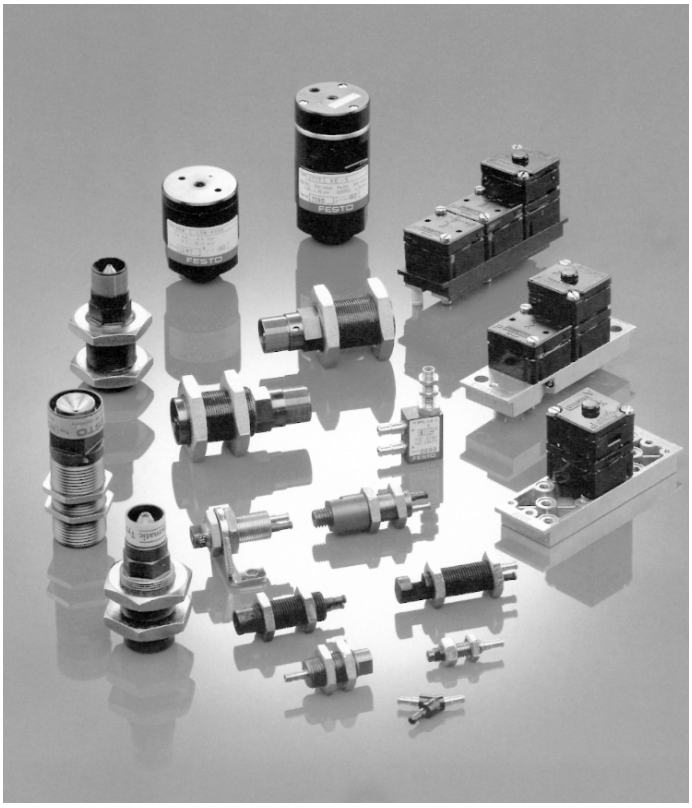
FESTO

Non-Contact Pneumatic Sensors



Non-Contact Pneumatic Sensors Offer Sensing Versatility Without Electrical Connections in the Sensing Environment

Pneumatic sensors are immune to variation in ambient light conditions or nearby electro-magnetic fields.

Tiny objects or objects in highly constricted, remote or hazardous areas can be detected.

Features

- **Reliable even where there is a large amount of dirt (self-cleaning due to emitted air jet).**
- **Reliable operation with high ambient temperatures (around foundries and welding equipment).**
- **Use even in explosive environments (chemical industry, pyrotechnics and paint industries).**
- **As opposed to electrical, optical, and acoustic elements, insensitive to magnetic influences and sound waves.**
- **Reliable even in complete darkness and when sensing transparent objects (glass, clear plastic, etc.)**
- **Maintenance-free with unlimited life (no moving parts).**

The high accuracy, high reliability and compact size of Festo non-contact, pneumatic sensors make them particularly suited to close tolerance applications in confined, hard-to-reach spaces, or in tough, dirty or hazardous environments.

Sensing accuracy within 0.004", plus fast response and rugged, self-cleaning design provide the superior dependability you need. These sensors are ideal replacements for mechanical limit valves and electrical switches. Pneumatic/electric converters can be used for interfacing with remote electrical controls in hybrid systems.

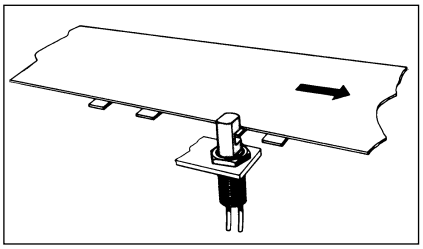
Operation
Non-contact, pneumatically operated sensors detect the presence of an object or its distance by means of an air jet. Object presence is indicated by a variation in the signal pressure output.

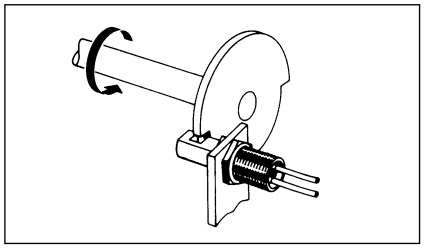
Three functional sensor categories:

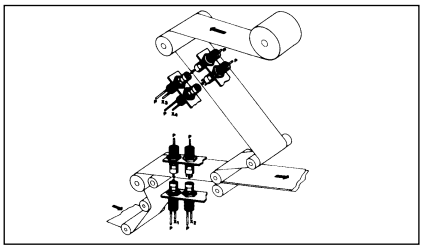
- **Air-barrier Gap/Sensors**
  Interruption of an air jet between the sender nozzle and the receiver by the object being sensed results in a lowering of signal pressure at the receiver.
- **Reflex Proximity Sensors**
  Reflection of an air jet from the object being sensed results in a rise of signal pressure at the output port, depending on a sense-range and supply pressure.
- **Back Pressure Sensors**
  Blocking of the air jet opening with the object being sensed results in a rise of signal pressure at the output port to the level of supply pressure.

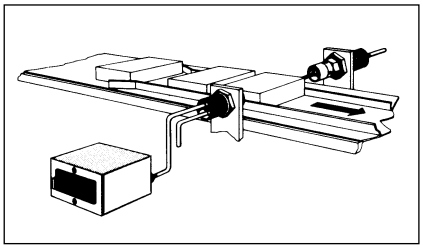
The drawings below illustrate the usage of various sensors. For maximum sensing ranges, see page 187.

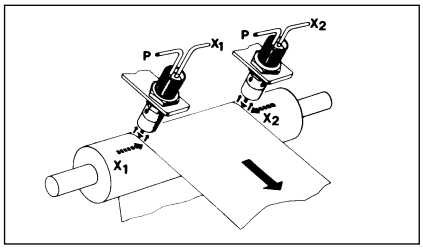
Typical Applications


Strip monitor (gap sensor)

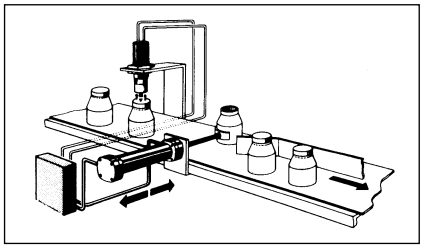

Cam-type rotational position sensor (gap sensor)


Edge control (air-barrier)


Parts counting/pressure indicates (air-barrier)



Edge control (reflex proximity sensor)


Part-in-place or end-position sensing (reflex proximity sensor)

All Festo products can be ordered from your local Festo Distributor or from Festo Regional Centers.
A Festo Order Number consists of a Part No. and a Type code, as described here:

Part No.	Type
100430	SFL – 100 – S

SD-2
SD-3 = Back Pressure End Stops

Y-PK-3-N = Y-Connector with barbed fitting for 3/16 in./3 mm tubing

SD-3-N = Back pressure liquid level sensor

RML-4.8-S
RML-5
RML-4
RML-15 = Reflex Sensors

SML-40-S
SFL-100-S = Air Barrier Sensors, Sender

SFL-100-F = Air Barrier Sensors, Receiver

SFL-6 = Gap Sensor

Ordering Example
To order sender and receiver air barrier sensors for sensing distances up to 4.0/100 mm, order:

Qty	Part No.	Type
1	**100430**	**SFL-100-S**
1	**100431**	**SFL-100-F**

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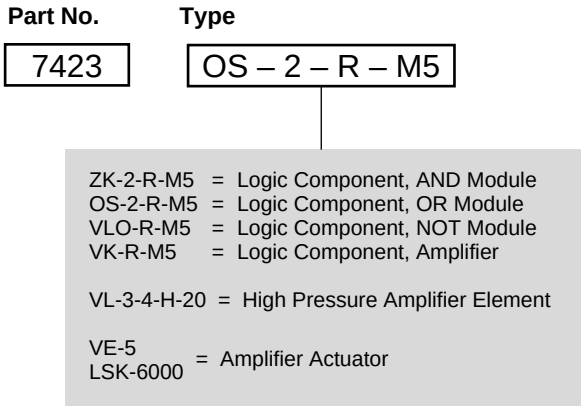
A Festo Order Number consists of a Part No. and a Type Code, as described here.

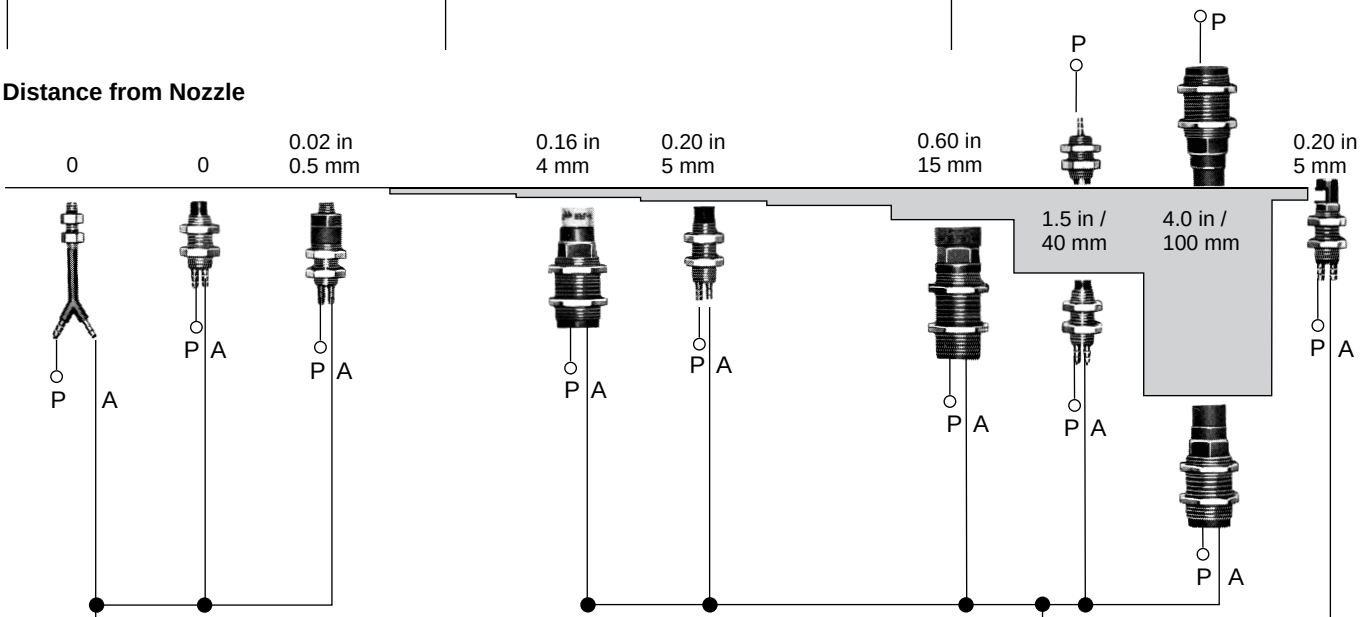


Ordering Example
To order an OR module logic component for sensor output signals, order:

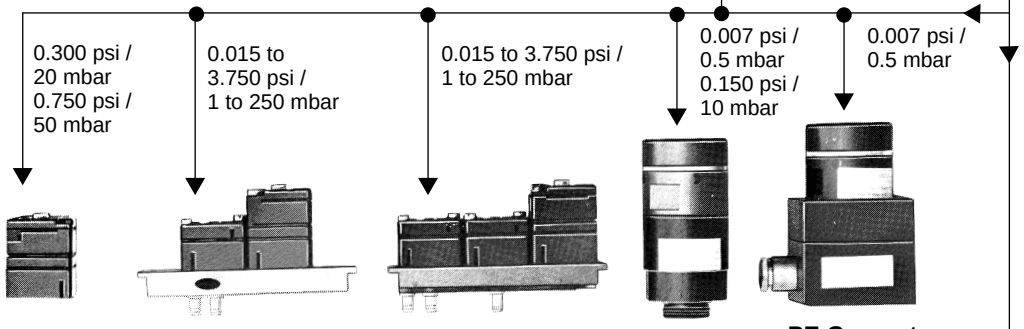
Qty	Part No.	Type
1	**7243**	**OS-2-R-M5**

Back Pressure Sensors			Reflex/Proximity Sensors			Air Barrier Sensors		
			RFL-4	RML-5	RFL-15	SML-40 S	SFL-100 S	SFL-6
SD-2	SD-3	SD-3-N		RML-4.8-S		SD-3	SFL-100 F	

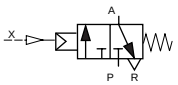
Distance from Nozzle



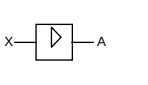
Response Pressure 0.008 to 1.500 psi / 0.5 to 100 mbar



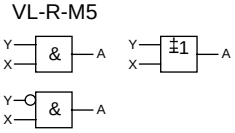
VL-3-4-H 20



VK-R-M5



ZK-2-R-M5
OS-2-R-M5
VL-R-M5

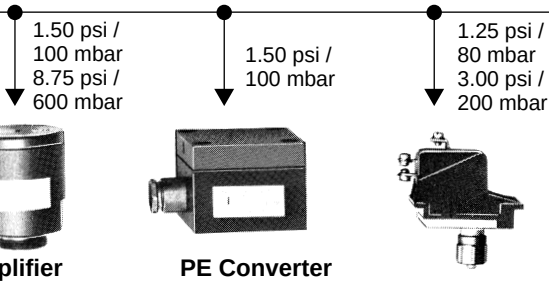


VE-5

PE Converters

PE-VK-5.1

Response Pressure > 1.50 psi / 100 mbar



Amplifier

LSK-6000

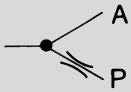
PE Converter

PE-1000

PE-PK-4
PE-PK-4-SW

Back Pressure End Stop
Type SD-2 Type SD-3

Barbed Restrictor Y-Connector
Type Y-PK-3-D



Mounting Block for SD-3
Type SDA-12 x 1-B

Back pressure sensors are used as limit switches and end stops to transmit signals dependent upon distance.

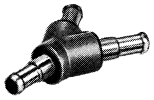
Type SD-3 can be used as an air barrier sensor in combination with the SML-40-S ejecting nozzle. See page 200.

These devices are especially suited for limit sensing and positioning control where a high degree of accuracy is required and where available operating forces are minimal. Because of their small size, they can be used in inaccessible areas at varying ambient temperatures and in a dirty atmosphere.

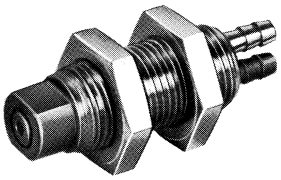
The mounting block, Type SDA-12 x 1-B, securely holds the SD-3 when it is used as a limit stop (end stop).

Type SD-2

Type Y-PK-3-D



Type SD-3



The back pressure sensor is connected to the compressed air supply at connection P (black). With the valve in open position, the air flows outward. If the nozzle is blocked, a signal appears at outlet A (yellow), which may reach as high as the supply pressure. The signal will remain as long as the nozzle is blocked.

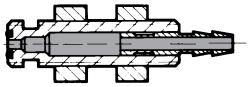
The back pressure sensor, Type SD-2, is used with a separate air supply throttling system. The restrictor Y-fitting, Type Y-PK-3-D, may be used for this purpose (connection P with 0.016 in / 0.4 mm throttle black, connection A yellow).

The following measures are recommended to reduce air consumption:

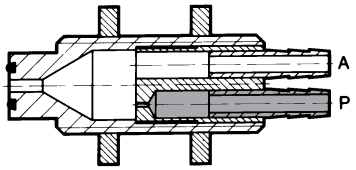
(a) Supply the back pressure nozzle with compressed air only if a signal is to be generated.
(b) Install a needle valve in air line P if the pressure is greater than 45 psi / 3 bar.

If the signal pressure from the sensor does not equal the actuating pressure required for the downstream unit, a pressure amplifier must be used.

Type SD-2



Type SD-3

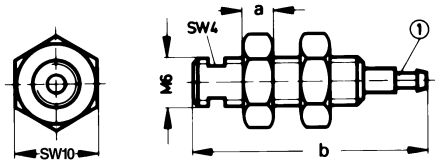


P = Supply
A = Outlet

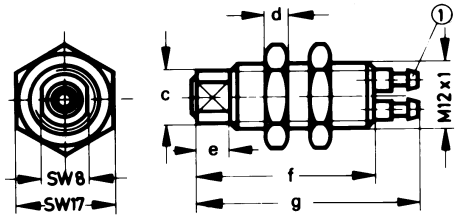
Order Number / Part No./Type	7455 SD-2	4498 SD-3	7456 Y-PK-3-D	11541 SDA-12 x 1-B
Medium	Compressed air (filtered, lubricated or unlubricated)			
Mounting	M6 with mounting nuts	M12 x 1 with mounting nuts	Tubing connections	Through holes
Mounting Hole Diameter	0.26 in / 6.5 mm	0.5 in / 12.5 mm		
Connection	Barbed fitting for 3/16 in / 3 mm tubing			
Orifice Size	0.098 in / 2.5 mm (throttle 0.016 in / 0.4 mm)			
Supply Pressure Range at P*	0 to 120 psi / 0 to 8 bar			
Signal Pressure Range at A	See graphs on page 226			
Air Consumption	See graphs on page 227			
Min. Closing Force	8.9 psi / 0.615 bar x supply pressure	12 psi / 0.83 bar x supply pressure		
Ambient Temperature	-40 to +212°F / -40 to +100°C†		14 to 140°F / -10 to +60°C	
Design	Nozzle, no moving parts			
Material	Stainless steel (face-hardened), brass. Seals: Buna N.		Brass, plastic	Steel, galvanized
Weight	0.015 lb / 0.007 kg	0.044 lb / 0.020 kg	0.011 lb / 0.005 kg	0.265 lb / 0.120 kg

*14 to 140°F / -10 to +60°C † Depending on tubing used.

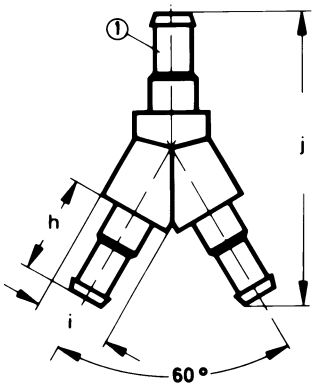
Type SD-2



Type SD-3



Type Y-PK-3-D



Dimensions

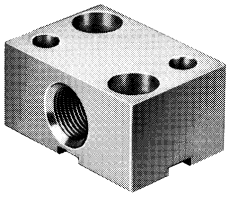
a 0.20 in / 5 mm
b 1.16 in / 29.5 mm
c 0.39 in / 10 mm
d 0.16 in / 4 mm
e 0.24 in / 6 mm
f 1.26 in / 32 mm
g 1.58 in / 40 mm
h 0.33 in / 8.5 mm
i 0.26 in / 6.5 mm
j 1.00 in / 25.5 mm

① Barbed fitting for 3/16 in / 3 mm tubing, connection P black, connection A yellow

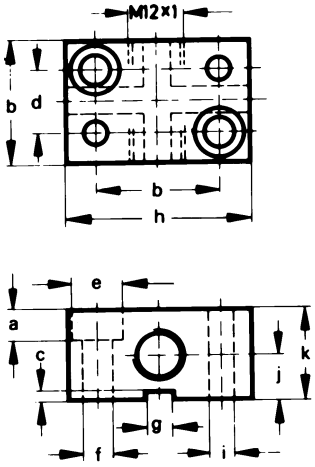
SW = wrench size, mm

Mounting Block, Type SDA

for Back Pressure Sensors, Type SD



Type SDA-12 x 1-B

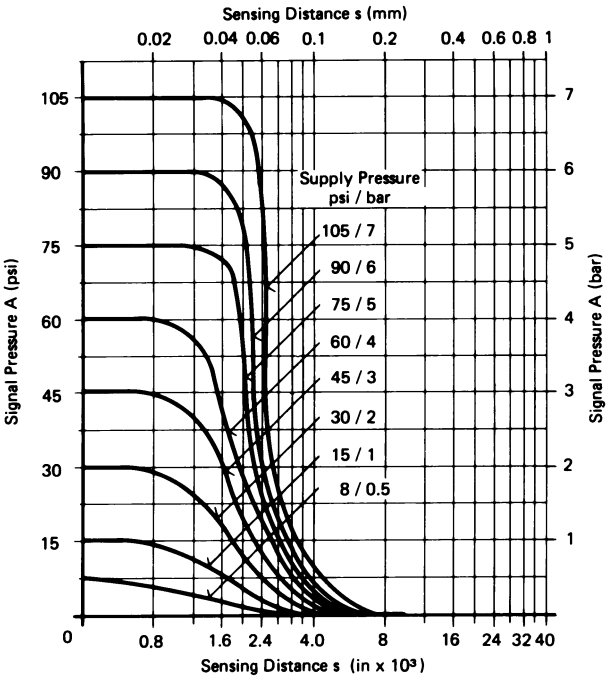


Dimensions

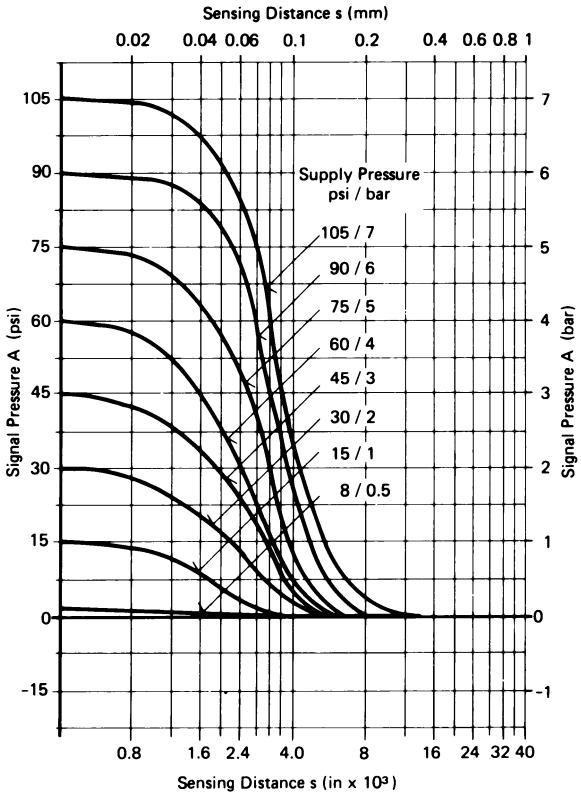
a 0.27 in / 6.8 mm
b 1.06 in / 27 mm
c 0.08 in / 2 mm
d 0.55 in / 14 mm
e 0.43 in / 11 mm
f 0.26 in / 6.6 mm
g 0.24 in / 6 mm
h 1.57 in / 40 mm
i 0.23 in / 5.8 mm
j 0.39 in / 10 mm
k 0.79 in / 20 mm

Signal Pressure Versus Sensing Distance and Supply Pressure at Back Pressure Sensors

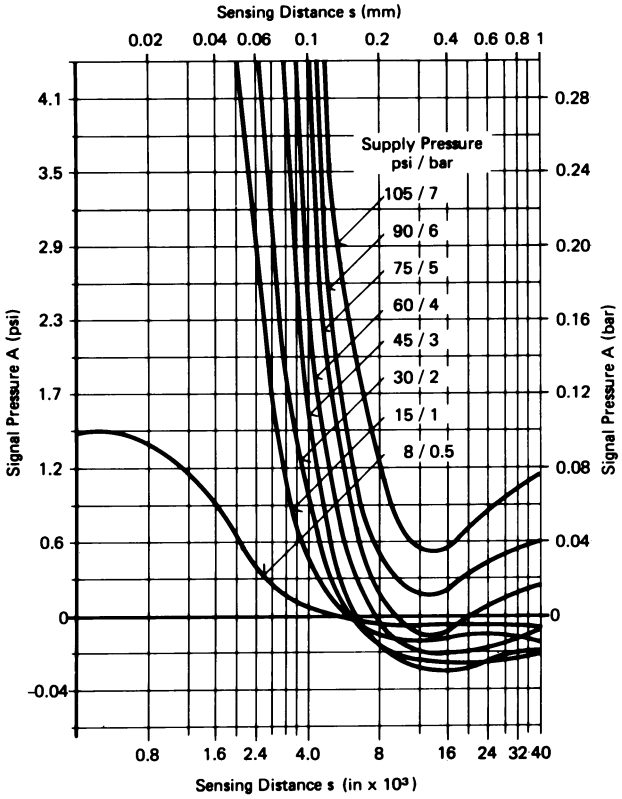
Type SD-2



Type SD-3
(Graph 1)



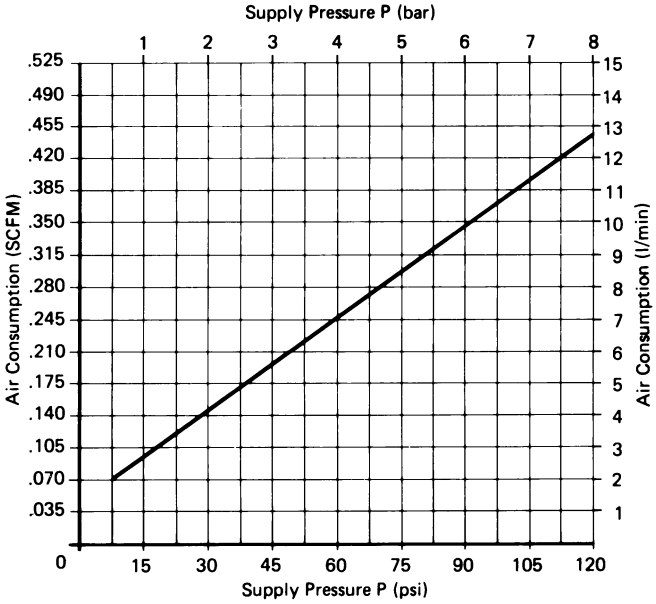
Type SD-3
(Detail - Graph 1)



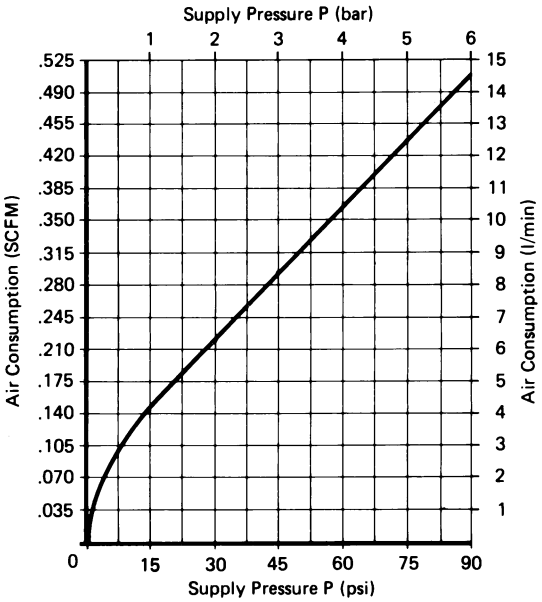
Note: Selection of supply pressure is critical for obtaining signals that approach either digital or analog outputs as required by individual applications.

Air Consumption versus Supply Pressure

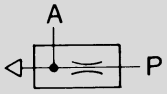
Type SD-2 with Y-PK-3-D

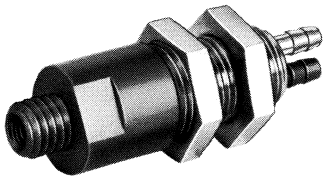


Type SD-3



Back Pressure Liquid Level Sensor
Type SD-3-N





This back pressure sensor generates a signal when a certain liquid level is reached.

The device is supplied with compressed air at connection P (black). The recommended supply pressure range is 1.5 to 2.25 psi / 0.1 to 0.15 bar. When the valve is not operating, the supply air flows outward through the sensing tube. As soon as the rising liquid obstructs the opening of the sensing tube, a signal appears at port A (yellow). The signal is proportional to the height of the liquid over the tube opening as well as to weight, reaching as high as the supply pressure. The signal pressure persists as long as the outlet is obstructed by the liquid.

The nominal diameters of tubing or hoses between the liquid surface and the back pressure sensor should be selected on the basis of distance, using the following table:

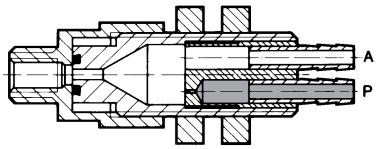
Tubing Length	Orifice Diameter
20 in / 0.50 m	0.1 in / 2.5 mm
40 in / 1.00 m	0.12 in / 3 mm
100 in / 2.50 m	0.16 in / 4 mm
200 in / 5.00 m	0.24 in / 6 mm

Since the sensing tube comes into contact with liquid, the material selected should be a material capable of withstanding liquid or vapor. Probable temperatures should also be taken into account.

If the surface to be sensed is highly agitated, cushioning should be provided. For this purpose, the sensing tube may be fitted with an outer casing with one or more small holes in the bottom so that the liquid surface within remains calm.

A pneumatic sensing system offers distinct advantages for liquids with a high degree of foam. While electronic sensing devices often respond to foam, the pneumatic signaling device registers a pressure change only if the liquid surface of higher specific gravity reaches it.

Accessories:
Mounting brackets, see page 199.



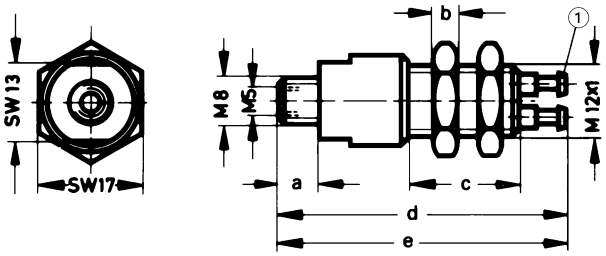
P = Supply
A = Outlet

Order Number Part No./Type	7457 SD-3-N
Medium	Compressed air (filtered, unlubricated)
Mounting	M12 x 1 with mounting nuts
Mounting Hole Diameter	0.5 in / 12.5 mm
Connection	Barbed fittings for 3/16 in / 3 mm tubing
Orifice Size	0.1 in / 2.5 mm (throttle 0.016 in / 0.5 mm)
Supply Pressure Range at P*	0-120 psi / 0-8 bar (preferably 1.5-2.25 psi / 0.1-0.14 bar)
Signal Pressure Range at A	0 to supply pressure
Air Consumption at 1.5 psi / 0.1 bar	3.5 x 10^2 SCFM / 1 l/min
Ambient Temperature	-40 to +212°F / -40 to +100°C†
Design	Nozzle, no moving parts
Material	Housing: stainless steel, Al. Seals: Buna N
Weight	0.06 lb / 0.025 kg

* 14 to 140°F / -10 to +60°C temperature range of medium

† Depending on tubing used

Type SD-3-N



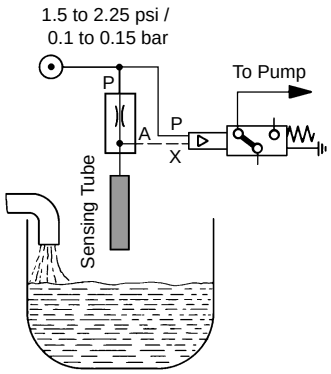
Dimensions

a 0.28 in / 7 mm
b 0.16 in / 4 mm
c 0.75 in / 19 mm
d 1.62 in / 41 mm
e 1.93 in / 49 mm

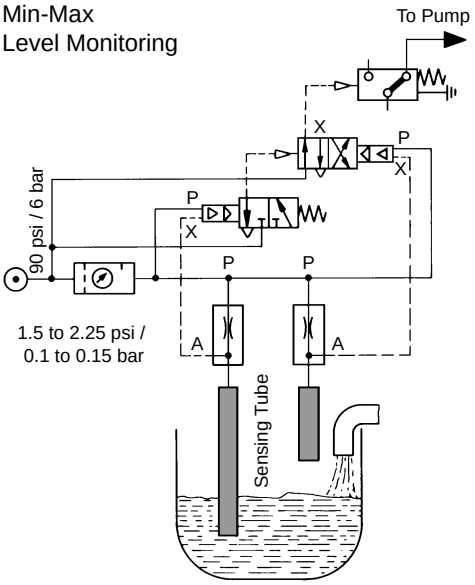
① Barbed fitting for 3/16 in / 3 mm tubing, connection P black, connection A yellow

SW = wrench size, mm

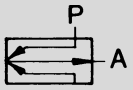
Simple
Level Monitoring

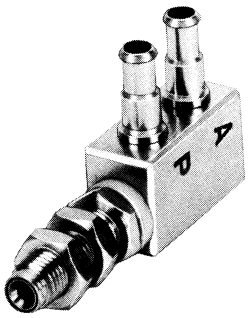


Min-Max
Level Monitoring



Reflex Sensor
Type RML-4.8-S

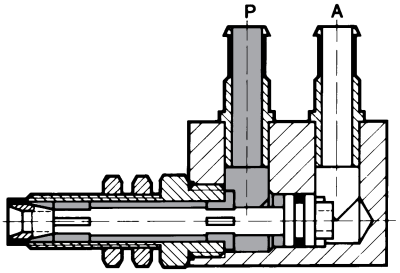




The reflex sensor is used as a non-contact signaling device. It is capable of sensing indicating instruments, monitoring press and stamping dies (sheet gauge, perforations, layering), including edge-guiding and magazine control, metering and measuring.

High pollution, noise interference, explosive atmosphere, total darkness or the transparency or magnetism of objects do not affect the functioning of reflex sensors.

The reflex sensor should be supplied with filtered, non-lubricated compressed air at port P. If the jet, constantly emitting air, is disturbed by an object in front of the sensor, a signal pressure ≥ 0.0073 psi / 0.5 mbar appears at outlet A. This signal pressure is then converted to a higher pressure by amplifiers.

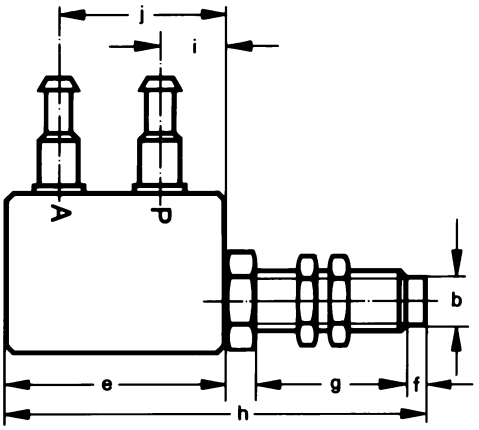


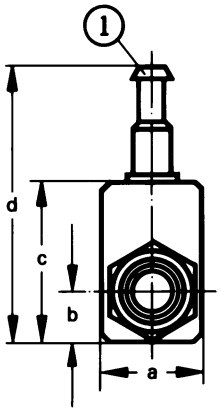
P = Supply
A = Outlet

Order Number Part No./Type	9849 RML-4.8-S
Medium	Compressed air (filtered, unlubricated)
Design	Reflex nozzle, no moving parts
Mounting	M6 x 0.75 with mounting nuts
Mounting Hole Diameter	0.24 in / 6.1 mm
Connection	Barbed fitting for 1/4 in / 4 mm plastic tubing
Supply Pressure Range of P*	1.13 to 3.75 psi / 0.075 to 0.25 bar
Signal Pressure Range, Max.	7.5 psi / 0.5 bar
Signal Pressure Range at A	See graph, next page
Air Consumption at 1.5 psi / 0.1 bar	0.5 scfm / 15 l/min
Materials	Housing: brass, Al. Seals: NBR
Weight	0.024 lb / 0.011 kg

* 14 to 140°F / -10 to +60°C

Type RML-4.8-S





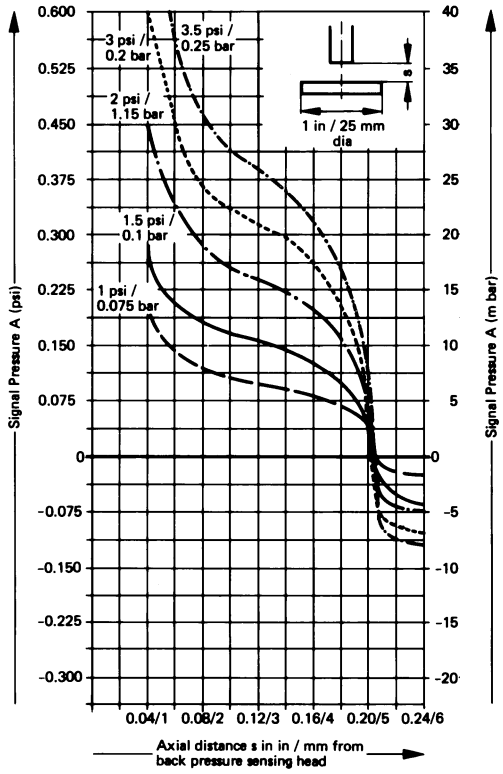
① Barbed fitting for 1/4 in / 4 mm plastic tubing

Dimensions

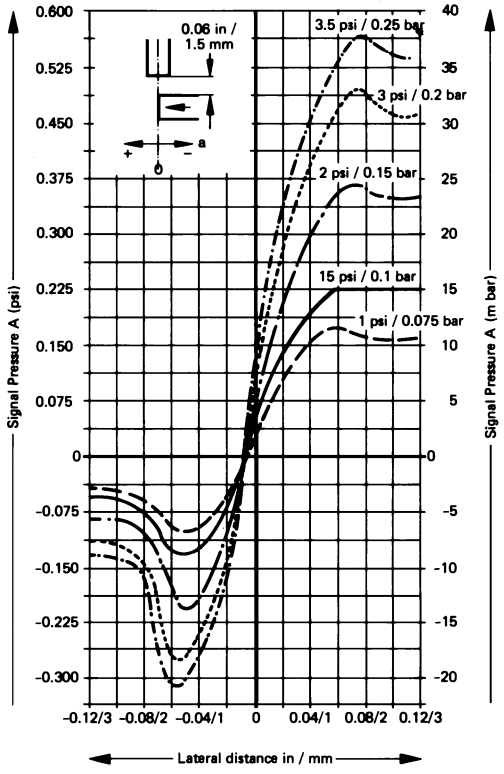
a	0.39 in / 10 mm	f	0.07 in / 2 mm
b	0.19 in / 5 mm	g	0.59 in / 15 mm
c	0.62 in / 16 mm	h	1.65 in / 42 mm
d	1.1 in / 27.5 mm	i	0.19 in / 6.5 mm
e	0.86 in / 22 mm	j	0.64 in / 16.5 mm

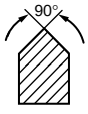
Signal Pressure Versus Sensing Distance and Supply Pressure
For Type RML-4.8-S

Axial Sensitivity at various pressures

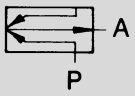


Lateral Sensitivity



Maximum sensing Distance	Minimum detectible variation	Minimum size of object to be detected (stationary pieces)		
				
0.19 to 0.21 in / 4.8 to 5.1 mm	0.002 in / 0.05 mm	0.15 x 0.10 in / 3.75 x 2.5 mm	0.12 x 0.12 in / 3 x 3 mm	0.12 in / 3 mm

Reflex Sensor
Type RML-5



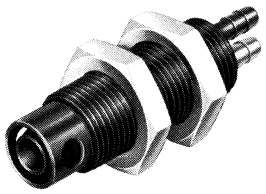
Reflex Sensors
Type RFL-4
RFL-15

The reflex sensor is used as a non-contact signaling device. It is capable of sensing indicating instruments, monitoring press and stamping dies (sheet gauge, perforations, layering), including edge-guiding and magazine control, metering and measuring. Depending on the type used, a range covering 0.004 to 0.008 in / 0.1 to 0.2 mm can be detected.

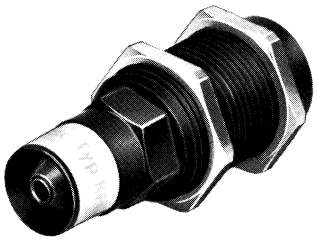
High pollution, noise interference, explosive atmosphere, total darkness or the transparency or magnetism of objects do not affect the functioning of reflex sensors.

The reflex sensor should be supplied with compressed air at port P. The air with a pressure of 1.5 to 3 psi / 0.1 to 0.2 bar must be filtered and free of any water or oil. If the jet, constantly emitting air, is disturbed by an object in front of the sensor, a signal pressure ≥ 0.007 psi / 0.5 mbar appears at outlet A. This signal pressure is then converted to a higher pressure by amplifiers.

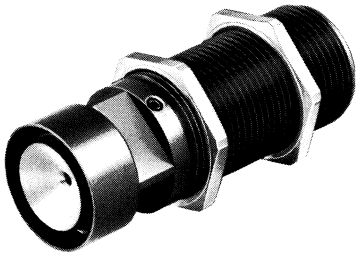
Type RML-5



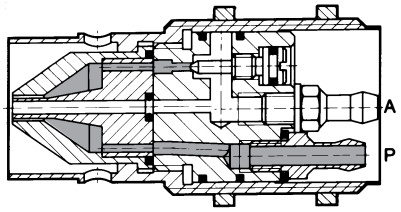
Type RFL-4



Type RFL-15



Accessories:
Mounting Bracket, see page 199



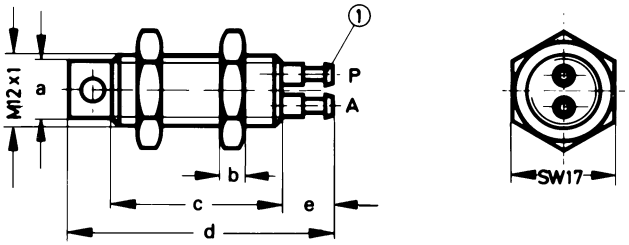
P = Supply
A = Outlet

Order Number / Part No./Type	7050 RML-5	3649 RFL-4	7454 RFL-15
Medium	Compressed air (filtered, unlubricated)		
Mounting	M12 x 1 with mounting nuts	M22 x 1 with mounting nuts	
Mounting Hole Diameter	0.5 in / 12.5 mm	0.89 in / 22.5 mm	
Connection	Barbed fitting for 3/16 in / 3 mm tubing	Barbed fitting for 1/4 in / 4 mm tubing	
Supply Pressure Range at P*	1.5 to 3 psi / 0.1 to 0.2 bar		3 to 4.5 psi / 0.2 to 0.3 bar
Supply Pressure Range, Max.	7.5 psi / 0.5 bar		22.5 psi / 1.5 bar
Signal Pressure Range at A	See graph, page 233		
Air Consumption	See graph, page 233		
Ambient Temperature	-40 to 212°F / -40 to 100°C†		
Design	Back pressure nozzle, no moving parts		
Material	Brass	Al, brass	
Weight	0.055 lb / 0.025 kg	0.110 lb / 0.050 kg	0.187 lb / 0.085 kg

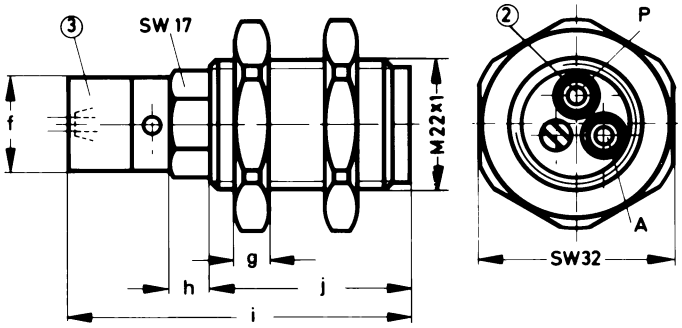
* 14 to 140°F / -10 to 60°C † Depending on tubing used

Type	Nozzle Diameter in / mm	Color Code	Max Sensing Range in / mm	Minimum Detectable Variation in Range in / mm	Minimum Size of Object to be Detected (Stationary Parts) bxh in / mm	bxh in / mm	d in / mm
RML-5	—	None	0.22 / 5.5	0.008 / 0.2	0.12 x 0.4 / 3 x 10	0.32 x 0.4 / 8 x 10	0.14 / 3.5
RFL-4	0.084 / 2.25	Yellow	0.18 / 4.5	0.004 / 0.1	0.12 x 0.8 / 3 x 20	0.32 x 0.8 / 8 x 20	0.12 / 3
RFL-15	—	None	0.61 / 15.5	0.01 / 0.3	—	—	0.8 / 20

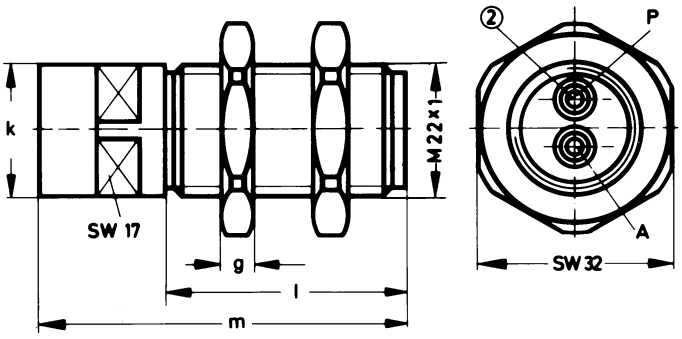
Type RML-5



Type RFL-4



Type RFL-15



Dimensions

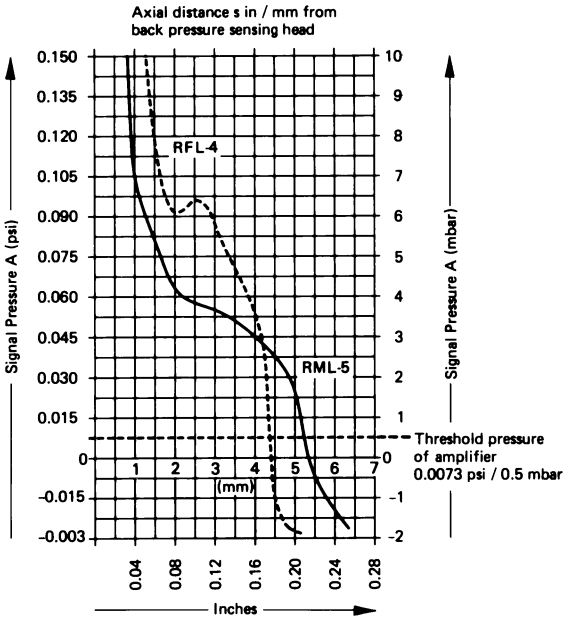
a 0.39 in / 10 mm
b 0.16 in / 4 mm
c 1.11 in / 28.3 mm
d 1.77 in / 45 mm
e 0.35 in / 9 mm
f 0.63 in / 16 mm
g 0.24 in / 6 mm
h 0.29 in / 7.5 mm
i 2.28 in / 58 mm
j 1.32 in / 33.5 mm
k 0.89 in / 22.5 mm
l 1.58 in / 40 mm
m 2.48 in / 63 mm

① Barbed fitting for 3/16 in / 3 mm tubing, connection P black, connection A yellow
② Barbed fitting for 1/4 in / 4 mm tubing
③ Color band

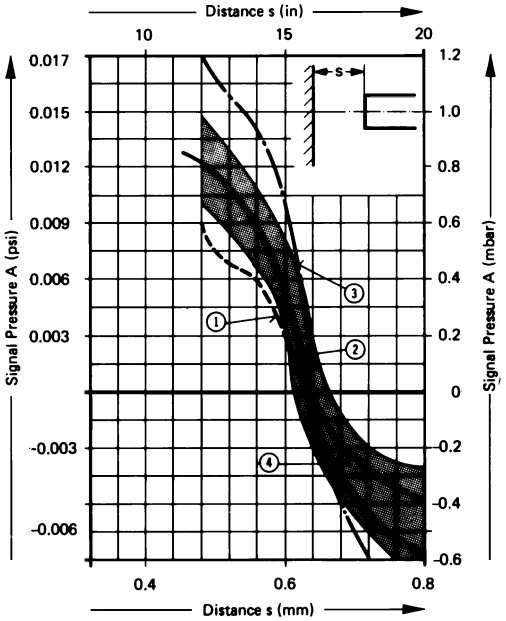
SW = wrench size, mm

Signal Pressure Versus Supply Pressure and Nozzle Range For Types RML-5, RFL-4

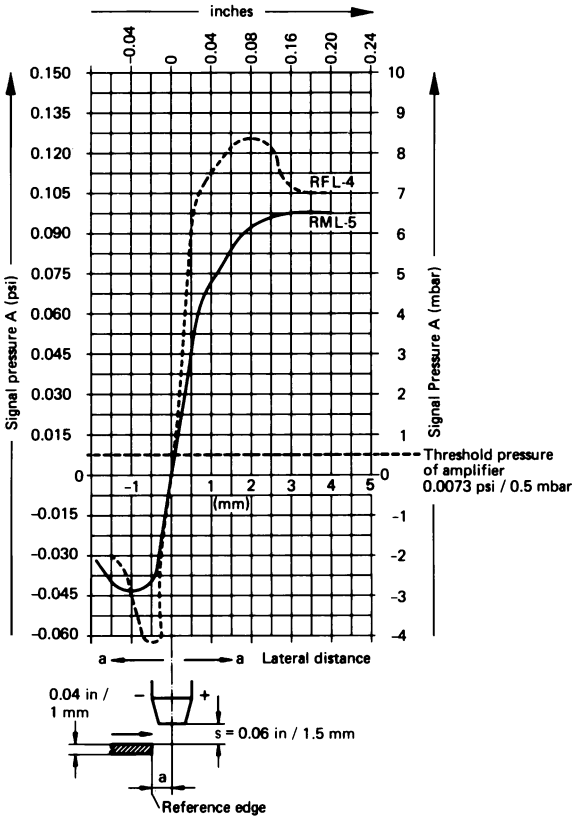
Axial Sensitivity at 2.18 psi / 150 mbar Supply Pressure



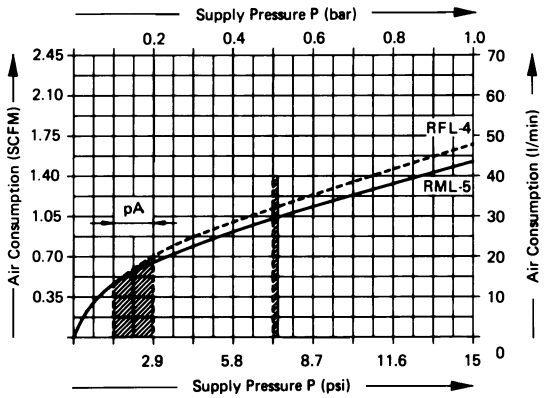
For Type RFL-15



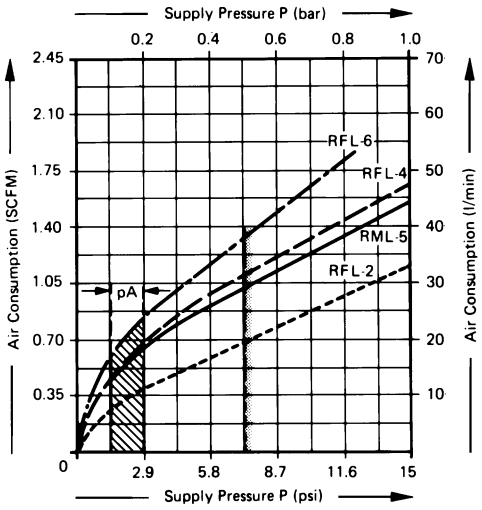
Lateral Sensitivity at 2.18 psi / 150 mbar Supply Pressure



Air Consumption Versus Supply Pressure (Unrestricted Flow) For Types RML-5, RFL-4

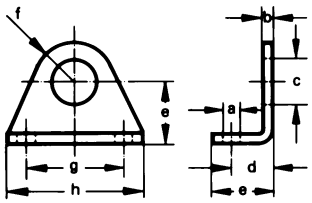


For Type RFL-15

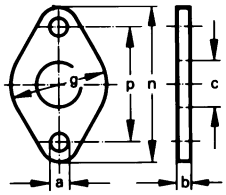


① Supply Pressure 2.18 psi / 150 mbar
② Supply Pressure 2.9 psi / 200 mbar
③ Supply Pressure 4.35 psi / 300 mbar
④ Sensing Range for Supply Pressure 2.9 psi / 200 mbar

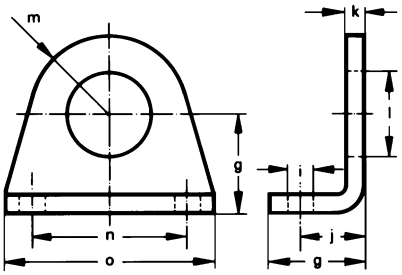
Mounting Thread M12 x 1:
Foot Mount
Order No.
5123 HBN-8/10-1



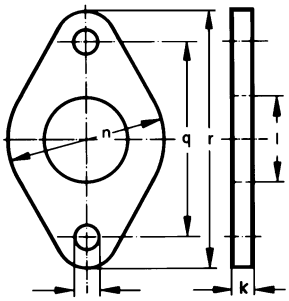
Flange Mount
Order No.
5129 FBN-8/10



For Mounting Thread M22 x 1:
Foot Mount
Order No.
5127 HBN-20/25-1



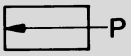
Flange Mount
Order No.
5131 FBN-20/25



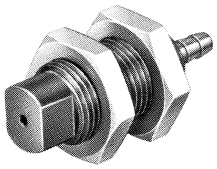
Dimensions

a	0.18 in / 4.5 mm	j	0.67 in / 17 mm
b	0.12 in / 3 mm	k	0.20 in / 5 mm
c	0.48 in / 12.1 mm	l	0.87 in / 22.1 mm
d	0.43 in / 11 mm	m	0.79 in / 20 mm
e	0.63 in / 16 mm	n	1.58 in / 40 mm
f	0.39 in / 10 mm	o	2.13 in / 54 mm
g	0.99 in / 25 mm	p	1.18 in / 30 mm
h	1.38 in / 35 mm	q	1.97 in / 50 mm
i	0.26 in / 6.6 mm	r	2.60 in / 66 mm

Sender for Air Barrier
Type SML-40-S

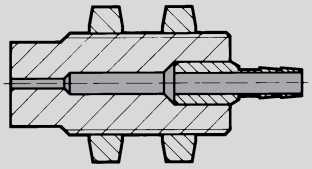


SML-40-S

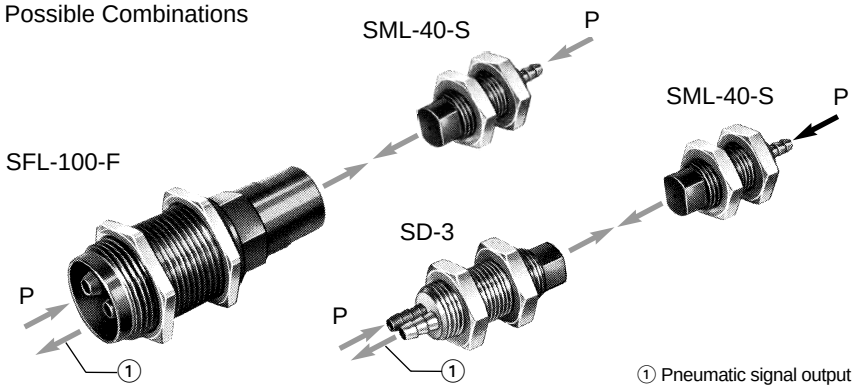


The sender nozzle may also be used as a back pressure sensor in combination with a separate air supply throttling system, (for example, Y-PK-3-D). See SD-2 setup shown on page 188.

The sender is used with receiver SFL-100-F (see page 202) or back pressure end stop SD-3 (see page 188) to set up an air barrier sensing arrangement (see illustrations on page 184). The sender nozzle produces a fine, stable flow of air, generating a dynamic pressure in the receiver. If an object interferes with the air flow, the receiver signal pressure decreases. For this combination, optimal sense range between the receiver and sender nozzle is 0.8-1.5 in / 20-40 mm. Air flowing from the two nozzles must be directed so that the critical point lies in front of the receiver orifice. For sensing ranges greater than 2 in / 50 mm, the flow of the receiver must be reduced by upstream throttling; for smaller sensing ranges, that of the sender must be reduced. The corresponding values are shown in the graph on page 201.



Possible Combinations

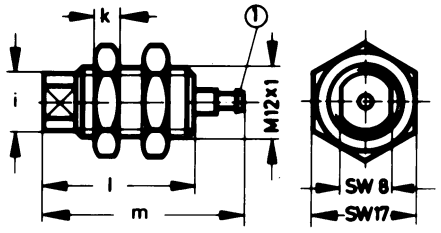


① Pneumatic signal output

Order Number Part No./Type	7442 SML-40-S
Medium	Compressed air (filtered, unlubricated)
Mounting	M12 x 1 threaded with mounting nuts
Mounting Hole Diameter	0.5 in / 12.5 mm
Connection	Barbed fitting for 3/16 in / 3 mm tubing
Orifice Size	0.1 in / 2.5 mm
Supply Pressure Range at P*	1.5 to 6 psi / 0.1 to 0.4 bar
Signal Pressure Range at A	See graph, next page
Air Consumption at 1.5 psi / 0.1 bar	0.22 SCFM / 6.3 l/min
Max. Nozzle Range	2 in / 50 mm (no upstream throttling)
Ambient Temperature	-40 to 212°F / -40 to 100°C†
Design	Nozzle, no moving parts
Material	Housing: Al, brass
Weight	0.033 lb / 0.015 kg

* 14 to 140°F / -10 to 60°C † Depending on tubing used

Type SML-40-S

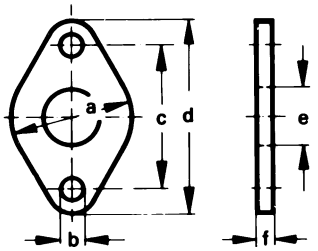


Dimensions

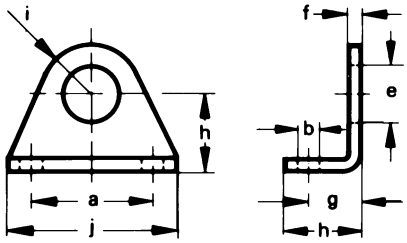
a	0.99 in / 25 mm		
b	0.18 in / 4.5 mm	h	0.63 in / 16 mm
c	1.18 in / 30 mm	i	0.39 in / 10 mm
d	1.58 in / 40 mm	j	1.38 in / 35 mm
e	0.48 in / 12.1 mm	k	0.16 in / 4 mm
f	0.12 in / 3 mm	l	1.02 in / 26 mm
g	0.43 in / 11 mm	m	1.36 in / 34.5 mm

① Barbed fitting for 3/16 in / 3 mm tubing
SW = wrench size, mm

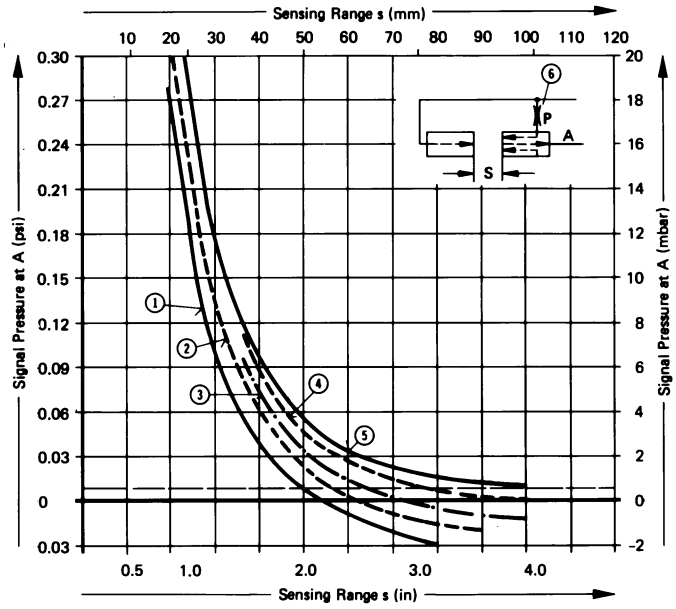
Flange Mount
Order Number 5129 FBN-8/10



Foot Mount
Order Number 5123 HBN-8/10-1



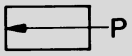
Signal Pressure versus Sensing Range
(at 2 psi / 150 mbar Supply Pressure, SML-40-S and SD-3).



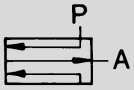
① No Upstream Throttling
② Upstream Throttling, Diameter 0.019 in / 0.5 mm
③ Upstream Throttling, Diameter 0.016 in / 0.4 mm
④ Upstream Throttling, Diameter 0.012 in / 0.3 mm
⑤ P Blocked
⑥ Upstream Throttling

Air Barrier Units

Sender
Type SFL-100-S

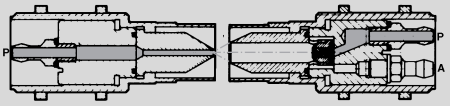


Receiver
Type SFL-100-F

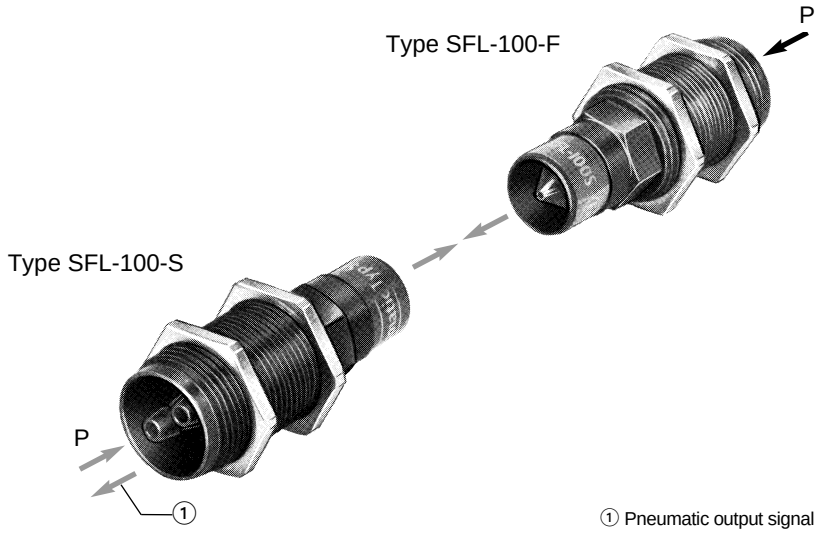


The air barrier is used as a non-contact sensing device for distances up to 4.0 in / 100 mm; for example, in detecting objects in an indefinite position or laying at varying distances from the nozzle (molded parts).

SFL-100-S SFL-100-F



P = Supply
A = Outlet



① Pneumatic output signal

Both sender and receiver nozzles are connected to the compressed air supply at connection P. The air has a pressure of 1.5 to 3 psi / 0.1 to 0.2 bar and should be dry and oil free. Air is continuously emitted from the receiver nozzle to prevent contamination and to assist in signal generation.

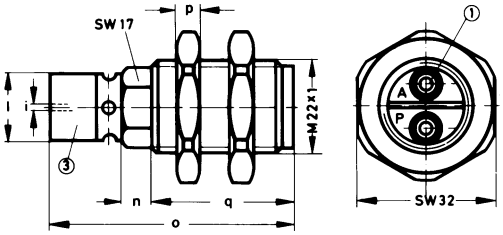
Air ejected through the nozzle disrupts the free flow of air at the receiver. A back pressure is generated, producing a signal pressure ≥ 0.007 psi / 0.5 m bar at outlet A of the receiver. This signal pressure is then raised to the desired working pressure by an amplifier. If any object disrupts the flow of air between the sender and receiver, the output signal at receiver port A drops to zero.

Order Number / Part No./Type	100430 SFL-100-S	100431 SFL-100-F
Medium	Compressed air (filtered, unlubricated)	
Mounting	M22 x 1 with mounting nuts	
Mounting Hole Diameter	0.89 in / 22.5 mm	
Connection	Barbed fitting for 1/4 in / 4 mm tubing	
Supply Pressure Range at P*	1 to 3 psi / 0.1 to 0.2 bar	
Supply Pressure, Max.	6.0 psi / 4 bar	7.5 psi / 0.5 bar
Supply Pressure Range at A	-0.07 in Hg / -0.002 bar to supply pressure	
Air Consumption at 1.5 psi / 0.1 bar	0.3 SCFM / 8.5 l/min	
Max. Nozzle Range	4.0 in / 100 mm	
Ambient Temperature	-40 to +212°F / -40 to +100°C†	
Design	Nozzle, no moving parts	
Material	Housing: Al, brass	
Weight	0.110 lb / 0.050 kg	

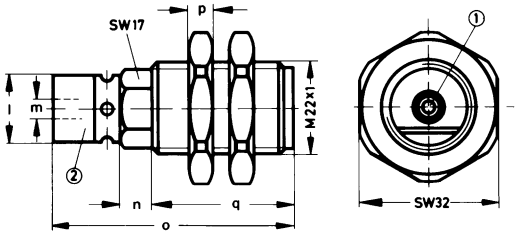
* 14 to 140°F / -10 to +60°C temperature range of medium

† Depending on tubing used

Type SFL-100-S



Type SFL-100-F



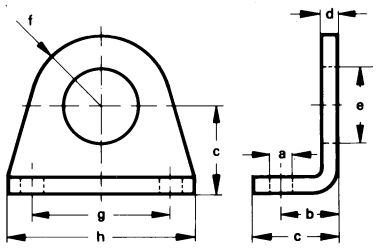
Dimensions

a	0.26 in / 6.6 mm		
b	0.67 in / 17 mm	j	0.26 in / 66 mm
c	0.99 in / 25 mm	k	1.97 in / 50 mm
d	0.20 in / 5 mm	l	0.63 in / 16 mm
e	0.87 in / 22.1 mm	m	0.22 in / 5.5 mm
f	0.79 in / 20 mm	n	0.30 in / 7.5 mm
g	1.58 in / 40 mm	o	2.29 in / 58 mm
h	2.13 in / 54 mm	p	0.24 in / 6 mm
i	0.06 in / 1.5 mm	q	1.32 in / 33.5 mm

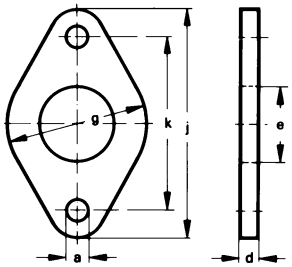
① Barbed fitting for 1/4 in / 4 mm tubing
② Brown Band
③ Green Band

SW = wrench size, mm

Foot Mount
Order Number 5127 HBN-20/25-1



Flange Mount
Order Number 5131 FBN-20/25



Non-Contact Pneumatic Sensors
Gap (Air Barrier) Sensor

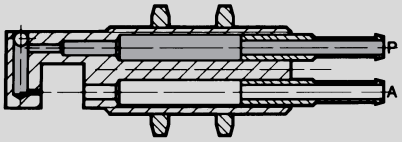
Gap Sensor
Type SFL-6

The air gap sensor is used for non-contact sensing of objects of a maximum width of 0.19 in / 5 mm. The device may also be used for metering and monitoring as well as detecting objects. To reduce air consumption, install a needle valve in air supply line P if the pressure at P is greater than 45 psi / 3 bar.

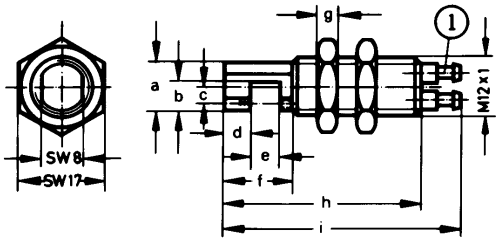
The recommended operating pressure is 1.5 to 15 psi / 0.1 to 1 bar at connection P (black).

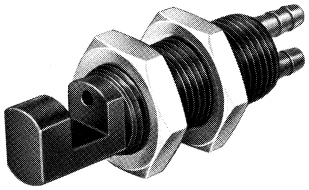
Signal pressure should not exceed the maximum allowable pressure for the downstream amplifier.

The air gap sensor is supplied with compressed air at connection P (black). If passage through the gap is clear, a signal is present at port A (yellow). If an object disrupts the flow of air in the gap, there will be no signal at port A.



P = Supply
A = Outlet



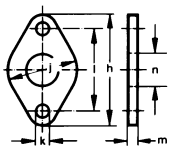


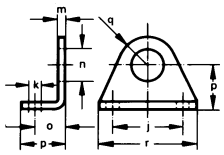
① Barbed fitting for 3/16 in / 3 mm tubing, connection P black, connection A yellow

SW = wrench size, mm

Mounting Accessories:

Flange Mount	Foot Mount
Order Number 5129	Order Number 5123
FBN-8/10	HBN-8/10

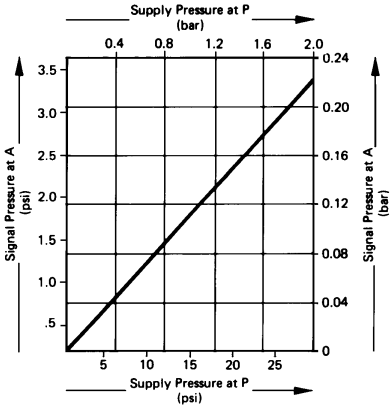




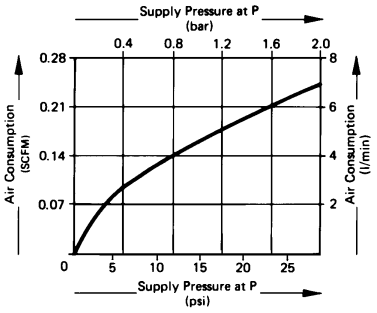
Dimensions:

a 0.42 in / 10.6 mm
b 0.24 in / 6.2 mm
c 0.12 in / 3.1 mm
d 0.20 in / 5 mm
e 0.24 in / 6 mm
f 0.55 in / 14 mm
g 0.16 in / 4 mm
h 1.58 in / 40 mm
i 1.90 in / 48 mm
j 0.99 in / 25 mm
k 0.18 in / 4.5 mm
l 1.18 in / 30 mm
m 0.12 in / 3 mm
n 0.48 in / 12.1 mm
o 0.43 in / 11 mm
p 0.63 in / 16 mm
q 0.39 in / 10 mm
r 1.38 in / 35 mm

Signal Pressure at A versus Supply Pressure at P



Air Consumption versus Supply Pressure at P



Order Number Part No./Type	4439 SFL-6
Medium	Compressed air (filtered, unlubricated)
Mounting	M12 x 1 threaded with 2 mounting nuts
Mounting Hole Diameter	0.5 in / 12.5 mm
Connection	Barbed fitting for 3/16 in / 3 mm tubing
Orifice Size	0.10 in / 2.5 mm
Supply Pressure Range at P*	0 to 120 psi / 0 to 8 bar
Signal Pressure Range at A	See graph, above
Air Consumption at 1.5 psi / 0.1 bar	0.05 SCFM / 1.5 l/min (see graph, above)
Max. Nozzle Range	0.24 in / 6 mm
Ambient Temperature	-40 to 212°F / -40 to 100°C†
Design	Nozzle, no moving parts
Material	Brass
Weight	0.073 lb / 0.033 kg

* 14 to 140°F / -10 to 60°C † Depending on tubing used

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