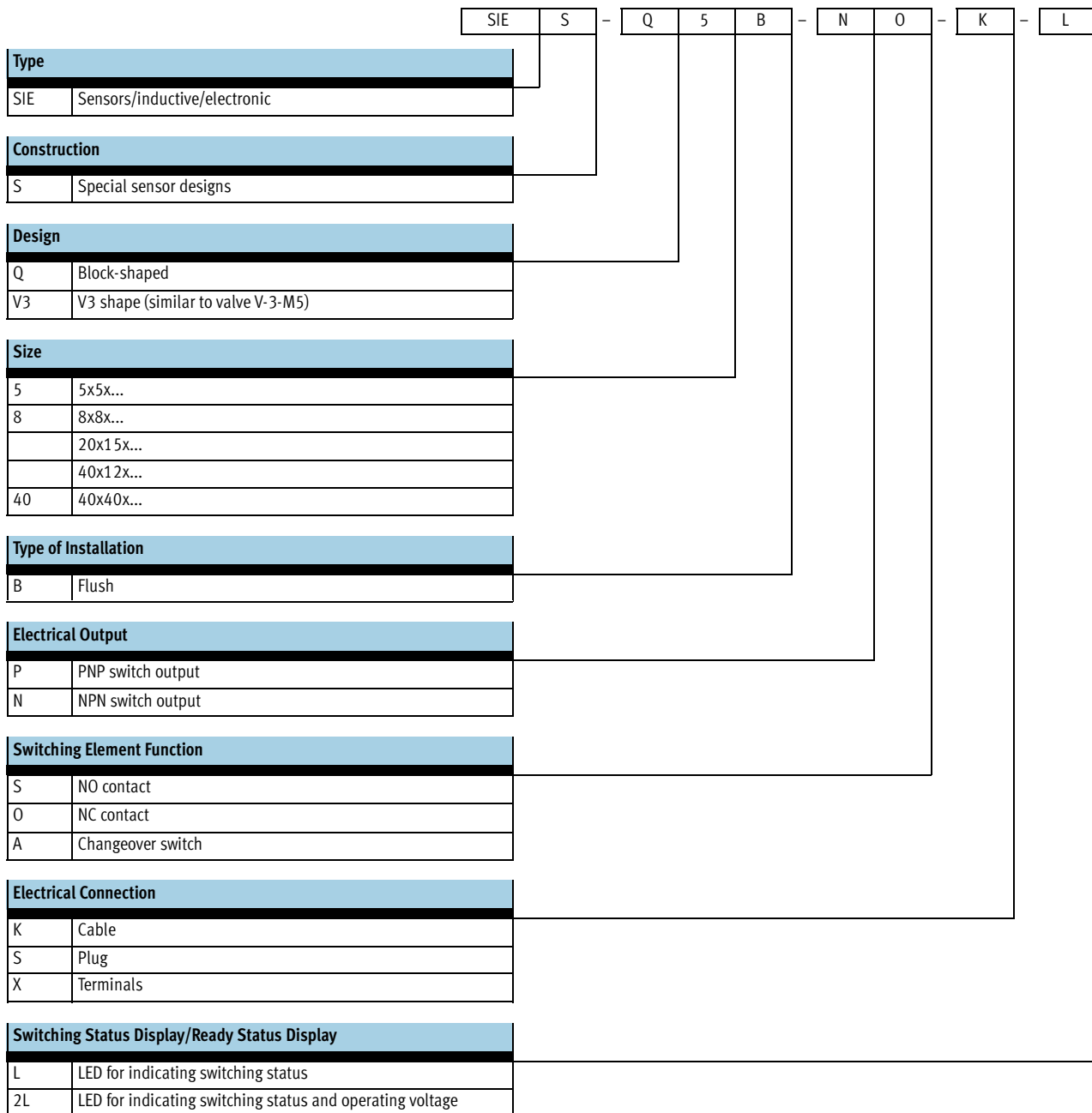
For DC voltage

Switching distances
from 0.8 to 15 mm

Solid State (PNP, NPN)

Normally open,
normally closed (NO/NC)
and changeover

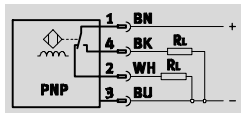
1
1.2



Technical Data

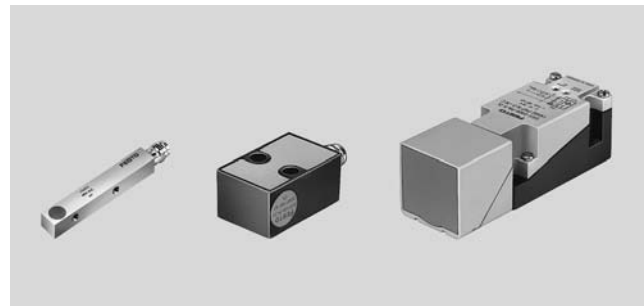
SIES-... Inductive Proximity Sensors

Function¹⁾



1) e.g. changeover with PNP output and terminals

- Standard Switching Distance
- For DC Voltage
- Block-shaped Design



General Technical Data						
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...	
Type of installation	flush					
Nominal switching distance S_n	[mm]	0.8	1.5	2.0	2.0	15.0
Assured switching distance S_a	[mm]	0.64	1.2	1.6	1.6	12.2
Repeatability	[mm]	±0.04	±0.075	±0.1	±0.1	±0.75
Type of mounting	Via female threads		Via through-holes			
Ready status display	-				Green LED	
Switching status display	Yellow LED					
Conforms to	DIN EN 60947-5-2					

Electrical Data						
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...	
Switch output	PNP or NPN					
Switching element function	NC or NO contact				Changeover switch	
Electrical connection	Plug	-	M8x1, 3-pin	M8x1, 3-pin	-	Screw terminal
	Cable	3-core	3-core	-	3-core	-
Cable length	[m]	2.5				
Operating voltage range	[V DC]	10 ... 30				
Residual ripple	[%]	10				
Max. switching frequency	[Hz]	3000	1500	1200	1200	100
Max. output current	[mA]	200		-		
Max. output current as a function of temperature	[mA]	200 at ≤ 70 °C		150 at ≤ 85 °C		
	[mA]			200 at ≤ 50 °C		
Voltage drop	[V]	2.0		3.2		3.5
Idle current	[mA]	10		30		
Protection against short circuit	Yes, auto recover					
Protection against polarity reversal	For all electrical connections					
Resistance to interference from magnetic fields	-					
Protection class to EN 60529	IP67				IP65	
CE symbol	89/336/EEC (EMC)					

1

1.2

Reduction Factors of Nominal Switching Distance S_n					
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...
Steel St 37	1.0				
Stainless steel St 18/8	0.7	0.8	0.7	0.8	0.7
Brass	0.4	0.5	0.5	0.5	0.3
Aluminum	0.4	0.4	0.45	0.45	0.3
Copper	0.3	0.2	0.3	0.35	0.25

Materials					
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...
Housing	Nickel plated brass		Die-cast zinc	Polybutylene terephthalate, reinforced	Polyester
Cable sheath	Polyurethane				-
Note on materials	Free of copper, PTFE and silicone				

Operating and Environmental Conditions					
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...
Ambient temperature [°C]	-25 ... +70		-25 ... +85		

Weight [g]					
Design	SIES-Q5B-...	SIES-Q8B-...	SIES-V3B-...	SIES-QB-...	SIES-Q40B-...
Plug version	-	15	120	-	230
Cable version	22	15	-	170	-

Technical Data – Dimensions

SIES... Inductive Proximity Sensors

Dimensions – SIES-Q5B Download CAD data → www.festo.com/en/engineering

Cable Installation

1.5

5.5

14

25

M1.6

2.5

5

2

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – SIES-Q8B Download CAD data → www.festo.com/en/engineering

Cable Plug Installation

8

5

37

4.5

40

10

20

M3

8

5

50

M8x1

3

10

20

59

M3

4

12

3

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – SIES-V3B Download CAD data → www.festo.com/en/engineering

Plug Installation

13

4.5

20

12

15

10

42

30

5.5

M8x1

6

12

5

- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

1

1.2

Technical Data – Dimensions

SIES... Inductive Proximity Sensors

FESTO

1

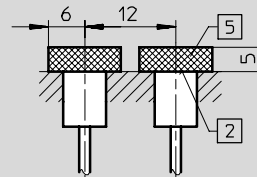
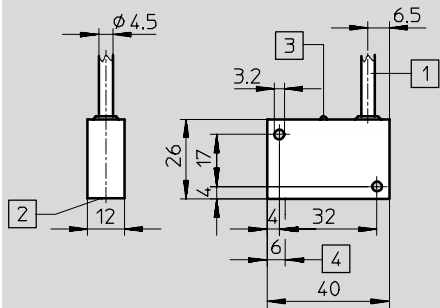
1.2

Dimensions – SIES-QB

Download CAD data → www.festo.com/en/engineering

Cable

Installation



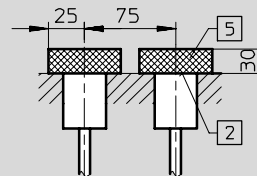
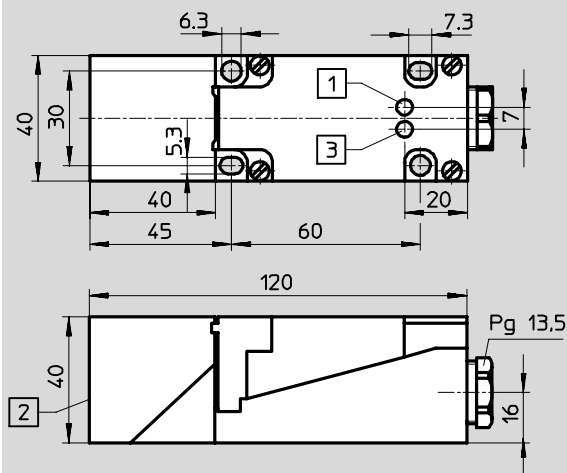
- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Sensor centre
- 5 Metal-free zone

Dimensions – SIES-Q40B

Download CAD data → www.festo.com/en/engineering

Plug

Installation



- 1 Ready status display
- 2 Supplied with active surface facing forward: sensor head can be adjusted to any one of 5 response directions
- 3 Switching status display
- 5 Metal-free zone

Ordering Data

SIES... Inductive Proximity Sensors

Ordering Data – Design SIES-Q5B							
Switch Output	Installation		Electrical Connection			Part No.	Type
	Flush	Non-flush	Cable	Plug			
NO Contact							
PNP	■	–	■	–		178291	SIES-Q5B-PS-K-L
NPN	■	–	■	–		178290	SIES-Q5B-NS-K-L
NC Contact							
PNP	■	–	■	–		174549	SIES-Q5B-PO-K-L
NPN	■	–	■	–		174548	SIES-Q5B-NO-K-L

Ordering Data – Design SIES-Q8B							
Switch Output	Installation		Electrical Connection			Part No.	Type
	Flush	Non-flush	Cable	Plug			
NO Contact							
PNP	■	–	■	–		178294	SIES-Q8B-PS-K-L
	■	–	–	■		178295	SIES-Q8B-PS-S-L
NPN	■	–	■	–		178292	SIES-Q8B-NS-K-L
	■	–	–	■		178293	SIES-Q8B-NS-S-L
NC Contact							
PNP	■	–	■	–		174552	SIES-Q8B-PO-K-L
	■	–	–	■		174553	SIES-Q8B-PO-S-L
NPN	■	–	■	–		174550	SIES-Q8B-NO-K-L
	■	–	–	■		174451	SIES-Q8B-NO-S-L

Ordering Data – Remaining Variants							
Switch Output	Installation		Electrical Connection			Part No.	Type
	Flush	Non-flush	Cable	Plug	Screw terminal		
NO Contact							
PNP	■	–	–	■	–	150491	SIES-V3B-PS-S-L
NPN	■	–	–	■	–	150490	SIES-V3B-NS-S-L
PNP	■	–	■	–	–	150488	SIES-QB-PS-K-L
NC Contact							
PNP	■	–	■	–	–	150489	SIES-QB-PO-K-L
Changeover Switch							
PNP	■	–	–	–	■	150492	SIES-Q40B-PA-X-2L

SIEN-...-PA/SIED-...-PA/SIEH-...-CR Proximity Sensors, Corrosion Resistant



1

1.3

Round design

Sizes: M12x1 to M30x15

Polyamide or stainless steel housing

For DC and AC voltage

Switching distances from 2 to 15 mm

Solid State (PNP, NPN)

Normally open and normally closed (NO/NC)

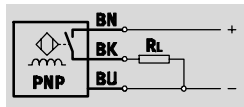
1
1.3

		SIE	N	-	M	12	B	-	P	S	-	K	-	PA
Type														
SIE	Sensors/inductive/electronic													
Construction														
N	Sensors with standard switching distance													
D	Sensors for DC and AC													
H	Sensors with standard switching distance													
Design														
M	Metric parallel thread													
Size														
12	M12x1													
18	M18x1													
30	M30x1.5													
Type of Installation														
B	Flush													
NB	Non-flush													
Electrical Output														
P	PNP switch output													
N	NPN switch output													
Z	2-wire output													
Switching Element Function														
S	NO contact													
Electrical Connection														
K	Cable													
S	Plug													
L	LED for indicating switching status													
Options														
PA	Polyamide													
CR	Corrosion resistant													

Technical Data

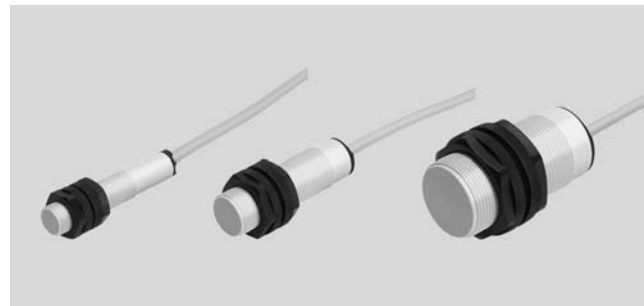
SIEN-...-PA Inductive Proximity Sensors

Function¹⁾



1) e.g. NO contact with PNP output and cable

- Standard Switching Distance
- Corrosion-resistant
- Polyamide Housing
- For DC Voltage
- Round Design



General Technical Data					
Size			M12x1	M18x1	M30x1.5
Type of installation	flush or non-flush				
Nominal switching distance S_n	flush	[mm]	2.0	5.0	10.0
	non-flush	[mm]	4.0	8.0	15.0
Assured switching distance S_a	flush	[mm]	1.62	4.05	8.1
	non-flush	[mm]	3.24	6.48	12.15
Repeatability	flush	[mm]	0.04	0.1	0.2
	non-flush	[mm]	0.08	0.16	0.3
Type of mounting	Via lock nut				
Tightening torque	[Nm]		1.0	2.0	5.0
Ready status display	-				
Switching status display	Yellow LED				
Conforms to	DIN EN 60947-5-2				

Electrical Data					
Size			M12x1	M18x1	M30x1.5
Switch output	PNP or NPN				
Switching element function	NO contact				
Electrical connection	Cable		3-core		
Cable length	[m]		2.5		
Operating voltage range	[V DC]		10 ... 30		
Residual ripple	[%]		10		
Max. switching frequency	flush	[Hz]	2000	1000	500
	non-flush	[Hz]	2000	1000	500
Max. output current	[mA]		200		
Voltage drop	[V]		≤ 1.8		
Idle current	[mA]		≤ 15		
Protection against short circuit	Yes, auto recover				
Protection against polarity reversal	For all electrical connections				
Resistance to interference from magnetic fields	-				
Protection class to EN 60529	IP65/IP67				
CE symbol	89/336/EEC (EMC)				

1

1.3

Reduction Factors of Nominal Switching Distance S_n			
Size	M12x1	M18x1	M30x1.5
Steel St 37	1.0		
Stainless steel St 18/8	0.6 ... 1.0		
Brass	0.35 ... 0.5		
Aluminum	0.35 ... 0.5		
Copper	0.25 ... 0.45		

Materials			
Size	M12x1	M18x1	M30x1.5
Housing	Polyamide, reinforced		
Cable sheath	Polyvinyl chloride		
Note on materials	Free of copper, PTFE and silicone		

Operating and Environmental Conditions			
Size	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	-25 ... +70		
Ambient temperature with flexible cable installation [°C]	0 ... +70		
Corrosion resistance class CRC ¹⁾	4		

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Weight [g]			
Size	M12x1	M18x1	M30x1.5
	113	127	158

Technical Data – Dimensions

SIEN-...-PA Inductive Proximity Sensors

Dimensions – M12x1 Download CAD data → www.festo.com/en/engineering

Flush Mounting **Installation**

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting **Installation**

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M18x1 Download CAD data → www.festo.com/en/engineering

Flush Mounting **Installation**

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting **Installation**

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

1

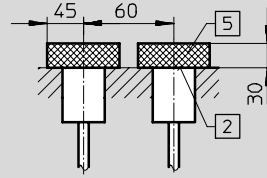
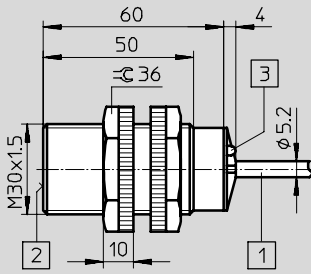
1.3

Download CAD data → www.festo.com/en/engineering

Dimensions – M30x1.5

Flush Mounting

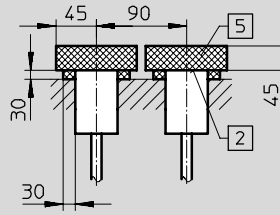
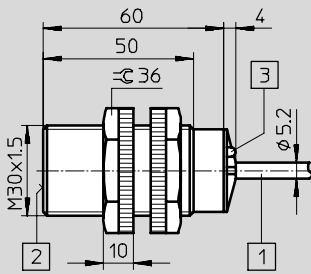
Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting

Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data – M12x1

Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO contact						
PNP	■	-	■	-	538323	SIEN-M12B-PS-K-L-PA
	-	■	■	-	538329	SIEN-M12NB-PS-K-L-PA
NPN	■	-	■	-	538324	SIEN-M12B-NS-K-L-PA
	-	■	■	-	538330	SIEN-M12NB-NS-K-L-PA

Ordering Data – M18x1

Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO contact						
PNP	■	-	■	-	538325	SIEN-M18B-PS-K-L-PA
	-	■	■	-	538331	SIEN-M18NB-PS-K-L-PA
NPN	■	-	■	-	538326	SIEN-M18B-NS-K-L-PA
	-	■	■	-	538332	SIEN-M18NB-NS-K-L-PA

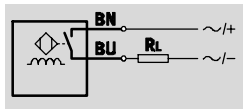
Ordering Data – M30x1.5

Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO contact						
PNP	■	-	■	-	538327	SIEN-M30B-PS-K-L-PA
	-	■	■	-	538333	SIEN-M30NB-PS-K-L-PA
NPN	■	-	■	-	538328	SIEN-M30B-NS-K-L-PA
	-	■	■	-	538334	SIEN-M30NB-NS-K-L-PA

Technical Data

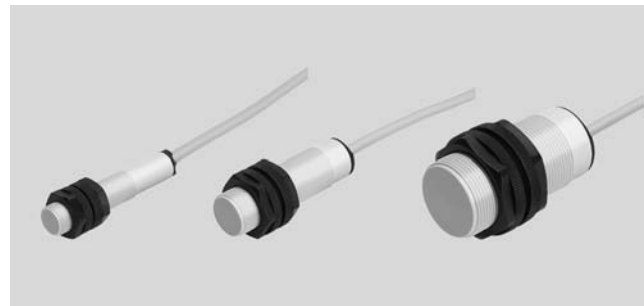
SIED-...-PA Inductive Proximity Sensors

Function¹⁾



1) e.g. NO contact with cable

- Standard Switching Distance
- Corrosion-resistant
- Polyamide Housing
- For DC and AC
- Round Design



General Technical Data					
Size			M12x1	M18x1	M30x1.5
Type of installation			flush or non-flush		
Nominal switching distance S_n	flush	[mm]	2.0	5.0	10.0
	non-flush	[mm]	4.0	8.0	15.0
Assured switching distance S_a	flush	[mm]	1.62	4.05	8.1
	non-flush	[mm]	3.24	6.5	12.15
Repeatability	flush	[mm]	0.04	0.1	0.2
	non-flush	[mm]	0.08	0.16	0.3
Type of mounting			Via lock nut		
Tightening torque	[Nm]		1.0	2.0	5.0
Ready status display			-		
Switching status display			Yellow LED		
Conforms to			DIN EN 60947-5-2		

Electrical Data					
Size			M12x1	M18x1	M30x1.5
Switching element function			NO contact		
Electrical connection	Plug		M12x1, 2-pin		
	Cable		2-core		
Cable length	[m]		2.5		
Operating voltage range	[V DC]		10 ... 300		
	[V AC]		20 ... 250		
Residual ripple	[%]				
Max. switching frequency DC	[Hz]		60		
Max. switching frequency AC	[Hz]		20		
Max. output current	[mA]		100	300	
Minimum load current	[mA]		3.0		
Mains frequency	[Hz]		50 ... 60		
Voltage drop	[V]		≤ 6.0		
Idle current	[mA]		≤ 1.5		
Protection against short circuit			No		
Protection against polarity reversal			For all electrical connections		
Resistance to interference from magnetic fields					
Protection class to EN 60529			IP65/IP67		
CE symbol			89/336/EEC (EMC)		

Reduction Factors of Nominal Switching Distance S_n			
Size	M12x1	M18x1	M30x1.5
Steel St 37	1.0		
Stainless steel St 18/8	0.6 ... 1.0		
Brass	0.35 ... 0.5		
Aluminum	0.35 ... 0.5		
Copper	0.25 ... 0.45		

Materials			
Size	M12x1	M18x1	M30x1.5
Housing	Polyamide, reinforced		
Cable sheath	Polyvinyl chloride		
Note on materials	Free of copper, PTFE and silicone		

Operating and Environmental Conditions			
Size	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	-25 ... +70		
Ambient temperature with flexible cable installation [°C]	0 ... +70		
Corrosion resistance class CRC ¹⁾	4		

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Weight [g]			
Size	M12x1	M18x1	M30x1.5
Cable version	109	123	175

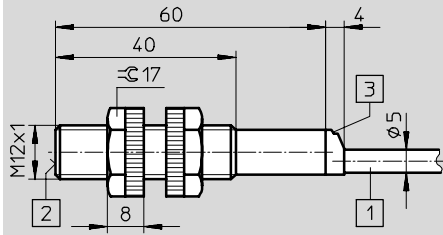
Technical Data – Dimensions

SIED-...-PA Inductive Proximity Sensors

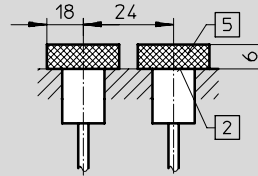
Dimensions – M12x1

Download CAD data → www.festo.com/en/engineering

Flush Mounting

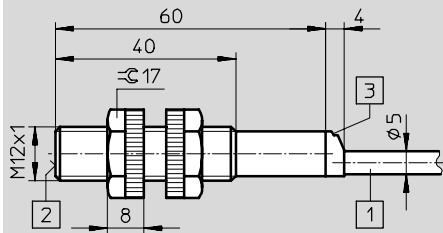


Installation

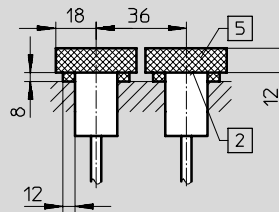


- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting



Installation

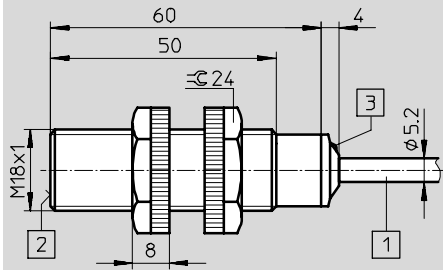


- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

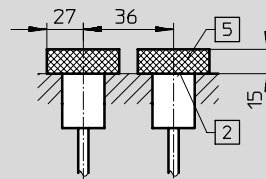
Dimensions – M18x1

Download CAD data → www.festo.com/en/engineering

Flush Mounting

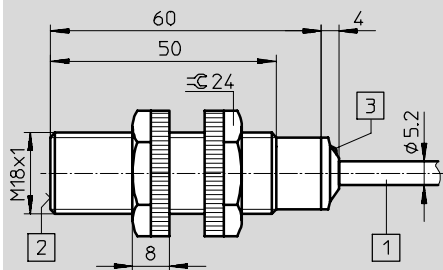


Installation

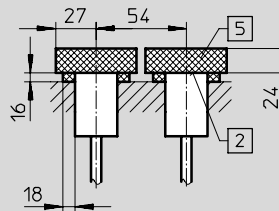


- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting



Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

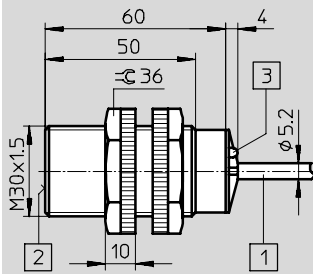
Download CAD data → www.festo.com/en/engineering

1

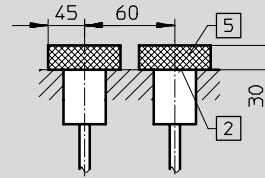
1.3

Dimensions – M30x1.5

Flush Mounting

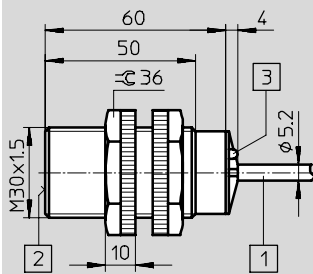


Installation

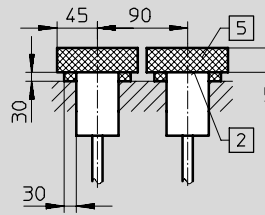


- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Non-flush Mounting



Installation



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data – M12x1

Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO contact					
■	-	■	-	538336	SIED-M12B-ZS-K-L-PA
-	■	■	-	538335	SIED-M12NB-ZS-K-L-PA

Ordering Data – M18x1

Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO contact					
■	-	■	-	538338	SIED-M18B-ZS-K-L-PA
-	■	■	-	538337	SIED-M18NB-ZS-K-L-PA

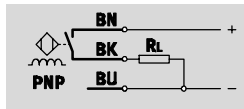
Ordering Data – M30x1.5

Installation		Electrical Connection		Part No.	Type
Flush	Non-flush	Cable	Plug		
NO contact					
■	-	■	-	538340	SIED-M30B-ZS-K-L-PA
-	■	■	-	538339	SIED-M30NB-ZS-K-L-PA

Technical Data

SIEH-...-CR Inductive Proximity Sensors

Function¹⁾



1) e.g. N/O contact with PNP output and cable

- Increased Switching Distance
- For DC Voltage
- Round Design
- Resistant to Chemicals and Mechanical Stress



General Technical Data		
Size	M12x1	M18x1
Type of installation	Flush	
Nominal switching distance S_n	[mm] 6.0	10.0
Assured switching distance S_a	[mm] 4.86	8.1
Hysteresis	[mm] ≤ 0.73	≤ 1.22
Type of mounting	Via lock nut	
Ready status display	-	
Switching status display	Yellow LED	
Conforms to	DIN EN 60947-5-2	

Electrical Data		
Size	M12x1	M18x1
Switch output	PNP	
Switching element function	N/O contact	
Electrical connection	Plug	M12x1, 3-pin
	Cable	3-wire
Cable length	[m] 2.5	
Operating voltage range	[V DC] 10 ... 30	
Residual ripple	[%] 20	
Max. switching frequency	[Hz] 400	200
Max. output current	[mA] 200	
Voltage drop	[V] 2.0	
Idle current	[mA] ≤ 12	
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Resistance to interference from magnetic fields	-	
Protection class to EN 60529	IP67	
CE marking symbol (see conformity declaration)	As per EU EMC directive	

1) Cable with plug

Reduction Factors of Nominal Switching Distance S_n		
Size	M12x1	M18x1
Stainless steel, 1 mm thick	0.45	0.4
Stainless steel, 2 mm thick	-	0.8
Aluminum	1.0	1.0
Copper	0.85	0.8

1

1.3

Materials	
Housing	High-alloy steel
Cable sheath	Polyurethane
Material note	Free of copper, PTFE and silicone
Corrosion resistance class CRC ¹⁾	2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Operating and Environmental Conditions		
Ambient temperature	[°C]	-25 ... +70
Ambient temperature with flexible cable installation	[°C]	-5 ... +70

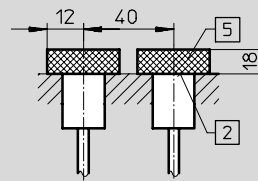
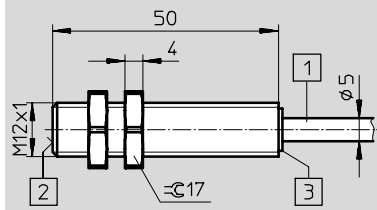
Weight [g]		
Size	M12x1	M18x1
Cable version	90	115
Plug version	28	53

Dimensions – M12x1

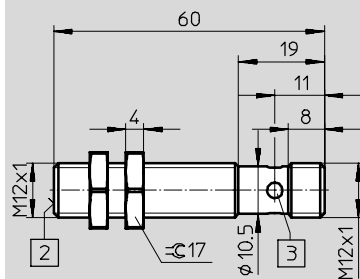
Download CAD data → www.festo.com/en/engineering

Cable Version

Installation



Plug Version



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions, Ordering Data

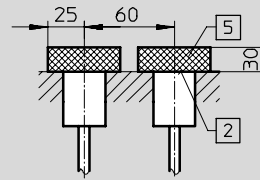
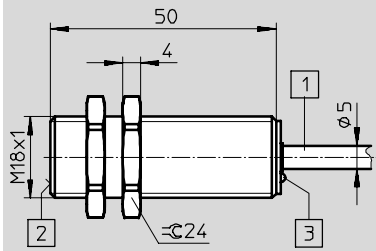
SIEH-...-CR Inductive Proximity Sensors

Dimensions – M18x1

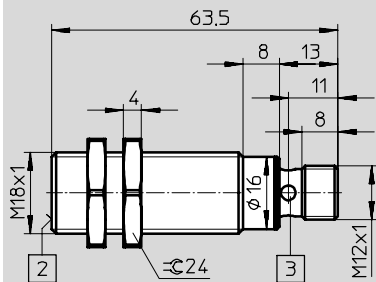
Download CAD data → www.festo.com/en/engineering

Cable Version

Installation



Plug Version



- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data – M12x1

Switch Output	Mounting Conditions		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
N/O contact						
PNP	■	–	■	–	538252	SIEH-M12B-PS-K-L-CR
	■	–	–	■	538251	SIEH-M12B-PS-S-L-CR

Ordering Data – M18x1

Switch Output	Mounting Conditions		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
N/O contact						
PNP	■	–	■	–	538256	SIEH-M18B-PS-K-L-CR
	■	–	–	■	538255	SIEH-M18B-PS-S-L-CR

SIEH-... Proximity Sensors, Increased Switching Distance



Round design

Sizes: Ø 3 mm, M12x1,
M18x1

For DC and AC voltage

Switching distances
from 2 to 15 mm

Solid State (PNP, NPN)

Normally open and
normally closed (NO/NC)

1
1.4

SIE H - M 12 B - P S - K - L

Type	
SIE	Sensors/inductive/electronic

Construction	
H	Sensors with increased switching distance

Design	
	Round
M	Metric parallel thread

Size	
3	∅ 3 mm
12	M12x1
18	M18x1

Type of Installation	
B	Flush

Electrical Output	
P	PNP switch output
N	NPN switch output

Switching Element Function	
S	NO contact
O	NC contact

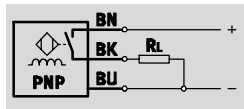
Electrical Connection	
K	Cable
S	Plug

Switching Status Display/Ready Status Display	
L	LED for indicating switching status

Technical Data

SIEH-... Inductive Proximity Sensors

Function¹⁾



- Increased Switching Distance
- For DC Voltage
- Round Design

1) e.g. NO contact with PNP output and cable



General Technical Data				
Size		∅ 3 mm	M12x1	M18x1
Type of installation		flush		
Nominal switching distance S_n	[mm]	1.0	4.0	7.0
Assured switching distance S_a	[mm]	0.81	2.9	4.9
Repeatability	[mm]	±0.02	±0.2	±0.2
Type of mounting		Clamped	Via lock nut	
Tightening torque	[Nm]	–	12	25
Ready status display		–		
Switching status display		Yellow LED		
Conforms to		DIN EN 60947-5-2	–	

Electrical Data				
Size		∅ 3 mm	M12x1	M18x1
Switch output		PNP or NPN		
Switching element function		NC or NO contact		
Electrical connection	Plug	M8x1, 3-pin ²⁾	M12x1, 3-pin	
	Cable	3-core		
Cable length	[m]	0.15 ²⁾ or 2.5	2.5	
Operating voltage range	[V DC]	10 ... 30	15 ... 34	
Residual ripple	[%]	20	10	
Max. switching frequency DC	[Hz]	3000	400	250
Max. output current	[mA]	100		
Max. output current as a function of temperature	[mA]	–	150 at ≤ 85 °C	
	[mA]	–	200 at ≤ 50 °C	
Voltage drop	[V]	≤ 2.0	3.2	
Idle current	[mA]	≤ 0.1	≤ 0.01	
Protection against short circuit		Yes, auto recover		
Protection against polarity reversal		For all electrical connections		
Protection class to EN 60529		IP67		
CE symbol		89/336/EEC (EMC)		

2) Cable with plug

1

1.4

Reduction Factors of Nominal Switching Distance S_n			
Size	∅ 3 mm	M12x1	M18x1
Steel St 37	1.0		
Stainless steel St 18/8	0.8	0.8	0.7
Brass	0.6	0.6	0.4
Aluminum	0.5	0.5	0.4
Copper	0.45	0.4	0.3

Materials			
Size	∅ 3 mm	M12x1	M18x1
Housing	High-alloy stainless steel	Nickel plated brass	
Cable sheath	Polyurethane		
Note on materials	Free of copper, PTFE and silicone		

Operating and Environmental Conditions			
Size	∅ 3 mm	M12x1	M18x1
Ambient temperature [°C]	-25 ... +70	-25 ... +85	
Ambient temperature with flexible cable installation [°C]	-5 ... +70	-5 ... +85	

Weight [g]			
Size	∅ 3 mm	M12x1	M18x1
Plug version	4	30	40
Cable version	18	80	120

Technical Data – Dimensions

SIEH... Inductive Proximity Sensors

Dimensions – Ø 3 mm Download CAD data → www.festo.com/en/engineering

Cable Installation

Plug

- 1 Connecting cable
- 3 Light emitting diode (LED)
- 2 Active surface
- 5 Metal-free zone

Dimensions – M12x1 Download CAD data → www.festo.com/en/engineering

Cable Plug Installation

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M18x1 Download CAD data → www.festo.com/en/engineering

Cable Plug Installation

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 4 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data

SIEH-... Inductive Proximity Sensors

1

1.4

Ordering Data – Ø 3 mm						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	538264	SIEH-3B-PS-K-L
	■	–	–	■	538263	SIEH-3B-PS-S-L
NPN	■	–	■	–	538266	SIEH-3B-NS-K-L
	■	–	–	■	538265	SIEH-3B-NS-S-L

Ordering Data – M12x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150450	SIEH-M12B-PS-K-L
	■	–	–	■	150451	SIEH-M12B-PS-S-L
NPN	■	–	■	–	150448	SIEH-M12B-NS-K-L
	■	–	–	■	150449	SIEH-M12B-NS-S-L
NC Contact						
PNP	■	–	■	–	150454	SIEH-M12B-PO-K-L
	■	–	–	■	150455	SIEH-M12B-PO-S-L
NPN	■	–	■	–	150452	SIEH-M12B-NO-K-L
	■	–	–	■	150453	SIEH-M12B-NO-S-L

Ordering Data – M18x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	■	–	■	–	150458	SIEH-M18B-PS-K-L
	■	–	–	■	150459	SIEH-M18B-PS-S-L
NPN	■	–	■	–	150456	SIEH-M18B-NS-K-L
	■	–	–	■	150457	SIEH-M18B-NS-S-L
NC Contact						
PNP	■	–	■	–	150462	SIEH-M18B-PO-K-L
	■	–	–	■	150463	SIEH-M18B-PO-S-L
NPN	■	–	■	–	150460	SIEH-M18B-NO-K-L
	■	–	–	■	150461	SIEH-M18B-NO-S-L

SIEA-... Proximity Sensors, Analog Output



Round design

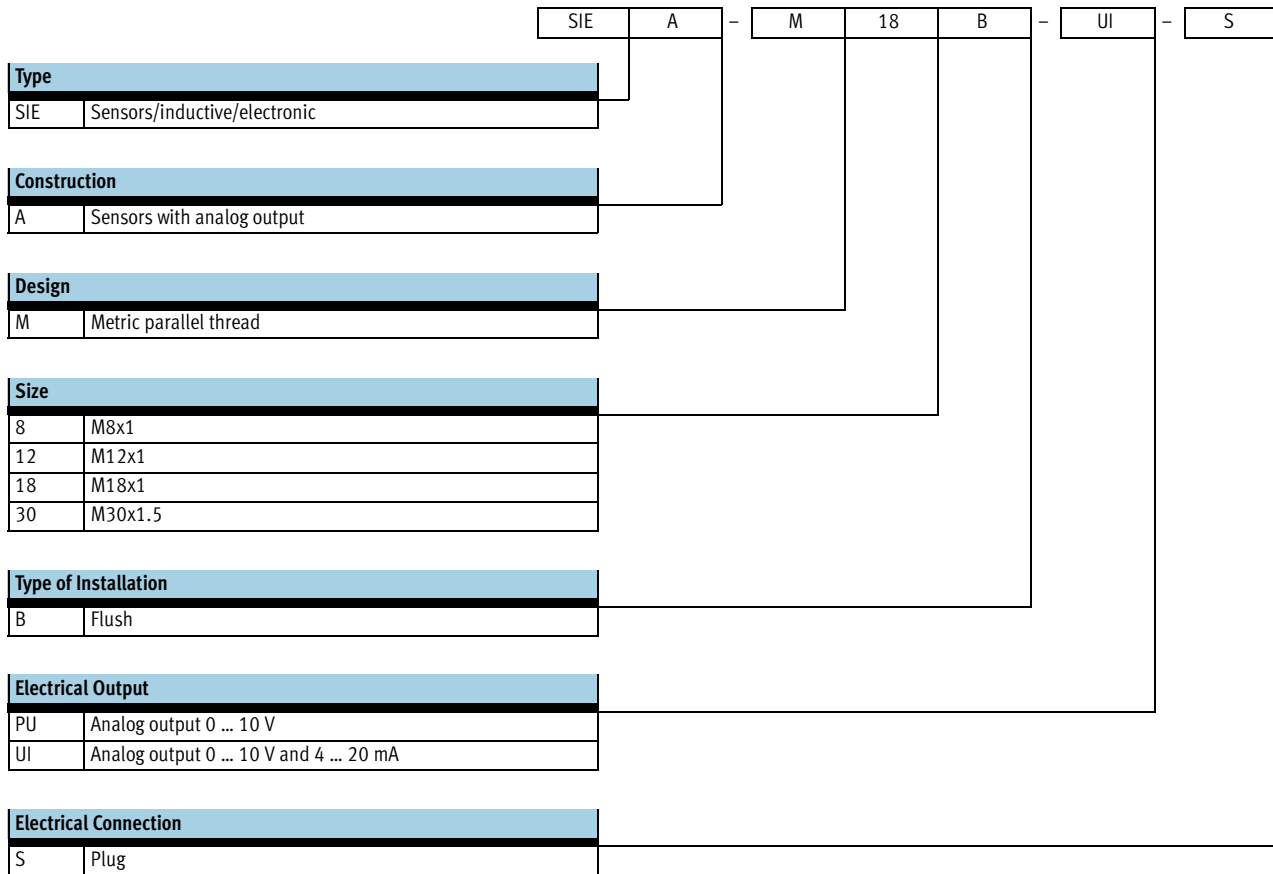
Sizes: M8x1 to M30x1.5

For DC voltage

Switching distances
from 0 to 20 mm

Analog output

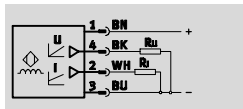
1
1.5



Technical Data

SIEA-... Inductive Proximity Sensors

Function¹⁾



- Analog Output
- For DC Voltage
- Round Design

1) e.g. with analog output for current and voltage



General Technical Data					
Size		M8x1	M12x1	M18x1	M30x1.5
Type of installation		flush			
Position measuring range	[mm]	0 ... 4	0 ... 6	0 ... 10	0 ... 20
Repeatability	[mm]	0.01	0.01	0.02	0.05
Type of mounting		Via lock nut			
Tightening torque	[Nm]	4	10	25	70
Ready status display		-			
Switching status display		-			
Conforms to		-			

Electrical Data					
Size		M8x1	M12x1	M18x1	M30x1.5
Analog output	[V]	0 ... 10	0 ... 10	0 ... 10	0 ... 10
	[mA]	-	4 ... 20	4 ... 20	4 ... 20
Electrical connection	Plug	M8x1, 3-pin	M12x1, 4-pin		
Cable length	[m]	2.5			
Operating voltage range	[V DC]	15 ... 30			
Residual ripple	[%]	20			
Max. switching frequency DC	[Hz]	1600	1000	500	200
Idle current	[mA]	10			
Protection against short circuit		Yes, auto recover			
Protection against polarity reversal		For operating voltage			
Resistance to interference from magnetic fields		-			
Protection class to EN 60529		IP67			
CE symbol		89/336/EEC (EMC)			

1

1.5

Reduction Factors of Nominal Switching Distance S_n				
Size	M8x1	M12x1	M18x1	M30x1.5
Steel St 37	1.0			
Stainless steel St 18/8	0.68	0.47	0.6	0.65
Brass	0.4	0.35	0.28	0.3
Aluminum	0.28	0.28	0.18	0.2
Copper	0.25	0.2	0.15	0.17

Materials				
Size	M8x1	M12x1	M18x1	M30x1.5
Housing	Chrome plated brass			
Note on materials	Free of copper, PTFE and silicone			

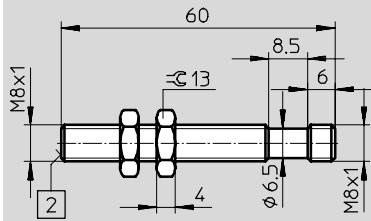
Operating and Environmental Conditions				
Size	M8x1	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	-25 ... +70			
Corrosion resistance class CRC ¹⁾	2			

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

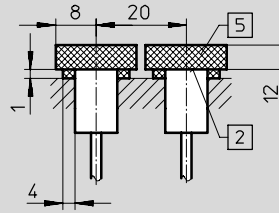
Weight [g]				
Size	M8x1	M12x1	M18x1	M30x1.5
	25	33	55	155

Dimensions – M8x1

Download CAD data → www.festo.com/en/engineering



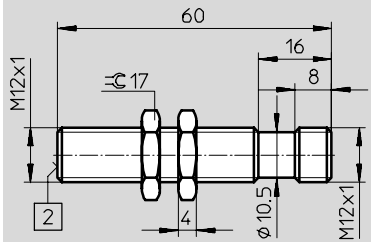
Installation



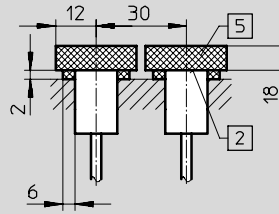
- 2 Active surface
- 5 Metal-free zone

Dimensions – M12x1

Download CAD data → www.festo.com/en/engineering



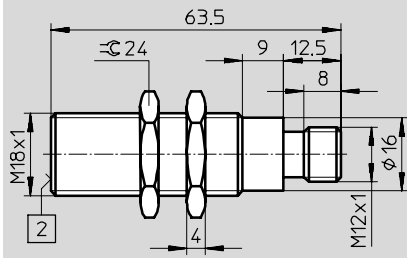
Installation



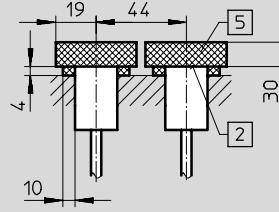
- 2 Active surface
- 5 Metal-free zone

Dimensions – M18x1

Download CAD data → www.festo.com/en/engineering



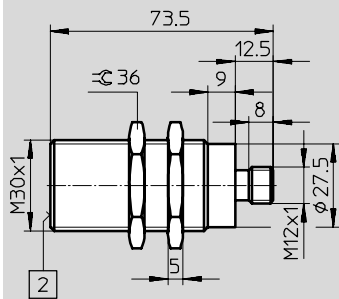
Installation



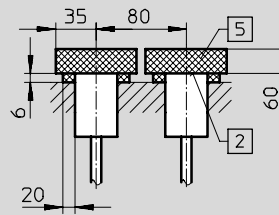
- 2 Active surface
- 5 Metal-free zone

Dimensions – M30x1.5

Download CAD data → www.festo.com/en/engineering



Installation



- 2 Active surface
- 5 Metal-free zone

Ordering Data

SIEA-... Inductive Proximity Sensors

1

1.5

Ordering Data – M8x1						Part No.	Type
Analog Output		Installation		Electrical Connection			
0 ... 10 V	4 ... 20 mA	Flush	Non-flush	Cable	Plug		
■	–	■	–	–	■	538291	SIEA-M8B-PU-S

Ordering Data – M12x1						Part No.	Type
Analog Output		Installation		Electrical Connection			
0 ... 10 V	4 ... 20 mA	Flush	Non-flush	Cable	Plug		
■	■	■	–	–	■	538292	SIEA-M12B-UI-S

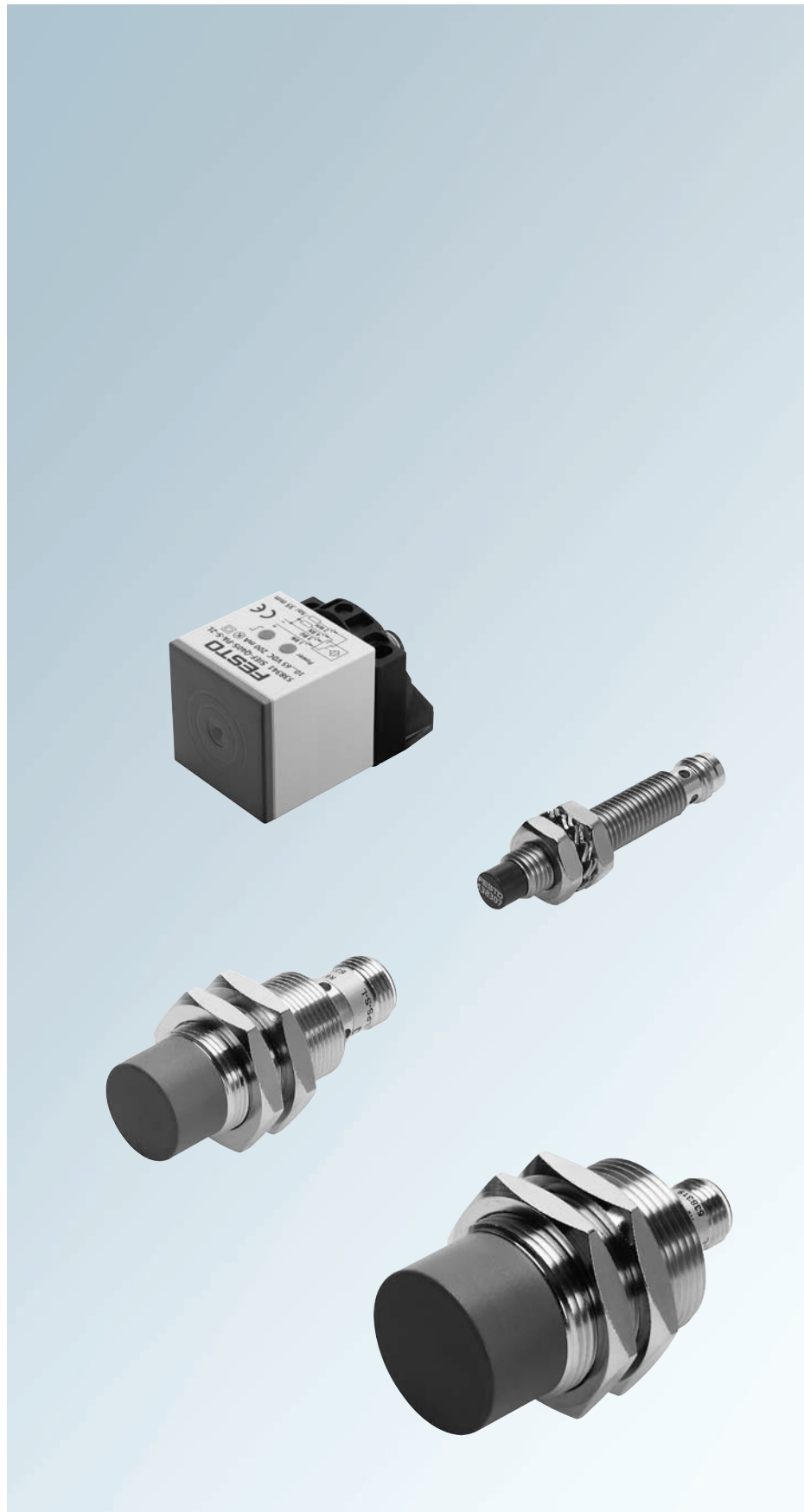
Ordering Data – M18x1						Part No.	Type
Analog Output		Installation		Electrical Connection			
0 ... 10 V	4 ... 20 mA	Flush	Non-flush	Cable	Plug		
■	■	■	–	–	■	538293	SIEA-M18B-UI-S

Ordering Data – M30x1.5						Part No.	Type
Analog Output		Installation		Electrical Connection			
0 ... 10 V	4 ... 20 mA	Flush	Non-flush	Cable	Plug		
■	■	■	–	–	■	538294	SIEA-M30B-UI-S

SIEF-... Proximity Sensors, For All Metals

1

1.6



Round and block-shaped design

Sizes: M8x1 to M30x1.5, 40x40x60 in block form

For DC voltage

Switching distances from 3 to 35 mm

Solid State (PNP, NPN)

Normally open (NO) and changeover

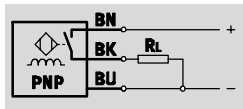
1
1.6

		SIE	F	-			M	12	NB	-		P	S	-		K	-		L	-		
Type																						
SIE	Sensors/inductive/electronic																					
Construction																						
F	Sensors with reduction factor 1 for all metals																					
Design																						
M	Metric parallel thread																					
Q	Block-shaped																					
Size																						
8	M8x1																					
12	M12x1																					
18	M18x1																					
30	M30x1.5																					
40	40x40 mm																					
Type of Installation																						
B	Flush																					
NB	Non-flush																					
S	Non-flush																					
Electrical Output																						
P	PNP switch output																					
N	NPN switch output																					
Switching Element Function																						
S	NO contact																					
A	Changeover switch																					
Electrical Connection																						
K	Cable																					
S	Plug																					
Switching Status Display/Ready Status Display																						
	Without LED																					
L	LED for indicating switching status																					
2L	LED for indicating switching status and operating voltage																					
Options																						
	Standard																					
WA	Welding field immune design																					

Technical Data

SIEF-... Inductive Proximity Sensors

Function¹⁾



1) e.g. NO contact with PNP output and cable

- Standard Switching Distance
- Reduction Factor 1 for All Metals
- For DC Voltage
- Round Design



General Technical Data				
Size	M8x1	M12x1	M18x1x1	M30x1.5
Type of installation	non-flush		partially flush	
Nominal switching distance S_n	[mm] 4.0	8.0	12.0	20.0
Assured switching distance S_a	[mm] 3.24	6.48	9.72	16.2
Repeatability	[mm] 0.08	0.16	0.24	0.4
Type of mounting	Via lock nut			
Tightening torque	[Nm] 10	10	25	90
Ready status display	-			
Switching status display	Yellow LED			
Conforms to	DIN EN 60947-5-2			

Electrical Data				
Size	M8x1	M12x1	M18x1	M30x1.5
Switch output	PNP or NPN			
Switching element function	NO contact			
Electrical connection	Plug	M8x1, 3-pin	M12x1, Fixcon, 3-pin	
	Cable	3-core		
Cable length	[m] 2.5			
Operating voltage range	[V DC] 10 ... 30			
Residual ripple	[%] 10			
Max. switching frequency DC	[Hz] 2000			1500
Max. output current	[mA] 150	200		
Voltage drop	[V] 3.2			
Idle current	[mA] ≤ 15			
Protection against short circuit	Yes, auto recover			
Protection against polarity reversal	For all electrical connections			
Resistance to interference from magnetic fields	Magnetic direct and alternating field			
Protection class to EN 60529	IP67			
CE symbol	89/336/EEC (EMC)			

Reduction Factors of Nominal Switching Distance S_n				
Size	M8x1	M12x1	M18x1	M30x1.5
Steel St 37	1.0			
Stainless steel St 18/8	1.0			
Brass	1.0			
Aluminum	1.0			
Copper	1.0			

Materials				
Size	M8x1	M12x1	M18x1	M30x1.5
Housing	High-alloy stainless steel Polyamide	Chrome plated brass Polybutylene terephthalate		
Cable sheath	Polyurethane			
Note on materials	Free of copper, PTFE and silicone			

Operating and Environmental Conditions				
Size	M8x1	M12x1	M18x1	M30x1.5
Ambient temperature [°C]	-30 ... +85			
Ambient temperature with flexible cable installation [°C]	0 ... 80			
Corrosion resistance class CRC ¹⁾	4	2	2	2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Weight [g]				
Size	M8x1	M12x1	M18x1	M30x1.5
Cable version	77	120	141	194
Plug version	19	22	38	90

Technical Data – Dimensions

SIEF-... Inductive Proximity Sensors

Dimensions – M8x1 Download CAD data → www.festo.com/en/engineering

Cable **Installation**

Plug

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M12x1 Download CAD data → www.festo.com/en/engineering

Cable **Installation**

Plug

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

1

1.6

1
1.6

Dimensions – M18x1

Download CAD data → www.festo.com/en/engineering

<p>Cable</p>	<p>Installation</p>
---------------------	----------------------------

Plug

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – M30x1.5

Download CAD data → www.festo.com/en/engineering

<p>Cable</p>	<p>Installation</p>
---------------------	----------------------------

Plug

- 1 Connecting cable
- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Ordering Data

SIEF... Inductive Proximity Sensors

Ordering Data – M8x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	–	■	■	–	538308	SIEF-M8NB-PS-K-L
	–	■	–	■	538307	SIEF-M8NB-PS-S-L
NPN	–	■	■	–	538310	SIEF-M8NB-NS-K-L
	–	■	–	■	538309	SIEF-M8NB-NS-S-L

Ordering Data – M12x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	–	■	■	–	538312	SIEF-M12NB-PS-K-L
	–	■	–	■	538311	SIEF-M12NB-PS-S-L
NPN	–	■	■	–	538314	SIEF-M12NB-NS-K-L
	–	■	–	■	538313	SIEF-M12NB-NS-S-L

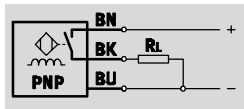
Ordering Data – M18x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	–	■	■	–	538316	SIEF-M18NB-PS-K-L
	–	■	–	■	538315	SIEF-M18NB-PS-S-L
NPN	–	■	■	–	538318	SIEF-M18NB-NS-K-L
	–	■	–	■	538317	SIEF-M18NB-NS-S-L

Ordering Data – M30x1.5						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Non-flush	Cable	Plug		
NO Contact						
PNP	–	■	■	–	538320	SIEF-M30NB-PS-K-L
	–	■	–	■	538319	SIEF-M30NB-PS-S-L
NPN	–	■	■	–	538322	SIEF-M30NB-NS-K-L
	–	■	–	■	538321	SIEF-M30NB-NS-S-L

Technical Data

SIEF-...-WA Inductive Proximity Sensors

Function¹⁾



1) e.g. NO contact with PNP output and cable

- Standard Switching Distance
- Reduction Factor 1 for All Metals
- Welding Field Immune
- For DC Voltage
- Round Design



General Technical Data					
Size		M12x1	M18x1	M30x1.5	40x40 mm
Type of installation		flush or partially flush			partially flush
Nominal switching distance S_n	flush [mm]	3	5	10	–
	partially flush [mm]	8	12	20	35
Assured switching distance S_a	flush [mm]	2.43	4.05	8.1	28.35
	partially flush [mm]	6.48	9.72	16.2	–
Repeatability	flush [mm]	0.06	0.1	0.2	
	partially flush [mm]	0.16	0.24	0.4	0.7
Type of mounting		Via lock nut			Via through-holes
Tightening torque [Nm]		10	25	90	–
Ready status display		–			Green LED
Switching status display		Yellow LED			
Conforms to		DIN EN 60947-5-2			

Electrical Data					
Size		M12x1	M18x1	M30x1.5	40x40 mm
Switch output		PNP or NPN			
Switching element function		NO contact			Changeover switch
Electrical connection	Plug	M12x1, Fixcon, 3-pin			M12x1, Fixcon, 4-pin
Operating voltage range [V DC]		10 ... 30			10 ... 65
Residual ripple [%]		10			
Max. switching frequency	flush [Hz]	3000	2500	2000	–
	partially flush [Hz]	2000	2000	1500	250
Max. output current [mA]		200			
Voltage drop [V]		≤ 1.8			
Idle current [mA]		≤ 15			
Protection against short circuit		Yes, auto recover			
Protection against polarity reversal		For all electrical connections			
Resistance to interference from magnetic fields		Magnetic direct and alternating field			
Protection class to EN 60529		IP67			
CE symbol		89/336/EEC (EMC)			

Technical Data

SIEF-...-WA Inductive Proximity Sensors

Reduction Factors of Nominal Switching Distance S_n				
Size	M12x1	M18x1	M30x1.5	40x40 mm
Steel St 37	1.0			
Stainless steel St 18/8	1.0			
Brass	1.0			
Aluminum	1.0			
Copper	1.0			

Materials				
Size	M12x1	M18x1	M30x1.5	40x40 mm
Housing	PTFE-coated brass Polybutylene terephthalate			Polyamide Polybutylene terephthalate, reinforced
Note on materials	-			Free of copper, PTFE and silicone

Operating and Environmental Conditions				
Size	M12x1	M18x1	M30x1.5	40x40 mm
Ambient temperature [°C]	-30 ... +85			-25 ... +70

Weight [g]				
Size	M12x1	M18x1	M30x1.5	40x40 mm
Plug version	26	48	106	156

Dimensions – M12x1 Download CAD data → www.festo.com/en/engineering

<p>Flush Mounting</p>	<p>Installation</p> <ul style="list-style-type: none"> 2 Active surface 3 Light emitting diode (LED) 5 Metal-free zone
------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>Partially Flush Mounting</p>	<p>Installation</p> <ul style="list-style-type: none"> 2 Active surface 3 Light emitting diode (LED) 5 Metal-free zone
----------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Dimensions – M18x1 Download CAD data → www.festo.com/en/engineering

<p>Flush Mounting</p>	<p>Installation</p> <ul style="list-style-type: none"> 2 Active surface 3 Light emitting diode (LED) 5 Metal-free zone
------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>Partially Flush Mounting</p>	<p>Installation</p> <ul style="list-style-type: none"> 2 Active surface 3 Light emitting diode (LED) 5 Metal-free zone
----------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Technical Data – Dimensions

SIEF...-WA Inductive Proximity Sensors

Dimensions – M30x1.5 Download CAD data → www.festo.com/en/engineering

Flush Mounting **Installation**

- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Partially Flush Mounting **Installation**

- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

Dimensions – 40x40 mm Download CAD data → www.festo.com/en/engineering

Flush Mounting **Installation**

- 2 Active surface
- 3 Light emitting diode (LED)
- 5 Metal-free zone

1

1.6

Ordering Data

SIEF-...-WA Inductive Proximity Sensors

1

1.6

Ordering Data – M12x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Partially Flush	Cable	Plug		
NO Contact						
PNP	■	–	–	■	538297	SIEF-M12B-PS-S-L-WA
	–	■	–	■	538295	SIEF-M12NB-PS-S-L-WA
NPN	■	–	–	■	538298	SIEF-M12B-NS-S-L-WA
	–	■	–	■	538296	SIEF-M12NB-NS-S-L-WA

Ordering Data – M18x1						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Partially Flush	Cable	Plug		
NO Contact						
PNP	■	–	–	■	538301	SIEF-M18B-PS-S-L-WA
	–	■	–	■	538299	SIEF-M18NB-PS-S-L-WA
NPN	■	–	–	■	538302	SIEF-M18B-NS-S-L-WA
	–	■	–	■	538300	SIEF-M18NB-NS-S-L-WA

Ordering Data – M30x1.5						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Partially Flush	Cable	Plug		
NO Contact						
PNP	■	–	–	■	538305	SIEF-M30B-PS-S-L-WA
	–	■	–	■	538303	SIEF-M30NB-PS-S-L-WA
NPN	■	–	–	■	538306	SIEF-M30B-NS-S-L-WA
	–	■	–	■	538304	SIEF-M30NB-NS-S-L-WA

Ordering Data – 40x40 mm						
Switch Output	Installation		Electrical Connection		Part No.	Type
	Flush	Partially Flush	Cable	Plug		
Antivalent						
PNP	–	■	–	■	538341	SIEF-Q40S-PA-S-2L
NPN	–	■	–	■	538342	SIEF-Q40S-NA-S-2L

SOE... Optical Sensors



2

2.0

Optoelectronic sensors to fulfill a broad range of object detection

For through beam, retro-reflective, diffuse, and other applications

Small size, teach-in functions, background suppression, laser detection and distance, and color detection

Easy installation, convenient set-up, accurate detection, and cost savings

<p>Diffuse – SOEG-RT</p> <ul style="list-style-type: none"> ■ Round and block-shaped design ■ Sizes: \varnothing 4 mm, M5 to M18, 20x32x12 mm, 30x30x15 mm, 50x50x17 mm ■ Beam exit: straight or angled ■ Working range: 0 to 600 mm ■ Background suppression ■ Switching element function: light, switchable, changeover ■ PNP or NPN switch output ■ Cable or plug connection ■ Normally open and normally closed (NO/NC) 	<p style="text-align: right;">Section 2.1 → Page 79</p>
<p>Retro Reflective – SOEG-RSP</p> <ul style="list-style-type: none"> ■ Round and block-shaped design ■ Sizes: M12, M18, 20x32x12 mm, 30x30x15 mm, 50x50x17 mm ■ Beam exit: straight or angled ■ Working range: 0 to 5,500 mm ■ Switching element function: dark, switchable, changeover ■ PNP or NPN switch output ■ Cable or plug connection 	<p style="text-align: right;">Section 2.2 → Page 97</p>
<p>Through Beam – SOEG-S/SOEG-E</p> <ul style="list-style-type: none"> ■ Round and block-shaped design ■ Sizes: M18, 20x32x12 mm, 30x30x15 mm, 50x50x17 mm ■ Working range: M18: 20,000 mm; 20x32x12 and 30x30x15: 0 to 6,000 mm, 50x50x17: 0 to 15,000 mm ■ Switching element function: dark, changeover ■ PNP or NPN switch output ■ Cable or plug connection 	<p style="text-align: right;">Section 2.3 → Page 109</p>
<p>Fiber-optic – SOEG-L</p> <ul style="list-style-type: none"> ■ Block-shaped design ■ Sizes: 20x32x12 mm, 30x30x15 mm ■ Beam exit: straight or angled ■ Working range: 0 to 250 mm ■ Switching element function: switchable, changeover ■ PNP or NPN switch output ■ Cable or plug connection 	<p style="text-align: right;">Section 2.4 → Page 119</p>
<p>Laser Diffuse/Retro-reflective – SOEL-RT, SOEL-RSP</p> <ul style="list-style-type: none"> ■ Block-shaped design ■ Sizes: 20x32x12 mm, 50x50x17 mm ■ Beam exit: straight ■ Working range: 0 to 12,000 mm, displacement to 300 mm ■ Background suppression ■ Switching element function: light, switchable, changeover ■ PNP or NPN switch output ■ Cable or plug connection 	<p style="text-align: right;">Section 2.5 → Page 125</p>
<p>For Color Detection – SOEC-RT</p> <ul style="list-style-type: none"> ■ Block-shaped design ■ Size: 50x50x17 mm ■ Beam exit: straight ■ Working range: 12 to 32 mm ■ Switching element function: light, switchable, changeover ■ PNP or NPN switch output ■ Plug connection 	<p style="text-align: right;">Section 2.6 → Page 139</p>

SOE... Optical Sensors

Complete Product Type Code Overview

		SOE	G	-	RTD	-	Q20	-	PP	-	K	-	2L	-	TI
Type															
SOE	Opto-electronic sensor														
Construction															
G	Standard sensor														
L	Laser sensor														
C	Color sensor														
Function															
RT	Diffuse sensor														
RSP	Retro-reflective sensor														
S	Through-beam sensor, transmitter														
E	Through-beam sensor, receiver														
L	Fiber-optic unit														
RTH	Diffuse sensor with background suppression														
RTZ	Diffuse sensor with cylindrical light beam														
RTD	Distance sensor														
RSG	Retro-reflective sensor for transparent objects														
Design, Version															
4	Round, Ø 4 mm														
M5	Round, M5														
M12	Round, M12														
M18	Round, M18, beam exit straight														
M18W	Round, M18, beam exit lateral														
Q20	Block design, 20x32x12 mm														
Q30	Block design, 30x30x15 mm														
Q50	Block design, 50x50x17 mm														
Switch Output															
PS	PNP, NO contact														
NS	NPN, NO contact														
PA	PNP, changeover switch														
NA	NPN, changeover switch														
PP	PNP, switchable														
NP	NPN, switchable														
PU	Analog 0 ... 10 V														
Electrical Connection															
K	Cable														
S	Plug														
Display															
L	1 LED														
2L	2 LEDs														
3L	3 LEDs														
7L	7 LEDs														
Options															
	Standard version														
TI	Teach-in by means of a button and via electrical connection														

2
2.0

Method of Measurement

Diffuse Sensors – With Background Suppression

Conventional optical diffuse sensors only evaluate the quantity of light reflected by the object.

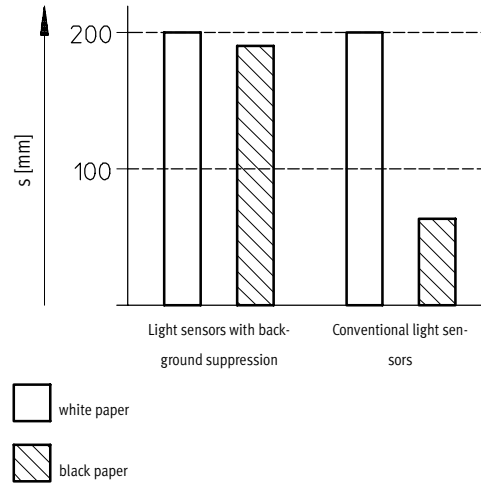
This makes it impossible to detect a dark (poorly reflective) object against a bright (highly reflective) background. Moreover, objects with different surfaces (material or color) are detected at differing intervals because of the different reflective properties. Sensors with background suppression detect objects practically independent of color and surface.

It is not the intensity of the reflected light that is measured but instead

rather the geometric position of the reflected light point, i.e. the distance between the object and the sensor.

Advantages:

- Switching distance practically independent of color and surface finish
- Can also be used for bright or reflective backgrounds
- Detection of the smallest differences in distance even for changing materials (extreme case black/white)
- Assembly advantage over other systems (simple wiring, no reflector)



Retro-reflective Sensors

In retro-reflective sensors the transmitter and the receiver are located in the same housing. The light transmitted is thrown back to the receiver by means of a reflector.

Thanks to the principle of autocollimation, retro-reflective sensors for transparent objects detect transparent materials, irrespective of their shape, across the entire sensing range. Reflections from mirroring surfaces are effectively suppressed using a polarization filter. The beam of light is sent to the reflector through a semi-transparent mirror. The reflected light is diverted to the receiver via the

semi-transparent mirror. Transmission and receiver light fields are positioned one above the other and are fully congruent with one another.

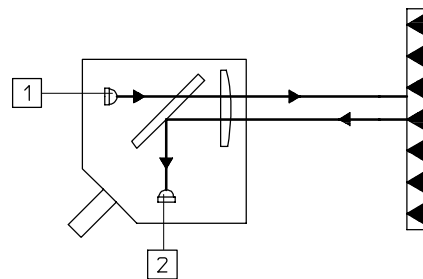
Advantages:

- No dead range
- High precision, low hysteresis
- Radially symmetrical sensing range
- Good reproducibility irrespective of whether the object to be detected brakes the light beam horizontally or vertically
- High accuracy across the entire sensing range

Disadvantage:

- Reduced operating range

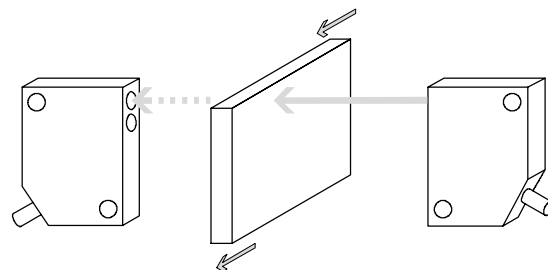
Principle of Autocollimation



- 1 Transmitter
- 2 Receiver

Through-beam Sensors

Through-beam sensors comprise two devices, the transmitter and the receiver. Large ranges are made possible due to their separated layout.



Switching Element Functions

Dark Switching

A “dark switching” function means that the output concerned carries current (i.e. is activated), when no light is falling on the receiver. This is the equivalent of a normally closed function (NC).

Light Switching

A “light switching” function means that the output concerned carries current (i.e. is activated), once light falls on the receiver. This is the equivalent of a normally open function (NO).

Parallel Connection

It is possible to connect opto-electronic sensors in parallel to obtain any desired logical functions.

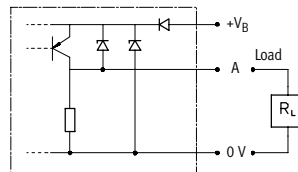
Note

Current consumption will increase with parallel connection. The inverse currents are accumulative, with the result that an impermissibly large voltage drop may occur across the load even when the sensors are non-conductive.

Switching Outputs

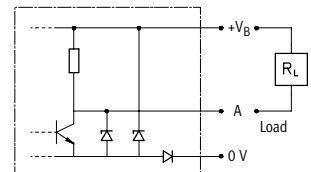
PNP Circuit

The output stage includes a PNP transistor which switches the load to the positive power supply (+V_B). The load is connected between the output and ground (0 V).



NPN Circuit

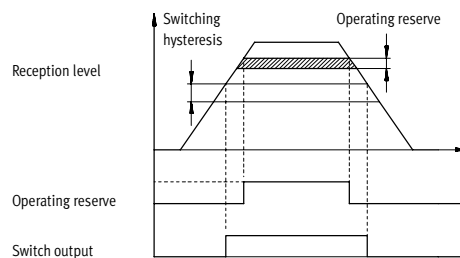
The output stage includes an NPN transistor which switches the load to ground (0 V). The load is connected between the output and the positive power supply (+V_B).



Operating Reserve

The operating reserve is a measure of the excess radiant energy which falls on the light-gathering surface and is evaluated by the light receiver. Operating reserve may diminish over a period of time due to contamination, changing reflection factor of the object to be scanned and aging of the transmitter diode, so that reliable operation is no longer assured. Certain sensors are equipped with a

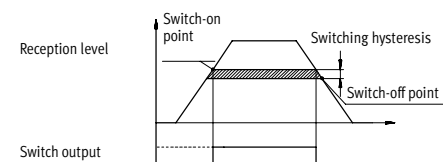
second LED which lights up, once approx. 80% of the sensor’s available working range is being utilized. With certain other sensors, a yellow LED flashes or a red LED lights up when the available operating reserve is insufficient. This allows for prompt recognition of inadequate operating reliability.



Switching Hysteresis

Hysteresis causes a defined switching behaviour of a sensor. The specified range always relates to the switch-on point (as an object approaches).

Distance hysteresis is meaningful only for diffuse sensors and the corresponding fiber optic cable version.



Working Range

The working range is the maximum possible distance between the transmitter and receiver (through-beam sensor). To obtain this

maximum, the potentiometer must be set to MAX and the specified reflector (retro-reflective sensor)

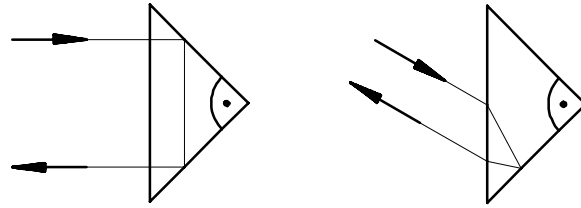
must be used. Unless otherwise specified in the technical data, the working ranges for diffuse sensors

are determined using Kodak Grey Cards (90% grey) as a reference.

Reflector

Retro-reflective sensors are equipped with polarizing filters which ensure that they respond only to light thrown back by special reflectors. These are designed on the principle of triple

mirrors. The choice of the most suitable reflector for a given application will be governed by the required working range and the available mounting facilities.

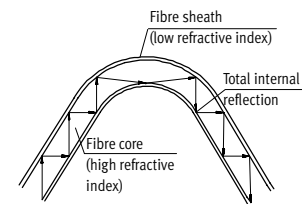


Fiber Optics

A fiber optic cable can consist of a bundle of glass fibers, or one or more plastic fibers. The function of a fiber optic cable is to guide light from one place to another, even round corners. This is made possible by exploiting the phenomenon of total internal reflection. Total internal reflection

occurs whenever light from a material with a high refractive index impinges on the boundary between this and a medium with a lower refractive index at an angle less than the maximum angle for total internal reflection.

The fibers of a fiber optic cable consist of a core (with a high refractive index) and a sheath (with a low refractive index). Within this, the light is constantly reflected back and forth as the result of total internal reflection and is thus able to travel even on curved paths.



Laser

Laser Protection Class 2

All of the laser components currently offered by Festo correspond to laser protection class 2 according to EN 60825-1/94

- Maximum radiant energy 1 mW (cw). (cw = continuous wave)
- Beam only in the visible spectral range.
- Due to the high light intensity, the eye is protected by what is

- termed the lid shutting reflex (≤ 0.25 s).
- Appropriate laser warning notices must be displayed on the device.
- No protective measures (covers, encapsulation etc.) are required.
- The user does not require the

- presence of a laser protection officer.
- Class 2 lasers are completely harmless to use. Consequently no safety precautions are required for sensors of laser protection class 2.

Test Input

The transmitter of a through-beam sensor is equipped with a test input.

This can be used to switch the transmitter light on and off. The

operation of the sensor can be tested by periodically activating the test

input and evaluating the reaction of the receiver.

Installation

Opto-electronic sensors must not be allowed to interfere with each other during operation. A certain minimum

distance must thus be maintained between sensors. This distance depends principally on the sensitivity

to which the sensors have been set. For sensors fitted with fiber optic cables, the distance is heavily

dependent on the type of fiber optic cable used. It is thus not possible to specify any general values.

Alignment

Through-beam Sensors

- First position the receiver as desired and secure it.
- Then align the transmitter as accurately as possible to the receiver.

Retro-reflective Sensors

- First position the reflector as desired and secure it.
- Cover the reflector so that only the center remains exposed (25% of reflector area).

Diffuse Sensors

- Install the retro-reflective sensor in such a way that reliable switching operation is obtained.
- Finally, remove the cover from the reflector.
- Align the sensor to the object to be scanned in such a way that reliable operation is obtained.
- In order to obtain reliable operation, the operating reserve must be active.

SOEG-RT... Optical Sensors, Diffuse



Round and block-shaped design

Sizes: Ø 4 mm, M5 to M18,
20x32x12 mm, 30x30x15 mm,
50x50x17 mm

Beam exit: straight or angled

Working range: 0 to 600 mm

Background suppression

Switching element function:
light, switchable, changeover

PNP or NPN switch output

Cable or plug connection

Normally open and
normally closed (NO/NC)

SOE – G – RTD – Q20 – PP – K – 2L – TI

Type	
SOE	Opto-electronic sensor

Construction	
G	Standard sensor

Function	
RT	Diffuse sensor
RTH	Diffuse sensor with background suppression
RTZ	Diffuse sensor with cylindrical light beam
RTD	Distance sensor

Design, Version	
4	Round, Ø 4 mm
M5	Round, M5
M12	Round, M12
M18	Round, M18, beam exit straight
M18W	Round, M18, beam exit lateral
Q20	Block design, 20x32x12 mm
Q30	Block design, 30x30x15 mm
Q50	Block design, 50x50x17 mm

Switch Output	
PS	PNP, NO contact
NS	NPN, NO contact
PA	PNP, changeover switch
NA	NPN, changeover switch
PP	PNP, switchable
NP	NPN, switchable

Electrical Connection	
K	Cable
S	Plug

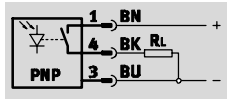
Display	
L	1 LED
2L	2 LEDs
3L	3 LEDs

Options	
	Standard version
TI	Teach-in by means of a button and via electrical connection

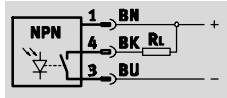
Technical Data

SOEG-RT Diffuse Sensors

Function



PNP, NO contact, e.g. with plug



NPN, NO contact, e.g. with plug

- Beam Exit Straight or Angled
- Round Design
- Variants: \varnothing 4 mm, M5, M12 and M18



General Technical Data					
Version	\varnothing 4 mm	M5	M12	M18, Straight	M18, Angled
Method of measurement	Diffuse sensor				
Measured variable	Position				
Light type	infra-red	infra-red	infra-red	infra-red	red
Working range [mm]	50	50	0 ... 200	0 ... 430	0 ... 600
Setting range, lower limit [mm]	-	-	10	20	100
Setting range, upper limit [mm]	-	-	200	430	600
Setting options	-	-	Potentiometer	Potentiometer	Potentiometer
Switching status display	Yellow LED				
Operating reserve display	Yellow LED ¹⁾	Yellow LED ¹⁾	Yellow LED ¹⁾	Yellow LED ¹⁾	Green LED
Type of mounting	Clamped	Via lock nut	Via lock nut	Via lock nut	Via lock nut
Tightening torque [Nm]	-	1.5	10	20	20
Conforms to	DIN EN 60947-5-2				

1) LED flashes when available operating reserve is insufficient

Electrical Data					
Version	\varnothing 4 mm	M5	M12	M18, Straight	M18, Angled
Switch output	PNP or NPN				
Switching element function	Light switching				
Electrical connection	Plug	M8 x 1, 3-pin	M8 x 1, 3-pin	M12x1, 3-pin	M12x1, 3-pin
	Cable	3-core	3-core	3-core	3-core
Cable length [m]	2.5	2.5	2.5	2.5	2.5
Operating voltage range [V DC]	10 ... 30	10 ... 30	10 ... 30	10 ... 30	10 ... 36
Residual ripple [%]	20	20	10	10	20
Max. switching frequency [Hz]	250	250	250	250	1,000
Max. output current [mA]	100	100	200	200	200
Voltage drop [V]	\leq 2.0	\leq 2.0	1.8	1.8	\leq 2.0
Idle current [mA]	15	15	30	35	15
Protection against short circuit	Yes, auto recover				
Protection against polarity reversal	For all electrical connections				
Protection class to EN 60529	IP67	IP67	IP65	IP65	IP67
CE symbol	89/336/EEC (EMC)				

Materials					
Version	\varnothing 4 mm	M5	M12	M18, Straight	M18, Angled
Body	High-alloy stainless steel		Brass, chrome-plated		Brass, nickel-plated
Union nut	-	High-alloy stainless steel	Brass, chrome-plated		Brass, nickel-plated
Cable sheath	Polyurethane				
Material note	Free of copper and PTFE				

Operating and Environmental Conditions											
Version	∅ 4 mm		M5		M12		M18, Straight		M18, Angled		
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible	
Ambient temperature [°C]	0 ... 55		0 ... 55		-5 ... +55		-5 ... +55		-25 ... +55		
Corrosion resistance class CRC ¹⁾	4		4		2		2		2		

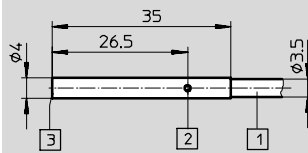
- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
 Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions

Download CAD data → www.festo.com/en/engineering

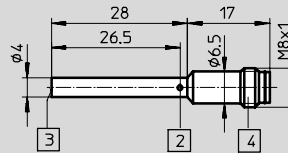
∅ 4 mm

Cable Type



- 1 Connecting cable 2 Light emitting diode (LED)

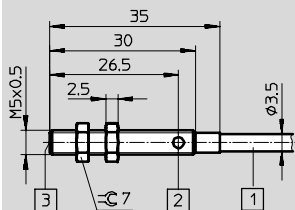
Plug Type



- 3 Light exit 4 Plug suitable for plug socket with cable SIM-M8...

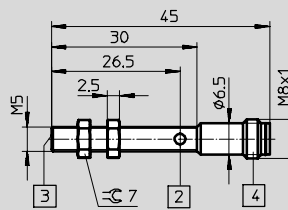
M5

Cable Type



- 1 Connecting cable 2 Light emitting diode (LED)

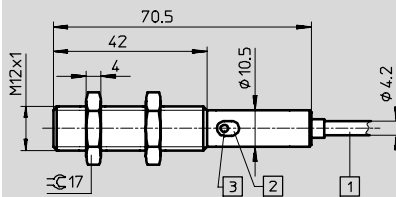
Plug Type



- 3 Light exit 4 Plug suitable for plug socket with cable SIM-M8...

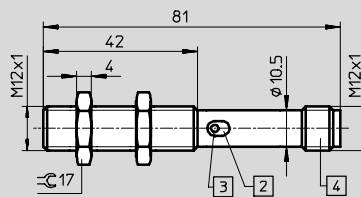
M12

Cable Type



- 1 Connecting cable 2 Light emitting diode (LED)

Plug Type



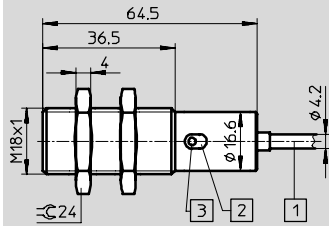
- 3 Potentiometer 4 Plug suitable for plug socket with cable SIM-M12-...

Dimensions

Download CAD data → www.festo.com/en/engineering

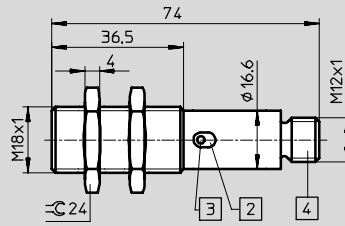
M18, Beam Exit Straight

Cable Type



- 1 Connecting cable
- 2 Light emitting diode (LED)

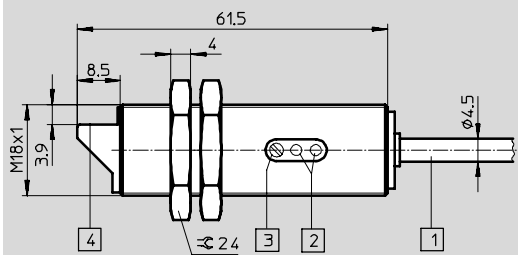
Plug Type



- 3 Potentiometer
- 4 Plug suitable for plug socket with cable SIM-M12-...

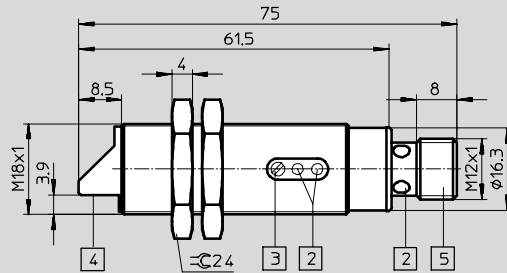
M18, Beam Exit Lateral

Cable Type



- 1 Connecting cable
- 2 Light emitting diode (LED)
- 3 Potentiometer
- 4 Light exit

Plug Type



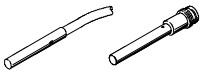

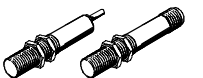
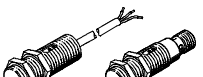
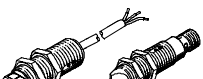
- 5 Plug suitable for plug socket with cable SIM-M12-...

2

2.1

Ordering Data

SOEG-RT Diffuse Sensors

Ordering Data								
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Free of Copper and PTFE	Part No.	Type
			Cable	Plug				
Ø 4 mm								
	50	PNP	■	–	33	■	537671	SOEG-RT-4-PS-K-L
			–	■	3	■	537673	SOEG-RT-4-PS-S-L
		NPN	■	–	33	■	537674	SOEG-RT-4-NS-K-L
			–	■	3	■	537676	SOEG-RT-4-NS-S-L
M5								
	50	PNP	■	–	35	■	537677	SOEG-RT-M5-PS-K-L
			–	■	4	■	537679	SOEG-RT-M5-PS-S-L
		NPN	■	–	35	■	537680	SOEG-RT-M5-NS-K-L
			–	■	4	■	537682	SOEG-RT-M5-NS-S-L
M12								
	0 ... 200	PNP	■	–	100	–	165338	SOEG-RT-M12-PS-K-L
			–	■	32	–	165339	SOEG-RT-M12-PS-S-L
		NPN	■	–	100	–	165336	SOEG-RT-M12-NS-K-L
			–	■	32	–	165337	SOEG-RT-M12-NS-S-L
M18, Beam Exit Straight								
	0 ... 430	PNP	■	–	110	–	165342	SOEG-RT-M18-PS-K-L
			–	■	85	–	165343	SOEG-RT-M18-PS-S-L
		NPN	■	–	110	–	165340	SOEG-RT-M18-NS-K-L
			–	■	85	–	165341	SOEG-RT-M18-NS-S-L
M18, Beam Exit Lateral								
	0 ... 600	PNP	■	–	123	■	537701	SOEG-RT-M18W-PS-K-2L
			–	■	56	■	537702	SOEG-RT-M18W-PS-S-2L
		NPN	■	–	123	■	537717	SOEG-RT-M18W-NS-K-2L
			–	■	56	■	537718	SOEG-RT-M18W-NS-S-2L

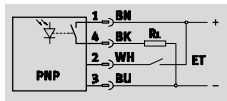
2

2.1

Technical Data

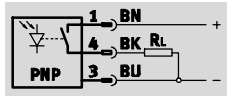
SOEG-RT Diffuse Sensors

Function



e.g. 20x32x12 mm

PNP, switchable, with plug



e.g. 30x30x15 mm,

PNP, NO contact, with plug

- Beam Exit Straight
- Block Design
- Variants: 20x32x12 and 30x30x15 mm



General Technical Data		
Version	20x32x12 mm	30x30x15 mm
Method of measurement	Diffuse sensor	
Measured variable	Position	
Light type	red	infra-red
Working range	[mm] 10 ... 300	0 ... 600
Setting range, lower limit	[mm] 10	0
Setting range, upper limit	[mm] 300	600
Setting options	Teach-in Teach-in via electrical connection	Potentiometer
Max. light spot	[mm] 12x12 mm at a sensing range of 160 mm	–
Switching status display	Yellow LED	
Operating reserve display	Green LED	
Type of mounting	Via through-holes	
Conforms to	DIN EN 60947-5-2	

Electrical Data		
Version	20x32x12 mm	30x30x15 mm
Switch output	PNP or NPN	
Switching element function	Switchable	Light switching
Electrical connection	Plug	M8 x 1, 4-pin
	Cable	4-core
Electrical connection	Plug	M8 x 1, 3-pin
	Cable	3-core
Cable length	[m] 2.0	2.5
Operating voltage range	[V DC] 10 ... 30	10 ... 30
Residual ripple	[%] 10	20
Max. switching frequency	[Hz] 1,000	1,000
Max. output current	[mA] 100	200
Voltage drop	[V] ≤ 2.4	2.0
Idle current	[mA] 35	25
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP67	IP65
CE symbol	89/336/EEC (EMC)	89/336/EEC (EMC)
	73/23/EEC (low voltage)	
Approval	c UL us - Listed (OL)	–

Materials		
Version	20x32x12 mm	30x30x15 mm
Body	Acrylic butadiene styrene	Polybutylene terephthalate, reinforced
Cable sheath	Polyurethane	
Material note	Free of copper and PTFE	

Operating and Environmental Conditions				
Version	20x32x12 mm		30x30x15 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-25 ... +55	-5 ... +55
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		2	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
3) Plug type

Dimensions Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type Plug Type

1) Connecting cable 2) Plug suitable for plug socket with cable SIM-M8-... 3) Mounting holes 5) Receiver
4) Teach-in 6) Transmitter

30x30x15 mm

Cable Type Plug Type

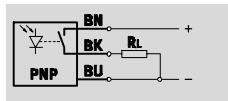
1) Connecting cable 2) Plug suitable for plug socket with cable SIM-M8-... 4) Potentiometer 6) Center of optical beam
3) Mounting holes 5) Light emitting diode (LED)

Ordering Data						
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type
			Cable	Plug		
20x32x12 mm						
	10 ... 300	PNP	■	-	36	537732 SOEG-RT-Q20-PP-K-2L-TI
			-	■	7	537731 SOEG-RT-Q20-PP-S-2L-TI
		NPN	■	-	36	537734 SOEG-RT-Q20-NP-K-2L-TI
			-	■	7	537733 SOEG-RT-Q20-NP-S-2L-TI
30x30x15 mm						
	0 ... 600	PNP	■	-	85	165350 SOEG-RT-Q30-PS-K-2L
			-	■	18	165351 SOEG-RT-Q30-PS-S-2L
		NPN	■	-	85	165348 SOEG-RT-Q30-NS-K-2L
			-	■	18	165349 SOEG-RT-Q30-NS-S-2L

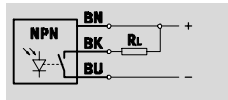
Technical Data

SOEG-RTZ Diffuse Sensors

Function

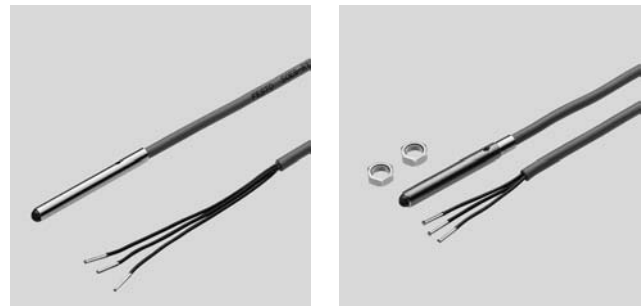


PNP, NO contact



NPN, NO contact

- Cylindrical Light Beam
- Beam Exit Straight
- Round Design
- Variants: \varnothing 4 mm and M5



General Technical Data		
Version	\varnothing 4 mm	M5
Method of measurement	Diffuse sensor with cylindrical light beam	
Measured variable	Position	
Light type	infra-red	infra-red
Working range [mm]	10	10
Setting options	-	-
Switching status display	Yellow LED	
Operating reserve display	Yellow LED ¹⁾	
Type of mounting	Clamped	Via lock nut
Tightening torque [Nm]	-	1.5
Conforms to	DIN EN 60947-5-2	DIN EN 60947-5-2

1) LED flashes when available operating reserve is insufficient

Electrical Data		
Switch output	PNP or NPN	
Switching element function	Light switching	
Electrical connection	Cable	3-core
Cable length [m]	2.5	
Operating voltage range [V DC]	10 ... 30	
Residual ripple [%]	20	
Max. switching frequency [Hz]	250	
Max. output current [mA]	100	
Voltage drop [V]	\leq 2.0	
Idle current [mA]	15	
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP67	
CE symbol	89/336/EEC (EMC)	

Materials		
Version	\varnothing 4 mm	M5
Body	High-alloy stainless steel	
Union nut	-	High-alloy stainless steel
Cable sheath	Polyurethane	
Material note	Free of copper and PTFE	

Operating and Environmental Conditions		
Cable Installation	Fixed	Flexible
Ambient temperature [°C]	0 ... 55	
Corrosion resistance class CRC ¹⁾	4	

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions Download CAD data → www.festo.com/en/engineering

∅ 4 mm M5

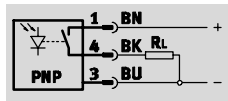
1 Connecting cable 2 Light emitting diode (LED) 3 Light exit

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
∅ 4 mm							
	10	PNP	■	-	28	537672	SOEG-RTZ-4-PS-K-L
		NPN	■	-	28	537675	SOEG-RTZ-4-NS-K-L
M5							
	10	PNP	■	-	30	537678	SOEG-RTZ-M5-PS-K-L
		NPN	■	-	30	537681	SOEG-RTZ-M5-NS-K-L

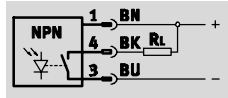
Technical Data

SOEG-RTH Diffuse Sensors

Function



PNP, NO contact, e.g. with plug



NPN, NO contact, e.g. with plug

- With Background Suppression
- Beam Exit Straight or Angled
- Round Design
- Version: M18



General Technical Data	
Method of measurement	Diffuse sensor with background suppression
Measured variable	Position
Light type	red
Working range [mm]	10 ... 120
Setting range, lower limit [mm]	10
Setting range, upper limit [mm]	120
Setting options	Potentiometer
Switching status display	Yellow LED
Operating reserve display	Green LED
Type of mounting	Via lock nut
Tightening torque [Nm]	20
Conforms to	DIN EN 60947-5-2

Electrical Data	
Switch output	PNP or NPN
Switching element function	Light switching
Electrical connection	Plug M12x1, 3-pin Cable 3-core
Cable length [m]	2.5
Operating voltage range [V DC]	10 ... 36
Residual ripple [%]	20
Max. switching frequency [Hz]	500
Max. output current [mA]	200
Voltage drop [V]	≤ 2.0
Idle current [mA]	25
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC)

Materials	
Body	Nickel-plated brass
Union nut	Nickel-plated brass
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

2
2.1

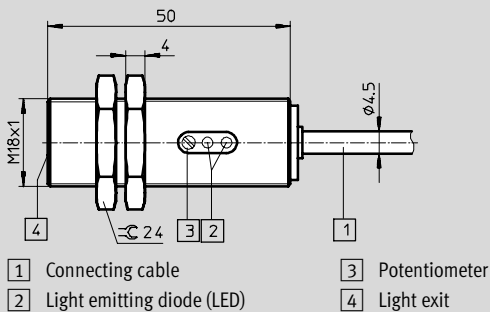
Operating and Environmental Conditions		
Cable installation	Fixed	Flexible
Ambient temperature [°C]	-25 ... +55	-5 ... +55
Corrosion resistance class CRC ¹⁾	2	

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

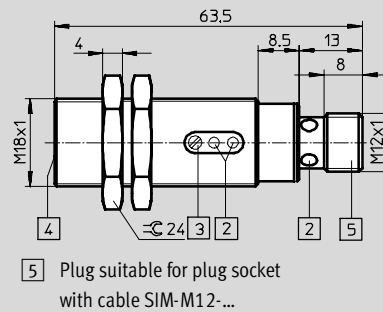
Dimensions Download CAD data → www.festo.com/en/engineering

M18, Beam Exit Straight

Cable Type

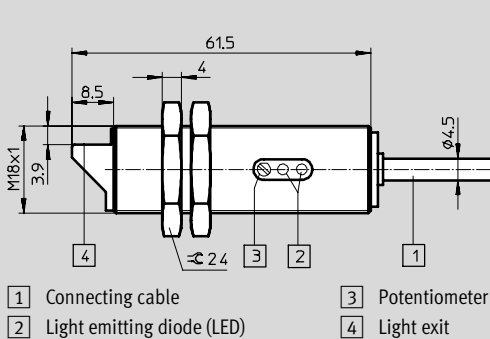


Plug Type

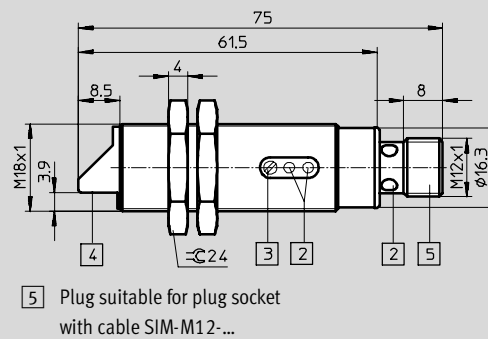


M18, Beam Exit Lateral

Cable Type



Plug Type



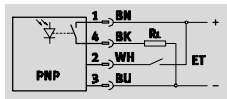
Ordering Data

Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
M18, Beam Exit Straight							
	10 ... 120	PNP	■	–	121	537687	SOEG-RTH-M18-PS-K-2L
			–	■	53	537689	SOEG-RTH-M18-PS-S-2L
		NPN	■	–	121	537705	SOEG-RTH-M18-NS-K-2L
			–	■	53	537707	SOEG-RTH-M18-NS-S-2L
M18, Beam Exit Lateral							
	10 ... 120	PNP	■	–	124	537688	SOEG-RTH-M18W-PS-K-2L
			–	■	57	537690	SOEG-RTH-M18W-PS-S-2L
		NPN	■	–	124	537706	SOEG-RTH-M18W-NS-K-2L
			–	■	57	537708	SOEG-RTH-M18W-NS-S-2L

Technical Data

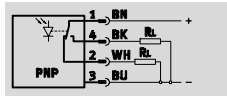
SOEG-RTH Diffuse Sensors

Function



e.g. 20x32x12 mm

PNP, switchable, with plug



e.g. 50x50x17 mm,

PNP, changeover, with plug

- With Background Suppression
- Beam Exit Straight
- Block Design
- Variants: 20x32x12, 30x30x15 and 50x50x17 mm



General Technical Data				
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm	
Method of measurement	Diffuse sensor with background suppression			
Measured variable	Position			
Light type	red			
Working range [mm]	25 ... 100	15 ... 150	30 ... 300	
Reference material	18%	90%	18%	
Setting range, lower limit [mm]	25	15	30	
Setting range, upper limit [mm]	100	150	300	
Setting options	Teach-in Teach-in via electrical connection	Potentiometer	Potentiometer	
Max. light spot [mm]	5x5 mm at a sensing range of 60 mm	–	8x8 mm at a sensing range of 200 mm	
Ready status display	–	–	Green LED	
Switching status display	Yellow LED			
Operating reserve display	Green LED	Green LED	Red LED ¹⁾	
Type of mounting	Via through-holes			
Conforms to	DIN EN 60947-5-2			

1) LED lights up when available operating reserve is insufficient.

Electrical Data				
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm	
Switch output	PNP or NPN			
Switching element function	Switchable	Light switching	Changeover switch	
Electrical connection	Plug	M8 x 1, 4-pin	M8 x 1, 3-pin	M12x1, 4-pin
	Cable	4-core	3-core	4-core
Cable length [m]	2.0	2.5	3.0	
Operating voltage range [V DC]	10 ... 30	10 ... 36	10 ... 30	
Residual ripple [%]	10	20	10	
Max. switching frequency [Hz]	1,000	500	1,000	
Max. output current [mA]	100	200	200	
Voltage drop [V]	≤ 2.4	≤ 2.0	≤ 2.4	
Idle current [mA]	35	25	35	
Protection against short circuit	Yes, auto recover			
Protection against polarity reversal	For all electrical connections			
Protection class to EN 60529	IP67	IP65	IP67	
CE symbol	89/336/EEC (EMC)			
Approval	c UL us - Listed (OL)	–	c UL us - Listed (OL)	

Materials			
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm
Body	Acrylic butadiene styrene	Polybuteneterephthalate	Acrylic butadiene styrene
Cable sheath	Polyurethane		
Material note	Free of copper and PTFE		

Operating and Environmental Conditions						
Version	20x32x12 mm		30x30x15 mm		50x50x17 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-25 ... +55	-5 ... +55	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		2		4	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Dimensions Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type Plug Type

1 Connecting cable 2 Plug suitable for plug socket with cable SIM-M8-... 3 Mounting holes 5 Receiver

4 Teach-in 6 Transmitter

30x30x15 mm

Cable Type Plug Type

1 Connecting cable 2 Plug suitable for plug socket with cable SIM-M8-... 4 Potentiometer 6 Center of optical beam

5 Light emitting diode (LED)

Technical Data, Ordering Data

SOEG-RTH Diffuse Sensors

Dimensions Download CAD data → www.festo.com/en/engineering

50x50x17 mm

Cable Type Plug Type

1 Connecting cable 2 Plug suitable for plug socket with cable SIM-M12-... 4 Potentiometer 6 Numerical display
 3 Mounting holes 5 Light emitting diode (LED) 7 Light exit

2

2.1

Ordering Data						
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type
			Cable	Plug		
20x32x12 mm						
	25 ... 100	PNP	■	–	36	537724 SOEG-RTH-Q20-PP-K-2L-TI
			–	■	7	537723 SOEG-RTH-Q20-PP-S-2L-TI
		NPN	■	–	36	537726 SOEG-RTH-Q20-NP-K-2L-TI
			–	■	7	537725 SOEG-RTH-Q20-NP-S-2L-TI
30x30x15 mm						
	15 ... 150	PNP	■	–	75	537719 SOEG-RTH-Q30-PS-K-2L
			–	■	17	537720 SOEG-RTH-Q30-PS-S-2L
		NPN	■	–	75	537721 SOEG-RTH-Q30-NS-K-2L
			–	■	17	537722 SOEG-RTH-Q30-NS-S-2L
50x50x17 mm						
	30 ... 300	PNP	■	–	122	537771 SOEG-RTH-Q50-PA-K-3L
			–	■	32	537773 SOEG-RTH-Q50-PA-S-3L
		NPN	■	–	122	537772 SOEG-RTH-Q50-NA-K-3L
			–	■	32	537774 SOEG-RTH-Q50-NA-S-3L

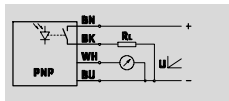
Technical Data

SOEG-RTD Diffuse Sensors

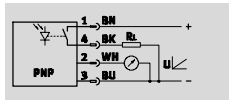
FESTO

Function

- Sensor for Distance Measurement
- Beam Exit Straight
- Block Design
- Version: 20x32x12 mm



PNP and analog output with cable



PNP and analog output with plug



General Technical Data	
Method of measurement	Diffuse sensor for distance measurement
Measured variable	Displacement
Light type	red
Working range [mm]	20 ... 80
Setting range, lower limit [mm]	20
Setting range, upper limit [mm]	80
Setting options	Teach-in Teach-in via electrical connection
Switching status display	Yellow LED
Operating reserve display	Green LED
Resolution [mm]	0.5
Type of mounting	Via through-holes
Conforms to	-

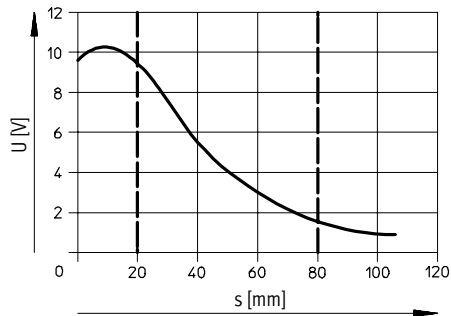
Electrical Data		
Analog output [V]	0 ... 10	
Switch output	PNP	
Electrical connection	Plug	M8 x 1, 4-pin
	Cable	4-core
Cable length [m]	2.0	
Operating voltage range [V DC]	15 ... 30	
Residual ripple [%]	10	
Max. switching frequency [Hz]	200	
Max. output current [mA]	100	
Voltage drop [V]	≤ 2.4	
Idle current [mA]	25	
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP67	
CE symbol	89/336/EEC (EMC)	
Approval	c UL us - Listed (OL)	

Materials	
Body	Acrylic butadiene styrene
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

Operating and Environmental Conditions		
Ambient temperature	[°C]	0 ... 60
Corrosion resistance class CRC ¹⁾		4 ²⁾ / 2 ³⁾

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Response Curve



s = Distance
U = Output voltage

Dimensions

Download CAD data → www.festo.com/en/engineering

Cable Type

Plug Type

1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

3 Mounting holes

4 Teach-in

5 Receiver

6 Transmitter

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	20 ... 80	PNP	■	-	37	537758	SOEG-RTD-Q20-PP-K-2L-TI
			-	■	7	537757	SOEG-RTD-Q20-PP-S-2L-TI

SOEG-RSP-.../SOEG-RSG-... Optical Sensors, Retro Reflective



2

2.2

Round and block-shaped design

Sizes: M12, M18, 20x32x12 mm,
30x30x15 mm, 50x50x17 mm

Beam exit: straight or angled

Working range: 0 to 5,500 mm

Switching element function:
dark, switchable, changeover

PNP or NPN switch output

Cable or plug connection

2

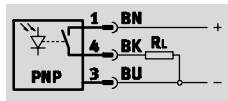
2.2

		SOE	G	RSP	Q20	PP	K	2L	TI
Type									
SOE	Opto-electronic sensor								
Construction									
G	Standard sensor								
Function									
RSP	Retro-reflective sensor								
RSG	Retro-reflective sensor								
Design, Version									
M12	Round, M12								
M18	Round, M18, beam exit straight								
Q20	Block design, 20x32x12 mm								
Q30	Block design, 30x30x15 mm								
Q50	Block design, 50x50x17 mm								
Switch Output									
PS	PNP, NO contact								
NS	NPN, NO contact								
PA	PNP, changeover switch								
NA	NPN, changeover switch								
PP	PNP, switchable								
NP	NPN, switchable								
Electrical Connection									
K	Cable								
S	Plug								
Display									
2L	2 LEDs								
3L	3 LEDs								
Options									
	Standard version								
TI	Teach-in by means of a button and via electrical connection								

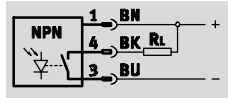
Technical Data

SOEG-RSP Retro-reflective Sensors

Function



PNP, NO contact, e.g. with plug



NPN, NO contact, e.g. with plug

- Beam Exit Straight or Angled
- Round Design
- Variants: M12 and M18



General Technical Data			
Version	M12	M18, Straight	M18, Angled
Method of measurement	Retro-reflective sensor		
Measured variable	Position		
Light type	red polarized		
Working range [mm]	1,500	2,000	2,000
Setting options	-	-	-
Switching status display	Yellow LED		
Operating reserve display	Green LED		
Type of mounting	Via lock nut		
Tightening torque [Nm]	10	20	20
Conforms to	DIN EN 60947-5-2		

Electrical Data	
Switch output	PNP or NPN
Switching element function	Dark switching
Electrical connection	Plug
	Cable
Cable length [m]	2.5
Operating voltage range [V DC]	10 ... 36
Residual ripple [%]	20
Max. switching frequency [Hz]	1,000
Response time [ms]	0.5
Max. output current [mA]	200
Voltage drop [V]	≤ 2.0
Idle current [mA]	15
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC)

Materials	
Body	Nickel-plated brass
Union nut	Nickel-plated brass
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

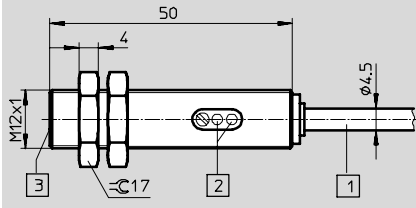
Operating and Environmental Conditions						
Version	M12		M18, Straight		M18, Angled	
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-25 ... +55	-5 ... +55	-25 ... +55	-5 ... +55	-25 ... +55	-5 ... +55
Corrosion resistance class CRC ¹⁾	2		2		2	

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Dimensions Download CAD data → www.festo.com/en/engineering

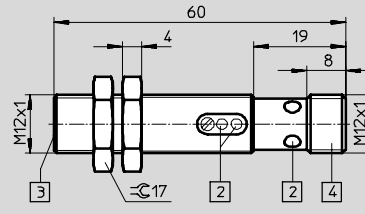
M12

Cable Type



1 Connecting cable 2 Light emitting diode (LED)

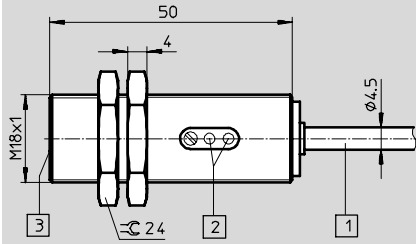
Plug Type



3 Light exit 4 Plug suitable for plug socket with cable SIM-M12...

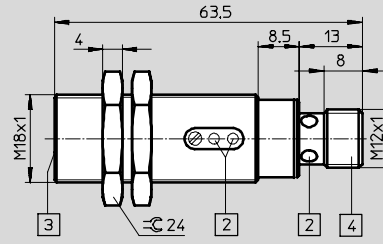
M18, Beam Exit Straight

Cable type



1 Connecting cable 2 Light emitting diode (LED)

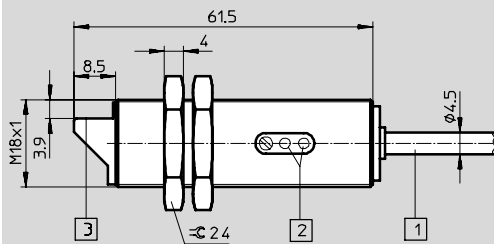
Plug Type



3 Light exit 4 Plug suitable for plug socket with cable SIM-M12...

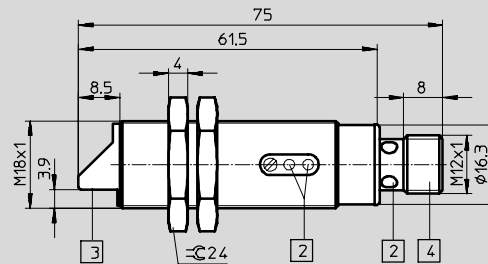
M18, Beam Exit Lateral

Cable Type



1 Connecting cable 2 Light emitting diode (LED)

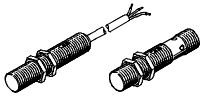
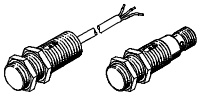
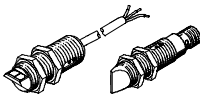
Plug Type



3 Light exit 4 Plug suitable for plug socket with cable SIM-M12...

Ordering Data

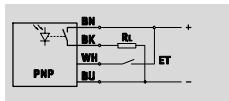
SOEG-RSP Retro-reflective Sensors

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
M12							
	1,500	PNP	■	–	100	537683	SOEG-RSP-M12-PS-K-2L
			–	■	20	537684	SOEG-RSP-M12-PS-S-2L
		NPN	■	–	100	537685	SOEG-RSP-M12-NS-K-2L
			–	■	20	537686	SOEG-RSP-M12-NS-S-2L
M18, Beam Exit Straight							
	2000	PNP	■	–	121	537697	SOEG-RSP-M18-PS-K-2L
			–	■	53	537699	SOEG-RSP-M18-PS-S-2L
		NPN	■	–	121	537713	SOEG-RSP-M18-NS-K-2L
			–	■	53	537715	SOEG-RSP-M18-NS-S-2L
M18, Beam Exit Lateral							
	2000	PNP	■	–	125	537698	SOEG-RSP-M18W-PS-K-2L
			–	■	56	537700	SOEG-RSP-M18W-PS-S-2L
		NPN	■	–	125	537714	SOEG-RSP-M18W-NS-K-2L
			–	■	56	537716	SOEG-RSP-M18W-NS-S-2L

Technical Data

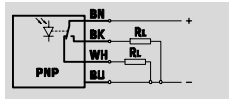
SOEG-RSP Retro-reflective Sensors

Function



e.g. 20x32x12 mm

PNP, switchable, with cable



e.g. 50x50x17 mm,

PNP, antivalent, with cable

- Beam Exit Straight
- Block Design
- Low-cost Version Without the Teach-in and Programming Functionality Available
- Variants: 20x32x12, 30x30x15 and 50x50x17 mm



General Technical Data

Version	20x32x12 mm	20x32x12 mm ¹⁾	30x30x15 mm	50x50x17 mm
Method of measurement	Retro-reflective sensor			
Measured variable	Position			
Light type	red polarized			
Working range [mm]	0 ... 2,500 ²⁾	2,500	0 ... 2,000	0 ... 5,000 ¹⁾
Reference material	Reflector Ø 84 mm			
Setting range, lower limit [mm]	0	–	0	0
Setting range, upper limit [mm]	2,500	–	2,000	5,000
Setting options	Teach-in via electrical connection	–	Potentiometer	Potentiometer
Max. light spot [mm]	75x75 mm at a sensing range of 2 m		–	–
Ready status display	–		–	Green LED
Switching status display	Yellow LED			
Operating reserve display	Green LED		Green LED	Red LED ³⁾
Type of mounting	Via through-holes			
Conforms to	DIN EN 60947-5-2			

1) Low-cost version without the teach-in and programming functionality.

2) Independent of the reflector used → See table below.

3) LED lights up when available operating reserve is insufficient.

Working Range¹⁾

Version	20x32x12 mm	30x30x15 mm	50x50x17 mm
Reflector, rectangular 10x50 mm	–	–	–
Reflector, round Ø 20 mm	1,200	800	1,200
Reflector, round Ø 40 mm	2,000	1,200	3,000
Reflector, square 50x50 mm	2,500	1,200	3,000
Reflector, round Ø 84 mm	2,500	2,000	5,500
Reflector foil, 100 x 100 mm	1,000	1,000	1,000

1) Reflectors → See page 292.

Electrical Data						
Version	20x32x12 mm		20x32x12 mm ¹⁾		30x30x15 mm	50x50x17 mm
Switch output	PNP or NPN					
Switching element function	Switchable		Switchable ²⁾		Dark switching	Changeover switch
Electrical connection	Plug	M8 x 1, 4-pin			M8 x 1, 3-pin	M12x1, 4-pin
	Cable	4-core	-		3-core	4-core
Cable length	[m]	2.0	-		2.5	3.0
Operating voltage range	[V DC]	10 ... 30				
Residual ripple	[%]	10			20	10
Max. switching frequency	[Hz]	1,000		1,000		1,000
Max. output current	[mA]	100		200		200
Voltage drop	[V]	≤ 2.4		2.0		≤ 2.4
Idle current	[mA]	35	25	25		30
Protection against short circuit	Yes, auto recover					
Protection against polarity reversal	For all electrical connections					
Protection class to EN 60529	IP67			IP65		IP67
CE symbol	89/336/EEC (EMC)			89/336/EEC (EMC)		89/336/EEC (EMC)
	73/23/EEC (low voltage)			73/23/EEC (low voltage)		73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)			-		c UL us - Listed (OL)

- 1) Low-cost version without the teach-in and programming functionality.
- 2) By swapping the connections.

Materials				
Version	20x32x12 mm		30x30x15 mm	50x50x17 mm
Body	Acrylic butadiene styrene		Polybutylene terephthalate, reinforced	Acrylic butadiene styrene
Cable sheath	Polyurethane			
Material note	Free of copper and PTFE			

Operating and Environmental Conditions						
Version	20x32x12 mm		30x30x15 mm		50x50x17 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible
Ambient temperature	[°C] -20 ... +60		-5 ... +60		-25 ... +55	
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		2		4	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

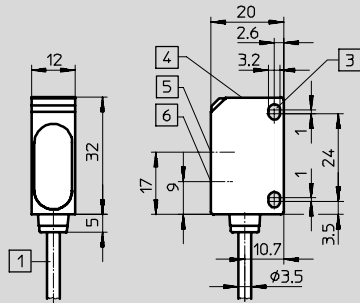
2
2.2

Dimensions

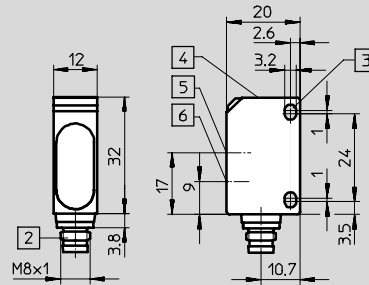
Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

3 Mounting holes

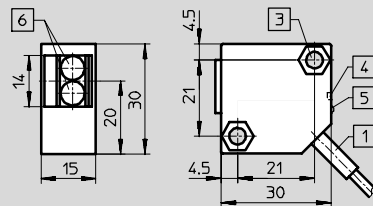
4 Teach-in

5 Receiver

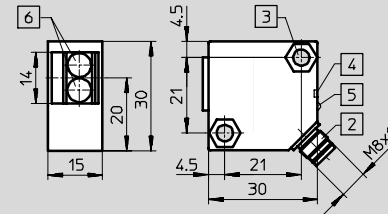
6 Transmitter

30x30x15 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

3 Mounting holes

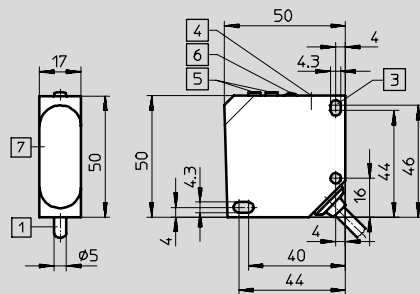
4 Potentiometer

5 Light emitting diode (LED)

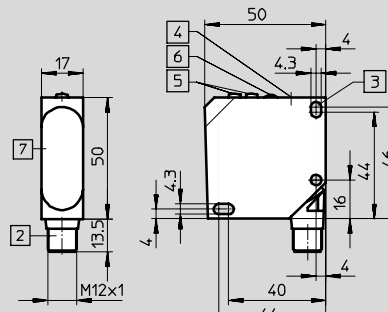
6 Center of optical beam

50x50x17 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M12-...

3 Mounting holes

4 Potentiometer

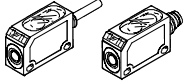
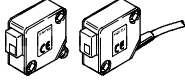
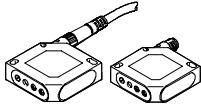
5 Light emitting diode (LED)

6 Numerical display

7 Light exit

Ordering Data

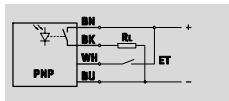
SOEG-RSP Retro-reflective Sensors

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	0 ... 2,500	PNP	■	–	37	537750	SOEG-RSP-Q20-PP-K-2L-TI
			–	■	7	537749	SOEG-RSP-Q20-PP-S-2L-TI
		NPN	–	■	10	537784	SOEG-RSP-Q20-PS-S-2L
			■	–	37	537752	SOEG-RSP-Q20-NP-K-2L-TI
–	■	7	537751	SOEG-RSP-Q20-NP-S-2L-TI			
30x30x15 mm							
	0 ... 2,000	PNP	■	–	85	165330	SOEG-RSP-Q30-PS-K-2L
			–	■	18	165331	SOEG-RSP-Q30-PS-S-2L
		NPN	■	–	85	165328	SOEG-RSP-Q30-NS-K-2L
			–	■	18	165329	SOEG-RSP-Q30-NS-S-2L
50x50x17 mm							
	0 ... 5,500	PNP	■	–	122	537763	SOEG-RSP-Q50-PA-K-3L
			–	■	32	537765	SOEG-RSP-Q50-PA-S-3L
		NPN	■	–	122	537764	SOEG-RSP-Q50-NA-K-3L
			–	■	32	537766	SOEG-RSP-Q50-NA-S-3L

Technical Data

SOEG-RSG Retro-reflective Sensors

Function



PNP, switchable, with cable

- For Transparent Objects
- Autocollimation Principle
- Beam Exit Straight
- Block Design
- Version: 20x32x12 mm



General Technical Data	
Method of measurement	Retro-reflective sensor for transparent objects
Measured variable	Position
Light type	red polarized
Working range [mm]	5 ... 500
Reference material	Laser reflector 51x51 mm
Setting range, lower limit [mm]	5
Setting range, upper limit [mm]	500
Setting options	Teach-in Teach-in via electrical connection
Max. light spot [mm]	20x20 mm at a sensing range of 500 mm
Ready status display	-
Switching status display	Yellow LED
Operating reserve display	Green LED
Type of mounting	Via through-holes
Conforms to	DIN EN 60947-5-2

Electrical Data	
Switch output	PNP
Switching element function	Switchable
Electrical connection	4-core
Cable length [m]	2.0
Operating voltage range [V DC]	10 ... 30
Residual ripple [%]	10
Max. switching frequency [Hz]	1,000
Max. output current [mA]	100
Voltage drop [V]	≤ 2.4
Idle current [mA]	25
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)

Materials	
Body	Acrylic butadiene styrene
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

2
2.2

Technical Data, Ordering Data

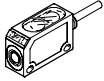
SOEG-RSG Retro-reflective Sensors

Operating and Environmental Conditions		
Cable Installation	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
3) Plug type

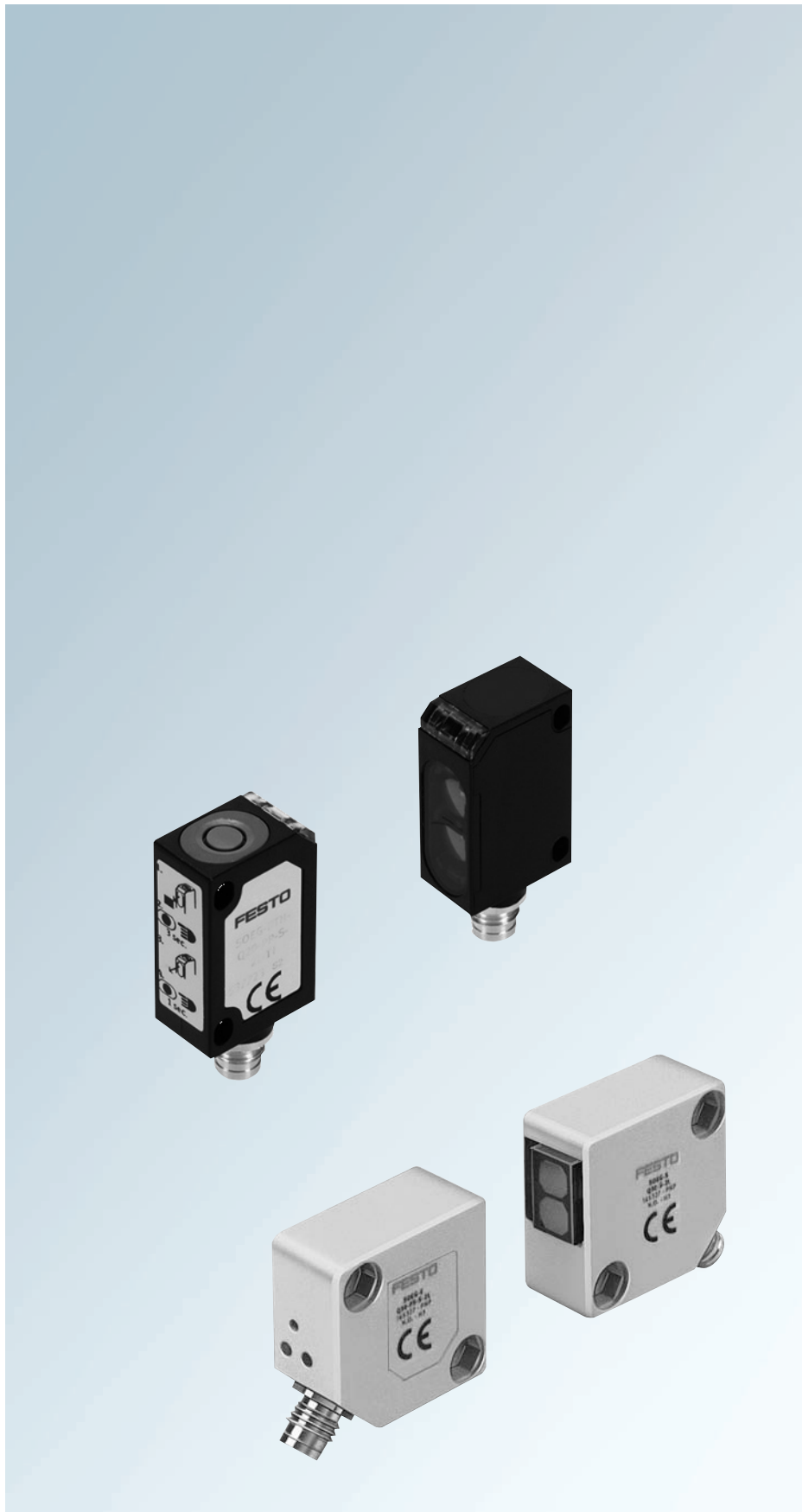
Dimensions Download CAD data → www.festo.com/en/engineering

1) Connecting cable
3) Mounting holes
4) Teach-in
5) Receiver
6) Transmitter

Ordering Data						
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type
			Cable	Plug		
20x32x12 mm						
	5 ... 500	PNP	■	-	40	537754 SOEG-RSG-Q20-PP-K-2L-TI

2
2.2

SOEG-S-.../SOEG-E-... Optical Sensors, Through Beam



Round and block-shaped design

Sizes: M18, 20x32x12 mm,
30x30x15 mm, 50x50x17 mm

Working range: M18: 20,000 mm

Switching element function:
dark, switchable, changeover

PNP or NPN switch output

Cable or plug connection

SOE – G – E – Q20 – PP – K – 2L – TI

Type	
SOE	Opto-electronic sensor

Construction	
G	Standard sensor

Function	
S	Through-beam sensor, transmitter
E	Through-beam sensor, receiver

Design, Version	
M18	Round, M18, beam exit straight
M18W	Round, M18, beam exit lateral
Q20	Block design, 20x32x12 mm
Q30	Block design, 30x30x15 mm
Q50	Block design, 50x50x17 mm

Switch Output	
	No switch output
PS	PNP, NO contact
NS	NPN, NO contact
PA	PNP, changeover switch
NA	NPN, changeover switch
PP	PNP, switchable
NP	NPN, switchable

Electrical Connection	
K	Cable
S	Plug

Display	
L	1 LED
2L	2 LEDs
3L	3 LEDs

Options	
	Standard version
TI	Teach-in by means of a button and via electrical connection

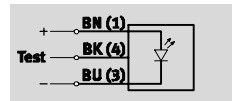
2

2.3

Technical Data

SOEG-S/E Through-beam Sensors

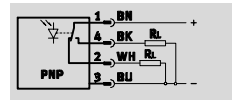
Function



- Beam Exit Straight or Angled
- Round Design
- Version: M18



Transmitter



Receiver, e.g. PNP, changeover, with plug

General Technical Data	
Method of measurement	Through-beam sensor
Measured variable	Position
Light type	red
Working range [mm]	20,000
Setting options	-
Switching status display	Yellow LED
Operating reserve display	Green LED
Type of mounting	Via lock nut
Tightening torque [Nm]	20
Conforms to	DIN EN 60947-5-2

Electrical Data	
Switch output	PNP or NPN
Switching element function	Changeover switch
Electrical connection	Plug M12x1, 3-pin ¹⁾ or 4-pin ²⁾
	Cable 3-core
Cable length [m]	2.5
Operating voltage range [V DC]	10 ... 36
Residual ripple [%]	20
Max. switching frequency ²⁾ [Hz]	1,000
Max. output current ²⁾ [mA]	200
Voltage drop [V]	≤ 2.0
Idle current [mA]	15 ¹⁾ / 10 ²⁾
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC)

1) At the transmitter

2) At the receiver

Materials	
Body	Nickel-plated brass
Union nut	Nickel-plated brass
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

Operating and Environmental Conditions		
Cable Installation	Fixed	Flexible
Ambient temperature [°C]	-25 ... +55	-5 ... +55
Corrosion resistance class CRC ¹⁾	2	

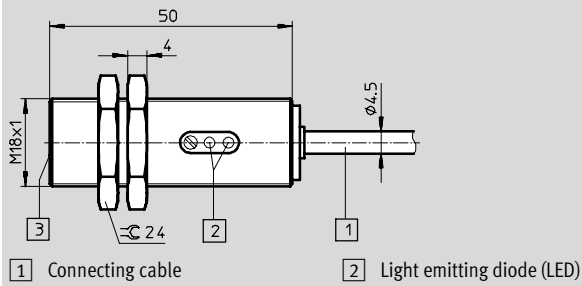
1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Dimensions

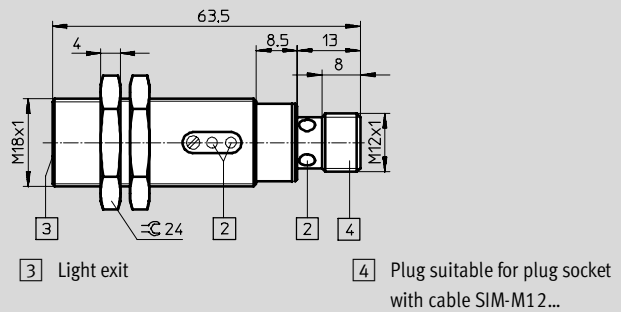
Download CAD data → www.festo.com/en/engineering

M18, Beam Exit Straight

Cable Type

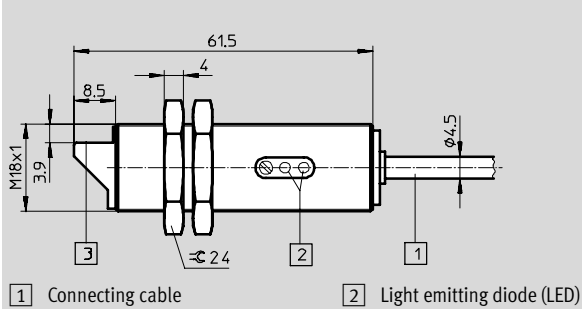


Plug Type

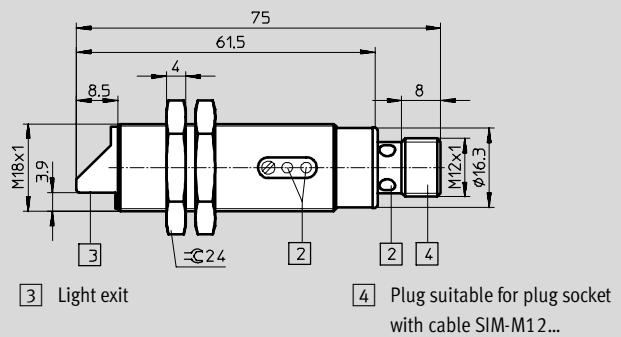


M18, Beam Exit Lateral

Cable Type

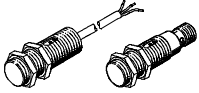
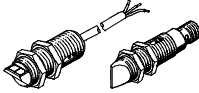


Plug Type



Ordering Data

SOEG-S/E Through-beam Sensors

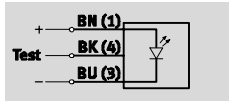
Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weights [g]	Part No.	Type
			Cable	Plug			
M18, Beam Exit Straight							
	Transmitter						
	20,000	-	■	-	115	537691	SOEG-S-M18-K-L
			-	■	40	537703	SOEG-S-M18-S-L
	Receiver						
	20,000	PNP	■	-	115	537692	SOEG-E-M18-PA-K-2L
			-	■	40	537704	SOEG-E-M18-PA-S-2L
NPN		■	-	115	537709	SOEG-E-M18-NA-K-2L	
		-	■	40	537711	SOEG-E-M18-NA-S-2L	
M18, Beam Exit Lateral							
	Transmitter						
	20,000	-	■	-	124	537693	SOEG-S-M18W-K-L
			-	■	57	537695	SOEG-S-M18W-S-L
	Receiver						
	20,000	PNP	■	-	124	537694	SOEG-E-M18W-PA-K-2L
			-	■	57	537696	SOEG-E-M18W-PA-S-2L
NPN		■	-	124	537710	SOEG-E-M18W-NA-K-2L	
		-	■	57	537712	SOEG-E-M18W-NA-S-2L	

Technical Data

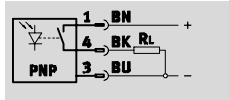
SOEG-S/E Through-beam Sensors

FESTO

Function



e.g. 30x30x15 mm, transmitter



e.g. 30x30x15 mm, receiver, PNP, with plug

- Beam Exit Straight
- Block Design
- Transmitter with Test Input
- Variants: 20x32x12, 30x30x15 and 50x50x17 mm



General Technical Data			
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm
Method of measurement	Through-beam sensor		
Measured variable	Position		
Light type	red	infra-red	infra-red
Working range [mm]	0 ... 6,000	0 ... 6,000	0 ... 15,000
Setting options	Teach-in Teach-in via electrical connection	Potentiometer	Potentiometer
Ready status display	–	–	Green LED
Switching status display	Yellow LED		
Operating reserve display	Green LED	Green LED	Red LED ¹⁾
Type of mounting	Via through-holes		
Conforms to	DIN EN 60947-5-2		

1) LED lights up when available operating reserve is insufficient.

Electrical Data			
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm
Switch output	PNP or NPN		
Switching element function	Switchable	Dark switching	Changeover switch
Electrical connection	Plug	M8 x 1, 4-pin	M12x1, 4-pin
	Cable	4-core	3-core
Cable length [m]	2.0	2.5	3.0
Operating voltage range [V DC]	10 ... 30		
Residual ripple [%]	10	20	10
Max. switching frequency [Hz]	500	1,000	1,000
Max. output current ²⁾ [mA]	100	200	200
Voltage drop [V]	≤ 2.4	2.0	≤ 2.4
Idle current [mA]	20	25 ²⁾ / 30 ³⁾	30
Protection against short circuit	Yes, auto recover		
Protection against polarity reversal	For all electrical connections		
Protection class to EN 60529	IP67	IP65	IP67
CE symbol	89/336/EEC (EMC)	89/336/EEC (EMC)	89/336/EEC (EMC)
	73/23/EEC (low voltage)		73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)	–	c UL us - Listed (OL)

2) At the transmitter

3) At the receiver

Technical Data

SOEG-S/E Through-beam Sensors

Materials			
Version	20x32x12 mm	30x30x15 mm	50x50x17 mm
Body	Acrylic butadiene styrene	Polybutylene terephthalate, reinforced	Acrylic butadiene styrene
Cable sheath	Polyurethane		
Material note	Free of copper and PTFE		

Operating and Environmental Conditions						
Version	20x32x12 mm		30x30x15 mm		50x50x17 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-25 ... +55	-5 ... +55	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		2		4	

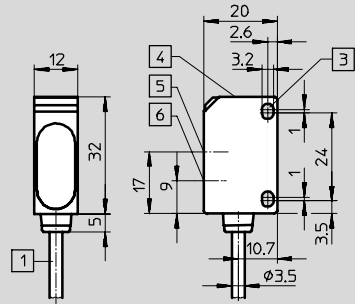
- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Dimensions

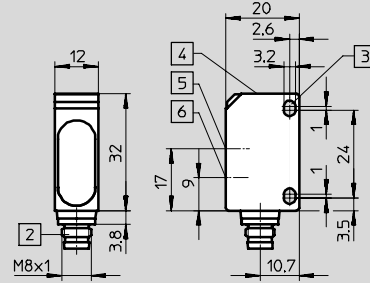
Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

3 Mounting holes

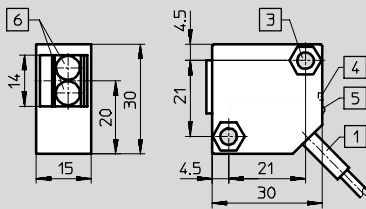
4 Teach-in

5 Receiver

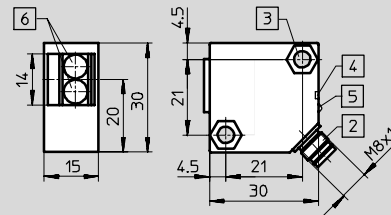
6 Transmitter

30x30x15 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

3 Mounting holes

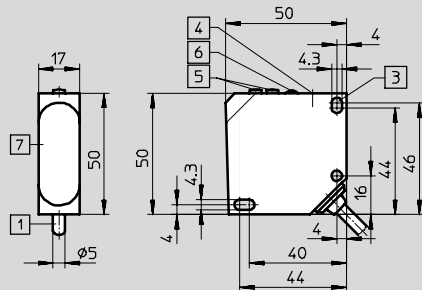
4 Potentiometer

5 Light emitting diode (LED)

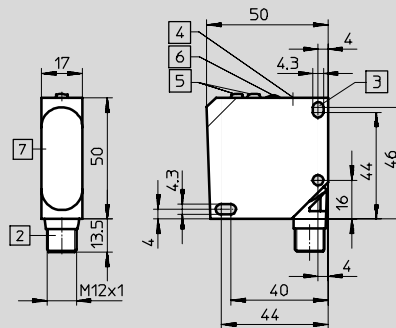
6 Center of optical beam

50x50x17 mm

Cable Type



Plug Type



1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M12-...

3 Mounting holes

4 Potentiometer

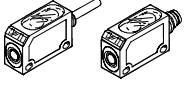
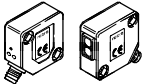
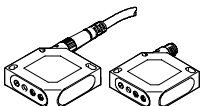
5 Light emitting diode (LED)

6 Numerical display

7 Light exit

Ordering Data

SOEG-S/E Through-beam Sensors

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type	
			Cable	Plug			
20x32x12 mm							
	Transmitter						
	0 ... 6,000	-	■	-	37	537744	SOEG-S-Q20-K-L-TI
			-	■	7	537743	SOEG-S-Q20-S-L-TI
	Receiver						
	0 ... 6,000	PNP	■	-	37	537746	SOEG-E-Q20-PP-K-2L-TI
			-	■	7	537745	SOEG-E-Q20-PP-S-2L-TI
NPN		■	-	37	537748	SOEG-E-Q20-NP-K-2L-TI	
		-	■	7	537747	SOEG-E-Q20-NP-S-2L-TI	
30x30x15 mm							
	Transmitter						
	0 ... 6,000	-	■	-	85	165352	SOEG-S-Q30-K-L
			-	■	18	165353	SOEG-S-Q30-S-L
	Receiver						
	0 ... 6,000	PNP	■	-	85	165322	SOEG-E-Q30-PS-K-2L
			-	■	18	165323	SOEG-E-Q30-PS-S-2L
NPN		■	-	85	165320	SOEG-E-Q30-NS-K-2L	
		-	■	18	165321	SOEG-E-Q30-NS-S-2L	
50x50x17 mm							
	Transmitter						
	0 ... 15,000	-	■	-	121	537779	SOEG-S-Q50-K-L
			-	■	31	537780	SOEG-E-Q50-PA-K-3L
	Receiver						
0 ... 15,000	PNP	■	-	121	537781	SOEG-S-Q50-S-L	
		-	■	31	537782	SOEG-E-Q50-PA-S-3L	

2
2.3

SOEG-... Optical Sensors, Fiber Optic



2

2.4

Block-shaped design

Sizes: 20x32x12 mm, 30x30x15 mm

Beam exit: straight or angled

Working range: 0 to 250 mm

Switching element function:
switchable, changeover

PNP or NPN switch output

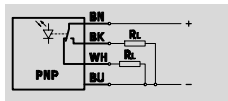
Cable or plug connection

		SOE	G	-	L	-	Q20	-	PP	-	S	-	2L	-	TI
Type															
SOE	Opto-electronic sensor														
Construction															
G	Standard sensor														
Function															
L	Fiber-optic unit														
Design, Version															
Q20	Block design, 20x32x12 mm														
Q30	Block design, 30x30x15 mm														
Switch Output															
PA	PNP, changeover switch														
NA	NPN, changeover switch														
PP	PNP, switchable														
NP	NPN, switchable														
Electrical Connection															
K	Cable														
S	Plug														
Display															
2L	2 LEDs														
Options															
	Standard version														
TI	Teach-in by means of a button and via electrical connection														

Technical Data

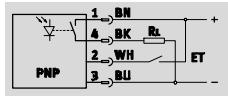
SOEG-L Fiber-optic Units

Function



e.g. 30x30x15 mm

PNP, NO contact, with plug



e.g. 20x32x12 mm

PNP, switchable, with plug

- For Polymer and Glass Fiber-optic Cable
- Beam Exit Straight
- Block Design
- Variants: 20x32x12 and 30x30x15 mm



General Technical Data		
Version	20x32x12 mm	30x30x15 mm
Method of measurement	Fiber-optic unit	
Measured variable	Position	
Light type	red	
Working range [mm]	0 ... 250 ¹⁾	0 ... 400 ²⁾
Setting range, lower limit [mm]	0	
Setting range, upper limit [mm]	100 ... 250 ¹⁾	100 ... 400 ²⁾
Setting options	Teach-in Teach-in via electrical connection	Potentiometer
Switching status display	Yellow LED	
Operating reserve display	Green LED	
Type of mounting	Via through-holes	
Conforms to	DIN EN 60947-5-2	

1) Depending on the fiber-optic cable used → See pages 295-296.
 100 mm at SOEZ-LLG-RT-0.5-M6 and SOEZ-LLK-RT-2.0-M6
 150 mm at SOEZ-LLG-SE-0.5-M4
 250 mm at SOEZ-LLK-SE-2.0-M4

2) Depending on the fiber-optic cable used → See pages 295-296.
 100 mm at SOEZ-LLG-RT-0.5-M6
 120 mm at SOEZ-LLK-RT-2.0-M6
 280 mm at SOEZ-LLG-SE-0.5-M4
 400 mm at SOEZ-LLK-SE-2.0-M4

Electrical Data		
Version	20x32x12 mm	30x30x15 mm
Switch output	PNP or NPN	
Switching element function	Switchable	Changeover switch
Electrical connection	Plug	M8 x 1, 4-pin
	Cable	4-core
Cable length [m]	2.0	2.5
Operating voltage range [V DC]	10 ... 30	
Residual ripple [%]	10	20
Max. switching frequency [Hz]	1,000	
Max. output current ¹⁾ [mA]	100	200
Voltage drop [V]	≤ 2.4	2.0
Idle current [mA]	25	25
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP67	IP65
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)	89/336/EEC (EMC)
Approval	c UL us - Listed (OL)	-

Materials		
Version	20x32x12 mm	30x30x15 mm
Body	Acrylic butadiene styrene	Polybutylene terephthalate, reinforced
Cable sheath	Polyurethane	
Material note	Free of copper and PTFE	

Operating and Environmental Conditions				
Version	20x32x12 mm		30x30x15 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	0 ... +60	0 ... +60	-25 ... +55	-5 ... +55
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		2	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Dimensions Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type Plug Type

1) Connecting cable

2) Plug suitable for plug socket with cable SIM-M8...

3) Mounting holes

4) Teach-in

5) Receiver

6) Transmitter

7) Mounting holes for fiber-optic cable

30x30x15 mm

Cable Type Plug Type

1) Connecting cable

2) Plug suitable for plug socket with cable SIM-M8...

3) Mounting holes

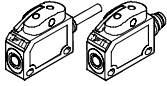
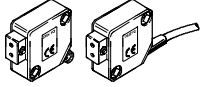
4) Potentiometer

5) Light emitting diode (LED)

6) Mounting holes for fiber-optic cable

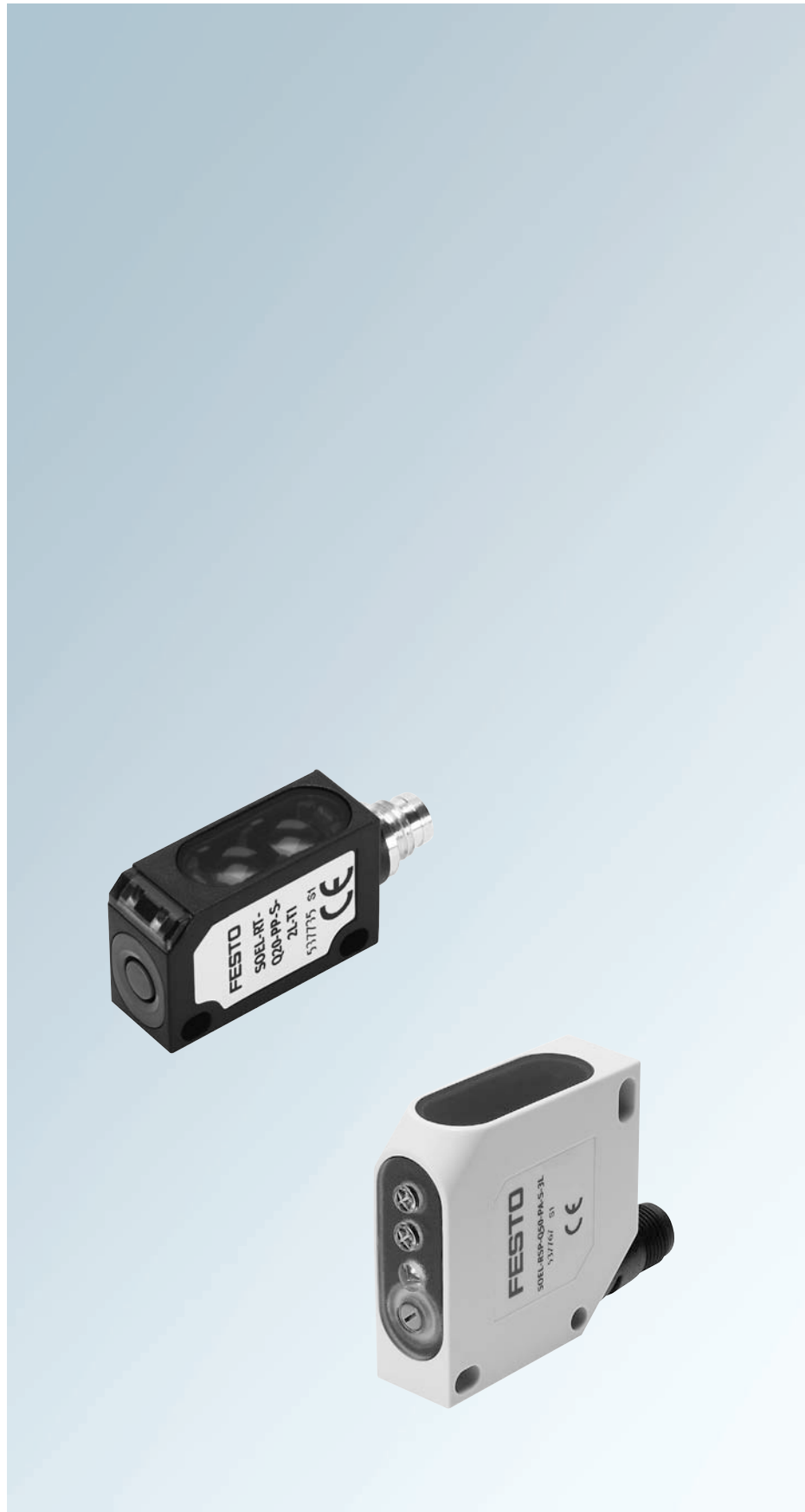
Ordering Data

SOEG-L Fiber-optic Units

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	0 ... 250	PNP	■	-	37	537740	SOEG-L-Q20-PP-K-2L-TI
			-	■	8	537739	SOEG-L-Q20-PP-S-2L-TI
		NPN	■	-	37	537742	SOEG-L-Q20-NP-K-2L-TI
			-	■	8	537741	SOEG-L-Q20-NP-S-2L-TI
30x30x15 mm							
	0 ... 120	NPN	■	-	88	165324	SOEG-L-Q30-NA-K-2L
			-	■	18	165325	SOEG-L-Q30-NA-S-2L
		PNP	■	-	88	165326	SOEG-L-Q30-PA-K-2L
			-	■	18	165327	SOEG-L-Q30-PA-S-2L

Accessories: Fiber-optic cables, see pages 295-296.

SOEL-... Optical Sensors, Laser Diffuse/Retro-reflective



2

2.5

Block-shaped design

Sizes: 20x32x12 mm, 50x50x17 mm

Analog displacement

Working range: 0 to 12,000 mm

Background suppression

Switching element function:
light, switchable, changeover

PNP or NPN switch output

Cable or plug connection

2

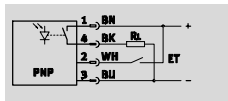
2.5

		SOE	L	-	RSP	-	Q20	-	PP	-	K	-	2L	-	TI
Type															
SOE	Opto-electronic sensor														
Construction															
L	Laser sensor														
Function															
RT	Diffuse sensor														
RSP	Retro-reflective sensor														
RTH	Diffuse sensor with background suppression														
RTD	Distance sensor														
Design, Version															
Q20	Block design, 20x32x12 mm														
Q50	Block design, 50x50x17 mm														
Switch Output															
PA	PNP, changeover switch														
NA	NPN, changeover switch														
PP	PNP, switchable														
NP	NPN, switchable														
Electrical Connection															
K	Cable														
S	Plug														
Display															
2L	2 LEDs														
3L	3 LEDs														
7L	7 LEDs														
Options															
	Standard version														
TI	Teach-in by means of a button and via electrical connection														

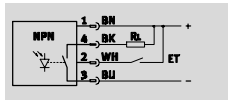
Technical Data

SOEL-RT Laser Diffuse Sensors

Function



PNP, switchable, e.g. with plug



NPN, switchable, e.g. with plug

- With Laser Light
- Beam Exit Straight
- Block Design
- Version: 20x32x12 mm



General Technical Data	
Method of measurement	Diffuse sensor
Measured variable	Position
Light type	Laser, red
Laser protection class	2
Working range [mm]	10 ... 150
Setting range, lower limit [mm]	10
Setting range, upper limit [mm]	150
Setting options	Teach-in Teach-in via electrical connection
Max. light spot [mm]	0.7 mm in focus
Switching status display	Yellow LED
Operating reserve display	Green LED
Type of mounting	Via through-holes
Conforms to	DIN EN 60947-5-2

Electrical Data	
Switch output	PNP or NPN
Switching element function	Switchable
Electrical connection	Plug M8 x 1, 4-pin Cable 4-core
Cable length [m]	2.0
Operating voltage range [V DC]	10 ... 30
Residual ripple [%]	10
Max. switching frequency [Hz]	1,000
Max. output current [mA]	100
Voltage drop [V]	≤ 2.4
Idle current [mA]	25
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)

2
2.5

Materials	
Body	Acrylic butadiene styrene
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

Operating and Environmental Conditions		
Cable Installation	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Dimensions Download CAD data → www.festo.com/en/engineering

Cable Type

Plug Type

1 Connecting cable

2 Plug suitable for plug socket with cable SIM-M8-...

4 Teach-in

6 Transmitter

3 Mounting holes

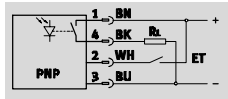
5 Receiver

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	10 ... 150	PNP	■	-	36	537736	SOEL-RT-Q20-PP-K-2L-TI
			-	■	8	537735	SOEL-RT-Q20-PP-S-2L-TI
		NPN	■	-	36	537738	SOEL-RT-Q20-NP-K-2L-TI
			-	■	8	537737	SOEL-RT-Q20-NP-S-2L-TI

Technical Data

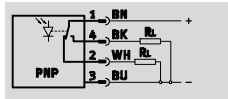
SOEL-RTH Laser Diffuse Sensors

Function



e.g. 20x32x12 mm

PNP, switchable, with plug



e.g. 50x50x17 mm,

PNP, antivalent, with plug

- With Laser Light
- With Background Suppression
- Beam Exit Straight
- Block Design
- Variants: 20x32x12 and 50x50x17 mm



General Technical Data		
Version	20x32x12 mm	50x50x17 mm
Method of measurement	Laser diffuse sensor with background suppression	
Measured variable	Position	
Light type	Laser, red	
Laser protection class	2	
Working range [mm]	30 ... 110	50 ... 300
Reference material	18%	
Setting range, lower limit [mm]	30	50
Setting range, upper limit [mm]	110	300
Setting options	Teach-in Teach-in via electrical connection	Potentiometer
Max. light spot [mm]	0.7 mm in focus	–
Ready status display	–	Green LED
Switching status display	Yellow LED	
Operating reserve display	Green LED	Red LED ¹⁾
Type of mounting	Via through-holes	
Conforms to	DIN EN 60947-5-2	

1) LED lights up when available operating reserve is insufficient.

Electrical Data		
Version	20x32x12 mm	50x50x17 mm
Switch output	PNP or NPN	
Switching element function	Switchable	Changeover switch
Electrical connection	Plug	M8 x 1, 4-pin
	Cable	4-core
Cable length [m]	2.0	3.0
Operating voltage range [V DC]	10 ... 30	
Residual ripple [%]	10	
Max. switching frequency [Hz]	1,000	2,500
Max. output current [mA]	100	200
Voltage drop [V]	≤ 2.4	
Idle current [mA]	30	50
Protection against short circuit	Yes, auto recover	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP67	
CE symbol	89/336/EEC (EMC)	
	73/23/EEC (low voltage)	
Approval	c UL us - Listed (OL)	

Materials		
Version	20x32x12 mm	50x50x17 mm
Body	Acrylic butadiene styrene	
Cable sheath	Polyurethane	
Material note	Free of copper and PTFE	

Operating and Environmental Conditions				
Version	20x32x12 mm		50x50x17 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-20 ... +45	-5 ... +45
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		4	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

Dimensions Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type Plug Type

1 Connecting cable 2 Plug suitable for plug socket with cable SIM-M8-... 3 Mounting holes 5 Receiver
4 Teach-in 6 Transmitter

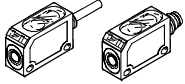
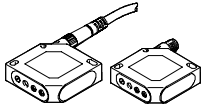
50x50x17 mm

Cable Type Plug Type

1 Connecting cable 2 Plug suitable for plug socket with cable SIM-M12-... 3 Mounting holes 4 Potentiometer 6 Numerical display
5 Light emitting diode (LED) 7 Light exit

Ordering Data

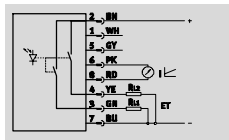
SOEL-RTH Laser Diffuse Sensors

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	30 ... 110	PNP	■	–	36	537729	SOEL-RTH-Q20-PP-K-2L-TI
			–	■	7	537727	SOEL-RTH-Q20-PP-S-2L-TI
		NPN	■	–	36	537730	SOEL-RTH-Q20-NP-K-2L-TI
			–	■	7	537728	SOEL-RTH-Q20-NP-S-2L-TI
50x50x17 mm							
	50 ... 300	PNP	■	–	122	537777	SOEL-RTH-Q50-PA-K-3L
			–	■	32	537775	SOEL-RTH-Q50-PA-S-3L
		NPN	■	–	122	537778	SOEL-RTH-Q50-NA-K-3L
			–	■	32	537776	SOEL-RTH-Q50-NA-S-3L

Technical Data

SOEL-RTD Laser Diffuse Sensors

Function



Analog output

- With Laser Light
- Sensor for Distance Measurement
- Beam Exit Straight
- Block Design
- Version: 50x50x17 mm



General Technical Data	
Method of measurement	Distance sensor
Measured variable	Displacement
Light type	Laser, red
Laser protection class	2
Working range [mm]	80 ... 300
Reference material	18%
Setting range, lower limit [mm]	80
Setting range, upper limit [mm]	300
Setting options	Teach-in Teach-in via electrical connection
Max. light spot [mm]	2x4
Resolution [mm]	0.3
Ready status display	Green LED
Switching status display	Yellow LED
Operating reserve display	Green LED
Type of mounting	Via through-holes

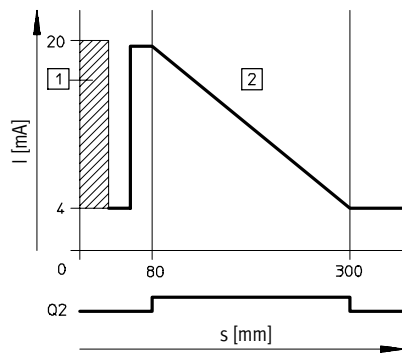
Electrical Data	
Analog output [mA]	4 ... 20
Switch output	Switchable
Electrical connection	Plug M12x1, 8-pin
Operating voltage range [V DC]	16 ... 30
Residual ripple [%]	10
Max. switching frequency [Hz]	1,000
Max. output current [mA]	100
Voltage drop [V]	≤ 2.4
Idle current [mA]	40
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)

Materials	
Body	Acrylic butadiene styrene
Material note	Free of copper and PTFE

Operating and Environmental Conditions		
Ambient temperature	[°C]	-10 ... +55
Corrosion resistance class CRC ¹⁾		4

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Response Curve (Delivery Condition)

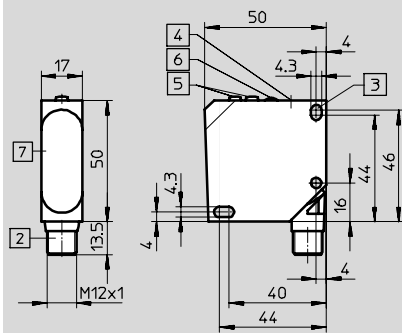


s = Distance
 I = Output current
 Q2 = Digital output

- 1 Undefined range
- 2 Operating range

Dimensions

Download CAD data → www.festo.com/en/engineering



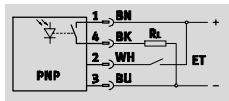
- 2 Plug suitable for plug socket with cable SIM-M12-...
- 3 Mounting holes
- 4 Teach-in
- 5 Light emitting diode (LED)
- 6 Light emitting diode (LED)
- 7 Light exit

Ordering Data						
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type
			Cable	Plug		
50x50x17 mm						
	80 ... 300	PNP	-	■	42	537823 SOEL-RTD-Q50-PP-S-7L

Technical Data

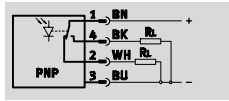
SOEL-RSP Laser Retro-reflective Sensors

Function



e.g. 20x32x12 mm

PNP, switchable, with plug



e.g. 50x50x17 mm,

PNP, anti-voltage, with plug

- With Laser Light
- Beam Exit Straight
- Block Design
- Variants: 20x32x12 and 50x50x17 mm



General Technical Data		
Version	20x32x12 mm	50x50x17 mm
Method of measurement	Retro-reflective sensor	
Measured variable	Position	
Light type	Laser, red polarized	
Laser protection class	2	
Working range [mm]	100 ... 1,000 ¹⁾	0 ... 12,000 ¹⁾
Reference material	Laser reflector 51x51 mm	Reflector Ø 84 mm
Setting range, lower limit [mm]	100	0
Setting range, upper limit [mm]	1,000	12,000
Setting options	Teach-in via electrical connection	Potentiometer
Max. light spot [mm]	1 mm at a sensing range of 300 mm	15 mm at a sensing range of 8 mm
Ready status display	–	Green LED
Switching status display	Yellow LED	
Operating reserve display	Green LED	Red LED ²⁾
Type of mounting	Via through-holes	
Conforms to	DIN EN 60947-5-2	

1) Independent of the reflector used → See table below.

2) LED lights up when available operating reserve is insufficient.

Working Range ³⁾ [mm]		
Version	20x32x12 mm	50x50x17 mm
Reflector, rectangular 10x50 mm	10 ... 1,000	5,000
Reflector, round Ø 20 mm	2,500 ⁴⁾	6,000 ⁵⁾
Reflector, round Ø 40 mm	2,500 ⁴⁾	12,000 ⁵⁾
Reflector, square 50x50 mm	10 ... 1,000	12,000 ⁵⁾
Reflector, round Ø 84 mm	2,500 ⁴⁾	12,000 ⁵⁾

3) Reflectors → See page 292.

4) to be used only for sensing ranges > 1,000 mm.

5) to be used only for sensing ranges > 5,000 mm.

Electrical Data				
Version	20x32x12 mm		50x50x17 mm	
Switch output	PNP or NPN			
Switching element function	Switchable		Changeover switch	
Electrical connection	Plug	M8 x 1, 4-pin		M12x1, 4-pin
	Cable	4-core		
Cable length	[m]	2.0	3.0	
Operating voltage range	[V DC]	10 ... 30		
Residual ripple	[%]	10		
Max. switching frequency	[Hz]	1,000	2,500	
Max. output current	[mA]	100	200	
Voltage drop	[V]	≤ 2.4		
Idle current	[mA]	25	40	
Protection against short circuit	Yes, auto recover			
Protection against polarity reversal	For all electrical connections			
Protection class to EN 60529	IP67			
CE symbol	89/336/EEC (EMC)			
	73/23/EEC (low voltage)			
Approval	c UL us - Listed (OL)			

Materials	
Body	Acrylic butadiene styrene
Cable sheath	Polyurethane
Material note	Free of copper and PTFE

Operating and Environmental Conditions				
Version	20x32x12 mm		50x50x17 mm	
Cable Installation	Fixed	Flexible	Fixed	Flexible
Ambient temperature	[°C]	-20 ... +60	-5 ... +60	-20 ... +45
Corrosion resistance class CRC ¹⁾	4 ²⁾ / 2 ³⁾		4	

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.
- 2) Cable type
- 3) Plug type

2
2.5

Dimensions Download CAD data → www.festo.com/en/engineering

20x32x12 mm

Cable Type Plug Type

1 Connecting cable
 2 Plug suitable for plug socket with cable SIM-M8-...
 4 Teach-in
 6 Transmitter

3 Mounting holes
 5 Receiver

Dimensions Download CAD data → www.festo.com/en/engineering

50x50x17 mm

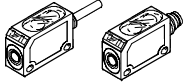
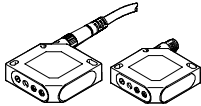
Cable Type Plug Type

1 Connecting cable
 2 Plug suitable for plug socket with cable SIM-M12-...
 4 Potentiometer
 6 Numerical display

3 Mounting holes
 5 Light emitting diode (LED)
 7 Light exit

Ordering Data

SOEL-RSP Laser Retro-reflective Sensors

Ordering Data							
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No.	Type
			Cable	Plug			
20x32x12 mm							
	100 ... 1,000	PNP	■	–	37	537760	SOEL-RSP-Q20-PP-K-2L-TI
			–	■	7	537759	SOEL-RSP-Q20-PP-S-2L-TI
		NPN	■	–	37	537762	SOEL-RSP-Q20-NP-K-2L-TI
			–	■	7	537761	SOEL-RSP-Q20-NP-S-2L-TI
50x50x17 mm							
	0 ... 12,000	PNP	■	–	122	537769	SOEL-RSP-Q50-PA-K-3L
			–	■	32	537767	SOEL-RSP-Q50-PA-S-3L
		NPN	■	–	122	537770	SOEL-RSP-Q50-NA-K-3L
			–	■	32	537768	SOEL-RSP-Q50-NA-S-3L

SOEC-... Optical Sensors, For Color Detection



2

2.6

Block-shaped design

Size: 50x50x17 mm

Three color sensing

Working range: 12 to 32 mm

Background suppression

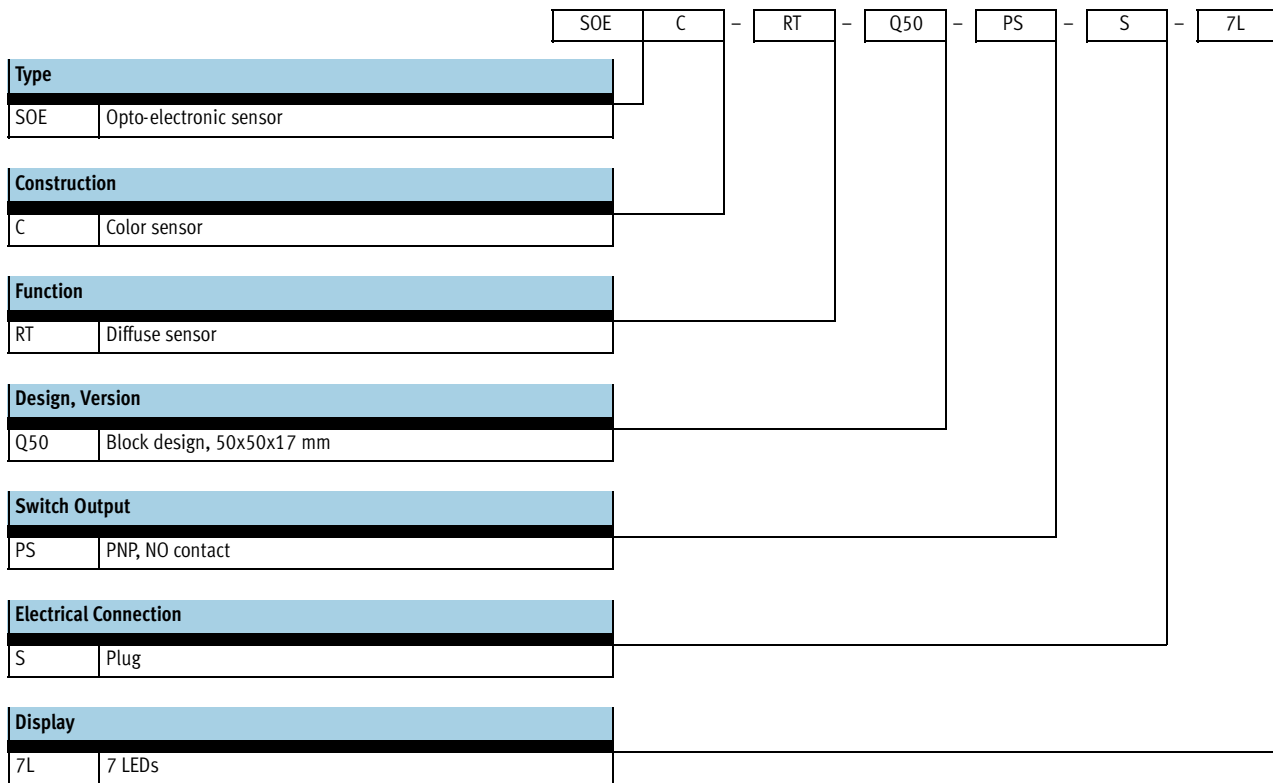
Switching element function:
light, switchable, changeover

PNP or NPN switch output

Plug connection

2

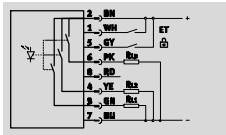
2.6



Technical Data

SOEC-RT Color Sensor

Function



3x PNP, NO contact, with plug

- Sensor for Measuring Color
- Beam Exit Straight
- Block Design
- Version: 50x50x17 mm



General Technical Data	
Method of measurement	Color sensor
Measured variable	Position
Light type	white
Working range [mm]	12 ... 32
Reference material	18%
Setting options	Teach-in Teach-in via electrical connection
Max. light spot [mm]	∅ 4 mm at a sensing range of 22 mm
Ready status display	Green LED
Switching status display	LED
Operating reserve display	Green LED
Type of mounting	Via through-holes
Conforms to	DIN EN 60947-5-2

Electrical Data	
Switch output	3x PNP
Switching element function	Light switching
Electrical connection Plug	M12x1, 8-pin
Operating voltage range [V DC]	16 ... 30
Residual ripple [%]	10
Max. switching frequency [Hz]	500
Max. output current [mA]	100
Voltage drop [V]	≤ 2.4
Idle current [mA]	40
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP67
CE symbol	89/336/EEC (EMC) 73/23/EEC (low voltage)
Approval	c UL us - Listed (OL)

2
2.6

Technical Data

SOEC-RT Color Sensor

FESTO

Materials

Body	Acrylic butadiene styrene
Material note	Free of copper and PTFE

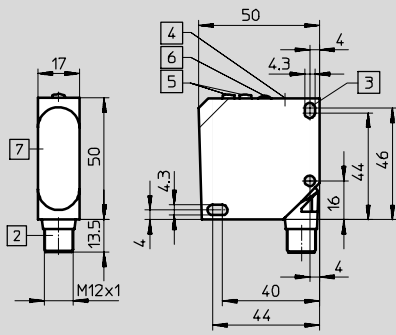
Operating and Environmental Conditions

Ambient temperature	[°C]	-10 ... +55
Corrosion resistance class CRC ¹⁾		4

- 1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions


Download CAD data → www.festo.com/en/engineering



- 2 Plug suitable for plug socket with cable SIM-M12-...
- 3 Mounting holes
- 4 Teach-in
- 5 Light emitting diode (LED)
- 6 Light emitting diode (LED)
- 7 Light exit

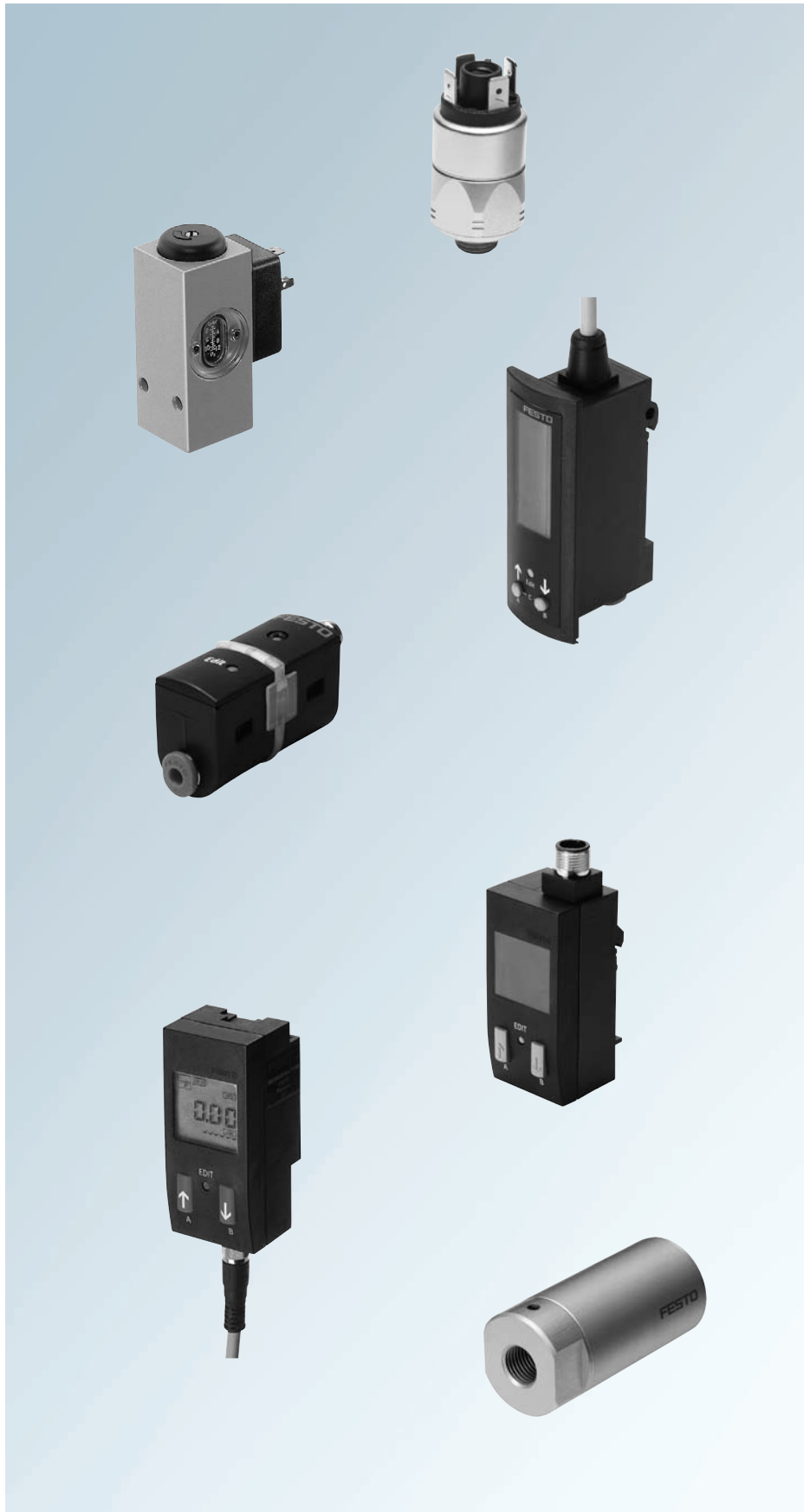
Ordering Data

SOEC-RT Color Sensor

Ordering Data						
Version	Working Range [mm]	Switch Output	Electrical Connection		Weight [g]	Part No. Type
			Cable	Plug		
50x50x17 mm						
	12 ... 32	PNP	-	■	38	538236 SOEC-RT-Q50-PS-S-7L

2
2.6

Pressure/Vacuum Sensors



3






3.0

Modular family of sensors for pressure/vacuum measurement

Styles ranging from digital trigger functions for sensing applications to continuous monitoring applications with LED display and analog data

Integrate onto service unit, or mount via panel, wall or DIN rail

Cost effective, easy to mount, configure, and connect electrically all add to your convenience

<p>Mechanical Pressure – PEV</p> <ul style="list-style-type: none"> ■ Adjustable pressure switches ■ With adjustable switching points ■ Version with scale for reading the selected switching pressure ■ Normally open, normally closed contacts (NO/NC) or transfer switch ■ Direct, threaded connection 	<p style="text-align: right;">Section 3.1 → Page 149</p> 
<p>Pressure/Vacuum – SDE5</p> <ul style="list-style-type: none"> ■ Pressure or vacuum sensing ■ PNP output ■ M8 or cable connection ■ High contrast LED on three sides of the sensor ■ Teach-in button for fast programming ■ Unilateral or bilateral pneumatic connection ■ Option to mount in-line with vacuum generator 	<p style="text-align: right;">Section 3.2 → Page 159</p> 
<p>Pressure/Vacuum with LCD Display – SDE3</p> <ul style="list-style-type: none"> ■ Pressure or vacuum sensing ■ PNP or NPN output ■ M8 or cable connection ■ Illuminated LCD display ■ Various mounting options ■ Various unit types for display ■ Size optimized 	<p style="text-align: right;">Section 3.3 → Page 169</p> 
<p>Pressure/Vacuum with LCD Display – SDE1</p> <ul style="list-style-type: none"> ■ Differential or relative pressure sensing ■ Monitoring of regulator pressure settings ■ Programmable ■ PNP or NPN output ■ Digital and/or analog (0-10 V or 4-20 mA) signals ■ M8 or M12 electrical connection ■ LCD displays (backlit or illuminated) ■ Various mounting options 	<p style="text-align: right;">Section 3.4 → Page 177</p> 
<p>Analog Pressure – SDE</p> <ul style="list-style-type: none"> ■ Provide analog current or voltage output that is proportional to the pressure input ■ Five models for analog sensing, 0 to 16 bar ■ Fast response, high accuracy, Class 1, +/- 0.5% ■ Excellent linearity ■ Solid state, no moving parts ■ Built-in circuit protection, temperature compensation ■ Quick connect with LED option ■ Easily interfaced to PLCs 	<p style="text-align: right;">Section 3.5 → Page 189</p> 

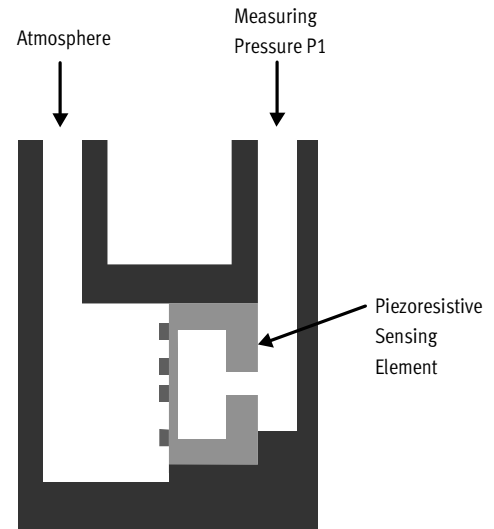
3
3.0

Pressure/Vacuum Sensors – For Digital and Analog Outputs

Uses Piezoresistive Sensing Element – For SDE5, SDE3, and SDE1

The internal electronics consist of a preamplifier stage with temperature compensation, an amplifier stage, a microcontroller and an output circuit. The voltage signal generated by the pressure sensing element is re-amplified downstream from pre-amplification and temperature compensation, and is converted into a digital signal. After A-D conversion, the microcontroller processes the data and forwards it to the switching stage in accordance with the selected switching function (switching output). This digital output signal can then be used by a controller for further action within the process automation sequence.

The piezoresistive pressure sensing element is comprised of a silicon chip with diffused resistors. The rear side is etched away, thus creating a thin membrane. The resistors are arrayed at the edge of the membranous faceplate, and are linked to form a measuring bridge. When mechanical stressing occurs (pressurization of the silicon chip), the value of radially arranged resistors is increased, or the value of transversally arranged resistors is decreased. Measuring bridge imbalance determines the measured value. Each pressure measurement is a differential pressure measurement between the two surfaces.



Pressure Sensor SDE1, SDE3, and SDE5

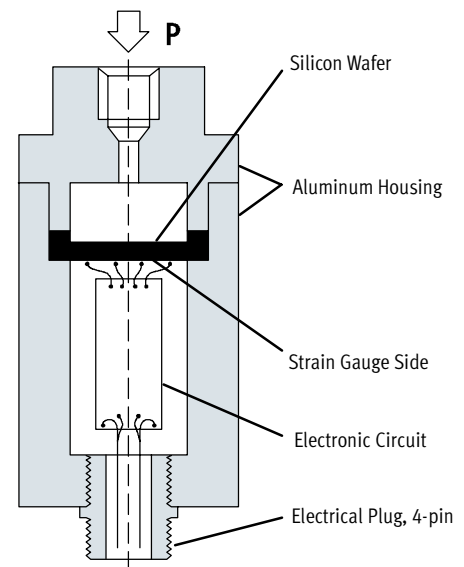
Analog Pressure Sensors

Uses Piezoresistive Strain Gauge Principle – For Transmitter SDE

Supply voltage which is wired to the sensor terminals is applied, through the internal circuitry which is laminated to the non-fluid side of the wafer, to the strain gauge. When the pressure applied to the input port of the sensor changes, there is a proportional change in the voltage and current output signals from the sensor.

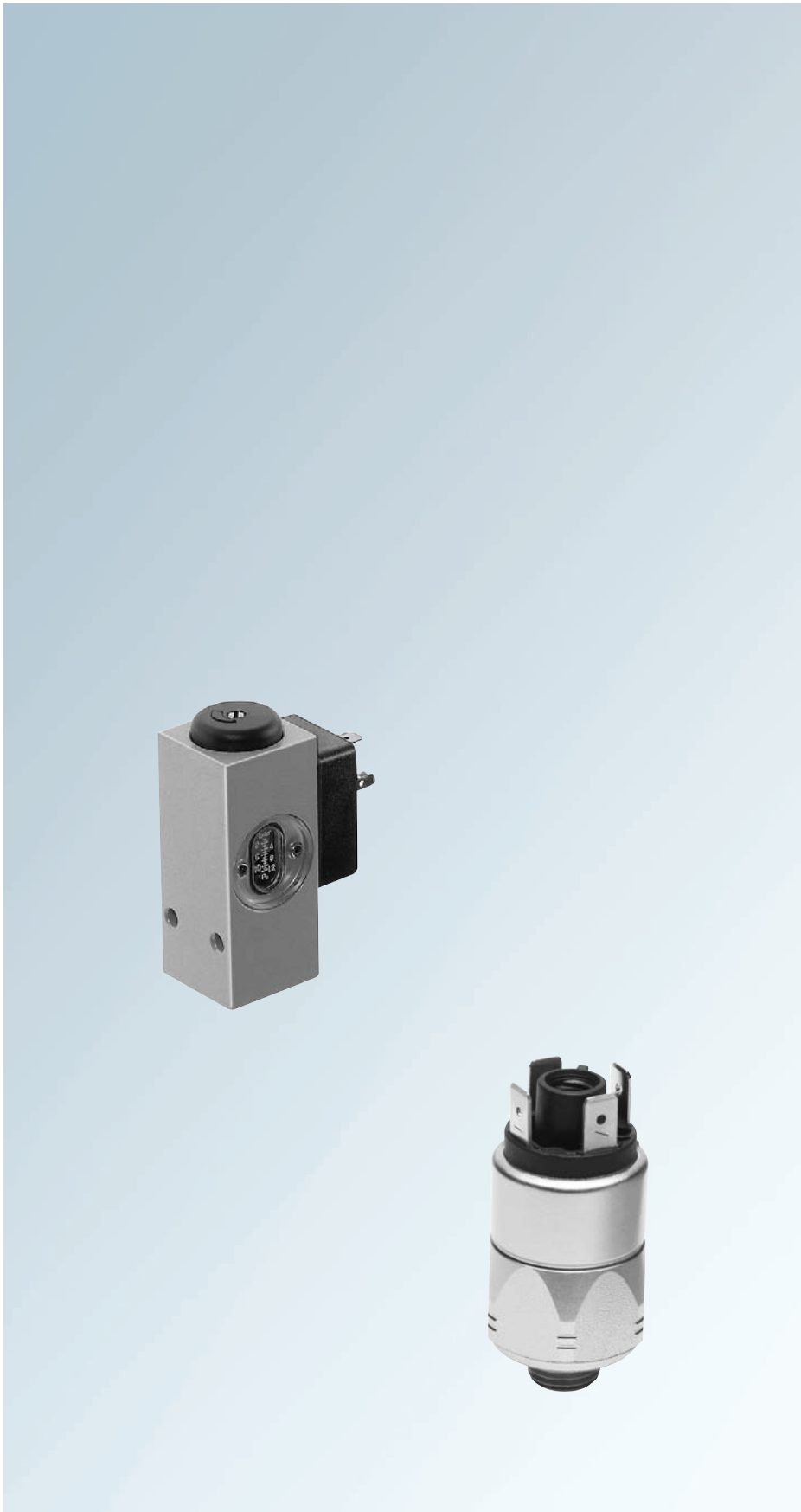
The design of the sensor isolates the pressurized medium from the gauge and electronic circuitry; the only concerns for suitability with a particular medium are compatibility with the aluminum housing and the silicon. Amplifier and temperature compensation are included in the internal circuitry.

Most Festo type SDE... pressure sensors have the same housing diameter, input port size and wiring connector. Therefore installation is standardized.



Transmitter SDE

PEV-... Mechanical Pressure Sensors



Adjustable pressure sensors

Version with scale

With adjustable
switching points

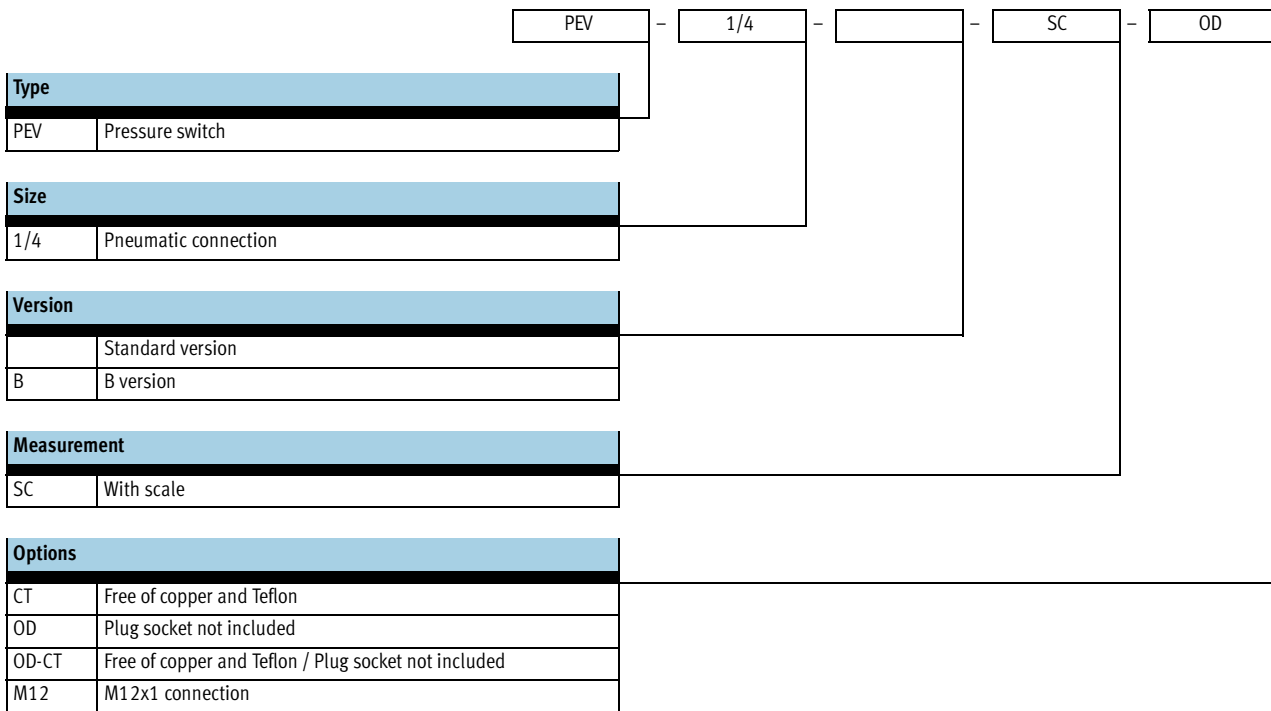
Direct, threaded connection

Normally open, normally
closed contacts (NO/NC)
or transfer switch

3

3.1

Type Code – PEV-... Mechanical Pressure Sensors

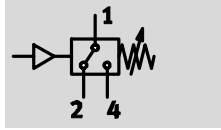


3
3.1

Technical Data

PEV Mechanical Pressure Sensors – Mounting Via Screws

Function



Voltage:

0 ... 250 V DC/AC

Pressure:

1 ... 12 bar

Temperature Range:

-20 ... +80 °C



General Technical Data			
Type	PEV-1/4-B, PEV-1/4-B-...	PEV-1/4-SC-OD	PEV-1/4-B-M12
Mechanical			
Pneumatic connection	G1/4		
Method of measurement	Pneumatic/electrical pressure transducer		
Measured variable	Relative pressure		
Hysteresis	→ See graphs on page 152		
Electrical connection	Plug, square design to EN 175301-803, type A		Plug M12x1, 4-pin, round design to EN 60947-5-2
Type of mounting	Via through-holes		Via through-holes
Mounting position	Any ¹⁾		
Materials	Wrought aluminum alloy		
Note on material	Designs free of copper and Teflon		
Weight [g]	220	170	170
Electrical			
Operating voltage range	[V DC]	0 ... 250	
	[V AC]	0 ... 250	
Max. switch output voltage	[V DC]	250	
	[V AC]	250	
Max. output current [mA]	5,000		
Max. switching frequency [Hz]	3.3		
Protection against short circuit	No		
Protection against polarity reversal	Yes		
Switching element function	Changeover switch (dry contact)		
Ready status display	-		
Switching status display	-		
Protection class to EN 60529	IP65		
CE symbol	73/23/EEC (low voltage)		

1) The collection of condensate in the sensor should be prevented.

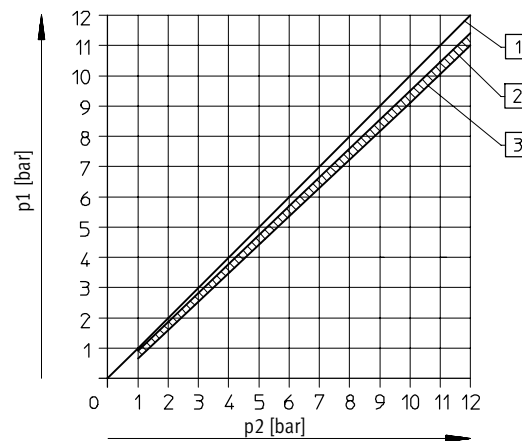
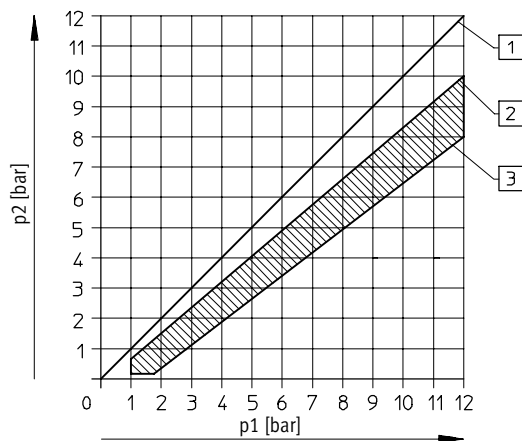
3
3.1

Operating and Environmental Conditions			
Type	PEV-1/4-B, PEV-1/4-B-...	PEV-1/4-SC-OD	PEV-1/4-B-M12
Operating medium	Filtered compressed air, lubricated or unlubricated Water Mineral oil		
Operating pressure [bar]	1 ... 12	1 ... 12	1 ... 12
Threshold value setting range [bar]	1 ... 12	1 ... 12	1 ... 12
Ambient temperature [°C]	-20 ...+80	-20 ...+80	-20 ...+80
Temperature of medium [°C]	-20 ...+80	-20 ...+80	-20 ...+80

Hysteresis

PEV-1/4-B, PEV-1/4-B-...

PEV-1/4-SC-OD



- 1 Switch-on pressure
- 2 Switch-off pressure (min.)
- 3 Switch-off pressure (max.)

p1 = Switch-on pressure
p2 = Switch-off pressure

3
3.1

Technical Data

PEV-1/4-B, PEV-1/4-B-CT

Dimensions Download CAD data → www.festo.com/en/engineering
 PEV-1/4-B, PEV-1/4-B-CT PEV-1/4-B-OD, PEV-1/4-B-OD-CT

The image contains two sets of technical drawings. The left set is for the PEV-1/4-B and PEV-1/4-B-CT models, and the right set is for the PEV-1/4-B-OD and PEV-1/4-B-OD-CT models. Each set includes a top view, a side view, and a front view of the sensor body. Dimensions are provided in millimeters. Callouts 1, 2, 3, and 4 identify key components: 1 (switching point adjustment screw), 2 (spindle for hysteresis setting), 3 (protective cover), and 4 (plug socket).

<p>1 Switching point adjustment screw</p> <p>2 Spindle for hysteresis setting (under protective cover)</p>	<p>3 Protective cover</p> <p>4 Plug socket MSSD-C-4P Cable outlet selectable by rotating the socket insert 4x90°</p>	<p>1 Switching point adjustment screw</p> <p>2 Spindle for hysteresis setting (under protective cover)</p>	<p>3 Protective cover</p> <p>4 Plug, square design, suitable for connector socket DIN EN 175301-803-A</p>
------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------

Terminal Allocation



3

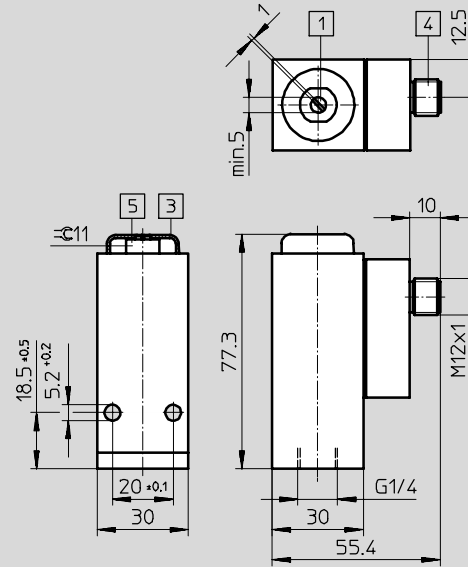
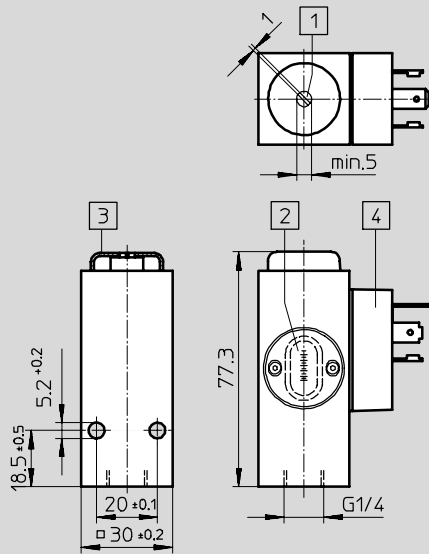
3.1

Dimensions

Download CAD data → www.festo.com/en/engineering

PEV-1/4-SC-OD

PEV-1/4-B-M12



- | | |
|-----------------------------------------------------|--------------------------------------------------------------------------------|
| 1 Switching point adjustment screw | 3 Protective cover |
| 2 Scale for reading the selected switching pressure | 4 Push-in connector, suitable for connector socket DIN EN 175301-803-A M16x1.5 |

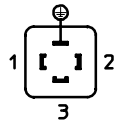
- | | |
|---------------------------------------------|---------------------------------------------------------|
| 1 Switching point adjustment screw | 4 Connection for plug connectors to EN 60947-5-2, M12x1 |
| 3 Remove the cover cap to adjust hysteresis | 5 Hysteresis adjustment |

Technical Data, Ordering Data

PEV-1/4-Mechanical Pressure Sensors - Mounting Via Screws

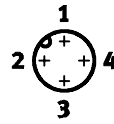
Terminal Allocation

PEV-1/4-SC-OD



- 1 + (-)
- 2 NC contact
- 3 NO contact

PEV-1/4-B-M12



- 1 + (-)
- 2 NC contact
- 3 Unused
- 4 NO contact

Ordering Data

Circuit Symbol	Description	Pneumatic Connection	Plug Socket (included)	With Measuring Scale (included)	Part No.	Type
	Pneumatic/electrical pressure transducer	G1/4	■	-	10773	PEV-1/4-B
		G1/4	■	-	165869	PEV-1/4-B-CT ¹⁾
		G1/4	-	-	175250	PEV-1/4-B-OD
		G1/4	-	-	175251	PEV-1/4-B-OD-CT ¹⁾
		G1/4	-	■	161760	PEV-1/4-SC-OD
		G1/4	■	-	192488	PEV-1/4-B-M12

1) Free of copper and Teflon

PEV - 1/4 - A - SW27 - B - OD

Type	
PEV	Pressure switch
Size	
1/4	Pneumatic connection
Version	
A	A version
Body	
SW27	Wrench size
Plug	
	No plug
B	Rectangular plug
Options	
	*
OD	Plug socket not included

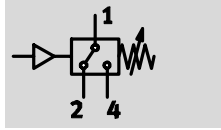
***Note:** Although it is not specified in the type code (PEV-1/4-A-SW27), this product does not include a plug socket, please order separately (see page 300).

3
3.1

Technical Data

PEV Mechanical Pressure Sensors – Mounting Via Screw-in Thread

Function



Voltage:

0 ... 250 V AC/DC

Pressure:

1 ... 10 bar

Temperature Range:

-20 ... +100 °C



General Technical Data		
Type	PEV-1/4-A-SW27...	
Mechanical		
Pneumatic connection	G1/4	
Method of measurement	Pneumatic/electrical pressure transducer	
Measured variable	Relative pressure	
Hysteresis	15±5% at 6 bar 30±5% at 2 bar	
Electrical connection	Plug vanes for socket PEV-1/4-A	
Type of mounting	Threaded	
Mounting position	Any ¹⁾	
Materials	Polyacetal	
Weight [g]	138	
Electrical		
Operating voltage range	[V DC]	0 ... 250
	[V AC]	0 ... 250
Max. output current [mA]	2,500	
Max. switching frequency [Hz]	3.3	
Protection against short circuit	No	
Protection against polarity reversal	No	
Switching element function	Changeover switch (dry contact)	
Ready status display	-	
Switching status display	-	
Protection class to EN 60529	IP65	
CE symbol	73/23/EEC (low voltage)	

1) The collection of condensate in the sensor should be prevented.

Operating and Environmental Conditions	
Type	PEV-1/4-A-SW27...
Operating medium	Filtered compressed air, lubricated or unlubricated
Operating pressure [bar]	1 ... 10
Threshold value setting range [bar]	1 ... 10
Ambient temperature [°C]	-20 ... +100
Temperature of medium [°C]	-20 ... +80

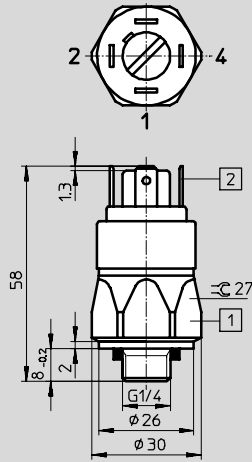
3
3.1

Dimensions

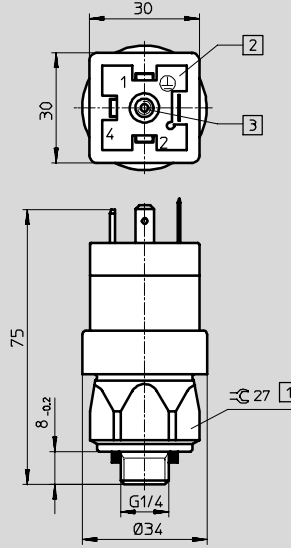
Download CAD data → www.festo.com/en/engineering

PEV-1/4-A-SW27

PEV-1/4-A-SW27-B-OD



- 1 Max. tightening torque 50 Nm
- 2 Integral plug in accordance with DIN 46244-A6,3

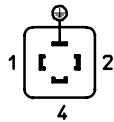
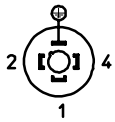


- 1 Max. tightening torque 50 Nm
- 2 Integral plug in accordance with DIN EN 175201-803-A003M
- 3 Switching point adjustment

Terminal Allocation

PEV-1/4-A-SW27

PEV-1/4-A-SW27-B-OD



- 1 + (-)
- 2 NC contact
- 4 NO contact

Ordering Data

Circuit Symbol	Description	Pneumatic Connection	Plug Socket (included)	Part No.	Type
	Pneumatic/electrical pressure transducer	G1/4	-	175252	PEV-1/4-A-SW27-B-OD
		G1/4	-	159259	PEV-1/4-A-SW27

SDE5-... Pressure/Vacuum Sensors



3

3.2

Pressure or vacuum sensing

PNP output

M8 or cable connection

High contrast LED on three sides of the sensor

Teach-in button for fast programming

Unilateral or bilateral pneumatic connection

Option to mount in-line with vacuum generator

SDE5 - D2 - 0 - Q6 - P - M8 - G5 - - -

Type	
SDE5	Pressure sensor

Pressure Measuring Range	
V1	-1 ... 0 bar
D2	0 ... 2 bar
D10	0 ... 10 bar

Switching Function	
FP	Freely programmable
Threshold comparator with fixed hysteresis, 1 teach-in pressure	
O	Normally open contact
C	Normally closed contact
Threshold comparator with fixed hysteresis, 2 teach-in pressures	
O1	Normally open contact
C1	Normally closed contact
Threshold comparator with variable hysteresis, 2 teach-in pressures	
O2	Normally open contact
C2	Normally closed contact
Window comparator with fixed hysteresis, 2 teach-in pressures	
O3	Normally open contact
C3	Normally closed contact

Pneumatic Connection	
Push-in connector at both ends	
Q3	For tubing OD 3 mm
Q4	For tubing OD 4 mm
Q6	For tubing OD 6 mm
Push-in connector at one end	
Q3E	For tubing OD 3 mm
Q4E	For tubing OD 4 mm
Q6E	For tubing OD 6 mm

Electrical Output	
P	1 switch output PNP (positive switching)

Electrical Connection	
K	2.5 m cable
M8	3-pin M8 plug

Connecting Cable	
SIM cable with straight connection socket	
G	2.5 m long
G5	5 m long
SIM cable with angled connection socket	
W	2.5 m long
W5	5 m long

Teach-in Point 1 Permanently Set	
...X	Permanent factory setting as per customer's requirement, required switching pressure [bar]

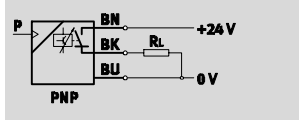
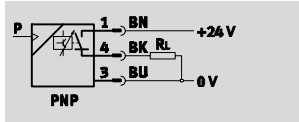
Teach-in Point 2 Permanently Set	
...Y	Permanent factory setting as per customer's requirement, required switching pressure [bar]

3
3.2

Technical Data

SDE5 Pressure/Vacuum Sensors

Function



Voltage:

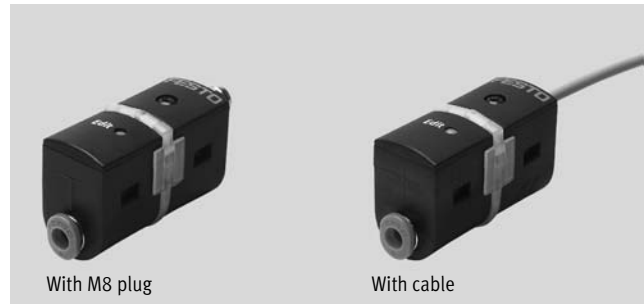
15 ... 30 V DC

Pressure:

-1 ... +10 bar

Temperature Range:

0 ... 50°C



With M8 plug

With cable

General Technical Data	
Mechanical	
Pneumatic connection	Push-in connector at one or both ends, QS-3, QS-4 or QS-6 (for 3, 4, or 6 mm tubing)
Method of measurement	Piezoresistive pressure switch
Measured variable	Relative pressure
Accuracy	±1.5% of FS ¹⁾
Repeatability	±0.3% of the measuring range final value
Hysteresis FS	2%
Electrical connection	Plug M8x1, round design to EN 60947-5-2, 3-pin 3-core cable, 2.5 m long
Type of mounting	Via accessories
Assembly position	Any ²⁾
Electrical	
Operating voltage range [V DC]	15 ... 30
Max. output current [mA]	100
Response time	2 ms typical / 4 ms maximum
Protection against short circuit	Yes, auto recover
Protection against polarity reversal	For all electrical connections
Switching output	PNP
Switching function	→ See page 162
Switching element function	NO contact, NC contact or switchable
Type of display	Yellow LED, visible from all sides
CE symbol	89/336/EEC (EMC)
Approval	c UL us - Listed (OL)

- 1) % FS = % of the measuring range final value (full scale).
- 2) The collection of condensate in the sensor should be prevented.

Operating and Environmental Conditions			
Pressure Measuring Range [bar]	-1 ... 0	0 ... 2	0 ... 10
Operating medium	Filtered compressed air, lubricated or unlubricated, grade of filtration 40µm		
Overload pressure [bar]	5	6	15
Threshold value setting range	0 ... 100%		
Ambient temperature [°C]	0 ... 50		
Temperature of medium [°C]	0 ... 50		
Corrosion resistance class CRC ¹⁾	2		
Protection class to EN 60529	IP 40		

- 1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Weights [g]	
With M8 plug, without bracket	19
With cable, without bracket	47
Bracket	5.5

Switch Functions

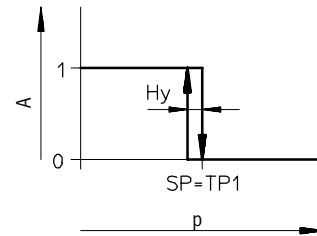
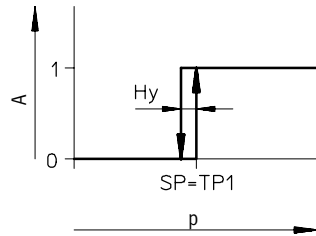
Operating Mode

NO Switching Element (Normally Open)

NC Switching Element (Normally Closed)

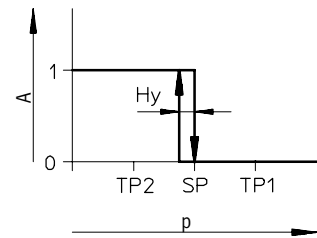
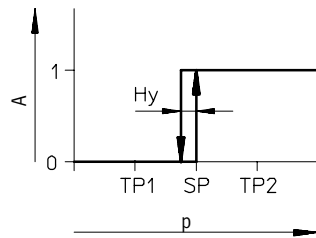
Mode 0

Threshold comparator with fixed hysteresis, 1 teach-in pressure.



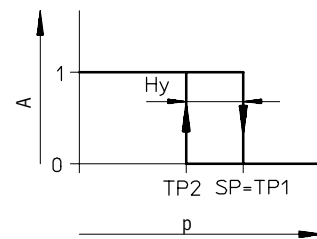
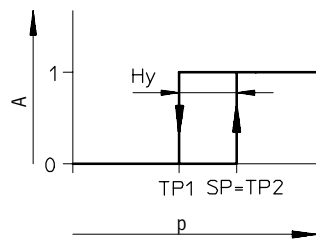
Mode 1

Threshold comparator with fixed hysteresis, 2 teach-in pressures.



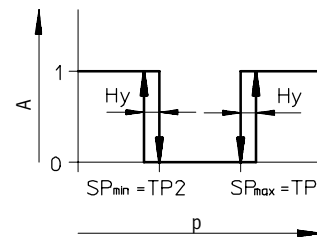
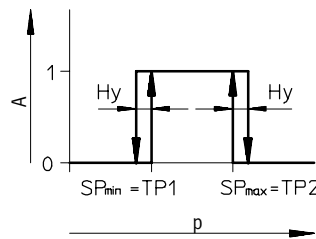
Mode 2

Threshold comparator with variable hysteresis, 2 teach-in pressures.



Mode 3

Window comparator with fixed hysteresis, 2 teach-in pressures.



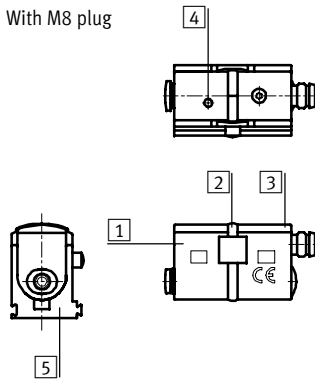
- A = Binary output signal
- p = Pressure
- SP = Switching point
- TP = Teach-in pressure
- Hy = Hysteresis

3

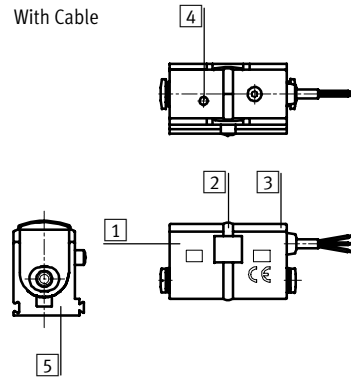
3.2

Materials

With M8 plug



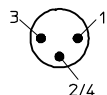
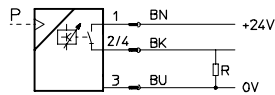
With Cable



Description		
1	Housing	Polyacetate, reinforced
2	Fiber-optic display	Polyamide
3	Cover	Polyphenylene sulphide, reinforced
4	Pushbutton	Silicon rubber
5	Wall bracket	Polypropylene

Pin Allocation

Variant With M8 Plug

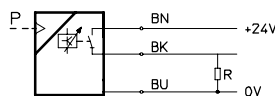


- 1 = Brown
- 2/4 = Black
- 3 = Blue

Note

The colors specified are for cables with socket SIM-...

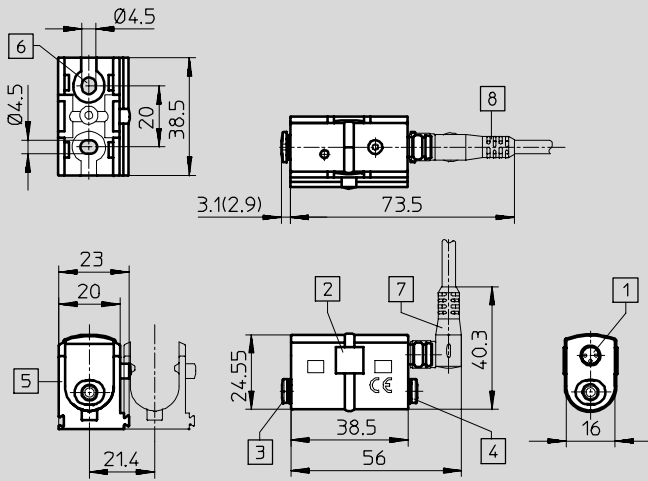
Variant With Cable



- BN = Brown
- BK = Black
- BU = Blue

Dimensions

Variant With M8 Plug

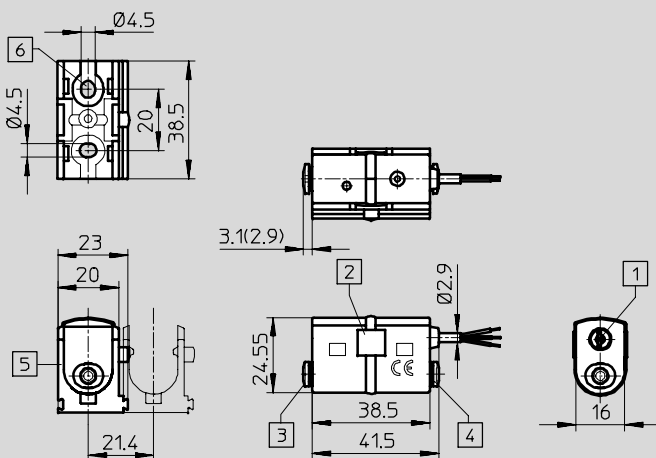


Note

Dimensions in brackets are for the variant SDE5-...-Q3-...

- 1 Plug M8x1, 3-pin, pin allocation to EN 60947-5-2 Appendix D
- 2 Yellow LED display, visible from all sides
- 3 Pneumatic connection QS-3, QS-4 or QS-6
- 4 Pneumatic connection QS-3, QS-4 or QS-6 or blanking plug with SDE5-...-Q...E...
- 5 Bracket for wall mounting
- 6 Through-hole for mounting screw
- 7 Angled connection socket SIM-M8-3WD
- 8 Straight connection socket SIM-M8-3GD

Variant With Cable



Note

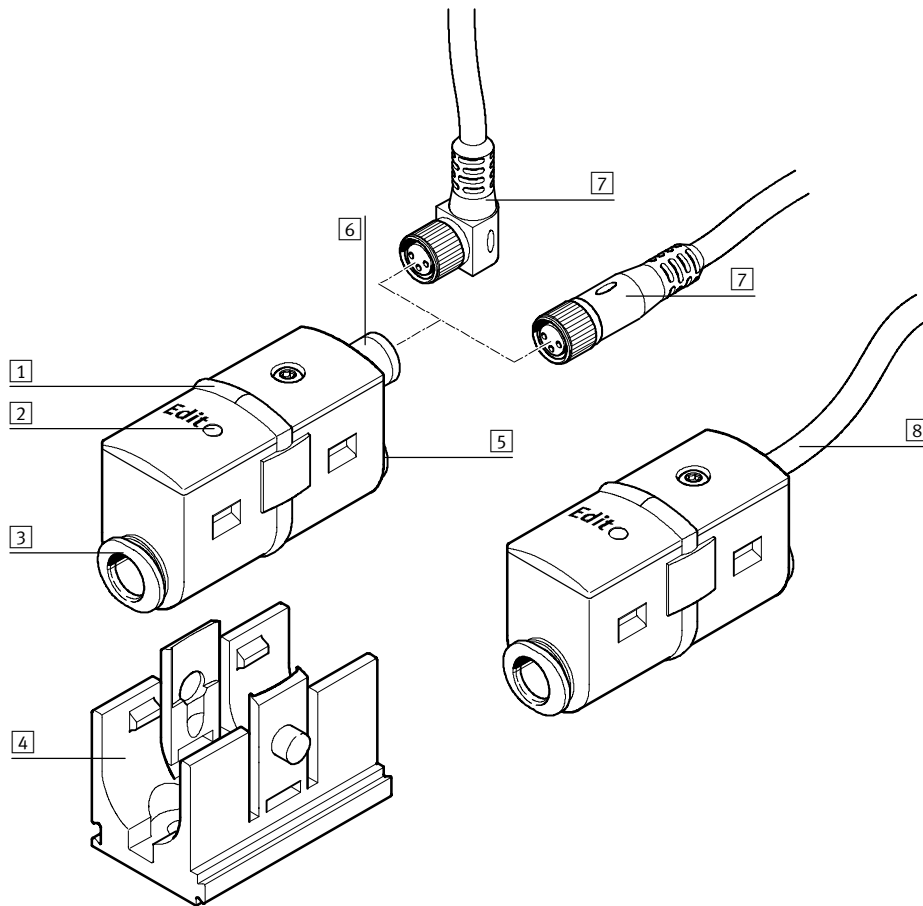
Dimensions in brackets are for the variant SDE5-...-Q3-...

- 1 PUR cable, 3-core, 2.5 m long
- 2 Yellow LED display, visible from all sides
- 3 Pneumatic connection QS-3, QS-4 or QS-6
- 4 Pneumatic connection QS-3, QS-4 or QS-6 or blanking plug with SDE5-...-Q...E...
- 5 Bracket for wall mounting
- 6 Through-hole for mounting screw

Overview

SDE5 Pressure/Vacuum Sensors

Function Overview



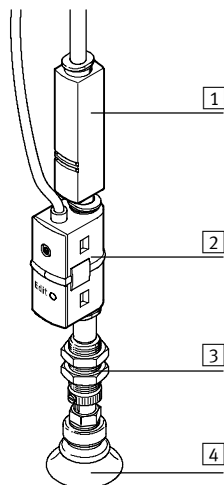
- 1 Yellow LED display, visible from all sides
- 2 Programming pushbutton
- 3 Pneumatic connection
- 4 Clip-in, dovetailing bracket for wall-mounting (included)
- 5 Pneumatic connection or blanking plug
- 6 Plug M8x1
- 7 Cable with socket SIM-M8 (must be ordered separately)
→ See page 302. Or use the modular system order form on page 167.
- 8 Free cable end

3

3.2

Application Example

Separation of parts by checking the applied vacuum:



- 1 VN Vacuum generator
- 2 SDE5 Pressure sensor
- 3 HCL Suction cup holder
- 4 ESS Suction cup

Two pressures must be programmed (taught-in) for this application:

- Teach-in pressure 1: Part gripped
- Teach-in pressure 2: Part not gripped

Operating mode 1 of the SDE5 calculates the average of the stored teach-in pressures:

If the applied vacuum is below the average, the workpiece is regarded as gripped and the SDE5 registers it as an acceptable part.

If the applied vacuum is above the average, the workpiece is regarded as not fully gripped and is rejected as unacceptable.

Other applications:

- Pressure monitoring (pressure present?)
- Regulator monitoring (pressure in desired range?)
- Detection of objects by means of back pressure monitoring

Ordering Data

SDE5 Pressure/Vacuum Sensors

Ordering Data – Threshold Value with Fixed Hysteresis, 1 Teach-in Pressure									
Pressure Measuring Range	Pneumatic Connection		For Tubing O.D. [mm]			Electrical Connection		Part No.	Type
	At One End	At Both Ends	3	4	6	Plug M8x1	Cable		
NO Contact									
-1 ... 0 bar	■	-	■	-	-	■	-	527459	SDE5-V1-O-Q3E-P-M8
	■	-	-	■	-	■	-	527460	SDE5-V1-O-Q4E-P-M8
	■	-	-	-	■	■	-	527461	SDE5-V1-O-Q6E-P-M8
	-	■	■	-	-	■	-	527456	SDE5-V1-O-Q3-P-M8
	-	■	-	■	-	■	-	527457	SDE5-V1-O-Q4-P-M8
-	■	-	-	-	■	■	-	527458	SDE5-V1-O-Q6-P-M8
0 ... 2 bar	■	-	-	-	■	-	■	542888	SDE5-D2-O-Q6E-P-K
0 ... 10 bar	■	-	■	-	-	■	-	527465	SDE5-D10-O-Q3E-P-M8
	■	-	-	■	-	■	-	527466	SDE5-D10-O-Q4E-P-M8
	■	-	-	-	■	■	-	527467	SDE5-D10-O-Q6E-P-M8
	-	■	■	-	-	■	-	527462	SDE5-D10-O-Q3-P-M8
	-	■	-	■	-	■	-	527463	SDE5-D10-O-Q4-P-M8
	-	■	-	-	-	■	■	-	527464
■	-	-	-	-	■	■	-	542890	SDE5-D10-O-Q6E-P-K
NC Contact									
0 ... 10 bar	■	-	-	■	-	■	-	542889	SDE5-D10-C-Q4E-P-M8
	■	-	-	-	-	■	-	542894	SDE5-D10-C-Q6E-P-M8
	■	-	-	-	■	-	■	542895	SDE5-D10-C-Q6E-P-K

Ordering Data – Threshold Value with Fixed Hysteresis, 2 Teach-in Pressures									
Pressure Measuring Range	Pneumatic Connection		For tubing O.D. [mm]			Electrical Connection		Part No.	Type
	At One End	At Both Ends	3	4	6	Plug M8x1	Cable		
NO Contact									
-1 ... 0 bar	-	■	-	-	■	■	-	542886	SDE5-V1-O1-Q6-P-M8

Ordering Data – Threshold Value with Variable Hysteresis, 2 Teach-in Pressures									
Pressure Measuring Range	Pneumatic Connection		For Tubing O.D. [mm]			Electrical Connection		Part No.	Type
	At One End	At Both Ends	3	4	6	Plug M8x1	Cable		
NO Contact									
0 ... 10 bar	■	-	-	-	■	■	-	542891	SDE5-D10-O2-Q6E-P-M8
	-	■	-	-	■	■	-	542892	SDE5-D10-O2-Q6-P-M8

Ordering Data – Window Comparator with Fixed Hysteresis, 2 Teach-in Pressures									
Pressure Measuring Range	Pneumatic Connection		For Tubing O.D. [mm]			Electrical Connection		Part No.	Type
	At One End	At Both Ends	3	4	6	Plug M8x1	Cable		
NO Contact									
0 ... 10 bar	■	-	-	-	■	-	■	542893	SDE5-D10-O3-Q6E-P-K
NC Contact									
0 ... 10 bar	■	-	-	-	■	-	■	542896	SDE5-D10-C3-Q6E-P-K

Ordering Data – Programmable Version									
Pressure Measuring Range	Pneumatic Connection		For Tubing O.D. [mm]			Electrical Connection		Part No.	Type
	At One End	At Both Ends	3	4	6	Plug M8x1	Cable		
NO contact									
-1 ... 0 bar	-	■	-	-	■	■	-	542887	SDE5-V1-FP-Q6-P-M8
0 ... 10 bar	■	-	-	■	-	■	-	542900	SDE5-D10-FP-Q4E-P-M8
	■	-	-	-	■	■	-	542897	SDE5-D10-FP-Q6E-P-M8
	-	■	-	-	■	■	-	542898	SDE5-D10-FP-Q6-P-M8
	■	-	-	■	-	-	■	542901	SDE5-D10-FP-Q4E-P-K
	■	-	-	-	-	■	■	542899	SDE5-D10-FP-Q6-P-K

Note
Additional wall brackets can be reordered using the embossed part number.

Ordering Data – Modular System

SDE5 Pressure/Vacuum Sensors

M Mandatory Data							O Options		
Module No.	Sensor Function	Pressure Range	Switching Function	Pneumatic Connection	Electrical Output	Electrical Connection	Connecting Cable	Teach-in point 1 permanently set	Teach-in point 2 permanently set
529027	SDE5	V1 D2 D10	FP O C O1 C1 O2 C2 O3 C3	Q3 Q4 Q6 Q3E Q4E Q6E	P	K M8	G W G5 W5	...X	...Y
Order Example									
529027	SDE5	- D10	- O2	- Q6	- P	- M8	- G5	- 5.5X	- 5.5Y

Order table				
Size	5	Conditions	Code	Enter Code
M Module No.	529027			529027
Sensor function	Pressure switch		SDE5	SDE5
Pressure range	Pressure range 0 ... -1 bar (relative)		-V1	
	Pressure range 0 ... 2 bar (relative)		-D2	
	Pressure range 0 ... 10 bar (relative)		-D10	
Switching function	Freely programmable, NO contact, NC contact		-FP	
	Threshold value with fixed hysteresis, 1 teach-in point, NO contact		-O	
	Threshold value with fixed hysteresis, 1 teach-in point, NC contact		-C	
	Threshold value with fixed hysteresis, 2 teach-in points, NO contact		-O1	
	Threshold value with fixed hysteresis, 2 teach-in points, NC contact		-C1	
	Threshold value with variable hysteresis, NO contact		-O2	
	Threshold value with variable hysteresis, NC contact		-C2	
	Window comparator with fixed hysteresis, NO contact		-O3	
	Window comparator with fixed hysteresis, NC contact		-C3	
	Pneumatic connection	QS3 connection at both ends		-Q3
QS4 connection at both ends			-Q4	
QS6 connection at both ends			-Q6	
QS3 connection at one end			-Q3E	
QS4 connection at one end			-Q4E	
QS6 connection at one end			-Q6E	
Electrical output	1 switch output PNP		-P	-P
Electrical connection	Cable 2.5 m		-K	
	M8 plug, 3-pin		-M8	
O Connecting cable (accessory)	2.5 m SIM cable with straight connection socket	1	-G	
	2.5 m SIM cable with angled connection socket	1	-W	
	5.0 m SIM cable with straight connection socket	1	-G5	
	5.0 m SIM cable with angled connection socket	1	-W5	
Teach-in point 1 permanently set [bar]	0 ... 10 (required switching pressure)	2	...X	
Teach-in point 2 permanently set [bar]	0 ... 10 (required switching pressure)	2 3	...Y	

1 Only in combination with M8.

2 Not in combination with FP, O1, C1
Must be evaluated if O2, C2, O3, C3, and X or Y was selected.
Only one decimal place permissible in combination with D10.

3 Not in combination with O, C.

3
3.2

SDE3-... Pressure/Vacuum Sensors With LCD Display



3

3.3

- Pressure or vacuum sensing
- PNP or NPN output
- M8 or cable connection
- Illuminated LCD display
- Various mounting options

SDE3 - D10 S - P - HQ4 - 2P - M8 -

Sensor Function

SDE3	Piezoresistive pressure sensor with display
------	---------------------------------------------

Pressure Measuring Range

V1	0 ... -1 bar
B2	-1 ... +1 bar
D2	0 ... 2 bar
D6	0 ... 6 bar
D10	0 ... 10 bar

Measured Variable

S	1x relative pressure
D	2x relative pressure
Z	1x differential pressure

Display

P	Display in psi
B	Display in bar
K	Display in kPa
H	Display in inches of mercury
W	Display in inches of water

Mounting/Pneumatic Connection

HQ4	Via DIN rail, push-in fitting 4 mm
WQ4	Wall mounting, push-in fitting 4 mm
FQ4	Panel mounting, push-in fitting 4 mm

Electrical Output

2P	2 switch outputs PNP
2N	2 switch outputs NPN

Electrical Connection

M8	Plug M8x1
K	Cable, 2.5 m long

Connecting Cable

SIM cable with straight connection socket	
G	2.5 m long
G5	5 m long
SIM cable with angled connection socket	
W	2.5 m long
W5	5 m long

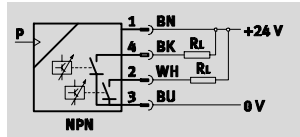
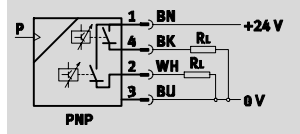
3

3.3

Technical Data

SDE3 Pressure/Vacuum Sensors with LCD Display

Function



Voltage:

15 ... 30 V DC

Pressure:

-1 ... +10 bar

Temperature Range:

0 ... 50°C



General Technical Data		0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Pressure Measuring Range	[bar]	0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Mechanical						
Method of measurement	Piezoresistive pressure sensor with display					
Pneumatic connection	QS-4					
Measured variable	Relative pressure					
	2x relative pressure					
	Differential pressure					
Accuracy	±2% of FS (digital output in temperature range of 20 ... 25 °C) ¹⁾					
Repeatability	0.3%					
Electrical connection	Plug M8x1, 4-pin, round design to EN 60947-5-2					
	Cable					
	Cable with plug M8x1, 4-pin, round design to EN 60947-5-2					
Type of display	Illuminated LCD					
Type of mounting	Panel mounting					
	Via DIN rail					
	Via through-holes					
	Via wall/surface bracket					
Material	Housing	Polyamide, reinforced				
		Polycarbonate				
Material note	Free of copper and PTFE					
Mounting position	Any ²⁾					
Electrical						
Operating voltage range	[V DC]	15 ... 30				
Max. output current	[mA]	100				
Response time	2 ms typical / 4 ms maximum					
Protection against short circuit	Yes, auto recover					
Protection against polarity reversal	For all electrical connections					
Switch output	2x PNP					
	2x NPN					
ATEX symbol	II 3G EEx nAL IIC T4 X					
CE symbol	89/336/EEC (EMC)					
Approval	c UL us – In preparation, contact Festo					

1) % FS = % of the measuring range final value (full scale).
 2) The collection of condensate in the sensor should be prevented.

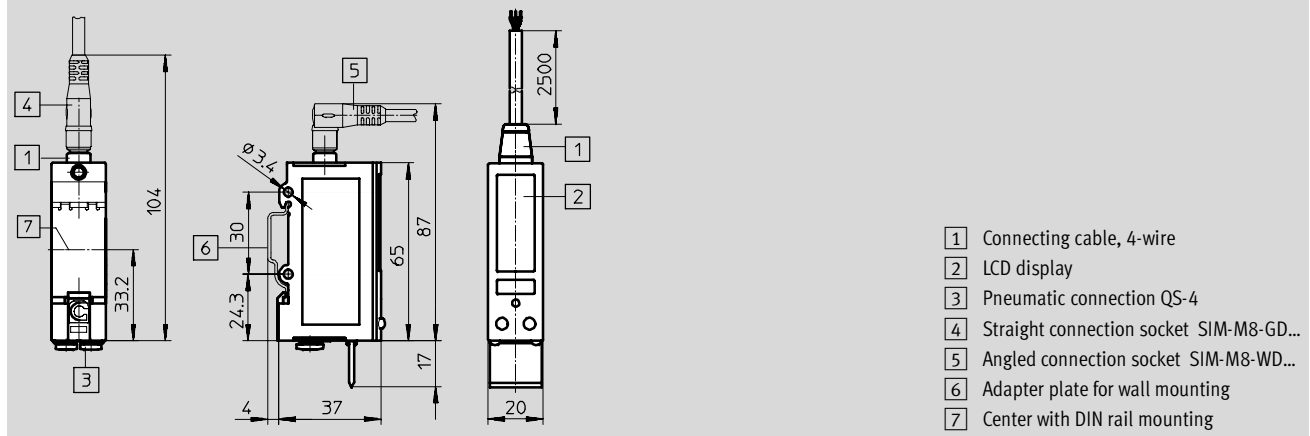
3
3.3

Operating and Environmental Conditions						
Pressure Measuring Range	[bar]	0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Operating pressure	[bar]	0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Threshold value setting range	[%]	0 ... 100				
Hysteresis setting range	[%]	0 ... 90				
Operating medium		Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm				
Ambient temperature	[°C]	0 ... 50				
ATEX ambient temperature	[°C]	0°C ≤ Ta ≤ +40°C				
Temperature of medium	[°C]	0 ... 50				
Corrosion resistance class CRC ¹⁾		2				
Protection class to EN 60529		IP 65				

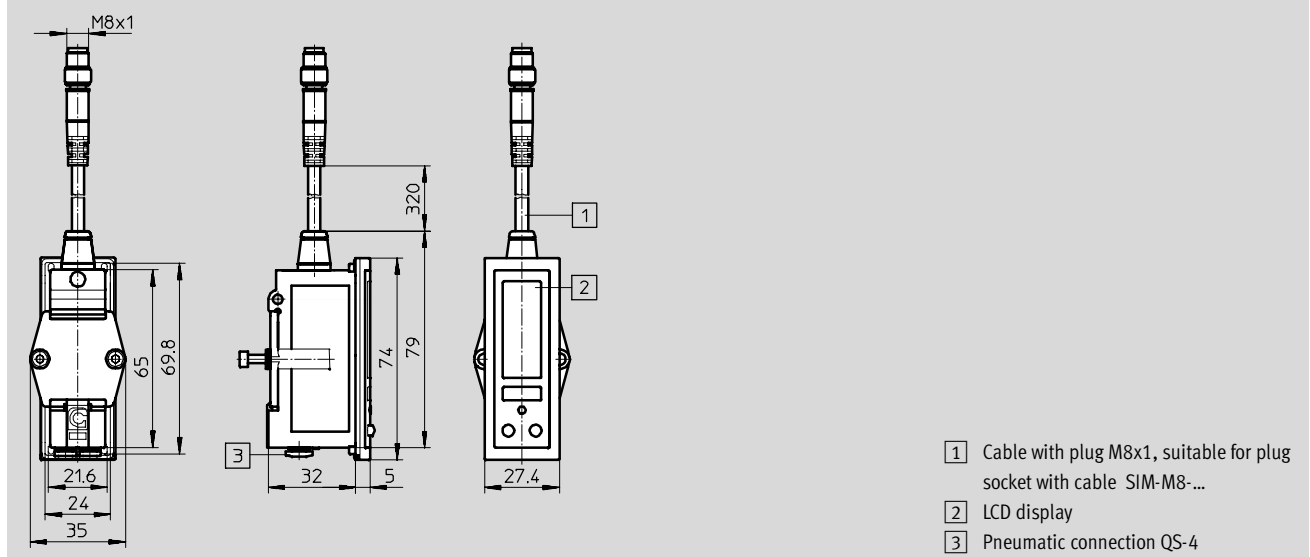
1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [g]		
	DIN Rail, Wall or Surface Mounting	Panel Mounting
	37	61

Dimensions – DIN Rail, Wall or Surface Mounting



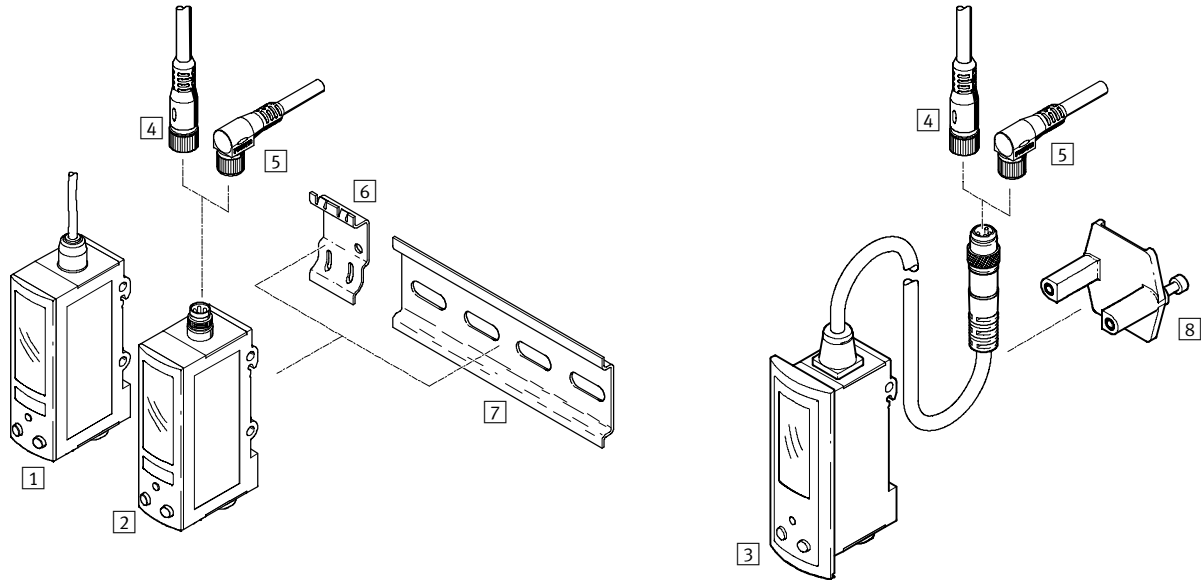
Dimensions – Panel Mounting



Overview

SDE3 Pressure/Vacuum Sensors with LCD Display

Accessories



	Description	→ See Page
Pressure Sensors		
1	SDE3-...-...-K	183
2	SDE3-...-...-M8	
3	SDE3-...-F...-M8	
Plug Sockets with Cable		
4	SIM-M8-4GD-...	302
5	SIM-M8-4WD-...	
Mounting Attachments		
6	Adapter plate SXE3-W	-
7	Mounting rail	306
8	Clamping plate	-

3
3.3

Ordering Data

SDE3 Pressure/Vacuum Sensors with LCD Display

Ordering Data – Pressure Measuring Range: 0 ... –1 bar										
Measured Variable			Display				Mounting		Part No.	Type ¹⁾
Relative Pressure	2x Relative Pressure	Differential Pressure	bar	psi	Inches of Mercury	Inches of Water	Via DIN Rail	Panel Mounting		
Switch Output 2x PNP										
■	–	–	■	–	–	–	■	–	540193	SDE3-V1S-B-HQ4-2P-M8
■	–	–	–	–	■	–	■	–	540194	SDE3-V1S-H-HQ4-2P-M8
■	–	–	■	–	–	–	–	■	540195	SDE3-V1S-B-FQ4-2P-M8
■	–	–	–	–	–	■	■	–	546122	SDE3-V1S-W-HQ4-2P-M8
■	–	–	–	–	■	–	■	–	546123	SDE3-V1S-H-HQ4-2P-M8
■	–	–	–	–	–	■	–	■	546124	SDE3-V1S-W-FQ4-2P-M8
–	■	–	■	–	–	–	■	–	540196	SDE3-V1D-B-HQ4-2P-M8
–	■	–	–	–	■	–	■	–	540197	SDE3-V1D-H-HQ4-2P-M8
–	■	–	■	–	–	–	–	■	540198	SDE3-V1D-B-FQ4-2P-M8
–	–	■	■	–	–	–	■	–	540199	SDE3-V1Z-B-HQ4-2P-M8
–	–	■	–	–	■	–	■	–	540200	SDE3-V1Z-H-HQ4-2P-M8
–	–	■	■	–	–	–	–	■	540201	SDE3-V1Z-B-FQ4-2P-M8
Switch Output 2x NPN										
–	–	■	■	■	–	–	■	–	540202	SDE3-V1Z-B-HQ4-2N-M8

Ordering Data – Pressure Measuring Range: –1 ... 1 bar											
Measured Variable			Display				Mounting		Part No.	Type ¹⁾	
Relative Pressure	2x Relative Pressure	Differential Pressure	bar	psi	Inches of Mercury	Inches of Water	Via DIN Rail	Panel Mounting			
Switch Output 2x PNP											
■	–	–	–	–	–	–	■	■	–	546125	SDE3-B2S-W-HQ4-2P-M8

Ordering Data – Pressure Measuring Range: 0 ... 2 bar									
Measured Variable			Display			Mounting		Part No.	Type ¹⁾
Relative Pressure	2x Relative Pressure	Differential Pressure	bar	psi	Via DIN Rail	Panel Mounting			
Switch Output 2x PNP									
■	–	–	–	–	■	■	–	546126	SDE3-D2S-P-HQ4-2P-M8
–	■	–	■	–	–	■	–	540203	SDE3-D2D-B-HQ4-2P-M8
–	■	–	■	–	–	–	■	540204	SDE3-D2D-B-FQ4-2P-M8
–	■	–	–	–	■	■	–	546127	SDE3-D2D-P-HQ4-2P-M8
–	–	■	■	–	–	■	–	540205	SDE3-D2Z-B-HQ4-2P-M8
–	–	■	■	–	–	–	■	540206	SDE3-D2Z-B-FQ4-2P-M8
–	–	■	–	–	■	■	–	546128	SDE3-D2Z-P-HQ4-2P-M8

Ordering Data – Pressure Measuring Range: 0 ... 10 bar									
Measured Variable			Display		Mounting		Part No.	Type ¹⁾	
Relative Pressure	2x Relative Pressure	Differential Pressure	bar	psi	Via DIN Rail	Panel Mounting			
Switch Output 2x PNP									
■	–	–	–	–	■	■	–	546129	SDE3-D10S-P-HQ4-2P-M8
■	–	–	■	–	–	■	–	540207	SDE3-D10S-B-HQ4-2P-M8
■	–	–	■	–	–	–	■	540208	SDE3-D10S-B-FQ4-2P-M8
–	■	–	■	–	–	■	–	540209	SDE3-D10D-B-HQ4-2P-M8
–	■	–	■	–	–	–	■	540210	SDE3-D10D-B-FQ4-2P-M8
–	■	–	–	–	■	■	–	546130	SDE3-D10D-P-HQ4-2P-M8
–	–	■	■	–	–	■	–	540211	SDE3-D10Z-B-HQ4-2P-M8
–	–	■	■	–	–	–	■	540212	SDE3-D10Z-B-FQ4-2P-M8
–	–	■	–	–	■	■	–	546131	SDE3-D10Z-P-HQ4-2P-M8
Switch Output 2x NPN									
–	–	■	■	–	–	■	–	540213	SDE3-D10Z-B-HQ4-2N-M8
■	–	–	–	–	■	■	–	546225	SDE3-D10S-P-HQ4-2N-M8

1) Explanation of the type code → See page 170.

Ordering Data – Modular System

SDE3 Pressure/Vacuum Sensors with LCD Display

M Mandatory Data							O Options	
Module No.	Function	Pressure measuring range	Pressure input	Display	Mounting and pneumatic connection	Electrical output	Electrical connection	Connecting cable (accessory)
539679	SDE3	V1 B2 D2 D6 D10	S D Z	B P K H W	HQ4 WQ4 FQ4	2P 2N	M8 K	G W G5 W5
Ordering Example								
539679	SDE3	- D6	D	- B	- WQ4	- 2N	- K	- W5

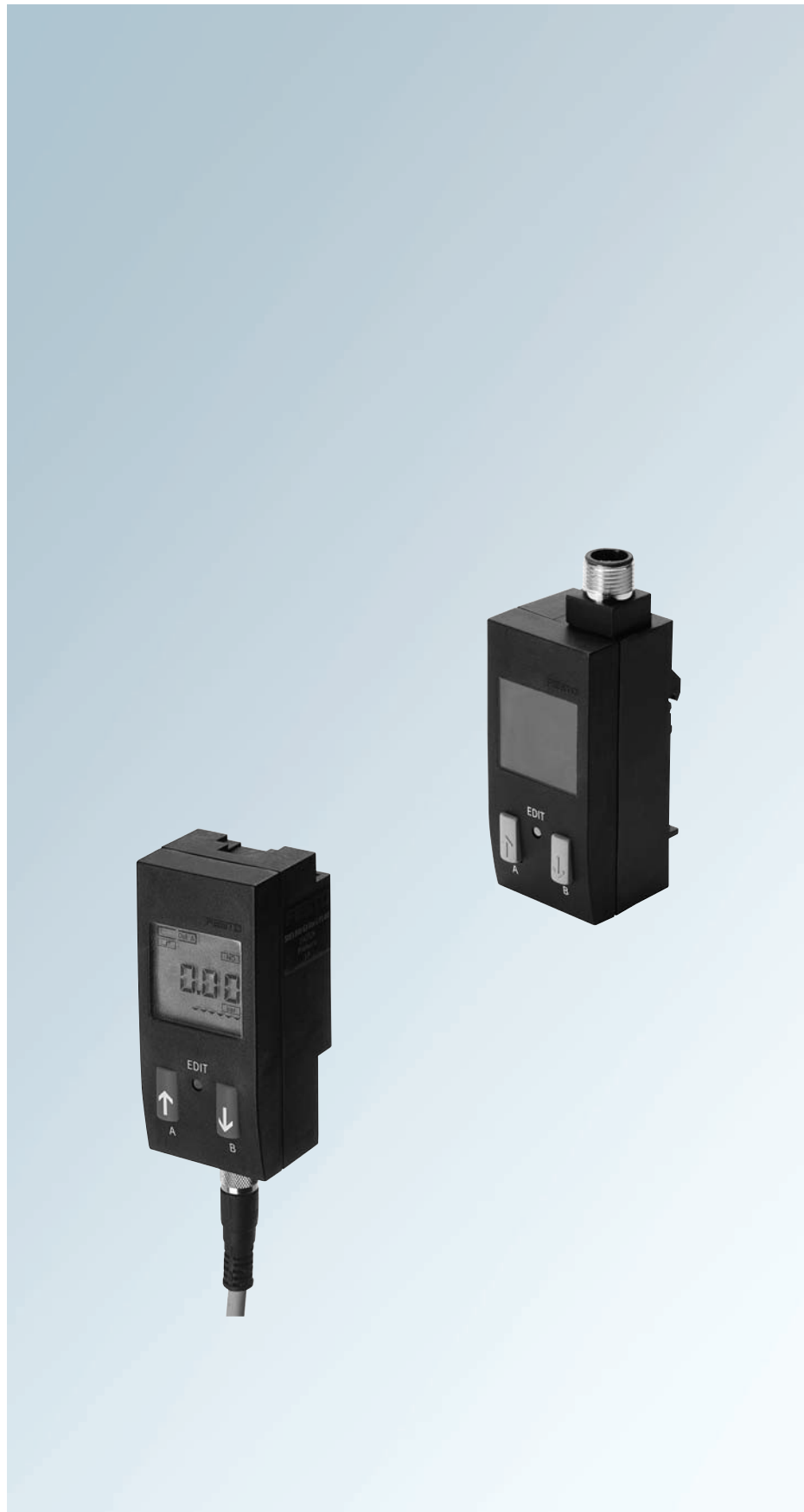
Ordering Table		Code	Enter code
M	Module No.	539679	
	Sensor function	Pressure sensor	SDE3
	Pressure measuring range	[bar] 0 ... -1	-V1
		[bar] -1 ... +1	-B2
		[bar] 0 ... 2	-D2
		[bar] 0 ... 6	-D6
		[bar] 0 ... 10	-D10
	Pressure input	1x relative pressure	S
		2x relative pressure, independent	D
		1x differential pressure	Z
	Display	Values in bar	-B
		Values in psi	-P
		Values in kPa	-K
		Values in inches of mercury	-H
		Values in inches of water	-W
	Mounting and pneumatic connection	Via DIN rail, push-in fitting 4 mm	-HQ4
		Wall mounting, push-in fitting 4 mm	-WQ4
		Panel mounting, push-in fitting 4 mm	-FQ4
	Electrical output	2 switch outputs PNP	-2P
		2 switch outputs NPN	-2N
	Electrical connection	Plug M8x1	-M8
		Cable, 2.5 m	-K
O	Connecting cable (accessory)	Straight socket, 2.5 m	-G
		Angled socket, 2.5 m	-W
		Straight socket, 5 m	-G5
		Angled socket, 5 m	-W5

Transfer Order Code

539679 SDE3 - [] - [] - [] - [] - [] - []

3
3.3

SDE1-... Pressure/Vacuum Sensors



3

3.4

Freely programmable

Differential or relative pressure

PNP or NPN output

Digital and/or analog (0 to 10 V or 4 to 20 mA) signals

M8 or M12 electrical connection

LCD displays (backlit or illuminated)

Various mounting options

Monitoring of regular pressure settings

SDE1 – D10 – G2 – W18 – L – P1 – M12 – G5

Type	
SDE1	Pressure Sensor with Display

Pressure Range	
V1	0 ... -1 bar
B2	-1 ... +1 bar
D2	0 ... 2 bar
D6	0 ... 6 bar
D10	0 ... 10 bar

Absolute Accuracy	
G2	Accuracy 2%

Pneumatic Connection, Mounting, Measured Variable	
R18	Male thread R1/8, mounting on service unit (MS or D series), relative pressure
R14	Male thread R1/4, mounting on service unit (MS or D series), relative pressure
H18	Female thread G1/8, Din rail mounting, relative pressure
W18	Female thread G1/8, wall or surface mounting, relative pressure
FQ4	Push-in fitting QS-4, front panel mounting, differential and relative pressure
HQ4	Push-in fitting QS-4, DIN rail mounting, differential and relative pressure
WQ4	Push-in fitting QS-4, wall or surface mounting, differential and relative pressure

Display, Setting	
C	LCD display with backlighting (user optimized)
L	Illuminated LCD display (reading optimized)

Electrical Output	
P1	1 switch output PNP
P2	2 switch outputs PNP
PU	1 switch output PNP and 0 ... 10 V analog
PI	1 switch output PNP and 4 ... 20 mA analog
2I ¹⁾	2 switch outputs PNP and 1 switch output 4 ... 20 mA analog
N1	1 switch output NPN
N2	2 switch outputs NPN
NU	1 switch output NPN and 0 ... 10 V analog
NI	1 switch output NPN and 4 ... 20 mA analog

Electrical Connection	
M8	Plug M8x1
M12	Plug M12x1

Connecting Cable	
SIM Cable with Straight Connection Socket	
G	2.5 m long
G5	5 m long
SIM Cable with Angled Connection Socket	
W	2.5 m long
W5	5 m long

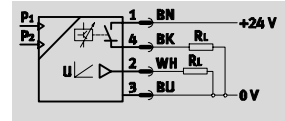
1) Cannot be ordered via the modular product system.

3
3.4

Technical Data

SDE1 Pressure/Vacuum Sensors with LCD Display

Function¹⁾



1) For example with 1 switch output PNP and 0 ... 10 V analog

Voltage:

15 ... 30 V DC

Pressure:

-1 ... +10 bar

Temperature Range:

0 ... 50°C



Illuminated LCD

Backlit LCD

General Technical Data						
Pressure Measuring Range	[bar]	0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Mechanical						
Method of measurement	Piezoresistive pressure sensor with display					
Pneumatic connection	R ¹ / ₈ , R ¹ / ₄ , G ¹ / ₈ or QS-4 (push-in fitting for 4 mm tubing)					
Measured variable	Relative pressure Differential pressure ¹⁾					
Accuracy	±2% of FS (digital output in temperature range of 20 ... 25 °C) ²⁾					
Repeatability	0.3%					
Electrical connection	Plug M8x1 or M12x1, round design to EN 60947-5-2					
Type of mounting	Front panel mounting or on service unit, DIN rail or adapter plate					
Mounting position	Any ³⁾					
Electrical						
Operating voltage range	[V DC]	15 ... 30				
Max. output current	[mA]	150				
Response time	Digital outputs (on: 5 ms; off: 10 ms); Analog outputs 15 ms					
Protection against short circuit	Yes, auto recover					
Protection against polarity reversal	For all electrical connections					
Switch output	PNP or NPN					
CE symbol	89/336/EEC (EMC)					
Approval	c UL us - Listed (OL)					

1) Versions with QS-4 push-in fitting.

2) % FS = % of the measuring range final value (full scale).

3) The collection of condensate in the sensor should be prevented.

• Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

Operating and Environmental Conditions						
Pressure Measuring Range	[bar]	0 ... -1	-1 ... +1	0 ... 2	0 ... 6	0 ... 10
Operating medium	Filtered compressed air, lubricated or unlubricated					
Threshold value setting range	[bar]	-0.02 ... -0.998	-0.999 ... +0.996	0.04 ... 1.996	0.12 ... 5.99	0.2 ... 9.98
Hysteresis setting range	[bar]	0 ... -0.9	-0.9 ... +0.9	0 ... 1.8	0 ... 5.4	0 ... 9
Overload pressure	[bar]	5	5	6	16	20
Ambient temperature	[°C]	0 ... 50				
Temperature of medium	[°C]	0 ... 50				
Corrosion resistance class CRC ¹⁾	2					
Protection class to EN 60529	IP 65					

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [g]			
	Male Thread R ¹ / ₈ or R ¹ / ₄	DIN rail, Wall or Surface Mounting	Front Panel Mounting
	95	70	150

Electrical Outputs ¹⁾		Pin Allocations	
1 Switch Output PNP			
Variant P1 with M8 plug		1 = +24 V 3 = 0 V 4 = Output A	
Variant P1 with M12 plug		1 = +24 V 3 = 0 V 4 = Output A	
2 Switch Outputs PNP			
Variant P2 with M8 plug		1 = +24 V 2 = Output B 3 = 0 V 4 = Output A	
Variant P2 with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B	
1 Switch Output PNP and 0 ... 10 V Analog			
Variant PU with M8 plug		1 = +24 V 2 = Output B (0 ... 10 V analog) 3 = 0 V 4 = Output A	
Variant PU with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B (0 ... 10 V analog)	
1 Switch Output PNP and 4 ... 20 mA Analog			
Variant PI with M8 plug		1 = +24 V 2 = Output B (4 ... 20 mA analog) 3 = 0 V 4 = Output A	
Variant PI with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B (4 ... 20 mA analog)	
2 Switch Outputs PNP and 4 ... 20 mA Analog			
Variant 2I with M12 plug		1 = +24 V 2 = Output B 3 = 0 V 4 = Output A 5 = Output C (4 ... 20 mA analog)	

1) Core colors indicated apply when using plug sockets with cable, type SIM-...

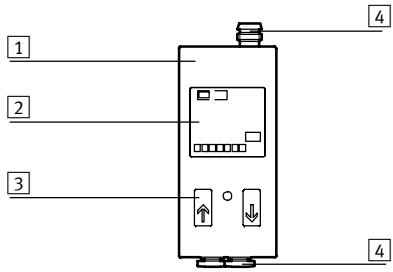
Electrical Outputs ¹⁾		Pin Allocations	
1 Switch Output NPN			
Variant N1 with M8 plug		1 = +24 V 3 = 0 V 4 = Output A	
Variant N1 with M12 plug		1 = +24 V 3 = 0 V 4 = Output A	
2 Switch Outputs NPN			
Variant N2 with M8 plug		1 = +24 V 2 = Output B 3 = 0 V 4 = Output A	
Variant N2 with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B	
1 Switch Output NPN and 0 ... 10 V Analog			
Variant NU with M8 plug		1 = +24 V 2 = Output B (0 ... 10 V analog) 3 = 0 V 4 = Output A	
Variant NU with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B (0 ... 10 V analog)	
1 Switch Output NPN and 4 ... 20 mA Analog			
Variant NI with M8 plug		1 = +24 V 2 = Output B (4 ... 20 mA analog) 3 = 0 V 4 = Output A	
Variant NI with M12 plug		1 = +24 V 2 = Output A 3 = 0 V 4 = Output B (4 ... 20 mA analog)	

1) Core colors indicated apply when using plug sockets with cable, type SIM-...

Technical Data

SDE1 Pressure/Vacuum Sensors with LCD Display

Materials



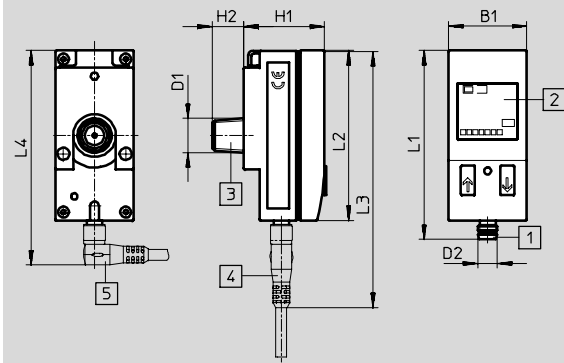
Description		
1	Housing	Polyacetate, reinforced Polyamide
2	Display	Polycarbonate
3	Buttons	Nitrile rubber
4	Plug, QS push-in fittings	Brass, nickel plated or chrome plated
-	Pressure gauge adapter	Brass, nickel plated or chrome plated
-	Seals	Nitrile rubber
-	Clamping plate	Polyamide, fibreglass reinforced

3
3.4

Technical Data – Dimensions

SDE1 Pressure/Vacuum Sensors with LCD Display

Dimensions – Mounting Using Male Thread R $\frac{1}{8}$ or R $\frac{1}{4}$



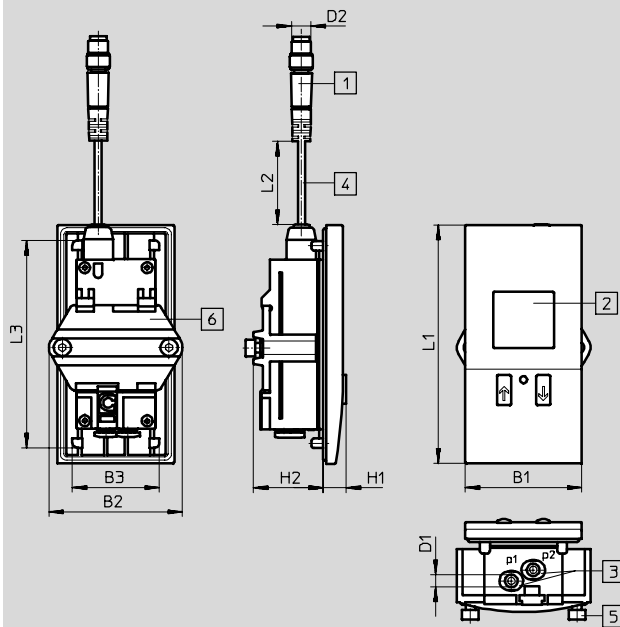
- 1 Plug M8x1 or M12x1 to EN 60947-5-2
- 2 LCD display
- 3 Adapter for pneumatic connection
- 4 Connection socket, straight
- 5 Connection socket, angled

Type	B1	D1	D2	H1	H2	L1	L2	L3	L4
SDE1-...-R18-M8	32.3	R $\frac{1}{8}$	M8	33	13	78	70	107	89
SDE1-...-R14-M8		R $\frac{1}{4}$							
SDE1-...-R18-M12	32.3	R $\frac{1}{8}$	M12	33	13	87	70	125	104
SDE1-...-R14-M12		R $\frac{1}{4}$							

3

3.4

Dimensions – Front Panel Mounting



- 1 Plug M8x1 or M12x1 to EN 60947-5-2
- 2 LCD display
- 3 Pneumatic connection QS-4
- 4 Connecting cable
- 5 Mounting screw M4x25 to DIN 912
- 6 Clamping plate

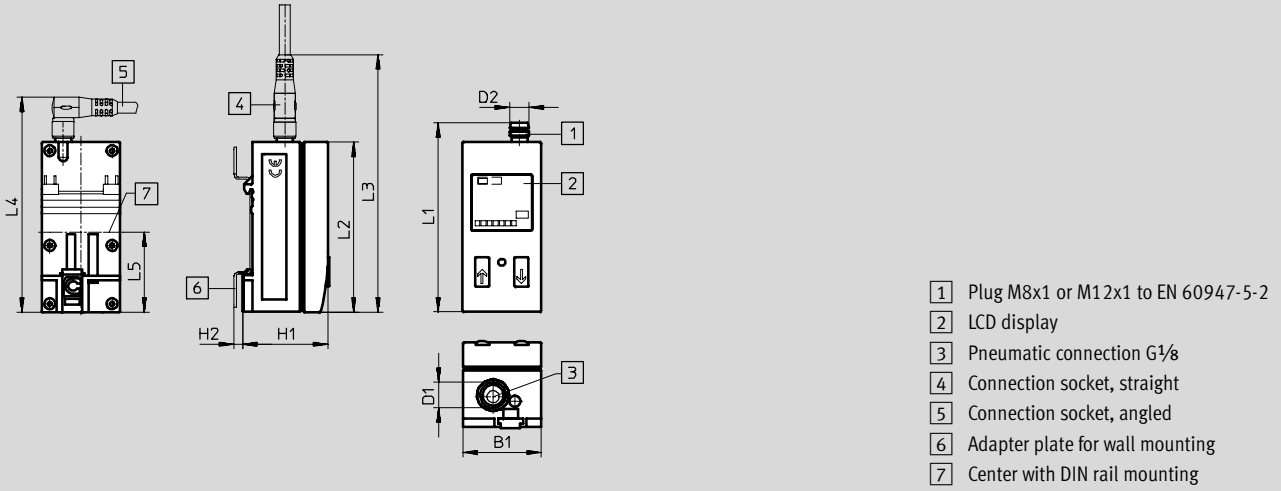
Type	B1	B2	B3	D1	D2	H1	H2	L1	L2	L3
SDE1-...-FQ4-M8	48	55	35.8	QS-4	M8x1	8.1	28.85	98	320	85.3
SDE1-...-FQ4-M12					M12x1					

Technical Data – Dimensions

SDE1 Pressure/Vacuum Sensors with LCD Display

Dimensions – DIN Rail, Wall or Surface Mounting

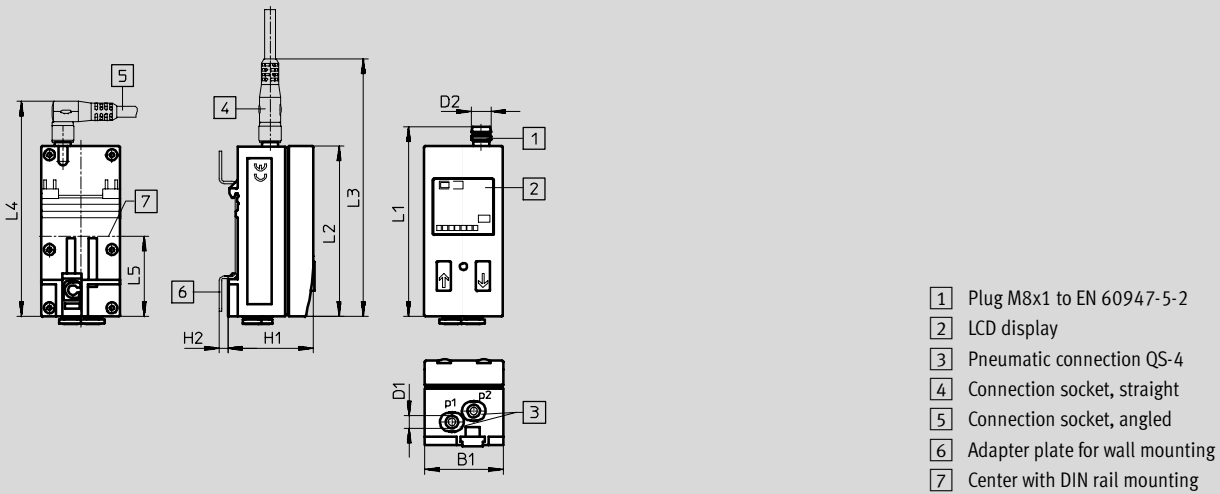
Pneumatic Connection G $\frac{1}{8}$



Type	B1	D1	D2	H1	H2	L1	L2	L3	L4	L5
SDE1-...-W18-...-M8	32.3	G $\frac{1}{8}$	M8	35.2	3.5	78	70	107	89	33
SDE1-...-H18-...-M8										
SDE1-...-W18-...-M12	32.3	G $\frac{1}{8}$	M12	35.2	3.5	87	70	125	104	33
SDE1-...-H18-...-M12										

Note: This product conforms with the ISO 1179-1 standard and the ISO 228-1 standard.

Pneumatic Connection QS-4



Type	B1	D1	D2	H1	H2	L1	L2	L3	L4	L5
SDE1-...-WQ4-...-M8	32.3	QS-4	M8	35.2	3.5	78	70	107	89	33
SDE1-...-HQ4-...-M8										

Ordering Data

SDE1 Pressure/Vacuum Sensors with LCD Display

Ordering Data – Pressure Measuring Range 0 ... –1 bar						
Electrical Output	Display, Setting		Electrical Connection		Part No.	Type ¹⁾
	LCD	Illuminated LCD	M8	M12		
Male Thread R $\frac{1}{8}$, Mounting on Service Unit (MS or D series), Relative Pressure Measurement						
1 output NPN	■	–	■	–	546143	SDE1-V1-G2-R18-C-N1-M8
Female Thread G $\frac{1}{8}$, DIN Rail Mounting, Relative Pressure Measurement						
1 output PNP	■	–	■	–	192034	SDE1-V1-G2-H18-C-P1-M8
	–	■	■	–	529973	SDE1-V1-G2-H18-L-P1-M8
2 outputs PNP	■	–	■	–	192035	SDE1-V1-G2-H18-C-P2-M8
	–	■	■	–	529974	SDE1-V1-G2-H18-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529959	SDE1-V1-G2-H18-C-PU-M8
	–	■	■	–	529975	SDE1-V1-G2-H18-L-PU-M8
Female Thread G $\frac{1}{8}$, Wall or Surface Mounting, Relative Pressure Measurement ²⁾						
1 output PNP	–	■	–	■	534065	SDE1-V1-G2-W18-L-P1-M12
1 output PNP and 4 ... 20 mA	–	■	■	–	537022	SDE1-V1-G2-W18-L-PI-M8
	–	■	–	■	537023	SDE1-V1-G2-W18-L-PI-M12
Push-in Fitting QS-4, DIN Rail Mounting, Differential Pressure and Relative Pressure Measurement						
1 output PNP	■	–	■	–	192036	SDE1-V1-G2-HQ4-C-P1-M8
	–	■	■	–	529976	SDE1-V1-G2-HQ4-L-P1-M8
2 outputs PNP	■	–	■	–	192037	SDE1-V1-G2-HQ4-C-P2-M8
	–	■	■	–	529977	SDE1-V1-G2-HQ4-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529960	SDE1-V1-G2-HQ4-C-PU-M8
	–	■	■	–	529978	SDE1-V1-G2-HQ4-L-PU-M8

3
3.4

Ordering Data – Pressure Measuring Range 0 ... 2 bar						
Electrical Output	Display, Setting		Electrical Connection		Part No.	Type ¹⁾
	LCD	Illuminated LCD	M8	M12		
Female Thread G $\frac{1}{8}$, Wall or Surface Mounting, Relative Pressure Measurement ²⁾						
1 output PNP	–	■	■	–	537024	SDE1-D2-G2-W18-L-P1-M8
2 outputs PNP	–	■	■	–	537025	SDE1-D2-G2-W18-L-P2-M8
Push-in Fitting QS-4, DIN Rail mounting, Differential Pressure and Relative Pressure Measurement						
2 outputs PNP	■	–	■	–	535581	SDE1-D2-G2-HQ4-C-P2-M8

Ordering Data – Pressure Measuring Range 0 ... 6 bar						
Electrical Output	Display, Setting		Electrical Connection		Part No.	Type ¹⁾
	LCD	Illuminated LCD	M8	M12		
Male Thread R $\frac{1}{4}$, Mounting on Service Unit (MS or D series), Relative Pressure Measurement						
1 output PNP and 4 ... 20 mA	–	■	■	–	546138	SDE1-D6-G2-R14L-PI-M8
Female Thread G $\frac{1}{8}$, DIN Rail mounting, Relative Pressure Measurement						
1 output PNP and 4 ... 20 mA	–	■	■	–	546137	SDE1-D6-G2-H18L-PI-M8
Female Thread G $\frac{1}{8}$, Wall or Surface Mounting, Relative Pressure Measurement ²⁾						
1 output PNP	–	■	■	–	537026	SDE1-D6-G2-W18-L-P1-M8
2 outputs PNP	–	■	■	–	537027	SDE1-D6-G2-W18-L-P2-M8
2 outputs NPN	–	■	■	–	546141	SDE1-D6-G2-W18-L-N2-N8

1) Explanation of the type code → See page 178.
 2) Adapter plate SDE1-...-W... is included.

Ordering Data

SDE1 Pressure/Vacuum Sensors with LCD Display

Ordering Data – Pressure Measuring Range 0 ... 10 bar						
Electrical Output	Display		Electrical Connection		Part No.	Type ¹⁾
	LCD	Illuminated LCD	M8	M12		
Male Thread R1/8, Mounting on Service Unit (MS or D series), Relative Pressure Measurement						
1 output PNP	■	–	■	–	192026	SDE1-D10-G2-R18-C-P1-M8
	–	■	■	–	529970	SDE1-D10-G2-R18-L-P1-M8
	–	■	–	■	534064	SDE1-D10-G2-R18-L-P1-M12
2 outputs PNP	■	–	■	–	192027	SDE1-D10-G2-R18-C-P2-M8
	–	■	■	–	529971	SDE1-D10-G2-R18-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529958	SDE1-D10-G2-R18-C-PU-M8
	–	■	■	–	529972	SDE1-D10-G2-R18-L-PU-M8
1 output PNP and 4 ... 20 mA	–	■	■	–	546133	SDE1-D10-G2-R18-L-PI-M8
2 outputs NPN	–	■	■	–	546140	SDE1-D10-G2-R18-L-N2-M8
1 output NPN	■	–	■	–	546144	SDE1-D10-G2-R18-C-N1-M8
Male Thread R1/4, Mounting on Service Unit (MS or D series), Relative Pressure Measurement						
1 output PNP	■	–	■	–	192028	SDE1-D10-G2-R14-C-P1-M8
	–	■	■	–	529967	SDE1-D10-G2-R14-L-P1-M8
	–	■	–	■	534157	SDE1-D10-G2-R14-L-P1-M12
2 outputs PNP	■	–	■	–	192029	SDE1-D10-G2-R14-C-P2-M8
	–	■	■	–	529968	SDE1-D10-G2-R14-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529957	SDE1-D10-G2-R14-C-PU-M8
	–	■	■	–	529969	SDE1-D10-G2-R14-L-PU-M8
1 output PNP and 4 ... 20 mA	–	■	■	–	546132	SDE1-D10-G2-R14-L-PI-M8
1 output NPN	–	■	■	–	546135	SDE1-D10-G2-R14-L-N1-M8
	■	–	■	–	546142	SDE1-D10-G2-R14-C-N1-M8
Female Thread G1/8, DIN Rail mounting, Relative Pressure Measurement						
1 output PNP	■	–	■	–	192030	SDE1-D10-G2-H18-C-P1-M8
	–	■	■	–	529961	SDE1-D10-G2-H18-L-P1-M8
2 outputs PNP	■	–	■	–	192031	SDE1-D10-G2-H18-C-P2-M8
	–	■	■	–	529962	SDE1-D10-G2-H18-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529955	SDE1-D10-G2-H18-C-PU-M8
	–	■	■	–	529963	SDE1-D10-G2-H18-L-PU-M8
1 output PNP and 4 ... 20 mA	–	■	■	–	546134	SDE1-D10-G2-H18-L-PI-M8
2 outputs NPN	–	■	■	–	546139	SDE1-D10-G2-H18-L-N2-M8
Female Thread G1/8, Wall or Surface Mounting, Relative Pressure Measurement²⁾						
1 output PNP	–	■	–	■	534063	SDE1-D10-G2-W18-L-P1-M12
1 output PNP and 0 ... 10 V	–	■	■	–	530900	SDE1-D10-G2-W18-L-PU-M8
2 outputs PNP and 1 output 4 ... 20 mA	–	■	–	■	534062	SDE1-D10-G2-W18-L-2I-M12
1 output PNP and 4 ... 20 mA	–	■	■	–	537020	SDE1-D10-G2-W18-L-PI-M8
	–	■	–	■	537021	SDE1-D10-G2-W18-L-PI-M12
1 output NPN	–	■	■	–	546136	SDE1-D10-G2-W18-L-N1-M8
Push-in Fitting QS-4, DIN Rail Mounting, Differential Pressure and Relative Pressure Measurement						
1 output PNP	■	–	■	–	192032	SDE1-D10-G2-HQ4-C-P1-M8
	–	■	■	–	529964	SDE1-D10-G2-HQ4-L-P1-M8
2 outputs PNP	■	–	■	–	192033	SDE1-D10-G2-HQ4-C-P2-M8
	–	■	■	–	529965	SDE1-D10-G2-HQ4-L-P2-M8
1 output PNP and 0 ... 10 V	■	–	■	–	529956	SDE1-D10-G2-HQ4-C-PU-M8
	–	■	■	–	529966	SDE1-D10-G2-HQ4-L-PU-M8
Push-in Fitting QS-4, Front Panel Mounting, Differential Pressure and Relative Pressure Measurement						
1 output PNP	–	■	■	–	537028	SDE1-D10-G2-FQ4-L-P1-M8
	–	■	–	■	537030	SDE1-D10-G2-FQ4-L-P1-M12
2 outputs PNP	–	■	■	–	537029	SDE1-D10-G2-FQ4-L-P2-M8
	–	■	–	■	537031	SDE1-D10-G2-FQ4-L-P2-M12

1) Explanation of the type code → See page 178.

2) Adapter plate SDE1-...W... is included.

3
3.4

Ordering Data – Modular System

SDE1 Pressure and Vacuum Sensors with LCD Display

M Mandatory Data								O Options
Module No.	Function	Pressure Measuring Range	Accuracy	Pneumatic Connection and Assembly	Display and Adjustment	Electrical Output	Electrical Connection	Accessories: Plug Socket
192 766	SDE1	B2 V1 D2 D6 D10	G2	R18 R14 H18 W18 HQ4 WQ4 FQ4	C L	P1 P2 PU PI N1 N2 NU NI	M8 M12	G W G5 W5
Ordering Example								
192766	SDE1	- D6	- G2	- W18	- L	- P2	- M12	- W5

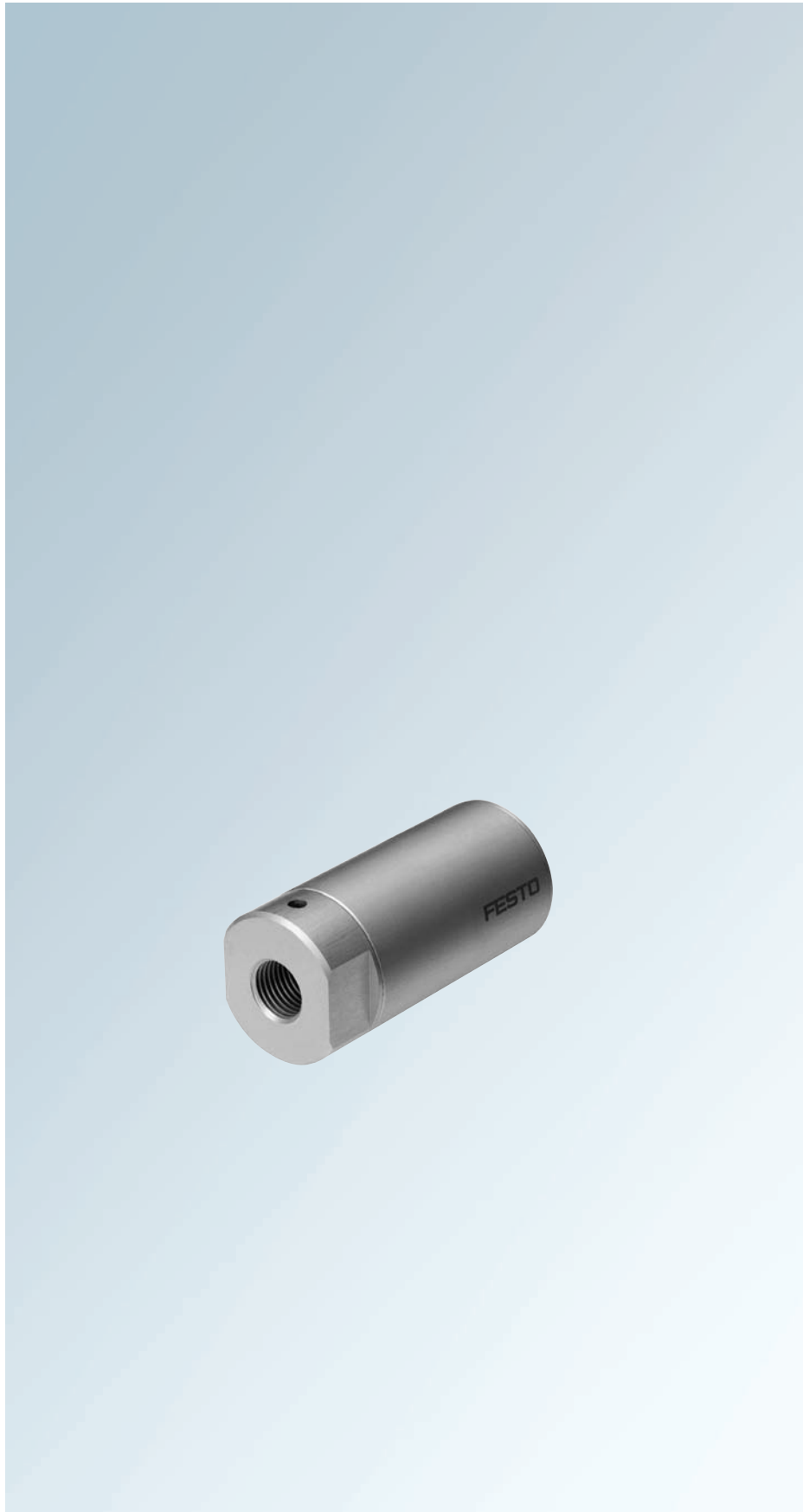
Ordering Table			Code	Enter code
M	Part No.	192766		
	Function	Pressure sensor	SDE1	SDE1
	Pressure measuring range	Pressure measuring range -1 ... 1 bar	-B2	
		Pressure measuring range 0 ... -1 bar	-V1	
		Pressure measuring range 0 ... 2 bar	-D2	
		Pressure measuring range 0 ... 6 bar	-D6	
		Pressure measuring range 0 ... 10 bar	-D10	
		Accuracy	Accuracy 2%	-G2
	Pneumatic connection and assembly	Connection R1/8 (for D series)	-R18	
		Connection R1/4 (for D series)	-R14	
		Relative pressure with G1/8 connection for DIN rail mounting	-H18	
		Relative pressure with G1/8 connection for wall or surface mounting	-W18	
		Differential pressure, 4 mm push-in fitting for DIN rail mounting	-HQ4	
		Differential pressure, 4 mm push-in fitting for wall or surface mounting	-WQ4	
		Front panel mounting, 4 mm push-in fitting	-FQ4	
	Display and adjustment	LCD display with backlight	-C	
		Illuminated LCD	-L	
	Electrical output	1 switch output PNP	-P1	
		2 switch outputs PNP	-P2	
		2 switch outputs PNP, 1 analog output 0 ... 10 V analog	-PU	
		1 switch output PNP, 1 analog output 4 ... 20 mA	-PI	
		1 switch output NPN	-N1	
		2 switch outputs NPN	-N2	
		1 switch output NPN, 1 analog output 0 ... 10 V	-NU	
		1 switch output NPN, 1 analog output 4 ... 20 mA	-NI	
	Electrical connection	M8 Plug	-M8	
		M12 Plug	-M12	
O	Accessories		-	-
	Plug socket	Connecting cable, straight socket, 2.5 m	G	
		Connecting cable, angled socket, 2.5 m	W	
		Connecting cable, straight socket, 5 m	G5	
		Connecting cable, angled socket, 5 m	W5	

Transfer Order Code

192766	SDE1	-		-	G2	-		-		-		-		-	
--------	------	---	--	---	----	---	--	---	--	---	--	---	--	---	--

3
3.4

SDE-... Analog Pressure Sensors



3

3.5

Provides analog current or voltage output that is proportional to the pressure input

Five models for analog sensing, 1 to 232 psi

Fast response, high accuracy, Class1, +/- 0.5%

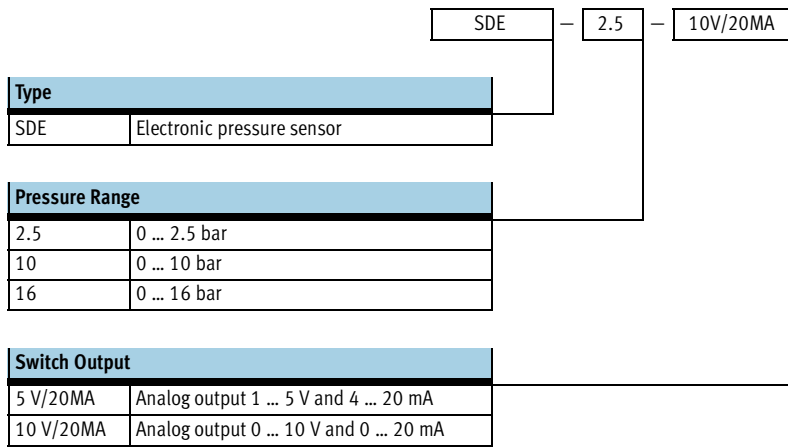
Excellent linearity

Solid state, no moving parts

Built-in circuit protection, temperature compensation

Quick connect with LED option

Easily interfaced to PLCs

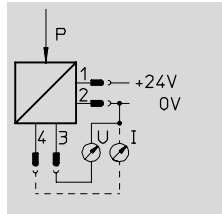


3
3.5

Technical Data

SDE Analog Pressure Sensors

Function



Voltage:

12 ... 30 V DC

Pressure:

0 ... 16 bar

Temperature Range:

0 ... +85°C



General Technical Data					
Type	SDE-2.5-10V/20MA	SDE-2.5-5V/20MA	SDE-10-10V/20MA	SDE-10-5V/20MA	SDE-16-10V/20MA
Operating pressure [bar]	0 ... 2.5		0 ... 10		0 ... 16
Mechanical					
Pneumatic connection	G $\frac{1}{4}$				
Method of measurement	Piezoresistive pressure sensor				
Measured variable	Relative pressure				
Accuracy	$\pm 0.5\%$ of FS				
Frequency range	100 Hz				
Hysteresis	Linearity and hysteresis to DIN 16005				
Electrical connection	Plug M12x1, 4-pin				
Type of mounting	Threaded				
Mounting position	Any ¹⁾				
Weight [g]	120				
Electrical					
Operating voltage range [V DC]	12 ... 30				
Output voltage [V DC]	0 ... 10	1 ... 5	0 ... 10	1 ... 5	0 ... 10
Output current [mA]	0 ... 20	4 ... 20	0 ... 20	4 ... 20	0 ... 20
Protection against short circuit	Yes				
Protection class to EN 60529	IP65				
CE symbol	89/336/EEC (EMC)				

1) The collection of condensate in the sensor should be prevented.

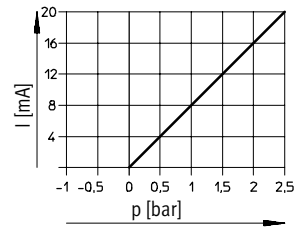
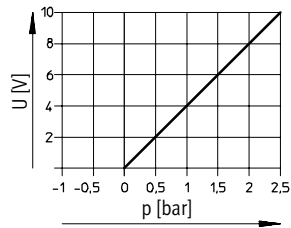
Operating and Environmental Conditions					
Type	SDE-2.5-10V/20MA	SDE-2.5-5V/20MA	SDE-10-10V/20MA	SDE-10-5V/20MA	SDE-16-10V/20MA
Operating medium	Filtered compressed air, lubricated or unlubricated				
Pressure measuring range [bar]	0 ... 2.5		0 ... 10		0 ... 16
Ambient temperature [°C]	0 ... 85				

Pressure Sensors – Output Functions

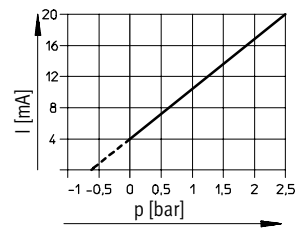
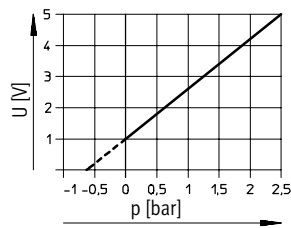
Output Voltage “U” as a Function of Operating Pressure “p”

Output Current “I” as a Function of Operating Pressure “p”

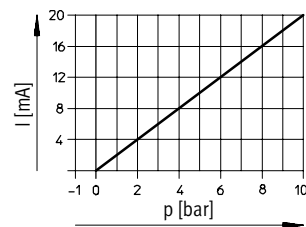
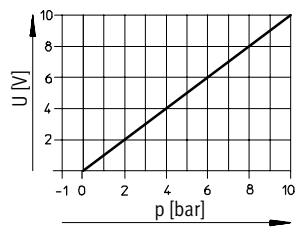
SDE-2.5-10V/20MA



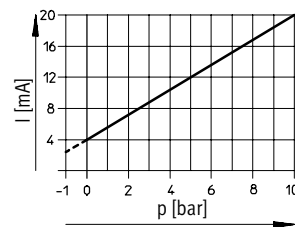
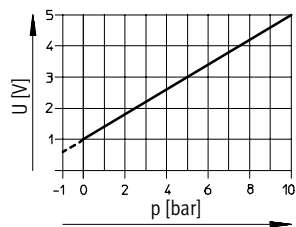
SDE-2.5-5V/20MA



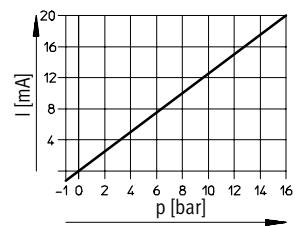
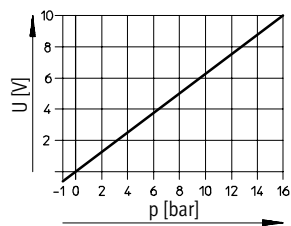
SDE-10-10V/20MA



SDE-10-5V/20MA



SDE-16-10V/20MA



3

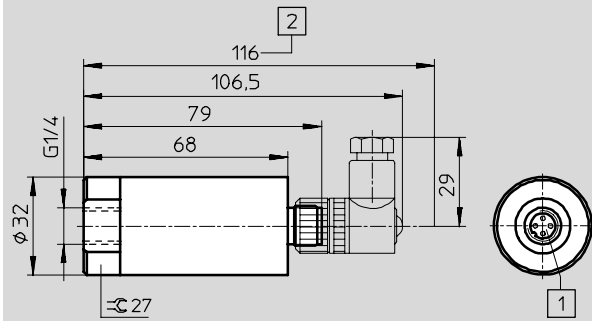
3.5

Technical Data – Dimensions

SDE Analog Pressure Sensors

Dimensions

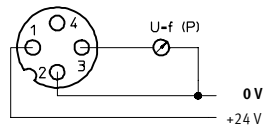
Download CAD data → www.festo.com/en/engineering



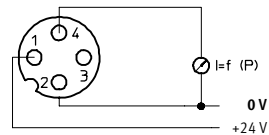
- 1 Connection to fit angled socket and straight socket
- 2 Installation space for angled socket

Terminal Allocation

Voltage Output

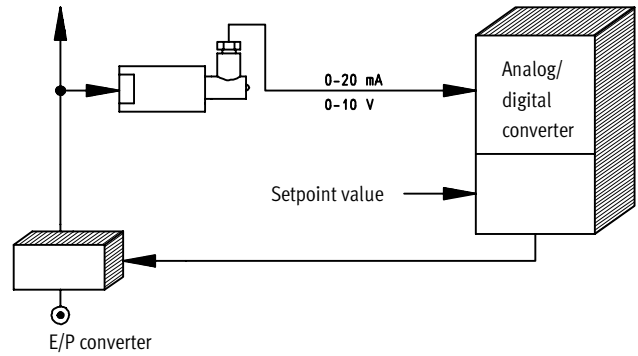


Current Output



Application

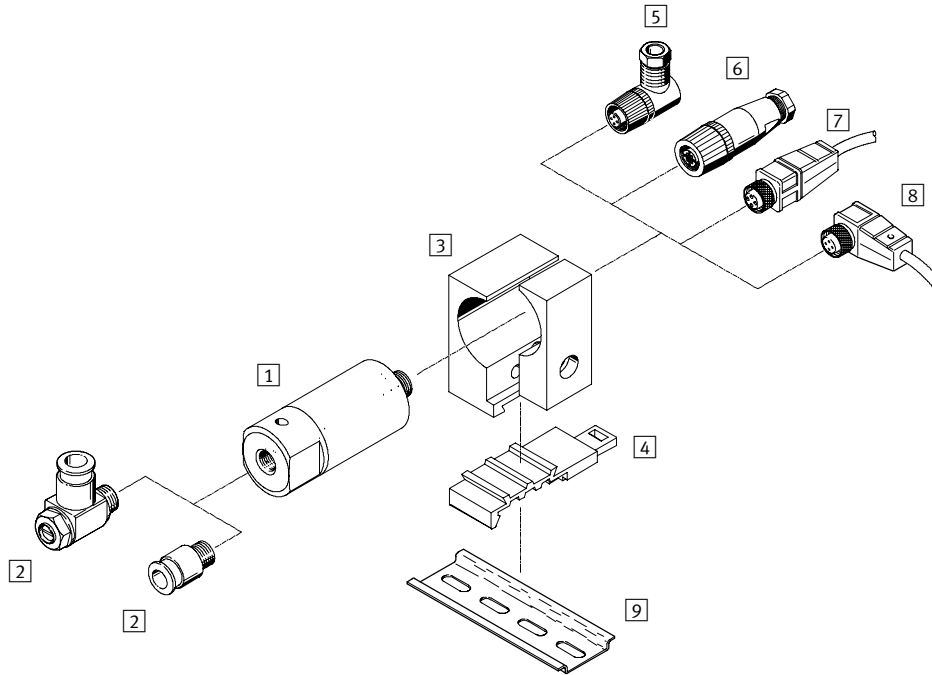
Example



3

3.5

Accessories



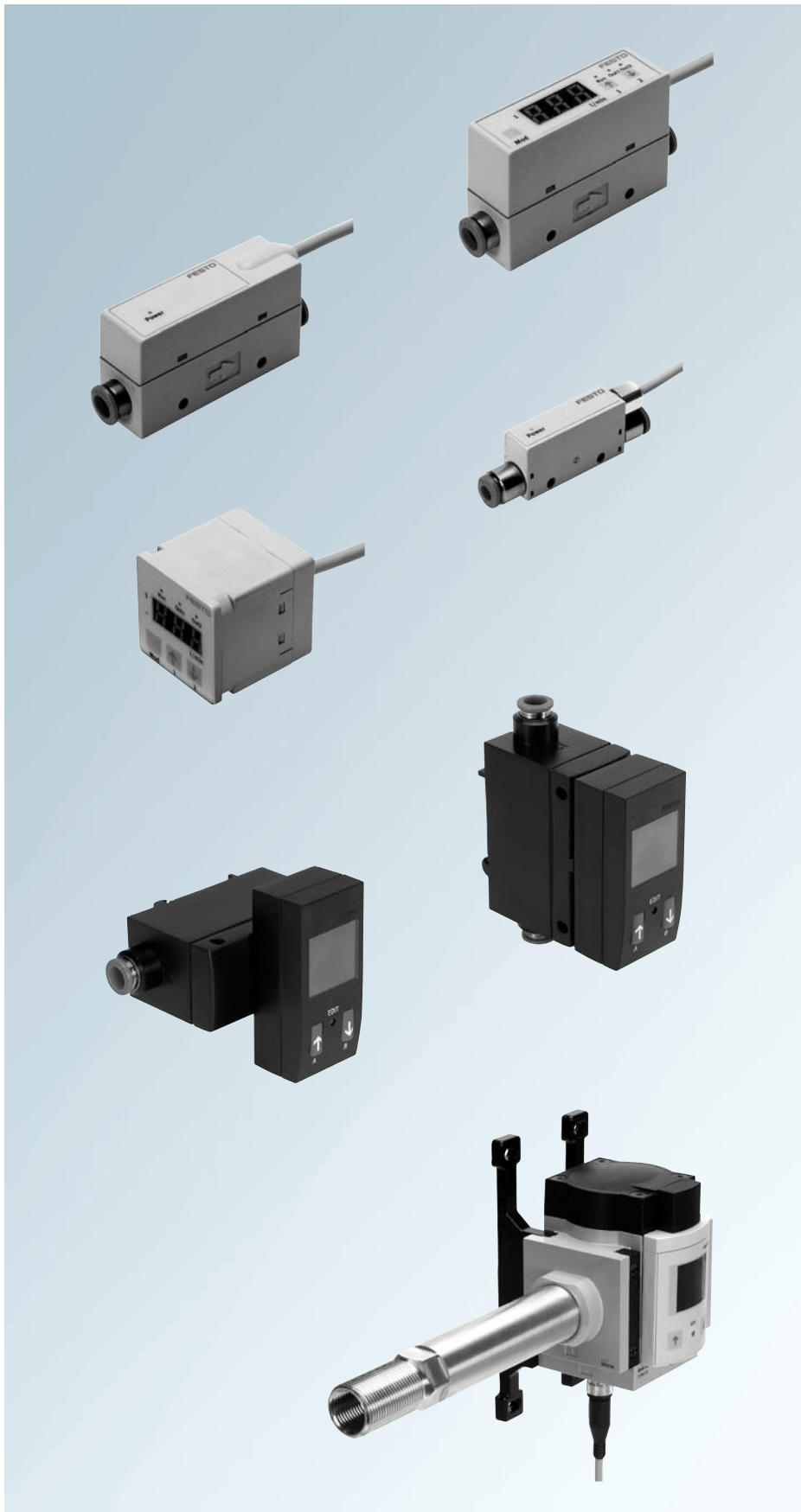
	Type	Description	→ See Page	
1	Pressure sensor	SDE	-	191
2	Tubing connector	QS	For connecting compressed air tubing with standard external diameters to CETOP RP 54 P	www.festo.com
3	Mounting kit	SDE-KL-1	For mounting the pressure sensor	306
4	Mounting plate	MPL	For mounting the pressure sensor on the DIN mounting rail	306
5	Plug socket, angled	SIE-GD	-	307
6	Plug socket, straight	SIE-WD-TR	-	307
7	Plug socket with cable, straight socket	SIM-M12-4GD	-	307
8	Plug socket with cable, angled socket	SIM-M12-4WD	-	307
9	DIN mounting rail	NRH	-	306

Ordering Data

SDE Analog Pressure Sensors

Ordering Data						
Circuit Symbol	Pneumatic Connection	Pressure Measuring Range [bar]	Output Voltage [V]	Output Current [mA]	Part No.	Type
	G $\frac{1}{4}$	0 ... 2.5	0 ... 10	0 ... 20	19560	SDE-2.5-10V/20MA
	G $\frac{1}{4}$	0 ... 2.5	1 ... 5	4 ... 20	19561	SDE-2.5-5V/20MA
	G $\frac{1}{4}$	0 ... 10	0 ... 10	0 ... 20	19562	SDE-10-10V/20MA
	G $\frac{1}{4}$	0 ... 10	1 ... 5	4 ... 20	19563	SDE-10-5V/20MA
	G $\frac{1}{4}$	0 ... 16	0 ... 10	0 ... 20	19564	SDE-16-10V/20MA







Flow Sensors



Flow sensors with thermal principle provide accurate indication for mass flow of compressed air or consumption of air

Several families available ranging from low flow of 0.05 to max. flow of 5,000 NI/min

LED display, digital and analog outputs, integration into service units, and various mounting and connection options all contribute to customer convenience

<p>Flow Sensor with Digital Display – SFE3</p> <ul style="list-style-type: none"> ■ Flow measuring range: 0.05 to 0.5 l/min, 0.1 to 1 l/min, 0.5 to 5 l/min, 1 to 10 l/min, 5 to 50 l/min ■ Operating pressure: –0.7 to 7 bar ■ Pneumatic connection: 6 mm tubing connection or G1/8 female thread ■ Switch output: 2x PNP or 2x NPN ■ Analog output: 1 to 5 V ■ Three character digital display (3 1/2-character alphanumeric) ■ Mounting: Via through-holes ■ IP40 rated 	<p>Section 4.1 → Page 201</p> 
<p>Flow Sensor with Analog Output – SFET-F</p> <ul style="list-style-type: none"> ■ Flow measuring range: 0.05 to 0.5 l/min, 0.1 to 1 l/min, 0.5 to 5 l/min, 1 to 10 l/min, 5 to 50 l/min ■ Use with separate digital display SFEV-F ■ Operating pressure: –0.7 to 7 bar ■ Pneumatic connection: 6 mm tubing connection or G1/8 female thread ■ Analog output: 1 to 5 V ■ Mounting: Via through-holes ■ IP40 rated 	<p>Section 4.2 → Page 207</p> 
<p>Vacuum Flow Sensor with Analog Output – SFET-R</p> <ul style="list-style-type: none"> ■ Flow measuring range: –0.05 to 0.05 l/min, –0.1 to 0.1 l/min, –0.5 to 0.5 l/min, –1 to 1 l/min, –5 to 5 l/min, –10 to 10 l/min ■ Use with separate digital display SFEV-R ■ Operating pressure: –0.9 to 2 bar ■ Pneumatic connection: 4 mm tubing connection ■ Analog output: 1 to 5 V ■ Mounting: Via through holes ■ IP40 rated 	<p>Section 4.3 → Page 213</p> 
<p>Digital Display for Sensors – SFEV-F, SFEV-R</p> <ul style="list-style-type: none"> ■ Separate display for connection to flow sensors SFEV-F or SFEV-R ■ Switch output: 2x PNP or 2x NPN ■ Analog output: 1 to 5 V ■ Three character digital display (3 1/2-character alphanumeric) ■ Mounting: With mounting bracket ■ IP40 rated 	<p>Section 4.4 → Page 219</p> 
<p>Flow Sensor with Digital Display – SFE1</p> <ul style="list-style-type: none"> ■ Flow measuring range: 0.5 to 10 l/min or 10 to 200 l/min ■ Operating pressure: 0 to 10 bar ■ Pneumatic connection: 6 or 8 mm tubing connection ■ Switch output: 2x PNP or 2x NPN ■ Analog output: 0 to 10 V or 4 to 20 mA ■ Illuminated LCD (optimized display) ■ Mounting: Via through-holes, on DIN rail, or on wall/surface bracket ■ IP65 rated 	<p>Section 4.5 → Page 225</p> 
<p>Flow Sensor with Digital Display – MS6 SFE</p> <ul style="list-style-type: none"> ■ Flow measuring range: 200 to 5,000 l/min ■ Illuminated LCD ■ Switch output: 2x PNP or 2x NPN ■ Analog output: 0 to 10 V or 4 to 20 mA ■ Mounting: Inline or with MS Series service units ■ IP65 rated 	<p>Section 4.6 → Page 231</p> 

Operating Principal

Thermal Anemometry Principle

The sensor makes use of the thermal anemometry principle. Thermal anemometry is utilized to ascertain how much heat energy is withdraw from a heated surface by a given flowing medium, and is thus also known as the heat loss principle.

An anemometer consist of one heating element, which is placed in the medium. This heating element will be kept at a constant temperature that is usually some ten's of Kelvin above the fluid temperature.

In case of a fluid flow, the heating element will be cooled by the fluid due to convective heat loss, and more power is necessary to keep the heater on its overtemperature.

The heating power is then used as an indicator for fluid velocity. A second operation mode is the constant power mode, where the power applied to the heater is kept constant. The temperature decrease of the heater is then an indicator for fluid flow.

Constant Overtemperature

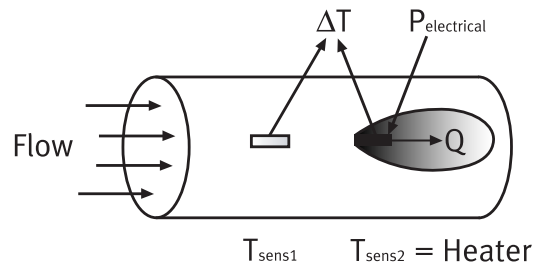
Heater T_{Sens2} is utilized to maintain a constant overtemperature independent of the temperature of the medium which is acquired by temperature sensor T_{Sens1} , so that the following mathematical equation applies:

$$T_{Sens2} - T_{Sens1} = \Delta T = \text{constant}$$

Mass Flow

The heating power required to maintain this relationship ($P_{\text{electrical}}$) is directly related to the mass flow passing the sensing element, which is capable of transporting a given amount of heat (Q) independent of media characteristics and flow velocity. The sensor described in this example utilizes a hot-film anemometer as a sensing element. The unit l/min is based on the mass of air at 0 °C and a pressure of 1013 mbar (Normliter/min).

Constant Overtemperature and Mass Flow Illustrated

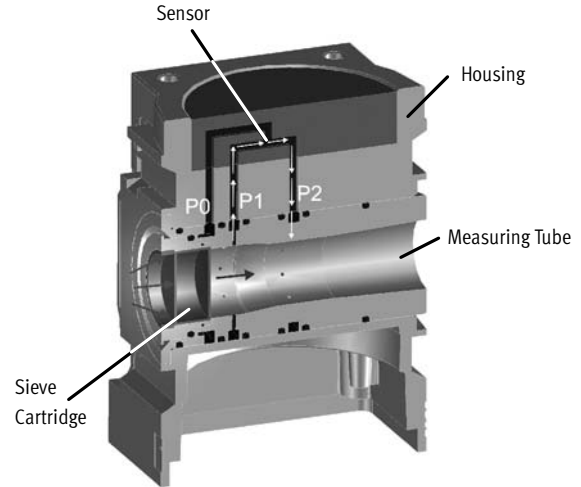
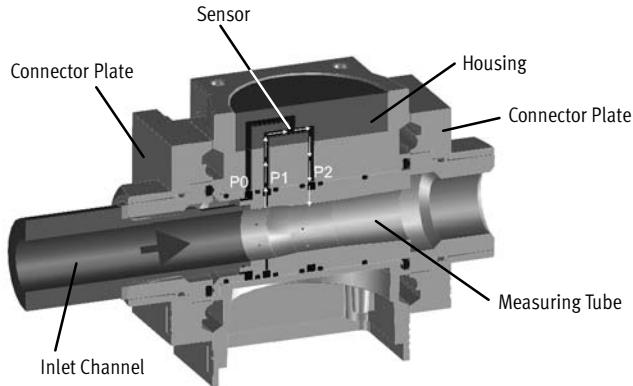


Operating Principal

Laminar Flow

Internally, the sensor is reached via a bypass, which is designed to provide appropriate flow.

An internal sieve, or sometimes an external inlet tube is necessary to make the flow laminar at the bypass.



Air Quality Classes

Compressed air must always be clean enough, so that it causes no malfunction or damage. Since every filter also represents a resistance to air flow, from an economical point of view the compressed air should only be as clean as required.

The quality of compressed air is identified by quality classes set forth in ISO 8573-1. Here it is established which contaminants are allowable in the corresponding compressed air quality classes.

The wide range of applications for compressed air accordingly imposes variable demands for air quality. If a high quality of compressed air is required, more steps of filtration must be used.

The determination of the quality class should consider the following information in the order in which it is listed.

1. The quality class of the solid contaminants.
2. The quality class for water content.
3. The quality class for total oil content (droplets, aerosols and vapors).

Details of Quality Classes per DIN ISO 8573-1

Class	1. Particle Size		2. Water Content	3. Oil Content
	Max. Particle Size [micron]	Max. Particulate Density [ppm / mg/m ³]	Max. Dew Point [°F / °C]	Max. Oil Concentration [ppm / mg/m ³]
1	0.1	0.08 / 0.1	-94 / -70	0.01 / 0.01
2	1	0.83 / 1	-40 / -40	0.08 / 0.1
3	5	4.15 / 5	-4 / -20	0.83 / 1
4	15	6.64 / 8	37 / 3	4.15 / 5
5	40	8.30 / 10	45 / 7	20.75 / 25
6	-	-	50 / 10	-
7	-	-	not defined	-

SFE3-... Flow Sensors



4

4.1

Operating pressure:
-0.7 to 7 bar

Pneumatic connection:
6 mm tubing connection
or G1/8 female thread

Flow measuring range:
0.05 to 0.5 l/min, 0.1 to 1
l/min, 0.5 to 5 l/min,
1 to 10 l/min, 5 to 50 l/min

Switch output:
2x PNP or 2x NPN

Analog output: 1 to 5 V

Three character digital display

IP40 rated

SFE 3 - F 100 - L - W Q6 - 2P B - K1

Type

SFE	Flow sensor
-----	-------------

Construction

3	With integrated digital display
---	---------------------------------

Direction of Flow

F	Mono-directional
---	------------------

Flow Measuring Range [l/min]

Mono-directional	
005	0.05 ... 0.5
010	0.1 ... 1
050	0.5 ... 5
100	1 ... 10
500	5 ... 50

Calibration

L	Air
---	-----

Mounting

W	Wall or surface mounting
---	--------------------------

Pneumatic Connection

Q6	Push-in fitting QS-6
18	Female thread G $\frac{1}{8}$

Switch Output

2P	2x PNP
2N	2x NPN

Analog Output

B	1 ... 5 V
---	-----------

Length of the Connecting Cable

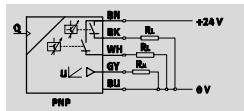
K1	1 m
----	-----

4
4.1

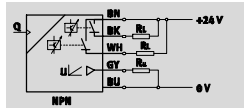
Technical Data

SFE3-... Flow Sensors

Function¹⁾



1) Can be switched between analog output and switch output 2xPNP



1) Can be switched between analog output and switch output 2xNPN

- Switch Output:
2x PNP or 2x NPN
- Analog Output:
1 ... 5 V
- 3-character Digital Display



General Technical Data						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
Indicating range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
Type of display		3 1/2-character alphanumeric				
Measuring principle		Thermal				
Repeatability, analog value FS	[%]	1				3
Repeatability, switching value FS	[%]	1				3
Accuracy FS	[%]	±8	±5			
Pneumatic connection		QS-6 (6 mm tubing)				Female thread G1/8
Ready status display		-				
Type of mounting		Via through-holes				
Assembly position ¹⁾		Horizontal or vertical				

1) Measurement inaccuracies can occur if installed at an angle.

Electrical Data	
Switch output	2x PNP or 2x NPN
Analog output	[V] 1 ... 5
Switching element function	Switchable
Switching function	Freely programmable
Operating voltage range	[V DC] 12 ... 24
Load resistance	[kΩ] 50
Response time	[ms] 50
Electrical connection	Cable
Cable length	[m] 1
Protection class to EN 60529	IP40
CE symbol	89/336/EEC (EMC)

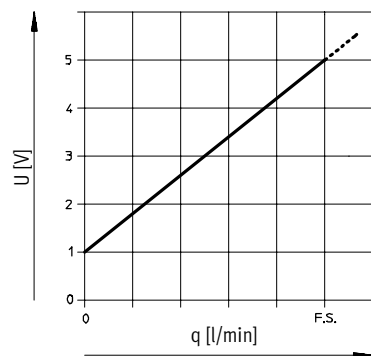
Materials						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
Housing		Polyamide				Aluminum
Cable sheath		Polyvinyl chloride				
Material note		Contains PWIS (Paint wetting impairment substances)				

Operating and Environmental Conditions		
Operating pressure	[bar]	-0.7 ... +7
Operating medium		Compressed air, filtered, unlubricated, grade of filtration 40 µm
Temperature of medium	[°C]	0 ... 50
Ambient temperature	[°C]	0 ... 50
Corrosion resistance class CRC ¹⁾		2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [g]						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
		70				90

Analog Output as a Function of Flow



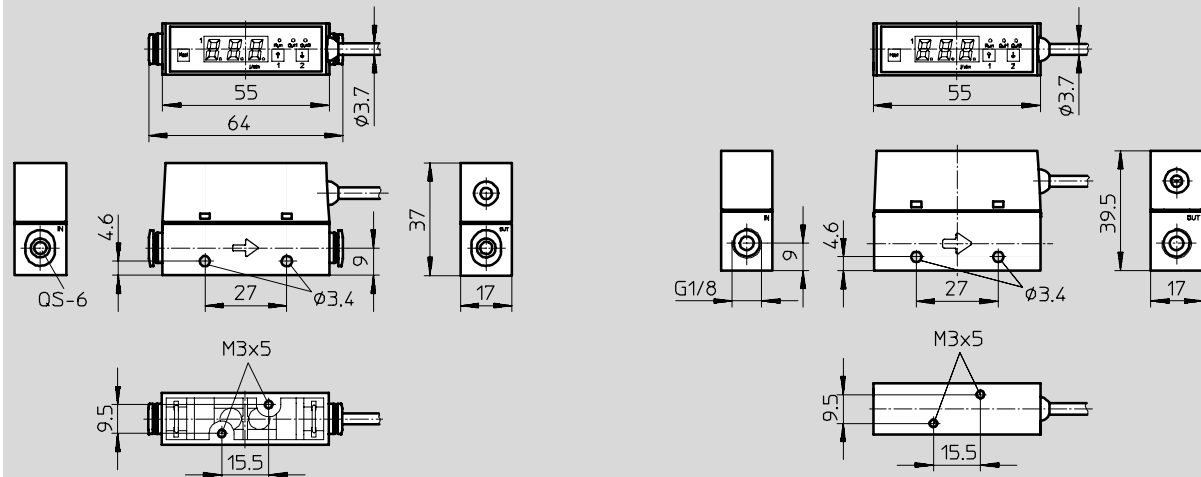
U = Analog output
q = Flow

4
4.1

Dimensions

Push-in Fitting QS-6

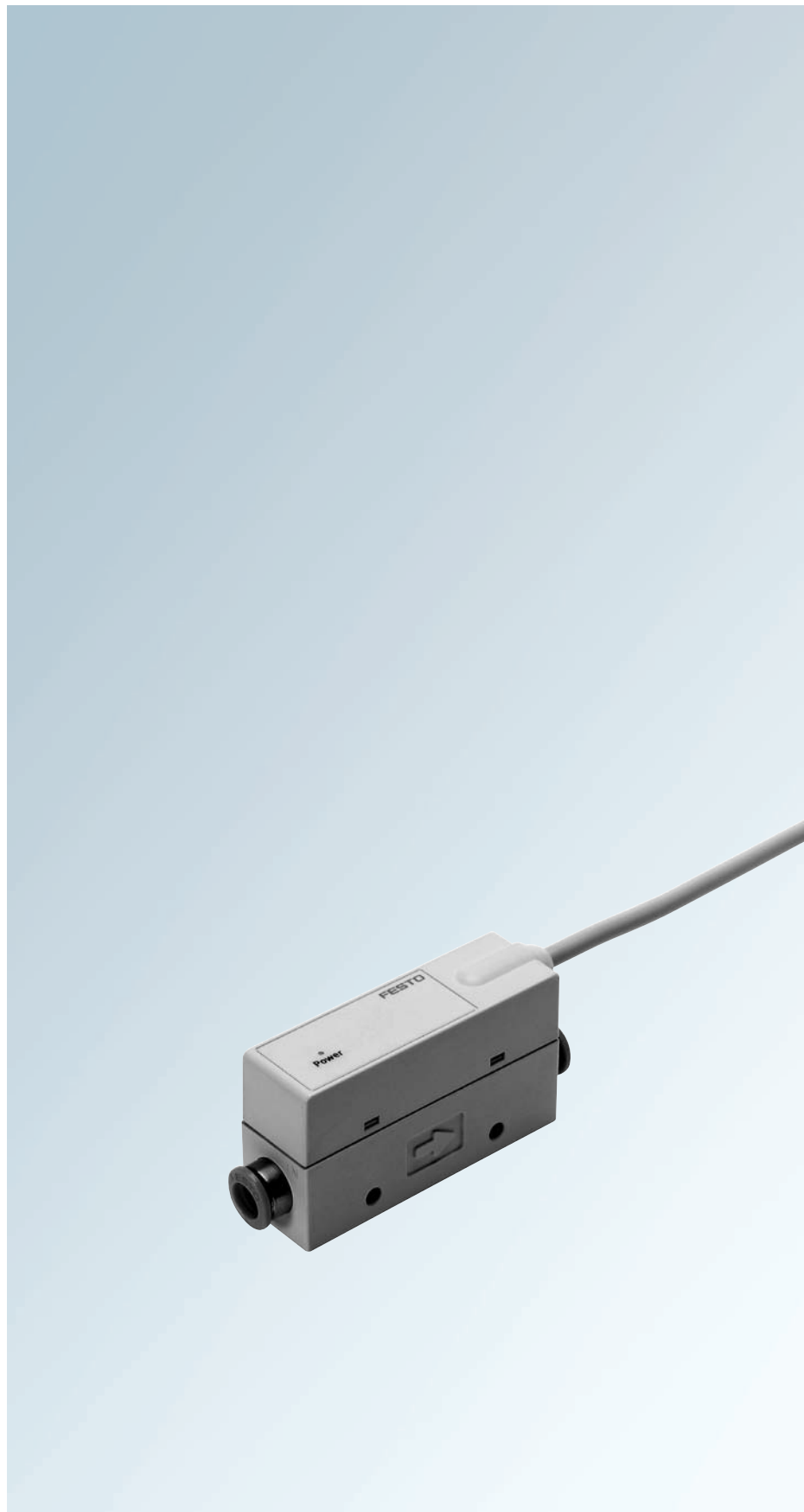
Female Thread G1/8



Ordering Data

Switch Output	Analog Output [V]	Flow Measuring Range [l/min]	Pneumatic Connection		Part No.	Type
			Push-in Fitting QS-6	Female Thread G1/8		
Pressure Range -0.7 ... +7 bar						
2x PNP	1 ... 5	0.05 ... 0.5	■	–	538519	SFE3-F005-L-WQ6-2PB-K1
		0.1 ... 1	■	–	538520	SFE3-F010-L-WQ6-2PB-K1
		0.5 ... 5	■	–	538521	SFE3-F050-L-WQ6-2PB-K1
		1 ... 10	■	–	538522	SFE3-F100-L-WQ6-2PB-K1
		5 ... 50	–	■	538523	SFE3-F500-L-W18-2PB-K1
2x NPN	1 ... 5	0.05 ... 0.5	■	–	538524	SFE3-F005-L-WQ6-2NB-K1
		0.1 ... 1	■	–	538525	SFE3-F010-L-WQ6-2NB-K1
		0.5 ... 5	■	–	538526	SFE3-F050-L-WQ6-2NB-K1
		1 ... 10	■	–	538527	SFE3-F100-L-WQ6-2NB-K1
		5 ... 50	–	■	538528	SFE3-F500-L-W18-2NB-K1

SFET-F... Flow Sensors



Use with separate digital display SFEV-F

Operating pressure:
-0.7 to 7 bar

Pneumatic connection:
6 mm tubing connection
or G1/8 female thread

Flow measuring range:
0.05 to 0.5 l/min, 0.1 to 1
l/min, 0.5 to 5 l/min,
1 to 10 l/min, 5 to 50 l/min

Analog output: 1 to 5 V

IP40 rated

SFE T – F 100 – L – W Q6 – B – K1

Type

SFE	Flow sensor
-----	-------------

Construction

T	Flow transmitter
---	------------------

Direction of Flow

F	Mono-directional
---	------------------

Flow Measuring Range [l/min]

Mono-directional	
005	0.05 ... 0.5
010	0.1 ... 1
050	0.5 ... 5
100	1 ... 10
500	5 ... 50

Calibration

L	Air
---	-----

Mounting

W	Wall or surface mounting
---	--------------------------

Pneumatic Connection

Q6	Push-in fitting QS-6
18	Female thread G $\frac{1}{8}$

Analog Output

B	1 ... 5 V
---	-----------

Length of the Connecting Cable

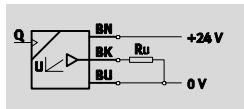
K1	1 m
----	-----

4
4.2

Technical Data

SFET-F Flow Sensors

Function¹⁾



1) With analog output

- Analog Output: 1 ... 5 V
- Mono-directional Flow
- To Connect a Separate Digital Display SFEV-F...



General Technical Data						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
Indicating range	[l/min]	-				
Type of display		-				
Measuring principle		Thermal				
Repeatability, analog value FS	[%]	1			3	
Repeatability, switching value FS	[%]	-			-	
Accuracy FS	[%]	±8	±5			
Pneumatic connection		QS-6 (6 mm tubing)				Female thread G1/8
Ready status display		LED				
Type of mounting		Via through-holes				
Assembly position ¹⁾		Horizontal or vertical				

1) Measurement inaccuracies can occur if installed at an angle.

Electrical Data	
Switch output	-
Analog output	[V] 1 ... 5
Switching element function	-
Switching function	-
Operating voltage range	[V DC] 12 ... 24
Load resistance	[kΩ] 50
Response time	[ms] 50
Electrical connection	Cable
Cable length	[m] 1
Protection class to EN 60529	IP40
CE symbol	-

4

4.2

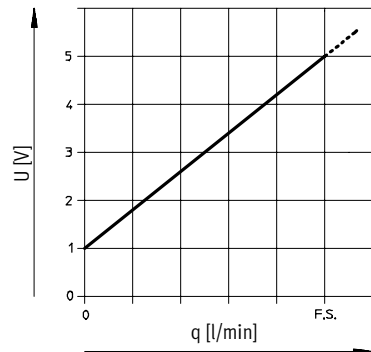
Materials						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
Housing		Polyamide				Aluminum, polyamide
Cable sheath		Polyvinyl chloride				
Material note		Contains PWIS (Paint wetting impairment substances)				

Operating and Environmental Conditions		
Operating pressure	[bar]	-0.7 ... +7
Operating medium		Compressed air, filtered, unlubricated, grade of filtration 40 µm
Temperature of medium	[°C]	0 ... 50
Ambient temperature	[°C]	0 ... 50
Corrosion resistance class CRC ¹⁾		2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [g]						
Flow Measuring Range	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50
		70				90

Analogue Output as a Function of Flow



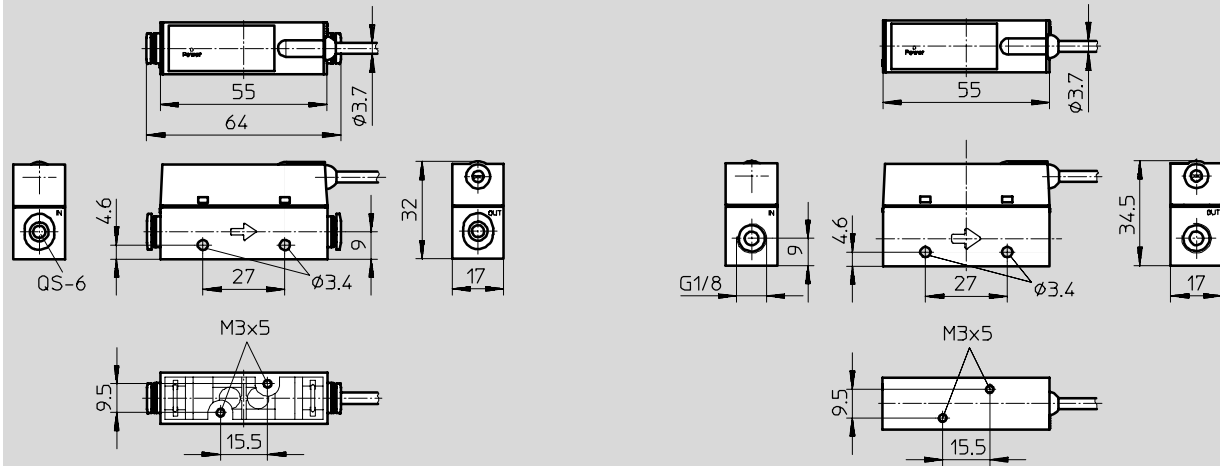
U = Analog output
 q = Flow

4
4.2

Dimensions

Push-in Fitting QS-6

Female Thread G1/8



Ordering Data

Switch Output	Analog Output [V]	Flow Measuring Range [l/min]	Pneumatic Connection		Part No.	Type
			Push-in Fitting QS-6	Female Thread G1/8		
Pressure Range -0.7 ... +7 bar						
-	1 ... 5	0.05 ... 0.5	■	-	538529	SFET-F005-L-WQ6-B-K1
		0.1 ... 1	■	-	538530	SFET-F010-L-WQ6-B-K1
		0.5 ... 5	■	-	538531	SFET-F050-L-WQ6-B-K1
		1 ... 10	■	-	538532	SFET-F100-L-WQ6-B-K1
		5 ... 50	-	■	538533	SFET-F500-L-W18-B-K1

SFET-R... Flow Sensors



Use with separate digital display SFEV-...

Operating pressure:
-0.9 to 2 bar

Pneumatic connection:
4 mm tubing connection

Flow measuring range:
-0.05 to 0.05 l/min,
-0.1 to 0.1 l/min,
-0.5 to 0.5 l/min,
-1 to 1 l/min,
-5 to 5 l/min,
-10 to 10 l/min

Analog output: 1 to 5 V

IP40 rated

SFE T – R 0100 – L – W Q4 – D – K3

Type

SFE	Flow sensor
-----	-------------

Construction

T	Flow transmitter
---	------------------

Direction of Flow

R	Bi-directional
---	----------------

Flow Measuring Range [l/min]

Bi-directional	
0005	-0.05 ... +0.05
0010	-0.1 ... +0.1
0050	-0.5 ... +0.5
0100	-1 ... +1
0500	-5 ... +5
1000	-10 ... +10

Calibration

L	Air
---	-----

Mounting

W	Wall or surface mounting
---	--------------------------

Pneumatic Connection

Q4	Push-in fitting QS-4
----	----------------------

Analog Output

D	3 ± 2 V, Bi-directional sensors
---	---------------------------------

Length of the Connecting Cable

K3	3 m
----	-----

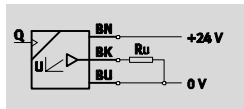
4

4.3

Technical Data

SFET-R... Flow Sensors

Function¹⁾



1) With analog output

- Suitable for Vacuum
- Bi-directional Flow
- Analog Output: 1 ... 5 V
- To Connect a Separate Digital Display SFEV-R...



General Technical Data							
Flow Measuring Range	[l/min]	-0.05 ... +0.05	-0.1 ... +0.1	-0.5 ... +0.5	-1 ... +1	-5 ... +5	-10 ... +10
Indicating range	[l/min]	-					
Type of display		-					
Measuring principle		Thermal					
Repeatability, analog value FS	[%]	1				2	
Repeatability, switching value FS	[%]	-					
Accuracy FS	[%]	±5					
Pneumatic connection		QS-4 (4 mm tubing)					
Ready status display		LED					
Type of mounting		Via through-holes					
Assembly position ¹⁾		Horizontal or vertical					

1) Measurement inaccuracies can occur if installed at an angle.

Electrical Data	
Switch output	-
Analog output	[V] 1 ... 5
Switching element function	-
Switching function	-
Operating voltage range	[V DC] 12 ... 24
Load resistance	[kΩ] 50
Response time	[ms] 5
Electrical connection	Cable
Cable length	[m] 3
Protection class to EN 60529	IP40
CE symbol	89/336/EEC (EMC)

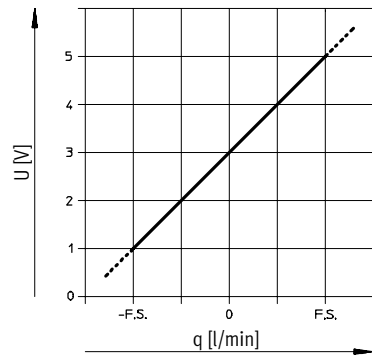
Materials	
Housing	Polyamide
Cable sheath	Polyvinyl chloride
Material note	Contains PWIS (Paint wetting impairment substances)

Operating and Environmental Conditions		
Operating pressure	[bar]	-0.9 ... 2
Operating medium		Compressed air, filtered, unlubricated, grade of filtration 40 µm
Temperature of medium	[°C]	0 ... 50
Ambient temperature	[°C]	0 ... 50
Corrosion resistance class CRC ¹⁾		2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [g]	
	25

Analog Output as a Function of Flow



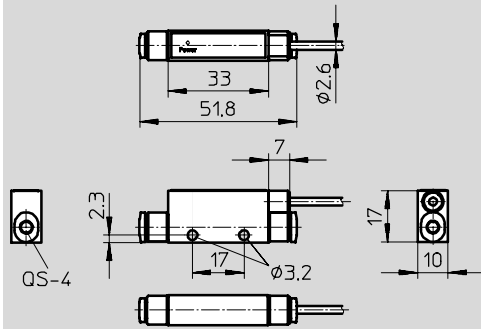
U = Analog output
q = Flow

4
4.3

Technical Data, Ordering Data

SFET-R... Flow Sensors

Dimensions



Ordering Data

Switch Output	Analog Output [V]	Flow Measuring Range [l/min]	Pneumatic Connection Push-in fitting QS-4	Part No.	Type
Pressure Range -0.9 ... +2 bar					
-	1 ... 5	-0.05 ... +0.05	■	538534	SFET-R0005-L-WQ4-D-K3
		-0.1 ... +0.1	■	538535	SFET-R0010-L-WQ4-D-K3
		-0.5 ... +0.5	■	538536	SFET-R0050-L-WQ4-D-K3
		-1 ... +1	■	538537	SFET-R0100-L-WQ4-D-K3
		-5 ... +5	■	538538	SFET-R0500-L-WQ4-D-K3
		-10 ... +10	■	538539	SFET-R1000-L-WQ4-D-K3

SFEV-... Flow Sensors



Separate display for connection to flow sensors SFET-F or SFET-R

Switch output:
2x PNP or 2x NPN

Analog output: 1 to 5 V

Three character digital display

IP40 rated

SFE V – F 500 – L – 2N B – K1

Type

SFE	Flow sensor
-----	-------------

Construction

V	Separate digital display
---	--------------------------

Direction of Flow

F	Mono-directional
R	Bi-directional

Flow Measuring Range [l/min]

Mono-directional	
005	0.05 ... 0.5
010	0.1 ... 1
050	0.5 ... 5
100	1 ... 10
500	5 ... 50
Bi-directional	
0005	-0.05 ... +0.05
0010	-0.1 ... +0.1
0050	-0.5 ... +0.5
0100	-1 ... +1
0500	-5 ... +5
1000	-10 ... +10

Calibration

L	Air
---	-----

Switch Output

2P	2x PNP
2N	2x NPN

Analog Output

B	1 ... 5 V
D	3 ± 2 V, Bi-directional sensors

Length of the Connecting Cable

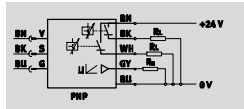
K1	1 m
----	-----

4
4.4

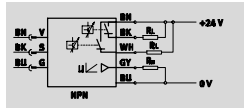
Technical Data

SFEV-... Flow Sensors

Function¹⁾



1) Can be switched between analog output and switch output 2xPNP



1) Can be switched between analog output and switch output 2xNPN

- Switch Output 2x PNP or 2x NPN
- Analog Output 1 ... 5 V
- 3-character Digital Display
- Separate Display for Connection with Flow Sensors SFET-F... or SFET-R...



General Technical Data								
Indicating range	For SFET-F...	[l/min]	0.05 ... 0.5	0.1 ... 1	0.5 ... 5	1 ... 10	5 ... 50	-
	For SFET-R...	[l/min]	-0.05 ... +0.05	-0.1 ... +0.1	-0.5 ... +0.5	-1 ... +1	-5 ... +5	-10 ... +10
Type of display	3 1/2-character alphanumeric							
Repeatability, analog value FS	[%]	-						
Repeatability, switching value FS	[%]	-						
Linearity error FS	[%]	-						
Accuracy FS	[%]	-						
Pneumatic connection	-							
Ready status display	-							
Type of mounting	With mounting bracket							
Assembly position	-							

Electrical Data		
Switch output		2x PNP or 2x NPN
Analog output	[V]	1 ... 5
Switching element function		Switchable
Switching function		Freely programmable
Operating voltage range	[V DC]	12 ... 24
Load resistance	[kΩ]	50
Response time	[ms]	6
Electrical connection		Cable
Cable length	[m]	1
Protection class to EN 60529		IP40
CE symbol		-

Technical Data

SFEV-... Flow Sensors

Materials	
Housing	Polyamide
Cable sheath	Polyvinyl chloride
Material note	Contains PWIS (Paint wetting impairment substances)

Operating and Environmental Conditions		
Operating pressure	[bar]	–
Operating medium		–
Temperature of medium	[°C]	–
Ambient temperature	[°C]	0 ... 50
Corrosion resistance class CRC ¹⁾		2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

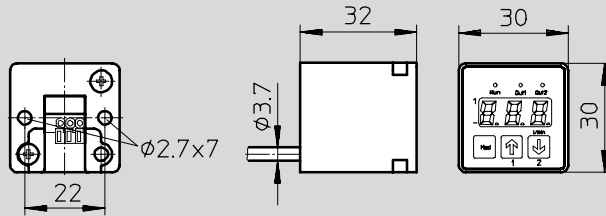
Weights [g]	
	70

4
4.4

Technical Data, Ordering Data

SFEV-... Flow Sensors

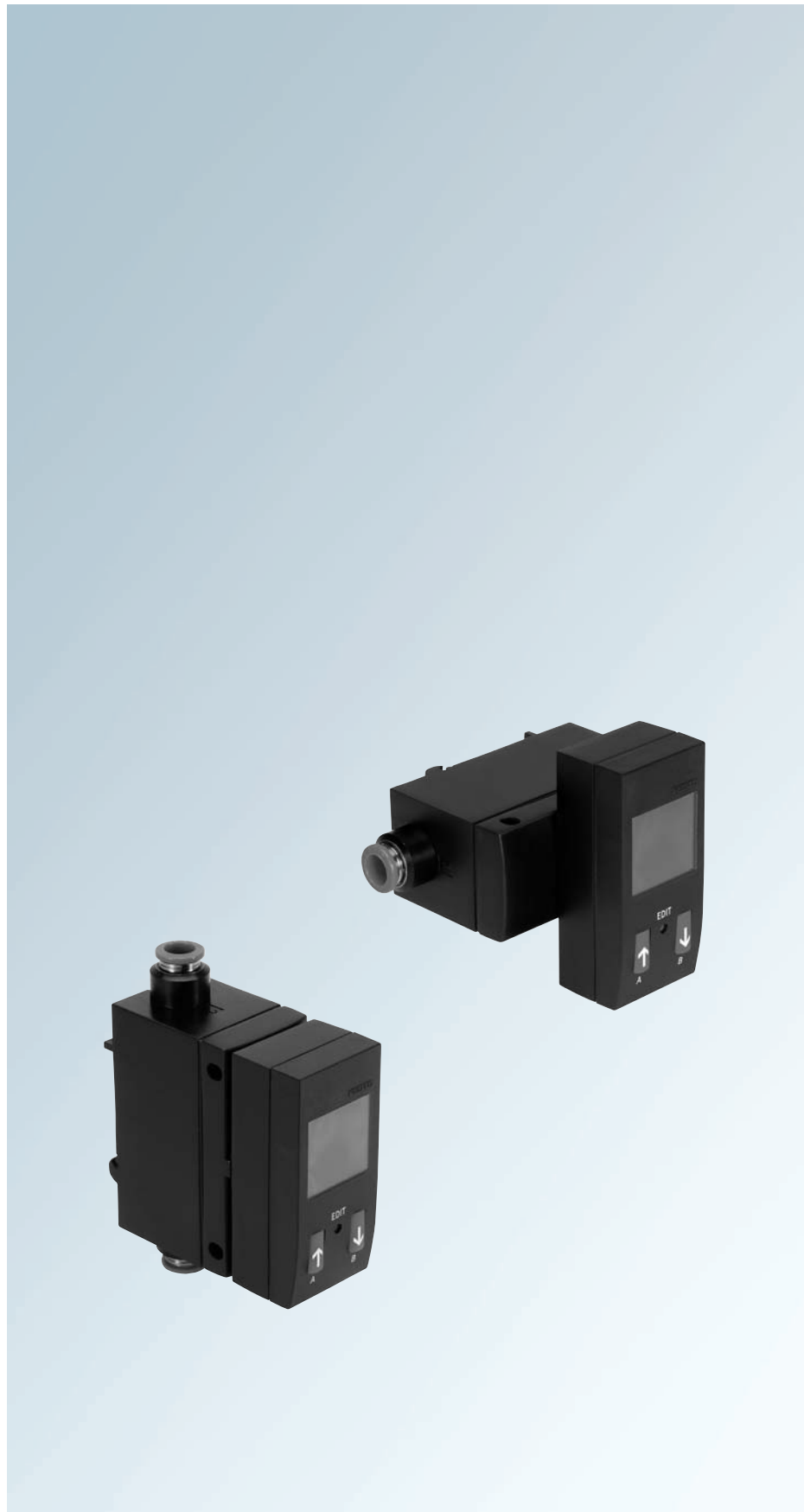
Dimensions



Ordering Data

Switch Output	Analog Output [V]	Indicating Range [l/min]	Part No.	Type
For Sensors SFET-F with Analog Output				
2x PNP	1 ... 5	0.05 ... 0.5	538540	SFEV-F005-L-2PB-K1
		0.1 ... 1	538541	SFEV-F010-L-2PB-K1
		0.5 ... 5	538542	SFEV-F050-L-2PB-K1
		1 ... 10	538543	SFEV-F100-L-2PB-K1
		5 ... 50	538544	SFEV-F500-L-2PB-K1
2x NPN	1 ... 5	0.05 ... 0.5	538545	SFEV-F005-L-2NB-K1
		0.1 ... 1	538546	SFEV-F010-L-2NB-K1
		0.5 ... 5	538547	SFEV-F050-L-2NB-K1
		1 ... 10	538548	SFEV-F100-L-2NB-K1
		5 ... 50	538549	SFEV-F500-L-2NB-K1
For Sensors SFET-R with Analog Output				
2x PNP	1 ... 5	-0.05 ... +0.05	538550	SFEV-R0005-L-2PD-K1
		-0.1 ... +0.1	538551	SFEV-R0010-L-2PD-K1
		-0.5 ... +0.5	538552	SFEV-R0050-L-2PD-K1
		-1 ... +1	538553	SFEV-R0100-L-2PD-K1
		-5 ... +5	538554	SFEV-R0500-L-2PD-K1
		-10 ... +10	538555	SFEV-R1000-L-2PD-K1
2x NPN	1 ... 5	-0.05 ... +0.05	538556	SFEV-R0005-L-2ND-K1
		-0.1 ... +0.1	538557	SFEV-R0010-L-2ND-K1
		-0.5 ... +0.5	538558	SFEV-R0050-L-2ND-K1
		-1 ... +1	538559	SFEV-R0100-L-2ND-K1
		-5 ... +5	538560	SFEV-R0500-L-2ND-K1
		-10 ... +10	538561	SFEV-R1000-L-2ND-K1

SFE1-LF... Flow Sensors



Operating pressure:
0 to 10 bar

Pneumatic connection:
6 or 8 mm tubing connection

Flow measuring range:
0.5 to 10 l/min or
10 to 200 l/min

Switch output:
2x PNP or 2x NPN

Analog output:
0 to 10 V or 4 to 20 mA

Mounting via through-holes,
on DIN rail, or on wall/surface
bracket

Illuminated LCD

IP65 rated

SFE1 – LF – F200 – H Q8 – P2 I – M12

Type

SFE1	Flow sensor
------	-------------

Construction

LF	Low flow
----	----------

Flow Measuring Range [l/min]

F10	0.5 ... 10
F200	10 ... 200

Assembly

H	DIN rail mounting
W	Wall or surface mounting

Pneumatic Connection

Q6	Push-in fitting QS-6
Q8	Push-in fitting QS-8

Switching Output

P2	2x PNP
N2	2x NPN

Analog Output

U	0 ... 10 V
I	4 ... 20 mA

Electrical Connection

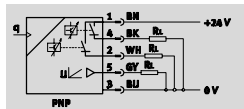
M12	Plug M12x1 5-pin
-----	------------------

4
4.5

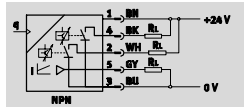
Technical Data

SFE1-LF-... Flow Sensors

Function



e.g. with switching output 2x PNP and analog output 0 ... 10 V



e.g. with switching output 2x NPN and analog output 4 ... 20 mA

- Flow Measuring Range:
0.5 ... 10 l/min or 10 ... 200 l/min
- Switching Output:
2x PNP or 2x NPN
- Analog Output:
0 ... 10 V or 4 ... 20 mA
- Illuminated LCD Display



General Technical Data		
Flow Measuring Range	[l/min]	0.5 ... 10 10 ... 200
Pneumatic connection		QS-6 (6 mm tubing) QS-8 (8 mm tubing)
Measuring principle		Thermal
Measured variable		Flow rate Consumption
Direction of flow		Unidirectional P1 → P2
Type of display		Illuminated LCD (optimized display)
Displayable unit(s)		l, m ³ l/min, m ³ /min
Repeatability of the analog value		± (0.8% o.m.v. + 0.2% FS) of measured value
Repeatability of switching point		± (0.8% o.m.v. + 0.2% FS) of measured value
Accuracy		± (3% o.m.v. + 0.3% FS) of measured value
Nominal temperature	[°C]	23
Pressure drop	[mbar]	< 100
Type of mounting		With through-holes On a DIN rail mounting On a wall/surface bracket
Mounting position		Any
Material	Body	Polyamide, reinforced
Product weight	[g]	160

Electrical Data		
Analog Output		0 ... 10 V 4 ... 20 mA
Switching output		2x PNP 2x NPN
Max. output current	[mA]	≤ 100
Switching element function		NO contact NC contact
Switching function		Threshold comparator Window comparator
Switching time	[ms]	< 100
Operating voltage range	[V DC]	15 ... 30
Load resistance	[kΩ]	≥ 10 ≤ 0.5
Electrical connection		Straight plug, M12x1, 5-pin
Protection against short circuit		Yes
Protection against overloading		Available
Protection class to EN 60529		IP65
CE symbol		89/336/EEC (EMC)
Approval		c UL us – In preparation, contact Festo

Ordering Data

SFE1-LF-... Flow Sensors

Ordering Data – Flow Measuring Range 0.5 ... 10 l/min					
Switching Output		Analog Output		Part No.	Type
2x PNP	2x NPN	0 ... 10 V	4 ... 20 mA		
DIN Rail Mounting					
■	–	■	–	537867	SFE1-LF-F10-HQ6-P2U-M12
■	–	–	■	537866	SFE1-LF-F10-HQ6-P2I-M12
–	■	■	–	537869	SFE1-LF-F10-HQ6-N2U-M12
–	■	–	■	537868	SFE1-LF-F10-HQ6-N2I-M12
Wall or Surface Mounting					
■	–	■	–	537871	SFE1-LF-F10-WQ6-P2U-M12
■	–	–	■	537870	SFE1-LF-F10-WQ6-P2I-M12
–	■	■	–	537873	SFE1-LF-F10-WQ6-N2U-M12
–	■	–	■	537872	SFE1-LF-F10-WQ6-N2I-M12

Ordering Data – Flow Measuring Range 10 ... 200 l/min					
Switching Output		Analog Output		Part No.	Type
2x PNP	2x NPN	0 ... 10 V	4 ... 20 mA		
DIN Rail Mounting					
■	–	■	–	537875	SFE1-LF-F200-HQ8-P2U-M12
■	–	–	■	537874	SFE1-LF-F200-HQ8-P2I-M12
–	■	■	–	537877	SFE1-LF-F200-HQ8-N2U-M12
–	■	–	■	537876	SFE1-LF-F200-HQ8-N2I-M12
Wall or Surface Mounting					
■	–	■	–	537879	SFE1-LF-F200-WQ8-P2U-M12
■	–	–	■	537878	SFE1-LF-F200-WQ8-P2I-M12
–	■	■	–	537881	SFE1-LF-F200-WQ8-N2U-M12
–	■	–	■	537880	SFE1-LF-F200-WQ8-N2I-M12

MS6-SFE... Flow Sensors



4

4.6

Illuminated LCD

Switch output:
2x PNP or 2x NPN

Analog output:
0 to 10 V or 4 to 20 mA

Inline mounting or with
MS Series service units

IP65 rated

Type Code – Flow Sensors MS6-SFE-...

For Use With MS Series Service Units and For Individual Mounting

MS 6 - SFE - F5 - - P2 I - M12

Basic Function

MS	Standard service unit
----	-----------------------

Size (MS Series service unit)

6	Grid dimension 62 mm
---	----------------------

Service Function

SFE	Flow sensor
-----	-------------

Flow Measuring Range [l/min]

F5	200 ... 5,000
----	---------------

Type of Mounting

	For use with service units Inline installation in service unit combination series MS depends on connecting plate selected → See accessories
AGD	Individual mounting With accessories/connecting plate with internal G1/2 thread and stabilizing attachment with internal G1/2 thread or outer G3/4 thread

Switch Output

P2	2x PNP
N2	2x NPN

Analog Output

U	0 ... 10 V
I	4 ... 20 mA

Electrical Connection

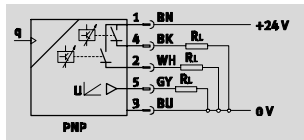
M12	Plug M12x1, 5-pin
-----	-------------------

4
4.6

Technical Data

MS6-SFE... Flow Sensors

Function¹⁾



1) For example with 2 switch outputs PNP and 0 ... 10 V analog

Flow Rate:
200 ... 5,000 l/min

Temperature Range:
0 ... +50 °C

Operating Pressure:
0 ... 16 bar



- Switch output
2x PNP or 2x NPN
- Analog output
0 ... 10 V or 4 ... 20 mA
- Suitable for flow and consumption measurement

- Switching points for measurement are freely programmable
- Prefiltration with filter MS-LF, grade of filtration 5 µm, recommended for compliance with air quality class

Note
To comply with the specified accuracies, the MS6-SFE-F5-AGD-... must be supplied via a connection inside diameter of at least 10 mm and the MS6-SFE-F5-... must be supplied via a pneumatic connection of at least G1/2.

Note
For installation directly after a filter regulator MS6-LFR or pressure regulator MS6-LR, the branching module MS6-FRM must be installed between these service units to comply with the specified accuracies.

General Technical Data			
		For Use In Service Unit Combinations, MS Series MS6-SFE-F5-...	Individual Mounting MS6-SFE-F5-AGD-...
Flow measuring range	[l/min]	200 ... 5,000 ¹⁾	
Pneumatic connection 1 ²⁾		G1/2	G3/4 Female thread G1/2 Male thread G3/4
Pneumatic connection 2 ²⁾		G1/2	G3/4 Female thread G1/2
Measuring principle		Thermal	
Method of measurement		Heat Loss	
Measured variable		Flow rate Consumption	
Direction of flow		Unidirectional P1 → P2	
Type of display		Illuminated LCD (optimized display)	
Displayable unit(s)		l m ³ l/min	
Repeatability of switching point		±(0.8% o.m.v. + 0.2% FS) ³⁾	
Repeatability of analog value		±(0.8% o.m.v. + 0.2% FS) ³⁾	
Accuracy		±(3% o.m.v. + 0.3% FS) ³⁾	
Type of mounting		Inline installation	With accessories
Assembly position		Horizontal	
Product weight	[g]	600	1,100

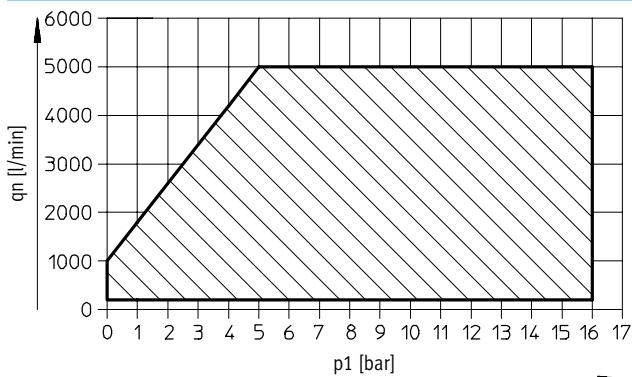
1) Restricted at operating pressure < 5 bar, diagram → See graph on page 234.
 2) Depends on connecting plate selected.
 3) % o.m.v. = % of measured value. % FS = % of measuring range's final value (full scale)

Electrical Data				
Type	MS6-SFE-F5-P2U-M12 MS6-SFE-F5-AGD-P2U-M12	MS6-SFE-F5-P2I-M12 MS6-SFE-F5-AGD-P2I-M12	MS6-SFE-F5-N2U-M12 MS6-SFE-F5-AGD-N2U-M12	MS6-SFE-F5-N2I-M12 MS6-SFE-F5-AGD-N2I-M12
Switch output	2x PNP	2x PNP	2x NPN	2x NPN
Analog output	[V]	0 ... 10	–	0 ... 10
	[mA]	–	4 ... 20	–
Switching element function	NC contact			
	NO contact			
Switching function	Window comparator			
	Threshold value with variable hysteresis			
Switching time	[ms]	100		
Operating voltage	[V DC]	15 ... 30		
Load resistance	[Ω]	≥ 10,000	≤ 500	≥ 10,000
Max. output current	[mA]	≤ 100		
Electrical connection	Straight plug, M12x1, 5-pin			
Pin allocation in accordance with standards	EN 60947-5-2			
Protection against short circuit	Yes			
Protection class to EN 60529	IP65			
CE symbol	89/336/EEC (EMC)			

Operating and Environmental Conditions	
Operating pressure	[bar] 0 ... 16 (overload at 20 bar, briefly)
Operating medium	Compressed air, air quality class 3.4.1 to DIN ISO 8573-1
Ambient temperature	[°C] 0 ... 50
Temperature of medium	[°C] 0 ... 50
Corrosion resistance class CRC ¹⁾	2

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

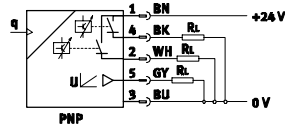
Flow Measuring Range “qn” as a Function of Operating Pressure “p1”



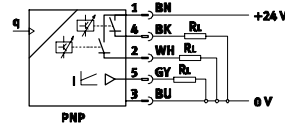
Electrical Outputs¹⁾

2 Switch Outputs PNP

0 ... 10 V Analog

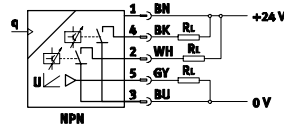


4 ... 20 mA Analog

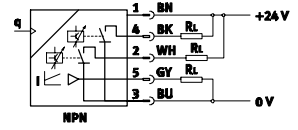


2 Switch Outputs NPN

0 ... 10 V Analog

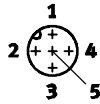


4 ... 20 mA Analog



Terminal Allocation

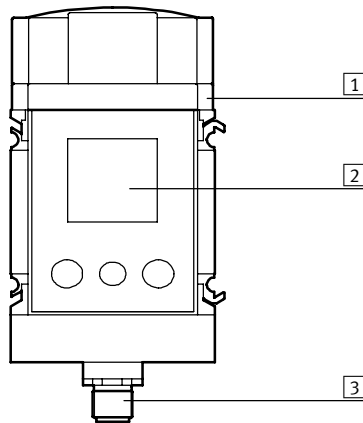
- 1 = +24 V
- 2 = Switch output B
- 3 = 0 V
- 4 = Switch output A
- 5 = Analog output C



1) Core colors indicated apply when using plug sockets with cable SIM-M12-5GD.

Materials

Sectional View

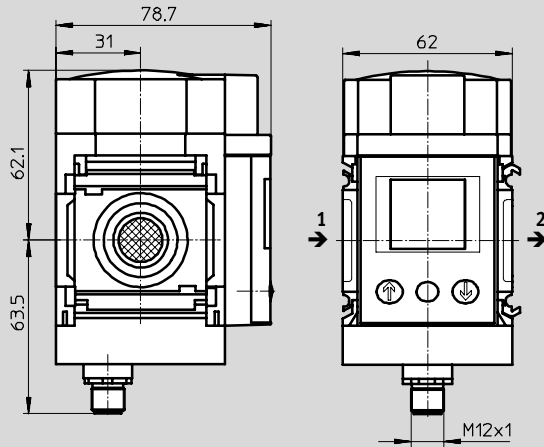


Flow Sensor		
1	Body	Die-cast aluminum, polyamide, reinforced
2		
3	Plug contacts	Gold-plated brass
-	Inspection glass	Polycarbonate

Dimensions

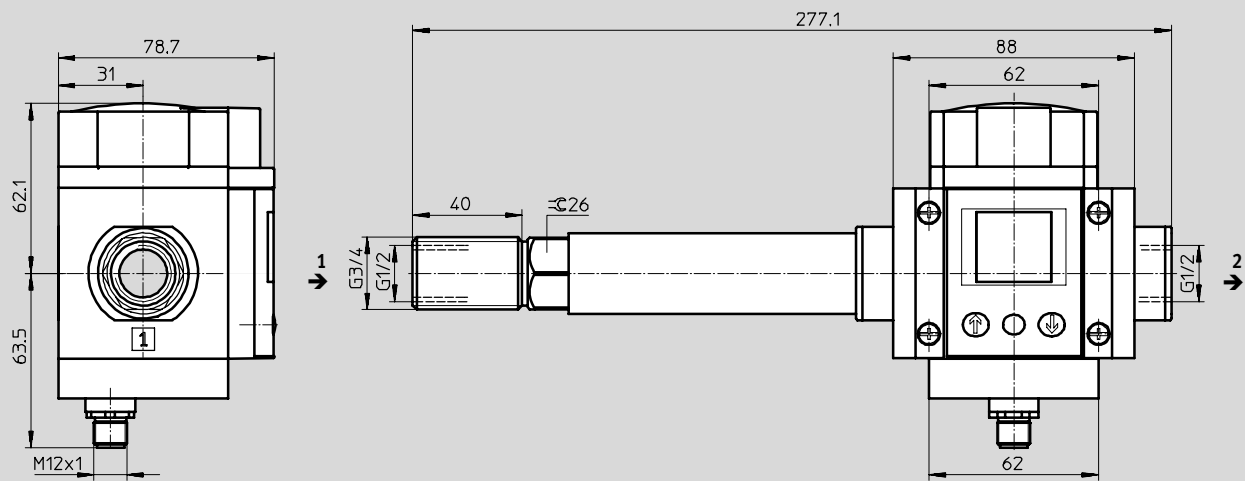
Download CAD data → www.festo.com/en/engineering

For Use In Service Unit Combinations, MS Series



→ Flow Direction

Individual Mounting



→ Flow Direction

Ordering Data

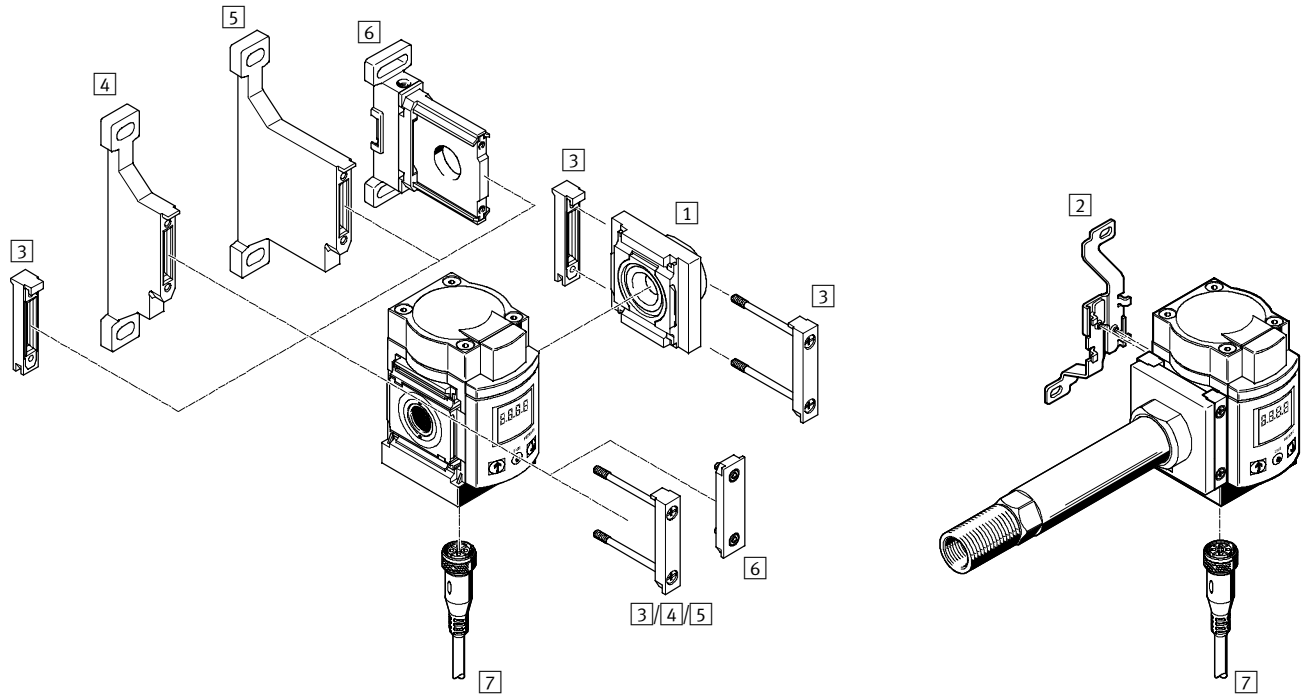
Size	Switch Output		Analog Output		For Use In Service Unit Combinations, MS Series		Individual Mounting	
	2x PNP	2x NPN	4 ... 20 mA	0 ... 10 V	Part No.	Type	Part No.	Type
MS6	■	-	■	-	538421	MS6-SFE-F5-P2I-M12	538417	MS6-SFE-F5-AGD-P2I-M12
	■	-	-	■	538422	MS6-SFE-F5-P2U-M12	538418	MS6-SFE-F5-AGD-P2U-M12
	-	■	■	-	538423	MS6-SFE-F5-N2I-M12	538419	MS6-SFE-F5-AGD-N2I-M12
	-	■	-	■	538424	MS6-SFE-F5-N2U-M12	538420	MS6-SFE-F5-AGD-N2U-M12

For Use In Service Unit Combinations

With Filter Cartridge

For Individual Mounting

With Connecting Plates and Inlet Section



Mounting Attachments and Accessories			
	Type	In Service Unit Combinations, MS series	Individual Mounting
1	Connecting plate (included with individual mounting)	MS6-AG...	■
2	Wall mounting bracket (included with individual mounting)	MS6-WB	-
3	Module connector	MS6-MV	■
4	Wall mounting plate	MS6-WP	■
5	Wall mounting bracket	MS6-WPB	■
6	Wall mounting plate	MS6-WPM	■
7	Plug socket with cable	SIM-M12-5GD...	■

See section 6.4 for individual mounting accessories.

See Info brochure 408 US for service unit combination accessories.

Actuator Feedback



Proximity sensors for
actuators with type 8
and type 10 sensor slots

Magneto resistive, inductive
and magnetic reed versions

Position transmitter with
50 mm position measuring
range and integrated
out-of-range detection

5

5.0




Operation			Transistor			
Feature	Description	Code				
Sensor Type			SMT	CRSMT	SMT0	SMTSO
Special Environment	Welding Field Immune	SO	-	-	-	■
	Corrosion Resistant	CR	-	■	-	-
	Heat Resistant Option	S6	-	-	-	-
Size	Type 8 Slot	8	■	■	■	■
	Type 10 Slot	10	■	-	-	-
Mounting	In cylinder Slot		■	■	-	-
	In Cylinder Slot via Accessory		-	-	■	■
Switch Type/Output	NO Contact, 3-wire, PNP	PS	■	■	■	■
	NO Contact, 3-wire, NPN	NS	-	-	■	■
	NO Contact, 3-wire	-	-	-	-	-
	NO Contact, 2-wire	ZS	-	-	-	-
	NC Contact, 3-wire	O	-	-	-	-
	NC 3/2 Valve	-	-	-	-	-
Voltage	24 V DC	24	■	■	■	■
	230 V AC	230	-	-	-	-
Electrical Connection	Cable		■	■	-	-
	Plug, M8		■	-	■	-
	Plug, M12		-	-	■	■
Page			245	255	261	263

■ = Available
 - = Unavailable

Position Transmitter, For Cylinder Sensor Type 8 Slot – SMAT	Section 5.3 → Page 279
<ul style="list-style-type: none"> ■ Operating Voltage Range: 15 to 30 V DC ■ Position Measuring Range: 50 mm ■ Analog Output: 0 ... 10 V and 0 ... 20 mA ■ Magnetic Measuring Principle (integrated out-of-range detection) ■ Magnetic contactless analog ■ Electrical Connection: plug 	

Actuator Feedback

Overview

Operation			Reed		Pneumatic
Feature	Description	Code			
Sensor Type			SME	SMEO	SMPO
Special Environment	Welding Field Immune	S0	-	-	-
	Corrosion Resistant	CR	-	-	-
	Heat Resistant Option	S6	■	■	-
Size	Type 8 Slot	8	■	■	■
	Type 10 Slot	10	■	-	-
Mounting	In cylinder Slot		■	-	-
	In Cylinder Slot via Accessory		-	■	■
Switch Type/Output	NO Contact, 3-wire, PNP	PS	-	-	-
	NO Contact, 3-wire, NPN	NS	-	-	-
	NO Contact, 3-wire	-	■	■	-
	NO Contact, 2-wire	ZS	■	■	-
	NC Contact, 3-wire	O	■	-	-
Voltage	NC 3/2 Valve	-	-	-	■
	24 V DC	24	■	■	-
Electrical Connection	230 V AC	230	■	■	-
	Cable		■	■	-
	Plug, M8		■	■	-
	Plug, M12		-	■	-
Page			245	265	269

■ = Available
 - = Unavailable

General Information

<p>Festo proximity sensors are position sensors specially adapted and optimized for use with Festo cylinders. SME/SMT sensors are mounted on cylinders directly and offer users the advantage of being</p>	<p>able to obtain from a single source an optimally harmonized system which requires only simple mounting components for assembly. The proximity sensors operate in conjunction with a permanent</p>	<p>magnet, matched to the overall system and integrated into the piston of the actuator. Festo actuators with the designation “A” are equipped with a permanent magnet of this kind.</p>	<p>The proximity sensors are adjusted mechanically on the cylinder and locked into the desired position. As soon as the cylinder piston returns to this position, the switching signal status changes.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

SMT Solid State Proximity Sensors

<p>The magneto resistive proximity sensor SMT has a sensor element comprising magnetic field-dependent resistors also known as an oscillator circuit.</p>	<p>A bridge circuit comprising magnetic field-dependent resistors generates a voltage contactlessly when a piston magnet approaches. A downstream logic function evaluates the voltage and supplies an output signal.</p>	<p>Current flowing through an oscillator circuit is changed contactlessly when a piston magnet is brought close to it. A downstream logic function evaluates this change and supplies an output signal.</p>	<p>Proximity sensors SMT are used mainly in applications where they are connected to a controller by means of which their switching signals are processed.</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------

SME Contacting Proximity Sensors

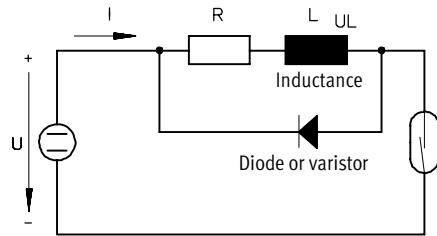
<p>Contacting proximity sensors SME consist of a reed switch whose contacts close when a magnetic field approaches, thus generating a switching signal.</p>	<p>Proximity sensors SME are used mainly in applications where it is necessary to switch high load currents (e.g. for the direct control</p>	<p>of electrical consuming devices). In applications involving large capacitive loads or long cable</p>	<p>lengths (over approx. 7.5 m), a protective circuit must be provided.</p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------

Protective Circuit – For SME Contacting Proximity Sensors

Inductive Loads

When inductive loads are switched, a high voltage peak is produced at the moment of switch-off. For this reason, proximity sensors must be provided with a protective circuit. The protective circuit can consist either of an appropriate diode or varistor (see circuit diagram). The electrical values of these components depend on the power component which is connected in

series (e.g. relay, contactor, etc.). If a relay or auxiliary contactor is switched, allowance must be made for the technical data of the proximity sensor and of the relay or auxiliary contactor. With R-C circuits, there is no need for an additional resistor to protect against inductive loads.



Note

The pick-up current rating of a relay or auxiliary contactor is much higher (8 to 10 times higher) than the holding power rating. For this reason, controller sizing should be based primarily on the pick-up power rating.

Cylinders with magnetically actuated proximity sensors should not be installed in places where strong magnetic fields (e.g. resistance welding machines) are present. Welding field immune proximity sensors should be used instead.

The distance between a proximity sensor and the nearest outer wall of a cylinder with a permanent magnet integrated in the piston must be at least 100 mm if no special screening is used.

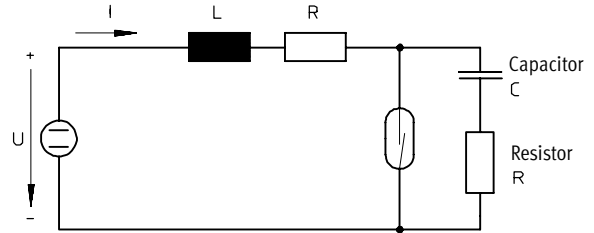
Protective Circuit – For SME Contacting Proximity Sensors

Capacitive Loads

When capacitive loads are switched or cables longer than approx. 7.5 m are used, a high current peak occurs at the moment of switch-on. These current peaks can lead to severe damage to mechanical switching devices. For this reason, proximity sensors must be provided with a protective circuit.

To protect against current peaks, a protective resistor R must be

installed in the power supply line (brown cable) as close as possible to the proximity sensor. This protective resistor reduces the load current I. Ensure therefore during sizing that the minimum current necessary for reliable status detection is available (allow for the technical data of the connected load).



Note

The pick-up current rating of a relay or auxiliary contactor is much higher (8 to 10 times higher) than the holding power rating. For this reason, controller sizing should be based primarily on the pick-up power rating.

Cylinders with magnetically actuated proximity sensors should not be installed in places where strong magnetic fields (e.g. resistance welding machines) are present. Welding field immune proximity sensors should be used instead.

The distance between a proximity sensor and the nearest outer wall of a cylinder with a permanent magnet integrated in the piston must be at least 100 mm if no special screening is used.

SMAT-8E Position Transmitters

The SMAT-8E is a sturdy magnetic measuring system in the 50 mm range. It provides a standardized analog current and voltage signal via an M8x1 plug connection,

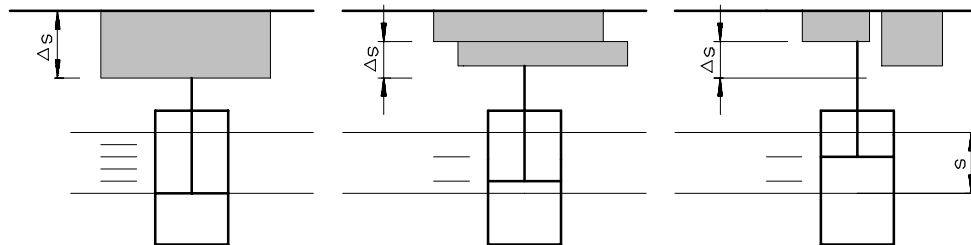
regardless of the actuator used. The transmitter can thus be connected directly to the analog input of a programmable logic controller. The piston position of the pneumatic

cylinder can be recorded by means of contactless sensing and the travel distance can be measured between any set switching points with typical reproducibility of 0.1 mm.

Typical Applications

Object Registering
Press-fitting, clamping, position sensing, quality sorting of parts, workpiece replacement.

Process Monitoring
Quality inspection, wear monitoring, thickness measuring.



s = Position measuring range

Note

Sensors that detect magnetic fields, such as proximity sensors SMT/SME and position transmitters SMAT, must not be secured onto the actuator using mountings made from ferritic materials, as this can lead to malfunction.

Actuator Compatibility

SMT-8/SME-8 and SMT-10/SME-10 Proximity Sensors

FESTO

Drive		SMT-8 CRSMT-8 SME-8 SMPO-8	SMT-10 SME-10
ISO Standard Cylinders			
ISO Standard cylinders DSNU, ESNU	∅ 8 ... 25 mm	■	■
ISO Standard cylinders DSN, ESN	∅ 8 ... 25 mm	■	■
ISO Standard cylinders DNCB		■	-
ISO Standard cylinders DNC		■	-
ISO Standard cylinders DNG		-	-
ISO Standard cylinders CDN		-	-
ISO Standard cylinders DNU		-	-
ISO Standard cylinders ADN		■	-
Cylinders			
Compact cylinders ADVU, AEVU		■	-
Short-stroke cylinders ADVC, AEVC	∅ 6 ... 25 mm	-	■
	∅ 32 ... 100 mm	■	-
Flat cylinders EZH-10/40-40-A-B		■	-
Flat cylinders DZF		■	-
Flat cylinders DZH	∅ 16 ... 25 mm	■	-
	∅ 32 ... 63 mm	-	-
Round cylinders DSNU, ESNU	∅ 32 ... 63 mm	■	■
Round cylinders DSW, ESW		■	■
Round cylinders DSEU, ESEU		■	■
Multimount cylinders DMM, EMM		■	-
Corrosion resistant cylinders CRDG		-	-
Corrosion resistant cylinders CRDSW		■	■
Corrosion resistant cylinders CRHD		■	-
Corrosion resistant cylinders CRDSNU		-	-
Corrosion resistant cylinders CRDNG		-	-
Corrosion resistant cylinders CRDNGS		-	-
Rodless Cylinders			
Rodless cylinders DGC		-	■
Rodless cylinders DGP, DGPL		■	-
Rodless cylinders SLG		-	■
Rodless cylinders SLM		■	-
Rotary Actuators			
Rotary actuators DSM	∅ 6 ... 10 mm	-	■
Rotary actuators DRQ	∅ 16 ... 32 mm	■	-
	∅ 40 ... 100 mm	-	-
Rotary actuators DRQD	∅ 6 ... 12 mm	-	■
	∅ 16 ... 32 mm	■	-
Rotary/linear actuators DSL		■	-

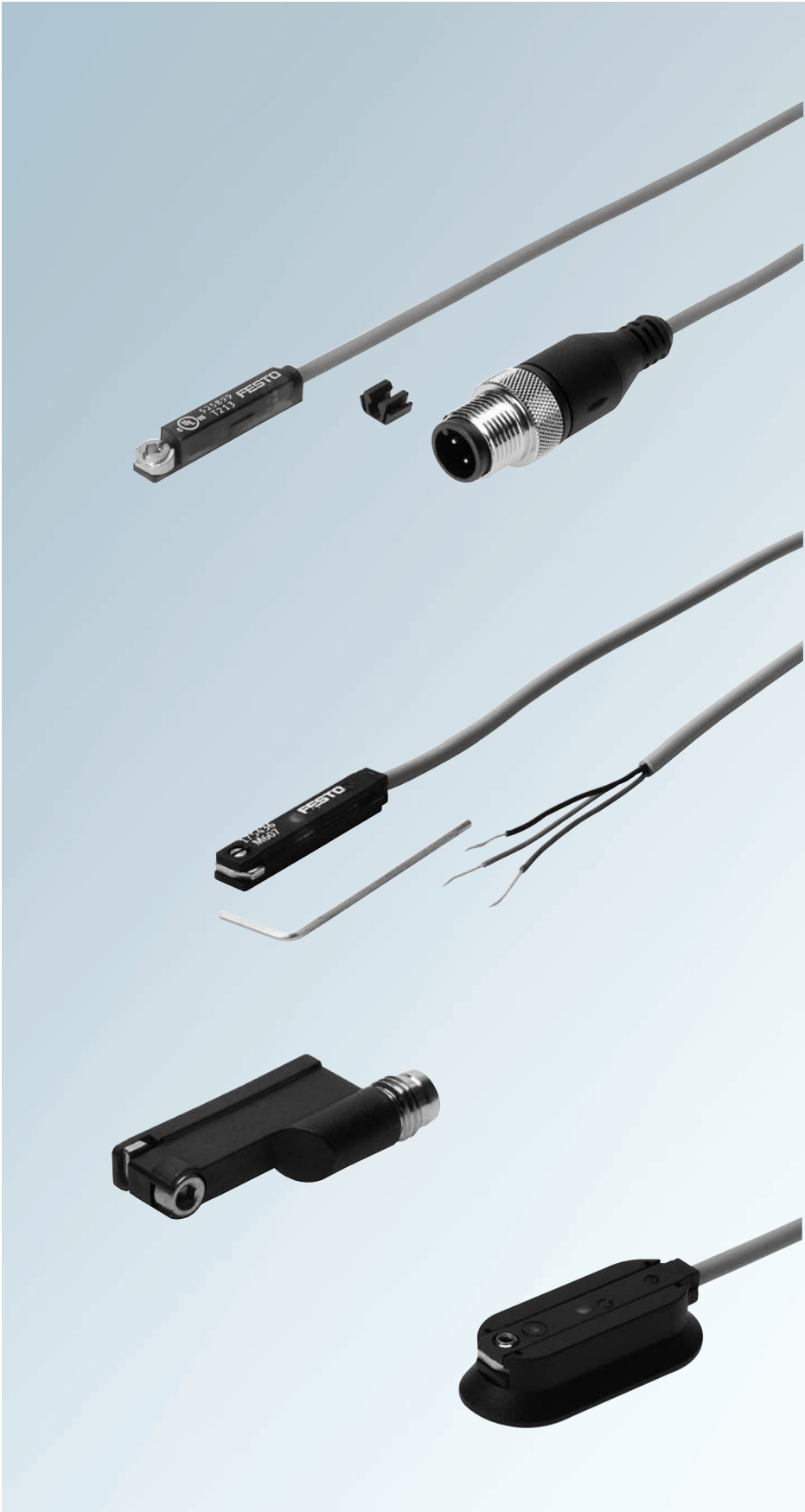
■ = Compatible
- = Unsuitable

Drive		SMT-8 CRSMT-8 SME-8 SMPO-8	SMT-10 SME-10
Function-oriented Actuators			
Stopper cylinders STA		■	-
Stopper cylinders STAF		■	-
Linear/rotary clamp CLR		■	-
Guided Cylinders			
Mini slides SLS, SLF, SLT		-	■
Twin cylinders SPZ		■	-
Slide units SLZ		■	-
Guided cylinders DFP	∅ 6 ... 16 mm	-	■
	∅ 25 ... 80 mm	■	-
Mini guided actuators DFC		-	■
Guided actuators DFM		■	-
Combination guide units SLE	∅ 32 ... 50 mm	■	-
Twin cylinders DPZC		-	■
Twin cylinders DPZ		■	-
Handling Units			
Linear modules HMP		■	-
Linear modules HMPL		■	-
Linear modules HSP		■	-
Grippers			
Feed separators HPV		■	-
Three-point grippers HGD	∅ 32, 50 mm	■	-
Parallel grippers HGP	∅ 6 mm	-	-
	∅ 10 ... 35 mm	■	-
Precision parallel grippers HGPP	∅ 12 ... 32 mm	-	-
T-slot grippers HGPT	∅ 16 ... 63 mm	-	■
Three-point gripper HGD	∅ 16 mm	-	-
Angle grippers HGW	∅ 10 mm	-	-
	∅ 16 ... 40 mm	■	-
Radial grippers HGR	∅ 10 mm	-	-
	∅ 16 ... 40 mm	■	-
Cushioning Components			
Shock absorbers YSRWJ		■	-
Electrical Linear Actuators			
Belt driven actuators DGE-ZR		■	-
Ball screw driven actuators DGE-SP		■	-
Actuators for Process Valves			
Copac linear actuators DLP-A		■	-

5

5.0

Proximity Sensors For Type 8 Slot



For actuators with type 8 sensor slot (T-slot)

Magneto resistive, inductive and magnetic reed versions

Operating voltage range: 0 to 250 V AC/DC

Switching element functions: normally open, normally closed and Namur

Switch output: PNP, NPN and Namur

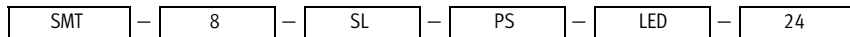
Electrical connection: plug or cable

Corrosion resistant version is available

5
5.1

Type Code – SMT-8-SL/SME-8-SL Proximity Sensors

For Type 8 Slot



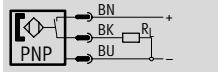
Type	
SMT	Proximity sensor, magneto-resistive
SME	Proximity sensor, magnetic reed
Construction	
8	For T-slot, insert from end
Electrical Connection	
SL	Plug in housing longitudinally attached
Switching Element Function, Switch Output	
PS	NO contact, 3-wire, PNP
Switching Status Display	
LED	Yellow LED
Rated Operating Voltage	
24	24 V DC

Technical Data

SMT-8-SL Proximity Sensor, For Type 8 Slot

Function

NO contact, PNP, with plug



- Magneto-resistive Measuring Principle
- Long Guides – Sturdy Construction
- Plug Directly On Sensor



General Technical Data		
Switching Element Function		NO Contact
Electrical Data		
Switch output		PNP
Electrical connection		Plug M8x1, 3-pin
Operating voltage range	[V DC]	10 ... 30
Max. output current	[mA]	200
Max. switching capacity	[W]	6
Voltage drop	[V]	1.8
Residual current	[mA]	0.1
Protection against short circuit		Yes
Protection against polarity reversal		For all electrical connections
Protection class to EN 60 529		IP65/IP67
CE symbol		89/336/EEC (EMC)
Construction		
Design		For T-slot
Type of mounting		Clamped in T-slot, insert from end
Reproducibility of switching point ¹⁾	[mm]	±0.1
Response time	[ms]	≤0.5
Switch-off time	[ms]	0.5
Switching status display		Yellow LED
Mounting position		Any
Materials	Body	Polyamide
	Plug	Brass, nickel-plated
Note on materials		Copper, PTFE and silicone-free
Product weight	[g]	5

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions		
Ambient temperature	[°C]	-25 ... +70
Corrosion resistance class CRC ²⁾		2

2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

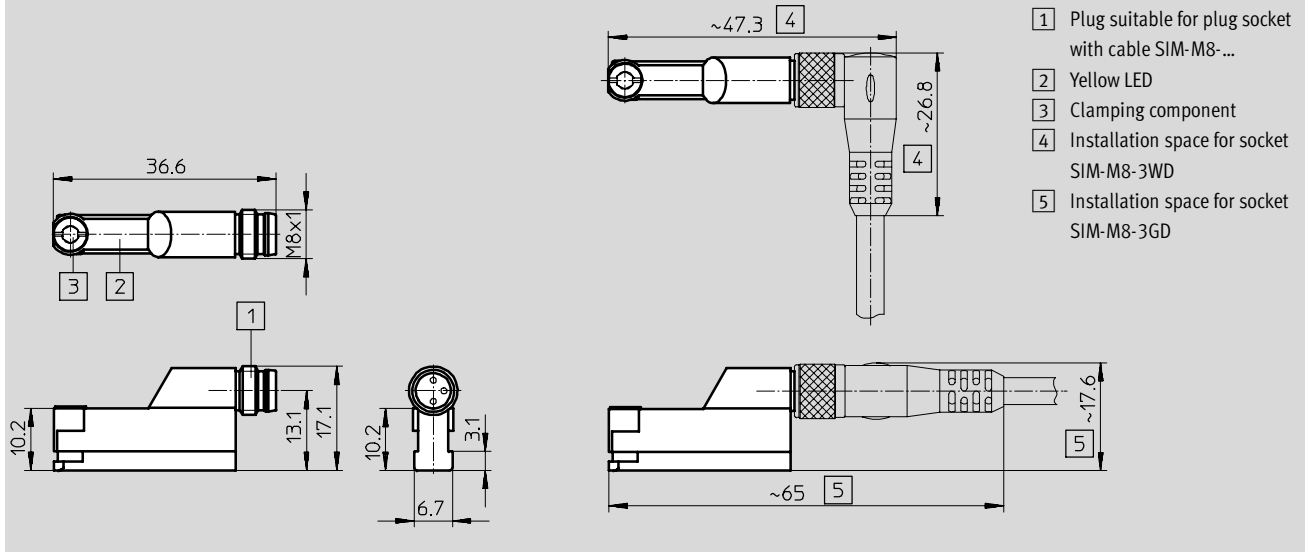
Technical Data, Ordering Data

SMT-8-SL Proximity Sensor, For Type 8 Slot


Dimensions

Download CAD data → www.festo.com/en/engineering

Plug Type M8x1



Ordering Data

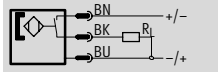
	Switch Output	Electrical Connection	Part No.	Type
	NO Contact			
	PNP	Plug M8x1, 3-pin	531145	SMT-8-SL-PS-LED-24

Technical Data

SME-8-SL Proximity Sensor, For Type 8 Slot

Function

NO contact, 3-wire, with plug



- Magnetic Reed Measuring Principle
- Long Guides – Sturdy Construction
- Plug Directly On Sensor



General Technical Data	
Switching Element Function	NO Contact
Electrical Data	
Switch output	Contacting, bipolar
Electrical connection	Plug M8x1, 3-pin
Operating voltage range	[V DC] 10 ... 30
Max. output current	[mA] 500
Max. switching capacity	[W] 10
Voltage drop	[V] –
Protection against short circuit	No
Protection against polarity reversal	No
Protection class per EN 60529	IP65/IP67
CE symbol	89/336/EEC (EMC)
Construction	
Design	For T-slot
Type of mounting	Clamped in T-slot, insert from end
Reproducibility of switching point ¹⁾	[mm] ±0.1
Response time	[ms] ≤0.6
Switch-off time	[ms] ≤0.05
Switching status display	Yellow LED
Mounting position	Any
Materials	Body: Polyamide Plug: Brass, nickel-plated
Note on materials	Copper, PTFE and silicone-free
Product weight	[g] 5

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions	
Ambient temperature	[°C] –20 ... +60
Corrosion resistance class CRC ²⁾	2

2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

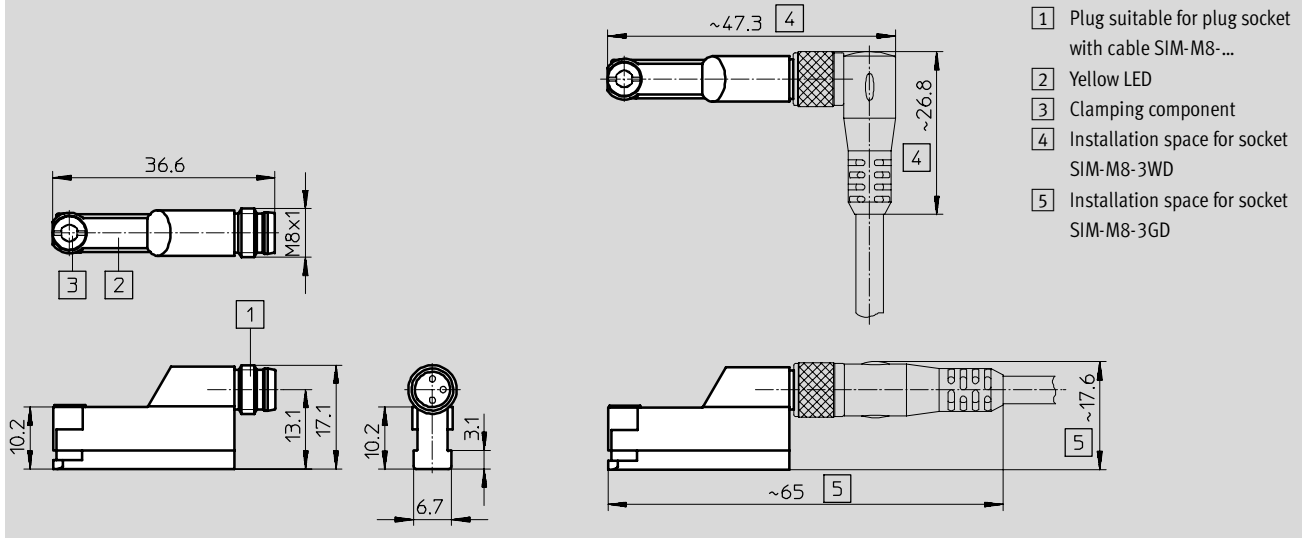
Technical Data, Ordering Data

SME-8-SL Proximity Sensor, For Type 8 Slot

Dimensions

Download CAD data → www.festo.com/en/engineering

Plug Type M8x1



Ordering Data

SME-8-SL Proximity Sensor, For Type 8 Slot

Ordering Data			
	Electrical Connection	Part No.	Type
	NO Contact		
	Plug M8x1, 3-pin	526622	SME-8-SL-LED-24

Type Code – SMT-8/CRSMT-8/SME-8 Proximity Sensors

For Type 8 Slot

SMT – 8 – PS – K – LED – 24 – – B –

Type	
SMT	Proximity sensor, magneto-resistive
CRSMT	Proximity sensor, magneto-resistive, corrosion resistant
SME	Proximity sensor, magnetic reed

Design	
8	For T-slot, insert from end

Switching Element Function, Switch Output	
PS	NO contact, 3-wire, PNP
NS	NO contact, 3-wire, NPN
O	NC contact, 3-wire
ZS	NO contact, 2-wire

Electrical Connection, Cable Length	
K	Cable, 2.5 m or 7.5 m
K2.5	Cable, 2.5 m
K5	Cable, 5.0 m
KL	Cable, 2.5 m
S	Plug M8x1 with cable, 0.3 m

Switching Status Display	
LED	Yellow LED

Rated Operating Voltage	
24	24 V DC
230	230 V AC

Variant	
S6	Heat resistant

Generation	
	Series A
B	Series B

Packaging Unit	
X	Quantity of 50

5
5.1

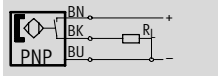
Technical Data

SMT-8 Proximity Sensors, For Type 8 Slot

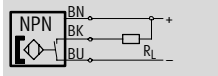
Function

■ Magneto-resistive Measuring Principle

e.g. NO contact, PNP, with cable



e.g. NO contact, NPN, with cable



General Technical Data					
Switching Element Function	NO Contact				
Switch Output	PNP			NPN	
Cable Length [m]	2.5	5.0	0.3	2.5	0.3
Electrical Data					
Electrical connection	Cable, 3-wire	Cable, 3-wire	Cable with plug M8x1, 3-pin	Cable, 3-wire	Cable with plug M8x1, 3-pin
Operating voltage range [V DC]	10 ... 30				
Max. output current [mA]	100				
Max. switching capacity [W]	3				
Voltage drop [V]	1.8				
Residual current [mA]	≤0.01				
Protection against short circuit	Yes				
Protection against polarity reversal	For all electrical connections				
Protection class to EN 60529	IP65/IP67				
CE symbol	89/336/EEC (EMC)				
Design					
Design	For T-slot				
Type of mounting	Clamped in T-slot, insert from end, flush with the cylinder profile				
Reproducibility of switching point ¹⁾ [mm]	±0.2				
Switch-on time [ms]	≤0.2				
Switch-off time [ms]	≤0.5				
Switching status display	Yellow LED				
Mounting position	Any				
Materials	Housing	Polyurethane			
	Cable sheath	Polyurethane			
Note on material	Free of copper, PTFE and silicone				
Product weight [g]	30	60	10	30	10

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions				
Electrical Connection	Cable, 3-wire		Cable With Plug	
Cable Installation	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ²⁾	4		2	

2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

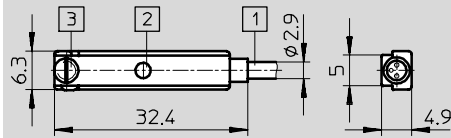
Technical Data, Ordering Data

SMT-8 Proximity Sensors, For Type 8 Slot

Dimensions

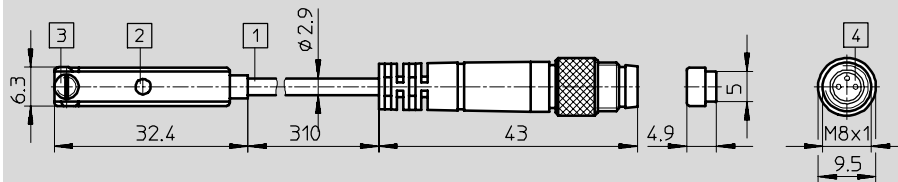
Download CAD data → www.festo.com/en/engineering

Cable Type



- 1 Connecting cable
- 2 Yellow LED
- 3 Clamping component

Plug Type M8x1



- 1 Connecting cable
- 2 Yellow LED
- 3 Clamping component
- 4 Plug suitable for plug socket with cable SIM-M8...

Ordering Data

	Switch Output	Electrical Connection		Cable Length [m]	Part No.	Type	PU ¹⁾
		Cable	Plug M8x1				
	NO Contact						
	PNP	3-wire	-	2.5	175436	SMT-8-PS-K-LED-24-B	1
				5.0	175434	SMT-8-PS-K5-LED-24-B	1
	NPN	3-wire	-	0.3	175484	SMT-8-PS-S-LED-24-B	1
					535196	SMT-8-PS-S-LED-24-B-X	50
	NPN	-	3-pin	0.3	171180	SMT-8-NS-K-LED-24-B	1
171181					SMT-8-NS-S-LED-24-B	1	

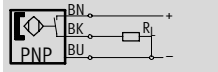
1) Packaging unit quantity

Technical Data

CRSMT-8 Proximity Sensors, For Type 8 Slot

Function

NO contact, PNP, with cable



- Corrosion Resistant
- Magneto-resistive Measuring Principle



General Technical Data		
Switching Element Function	NO Contact	
Electrical Data		
Electrical connection	Cable, 3-wire	Cable, 3-wire
Cable length [m]	2.5	5.0
Switch output	PNP	
Operating voltage range [V DC]	10 ... 30	
Max. output current [mA]	100	
Max. switching capacity [W]	3	
Voltage drop [V]	1.8	
Residual current [mA]	≤0.01	
Protection against short circuit	Yes	
Protection against polarity reversal	For all electrical connections	
Protection class to EN 60529	IP65/IP67	
CE symbol	89/336/EEC (EMC)	
Design		
Design	For T-slot	
Type of mounting	Clamped in T-slot, insert from end, flush with the cylinder profile	
Reproducibility of switching point ¹⁾ [mm]	±0.2	
Switch-on time [ms]	≤0.2	
Switch-off time [ms]	≤0.5	
Switching status display	Yellow LED	
Mounting position	Any	
Materials	Housing	Polypropylene
	Cable sheath	Thermoplastic rubber
Note on material	Free of copper, PTFE and silicone	
Product weight [g]	30	60

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions		
Electrical Connection	Cable, 3-wire	
Cable Installation	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ²⁾	4	

2) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

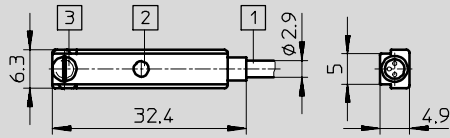
Technical Data, Ordering Data

CRSMT-8 Proximity Sensors, For Type 8 Slot

Dimensions

Download CAD data → www.festo.com/en/engineering

Cable Type



- 1 Connecting cable
- 2 Yellow LED
- 3 Clamping component

Ordering Data

	Switch Output	Electrical Connection	Cable Length [m]	Part No.	Type
	NO Contact				
	PNP	Cable, 3-wire	2.5	525563	CRSMT-8-PS-K2.5-LED-24
			5.0	525564	CRSMT-8-PS-K5-LED-24

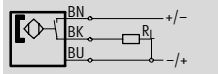
Technical Data

SME-8 Proximity Sensors, For Type 8 Slot

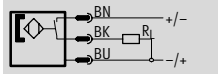
Function

■ Magnetic Reed Measuring Principle

e.g. NO contact, with 3-wire cable



e.g. NO contact, 3-wire, with plug



General Technical Data										
Switching Element Function		NO contact						NC contact		
Cable Length		[m]	2.5	5.0	0.3	2.5	2.5	2.5	7.5	
Electrical Data										
Switch output		Contacting, bipolar								
Electrical connection		Cable	Cable	Cable with plug M8x1	Cable	Cable	Cable	Cable		
		3-wire	3-wire	3-pin	2-wire	Cable	2-wire ¹⁾	3-wire		
Operating voltage range	D.C. voltage	[V DC]	12 ... 30			12 ... 27		3 ... 250	0 ... 30	12 ... 30
	A.C. voltage	[V AC]	-			-		3 ... 250	0 ... 30	12 ... 30
Max. output current	D.C. voltage	[mA]	500			80		120	500	50
	A.C. voltage	[mA]	-			-		200	-	50
Max. switching capacity	D.C. voltage	[W]	10			2		10	10	1.5
	A.C. voltage	[VA]	-			-		10	-	-
Voltage drop		[V]	-			-		-	-	1.8
Protection against short circuit		No								
Protection against polarity reversal		No				Yes ²⁾		Yes	No	
Protection class to EN 60529		IP65/IP67			IP67					
CE symbol	89/336/EEC (EMC)		Yes			Yes	Yes	Omitted	Yes	
	73/23/EEC (low voltage)		Omitted			Omitted	Yes	Omitted	Omitted	
Design										
Design		For T-slot								
Type of mounting		Clamped in T-slot, insert from end, flush with the cylinder profile								
Reproducibility of switching point ³⁾		[mm]	±0.1							
Switch-on time		[ms]	≤0.5					≤0.5	≤2	
Switch-off time		[ms]	0.03					≤0.5	≤0.2	
Switching status display		Yellow LED						-		
Mounting position		Any								
Materials	Housing		Polyester							
	Cable sheath		Polyurethane				Polyvinyl chloride	Polyurethane		
Note on material		Free of copper, PTFE and silicone					-			
Product weight		[g]	30	60	8	24	40	50	85	

- 1) Heat-resistant design
- 2) Without LED function
- 3) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions						
Electrical Connection	Cable		Cable, heat resistant		Cable with plug	
Cable Installation	Fixed	Flexible	Fixed	Flexible	Fixed	Flexible
Ambient temperature [°C]	-20 ... +60	-5 ... +60	-40 ... +120	-5 ... +120	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4		4		2	

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions Download CAD data → www.festo.com/en/engineering

NO Contact With Cable

1 Connecting cable
2 Yellow LED
3 Clamping component

NC Contact With Cable

1 Connecting cable
2 Yellow LED
3 Clamping component

Operating Voltage Range 3 ... 250 V DC/AC

1 Connecting cable
2 Yellow LED
3 Clamping component

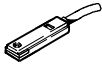
Plug Type M8x1

1 Connecting cable
2 Plug suitable for plug socket with cable SIM-M8-...
3 Clamping component
4 Yellow LED

5
5.1

Ordering Data

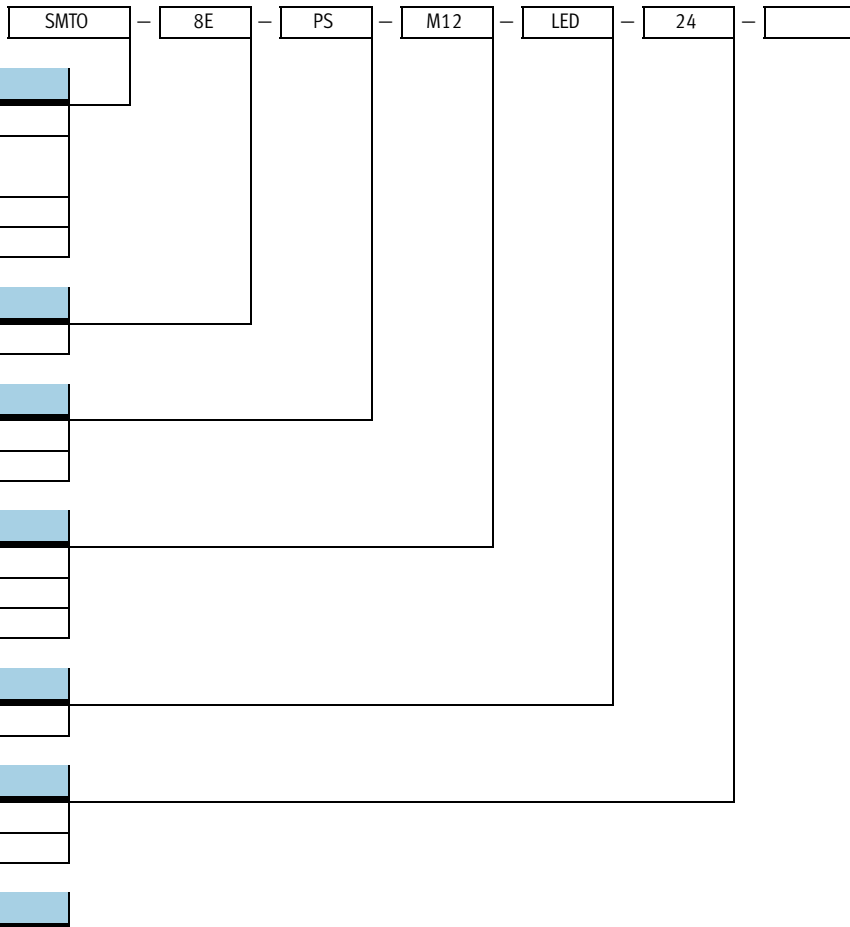
SME-8 Proximity Sensors, For Type 8 Slot

Ordering Data						
	Electrical Connection		Cable Length [m]	Part No.	Type	PU ¹⁾
	Cable	Plug M8x1				
	NO Contact					
	Operating Voltage Range 0 ... 30 V AC/DC					
	3-wire	–	2.5	150855	SME-8-K-LED-24	1
				535194	SME-8-K-LED-24-X	50
			5.0	175404	SME-8-K5-LED-24	1
	–	3-pin	0.3	150857	SME-8-S-LED-24	1
				535195	SME-8-S-LED-24-X	50
	2-wire	–	2.5	171169	SME-8-ZS-KL-LED-24	1
	Heat Resistant Up To 120 °C					
	2-wire	–	2.5	161756	SME-8-K-24-S6	1
	Operating Voltage Range 3 ... 250 V AC/DC					
	2-wire	–	2.5	152820	SME-8-K-LED-230	1
	NC Contact					
	3-wire	–	7.5	160251	SME-8-O-K-LED-24	1

1) Packaging unit quantity

Type Code – SMT0-8E/SMTSO-8E/SME0-8E/SMPO-8E Proximity Sensors

For Type 8 Slot



Type	
SMT0	Proximity sensor, magneto-resistive
SMTSO	Proximity sensor, magnetic reed, welding field immune
SME0	Proximity sensor, magnetic reed
SMPO	Proximity sensor, pneumatic

Design	
8E	For T-slot, with accessories

Switching Element Function, Switch Output	
PS	NO contact, 3-wire, PNP
NS	NO contact, 3-wire, NPN

Electrical Connection, Cable Length	
K	Cable, 2.5 m or 7.5 m
S	Plug M8x1
M12	Plug M12x1

Switching Status Display	
LED	Yellow LED

Rated Operating Voltage	
24	24 V DC
230	230 V AC

Variant	
	Standard
S6	Heat resistant

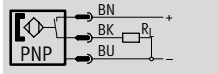
Technical Data

SMT0-8E Proximity Sensors, For Type 8 Slot

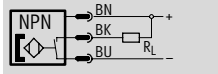
Function

■ Magneto-resistive Measuring Principle

NO contact, PNP, with plug



NO contact, NPN, with plug



General Technical Data				
Switching Element Function	NO Contact			
Electrical Data				
Switch output	PNP		NPN	
Electrical connection	Plug M8x1, 3-pin	Plug M12x1, 3-pin	Plug M8x1, 3-pin	Plug M12x1, 3-pin
Operating voltage range	[V DC]	10 ... 30		
Max. output current	[mA]	100		
Max. switching capacity	[W]	3		
Voltage drop	[V]	1.8		
Residual current	[mA]	≤0.01		
Protection against short circuit	Yes			
Protection against polarity reversal	For all electrical connections			
Protection class to EN 60529	IP65/IP67			
CE symbol	89/336/EEC (EMC)			
Design				
Design	For T-slot			
Type of mounting	With accessories			
Reproducibility of switching point ¹⁾	[mm]	±0.1		
Switch-on time	[ms]	≤0.5		
Switch-off time	[ms]	≤25		
Switching status display	Yellow LED			
Mounting position	Any			
Materials	Housing	Polyurethane		
Note on material	Free of copper, PTFE and silicone		-	
Product weight	[g]	10	10	10

1) Only applicable to actuators secured against rotation.

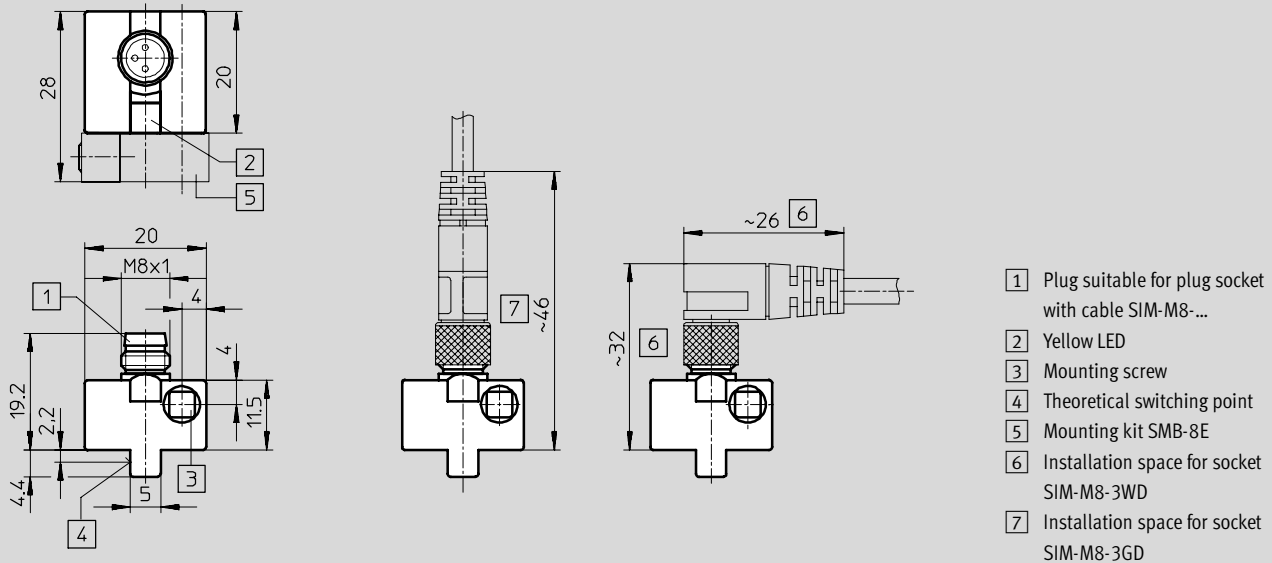
Operating and Environmental Conditions	
Electrical Connection	Plug
Ambient temperature	[°C] -20 ... +60
Corrosion resistance class CRC ¹⁾	4

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

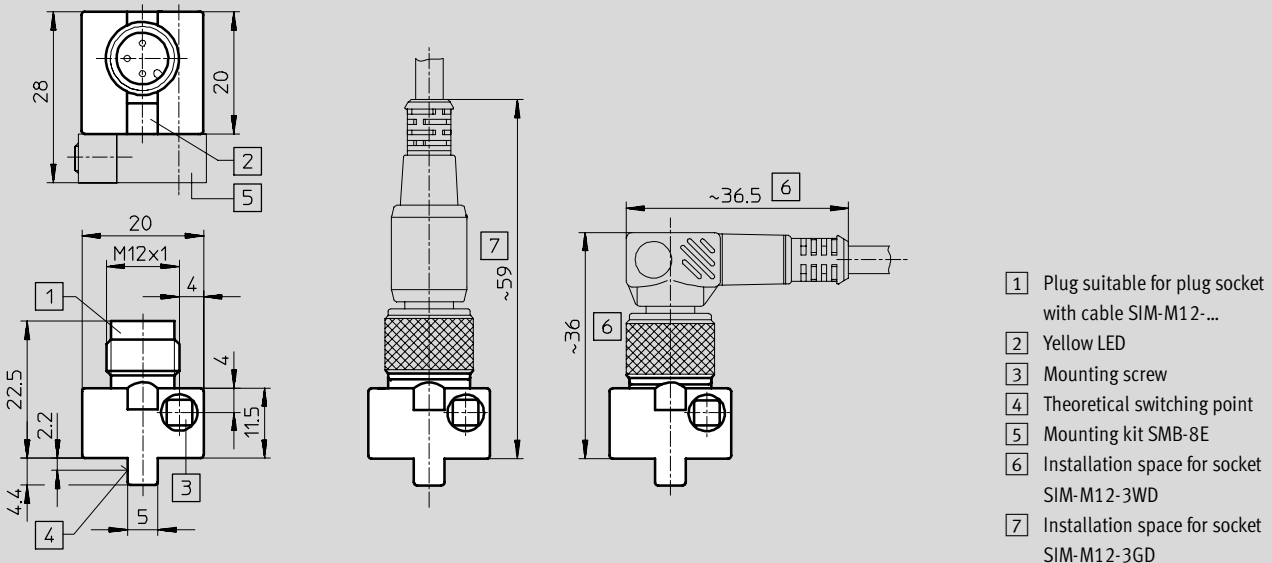
Dimensions

Download CAD data → www.festo.com/en/engineering

Plug Type M8x1



Plug Type M12x1



Ordering Data

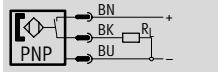
	Switch Output	Electrical Connection		Cable Length [m]	Part No.	Type
		Plug M8x1	Plug M12x1			
	NO Contact					
	PNP	3-pin	-	-	171178	SMT0-8E-PS-S-LED-24
		-	3-pin	-	171179	SMT0-8E-PS-M12-LED-24
	NPN	3-pin	-	-	171166	SMT0-8E-NS-S-LED-24
-		3-pin	-	171176	SMT0-8E-NS-M12-LED-24	

Technical Data

SMTSO-8E Proximity Sensors, For Type 8 Slot

Function

e.g. NO contact, PNP, with plug



- Welding Field Immune
- Magneto-resistive Measuring Principle



General Technical Data		
Switching Element Function	NO Contact	
Electrical Data		
Switch output	PNP	NPN
Electrical connection	Plug M12x1, 3-pin	
Operating voltage range	[V DC]	10 ... 30
Max. output current	[mA]	200
Max. switching capacity	[W]	6
Voltage drop	[V]	1.8
Residual current	[mA]	0.01
Protection against short circuit	Yes	
Protection against polarity reversal	For all electrical connections	
Resistance to interference from magnetic fields	Alternating magnetic field 45 ... 65 Hz	
Protection class to EN 60529	IP65/IP67	
CE symbol	89/336/EEC (EMC)	
Design		
Design	For T-slot	
Type of mounting	With accessories	
Reproducibility of switching point ¹⁾	[mm]	±0.1
Switch-on time	[ms]	≤38
Switch-off time	[ms]	≤20
Switching status display	Yellow LED	
Mounting position	Any	
Materials	Housing	Polyamide
Product weight	[g]	10

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions		
Electrical Connection	Plug	
Ambient temperature	[°C]	-25 ... +70
Corrosion resistance class CRC ¹⁾	2	

1) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

5
5.1

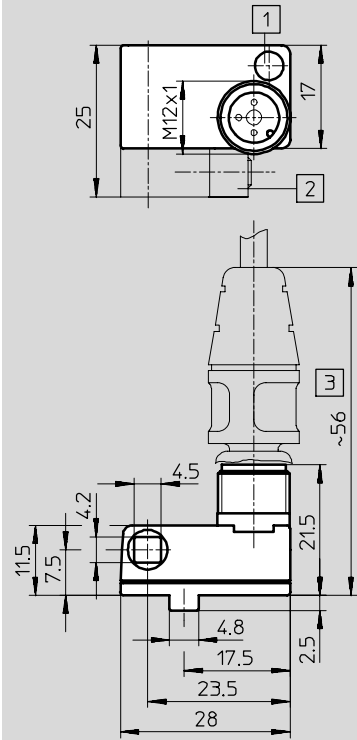
Technical Data, Ordering Data

SMTSO-8E Proximity Sensors, For Type 8 Slot

Dimensions


Download CAD data → www.festo.com/en/engineering

Plug Type M12x1



- 1 Yellow LED
- 2 Mounting kit SMB-8E
- 3 Installation space for socket SIM-M12-3GD

Ordering Data

	Switch Output	Electrical Connection	Cable Length [m]	Part No.	Type
		Plug M12x1			
	NO Contact				
	Welding Field Immune				
	PNP	3-pin	-	191986	SMTSO-8E-PS-M12-LED-24
	NPN			175825	SMTSO-8E-NS-M12-LED-24

5

5.1

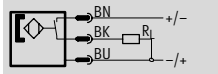
Technical Data

SMEO-8E Proximity Sensors, For Type 8 Slot

Function

■ Magnetic Reed Measuring Principle

e.g. NO contact, 3-wire, with plug



e.g. NO contact, with 2-wire cable



General Technical Data						
Switching Element Function			NO Contact			
Electrical Data						
Switch output			Contacting, bipolar			
Electrical connection			Plug M8x1, 3-pin	Plug M12x1, 3-pin	Plug M12x1, 2-pin	Cable, 2-wire ¹⁾
Operating voltage range	D.C. voltage	[V DC]	12 ... 30	12 ... 30	3 ... 250	0 ... 30
	A.C. voltage	[V AC]	–	–	3 ... 230	–
Max. output current	D.C. voltage	[mA]	500		120	500
	A.C. voltage	[mA]	–		120	–
Max. switching capacity	D.C. voltage	[W]	10			
	A.C. voltage	[VA]	–		10	–
Voltage drop		[V]	–		3.9	–
Protection against short circuit			No			
Protection against polarity reversal			No		Yes ²⁾	Yes
Protection class to EN 60529			IP65/IP67			
CE symbol	89/336/EEC (EMC)		Yes		Yes	Omitted
	73/23/EEC (low voltage)		Omitted		Yes	Omitted
Design						
Design			For T-slot			
Type of mounting			With accessories			
Reproducibility of switching point ³⁾		[mm]	±0.1			
Switch-on time		[ms]	≤0.5		≤2	≤0.5
Switch-off time		[ms]	0.03			
Switching status display			Yellow LED			–
Cable length		[m]	–	–	–	2.5
Mounting position			Any			
Materials	Housing		Polyurethane			
	Cable sheath		–			Polyurethane
Product weight		[g]	10	10	10	40

- 1) Heat-resistant design
- 2) Without LED function
- 3) Only applicable to actuators secured against rotation.

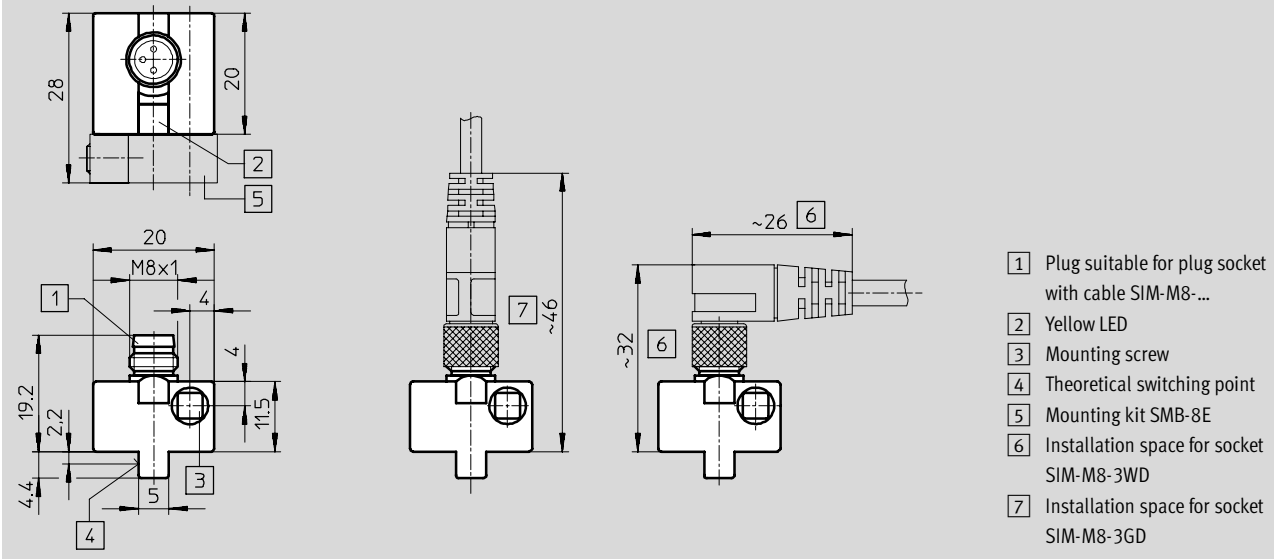
Operating and Environmental Conditions					
Electrical Connection		Cable, Heat Resistant		Plug	
Cable Installation		Fixed	Flexible	–	
Ambient temperature		[°C]	–20 ... +120	–5 ... +120	–20 ... +60
Corrosion resistance class CRC ⁴⁾		4		4	

- 4) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

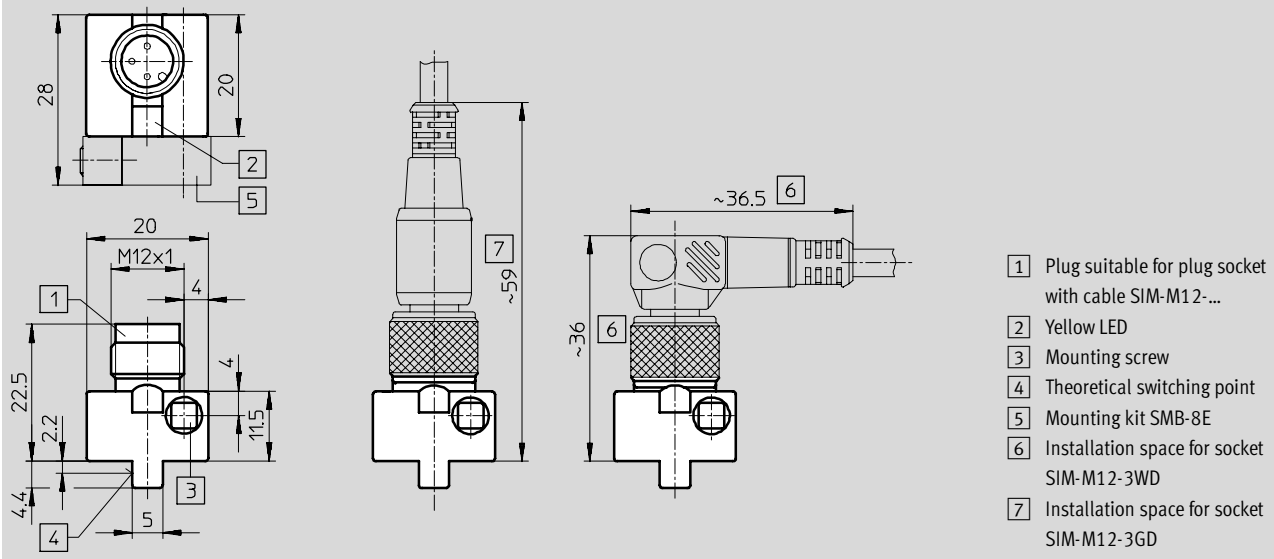
Dimensions

Download CAD data → www.festo.com/en/engineering

Plug Type M8x1



Plug Type M12x1



5
5.1

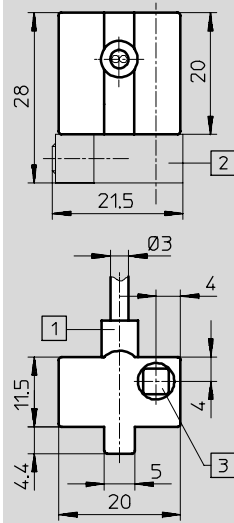
Technical Data, Ordering Data

SMEO-8E Proximity Sensors, For Type 8 Slot

Dimensions

Download CAD data → www.festo.com/en/engineering

Heat Resistant Up To 120 °C



- 1 Connecting cable
- 2 Mounting kit SMB-8E
- 3 Mounting screw

Ordering Data

	Electrical Connection		Cable Length [m]	Part No.	Type	
	Cable	Plug M8x1				Plug M12x1
	NO Contact					
	Operating Voltage Range 0 ... 30 V AC/DC					
	-	3-pin	-	-	171163	SMEO-8E-S-LED-24
	-	-	3-pin	-	171164	SMEO-8E-M12-LED-24
	Heat Resistant Up To 120 °C					
	2-wire	-	-	2.5	171158	SMEO-8E-K-S6
Operating Voltage Range 3 ... 250 V AC/DC						
-	-	2-pin	-	171160	SMEO-8E-M12-LED-230	

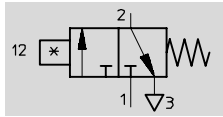
Technical Data

SMPO-8E Pneumatic Proximity Sensor – 3/2-way Valve, For Type 8 Slot

Function

3/2-way valve,
normally closed

- Pneumatic Proximity Sensor
- Magnetic Measuring Principle



General Technical Data		
Switching Element Function	3/2-way Valve, Normally Closed	
Design		
Design	For T-slot	
Type of mounting	With accessories	
Operating medium	Compressed air, filtered, unlubricated, grade of filtration 40 µm	
Operating pressure	[bar]	2 ... 8
Reproducibility of switching point ¹⁾	[mm]	±0.1
Switch-on time	[ms]	22
Switch-off time	[ms]	52
Switching status display	Visual	
Pneumatic connection	M5 female thread	
Mounting position	Any	
Materials	Housing	Polyamide, aluminum
Product weight	[g]	12
Electrical Data		
Protection class to EN 60529	IP65	
CE symbol	89/336/EEC (EMC)	Omitted

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions		
Ambient temperature	[°C]	-15 ... +60
Corrosion resistance class CRC ²⁾	2	

2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

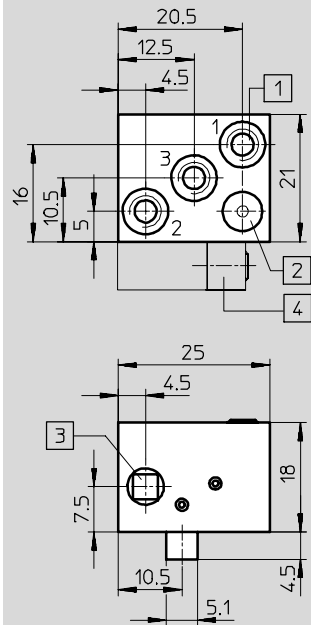
5
5.1

Technical Data, Ordering Data

SMPO-8E Pneumatic Proximity Sensor – 3/2-way Valve, For Type 8 Slot


Dimensions

Download CAD data → www.festo.com/en/engineering



- 1 M5 connecting thread
- 2 Pneumatic indicator
- 3 Mounting screw
- 4 Mounting kit SMB-8E

Ordering Data

	Pneumatic Connection	Part No.	Type
	3/2-way Valve, Normally Closed	178563	SMPO-8E
	M5 female thread		

Proximity Sensors For Type 10 Slot



For actuators with type 10 sensor slot (rounded slot)

Magneto resistive and magnetic reed versions

Operating voltage range: 5 to 30 V AC/DC

Switching element function: normally open

Switch output: PNP, NPN and contacting

Electrical connection: plug or cable

5

5.2

Type Code – SMT-10/SME-10 Proximity Sensors

For Type 10 Slot

SMT – 10 – PS – KL – LED – 24

Type

SMT	Proximity sensor, magneto-resistive
SME	Proximity sensor, magnetic reed

Design

10	For rounded slot, insertable
----	------------------------------

Switching Element Function, Switch Output

PS	NO contact, 3-wire, PNP
NS	NO contact, 3-wire, NPN

Electrical Connection, Cable Length, Connection Direction

KL	Cable, 2.5 m, in-line with switch axis
KQ	Cable, 2.5 m, at right angle to switch axis
SL	Plug M8x1 with cable, 0.3 m, in-line with switch axis
SQ	Plug M8x1 with cable, 0.3 m, at right angle to switch axis

Switching Status Display

LED	Yellow LED
-----	------------

Rated Operating Voltage

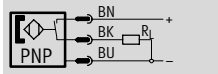
24	24 V DC
----	---------

Technical Data

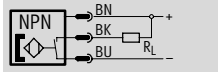
SMT-10 Proximity Sensors, For Type 10 Slot

Function

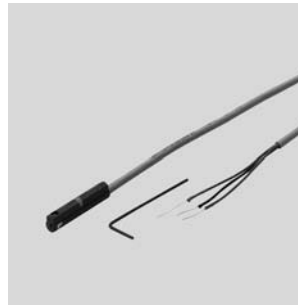
e.g. NO contact, PNP, with plug



e.g. NO contact, NPN, with plug



- Magnetic Reed Measuring Principle
- Insert From End



General Technical Data					
Switching Element Function	NO Contact				
Electrical Data					
Switch output	PNP		NPN		
Electrical connection	Cable, 3-wire	Cable with plug M8x1, 3-pin	Cable, 3-wire	Cable with plug M8x1, 3-pin	
Operating voltage range	[V DC]	10 ... 30			
Max. output current	[mA]	200			
Max. switching capacity	[W]	6			
Voltage drop	[V]	1.8			
Residual current	[mA]	≤0.01			
Protection against short circuit	Yes				
Protection against polarity reversal	For all electrical connections				
Protection class to EN 60529	IP65/IP67				
CE symbol	89/336/EEC (EMC)				
Design					
Design	For rounded slot				
Type of mounting	Clamped in rounded slot, insertable from end				
Reproducibility of switching point ¹⁾	[mm]	±0.1			
Switch-on time	[ms]	≤0.2			
Switch-off time	[ms]	≤0.2			
Switching status display	Yellow LED				
Cable length	[m]	2.5	0.3	2.5	0.3
Connection direction	In-line or lateral				
Mounting position	Any				
Materials	Housing	Polyamide			
	Cable sheath	Polyurethane			
Note on material	Free of copper, PTFE and silicone				
Product weight	[g]	20	6	20	6

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions					
Electrical Connection	Cable		Plug		
Cable Installation	Fixed	Flexible	Fixed	Flexible	
Ambient temperature	[°C]	-20 ... +60	-5 ... +60	-20 ... +60	-5 ... +60
Corrosion resistance class CRC ¹⁾	4		4		

1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

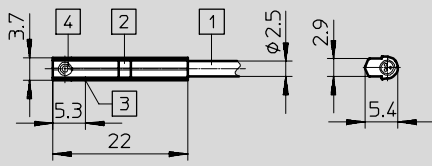
Technical Data, Ordering Data

SMT-10 Proximity Sensors, For Type 10 Slot

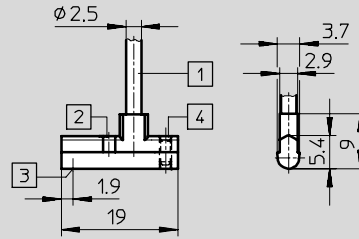
Download CAD data → www.festo.com/en/engineering

Dimensions

Cable Type, In-line Connection

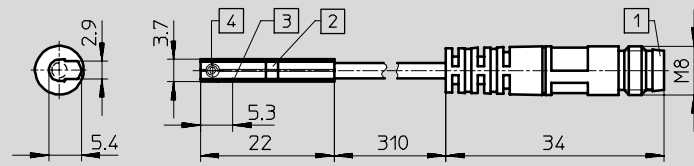


Cable Type, Lateral Connection



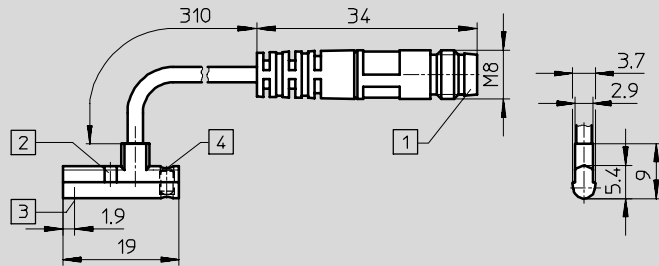
- 1 Connecting cable
- 2 Yellow LED
- 3 Theoretical switching point
- 4 Set screw M2x4

Plug Type M8x1, In-line Connection



- 1 Plug suitable for plug socket with cable SIM-M8-...
- 2 Yellow LED
- 3 Theoretical switching point
- 4 Set screw M2x4

Plug Type M8x1, Lateral Connection



- 1 Plug suitable for plug socket with cable SIM-M8-...
- 2 Yellow LED
- 3 Theoretical switching point
- 4 Set screw M2x4

Ordering Data

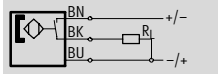
	Switch Output	Electrical Connection		Cable Length [m]	Cable Outlet Direction	Part No.	Type	
		Cable	Plug M8x1					
	NO Contact							
	NPN	3-wire	-	2.5	In-line	173222	SMT-10-NS-KL-LED-24	
			-	0.3	Lateral	173223	SMT-10-NS-KQ-LED-24	
		-	3-pin	-	2.5	In-line	173224	SMT-10-NS-SL-LED-24
				-	0.3	Lateral	173225	SMT-10-NS-SQ-LED-24
	PNP	3-wire	-	2.5	In-line	173218	SMT-10-PS-KL-LED-24	
			-	0.3	Lateral	173219	SMT-10-PS-KQ-LED-24	
		-	3-pin	-	2.5	In-line	173220	SMT-10-PS-SL-LED-24
-				0.3	Lateral	173221	SMT-10-PS-SQ-LED-24	

Technical Data

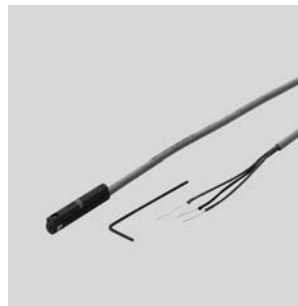
SME-10 Proximity Sensors, For Type 10 Slot

Function

e.g. NO contact, with 3-wire cable



- Magnetic Reed Measuring Principle
- Insert From End



General Technical Data			
Switching Element Function		NO Contact	
Electrical Data			
Switch output		Contacting, bipolar	
Electrical connection		Cable, 3-wire	Cable with plug M8x1, 3-pin
Operating voltage range		[V DC]	12 ... 27
Max. output current		[mA]	100
Max. switching capacity		[W]	1
Voltage drop		[V]	–
Residual current		[mA]	–
Protection against short circuit		No	
Protection against polarity reversal		No	
Protection class to EN 60529		IP65/IP67	
CE symbol		89/336/EEC (EMC)	
Design			
Design		For rounded slot	
Type of mounting		Clamped in rounded slot, insert from end	
Reproducibility of switching point ¹⁾		[mm]	±0.1
Switch-on time		[ms]	≤0.6
Switch-off time		[ms]	≤0.05
Switching status display		Yellow LED	
Cable length		[m]	2.5 0.3
Connection direction		In-line or lateral	
Mounting position		Any	
Materials		Housing	Polyphenylene sulphide
		Cable sheath	Polyurethane
Note on material		Free of copper, PTFE and silicone	
Product weight		[g]	20 5

1) Only applicable to actuators secured against rotation.

Operating and Environmental Conditions				
Electrical Connection		Cable		Plug
Cable Installation		Fixed	Flexible	Fixed Flexible
Ambient temperature		[°C]	–20 ... +70 –5 ... +70	–20 ... +70 –5 ... +70
Corrosion resistance class CRC ²⁾		4		2

2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a surrounding industrial atmosphere or media such as cooling or lubricating agents.

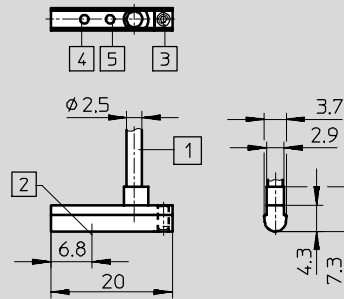
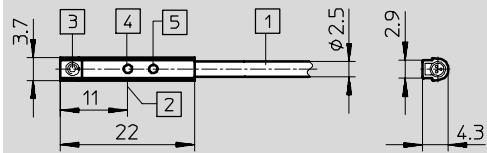
Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Dimensions

Download CAD data → www.festo.com/en/engineering

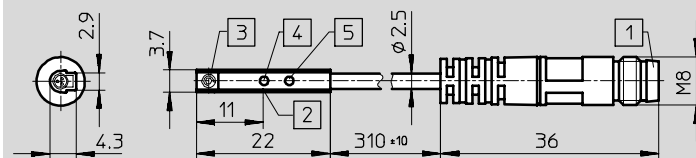
Cable Type, In-line Connection

Cable Type, Lateral Connection



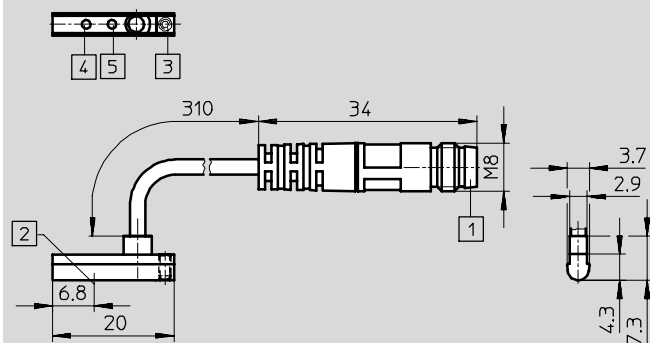
- 1 Connecting cable
- 2 Theoretical switching point
- 3 Set screw M2x4
- 4 Yellow LED (positive switching)
- 5 Yellow LED (negative switching)

Plug Type M8x1, In-line Connection



- 1 Plug suitable for plug socket with cable SIM-M8-...
- 2 Theoretical switching point
- 3 Set screw M2x4
- 4 Yellow LED (positive switching)
- 5 Yellow LED (negative switching)

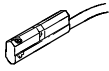
Plug Type M8x1, Lateral Connection



- 1 Plug suitable for plug socket with cable SIM-M8-...
- 2 Theoretical switching point
- 3 Set screw M2x4
- 4 Yellow LED (positive switching)
- 5 Yellow LED (negative switching)

Ordering Data

SME-10 Proximity Sensors, For Type 10 Slot

Ordering Data						
	Electrical Connection		Cable Length [m]	Cable Outlet Direction	Part No.	Type
	Cable	Plug M8x1				
	NO Contact					
	3-wire	-	2.5	In-line	173210	SME-10-KL-LED-24
				Lateral	173211	SME-10-KQ-LED-24
	-	3-pin	0.3	In-line	173212	SME-10-SL-LED-24
			Lateral	173213	SME-10-SQ-LED-24	

SMAT-8E Position Transmitter, For Type 8 Slot



For actuators with type 8
sensor slot (T-slot)

Position measuring range:
50 mm

Integrated out-of-range
detection

Operating voltage range:
15 to 30 V DC

Switching element function:
magnetic contactless analog

Analog output: 0 to 10 V
and 0 to 20mA

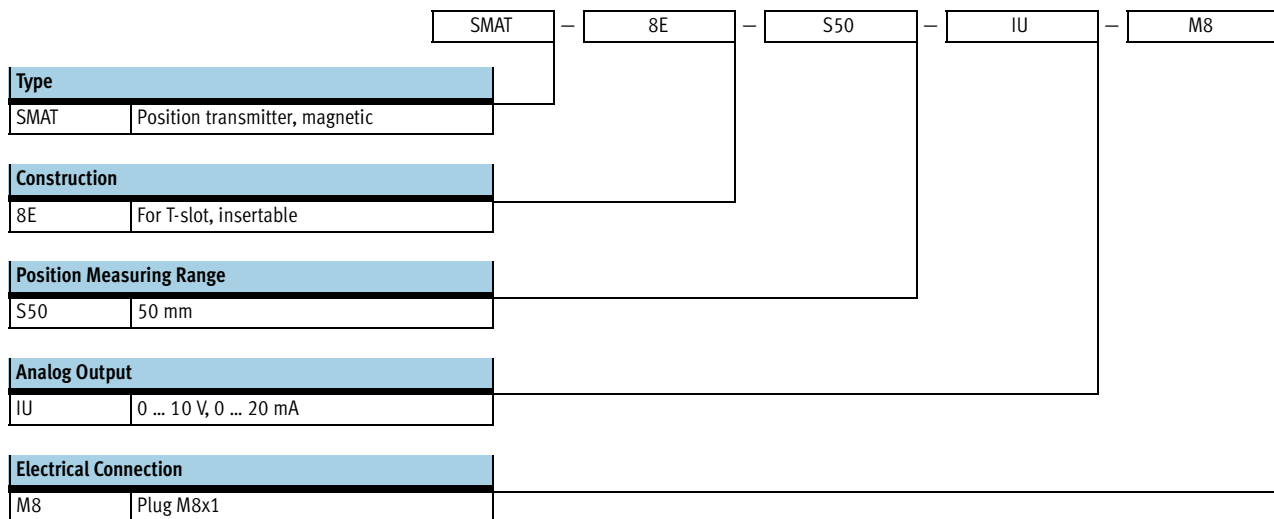
Electrical connection: plug

5

5.3

Type Code – SMAT-8E Position Transmitter

For Type 8 Slot



Drive	Piston Ø	Suitability
ISO Standard Cylinders		
Standard cylinders DSNU, ESNU		o
Standard cylinders DSN, ESN		o
Standard cylinders DNCB		++
Standard cylinders DNC		++
Standard cylinders ADN		++
Cylinders with Piston Rod		
Compact Cylinders ADVU, AEVU		++
Short-stroke Cylinders ADVC, AEVC	Ø 32 ... 100	++
Flat Cylinders EZH-10/40-40-A-B		+
Flat Cylinders DZF	Ø 12, 25, 32, 40, 63	+
	Ø 18, 50	++
Flat Cylinders DZH	Ø 16 ... 25	+
Round Cylinders DSNU, ESNU		o
Round Cylinders DSW, ESW		o
Round Cylinders DSEU, ESEU		o
Multimount Cylinders DMM, EMM		+
Round Cylinders CRDG		o
Round Cylinders CRDSW		o
Standard Cylinders CRHD		o
Standard Cylinders CRDSNU		o
Rodless Cylinders		
Linear Actuators SLM	Ø 12, 40	++
	Ø 16 ... 32	o
Rotary Actuators		
DRQD	Ø 16 ... 32	++
Guided Actuators		
Twin cylinders SPZ	Ø 10, 25	o
	Ø 16	++
Guided cylinders DFP	Ø 25 ... 80	o
Guided drives DFM	Ø 12, 25, 50	++
	Ø 16, 20	+
Guided drives DFM-B	Ø 20	+
	Ø 40, 50	++
Linear units SLE	Ø 32 ... 50	++
Twin cylinders DPZ		++

- ++ Unlimited use
- + Possible mounting restrictions due to installation direction and clamping.
- o Upon request, please contact Festo.

5

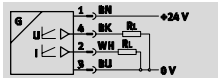
5.3

Technical Data

SMAT-8E Position Transmitter, For Type 8 Slot

Function

Position transmitter



- Position Measuring Range: 50 mm
- Analog Output: 0 ... 10 V and 0 ... 20 mA
- Integrated Out-of-range Detection
- Magnetic Measuring Principle
- Insert In T-slot



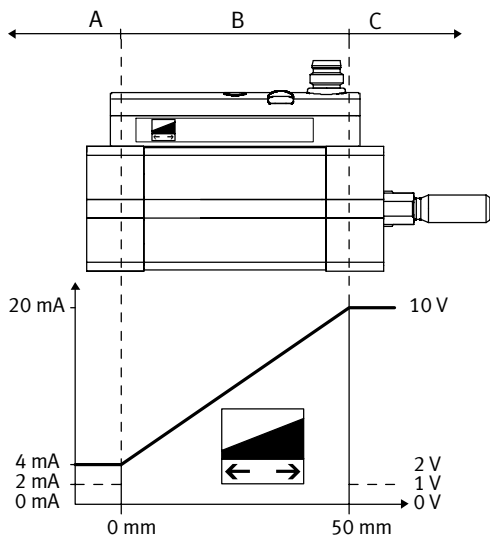
General Technical Data	
Switching Element Function	Magnetic contactless analog
Electrical Data	
Analog output	0 ... 10 V 0 ... 20 mA
Sensitivity	0.152 V/mm 0.305 mA/mm
Switching time, scanning interval [ms]	2.85
Displacement resolution [mm]	0.064
Electrical connection	Plug M8x1, 4-pin
Operating voltage range [V DC]	15 ... 30
Max. switching capacity [W]	–
Min. load resistance of voltage output [Ω]	2,000
Max. load resistance of current output [Ω]	500
Idle current [mA]	32
Protection against short circuit	Yes
Protection against overloading	Available
Protection against polarity reversal	For all electrical connections
Protection class to EN 60529	IP65/IP67
CE symbol	89/336/EEC (EMC)
Approval	c UL us - Listed (OL)
Construction	
Design	For T-slot
Type of mounting	Inserted in T-slot, clamped
Measuring principle	Magnetic
Measured variable	Position
Position measuring range [mm]	50, ± 2
Accuracy [mm]	± 0.5 max., ± 0.25 typ.
Repeatability, including hysteresis [mm]	± 0.064
Max. speed of travel [m/s]	3
Ready status display	Green LED
Status display	Red LED = outside measuring range
Assembly position	Any
Materials Housing	Polyamide, reinforced Polycarbonate
Note on materials	Free of copper, PTFE and silicone
Product weight [g]	15

Operating and Environmental Conditions

Ambient temperature	[°C]	-20 ... +50 ¹⁾
Corrosion resistance class CRC ²⁾		2

- 1) Extended ambient temperature range on request.
- 2) Corrosion resistance class 2 according to Festo standard 940070. Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

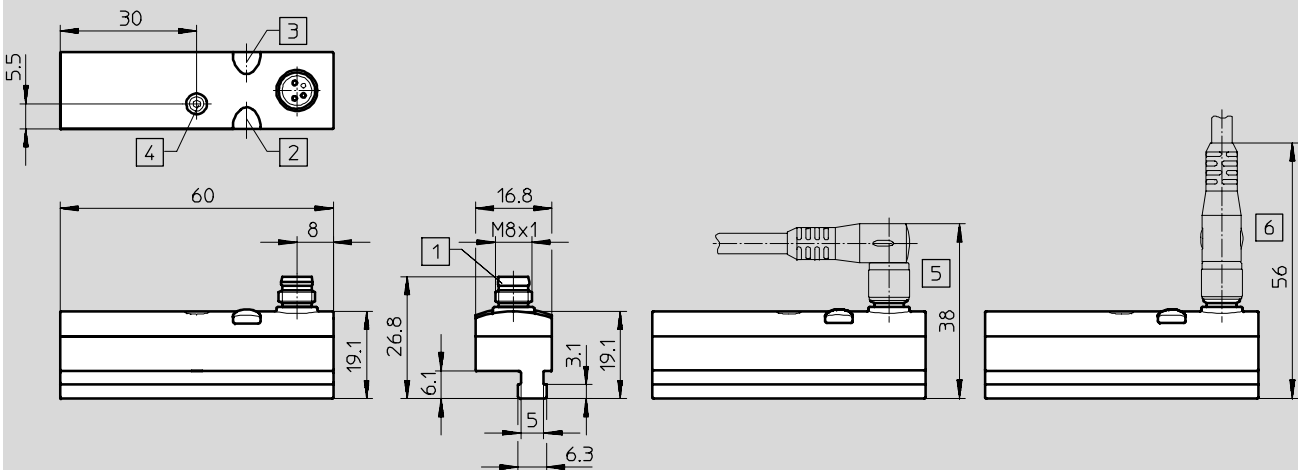
Analog Output as a Function of the Piston Position



Analog output		Description	Range
[V]	[mA]		
0	0	No valid signal, e.g. no operating voltage	-
1	2	Piston outside of detection range after operating voltage is switched on	A, C
2	4	Piston has left the detection range in the negative direction	A
10	20	Piston has left the detection range in the positive direction	C
2 ... 10	4 ... 20	Piston within the detection range at the relevant position	B

Dimensions

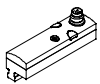
Download CAD data → www.festo.com/en/engineering



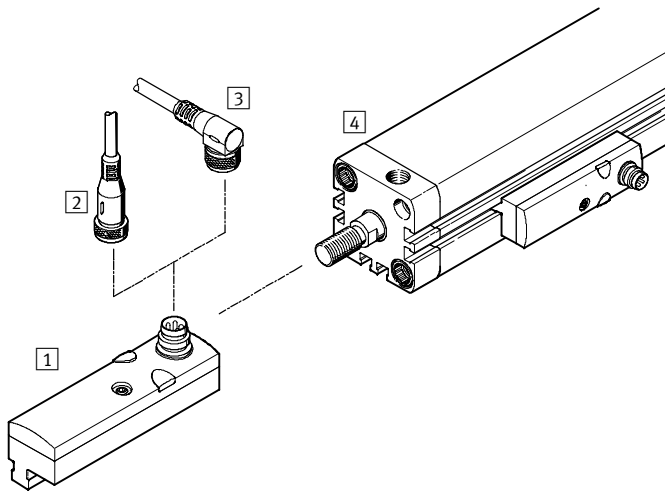
- | | | | |
|--------------------------------------------------------------|-----------------------------------------|---------------------------------------------------|---------------------------------------------------|
| 1 Plug suitable for plug socket with cable SIM-M8-... | 3 Red LED (out-of-range display) | 5 Installation space for socket SIM-M8-4WD | 6 Installation space for socket SIM-M8-4GD |
| 2 Green LED (ready status display) | 4 Threaded pin DIN 912-M3x12 | | |

Ordering Data, Overview

SMAT-8E Position Transmitter, For Type 8 Slot

Ordering Data				
	Analog Output	Electrical Connection	Part No.	Type
	0 ... 10 V 0 ... 20 mA	Plug M8x1, 4-pin	540191	SMAT-8E-S50-IU-M8

Overview



	Description	→ Page	
Proximity Sensors			
1	SMAT-8E	Magnetic, with M8x1 plug	281
Accessories			
2	Plug socket with cable SIM-M8-4GD-...	Straight socket, M8x1, 4-pin	323
3	Plug socket with cable SIM-M8-4WD-...	Angled socket, M8x1, 4-pin	
Actuators			
4	Actuators with type 8 slot (T-slot)	Actuators compatible with SMAT-8E → See table	280

Accessories



Proximity Sensors

Optical Sensors

Pressure and Vacuum Sensors

Flow Sensors

Actuator Feedback

Multipin Distributors

6

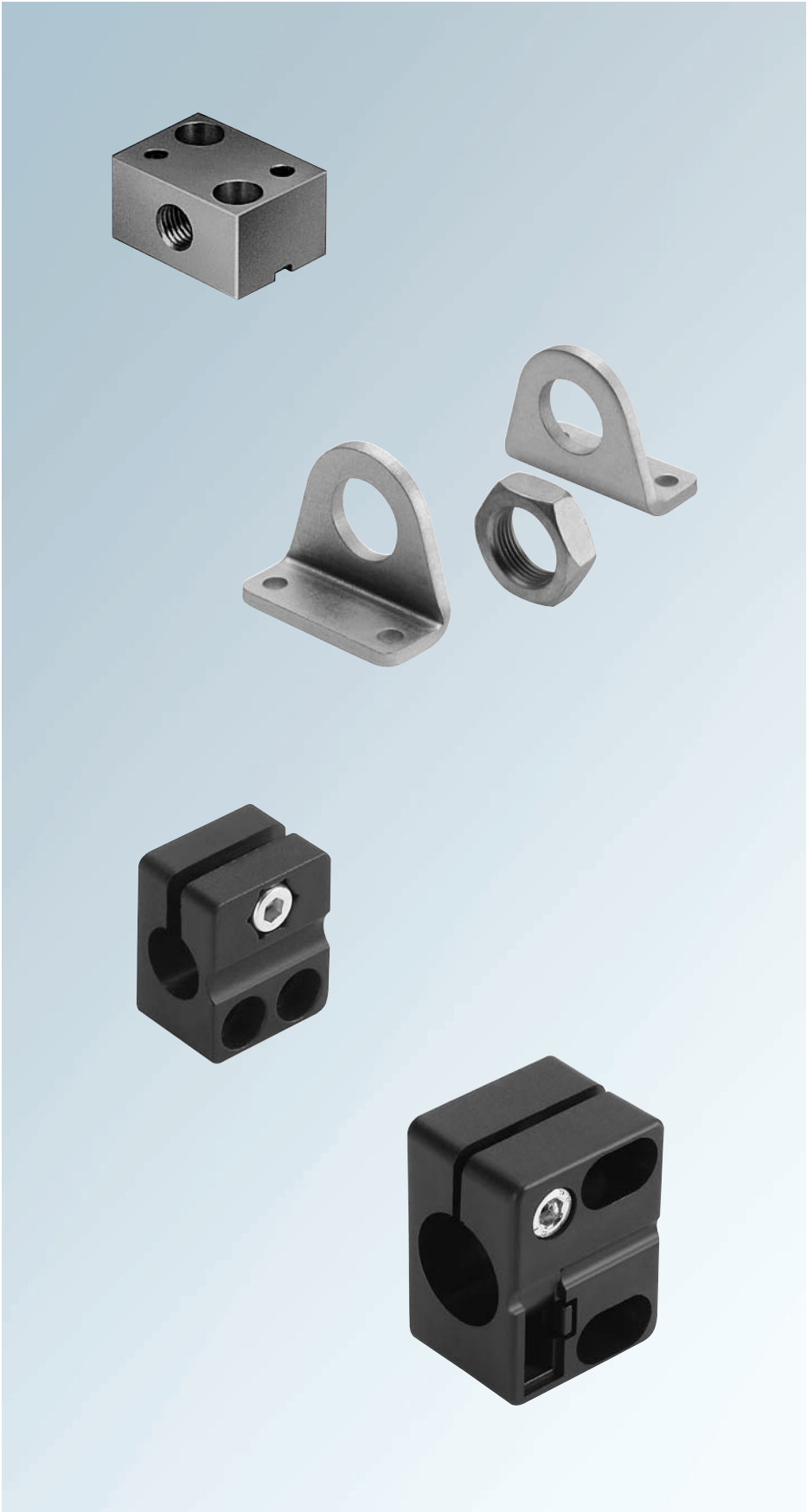
6.0

Accessories

For All Sensors and Input Devices

<p>For Proximity Sensors</p> <ul style="list-style-type: none"> ■ Sensor Retainers – SIEZ-NB ■ Flange and Foot Mountings – HBN / FBN / HBE ■ Sensor Bracket for SIES-V3B – HV-M5 ■ Stop Blocks – SDA ■ Plug Socket with Cable M8x1 – SIM-M8 ■ Plug Socket with Cable M12x1 – SIM-M12 ■ Sensor Sockets M12x1 – SIE-GD / SIE-WD-TR / SIE-LP-LED-GR 	<p style="text-align: right;">Section 6.1 → Page 287</p> 
<p>For Optical Sensors</p> <ul style="list-style-type: none"> ■ Polymer Fiber-optic Cable – SOEZ-LLK-... – For diffuse and through beam sensors – Cable length: 2 meters (cable cutter also available) ■ Glass Fiber-optic Cable – SOEZ-LLG-... – For diffuse and through beam sensors – Cable length: 0.5 meters (cable cutter also available) ■ Reflectors – SOEZ-RFL-50 / SOEZ-RFS-80 / SOEZ-RFF-100 – For infra-red, red light and laser light ■ Mounting Components – SOEZ-HW ■ Plug Socket with Cable M8x1 – SIM-M8 ■ Plug Socket with Cable M12x1 – SIM-M12 	<p style="text-align: right;">Section 6.2 → Page 291</p> 
<p>For Pressure and Vacuum Sensors</p> <ul style="list-style-type: none"> ■ Mounting Plate – APL-2N-PEV ■ Angled Plug Socket – PEV-1/4-WD ■ Mounting Frame – NRRQ-2N ■ Angled Plug Socket – PEV-1/4-A-WD ■ Sockets with Cable – SIM-M8-... ■ Assorted Sockets, Labels, Mounting Kits and DIN Rails 	<p style="text-align: right;">Section 6.3 → Page 297</p> 
<p>For Flow Sensors</p> <ul style="list-style-type: none"> ■ Mounting Components – SFEZ-..., SFEV-... ■ Adapter Plate for wall or surface mounting – SDE1-...-W-... ■ Connecting Plate, Mounting Components and Wall Mounting Plates – MS6-... ■ Assorted Sockets 	<p style="text-align: right;">Section 6.4 → Page 309</p> 
<p>For Actuator Feedback</p> <ul style="list-style-type: none"> ■ Connecting Cable – NEBU-M5G4-... ■ Plug Socket with Cable – SIM-M8-... ■ Plug Socket with Cable – SIM-M12-... ■ Mounting Kits for Type 8 Slot – SMBR / SMB / CRSMB / SMBZ ■ Mounting Kits for Type 10 Slot – SMBN / SMBR ■ Plug Sockets with Cable for Position Transmitter SMAT-8E – SIM-M8-... 	<p style="text-align: right;">Section 6.5 → Page 315</p> 
<p>MPV</p> <ul style="list-style-type: none"> ■ Multipin distributor modules, Types MPV-E/A08-M8 and MPV-E/A12-M8, for connecting inputs and outputs from PNP sensors and 2-pole valves/actuators. 	<p style="text-align: right;">Section 6.6 → Page 325</p> <ul style="list-style-type: none"> ■ Multipin distributor module, Type MPV-E/A08-M12 connects inputs and outputs from PNP sensors and 3-pole valves/actuators. 

Accessories For Proximity Sensors



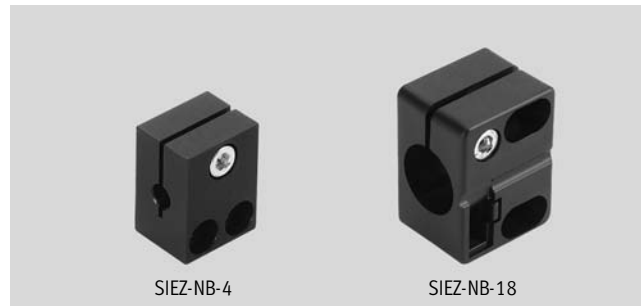
- Sensor retainers
- Flange and foot mountings
- Sensor bracket
- Stop blocks
- Plug sockets with cable
- Sensor sockets

Accessories For Inductive Proximity Sensors – For Type SIE... Sensors

Ordering Data

Sensor Retainer

Type SIEZ-NB-...



SIEZ-NB-4

SIEZ-NB-18

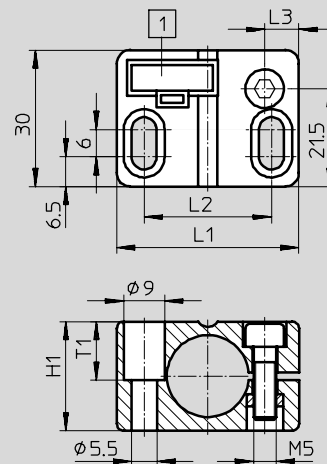
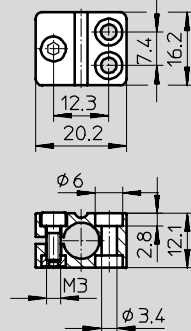
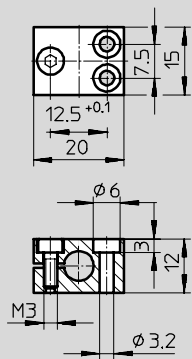
Dimensions

Download CAD data → www.festo.com/en/engineering

SIEZ-NB-4, SIEZ-NB-6.5

SIEZ-B-8, SIEZ-NB-8

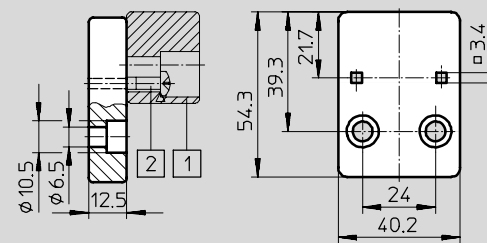
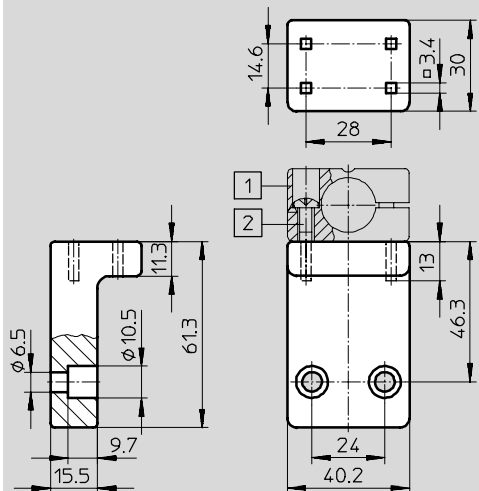
SIEZ-...B-12, SIEZ-...B-18, SIEZ-...B-30



1 Location for label, type SIEZ-LB

SIEZ-UH

SIEZ-UV



- 1 Sensor retainer SIEZ-...
- 2 Screw to DIN 7981
4.2 x 22 or 4.2 x 19 (not included)


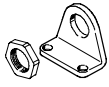


Dimensions

Size of Sensor	H1	L1	L2	L3	T1
M12x1	18.3	40	28	9.75	9.75
M18x1	24	40	28	7.5	12.85
M30x1.5	36	54	42	7.5	19.5

Accessories For Inductive Proximity Sensors – For Type SIE... Sensors



Ordering Data



Ordering Data								
Designation	Size of Sensor	Type of Installation		Weight [g]	Material	Free of Copper, PTFE and Silicone	Part No.	Type
		Flush	Non-flush					
Sensor retainer	∅ 4 mm	■	–	14	Anodized aluminum	■	538343	SIEZ-NB-4
	∅ 6.5 mm	■	–	9		■	538344	SIEZ-NB-6.5
	M8x1	■	–	3.5	Polyamide, reinforced	■	538346	SIEZ-B-8
		–	■			■	538345	SIEZ-NB-8
	M12x1	■	–	20		■	538348	SIEZ-B-12
		–	■			■	538347	SIEZ-NB-12
	M18x1	■	–	21		■	538350	SIEZ-B-18
		–	■			■	538349	SIEZ-NB-18
	M30x1.5	■	–	36		■	538352	SIEZ-B-30
		–	■			■	538351	SIEZ-NB-30
M12x1, M18x1	■	■	25	■		538354	SIEZ-UH	
	■	■	16	■		538355	SIEZ-UV	
Label	M12x1 ... M30x1.5	■	■	15	■	538353	SIEZ-LB	




Ordering Data – Mounting Attachments							
		Part No.	Type			Part No.	Type
Foot Mounting For Sensors, Size M12x1				Foot Mounting For Sensors, Size M18x1			
		5123	HBN-8/10x1			188990	HBE-25
Flange Mounting For Sensors, Size M30x1.5				Mounting Bracket For Sensors, Type SIES-V3B			
		195855	FBN-32			9634	HV-M5
Stop							
	for sensors, size M8x1	11542	SDA-8x1-B				
	for sensors, size M12x1	11541	SDA-12x1-B				

Accessories For Inductive Proximity Sensors – For Type SIE... Sensors

Ordering Data

Ordering Data – Plug Sockets With Cable, Sizes M8x1						Technical data → www.festo.com	
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut, M8x1	3-pin	■	■	2.5	159420	SIM-M8-3GD-2.5-PU
					5	159421	SIM-M8-3GD-5-PU
Angled Socket							
	Union nut, M8x1	3-pin	■	■	2.5	159422	SIM-M8-3WD-2.5-PU
					5	159423	SIM-M8-3WD-5-PU
			■	-	2.5	159424	SIM-M8-3WD-2.5-PSL-PU
					5	159425	SIM-M8-3WD-5-PSL-PU
			-	■	2.5	159426	SIM-M8-3WD-2.5-NSL-PU
					5	159427	SIM-M8-3WD-5-NSL-PU

Ordering Data – Plug Sockets With Cable, Sizes M12x1						Technical data → www.festo.com	
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut, M12x1	4-pin	■	■	5	164259	SIM-M12-4GD-5-PU
Angled Socket							
	Union nut, M12x1	4-pin	■	■	5	164258	SIM-M12-4WD-5-PU

Ordering Data – Sensor Sockets, Sizes M12x1						Technical data → www.festo.com	
	Assembly	Connection	Switch Output		Part No.	Type	
			PNP	NPN			
Straight Socket							
	Union nut, M12x1	4-pin	■	■	18494	SIE-GD	
Angled Socket							
	Union nut, M12x1	4-pin	■	■	12956	SIE-WD-TR	
Operating Status Display For Angled Socket, Type SIE-WD-TR							
	-	2-pin	■	■	12957	SIE-LP-LED-GR	

6
6.1

Accessories For Optical Sensors



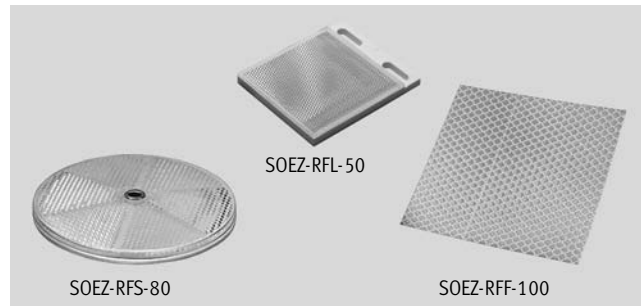
- Polymer fiber-optic cable
- Glass fiber-optic cable
- Reflectors
- Mounting components
- Plug sockets with cable

Accessories For Optical Sensors – For Type SOE... Sensors

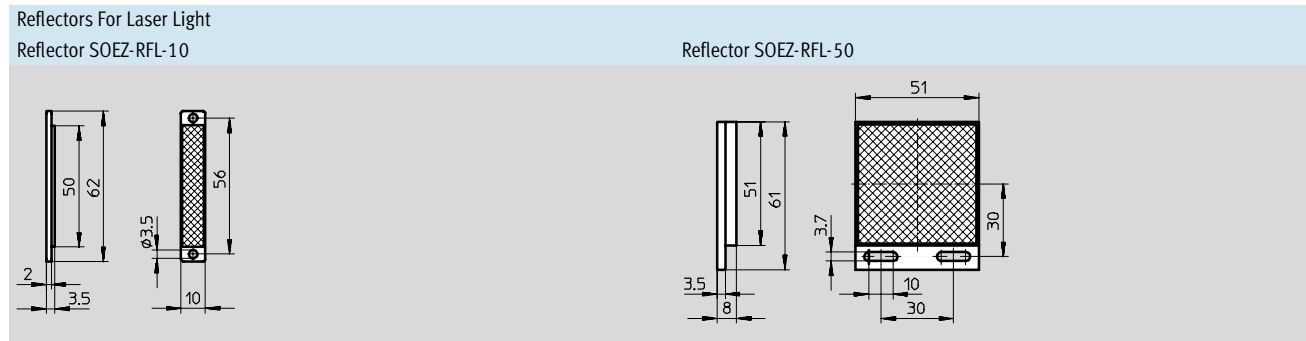
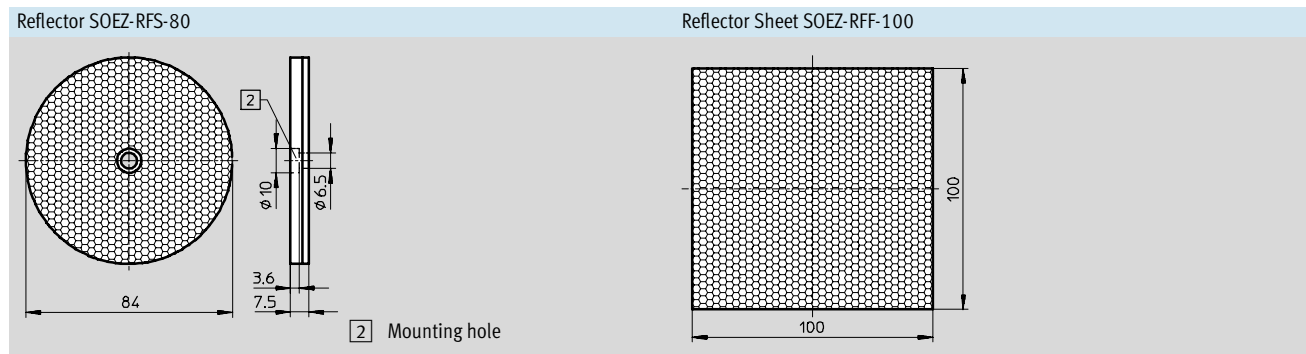
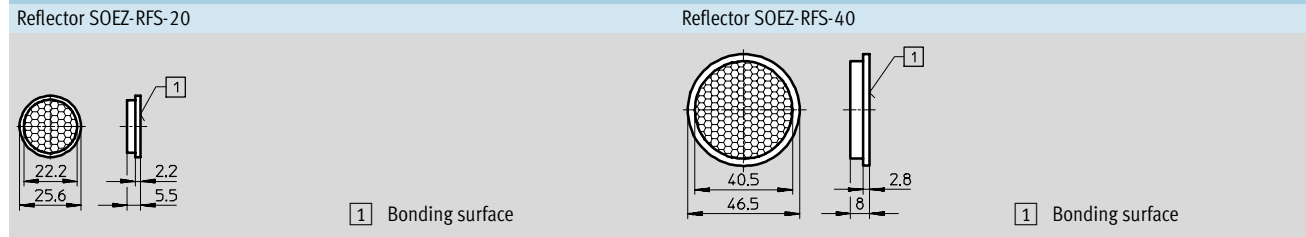
Ordering Data

Reflectors

- Type SOEZ-RFS
- SOEZ-RFZ
- SOEZ-RFF



Dimensions Download CAD data → www.festo.com/en/engineering



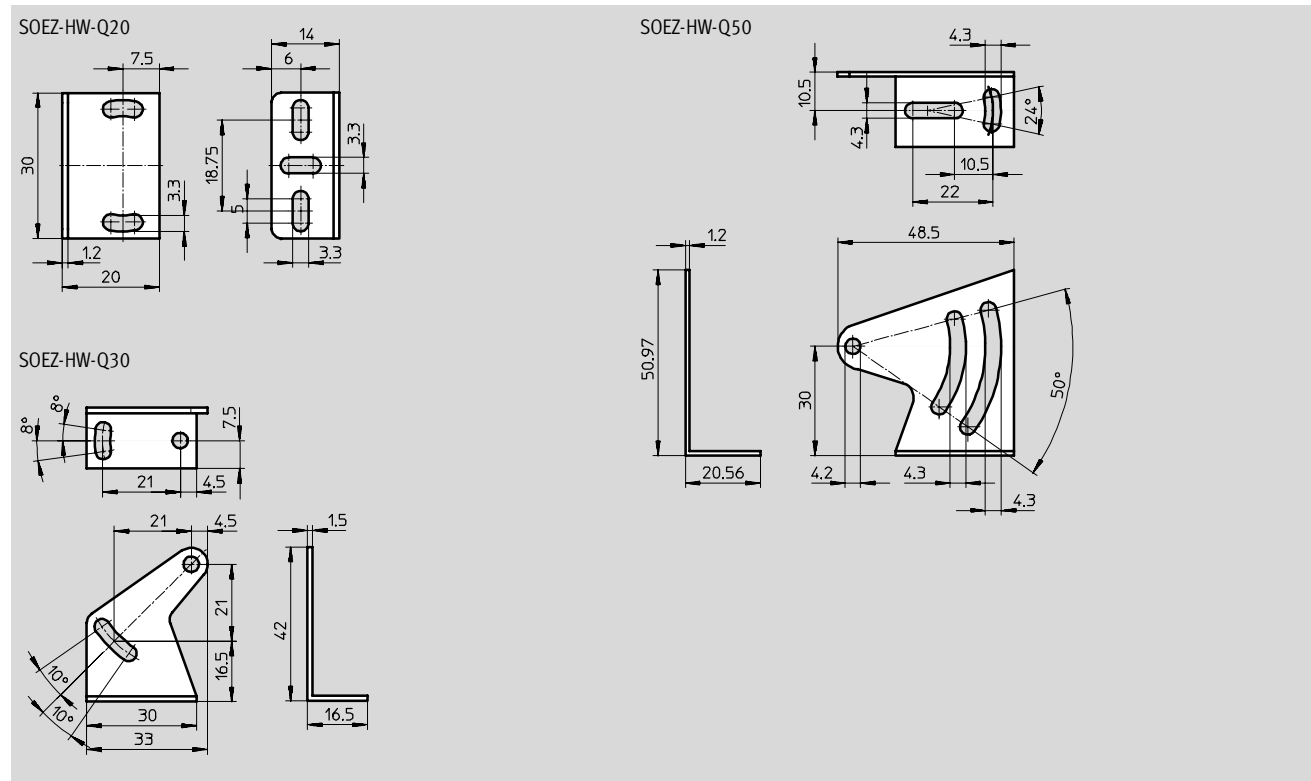
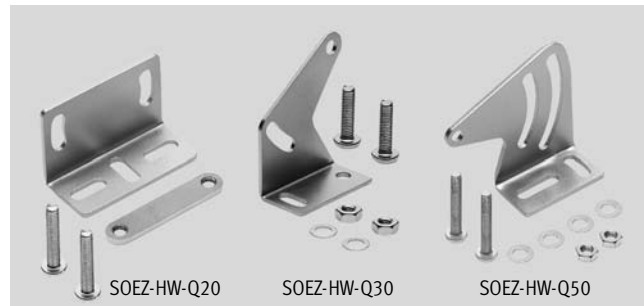
Ordering Data					
Designation	Description	Material	Free of Copper and PTFE	Part No.	Type
Reflector	∅ 20 mm		–	165363	SOEZ-RFS-20
	∅ 40 mm		–	165364	SOEZ-RFS-40
	∅ 84 mm		–	165365	SOEZ-RFS-80
Reflector sheet	Square, 100 x 100 mm		–	165362	SOEZ-RFF-100
Reflectors for laser light	Square, 50x50 mm	Polymethylmethacrylate, acrylic butadiene styrene	■	537788	SOEZ-RFL-50
	Rectangular, 10x50 mm	Polymethylmethacrylate, acrylic butadiene styrene	■	537787	SOEZ-RFL-10

Accessories For Optical Sensors – For Type SOE... Sensors

Ordering Data

Mounting Bracket



Type SOEZ-HW





Ordering Data					
Designation	Use	Material	Free of Copper and PTFE	Part No.	Type
Mounting Bracket	Sensors in block design, 20x32x12 mm	Steel, nickel-plated	■	537785	SOEZ-HW-Q20
	Sensors in block design, 30x30x15 mm	Galvanized steel	■	165355	SOEZ-HW-Q30
	Sensors in block design, 50x50x17 mm	Steel, nickel-plated	■	537786	SOEZ-HW-Q50

Accessories For Optical Sensors – For Type SOE... Sensors

Ordering Data

Ordering Data – Plug Socket With Cable, Sizes M8x1						Technical data → www.festo.com	
	Assembly	Port	For Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Locknut M8x1	3-pin	■	■	2.5	159420	SIM-M8-3GD-2.5-PU
			■	■	5	159421	SIM-M8-3GD-5-PU
		4-pin	■	■	2.5	158960	SIM-M8-4GD-2.5-PU
			■	■	5	158961	SIM-M8-4GD-5-PU
Angled Socket							
	Locknut M8x1	3-pin	■	■	2.5	159422	SIM-M8-3WD-2.5-PU
			■	■	5	159423	SIM-M8-3WD-5-PU
			■	-	2.5	159424	SIM-M8-3WD-2.5-PSL-PU
			■	-	5	159425	SIM-M8-3WD-5-PSL-PU
			-	■	2.5	159426	SIM-M8-3WD-2.5-NSL-PU
			-	■	5	159427	SIM-M8-3WD-5-NSL-PU
		4-pin	■	■	2.5	158962	SIM-M8-4WD-2.5-PU
			■	■	5	158963	SIM-M8-4WD-5-PU

Ordering Data – Plug Socket With Cable, Sizes M12x1						Technical data → www.festo.com	
	Assembly	Port	For Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Locknut M12x1	3-pin	■	■	2.5	159428	SIM-M12-3GD-2.5-PU
			■	■	5	159429	SIM-M12-3GD-5-PU
		4-pin	■	■	5	164259	SIM-M12-4GD-5-PU
		8-pin	■	■	2	525616	SIM-M12-8GD-2-PU
			■	■	5	525618	SIM-M12-8GD-5-PU
Angled Socket							
	Locknut M12x1	3-pin	■	■	2.5	159430	SIM-M12-3WD-2.5-PU
			■	■	5	159431	SIM-M12-3WD-5-PU
			■	-	2.5	159432	SIM-M12-3WD-2.5-PSL-PU
			■	-	5	159433	SIM-M12-3WD-5-PSL-PU
			-	■	2.5	159434	SIM-M12-3WD-2.5-NSL-PU
			-	■	5	159435	SIM-M12-3WD-5-NSL-PU
		4-pin	■	■	5	164258	SIM-M12-4WD-5-PU

Accessories For Optical Sensors – For Type SOEG-L Fiber-optic Sensors

Ordering Data

- Polymer Fiber Optic Cable,**
Type SOEZ-LLK-...
- Glass Fiber Optic Cable,**
Type SOEZ-LLG-...



General Technical Data				
Type	Polymer Fiber Optic Cable, Type SOEZ-LLK-...		Glass Fiber Optic Cable, Type SOEZ-LLG-...	
Setting Range, Upper Limit				
Use	Diffuse sensor	[mm]	100 ¹⁾ / 120 ²⁾	100 ¹⁾ / 100 ²⁾
	Through-beam sensor	[mm]	250 ¹⁾ / 400 ²⁾	150 ¹⁾ / 280 ²⁾
Min. bending radius		[mm]	25	25
Temperature range		[°C]	-40 ... +70	-20 ... +250

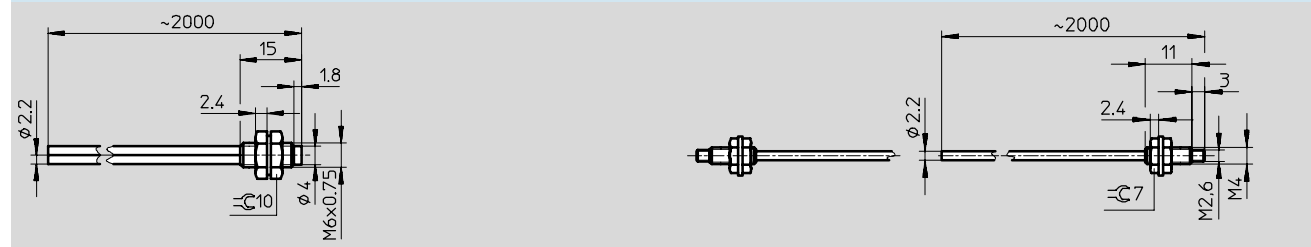
- 1) with SOEG-L-Q20
- 2) with SOEG-L-Q30

Materials		
Type	Polymer Fiber Optic Cable, Type SOEZ-LLK-...	Glass Fiber Optic Cable, Type SOEZ-LLG-...
Fiber optics	Polymethylmethacrylate	Glass fiber
Sheath	Polyethylene	Brass, chrome-plated
Probe	Brass, nickel-plated	Brass, nickel-plated

Dimensions Download CAD data → www.festo.com/en/engineering

Polymer Fiber Optic Cable, Type SOEZ-LLK-... (used as a diffuse sensor)

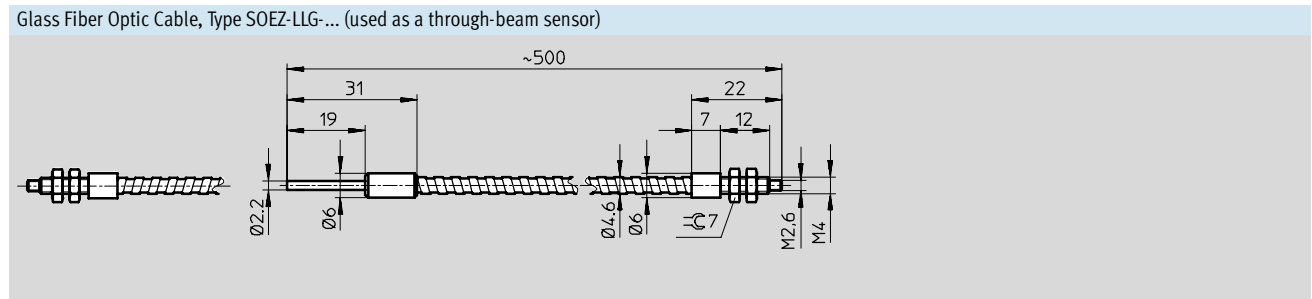
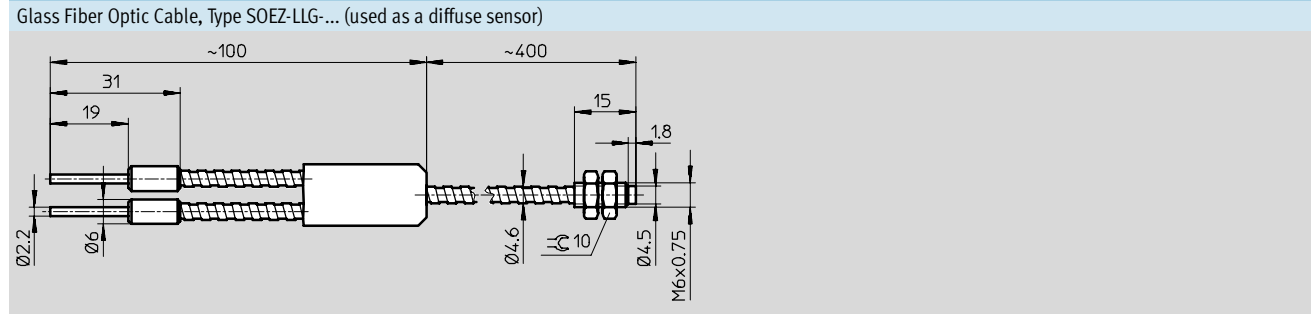
Polymer Fiber Optic Cable, Type SOEZ-LLK-... (used as a through-beam sensor)



Accessories For Optical Sensors – For Type SOEG-L Fiber-optic Sensors

Ordering Data

Dimensions Download CAD data → www.festo.com/en/engineering



Ordering Data						
Version	Description	Length [m]	Weight [g]	Free of Copper and PTFE	Part No.	Type
Polymer Fiber Optic Cable, Type SOEZ-LLK-...						
	Diffuse sensor	2	20	-	165358	SOEZ-LLK-RT-2.0-M6
	Through-beam sensor	2	20	-	165360	SOEZ-LLK-SE-2.0-M4
Glass Fiber Optic Cable, Type SOEZ-LLG-...						
	Diffuse sensor	0.5	50	-	165356	SOEZ-LLG-RT-0.5-M6
	Through-beam sensor	0.5	50	-	165357	SOEZ-LLG-SE-0.5-M4

Cutter For Polymer Fiber Optic Cable
Type SOE-LKS

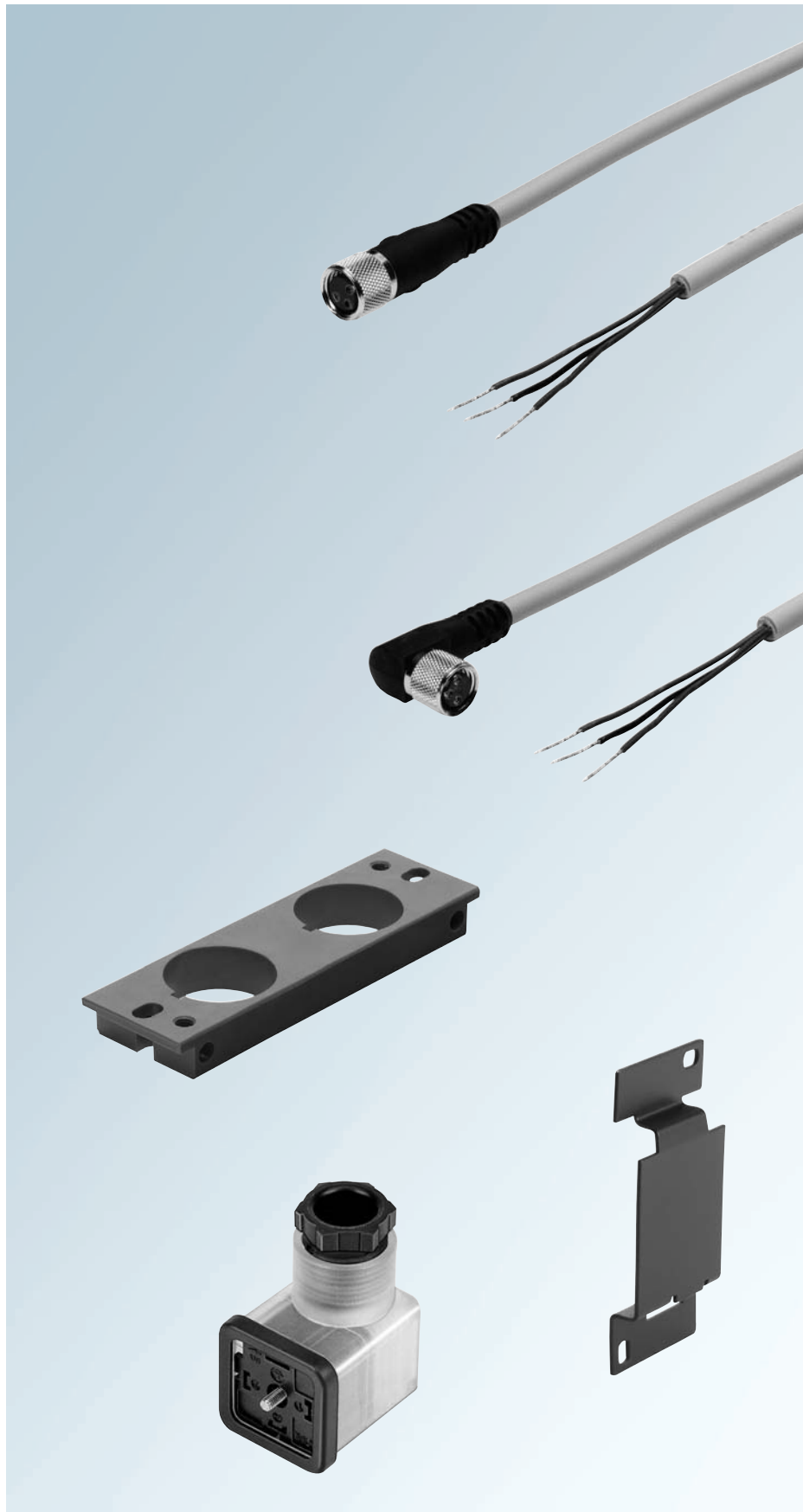
The fiber optic cable is guided within the cutter to ensure a clean cut surface at a right angle to the conductor surface, thus keeping the loss of light to a minimum.



Note
In order to obtain the highest-quality cuts, each hole should be used only once.

Ordering Data		
	Part No.	Type
Cutter for polymer fiber optic cable	36479	SOE-LKS

Accessories For Pressure/Vacuum Sensors



Mounting plate

Angled plug socket
with integrated LED

Mounting Frame

Angled plug socket,
plug sockets with cable,
sockets with cable

Labels

DIN mounting rails

Adapter plates, mounting kits

6

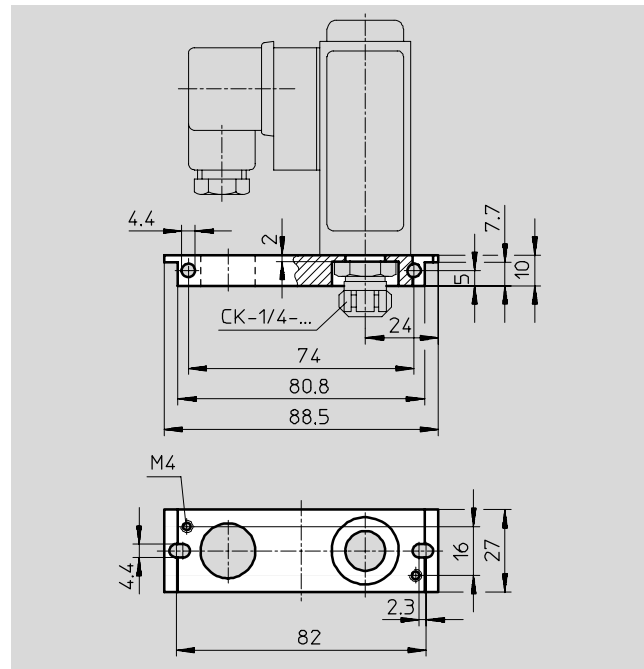
6.3

Accessories For Pressur/Vacuum Sensors – For Type PEV Sensors

Ordering Data

Mounting Plate
Type APL-2N-PEV

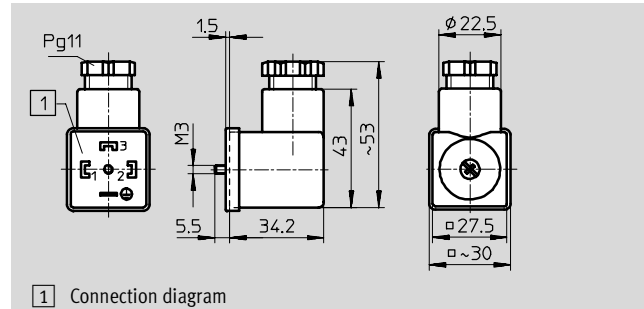
Material:
Fiberglass reinforced polyamide



Ordering Data		Weight [g]	Part No.	Type
Mounting plate for mounting of pressure switch PEV		18	9349	APL-2N-PEV

Angled Plug Socket
With Integrated LED
Type PEV-1/4-WD

Housing Material:
Fiberglass reinforced polyamide



For Pressure Sensors	Weight [g]	Operating Voltage Range		Ready Status Display	Switching Status Display	Part No.	Type
		[V DC]	[V AC]				
PEV-1/4-B-OD, PEV-1/4-B-OD-CT	34	15 ... 30	–	Green LED	Yellow LED	164274	PEV-1/4-WD-LED-24
PEV-1/4-SC-OD	34	≤180	≤230	Green LED	Yellow LED	164275	PEV-1/4-WD-LED-230

6

6.3

Accessories For Pressure/Vacuum Sensors – For Type PEV Sensors

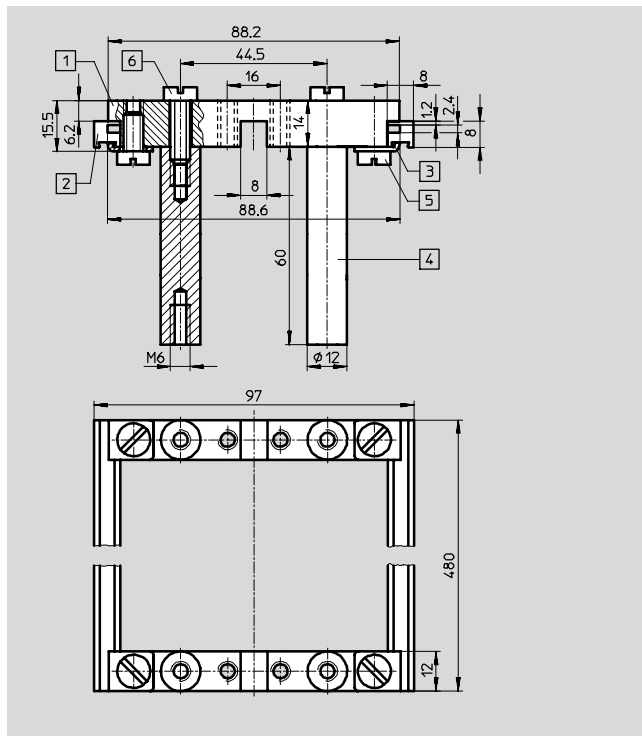
Ordering Data

Mounting Frame

Type NRRQ-2N

Contents:

- 2 x Connector, Type NRV-2N
- 2 x Mounting rail, Type NRQ-8-480
- 4 x Mounting bracket, Type NRW-12/3
- 4 x Bolt, Type NRB-12/60
- 4 x Socket head screw,
DIN 84-M6X18-4.8
- 4 x Socket head screw,
DIN 84-M6X12-4.8
- 4 x Mounting bracket, Type NRW-9/1.5-B
- 4 x Socket head screw,
DIN 84-M4X10-4.8



- 1 Connector NRV-2N
- 2 Mounting rail NRQ-8-480
- 3 Mounting bracket NRW-12/3
- 4 Bolt NRB-12/60
- 5 Socket head screw,
DIN 84-M6X18-4.8
- 6 Socket head screw,
DIN 84-M6X12-4.8

Mounting Frame	Part No.	Type
Mounting frame 2N complete (for 16 components)	9365	NRRQ-2N
Accessories		
Mounting bracket (for mounting sub-bases on frame)	11571	NRW-9/1.5-B
Socket head screw (includes 2 pieces)	204021	DIN 84-M4X12-4.8

Accessories For Pressure/Vacuum Sensors – For Type PEV Sensors

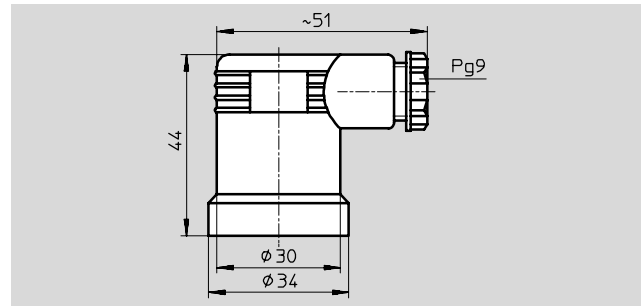
Ordering Data

Angled Plug Socket

Type PEV-1/4-A-WD

Housing Material:

Fiberglass reinforced polyamide



Ordering Data					
For Pressure Sensors	Weight [g]	Operating Voltage Range		Part No.	Type
		[V DC]	[V AC]		
PEV-1/4-A-SW27	55	≤180	≤230	161209	PEV-1/4-A-WD

Ordering Data – Plug Socket With Cable, Size M12x1						Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Angled Socket							
	Central screw	4-pin	■	■	–	171157	MSSD-C-4P





Ordering Data – Plug Sockets With Cable, Sizes M12x1						Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M12x1	4-pin	■	■	5	164259	SIM-M12-4GD-5-PU
Angled Socket							
	Union nut M12x1	4-pin	■	■	5	164258	SIM-M12-4WD-5-PU


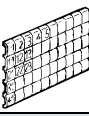
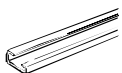
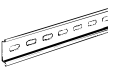
Ordering Data – Plug Sockets With Cable, Sizes M12x1						Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M12x1	4-pin	■	■	–	18494	SIE-GD
Angled Socket							
	Union nut M12x1	4-pin	■	■	–	12956	SIE-WD-TR
Operational Status Display For Angled Socket, Type SIE-WD-TR							
	–	–	■	■	–	12957	SIE-LP-LED-GR

6
6.3

Accessories For Pressure/Vacuum Sensors – For Type PEV Sensors

Ordering Data

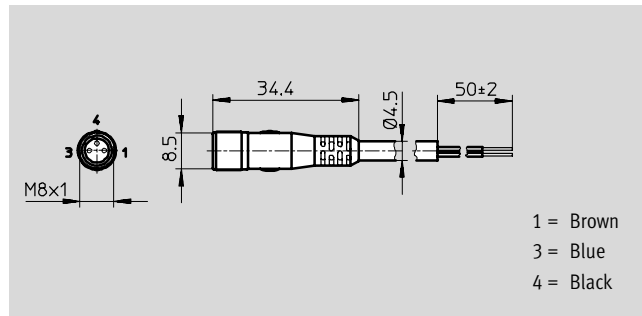
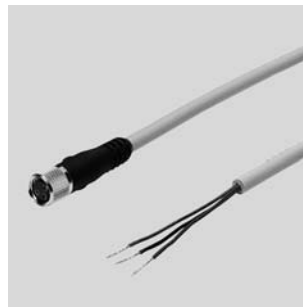
Ordering Data – Plug Sockets With Cable, Sizes M8x1							Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable length [m]	Part No.	Type	
			PNP	NPN				
Straight Socket								
	Union nut M8x1	4-pin	■	■	2.5	158960	SIM-M8-4GD-2.5-PU	
					5	158961	SIM-M8-4GD-5-PU	
	Snap connection	4-pin	■	■	2.5	164250	SIM-K-4-GD-2.5-PU	
					5	164251	SIM-K-4-GD-5-PU	
Angled Socket								
	Union nut M8x1	4-pin	■	■	2.5	158962	SIM-M8-4WD-2.5-PU	
					5	158963	SIM-M8-4WD-5-PU	
	Snap connection	4-pin	■	■	2.5	164252	SIM-K-4-WD-2.5-PU	
					5	164253	SIM-K-4-WD-5-PU	

Ordering Data – Accessories					Technical data → www.festo.com				
	For Pressure Sensors	Length	Part No.	Type		For Pressure Sensors	Length	Part No.	Type
Mounting Latch For Mounting On DIN Rail (G/H)					Labels				
	PEV-W-...	-	164597	PENV-BGH		PEV-W-...	-	6888	BZ-N1-50
								6889	BZ-N51-100
DIN Mounting Rail To DIN EN 50035					DIN Mounting Rail To DIN EN 50022				
	PEV-W-...	2 m	6756	NRC-32-200		PEV-W-...	2 m	35430	NRH-35-2000

Accessories For Pressure/Vacuum Sensors – For Type SDE5 Sensors

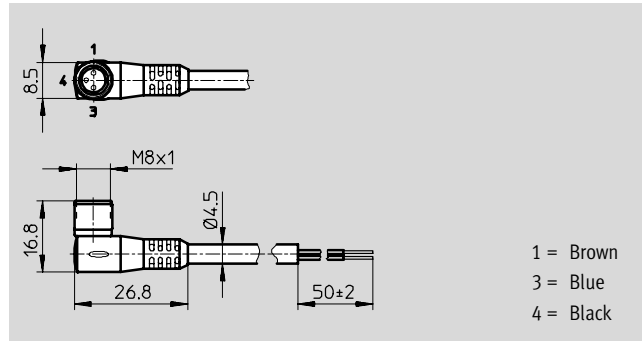
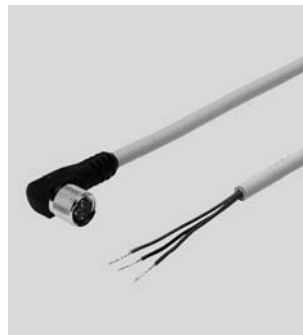
Ordering Data

Socket with Cable
SIM-M8-3GD-...-PU



1 = Brown
3 = Blue
4 = Black

Socket with Cable
SIM-M8-3WD-...-PU



1 = Brown
3 = Blue
4 = Black

Technical Data			
	SIM-M8-...-2.5-PU	SIM-M8-...-5-PU	SIM-M8-...-10-PU
Cable length	2.5 m	5 m	10 m
Constructional design	3 x 0.25 mm ²		
Cable diameter	4.5 mm		
Current I _{max}	2.8 A		
Voltage V _{max}	45 V AC / 70 V DC		
Protection class to EN 60529	IP67		
Ambient Temperature			
Fixed cable installation	-40 ... 70 °C		
Flexible cable installation	-5 ... 70 °C		
Materials			
Housing	PUR		
Cable sheath	PUR		

Ordering Data					
Plug Outlet		Straight		Angled	
		Part No.	Type	Part No.	Type
Cable length	2.5 m	159420	SIM-M8-3GD-2.5-PU	159422	SIM-M8-3WD-2.5-PU
	5 m	159421	SIM-M8-3GD-5-PU	159423	SIM-M8-3WD-5-PU
	10 m	192964	SIM-M8-3GD-10-PU	192965	SIM-M8-3WD-10-PU

Accessories For Pressure/Vacuum Sensors – For Type SDE3 Sensors

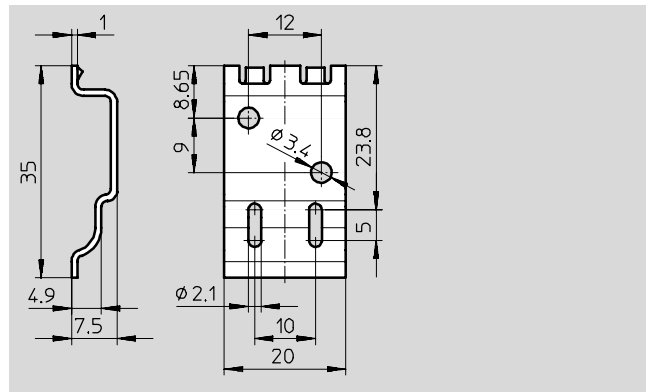
Ordering Data

Adapter Plate For Wall or Surface Mounting

Type SXE3-W



Material:

Steel



Ordering Data		Part No.	Type
Adapter plate ¹⁾		540214	SXE3-W

1) Included with SDE3-...-W...

Ordering Data – Plug Sockets With Cable, Sizes M8x1						Technical data → www.festo.com	
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M8x1	4-pin	■	■	2.5	158960	SIM-M8-4GD-2.5-PU
					5	158961	SIM-M8-4GD-5-PU
Angled Socket							
	Union nut M8x1	4-pin	■	■	2.5	158962	SIM-M8-4WD-2.5-PU
					5	158963	SIM-M8-4WD-5-PU

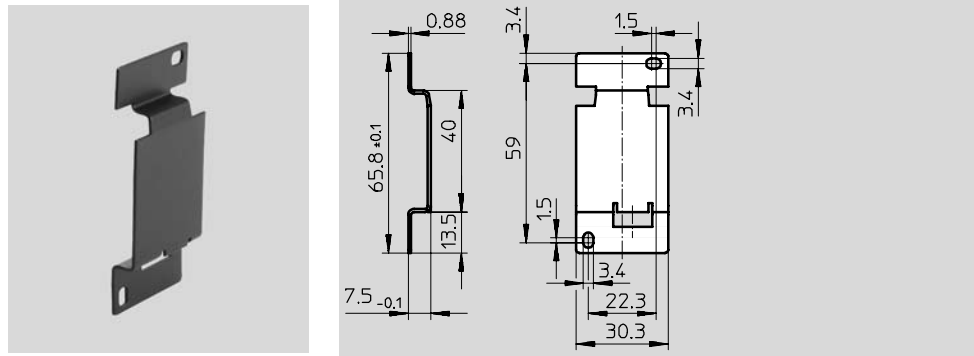
Accessories For Pressure/Vacuum Sensors – For Type SDE1 Sensors

Ordering Data

Adapter Plate For Wall or Surface Mounting

Type SDE1-...-W...

Material:
Steel



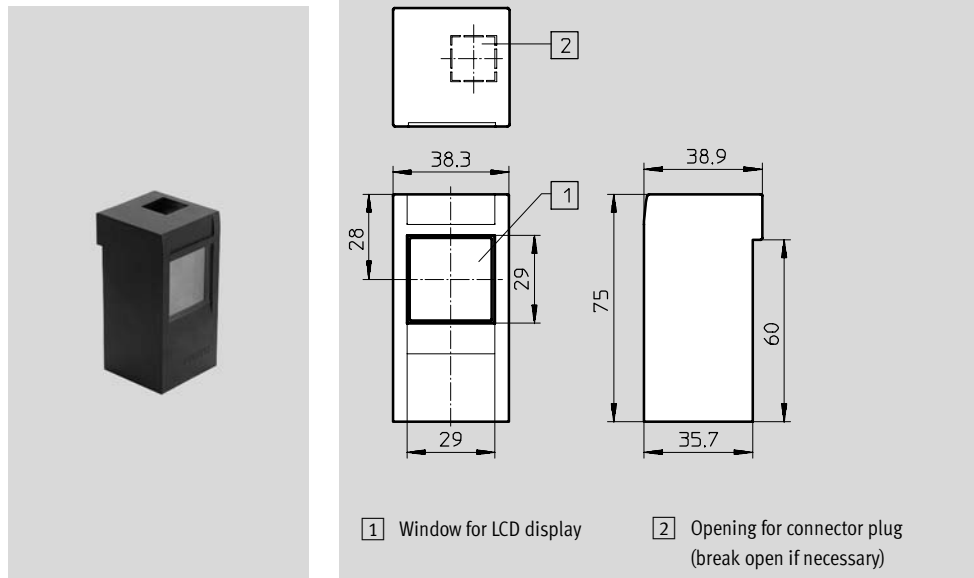
Ordering Data		Part No.	Type
Adapter plate ¹⁾		194297	SDE1-...-W...

1) Included with SDE1-...-W...

Safety Guard

Type SDE1-SH



Material:
Polyphenylene sulphide, reinforced





Ordering Data		Part No.	Type
Safety guard		537074	SDE1-SH

Accessories For Pressure/Vacuum Sensors – For Type SDE1 Sensors

Ordering Data

Ordering Data – Plug Sockets With Cable, Sizes M8x1						Technical data → www.festo.com	
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M8x1	3-pin	■	■	2.5	159420	SIM-M8-3GD-2.5-PU
			■	■	5	159421	SIM-M8-3GD-5-PU
		4-pin	■	■	2.5	158960	SIM-M8-4GD-2.5-PU
			■	■	5	158961	SIM-M8-4GD-5-PU
Angled Socket							
	Union nut M8x1	3-pin	■	■	2.5	159422	SIM-M8-3WD-2.5-PU
			■	■	5	159423	SIM-M8-3WD-5-PU
		4-pin	■	■	2.5	158962	SIM-M8-4WD-2.5-PU
			■	■	5	158963	SIM-M8-4WD-5-PU

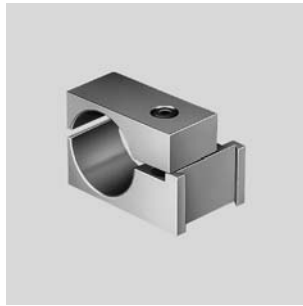
Ordering Data – Plug Sockets With Cable, Sizes M12x1						Technical data → www.festo.com		
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type	
			PNP	NPN				
Straight Socket								
	Union nut M12x1	3-pin	■	■	2.5	159428	SIM-M12-3GD-2.5-PU	
			■	■	5	159429	SIM-M12-3GD-5-PU	
		4-pin	■	■	5	164259	SIM-M12-4GD-5-PU	
			5-pin	■	■	2.5	175715	SIM-M12-5GD-2.5-PU
				■	■	5	175716	SIM-M12-5GD-5-PU
Angled Socket								
	Union nut M12x1	3-pin	■	■	2.5	159430	SIM-M12-3WD-2.5-PU	
			■	■	5	159431	SIM-M12-3WD-5-PU	
		4-pin	■	■	5	164258	SIM-M12-4WD-5-PU	

Accessories For Pressure/Vacuum Sensors – For Type SDE Sensors

Ordering Data

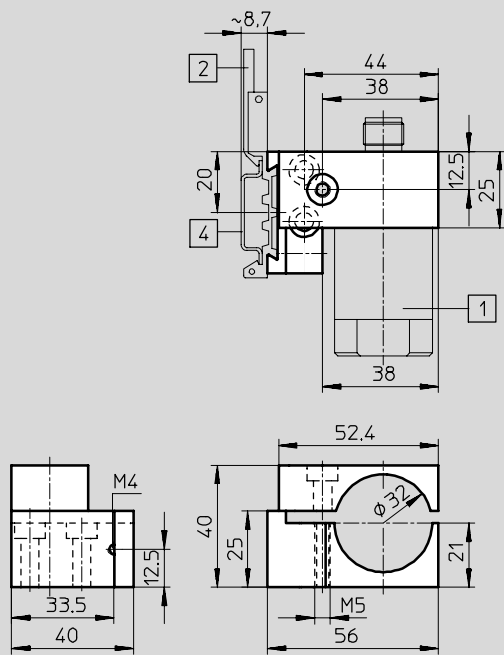
Mounting Kit SDE-KL-1

Material:
Wrought Aluminum Alloy



Dimensions

Download CAD data → www.festo.com/en/engineering



- 1 Pressure sensor SDE
- 2 Mounting plate MPL-MUS/PZ-H
- 4 DIN mounting rail to DIN 50022

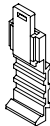
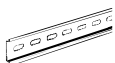
Ordering Data

Part No. Type

35319 SDE-KL-1



Ordering Data




Technical data → www.festo.com

	Length	Part No.	Type
Mounting Plate For DIN Rail			
	–	19135	MPL-MUS/PZ-H
DIN Mounting Rail To DIN EN 50022			
	2 m	35430	NRH-35-2000

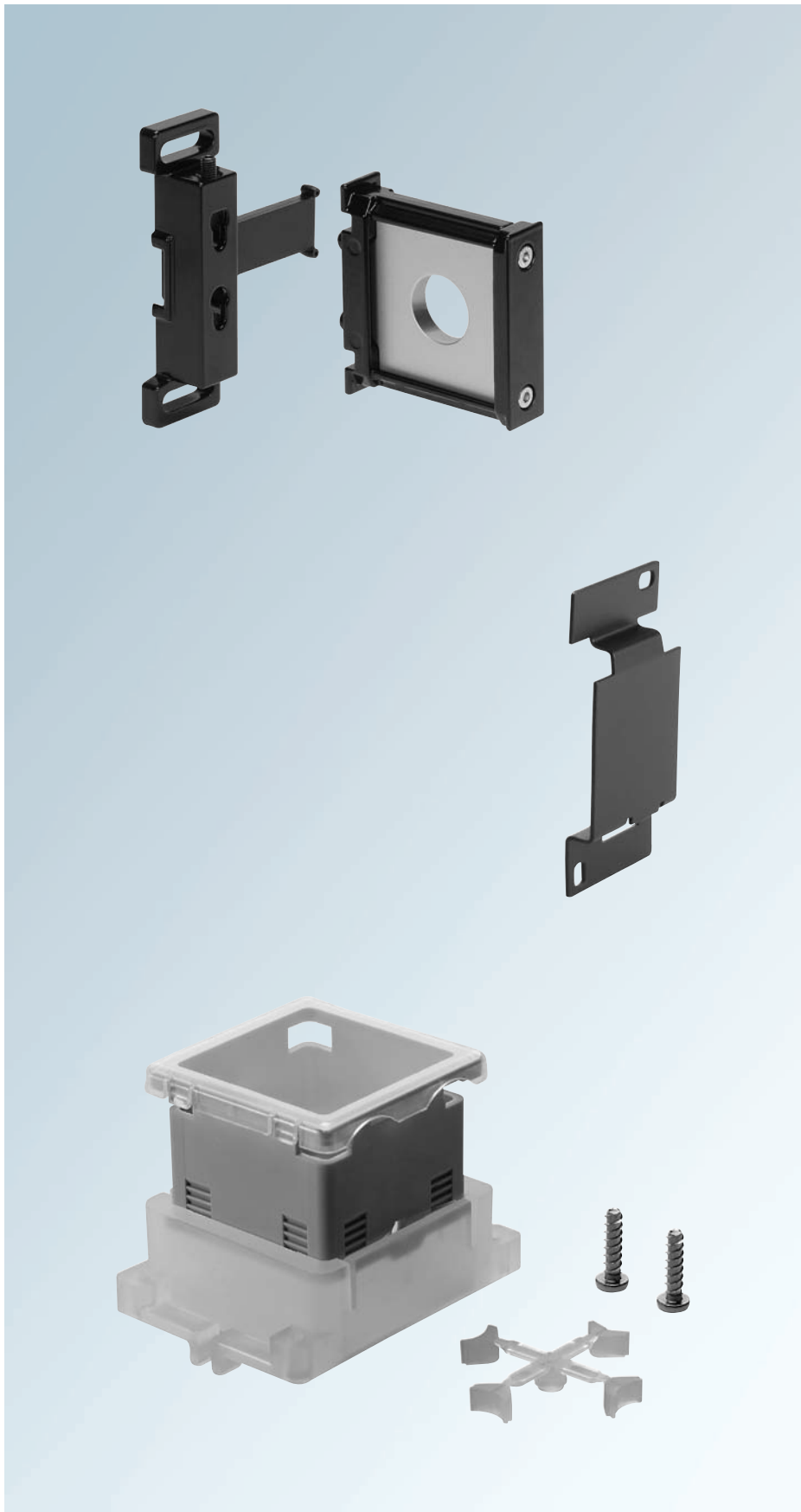
Accessories For Pressure/Vacuum Sensors – For Type SDE Sensors

Ordering Data

Ordering Data – Plug Sockets With Cable M12x1						Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M12x1	4-pin	■	■	5	164259	SIM-M12-4GD-5-PU
Angled Socket							
	Union nut M12x1	4-pin	■	■	5	164258	SIM-M12-4WD-5-PU

Ordering Data – Plug Sockets With Cable M12x1						Technical data → www.festo.com	
	Mounting	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M12x1	4-pin	■	■	–	18494	SIE-GD
Angled Socket							
	Union nut M12x1	4-pin	■	■	–	12956	SIE-WD-TR
Operational Status Display For Angled Socket, Type SIE-WD-TR							
	–	–	■	■	–	12957	SIE-LP-LED-GR

Accessories For Flow Sensors



Mounting components

Adapter plates

Connecting plates

Mounting brackets

Module connector

Wall mounting plates

6

6.4

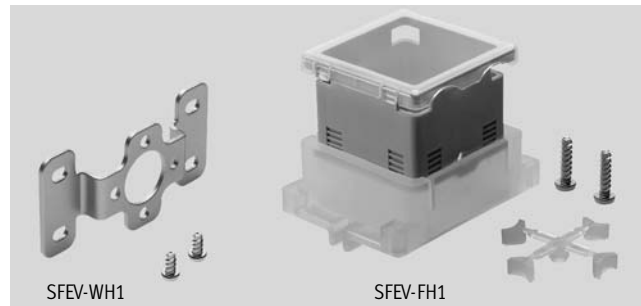
Accessories For Flow Sensors – For Type SFE... Sensors

Ordering Data

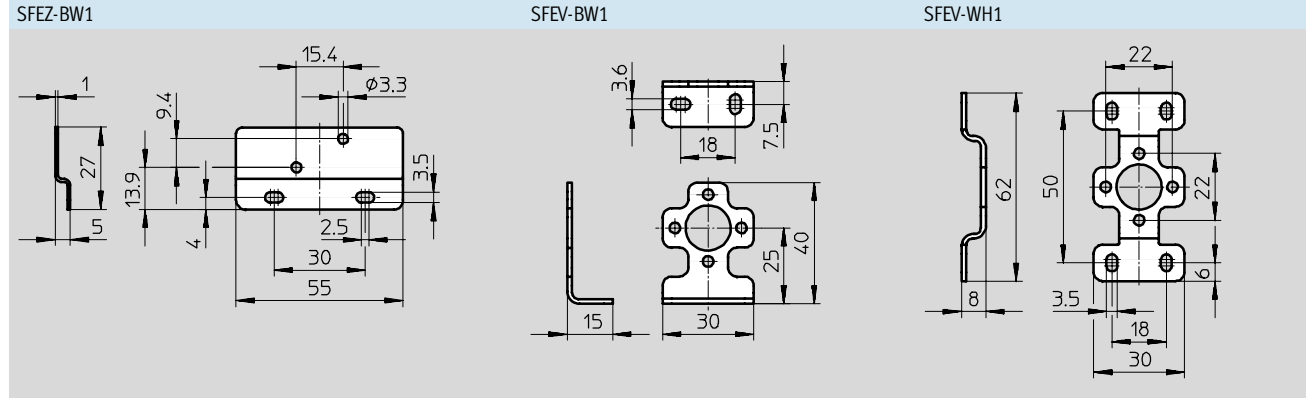
Mounting Components

Type SFEZ-...

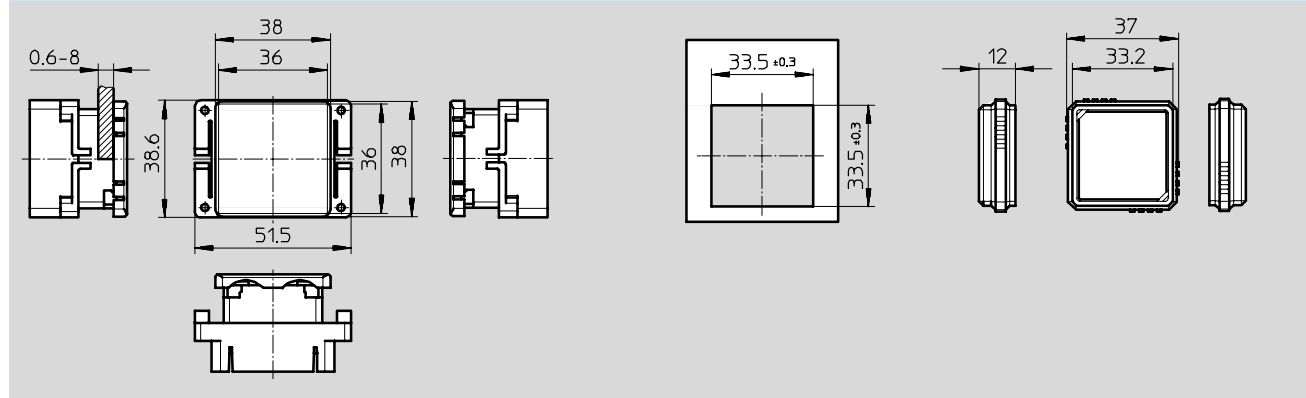
SFEV-...



Dimensions



Front Panel Installation Kit SFEV-FH1 Installation Aperture Safety Guard SFEV-SH1



Ordering Data						
Designation	Use	Material	Weight [g]	Free of Copper, PTFE and Silicone	Part No.	Type
Wall mounting bracket	For flow sensors SFE3, SFET	Steel, nickel-plated	17	■	538562	SFEZ-BW1
	For digital display SFEV		16	■	538563	SFEV-BW1
			16	■	538564	SFEV-WH1
Front panel installation kit	For digital display SFEV	Polyamide, reinforced	18	■	538565	SFEV-FH1
Safety guard			6	■	538566	SFEV-SH1

6

6.4

Accessories For Flow Sensors – For Type SFE1-LF-... Sensors

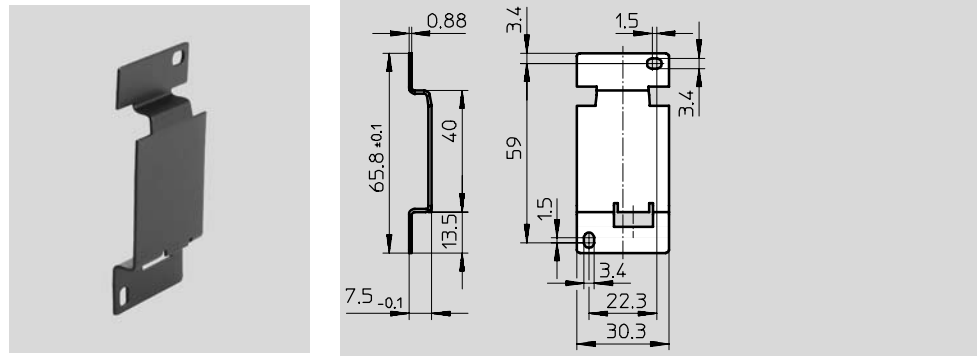
Ordering Data

Adapter Plate For Wall or Surface Mounting

Type SDE1-...-W...

Material:

Steel



Ordering Data		Part No.	Type
Adapter plate ¹⁾		194297	SDE1-...-W...

1) Included with SDE1-...-W...

Ordering Data – Plug Socket With Cable M12x1					Technical data → www.festo.com		
	Assembly	Port	Switching Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Locknut M12x1	5-pin	■	■	2.5	175715	SIM-M12-5GD-2.5-PU
			■	■	5	175716	SIM-M12-5GD-5-PU

Accessories For Flow Sensors – For Type MS6-SFE Sensors

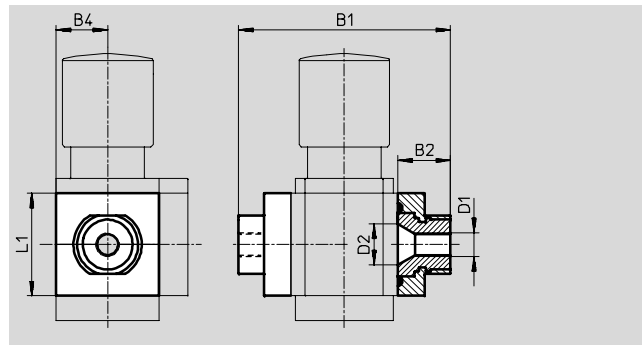
Ordering Data

Connecting Plate

Type MS6-AG...

- Adapter for Pneumatic Connection
- MS6-AGE is Used When Implementing Threaded Connection G $\frac{3}{4}$

Material:
Aluminum



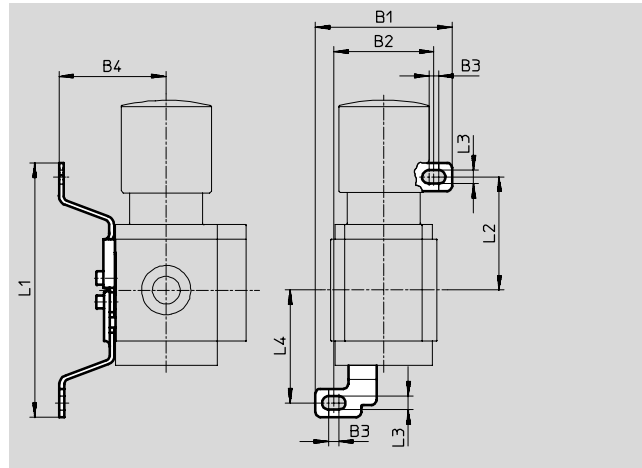
Dimensions and Ordering Data									
Size	B1	B2	B4	D1	D2	L1	Weight [g]	Part No.	Type
MS6	115	26.5	31	G $\frac{1}{2}$	24	62	300	526082	MS6-AGD
				G $\frac{3}{4}$				526083	MS6-AGE

Mounting Bracket

Type MS6-WB

- For Wall Mounting

Material:
Steel



Dimensions and Ordering Data											
Size	B1	B2	B3	B4	L1	L2	L3	L4	Weight [g]	Part No.	Type
MS6	79.4	61.9	4.5	55	157.6	71	6.6	71	121	532196	MS6-WB

Module Connector

Type MS6-MV

- For Connecting Modules

Material:
Stainless Steel/Polyacetate



Ordering Data									
Size							Weight [g]	Part No.	Type
MS6							54	532799	MS6-MV

Accessories For Flow Sensors – For Type MS6-SFE Sensors

Accessories

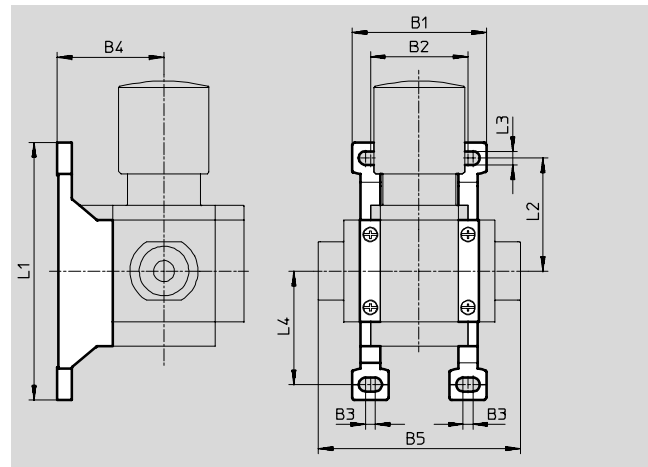
Wall Mounting Plate

Type MS6-WP

- Used for Connecting Service Modules for Wall Mounting
- For Wall Mounting of an Individual Unit (In Combination with a Connecting Plate)

Material:

Die-cast Aluminum



Dimensions and Ordering Data												
Size	B1	B2	B3	B4	B5	L1	L2	L3	L4	Weight [g]	Part No.	Type
MS6	79	62	4.5	54	115	158	71	6.6	71	76	532195	MS6-WP

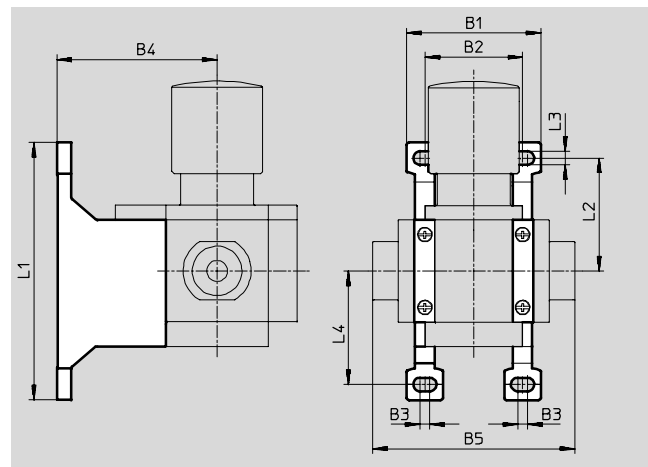
Wall Mounting Plate

Type MS6-WPB

- Used For Connecting Service Modules For Wall Mounting
- For Wall Mounting of an Individual Unit (In Combination With a Connecting Plate)

Material:

Die-cast Aluminum



Dimensions and Ordering Data												
Size	B1	B2	B3	B4	B5	L1	L2	L3	L4	Weight [g]	Part No.	Type
MS6	79	62	4.5	90.5	115	158	71	6.6	71	115	526074	MS6-WPB

Accessories For Flow Sensors – For Type MS6-SFE Sensors

Accessories

Wall Mounting Plate

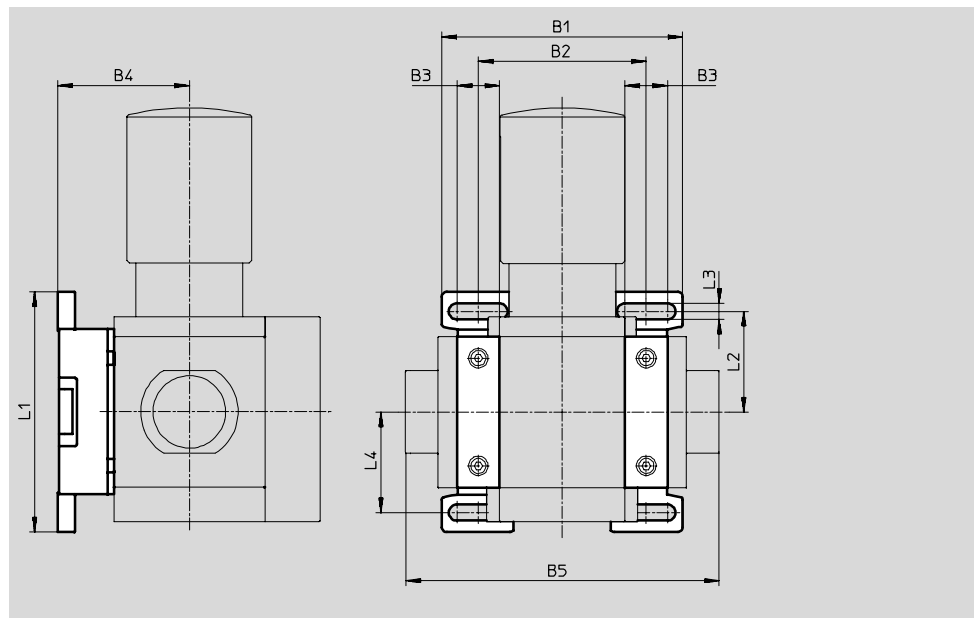
Type MS6-WPM

- Used for Connecting Service Modules for Wall Mounting
- In Combination with a Connecting Plate for Mounting an Individual Service Unit on a Wall
- Speedy Attachment and Detachment
- For Installation of Modules with Regulating Knob Pointing Downwards
- Also Matches the Hole Pattern of M Series Service Units for Retro-fitting

The distance piece D or 2D (designated in the type code) is included, and ensures the correct clearance.

Material:

Die-cast Aluminum



Dimensions and Ordering Data													
Size	B1	B2	B3	B4	B5	L1	L2	L3	L4	Clearance	Weight [g]	Part No.	Type
MS6	99	69	17.5	54	129	98.6	41.3	6.6	41.3	62	144	526073	MS6-WPM-D
	168	138			198					124	154	532186	MS6-WPM-2D

Ordering Data							
	Assembly	Connection	Switch Output		Cable Length [m]	Part No.	Type
			PNP	NPN			
Straight Socket							
	Union nut M12x1	5-pin	■	■	2.5	175715	SIM-M12-5GD-2.5-PU
			■	■	5	175716	SIM-M12-5GD-5-PU

Accessories For Actuator Feedback



Connecting cable

Plug sockets with cable,
size M8

Plug sockets with cable,
size M12

Mounting kits

Accessories For Actuator Feedback – For Sensors Type SME/SMT-8, SME/SMT-10

FESTO

Ordering Data

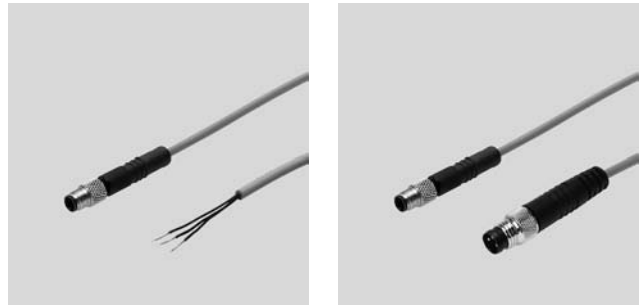
Connecting Cable M5

Type NEBU-M5G4-...

Material:

Housing: Polyurethane

Cable sheath: Polyurethane



Ordering Data						
Switch Output		Electrical Connection	Switching Status Display via LED	Cable Length [m]	Part No.	Type
PNP	NPN					
Straight Socket						
■	■	Plug M5x0.5 / open at one end	-	5	539508	NEBU-M5G4-K-5-Q3-LE3
■	■	Plug M5x0.5 / plug M8x1	-	1	539510	NEBU-M5G4-K-1-Q3-M8G3
■	■	Plug M5x0.5 / plug M12x1	-	1	539512	NEBU-M5G4-K-1-Q3-M12G4
■	■	Open variant	-	X	539052	NEBU-...

Plug Socket with Cable, Size M8

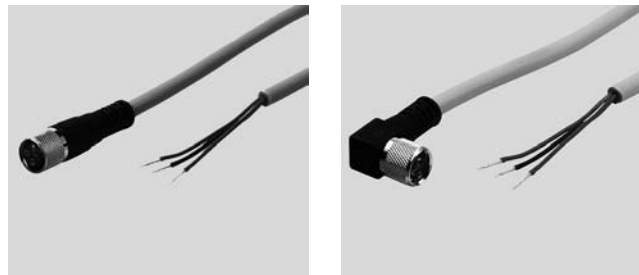
Type SIM-M8-3GD-...

Type SIM-M8-3WD-...

Material:

Housing: Polyurethane

Cable Sheath: Polyurethane



Ordering Data						
Switch Output		Switching Status Display via LED	Cable Length [m]	Weight [g]	Part No.	Type
PNP	NPN					
Straight Socket						
■	■	-	2.5	79	159420	SIM-M8-3GD-2.5-PU
■	■	-	5	150	159421	SIM-M8-3GD-5-PU
■	■	-	10	284	192964	SIM-M8-3GD-10-PU
Angled Socket						
■	■	-	2.5	81	159422	SIM-M8-3WD-2.5-PU
■	■	-	5	146	159423	SIM-M8-3WD-5-PU
■	■	-	10	283	192965	SIM-M8-3WD-10-PU
-	■	■	2.5	80	159426	SIM-M8-3WD-2.5-NSL-PU
-	■	■	5	150	159427	SIM-M8-3WD-5-NSL-PU
■	-	■	2.5	83	159424	SIM-M8-3WD-2.5-PSL-PU
■	-	■	5	143	159425	SIM-M8-3WD-5-PSL-PU

6

6.5

Accessories For Actuator Feedback – For Sensors Type SME/SMT-8, SME/SMT-10



Ordering Data

Plug Socket With Cable, Size M12

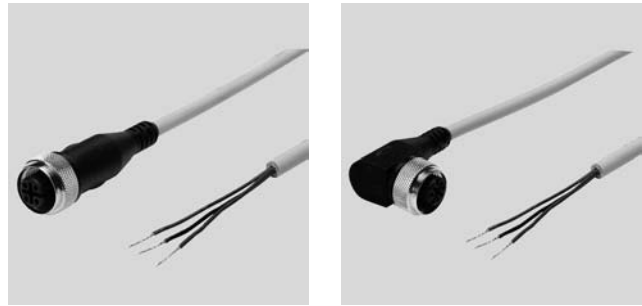
Type SIM-M12-3GD-...

Type SIM-M12-3WD-...

Material:

Housing: Polyurethane

Cable Sheath: Polyurethane




Ordering Data							
Switch Output		Switching Status Display with LED	Welding Field Immune	Cable Length [m]	Weights [g]	Part No.	Type
PNP	NPN						
Straight Socket							
■	■	-	-	2.5	85	159428	SIM-M12-3GD-2.5-PU
■	■	-	-	5	151	159429	SIM-M12-3GD-5-PU
■	■	-	■	3	131	30450	SIM-M12-RS-3GD-3
Angled Socket							
■	■	-	-	2.5	87	159430	SIM-M12-3WD-2.5-PU
■	■	-	-	5	155	159431	SIM-M12-3WD-5-PU
-	■	■	-	2.5	88	159434	SIM-M12-3WD-2.5-NSL-PU
-	■	■	-	5	155	159435	SIM-M12-3WD-5-NSL-PU
■	-	■	-	2.5	86	159432	SIM-M12-3WD-2.5-PSL-PU
■	-	■	-	5	158	159433	SIM-M12-3WD-5-PSL-PU
■	■	-	■	3	138	30451	SIM-M12-RS-3WD-3

Ordering Data – Slot Cover For Type 8 Slot

	Assembly	Length [m]	Part No.	Type
	Insert from above	2x 0.5	151680	ABP-5-S

Ordering Data – Cable Clip SMBK-8

	Part No.	Type
 For affixing the cable in the sensor slot	534254	SMBK-8

Ordering Data – Cable Clip SMBK-10

	Part No.	Type
 For affixing the cable in the sensor slot	534255	SMBK-10

Accessories For Actuator Feedback – For Actuators With Type 8 Slot

Ordering Data

Mounting Kit

Type SMBR-8-8/100-S6

Material:

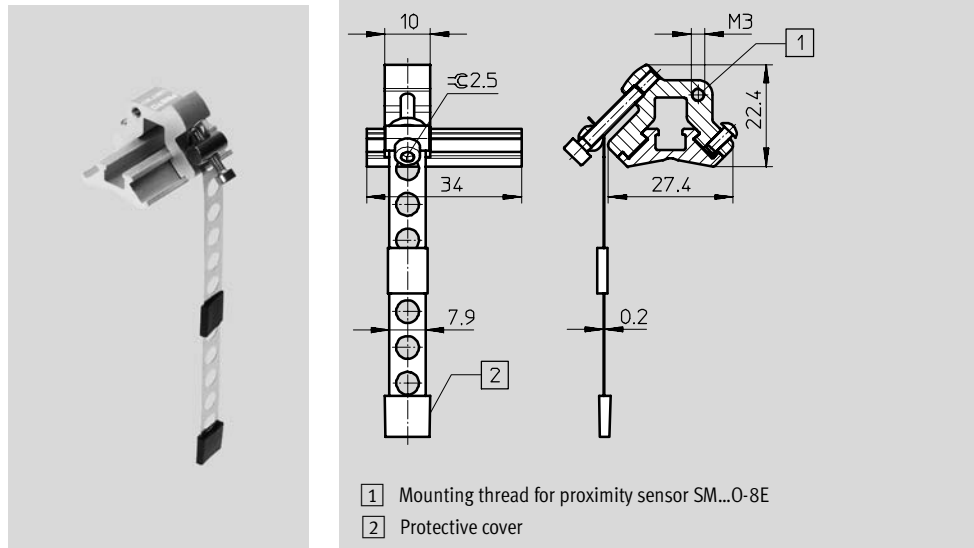
Rail:

Wrought aluminum alloy, anodized

Clamping strap, screws:

High-alloy stainless steel

Copper, PTFE and silicone-free



Dimensions and Ordering Data			
For Piston Ø	Corrosion Resistance Class CRC ¹⁾	Part No.	Type
8 ... 100	4	538937	SMBR-8-8/100-S6

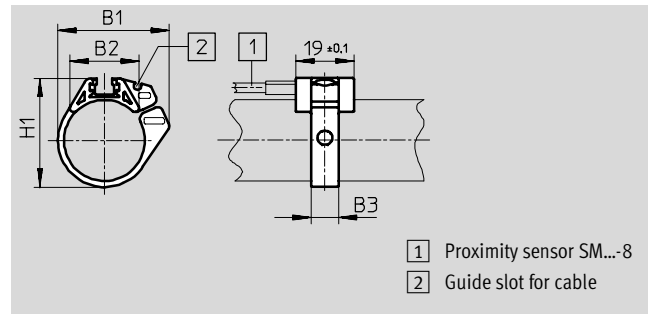
1) Corrosion resistance class 4 according to Festo standard 940070. Components requiring higher corrosion resistance. Parts used with aggressive media, e.g. food or chemical industry. These applications should be supported with special tests with the media if required.

Accessories For Actuator Feedback – For Actuators With Type 8 Slot

Ordering Data

Mounting Kit
Type SMBR

Material:
Polyacetate



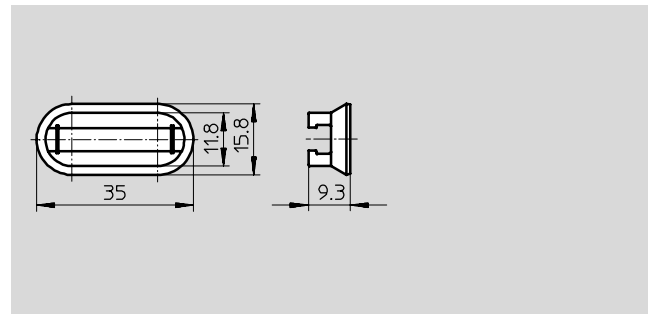
- 1 Proximity sensor SM...-8
- 2 Guide slot for cable

Dimensions and Ordering Data						
For Piston Ø	B1	B2	B3	H1	Part No.	Type
8	18.9	12.3	7	17.5	175091	SMBR-8-8
10	20.4	13.7	7	19.9	175092	SMBR-8-10
12	22.7	14.3	7	21.9	175093	SMBR-8-12
16	26.1	17.1	7	25.7	175094	SMBR-8-16
20	33.2	20.8	9	30.4	175095	SMBR-8-20
25	36.5	22.6	9	35.6	175096	SMBR-8-25
32	41.7	24.6	9	42.7	175097	SMBR-8-32
40	47.1	26.5	9	50.7	175098	SMBR-8-40
50	56.4	28.6	9	61.5	175099	SMBR-8-50
63	69.4	32	9	74.5	175100	SMBR-8-63

Mounting Kit
Type CRSMB

Material:
Housing: Polyurethane

Rail: Hard anodized aluminum
Copper, PTFE and silicone-free



Note
The mounting kit is secured to the cylinder using the double-sided adhesive tape provided.

Dimensions and Ordering Data		
For Piston Ø	Part No.	Type
32 ... 100	525565	CRSMB-8-32/100

Accessories For Actuator Feedback – For Actuators With Type 8 Slot

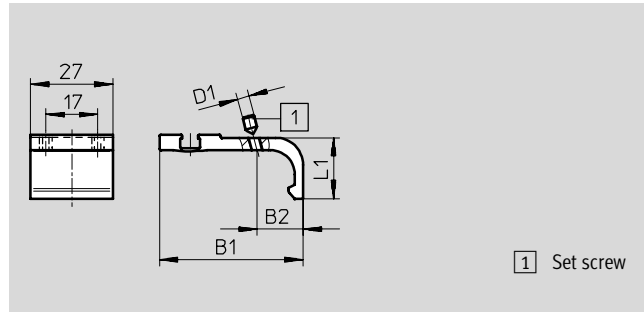
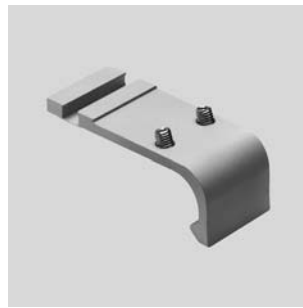
Ordering Data

Mounting Kit

Type SMB-8-FENG

Material:

Wrought aluminum alloy
Copper, PTFE and silicone-free



1 Set screw

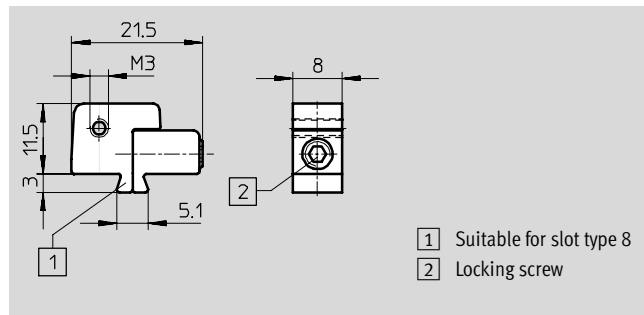
Dimensions and Ordering Data							
For Piston Ø	B1	B2	D1	L1	Tightening Torque [Nm]	Part No.	Type
32/40	35.1	8.7	M3	15.5	0.2	175705	SMB-8-FENG-32/40
50/63	47	12.3	M4	20	0.5	175706	SMB-8-FENG-50/63
80/100	64.3	15.7	M5	24.3	0.7	175707	SMB-8-FENG-80/100

Mounting Kit

Type SMB-8E

Material:

Polyacetate



1 Suitable for slot type 8
2 Locking screw

Ordering Data		
For Piston Ø	Part No.	Type
10 ... 125	178230	SMB-8E

Accessories For Actuator Feedback – For Actuators With Type 8 Slot

Ordering Data

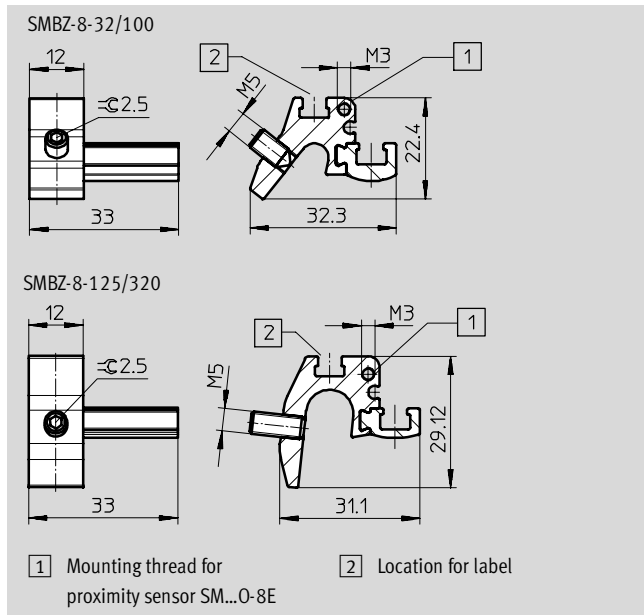
Mounting

Type SMBZ-8-...

Material:

Rail: Wrought aluminum alloy, anodized

Screws: High-alloy stainless steel
Copper, PTFE and silicone-free



Ordering Data		
For Piston Ø	Part No.	Type
32 ... 100	537806	SMBZ-8-32/100
125 ... 320	537808	SMBZ-8-125/320

Accessories For Actuator Feedback – For Actuators With Type 10 Slot

Ordering Data

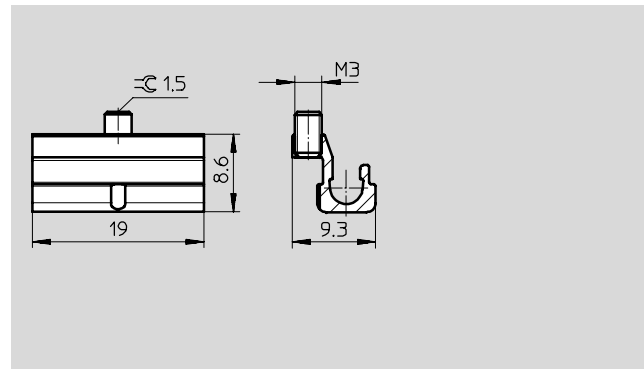
Mounting

Type SMBN-10

For mounting proximity sensors SME/SMT-10 on drives with type 8 slot (T-slot)

Material:

Rail: Wrought aluminum alloy, anodized
Screws: High-alloy stainless steel
Copper, PTFE and silicone-free



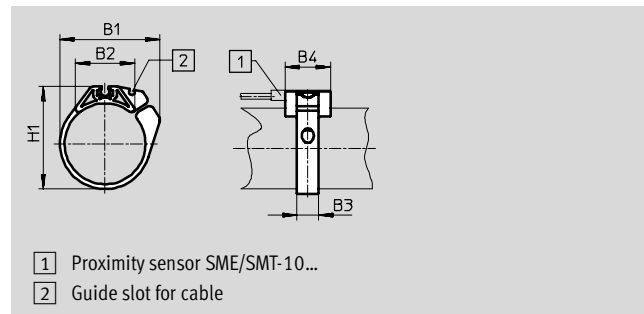
Ordering Data			
For Piston Ø	Part No.	Type	
125 ... 320	537809	SMBN-10	

Mounting Kit

Type SMBR

Material:

Polyacetate



Dimensions and Ordering Data							
For Piston Ø	B1	B2	B3 ±0.1	B4 ±0.1	H1	Part No.	Type
6	15.6	9.4	7	19	13.5	173226	SMBR-10-6
8	18.9	12.3	7	19	17.5	175101	SMBR-10-8
10	20.4	13.7	7	19	19.9	173227	SMBR-10-10
12	22.7	14.3	7	19	21.9	175102	SMBR-10-12
16	26.1	17	7	19	25.7	173228	SMBR-10-16
20	33.2	20.8	9	19	30.4	175103	SMBR-10-20
25	36.5	22.6	9	19	35.6	175104	SMBR-10-25
32	41.7	24.5	9	19	42.7	175105	SMBR-10-32
40	47	26.5	9	19	50.7	175106	SMBR-10-40
50	56.4	28.6	9	19	61.5	175107	SMBR-10-50
63	69.4	32	9	19	74.5	175108	SMBR-10-63

Ordering Data – Mounting Kit WSM-...-SME-10		Technical data → www.festo.com	
		Piston Ø	Part No. Type
	For rotary actuator, type DSM	6	173205 WSM-6-SME-10
		8	173206 WSM-8-SME-10
		10	173207 WSM-10-SME-10

Accessories For Actuator Feedback – For Position Transmitter Type SMAT-8E

Accessories

Plug Socket With Cable, Size M8

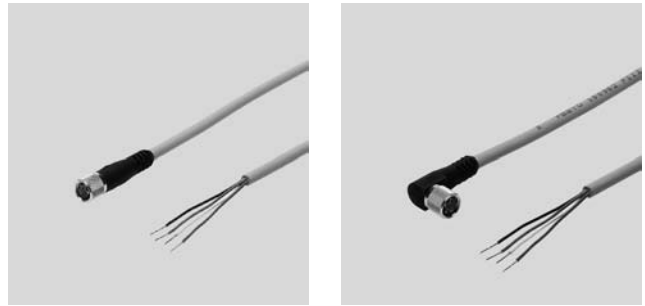
Type SIM-M8-4GD-...

Type SIM-M8-4WD-...

Material:

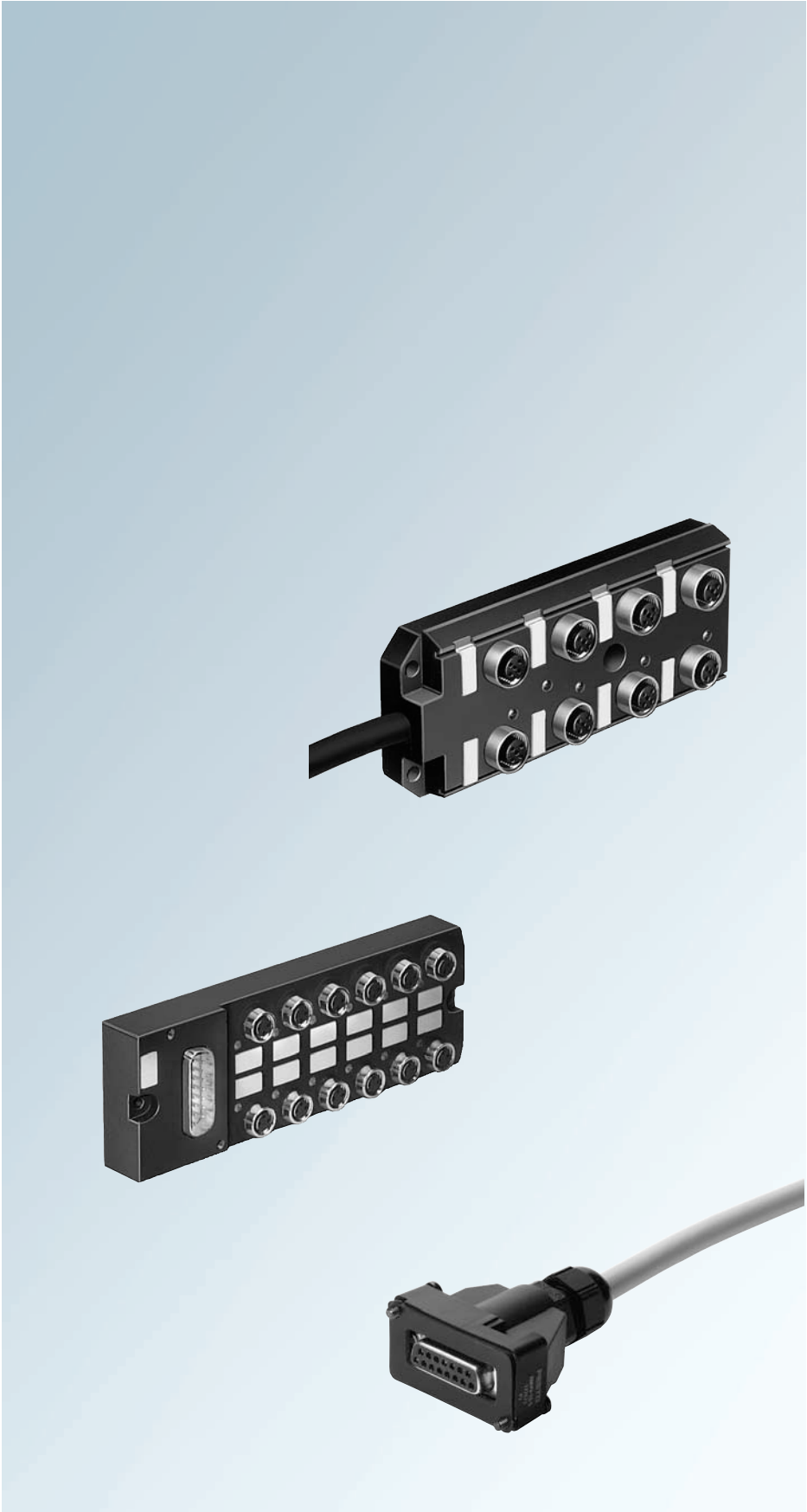
Housing: Polyurethane

Cable sheath: Polyurethane



Ordering Data					
Switching Output		Switching Status Display With LED	Cable Length [m]	Part No.	Type
PNP	NPN				
Straight Socket					
■	■	–	2.5	158960	SIM-M8-4GD-2.5-PU
■	■	–	5	158961	SIM-M8-4GD-5-PU
Angled Socket					
■	■	–	2.5	158962	SIM-M8-4WD-2.5-PU
■	■	–	5	158963	SIM-M8-4WD-5-PU

Multipin Distributors



8 or 12 Inputs/Outputs

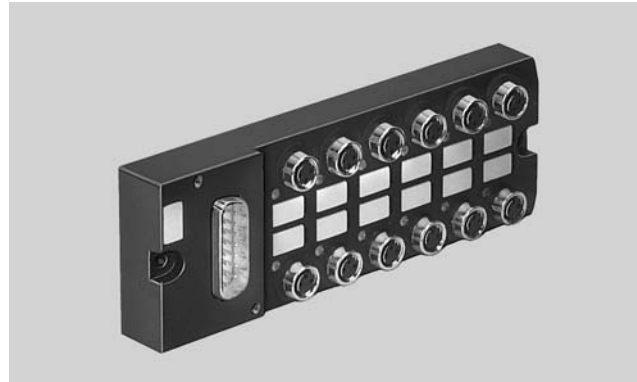
8 Inputs/Outputs

Technical Data

Multipin Distributor Modules, 8 or 12 Inputs/Outputs

8 or 12 Inputs or Outputs

Types MPV-E/A08-M8
MPV-E/A12-M8



Description

Multipin distributor modules, Types MPV-..., for connecting inputs and outputs from PNP sensors and 2-pole valves/actuators, feature integral yellow LED status indicators. The connection to sensors and valves is made via 3-pole M8x1 plug-in connections.

With Type MPV-E/A08-M8, eight sensors or valves/actuators can be connected. Twelve sensors or actuators can be connected to Type MPV-E/A12-M8.

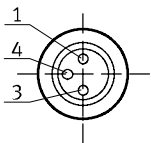
Type CPE valves, sizes 10 and 14 mm, can be connected to the multipin distributor with molded cables, Type KMYZ-... (ordered separately). When used as an output module for controlling solenoid valves, the multipin distributor should be electrically isolated according to DIN EN 60742.

Sensors can be connected using cables with pre-molded, plug-in connector, types KM-M8-..., or with sensor sockets, type SEA-GS-M8. Control signals from the PLC or electronic controller can be fed over a single cable, Type KMPV-SUB-D-..., with integral sub-D connector.

Technical Data

	Part No. Type	177669 MPV-E/A08-M8	177670 MPV-E/A12-M8
Mounting	Two through holes or on DIN rail (per DIN 50022)		
Operating voltage	10 to 30 V DC		
Acceptable current load	Max. 1A per card location (total current of all cards; max. 4A)		
Temperature range	-20 ... +80 °C		
Inputs/Outputs	No reverse polarity protection or short circuit protection		
Degree of protection	IP65 when plugged-in and screwed together		
Material	Housing: PA 6.5 sw VO; Bushes: CUZn, gal Au		
Weight	100 g		120 g

Pin Assignment



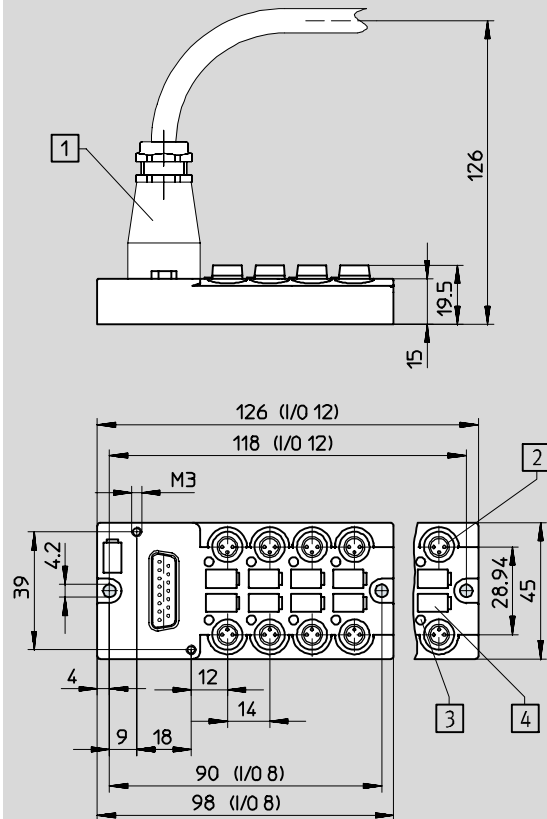
1 = 24 V DC
3 = 0 V
4 = Signal line

Technical Data, Ordering Data

Multipin Distributor Modules, 8 or 12 Inputs/Outputs

Dimensions

MPV-E/A...-M8



- 1 Multipin connector
- 2 3-pin socket M8x1
- 3 1 Switching status LED, yellow
- 4 Label

Ordering Data

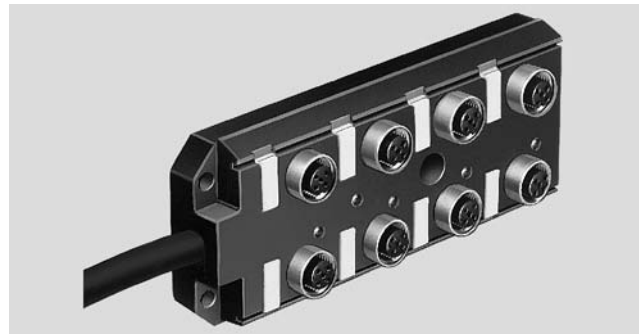
Description	Length	Type	Part No.
Cable with socket	0.5 m	KMYZ-2-24-M8-0.5-LED	177676
	2.5 m	KMYZ-2-24-M8-2.5-LED	177678
Sensor cable/socket	2.5 m	KM-M8-GSGD-2.5	165610
	5 m	KM-M8-GSGD-5	165611
Sensor connector (straight)	-	SEA-GS-M8	18576
Multipin cable/socket	10 m	KMPV-SUB-D-15-10	177674
	5 m	KMPV-SUB-D-15-5	177673
Multipin socket	-	SD-SUB-D-BU15	177675
Protective cover for M8 connector	-	ISK-M8	177672
Identification Labels (pkg. of 10)	-	IBS 6X10	18576
DIN rail (per DIN 50022)	2 m	NRH-35-2000	35430
Adapter for DIN rail mounting	-	CP-TS-HS35	170169

Technical Data

Multipin Distributor Module, 8 Inputs/Outputs

8 Inputs or Outputs

Type MPV-E/A08-M12



Description

Multipin distributor module, Type MPV-E/A08-M12 connects inputs and outputs from PNP sensors and 3-pole valves/actuators. They feature integral yellow LED status indicators and green LED operating indicators. The connection to sensors and valves is made via 5-pin M12x1 connections. Eight valves, actuators or sensors can be connected.

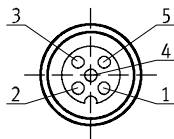
All CPE-18, CPE-24 and VDMA 24563 valves (sizes 02/01) can be connected with a premolded cable, Type KMEB-2-24-M12-...-LED, to the multipin I/O module.

Control signals from the PLC or electronic controller are fed over the integral multistrand cable.

Technical Data

Part No.	177671
Type	MPV-E/A08-M12
Mounting	Three through holes
Operating voltage	10 to 30 V DC
Acceptable current load	Max. 4A per card location (total current of all cards; max. 12A)
Temperature range	-20 ... +80 °C
Inputs/Outputs	No reverse polarity protection or short circuit protection
Degree of protection	IP67 when plugged-in and screwed together
Material	Housing: TBU; Bushes: CUZn, nickel-plated; Cable: PUR/PVC
Weight	200 g

Pin Assignment



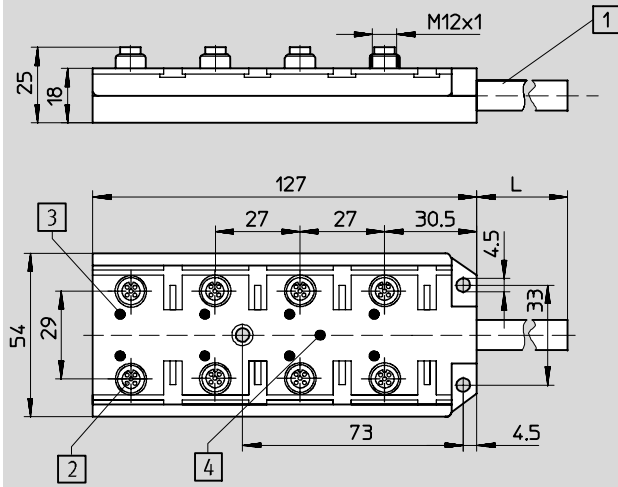
- 1 = 24 V DC
- 2 = Not used
- 3 = 0 V
- 4 = Signal line
- 5 = PE

Technical Data, Ordering Data

Multipin Distributor Module, 8 Inputs/Outputs

Dimensions

MPV-E/A08-M12



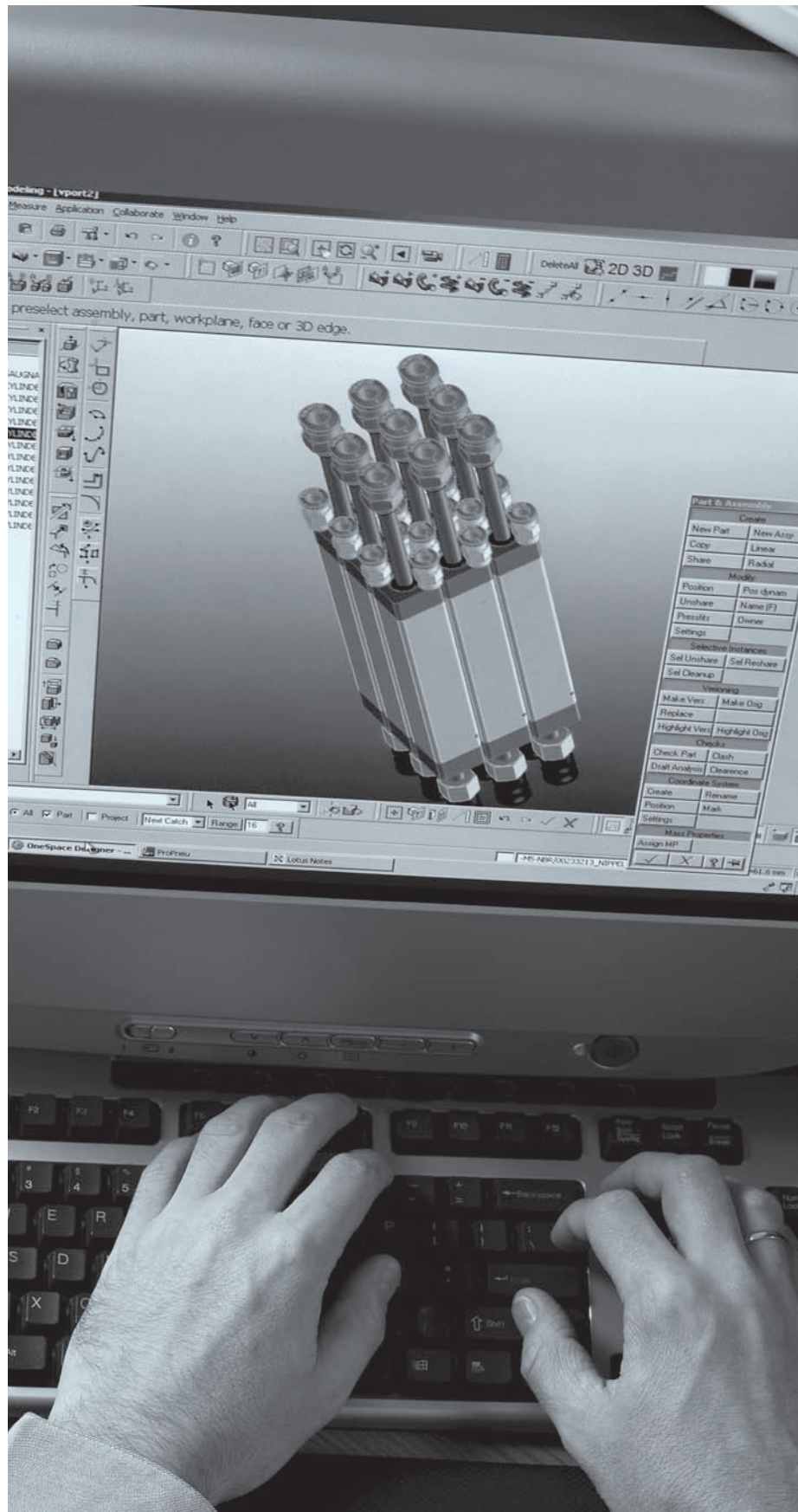
- 1 Connection cable, 5 m long
- 2 5-pin socket M12x1

- 3 1 Switching status LED, yellow
- 4 Power LED, green

Ordering Data

Description	Length	Type	Part No.
Cable with socket	0.5 m	KMEB-2-24-M12-0.5-LED	177677
Sensor cable/socket	2.5 m	KM12-M12-GSGD-2.5	18684
	5 m	KM12-M12-GSGD-5	18686
Sensor connector (straight)	-	SEA-GS-7	18666
Protective cover for M8 connector	-	ISK-M12	165592

Engineering Support



Glossary

Operating recommendations

Notes

Conversion factors

Note: When a term used within a definition is also included as an entry in this glossary, it is indicated by the term being set in **bold italics** within the definition.

A

Active Surface:

The surface of an **inductive proximity sensor** from which its magnetic field emerges, and which determines the **reference axis** of the sensor. Festo inductive proximity sensors have an active surface which is blue in color.

Active Sensing Area:

The total area in front of the **active surface** of an **inductive proximity sensor** in which the sensor is capable of detecting the presence of an object; the size of this area is defined by the sensor's switching distance for both **radial approach** and **axial approach**.

Analog Output:

Output current or voltage of a device which varies in direct proportion to the input.

Angle of Reflection:

The angle at which light is reflected from the surface of an object, measured in degrees.

Attenuating Material:

Any material (usually metallic) which will cause **attenuation** of the characteristic values of an **inductive proximity sensor** when present within the sensor's **active sensing area**.

Attenuation:

The **damping** effect on the field of an **inductive proximity sensor** when an object has entered its **active sensing area**.

Axial Approach:

The approach of a **standard test plate**, or object to be detected, directly along the **reference axis** of an **inductive proximity sensor** (i.e. decreasing distance between the plate or object and the **active surface** of the sensor).

C

Changeover switching:

Alternate term for **complementary switching**.

Cladding:

A layer of glass or polymer surrounding the light carrying fiber of **fiber-optic cable**. This material has a different refractive index than the optic fiber, and serves as a boundary for reflecting light along the length of the cable.

Complementary Switching:

A function available in a device which has both NO and NC electrical outputs, with one common connection. When both outputs are wired, actuation of the device causes both outputs to change status; the external circuit connected to the NC contact is broken, and the circuit connected to the NO contact is completed.

Correction Factors:

Pre-determined multipliers used to calculate switching gap for sensing objects made from materials with different degrees of conductivity or reflectivity.

Current Consumption:

The level of current consumed by a sensor at nominal voltage.

D

Damping:

The decrease of the amplitude of oscillation in the LC resonant circuit of an **inductive proximity sensor** as a result of **attenuating material** approaching the **active surface** of the sensor.

Dark Switching Sensor:

An **optical proximity sensor** which generates an active output when no light is present at the **photoreceiver**.

Deflection:

The "bending" of reflected light away from a **receiver** by **reflection** from another surface, usually one which did not affect the light before it reached the initial reflecting surface.

Diffuse Sensor:

An **optical proximity sensor** with **emitter** and **receiver** in the same housing. The light beam from the emitter is diffused (scattered) by the surface of an object being sensed; the portion of the diffused light which then enters the receiver is evaluated by the sensor's internal circuitry.

Diffusion:

The scattered **reflection** of light in many directions by irregular material surfaces (i.e. materials with low reflectivity or complex shapes).

Digital Output:

An output which changes value by a discrete increment in response to an incremental change in the input signal. If a device has only two unique values for the output, such as ON and OFF, the digital output may also be called a binary output.

Directed Reflection:

Causing reflected light to travel in a desired direction by means of special or additional reflecting surfaces.

E

Effective Switching Distance (gap):

The **switching distance** as determined under defined temperature and voltage conditions. For an **inductive proximity sensor**, this is typically +10% of the nominal **switching distance**.

Emitter:

An optical or pneumatic sensor unit, or a portion of such a unit, which produces an output that will be directed toward a **receiver** of the same type.

F

Fiber-optic Cable:

A "cable" made from flexible light conductive material, either glass fibers or polymer, which directs light applied at one end through to the other end by means of **reflection** and **refraction** off the material's boundary surface. The small diameter and flexibility of the cable allows it to be used to direct light in a concentrated beam to exactly the desired point. Fiber-optic cable is usually produced with **cladding** to minimize loss of light intensity over long distances.

Flush Mounting:

A term applied to a cylindrical bodied **inductive proximity sensor** which can be installed where metal or other material will surround it completely in the area near its **active surface**, without any affect on the sensor's characteristic values.

Free Zone:

The area near a cylindrical bodied **inductive proximity sensor** which must be free from metal to ensure that the sensor will function properly. For **flush mounting** sensors, the only free zone area to be considered is the measurement along its **reference axis** to any background object (i.e. beyond its sensing range). This distance must be at least 3 times the sensor's **nominal switching distance** (S_N). For **non-flush mounting** sensors, in addition to the above mentioned measurement, the free zone must also extend for a diameter of 3 times S_N around the center point of the active surface and for a distance of 2 times S_N back along the sensor body from the **active surface**. That is, the sensor must be installed with a clear "well" or "moat" around its active surface.

H

Hysteresis (H):

The difference between the switch-on point as an object enters the sensing range of a sensor and the switch-off point as the object leaves the sensing range. This is expressed as a percentage of the sensor's **effective switching distance**.

I

Inductive:

Having a function based on changes in the operating characteristics of an electro-magnetic coil.

Inductive Proximity Sensor:

A non-contact sensor which uses a high frequency oscillator (LC resonant circuit) to generate an electro-magnetic field, extending outward from the sensor's **active surface**, which is used to detect metallic objects approaching the sensor. An object penetrating the field absorbs energy from the field (through the formation of eddy currents at the metal's surface), thus causing **attenuation** (or **damping**) of the oscillator and triggering an output signal.

Infrared (IR) Light:

Light at the high end of the red portion of the electromagnetic light spectrum with a wavelength in the range of 780 nm to approximately 100 μm , and thus being invisible (not perceptible) to the unaided human eye.

L

Light Switching Sensor:

An **optical proximity sensor** which generates an active output when light is present at the **photoreceiver**.

Load Current:

The maximum current which may be applied to a sensor in continuous operation. A power supply must be provided with an appropriately filtered secondary winding.

M

Maximum Load Current:

An alternate term for **load current**.

Minimum Load Current:

The minimum current required for safe operation of a sensor while in the switched state.

Modulated Light Operation:

Use of a **receiver** tuned to test for the presence of a modulated (pulsed) light beam from the **emitter**, to reduce the possibility of false output signals in response to ambient or transient light.

N

Nominal Ambient Temperature:

The ambient temperature at which all technical operating data is calculated.

Nominal Range:

Standard specified range of light barriers. This range is established in a dry and clean environment and includes a reserve range to cover sundry tolerances. In the case of a **retro-reflective sensor** this range refers to the reflector specified for the sensor.

Nominal Sensing Range:

Standard specified sensing range of a **diffuse sensor**.

Nominal Switching Distance (S_N):

The switching distance of a proximity sensor at nominal supply voltage and nominal temperature without compensation for production tolerances.

Non-attenuating Material:

Any material which does not significantly affect the characteristic values of an **inductive proximity sensor**.

Non-flush Mounting:

A term applied to a cylindrical bodied **inductive proximity sensor** which requires a **free zone** around the **active surface** and the end of the sensor body when fitted in metal or other material, in order to maintain the sensor's characteristic values.

NPN Output:

An output from a switching device which connects the negative potential to the load when the device is actuated. NPN outputs are negative switching (sinking).

O

Operating Reserve Factor:

For an **optical proximity sensor**, the operating reserve factor (b) is derived from the quotient of the actual received optical signal power P_E in relation to the necessary optical signal power P_S at the switching level: $b = P_E / P_S$.

Optical Proximity Sensor:

A sensor which utilizes infrared or visible red light as a medium for the detection of the absence or presence of an object. In Festo optical proximity sensors, the light is generated by a gallium-aluminum-arsenide (GaAlAs) LED in the **emitter**. When the light beam is sensed as either present or not present (or interrupted) by the **photoreceiver**, the solid-state circuitry changes state and turns an output signal on or off.

Optoelectronic Sensor:

An alternate term for **optical proximity sensor**.

P

Photoelectronic Sensor:

An alternate term for **optical proximity sensor**.

Photoreceiver:

A solid state photo-transistor or photo-diode in an optical **receiver** sensor which converts light received from an **emitter** to a signal used by an electronic circuit to turn an output signal on or off. The photoreceiver is tuned to the pulse-modulated output frequency of the emitter, reducing the effects of ambient or transient light.

Phototransmitter:

An alternate term for an optical **emitter**.

Piezo-resistive Principle:

Production of a variable electrical output signal by using a piezo-resistive strain gage circuit.

Pneumatic Proximity Sensor:

A non-electrical proximity sensor which uses a jet of low pressure compressed air as the medium for detecting the absence or presence of an object. The presence of an object is indicated by a change in a low pressure pneumatic output signal.

PNP Output:

An output from a switching device which connects the positive potential to the load when the device is actuated. PNP outputs are positive switching (sourcing).

Protection Class IP:

A two-character code specifying an electrically-energized device's protection against contact and penetration by foreign matter (such as dust) and water, when tested under specified conditions of IEC 529 (DIN 40050).

Q

Quiescent Current:

The actual current consumed by a sensor at maximum operating voltage without load.

R

Radial Approach:

The approach of a **standard test plate**, or object to be detected, at a right angle to the **reference axis** of an **inductive proximity sensor** (i.e. moving parallel to the **active surface** of the sensor).

Range:

The maximum distance between the **emitter** and **receiver** of a **through-beam sensing** setup or a **retro-reflective sensor** and the **reflector**.

Real Switching Distance (S_r):

The **switching distance** of an **inductive proximity sensor** measured at nominal voltage and nominal temperature, taking into account manufacturing tolerances. Maximum deviation from the **nominal switching distance** is $\pm 10\%$.

Receiver:

An optical or pneumatic sensor unit, or a portion of such a unit, which receives the output from the **emitter**.

Reference Axis:

For an **inductive proximity sensor**, the axis passing vertically through the center point of the **active surface** which determines the direction in which the sensor generates its magnetic field.

Reflection:

The return of light from the surface of an object. The angle at which the light is reflected is related to the angle at which the light strikes the object and the material composition (i.e. reflective quality) of the object.

Reflector:

An optical aid, made of molded plastic or mylar film, often of **triple-reflector** design, used to direct light generated from a **retro-reflective sensor** back to its **receiver** section.

Reproducible Switching Accuracy (Reproducibility) (R):

The repetition accuracy of two successive switching operations during an 8-hour period measured at constant ambient temperature and constant voltage with max $+5\%$ deviation.

Residual Current (I_r):

The amount of current which flows through the load connected to a switching device when in the off state (contact circuit is open).

Residual Ripple:

The maximum permissible AC voltage (peak-to-peak) which may be superimposed on the switching or operating voltage. Festo inductive proximity sensors are designed for max 2.4 V residual ripple.

Residual Voltage (V_r):

The amount of output voltage which can be measured across the load connected to a switching device when in the off state (contact circuit is open).

Response Time:

The interval between the beginning of influence of an object on a proximity sensor's field and the switching through time of the output. (Duration of the influence must be at least equal to the response time for the object's presence to sensed.)

Retro-reflection:

Directed reflection of light which causes it to return toward its source.

Retro-reflective Sensor:

An **optical proximity sensor** which has an **emitter** and **receiver** both contained in the same housing. Light generated by the emitter strikes a **reflector** and is returned to the sensor's receiver. By using **fiber-optic cable** in conjunction with a retro-reflective sensor, it can be used without a reflector for **through-beam sensing**.

S

Sensing Range:

The distance between a **diffuse sensor** and a reference surface of specified dimensions (matt white paper) as it approaches the device in the direction of the axis until a signal change takes place.

Sensor:

A device capable of responding to physical stimuli and generating an output signal. Used in automated systems to provide intelligent feedback on system status or to provide control signals to system actuators.

Short-time Current (I_k):

The highest value of current which may flow through an electrical switching contact for a specified time at the time of switch-on.

Sinking: See **NPN output**.

Sourcing: See **PNP output**.

Standard Test Plate:

A mild steel test plate, square in shape and 1 mm thick, used in carrying out comparative measurements of the switching distances of **inductive proximity sensors**. The length of a side of the square for making measurements with a particular sensor is the greater of either (a) the diameter of the sensor's active surface, or (b) three times the sensor's **nominal switching distance**.

Switching Distance:

The distance at which a standard target approaching the active surface of an inductive proximity sensor generates a signal change. Four different values of switching distance are used:

S_N = **Nominal switching distance**

S_r = **Real switching distance**

S_U = **Useful switching distance**

S_a = **Working switching distance**

Real switching distance is specified as $0.9 S_N < S_r < 1.1 S_N$.

Useful switching distance is generally specified as $0.9 S_r < S_U < 1.1 S_r$, or, substituting for real switching distance as above, $0.81 S_N < S_U < 1.21 S_N$.

Switching Frequency:

The number of on-off cycles which the device is capable of switching in one second. Expressed in hertz (Hz). Calculated as the reciprocal value of the sum of the response and switch-off times. European Standard EN 50010 establishes the method of measuring switching frequency using a number of **standard test plates** attached to the perimeter of a rotating drum or disk.

Switching Hysteresis:

See **Hysteresis**.

Switch-off Time:

The interval between the end of influence of an object on a proximity sensor's field and breaking of the output signal.

Switch-on Delay:

The interval of time between the application of supply voltage to a device and its being ready to operate.

T

Temperature Drift:

Variation of the sensor's sensitivity/response due to changes in ambient temperature. For Festo optical sensors, this is less than 0.5% of the **nominal switching distance** (S_n) per degree C.

Through-beam Sensing:

A method of using **optical proximity sensors**. A light path (beam) is established by the placement of an **emitter** and a **receiver** opposite each other on a machine. (Alternatively, a **retro-reflective sensor** and **fiber-optic cable** can be used to establish the light path.) When an object enters the path and breaks the beam, the receiver acknowledges its presence by changing the state of its output signal.

Transmitter:

See **Emitter**.

Triple Reflector:

An optical aid which produces **retro-reflection** by means of multiple reflection of light from its pyramid-shaped inner surfaces.

V

Vacuum:

The condition within any portion of a pneumatic system or component when actual pressure is less than atmospheric pressure. A vacuum condition can only exist when the air passageway or container being measured (gauged) is sealed from the atmosphere; when that portion of the system or component is vented, the vacuum is lost. In SI units, vacuum is expressed as negative bar (– bar); in English units, it may be expressed as either negative psi (– psi) or inches of mercury (in Hg, without using the negative sign).
1 psi = 2.04 in Hg.

Voltage Drop (V_d):

The maximum voltage drop across a sensor when in the on state and the load is drawing maximum rated current.

U

Useful Switching Distance (S_u):

The switching distance of an **inductive proximity sensor** within the full rated supply voltage and temperature ranges. Maximum deviation from the **real switching distance** is $\pm 10\%$.

W

Working Switching Distance (S_a):

Switching distance of an **inductive proximity sensor** within which reliable operation is guaranteed, independent of manufacturing tolerances or environmental factors. The values are between 0 and the lowest value of the **useful switching distance**.

What Must Be Observed When Using Festo Components?

Specified limit values for technical data and any specific instructions must be adhered to by the user in order to ensure recommended operating conditions.

When Festo components are used in safety-oriented applications, the user shall ensure that all applicable national and local safety laws and regulations, together with the relevant references to standards, are observed. Unauthorized conversions or modifications to products and systems from Festo involve a safety risk and are thus not permissible. Festo does not accept any liability for resulting damages.

You should contact Festo's advisors if one of the following apply to your application:

- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.

All technical data applies at the time of going to print.

Festo Product Range

Integrated Systems



- Design, documentation, assembly/testing
- Single and multi-axis linear and rotary systems
- Stepper controls, servo pneumatic and servo electric systems

Control Systems



- Design, documentation, assembly/testing
- Cabinets are designed, manufactured, assembled, and tested per NEMA, UL, and IEC standards
- Standard and stainless steel enclosures

Pneumatic actuator and Grippers



- ISO and NFPA cylinders
- Linear and rotary actuator
- Standard, precision, and micro grippers plus accessories

Electromechanical actuator



- Belt and ball screw driven linear actuator
- High accuracy and repeatability
- High rigidity and speed

Pneumatic Valves and Valve Manifolds



- Valves**
 - In-line/sub-base directional control valves
 - OSHA compliant lockout valves
 - Proportional valves
- Valve Manifolds**
 - Direct, multi-pin, and fieldbus manifolds

Sensors and Control Technology



- Inductive, optical, mechanical, pressure and vacuum sensors
- PLCs and IPCs
- Remote access panels [HMI]
- Counters, timers and gauges

Air Preparation



- Filters
- Regulators
- Lubricators
- Dryers
- Combination units

Vacuum Components



- Vacuum generators
- Suction cups and suction grippers
- A variety of suction cup types and materials are available

Fittings and Tubing



- Inch/metric fittings, hybrid fittings, and flow controls
- Inch/metric tubing (various materials and colors)

Industry Specific Solutions



- Cylinders, manifolds, tubing and fittings for use in washdown environments
- Linear/rotary actuator with and without a process valve; diaphragm valves, Namur valves

For more information about the entire Festo product range, including technical specifications, CAD models, product selection software, and access to our on-line store, visit us at www.festo.com/us.

Conversion Factors

The conversion table below includes the most commonly used for designing a system. They are given to enable the user to make necessary calculations.

Length or Distance

$$\text{m} \rightarrow \text{ft} = \times 3.281$$

$$\text{mm} \rightarrow \text{inch} = \div 25.4$$

Volume

$$\text{cm}^3 \rightarrow \text{in}^3 = \times 0.061$$

Mass

$$\text{g} \rightarrow \text{lb} = \times 0.002$$

$$\text{kg} \rightarrow \text{lb} = \times 2.2046$$

Pressure

$$\text{bar} \rightarrow \text{psi} = \times 14.7$$

Temperature

$$\text{C}^\circ \rightarrow \text{F}^\circ = \times [1.8] + 32$$

Flow

$$\text{l/min} \rightarrow \text{Cv} = \times 0.001$$

$$\text{l/min} \rightarrow \text{scfm} = \times 0.0353$$

Force

$$\text{N} \rightarrow \text{lbf} = \times 0.2248$$

$$\text{kgf} \rightarrow \text{N} = \times 9.80665$$

Moment

$$\text{Nm} \rightarrow \text{in-lb} = \times 8.8507$$

$$\text{Nm} \rightarrow \text{ft-lb} = \times 0.7376$$

Moment of Inertia

$$\text{kg}\cdot\text{cm}^2 \rightarrow \text{lb}\cdot\text{in}^2 = \times 0.3417$$

$$\text{kg}\cdot\text{m} \rightarrow \text{lb}\cdot\text{ft} = \times 7.233$$

$$\text{kg}\cdot\text{m}^2 \rightarrow \text{oz}\cdot\text{in}^2 = \times 5.4675$$

© Copyright 2006, Festo Corporation

While every effort is made to ensure that all dimensions and specifications are correct, any printing errors not rectified are outside the control of Festo, who cannot be held responsible for the same. For Liability and Warranty conditions, refer to our standard "Conditions of Sale", available on request from your local Festo office.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Festo. All technical data subject to change according to technical update.

Festo North America

United States

For ordering and product assistance, or to find your nearest Festo Distributor in the USA, contact us via:

Phone: 1.800.99.FESTO
Fax: 1.800.96.FESTO
Email: customerservice@us.festo.com
www.festo.com/us

Customer Resource Center
502 Earth City Expressway
Suite 125
Earth City, MO 63045
Call Toll-free: 1.800.993.3786
Fax Toll-free: 1.800.963.3786

Headquarters
Festo Corporation
395 Moreland Road
P.O. Box 18023
Hauppauge, NY 11788

Sales Offices

Boston
120 Presidential Way
Suite 330
Woburn, MA 01801

Charlotte
4301-S Stuart Andrew Blvd.
Charlotte, NC 28217

Chicago
1441 East Business Center Drive
Mt. Prospect, IL 60056

Dallas
1825 Lakeway Drive
Suite 600
Lewisville, TX 75057

Detroit
1228 Kirts Blvd.
Suite 400
Troy, MI 48084

New York
395 Moreland Road
Hauppauge, NY 11788

Silicon Valley
2800 Collier Canyon Road
Livermore, CA 94550

Design and Manufacturing Facilities



East: 395 Moreland Road, Hauppauge, NY 11788



Central: 1441 East Business Center Drive, Mt. Prospect, IL 60056



West: 2800 Collier Canyon Road, Livermore, CA 94550

Mexico

Headquarters
Festo Pneumatic, S.A.
Av. Ceylán 3
Col. Tequesquahuac
54020 Tlalnepanitla
Edo. de México
Phone: 011 52 [55] 53 21 66 00
Fax: 011 52 [55] 53 21 66 65
Email: festo.mexico@mx.festo.com
www.festo.com/mx



Canada

Headquarters
Festo Inc.
5300 Explorer Drive
Mississauga, Ontario L4W 5G4
Phone: 1.905.624.9000
Fax: 1.905.624.9001
Email: info_ca@festo.com
www.festo.com/ca



Festo Worldwide

Argentina Australia Austria Belarus Belgium Brazil Bulgaria Canada Chile China Colombia Croatia Czech Republic Denmark Estonia Finland France Germany Great Britain Greece Hong Kong Hungary India Indonesia Iran Ireland Israel Italy Japan Korea Latvia Lithuania Malaysia Mexico Netherlands New Zealand Norway Peru Philippines Poland Romania Russia Serbia and Montenegro Singapore Slovak Republic Slovenia South Africa Spain Sweden Switzerland Taiwan Thailand Turkey Ukraine United States Venezuela

www.festo.com