

OEM SWITCHES

SPECIFIER'S GUIDE FOR

PRESSURE SWITCHES

PRESSURE DIFFERENCE SWITCHES



S Serisi



Using the section

This section on “How to use this catalogue “ helps you make a logical choice in selecting the best product for a particular application. It allows a user familiar with our product line to locate the exact page the product is listed on. For those not familiar with our products, a logical sequence is given to help the user pick the best product for their need.

By taking a few minutes to familiarise yourself with the catalogue organization, you will find it very easy to locate the product / information you need.

1. The contents page lists the broad outline in which the catalogue is organized, and will help the user familiar with products to select the page on which the product or other useful information is listed.

2. Need Product Selection help ?

Product selection help will start with the “Pictorial Index” on Page 291, where the products are broadly classified. A brief description of each product group , a typical photo of the product within the group and the page number on which it is listed are given.

If the user is not familiar with the products, a product selection guide is provided on pages 294 through 298, where photos for each product and important specifications are given to help determine and select the best product for the application.

By evaluating and comparing these parameters, a logical selection can be made. Turn to the page on which the product information for the selected product is listed, for :

Capsule Construction details

Physical sizes

Special features

Ranges, hysteresis, electrical ratings etc.

Ordering information

The organisation of each of these pages is demonstrated on pages 292 and 293, of this section “How to use this catalogue”.

In many cases, more than one product may work. For the most cost effective solution, compare prices and consider alternatives. Remember, the end cost includes initial product price, plus the installation, plus the service.

3. Need the terminology explained? (see page 330)

Turn to page 330 for the definitions and terminology. This will help you familiarize with the terms used throughout the catalogue.

4. Need information on Accessories? (see page 322)

Turn to page 322 for information on important accessories. These will give information on only important accessories, and information needed, when these are to be supplied with our products.

5. Need selection guidance? (see page 331)

A logical procedure on page 331 will help you to consider most of the important factors when selecting a pressure switch.

6. Need other products ? (see page 332)

Products other than those listed in this catalogue are referenced on these pages. Separate catalogues for these products are available.

Pictorial Index

SC SUBMINIATURE



Page No. 300

SM



Page No. 302

SA



Page No. 304

EZ/EX



Page No. 306

EZ_A/EX_A



Page No. 308

MZ/MX



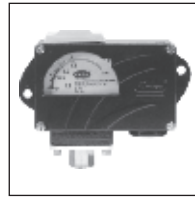
Page No. 310

MZ_A



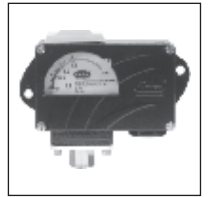
Page No. 312

MD



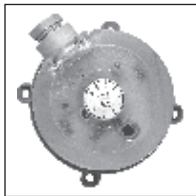
Page No. 314

MD_A



Page No. 316

CF



Page No. 318

CS12



Page No. 320

OTHER PRODUCTS

TR



Page No. 332

HOW TO USE this section

Due to the variety in product types and their salient features, catalogue page formats may vary. But generally the following formats are adhered to.


Elements appearing on each page will be:

1. Product family / series - A product family / series will appear on the outside page corner, depending on the left / right hand page, and will be in large bold type.
2. Product section - will appear immediately following the product family / series at top of the page and will be in bold type.
3. Features - will appear next to product description & will enlist only the major attributes.
4. Pressure capsule details - will show the construction of the pressure capsule and all its internal parts. If the process / working medium is variable, the wetted parts will be mentioned in italics. If the wetted parts are unique, the material of construction (MOC) will be mentioned


alongside in brackets. Where the material of construction is not specified, it will vary and the options are to be selected by the user considering the compatibility of the process / working medium. Modifications can be made to suit any particular medium, if the answer for your needs is not in the standard MOC listed. Products for which process / working medium is predefined, pressure capsule details are not provided (e.g as in case of comparison test pump). Pressure capsule details of accessories are not given.

5. Installation drawing - will show the typical installation dimensions of products as they exist in their standard forms. The dimensions are mentioned in millimetres and also in inches to facilitate the user. The dimensions of accessories will have to be added to these to arrive at any particular general arrangement (GA) drawings. The dimensions are approximate and for precise dimensions, where mounting space is restricted, the user may contact the nearest sales office. Installation drawings of only fast moving accessories are given.

1 ● **SM** OEM HIGH RANGE PRESSURE SWITCHES



6 ●



2 ●

7 ●

4 ●

3 ●

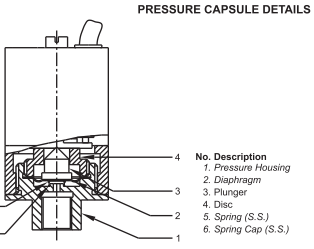
4 ●

4 ●

5 ●

302

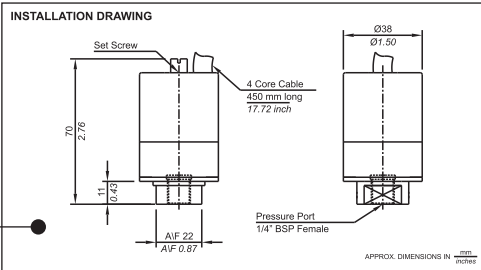
Pressure Capsule Details



No. Description
1. Pressure Housing
2. Diaphragm
3. Plunger
4. Disc
5. Spring (S.S.)
6. Spring Cap (S.S.)

Note: wetted parts are mentioned in italics.

INSTALLATION DRAWING



Set Screw
4 Core Cable
450 mm long
17.72 inch
Pressure Port
1/4" BSP Female
A/F 22
A/F 0.87
APPROX. DIMENSIONS IN mm/inches

Bulletin No. KA121024

OEM HIGH RANGE PRESSURE SWITCHES SM

3 ●

8 ●

9 ●

303

General information:
SM series pressure switches have a cast aluminium enclosure, intended for in-house use. These are generally used where size is a constraint. The repeat accuracy is better than ± 2% FSR. A core cable 450 mm long with CNCING contacts is provided for wiring. Pressure port is 1/4" BSPF standard.

Features:

- Compact
- Lightweight
- Electrical rating : 5A, 250VAC; 0.2A, 250 VDC(res.)
- Choice of wetted parts to suit working media
- Proof pressure available can be 4 times MWP (optional)
- Pressure port : 1/4" BSPF

Range Selection Table

Range Code	Range (rising pressure) bar (psi)	*Approximate Maximum Differential (fixed) bar (psi)	Maximum Working Pressure bar (psi)
H01	0.2 - 1.0 (2.90 - 14.50)	0.2 (2.90)	12 (174.05)
H03	0.2 - 2.4 (2.90 - 37.71)	0.3 (4.35)	12 (174.05)
H04	0.2 - 3.6 (2.90 - 52.52)	0.3 (4.35)	12 (174.05)
H07	0.5 - 7.0 (7.25 - 101.53)	0.5 (7.25)	12 (174.05)
H10	0.5 - 10.0 (7.25 - 145.04)	1.0 (14.50)	25 (362.6)
H15	1.0 - 15.0 (14.50 - 217.56)	1.5 (21.75)	25 (362.6)
H30	5.0 - 25.0 (72.52 - 362.6)	2.50 (36.26)	25 (362.6)

*Minimum differential increases with setpoint (Graphs available on request)

How to order SM Series High Range Pressure Switches

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Model	Range Code	Range Scale	Pressure Housing	Diaphragm	Enclosure
SM - Fixed Differential Pressure switch	H - High range pressure switch	U - Uncalibrated	A - Aluminium B - Brass S - SS316	0 - Neoprene 1 - Teflon	0 - IP 54 as per IS 2147

eg. A single pressure switch, high pressure range from 0.1-1.0 bar in uncalibrated style with brass pressure housing & a teflon diaphragm in a standard enclosure shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
SM	H01	U	B	1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, switches with standard wetted parts will be supplied.

Bulletin No. KA121024

Product Selection Guide



Page No. 300



Page No. 302



Page No. 304

Model	SC	SM	SA
Switch type	Subminiature	OEM (High Pr.)	OEM (High Pr.)
Differential type	Fixed	Fixed	Fixed
Repeatability (% FSR)	± 2	± 2	± 2
Range covered	0.1 bar to 25 bar	0.2 bar to 25 bar	0.2 bar to 25 bar
Enclosure Protection			
Enclosure Standard Optional	Cast aluminium	Cast aluminium to IP 54 as per IS 2147	
WETTED PARTS	sensing element Standard Optional	Diaphragm nylon reinforced neoprene diaphragm teflon, SS316L teflon	
	Pressure housing Standard Optional	SS 316 mild steel	Aluminium Brass/SS316
	Other Wetted Parts		
	Optional wetted parts through chem. seal		
Temp. of working medium	80°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A8 : General purpose rated at 5A, 250 VAC, 0.2 A, 250 VDC resistive. For other switching elements please contact sales office		

Accessories can be supplied with most of the switches. Please consult sales office.

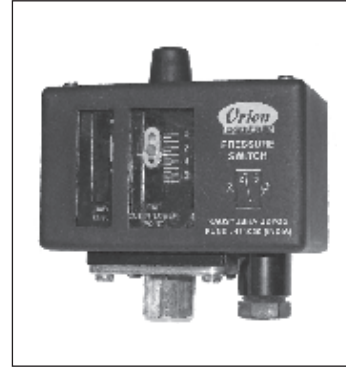
Product Selection Guide



Page No. 306



Page No. 306



Page No. 308

EZ	EX	EZ_A	Model
OEM (High Pr.)	OEM (High Pr.)	OEM (High Pr.)	Switch type
Fixed	Adjustable	Fixed	Differential type
± 1.5	± 1.5	± 1.5	Repeatability (% FSR)
0.2 bar to 25 bar	0.5 bar to 25 bar	3 psi to 350 psi	Range covered
Pressed steel enclosures IP 40 as per IS 2147			Enclosure Protection
Diaphragm Teflon			Enclosure Standard Optional
SS316			sensing element Standard Optional
			Pressure housing Standard Optional
			Other Wetted Parts
			Optional wetted parts through chem. seal
80°C maximum. For higher temperature, please use impulse tubing/chemical seals.			Temp. of working medium
SPDT Snap action switch A8 : General purpose rated at 5A, 250 VAC, 0.2 A, 250 VDC resistive. For other switching elements please contact sales office			Switching element

WETTED PARTS

Accessories can be supplied with most of the switches. Please consult sales office.

Product Selection Guide



Page No. 308



Page No. 310



Page No. 310

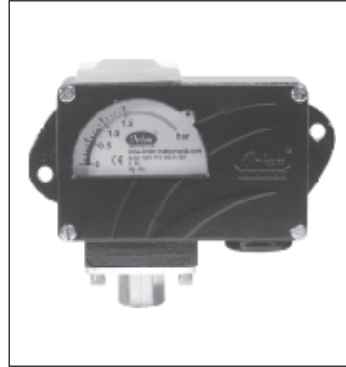
Model	EX_A	MZ	MX
Switch type	OEM (High Pr.)	OEM (High Pr.)	OEM (High Pr.)
Differential type	Adjustable	Fixed	Adjustable
Repeatability (% FSR)	± 1.5	Various	
Range covered	7 psi to 350 psi	0.1 bar to 25 bar	0.5 bar to 25 bar
Enclosure Protection		IP 66	
Enclosure Standard Optional	Pressed steel enclosures IP 40 as per IS 2147	Tough transparent polycarbonate	
sensing element Standard Optional	Teflon	Various	
Pressure housing Standard Optional	SS 316		
Other Wetted Parts		Teflon, SS 316	
Optional wetted parts through chem. seal			
Temp. of working medium	80°C maximum. For higher temperature, please use impulse tubing/chemical seals.		
Switching element	SPDT Snap action switch A8 : General purpose rated at 5A, 250 VAC, 0.2 A, 250 VDC resistive. For other switching elements please contact sales office		

Accessories can be supplied with most of the switches. Please consult sales office.

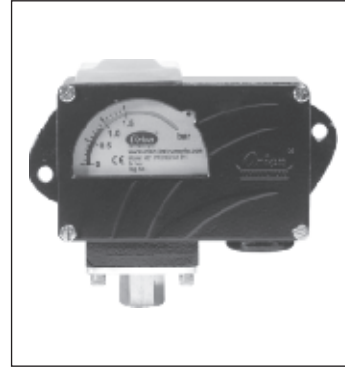
Product Selection Guide



Page No. 312



Page No. 314



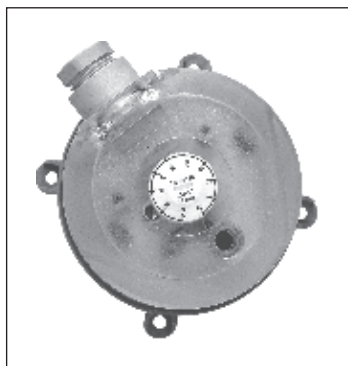
Page No. 316

MZ__A	MD	MD__A	Model
OEM (High Pr.)	OEM (High Pr.)	OEM (High Pr.)	Switch type
Fixed	Fixed		Differential type
Various	± 2		Repeatability (% FSR)
1.5 psi to 350 psi	0.1 bar to 25.0 bar	1.5 psi to 350 psi	Range covered
IP 66			Enclosure Protection
Tough transparent polycarbonate	Die-cast aluminium		Enclosure Standard Optional
Diaphragm nylon reinforced neoprene diaphragm teflon			sensing element Standard Optional
SS 316			Pressure housing Standard Optional
Teflon, SS316			Other Wetted Parts
			Optional wetted parts through chem. seal
80°C maximum. For higher temperature, please use impulse tubing/chemical seals.			Temp. of working medium
SPDT Snap action switch A8 : General purpose rated at 5A, 250 VAC, 0.2 A, 250 VDC resistive. For other switching elements please contact sales office		Maximum 1.0 A (.4A) / 250 VAC	Switching element

WETTED PARTS

Accessories can be supplied with most of the switches. Please consult sales office.

Product Selection Guide



Page No. 318



Page No. 320

Model	CF	CS12
Switch type	OEM (Ultra-low Range)	OEM
Differential type	Adjustable	Adjustable
Repeatability (% FSR)		
Range covered	20 Pa to 4000 Pa	2 bar to 12 bar
Enclosure Protection	IP 54	IP44
Enclosure Standard Optional	Body of PA 6.6 and Cover of PS	Non-metallic cover
sensing element Standard Optional		Nitrile rubber
Pressure housing Standard Optional	Industrial Plastic	Mild Steel
Other Wetted Parts		
Optional wetted parts through chem. seal		
Temp. of working medium	80°C maximum	
Switching element	Maximum 1.0 A (.4A) / 250 VAC	16 Amp, 500 VAC

WETTED PARTS

Accessories can be supplied with most of the switches. Please consult sales office.

SC SUBMINIATURE SWITCHES



General information:

SC series subminiature pressure switches are low cost options. They are generally used where size is a constraint. Typical applications are to sense oil pressure in power packs. Can also be used for several automation applications.

Features:

- Compact
- Lightweight (Approx. 0.13 Kg.)
- Normally closed (NC) or normally open (NO)
- Electrical rating: 5A, 250VAC; 0.2A, 250 VDC (res.)
- Switching point easy to adjust
- Body material : Aluminium
- Wetted parts : MS/SS, Neoprene, SS316L, Teflon
- Pressure port : 1/4" BSP(M), other sizes available

Range Selection Table

Range Code	Range bar (psi)	Differential bar (psi)	Maximum Working Pressure bar (psi)
H01	0.1 - 1.0 (1.45 - 14.50)	0.2 (2.9)	35 (507.6)
H10	0.5 - 10.0 (7.14 - 142.86)	0.5 (7.25)	35 (507.6)
H30	2.0 - 25.0 (29.00 - 362.6)	1.5 (21.76)	35 (507.6)

How to order SC Series Subminiature Switches

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non Standard Allocation	Model	Terminal Type	Switch Type	Range Code	Operating Type	Pressure Port Material / Size	Diaphragm
<input type="checkbox"/> Reserved for non-standard options not mentioned in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	SC = Subminiature Type	1 = Plug Type	PFO = Pressure Switch Fixed Differential	H01 = (0.1 - 1.0) H10 = (0.5 - 10.0) H30 = (2.0 - 25.0)	A1 = With Silver Contact NC A2 = With Silver Contact NO A3 = With Silver Contact SPDT	M3 = Mild Steel / 1/4" BSPM S3 = SS316L / 1/4" BSPM	0 = Neoprene 1 = Teflon

e.g.: A single subminiature switch, high pressure range from 0.1 - 1.0 bar in uncalibrated style with mild steel pressure port & a neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
<input type="checkbox"/>	SC	1	PFO	H01	A1	M3	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, switches with standard wetted parts will be supplied.

Construction :

The pressure switch is housed in a diecast aluminium enclosure. The pressure capsule, at the bottom of the switch, comprises a pressure housing (either M.S. Or S.S.), a disc, a diaphragm (Neoprene, Teflon or SS316L) and a plunger. This is a plug type switch with NO (Normally Open) or NC (Normally Closed) contacts. The electrical terminations are standard Push On type. Figure 1.

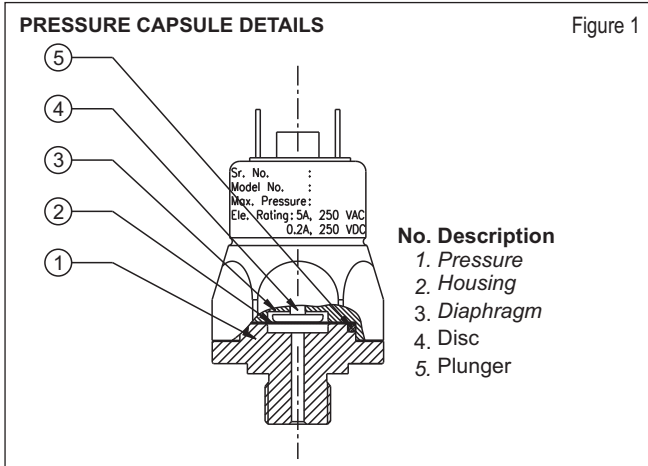


Figure 1

Principle of Operation :

The pressure in the pressure capsule is converted into force by means of a diaphragm and a calibrated piston, which is balanced by a compression spring from above. When the force generated by the pressure in the pressure capsule exceeds/falls beyond the balancing spring force, an electrical element is actuated/deactuated.

Materials of Construction :

Housing : Die-Cast Aluminium
Diaphragm : Neoprene / Teflon / SS316L

Mounting :

- 1) The SC series subminiature switches have stem type mounting and can be mounted in any direction.
- 2) The pressure port size is generally 1/4" BSP(M), unless specifically ordered otherwise. Other sizes can be obtained via adaptors for small quantities. For larger quantities, customized thread ends can be provided.

CAUTION : Tightening torque should not exceed by 4kg-m.

Electrical Connections :

These pressure switches will generally have NO (Normally Open) or NC (Normally Closed) contact terminals. Figure. 2.

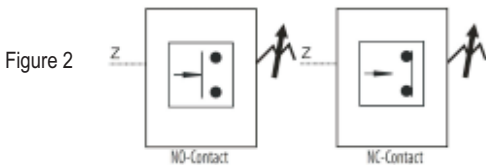


Figure 2

Wiring :

Connect the wires to the contact terminals as per your wiring diagram.

Set Point Adjustment :

- 1) The switching point can be easily adjusted by turning the setting screw located in between the contacts. Figure. 3.
- 2) Apply the desired cutin (lower) / cutout (higher) pressure to the pressure switch.
- 3) Increase the pressure setting by turning the setting screw till contacts changeover.
- 4) Some minor adjustment will be required to achieve the exact cutin (lower) / cutout (higher) point, which can be checked with the help of a proper pressure measurement device.

Tip : The pressure switches are factory set at half the set point range (unless otherwise specified in a Purchase Order).

Trouble Shooting Tips

Generally no problems are observed if the pressure switch selection, wiring and the setpoint is proper. For a pressure switch selection procedure please consult our sales office.

For properly selected pressure switches, if following symptoms are observed, the likely causes and remedies are as stated below:

Symptom 1: Switch does not operate

- 1) Check if the NO and NC contacts operate properly.
- 2) Pressure does not reach the pressure port.

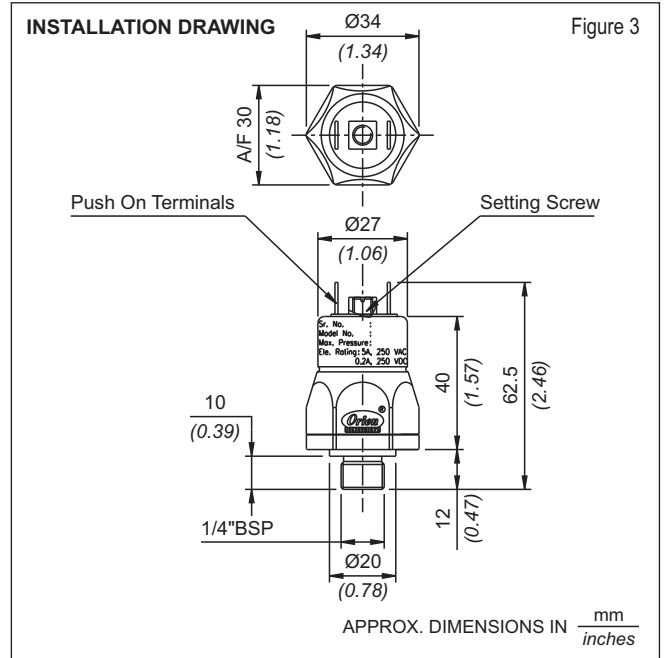


Figure 3

- a) Check if the entry to the pressure capsule is not blocked by frozen process or scales or impurities in the process.
 - i) If this is the case, try freeing the blocked path by a blunt tool in case of scales or impurities in the process.

DO NOT OPEN THE PRESSURE CAPSULE IN ANY EVENT

If the cause is none of the above mentioned probabilities, proceed as per the following steps.

- b) Check the system pressure and set point of pressure switch. For use of pressure switch for falling setpoints, system pressure has to be greater than cutin point. For use of pressure switch for rising setpoints, the system pressure may not be reaching or exceeding the cutout point.
 - i) Use 'T' connection and connect calibrated pressure gauge to the 'T' connection as shown in Figure 4.
 - ii) Adjust the setpoint such that the system pressure is greater than the cut-out point of the pressure switch.

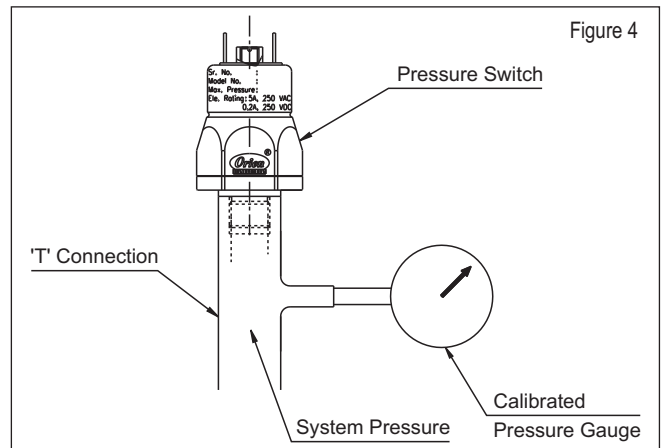


Figure 4

Symptom 2: Leakage

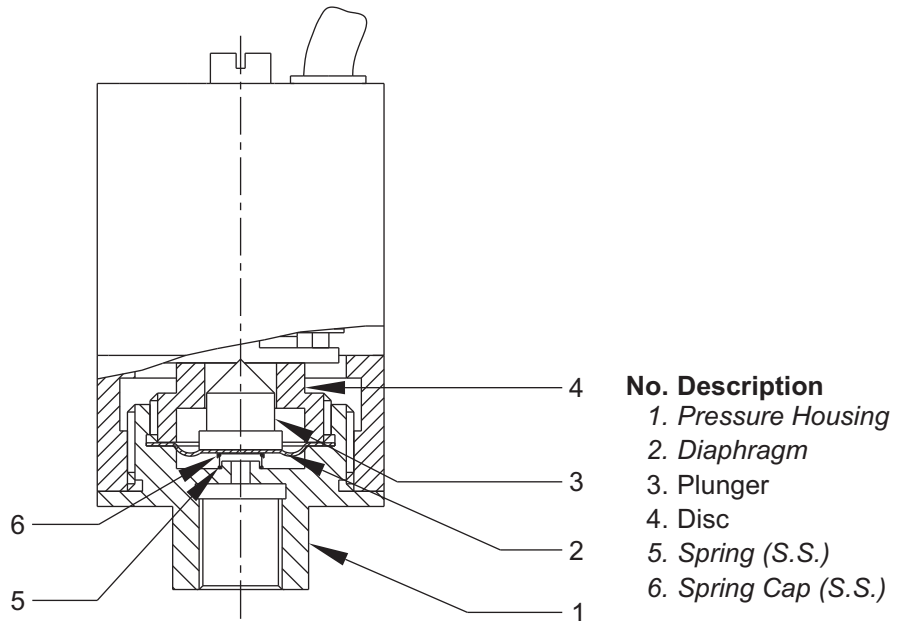
In case leakage is observed, pictures of pressure switch with wetted parts clearly visible, be mailed to service@orion-instruments.com. Please ensure to include a picture showing model no. and serial no. of the switch. Check for the following likely causes and use a new switch taking proper precautions.

- a) System pressure is greater than working pressure : Use an overrange protector or a switch with greater maximum working pressure.
- b) Incompatible wetted parts : The working medium may not be compatible with wetted parts, which damages the sealing of the process from working parts. Please choose proper compatible wetted parts.
- c) Excessive process temperature : Process temperature may exceed maximum allowable temperature, which in turn damages the diaphragms. Use an impulse tube to cool down process temperature.

SM OEM HIGH RANGE PRESSURE SWITCHES

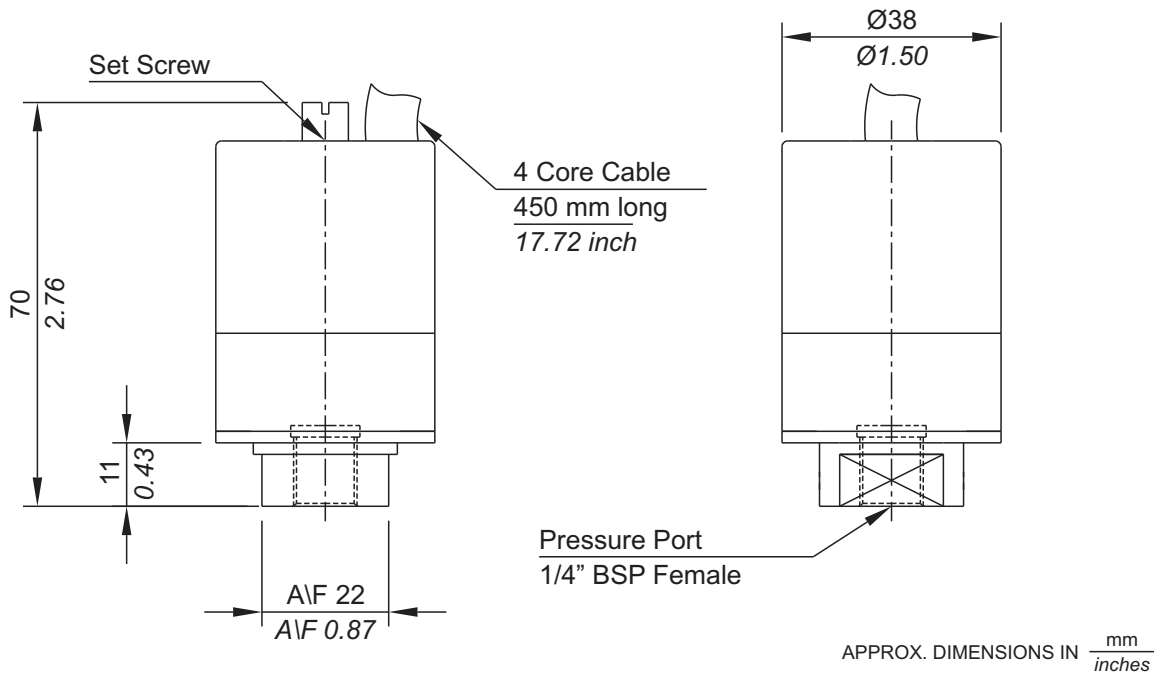


PRESSURE CAPSULE DETAILS



Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



OEM HIGH RANGE PRESSURE SWITCHES

SM

General information:

SM series pressure switches have a cast aluminium enclosure, intended for inhouse use. These are generally used where size is a constraint. The repeat accuracy is better than $\pm 2\%$ FSR. A core cable 450 mm long with C/NO/NC contacts is provided for wiring. Pressure port is $\frac{1}{4}$ " BSPF standard.

Features:

- Compact
- Lightweight
- Electrical rating : 5A, 250VAC; 0.2A, 250 VDC(res.)
- Choice of wetted parts to suit working media
- Proof pressure available can be 4 times MWP (optional)
- Pressure port : $\frac{1}{4}$ " BSPF

Range Selection Table

Range Code	Range (rising pressure) bar (psi)	*Approximate Maximum Differential (fixed) bar (psi)	Maximum Working Pressure bar (psi)
H01	0.2 - 1.0 (2.90 - 14.50)	0.2 (2.90)	12 (174.05)
H03	0.2 - 2.6 (2.90 - 37.71)	0.3 (4.35)	12 (174.05)
H04	0.2 - 3.6 (2.90 - 52.52)	0.3 (4.35)	12 (174.05)
H07	0.5 - 7.0 (7.25 - 101.53)	0.5 (7.25)	12 (174.05)
H10	0.5 - 10.0 (7.25 - 145.04)	1.0 (14.50)	25 (362.6)
H15	1.0 - 15.0 (14.50 - 217.56)	1.5 (21.76)	25 (362.6)
H30	5.0 - 25.0 (72.52 - 362.6)	2.50 (36.26)	35 (507.63)

*Minimum differential increases with setpoint (Graphs available on request)

How to order SM Series High Range Pressure Switches

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Model	Range Code	Range Scale	Pressure Housing	Diaphragm	Enclosure
SM - Fixed Differential Pressure switch	H - High range pressure switch	U - Uncalibrated	A - Aluminium B - Brass S - SS316	0 - Neoprene 1 - Teflon	0 - IP 54 as per IS 2147

eg. A single pressure switch, high pressure range from 0.1-1.0 bar in uncalibrated style with brass pressure housing & a teflon diaphragm in a standard enclosure shall be specified by

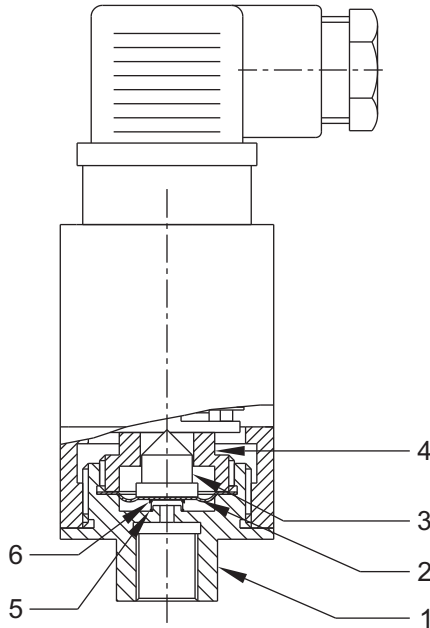
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
SM	H01	U	B	1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, switches with standard wetted parts will be supplied.

SA OEM HIGH RANGE PRESSURE SWITCHES



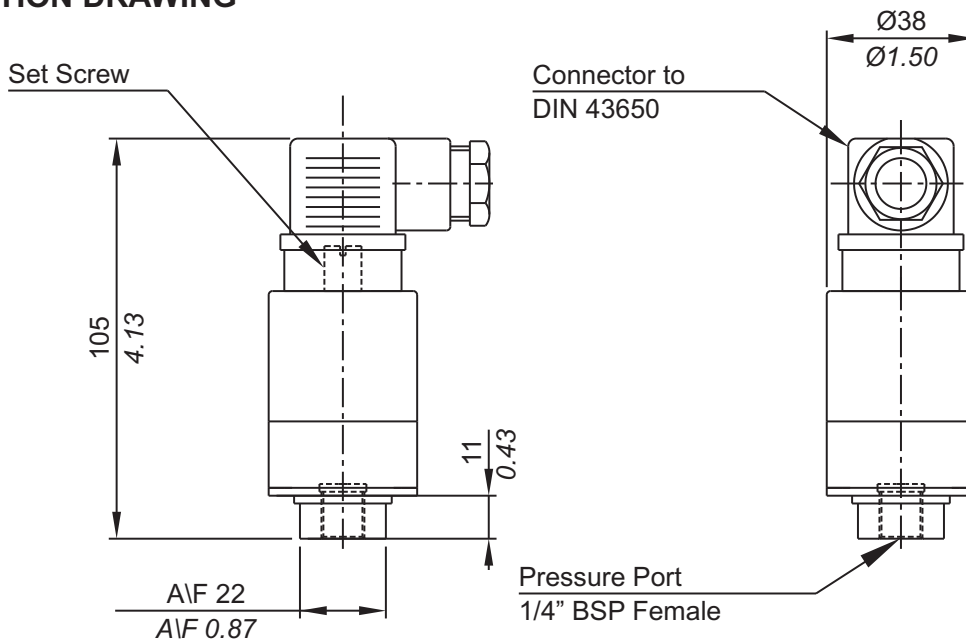
PRESSURE CAPSULE DETAILS



- No. Description**
1. Pressure Housing
 2. Diaphragm
 3. Plunger
 4. Disc
 5. Spring (S.S.)
 6. Spring Cap (S.S.)

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN $\frac{\text{mm}}{\text{inches}}$

OEM HIGH RANGE PRESSURE SWITCHES SA

General information:

SA series (a variant of SM series) pressure switches have a cast aluminium enclosure, intended for inhouse use. These are generally used where size is a constraint. The repeat accuracy is better than $\pm 2\%$ FSR. A connector to DIN 43650 is provided for wiring. Pressure port is 1/4" BSPF standard.

Features:

- Compact
- Lightweight
- Electrical rating : 5A, 250 VAC; 0.2A, 250 VDC (res.)
- Choice of wetted parts to suit working media
- Proof pressure available can be 4 times MWP (optional)
- Pressure port: 1/4" BSPF

Range Selection Table

Range Code	Range (rising pressure) bar (psi)	*Approximate Maximum Differential (fixed) bar (psi)	Maximum Working Pressure bar (psi)
H01	0.2 - 1.0 (2.90 - 14.50)	0.2 (2.90)	12 (174.05)
H03	0.2 - 2.6 (2.90 - 37.71)	0.3 (4.35)	12 (174.05)
H04	0.2 - 3.6 (2.90 - 52.21)	0.3 (4.35)	12 (174.05)
H07	0.5 - 7.0 (7.25 - 101.53)	0.5 (7.25)	12 (174.05)
H10	0.5 - 10.0 (7.25 - 145.04)	1.0 (14.50)	25 (362.6)
H15	1.0 - 15.0 (14.50 - 217.76)	1.5 (21.76)	25 (362.6)
H30	5.0 - 25.0 (72.52 - 362.6)	2.50 (36.26)	35 (507.63)

*Minimum differential increases with setpoint (Graphs available on request)

How to order SA high range pressure switches

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Model	Range Code	Range Scale	Pressure Housing	Diaphragm	Enclosure
SA - Fixed Differential Pressure switch	H - High range pressure Switch	U - Uncalibrated	A - Aluminium B - Brass S - SS316	0 - Neoprene 1 - Teflon	0 - IP 65 as per IS 2147

eg. A single pressure switch, high pressure range from 0.2 - 2.6 bar in uncalibrated style with brass pressure housing & a teflon diaphragm in a standard enclosure shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
SA	H03	U	B	1	0

Please specify full model number to avoid ambiguity. If only the first two groups are specified while ordering, switches with standard wetted parts will be supplied.

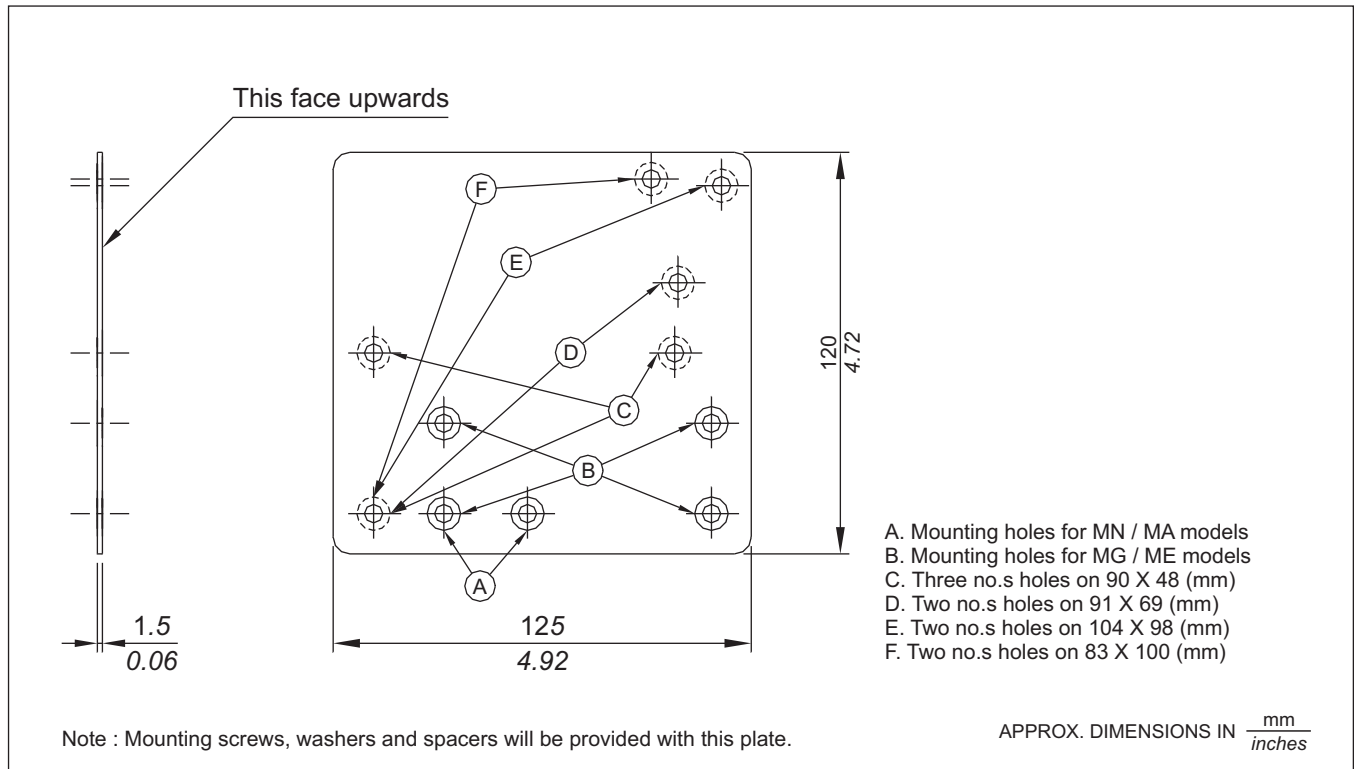
ACCESSORIES

Following accessories can be provided with pressure switches to make it suitable for any particular application.

- | | |
|--|---|
| Flameproof enclosures | syphons |
| Chemical seals (or diaphragm seals) | manifolds |
| adaptors to suit customer's process connection | pipe mounting brackets |
| switch savers | mounting plates to suit other makes on the market |
| impulse tubes | snubbers |
| | tag plates (to display tag no. and identify the instrument) |

Installation drawings of most common and fast moving accessories are given. The wetted parts, wherever applicable, are not specified due to the extreme variety available.

MOUNTING PLATE

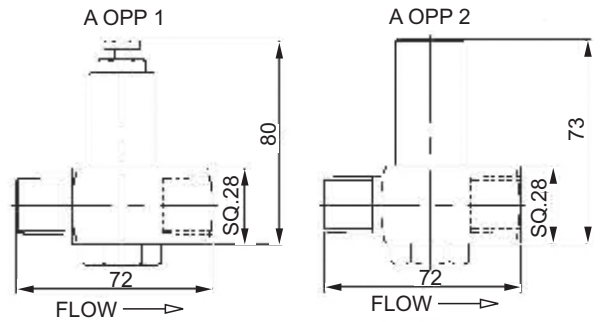


ACCESSORIES

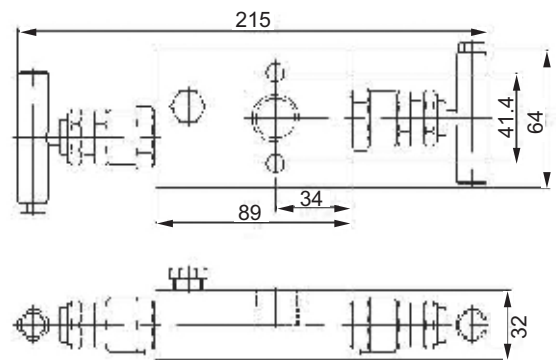
Gauge Saver



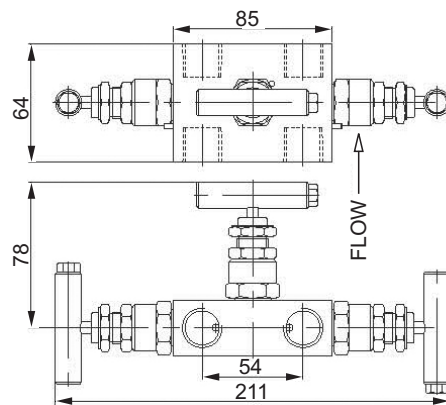
A OPP 1 = Set Pressure: 0.6 to 2.0 bar
 A OPP 2 = Set Pressure: 2.5 to 200 bar



2 Valve Manifold



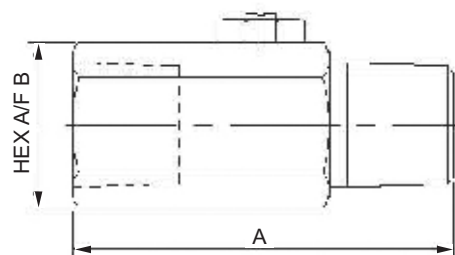
3 Valve Manifold



Snubber



SIZE	A	B
1/4"NPT	55	25
3/8"NPT	55	25
1/2"NPT	63	28
G1/2"	63	28



ACCESSORIES

CHEMICAL SEALS (DIAPHRAGM SEALS):

General description:

Diaphragm seals are partitions used with pressure switches which prevent the measured medium from entering the pressure capsule of the pressure switch. Diaphragm seals solve many problems encountered in sensing, which are otherwise impossible to solve with only pressure switches. Some of the examples are:

- protection of pressure switch from aggressive, highly viscous solidifying or crystallizing measured media
- protection from high measured medium temperatures or fluctuations in temperature
- protection from vibrations by coupling via capillaries
- dead zone free sensing arrangements for particular hygienic applications
- use of special materials or surface coatings of the wetted parts for special applications.

CAUTION: Pressure switch and diaphragm seal are always a closed system and should not be separated by unauthorised persons.

When the pressure switch is to be kept away from undesirable temperatures or vibrations, a capillary can be used to connect the pressure switch and the diaphragm seal. Capillaries also have a throttling effect which is often desirable in pulsating process pressures. During setpoint adjustment, the weight of the liquid column between the diaphragm seal and the pressure switch needs to be taken into consideration, if they are mounted at different elevations.

Depending on the application, a variety of media with different properties are used as transmission liquids. For most of the general applications, silicon oil can be used. For food industries, a transmission liquid compatible with the process needs to be used.

A variety of chemical seals can be supplied with pressure switches and only the most commonly used arrangements / assemblies are shown here.

In most of the cases, the common wetted parts and diaphragms are of SS316. Alternate wetted materials that can be provided are:

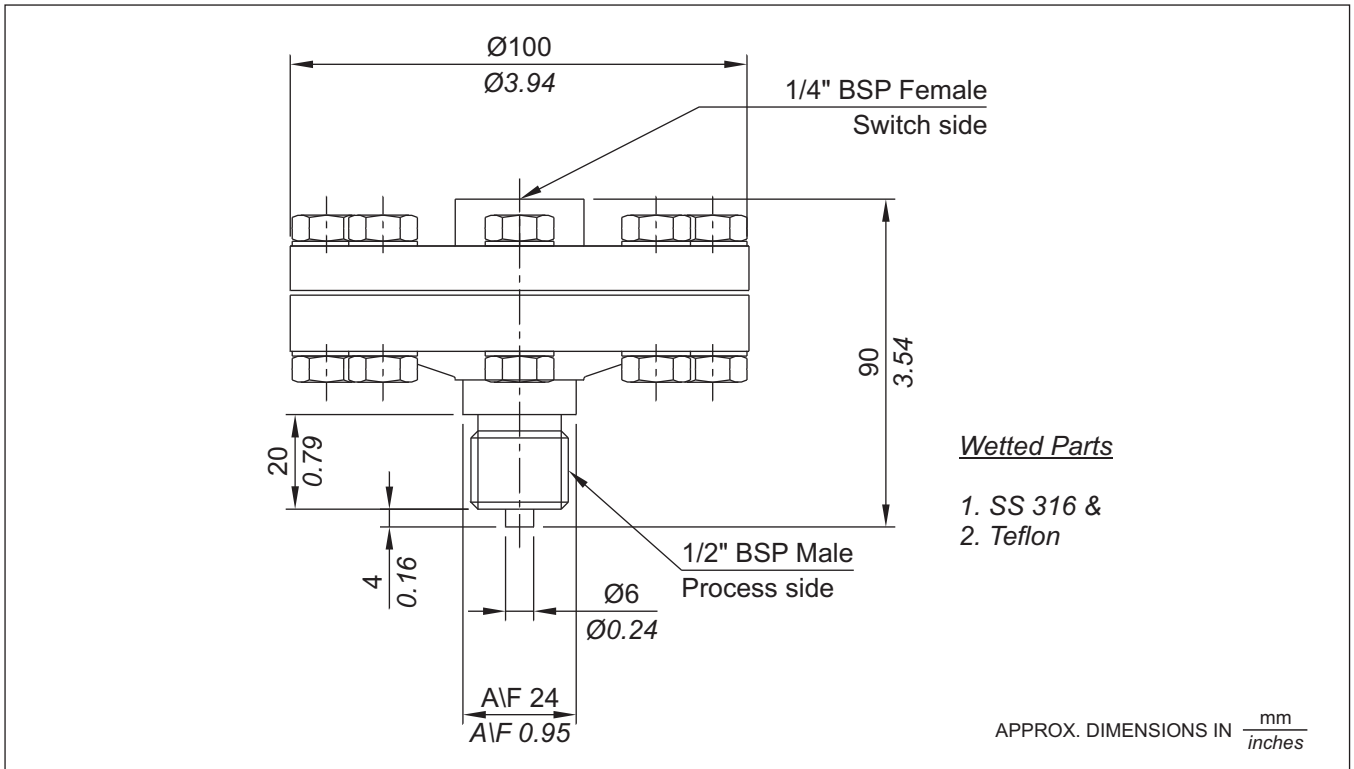
- HASTELLOY B2
- HASTELLOY C4
- HASTELLOY C22
- HASTELLOY C276
- INCONEL ALLOY 600
- MONELALLOY 400
- MONELALLOY K500
- NICKEL
- PLATINUM
- TANTALUM
- TITANIUM
- ZIRCONIUM
- SILVER
- PTFE

The on - off differentials of pressure switches fitted with chemical seals are likely to be higher than those mentioned in the catalogue. There is also a possibility of time lag (for sensing) being introduced, depending on the length of the tubing between the pressure switch and the seal.

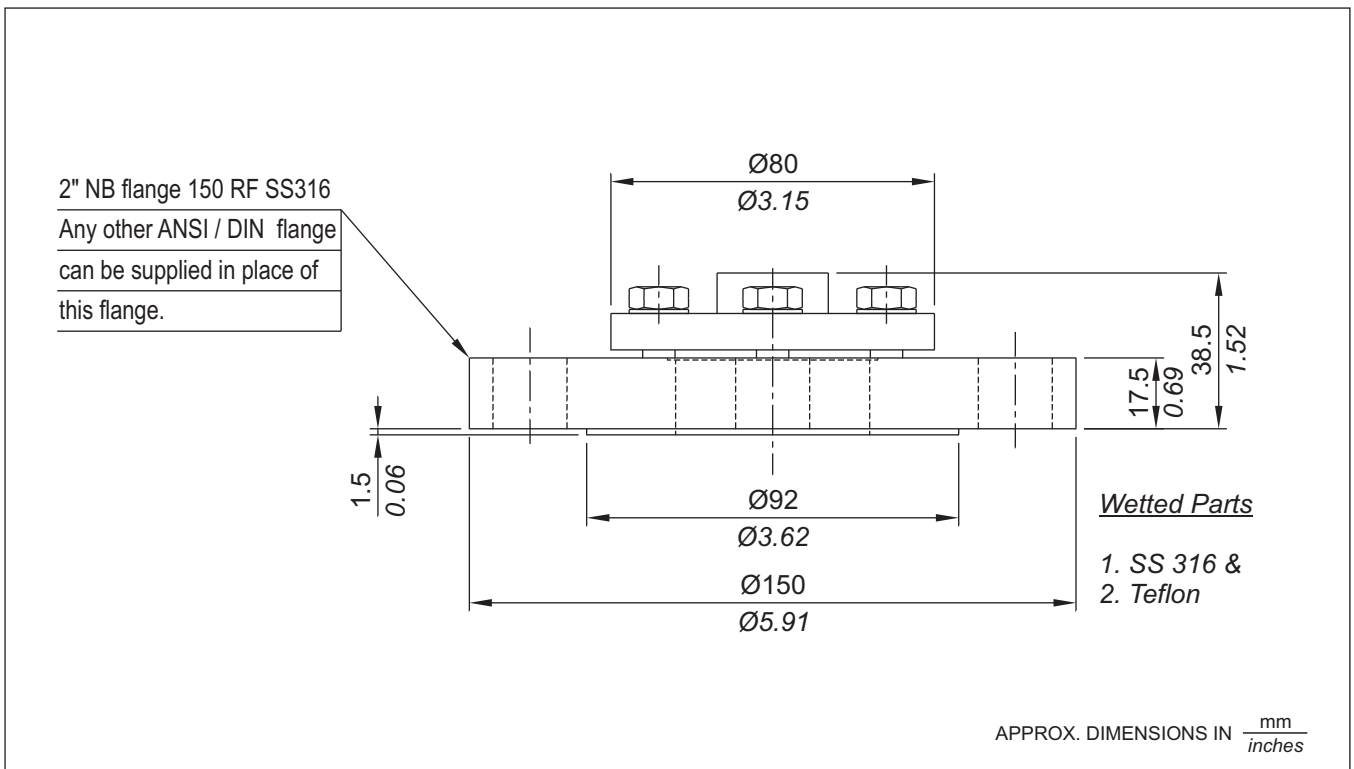
While ordering, customer's are requested to specify all the process parameters including ambient conditions, operating conditions, the process to be sensed and response times allowable, temperature of the seal under sensing conditions and temperature outside the measuring / sensing sequences (e.g as in rinsing sequences) so that a proper sealing system can be suggested.

ACCESSORIES

STANDARD CHEMICAL SEAL SUITABLE FOR THREADED CONNECTION : (Type A)

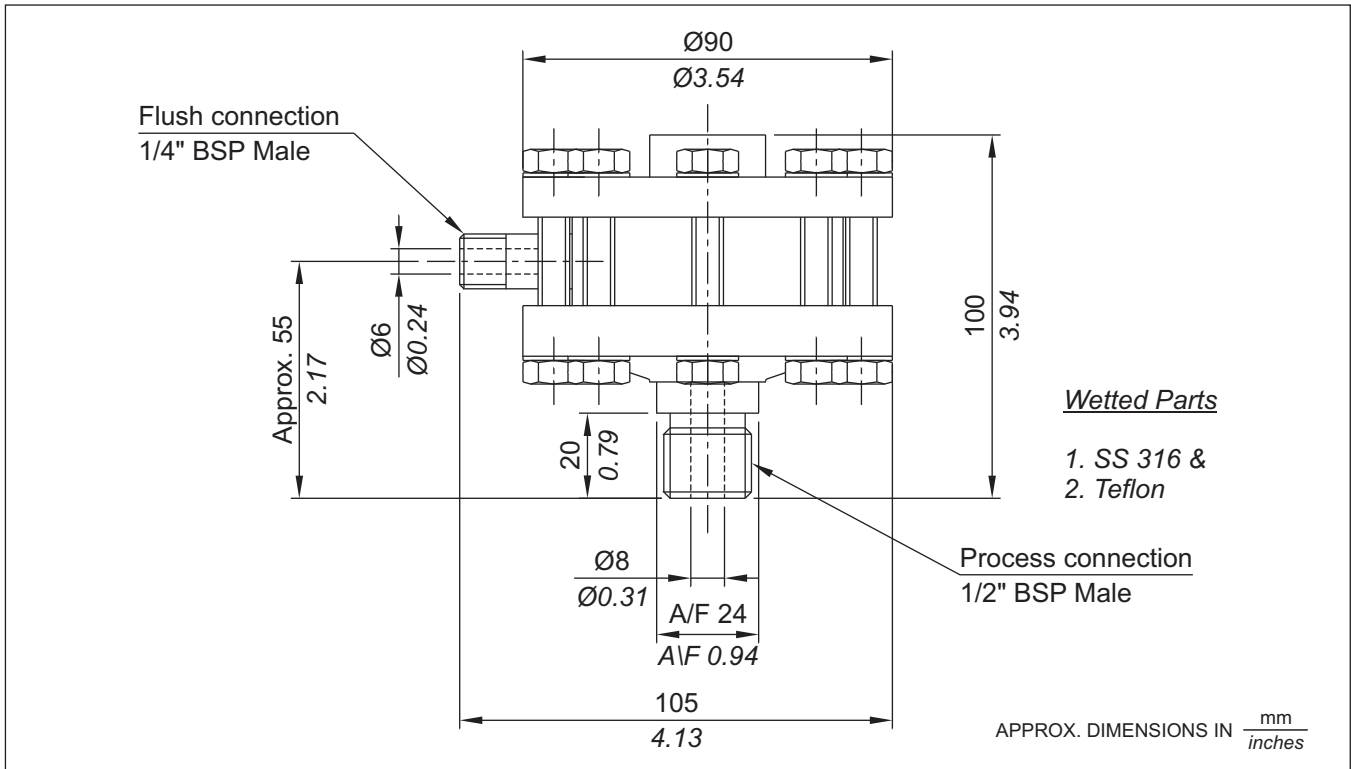


CHEMICAL SEAL SUITABLE FOR VARIABLE FLANGED CONNECTION : (Type B)

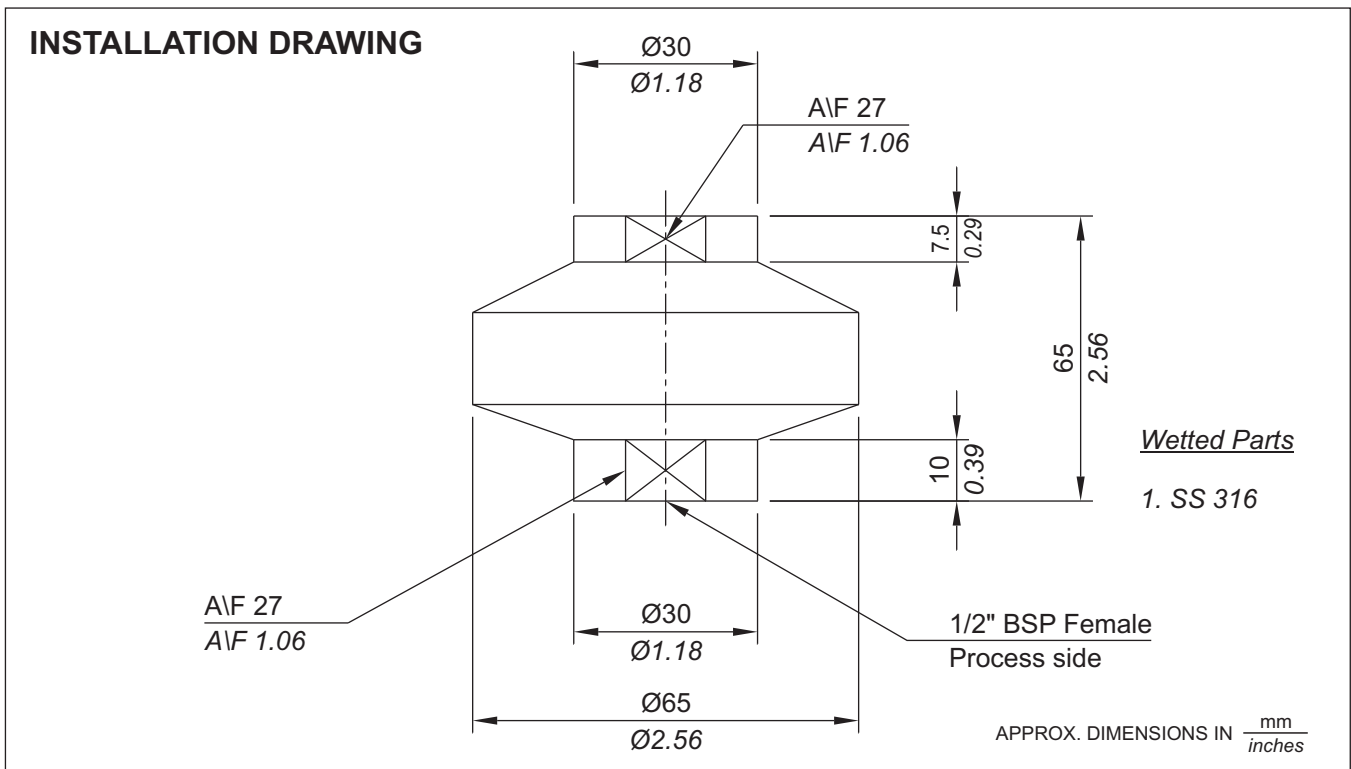


ACCESSORIES

FLUSH TYPE CHEMICAL SEAL (Type C)



FULL WELDED CHEMICAL SEAL (Type D)



GENERAL SPECIFICATIONS AND APPLICATION NOTES

1. All the pressure switches contained in this catalogue are gauge pressure switches.
2. Pressure switches are switching instruments and not measuring ones. As such, the word "calibration" is used for the markings made on the scale to indicate the approximate setpoint of the pressure switch. No "calibration certificate" for this indication can be given in the proper sense of the word. However, the pressure switches can be supplied preset at user specified setpoints, provided the setpoints are indicated during the ordering stage itself.
3. Process temperature : can be 80 deg. C maximum. A pressure switch being a dead end, is not subjected to continuous process temperature(as in case of flow). As such, a proper length of impulse tubing of proper material (or chemical seals with adequate tubing) will substantially bring down the temperature, well within the specified limits. Normal pressure switches (without any modifications) have been used with working media having a temperature of upto 350 deg. C, only by employing an additional impulse tube.
4. Ambient temperature: can be from -10 deg. C to 60 deg. C for most of the standard pressure switches. Care should be taken that no icing occurs inside the enclosure where the atmospheres are humid, when pressure switches are used in subzero ambient temperature areas. Pressure switches for use in wider ambient temperatures can be developed should your application fall in such areas. If the process is likely to freeze / crystallize / solidify within this ambient range, chemical seals should be used alongwith the pressure switches.
5. All the pressure switches are tested on kerosene / air prior to despatch. For applications involving food grade material / oxygen service or processes not compatible with kerosene, such a note should be specifically made while ordering, so that pressure switches are tested accordingly.
6. All data published is under standard test conditions. Following conditions generally apply for Laboratory Evaluation tests:

Temperature	:	Ambient room temperature (21 °C)
Humidity	:	Ambient (50%)
Proof pressure	:	1.5 times maximum working pressure
Cycling rate	:	30 cycles/minute
Pressure rise	:	compatible with above cycling rate (maximum)
Life in no. of cycles	:	100,000 minimum

The life and characteristics of pressure switches can be affected by temperature, humidity, airborne contamination, vibration and frequency of operation of the pressure switches. For specific switch selection, customers are requested to evaluate switch performance under actual application conditions or by simulating all the extreme application conditions and requirements. Laboratory Evaluation test data can never substitute customer's own product evaluation.

The life of the pressure switches can be increased by incorporating changes in design or by substituting certain components. Customers are requested to contact our sales office for any such specific requirements.

DEFINITIONS & TERMINOLOGY FOR PRESSURE ACTUATED SWITCHES

Pressure Switch:- A pressure switch is an instrument that automatically senses a change in pressure and opens or closes an electrical switching element when a pre-determined pressure point is reached.

Pressure sensing element:- A pressure sensing element is the portion of the pressure switch that transmits motion due to change in pressure.

Electrical switching element:- The electrical switching element in a pressure switch opens or closes an electrical circuit in response to the actuating force it receives from the pressure sensing element. Orion pressure switches are fitted with single pole double throw (SPDT) snap action switch(es) as electrical switching element (s) for maximum reliability.

Normally open switching element:- No current can flow through the switching element until the switch is actuated.

Normally closed switching element:- Current flows through the switching element until the switch is actuated.

Set Point:- The set point is expressed in terms of exact pressure at which the snap-action switch is actuated to either open or close the electrical circuit (depending on how the switch is wired).

Differential (Dead band, Hysteresis):- Differential is the difference between the actuation point and the deactuation point, e.g. if a pressure switch is set to operate at 5 bar on increasing pressure, the switch will close when the pressure rises to that point. As the pressure drops to, say, 4.8 bar the switch may open (this is the deactuation point). The differential of this switch is then 0.2 bar, the difference between the set point of 5 bar and deactuation point of 4.8 bar. Differential is sometimes referred to as "deadband" or "hysteresis".

Set Point in relation to increasing pressure & decreasing pressure:- A pressure switch may be set to actuate at any desired point on rising pressure or falling pressure. The former is described as "set to actuate on increasing (or rising) pressure" & the latter as "set to actuate on decreasing (or falling) pressure". The preferred actuation must be specified clearly on orders for pressure switches that are to be factory set.

Range :- The span within which the set point of a pressure-actuated switch may be adjusted.

Proof Pressure :- Proof pressure is the highest pressure to which a switch may be subjected without permanent damage.

Maximum working pressure (MWP) :- The nominal pressure level that a system will operate at, including workload.

Differential pressure :- The difference between a reference pressure and a variable pressure.

Wetted parts :- The parts which come in contact with the working medium.

HOW TO SELECT A PRESSURE SWITCH FOR YOUR APPLICATION

Following are the general guidelines which should help you arrive at a proper selection of a pressure switch for your application.

Step 1.

Service life of the switch. Expected service life is the first consideration to be made in selecting a pressure switch, regardless of sensitivity or pressure desired. A second consideration in choosing a pressure switch is the speed of cycling, regardless of the service life. A sensing element made of metal sheets is likely to fatigue at cycling speeds above 20 cycles per minute and is not recommended for service life of more than 1 million cycles. Orion and Parus pressure switches use nylon reinforced rubber or piston as a sensing element and have been tested at a cycling frequency of 30 cycles / minute for more than a million cycles. The working medium to be controlled must be considered and to simplify selection, wetted parts are indicated on the catalogue pages.

Step 2.

Proof pressure - Choice of type of pressure switch must also be governed by the highest pressure to which it will ever be subjected. The highest pressure in the system including surges, should not be more than the proof pressure of the switch. It must be remembered that, though there are surges in the system, a pressure gauge may register a constant reading, the surges being dampened out by the orifice in the gauge.

Step 3.

Function of the switch. Three types of Orion pressure switches, based on function, are described below, a) Single setting pressure switches : They sense a single pressure source and open or close a single electrical circuit by means of a snap action electrical switch. b) Pressure difference switches : They sense a change in relationship between two pressures and open or close a single electrical circuit by means of a snap action electrical switch. c) Adjustable differential pressure switches: They sense two pressure limits, within a desired adjustable range, from a single pressure source and open or close a single electrical circuit by means of a snap action electrical switch.

Step 4.

Selection of adjustable range. The range should be selected such that the setpoint lies as close as possible to the middle of the total adjustable range. This will ensure the most favourable combination of accuracy and life.

Step 5.

Working medium. The working medium should be compatible with the wetted parts. For easier selection, the wetted parts are given in the catalogue pages. The maximum temperature of the working medium is also important. A pressure switch, being a dead end, is not subjected to continuous temperature. If the temperature of the working medium exceeds 80 deg. C, an impulse tubing of appropriate length should be used between the process connection and pressure port of the switch. Where the working medium is likely to freeze at the sensing element, a diaphragm seal (chemical seal) with appropriate wetted parts should be used. In case of excessive temperature or mounting the pressure switch remotely, pressure switches can also be supplied with remote seals. The filling medium has to be compatible with the working medium, and needs to be specified while ordering. (Specially in case of food related industries / processes)

Step 6.

Environment. The environment in which the pressure switch will operate is very important. Orion pressure switches can be supplied in weatherproof enclosures for outdoor service. For use of pressure switches in hazardous areas Orion pressure switches can be supplied in flameproof enclosures.