PROCESS SWITCHES

SPECIFIER'S GUIDE FOR

- PRESSURE SWITCHES
- PRESSURE DIFFERENCE SWITCHES
- VACUUM SWITCHES
- TEMPERATURE SWITCHES

Orion® INSTRUMENTS

CE

MZ Basınç *Serisi*

Using the section

This section 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 177, 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 182 through 185, 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, hysterisis, electrical ratings etc.

   Ordering information

   Some applications

   The organisation of each of these pages is demonstrated on pages 178 and 179, 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

PRESSURE SWITCHES

HIGH RANGE

HIGH RANGE

Page No. 186

HIGH PROOF HIGH RANGE

Page No. 190

LARGE BORE HIGH RANGE

Page No. 194

FLANGED

Page No. 198

HYDRAULIC RANGE*

HYDRAULIC RANGE

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HYDRAULIC DIAPHRAGM RANGE

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PRESSURE DIFFERENCE SWITCHES

HIGH RANGE

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HIGH RANGE DP

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VACUUM SWITCHES

HIGH RANGE

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TEMPERATURE SWITCHES

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*Hydraulic ranges are ranges typically from 2 bar to 600 bar, used in oil applications.
However, these switches can be used for other media depending on wetted parts compatibility.

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 format is adhered to.

Elements appearing on each page will be:

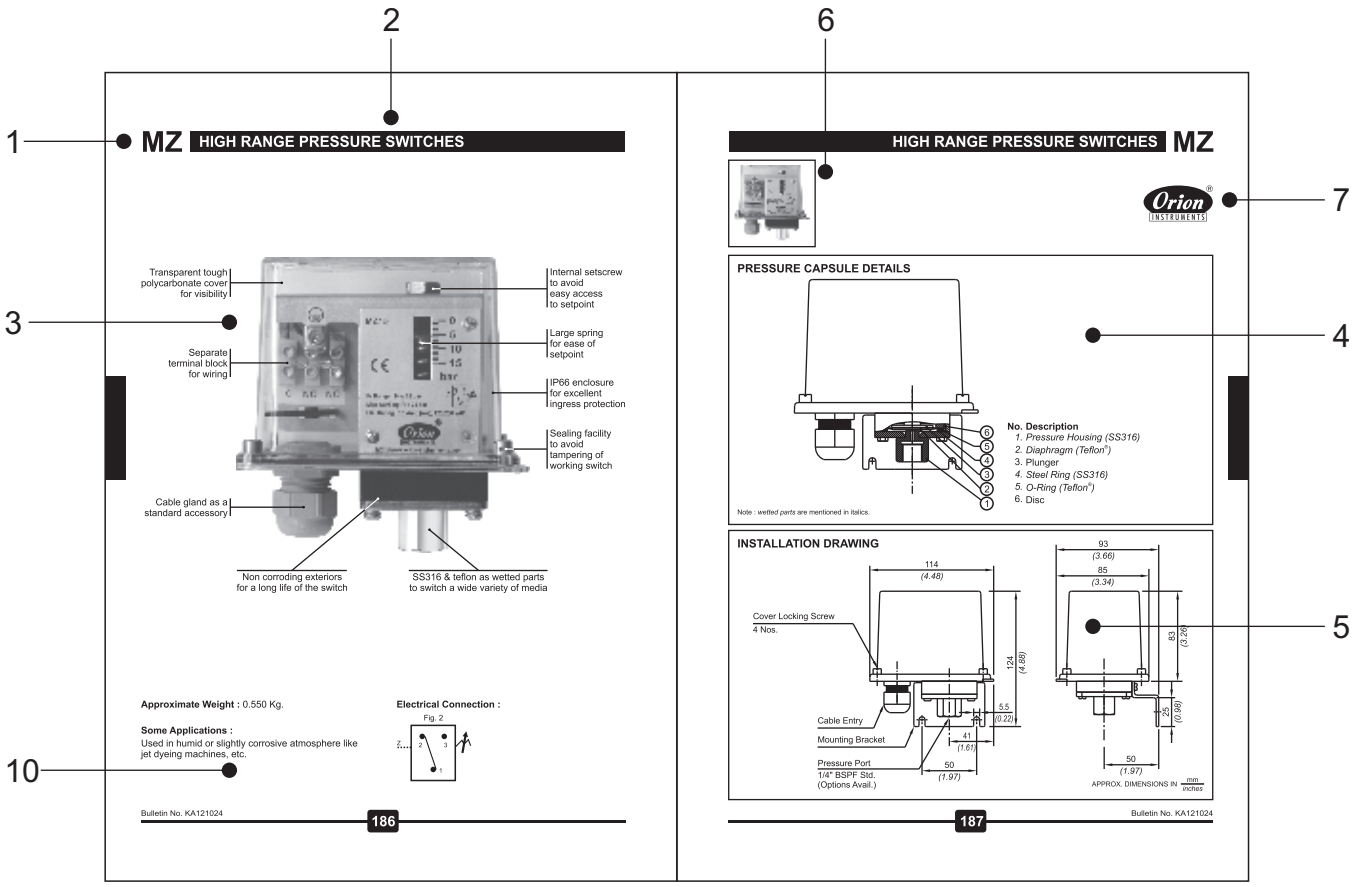
1. Product family / series - A product family / series will appear on the outside page corner, depending on the left / right hand page, and will be in large bold type.

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 it's 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.



6. Photos - will appear on the relevant top of the page for products. If there are mounting variations / styles, all the styles for standard products will appear for easy identification. Options, if included in the photograph, are for demonstration only, and are not a part of the standard equipment. For accessories, the photos are not given due to the sheer variety and range available.

7. Logo - will appear on right hand top of page to identify the manufacturer.

8. Characteristics - Range tables and their relevant data, e.g the range covered, the differentials and maximum working pressures will generally appear on the right hand page. Additional technical details will also be mentioned, wherever required, on the right hand side of the page.

9. Ordering guide - A guide as to how to order the particular series' variations will appear on right hand bottom of the page. Only the variations available within a particular product family / series will appear here. Any additional accessories or modifications required for the product need to be mentioned in text by the user.

10. Some applications - will appear at the bottom left of the page. This is for easy understanding of the specific use of the product.

11. Numerous combinations are possible when pressure switches are provided with accessories like chemical seals, snubbers, remote seals, pipe mounting brackets, combination of switches mounted in a panel etc. Users are requested to provide the details of accessories required in text / drawings, as separate identification codes are provided for pressure switches fitted and supplied with accessories.

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MZ HIGH RANGE PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
LP†	0.067 - 0.213 *(0.97 - 3.09)*	0.05 *(0.72)*	5 *(72.52)*
LP5	0.1 - 0.5 *(1.45 - 7.25)*	0.10 *(1.45)*	5 *(72.52)*
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.10 *(1.45)*	12 *(174.05)*
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.20 *(2.90)*	12 *(174.05)*
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.20 *(2.90)*	12 *(174.05)*
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.20 *(2.90)*	12 *(174.05)*
H07	0.5 - 7.0 *(7.25 - 101.50)*	0.40 *(5.80)*	12 *(174.05)*
H10	0.5 - 10.0 *(7.25 - 145.04)*	0.60 *(8.70)*	25 *(362.6)*
H15	1.0 - 15.0 *(14.50 - 217.56)*	0.60 *(8.70)*	25 *(362.6)*
H30	5.0 - 25.0 *(72.52 - 362.6)*	0.80 *(11.60)*	35 *(507.63)*

*Minimum differential increases with setpoint (Graphs available on request), results for neoprene diaphragm.
†Range not available in SS316 L diaphragm.

HOW TO ORDER PROCESS HIGH RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, on receipt of agreement of supply details with customer.	**MZ** = Process pressure switch with robust transparent polycarbonate enclosure to IP65 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale in bar **PF3** = pressure switch, fixed differential with scale in psi ***PA2** = pressure switch, adjustable differential with scale in bar ***PA3** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**LP** = (0.067 - 0.213) **LP5** = (0.1 - 0.5) **H01** = (0.1 - 1.0) **H02** = (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6) **H07** = (0.5 - 7.0) **H10** = (0.5 - 10.0) **H15** = (1.0 - 15.0) **H30** = (5.0 - 25.0)	**A8** = General purpose microswitch rated at 5A, 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC *Please refer note under Range selection table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 228 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon **2** = SS 316L **4** = Monel
Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**	**Group 6**	**Group 7**	**Group 8**
☐	MZ	3	PF2	H01	A8	S1	0

Please specify full model number to avoid ambiguity.

eg: A process pressure switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

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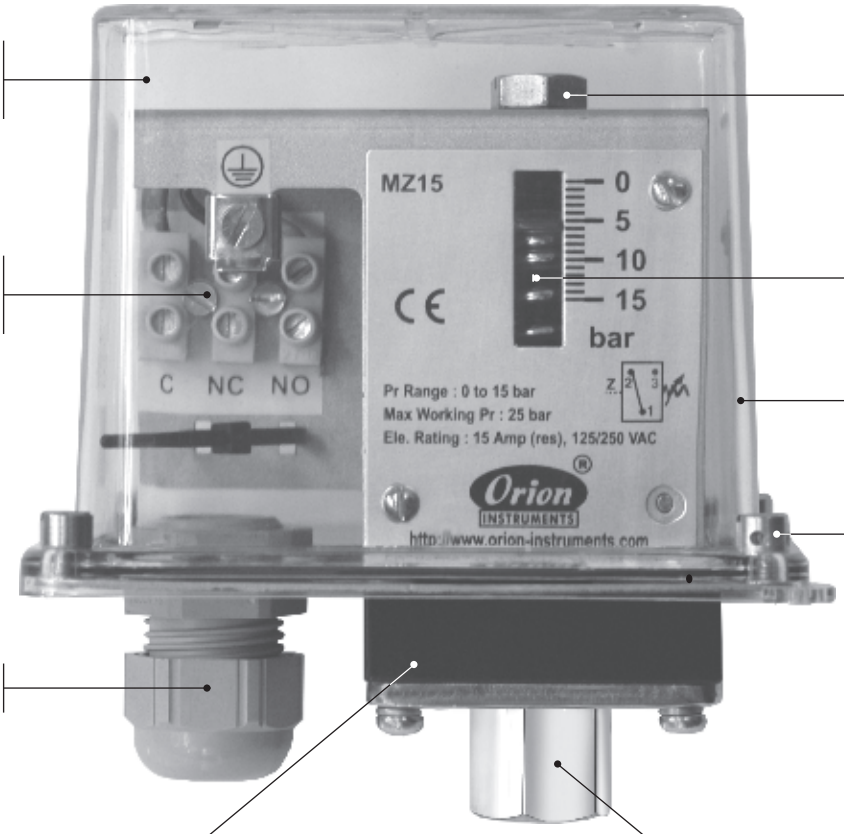
Switch Construction



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Non corroding exteriors for a long life of the switch

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

SS316 & teflon as wetted parts to switch a wide variety of media

Switch Construction

The versatile construction of MZ series process pressure switches can be configured to suit applications, by selecting the following main subassemblies / components :

a) The enclosure

The tough polycarbonate cover, fitted on a stainless steel base, retained by SS screws offers excellent resistance to corrosion, and also allows a view of the internal scale and working of the pressure switch. The reliable snapaction microswitch offers narrow deadband, switching values, which have excellent repeatability. By using appropriate capsules and wetted parts, MZ series pressure switches can be used for thousands of applications.

A standard cable gland (PG13.5 or M20 x 1.5) is provided as a standard accessory.

b) The electrical element (s) :

Choice of electrical elements to suit end use are offered, like :

A8 : General purpose applications

A7 : 2SPDT switching elements

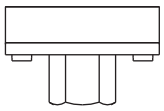
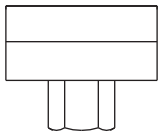
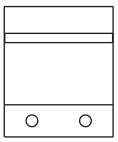
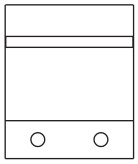
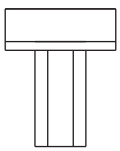
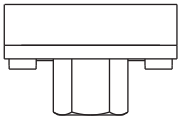
A9 : General purpose applications

It is possible to have more options of electrical elements not published here, to suit individual end use.

The deadband (or hysterisis / on-off differential) of the switches will change with the change of the electrical element (s). The approximate values for each range (for standard microswitches offered) are published in this catalogue

c) The pressure capsule :

To suit the setpoints , the working media and the function of the switch in the application:

High Range Pressure Switches (typically from 0.067 barg to 25 barg) 	**High Proof High Range Pressure Switches** (typically from 0.1 barg to 25 barg : Pmax = 70) 	**High Range Pressure Difference Switches** (typically from 0.1 barg to 25 barg) 
Vacuum Switches (typically from 760 mm Hg to atmospheric pressure) 	**Hydraulic Range Pressure Switches** (typically from 0.5 barg to 400 barg) 	**OEM Switches** (typically from 0.1 barg to 25 barg) 

The pressure capsule can be modified to take high proof pressures [typically 100 bar for high pressure switches, or pressure difference switches (from high pressure side)].

Several accessories like chemical seals, pipe mounting brackets etc can be supplied with these switches to suit the media to be sensed. All of these are not listed, though most popular ones can be found on pages 322 through 328.

Please do get in touch with us for any of your applications, not addressed in this catalogue. We would be glad to offer you a solution.

Product Selection Guide

Page No. 186

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Page No. 194

	Switch type	High range	High range high proof	Large Bore High Range
	Repeatability (% FSR)	± 1	± 2	± 2
	Range covered	0.067 bar to 25 bar	0.1 bar to 25 bar	0.1 bar to 25 bar
	Enclosure Protection	IP 66		
	Enclosure Material	Tough transparent polycarbonate		
WETTED PARTS	sensing element Standard Optional	Diaphragm nylon reinforced SS 316L, Teflon, Monel	neoprene diaphragm protected by Teflon SS 316L, Teflon	 SS 316L, Teflon, Monel
WETTED PARTS	Pressure housing Standard Optional	SS 316 Monel		Monel
WETTED PARTS	Other Wetted Parts	Teflon, SS316		Teflon
WETTED PARTS	Optional wetted parts through chem. seal	-		
	Temp. of working medium	For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°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.

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Flanged	Hydraulic	Hydraulic Diaphragm	Switch type
± 2	± 1	± 2	Repeatability (% FSR)
0.1 bar to 200 bar	5 bar to 400 bar	0.5 bar to 400 bar	Range covered
IP 66			Enclosure Protection
Tough transparent polycarbonate			Enclosure Material
Diaphragm nylon reinforced neoprene diaphragm Teflon, SS316L, Hastelloy C, Monel, Titanium, Tantalum	Piston SS	Diaphragm SS316 Monel	sensing element Standard Optional
Flange SS316L Hastelloy C276, Monel, Titanium, Tantalum	SS 316		Pressure housing Standard Optional
Teflon, SS 316	SS	SS316, Teflon	Other Wetted Parts
-	-	-	Optional wetted parts through chem. seal
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°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

Product Selection Guide

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Page No. 214

Page No. 218

Switch type		High range ?p	High Range DP	Vacuum
Repeatability (% FSR)		± 1	± 1	± 2
Range covered		0.1 bar to 3.6 bar	0.1 bar to 25 bar	760 mmHg to 100 mmHg
Enclosure Protection		IP 66		
Enclosure Material		Tough transparent polycarbonate		
WETTED PARTS	sensing element Standard Optional	Diaphragm nylon reinforced neoprene diaphragm protected by Teflon Teflon		
	Pressure housing Standard Optional	Aluminium SS 316	SS 316	Aluminium SS 316
	Other Wetted Parts	Teflon, SS, SS 316	Teflon	Teflon, SS 316
	Optional wetted parts through chem. seal			
Temp. of working medium		For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°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.

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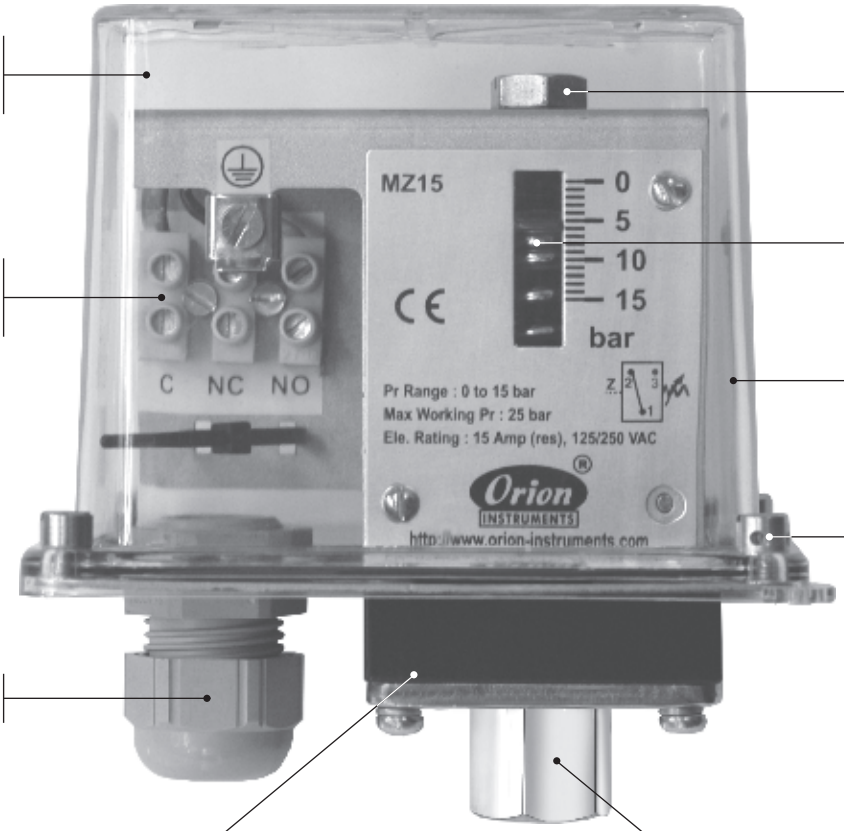
Temperature	Switch type	
± 1	Repeatability (% FSR)	
25°C to 215°C	Range covered	
IP 66	Enclosure Protection	
Tough transparent polycarbonate	Enclosure Material	
Bulb / Probe Brass	sensing element Standard Optional	WETTED PARTS
	Pressure housing Standard Optional	
	Other Wetted Parts	
	Optional wetted parts through chem. seal	
For non-metallic diaphragm: 80°C maximum. For metallic diaphragm: 150°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	

MZ HIGH RANGE PRESSURE SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

SS316 & teflon as wetted parts to switch a wide variety of media

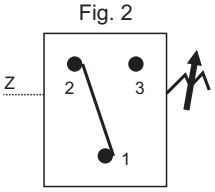
Approximate Weight : 0.550 Kg.

Some Applications :

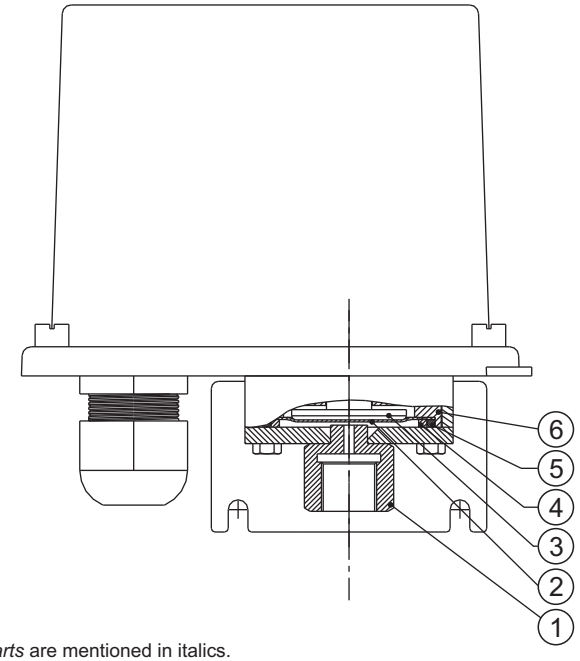
Used in humid or slightly corrosive atmosphere like jet dyeing machines, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

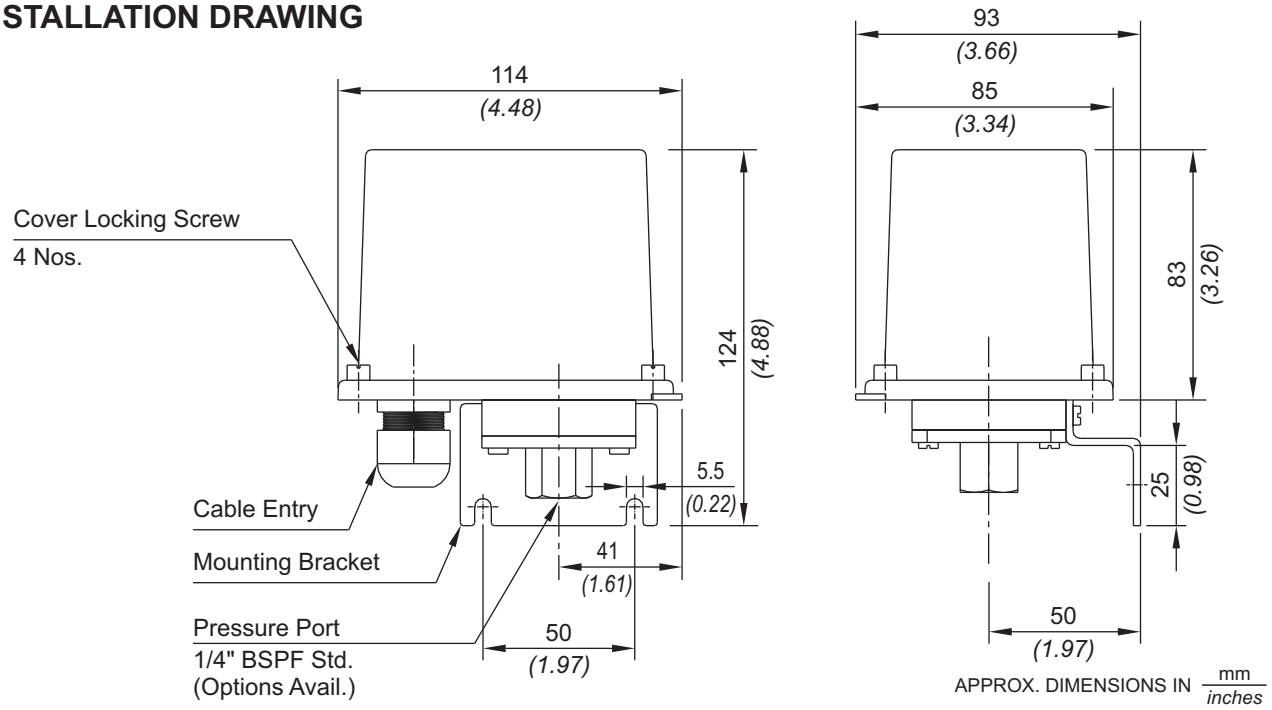


No. Description

1. *Pressure Housing (SS316)*
2. *Diaphragm (Teflon®)*
3. Plunger
4. *Steel Ring (SS316)*
5. *O-Ring (Teflon®)*
6. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ HIGH RANGE PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
LP†	0.067 - 0.213 *(0.97 - 3.09)*	0.05 *(0.72)*	5 *(72.52)*
LP5	0.1 - 0.5 *(1.45 - 7.25)*	0.10 *(1.45)*	5 *(72.52)*
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.10 *(1.45)*	12 *(174.05)*
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.20 *(2.90)*	12 *(174.05)*
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.20 *(2.90)*	12 *(174.05)*
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.20 *(2.90)*	12 *(174.05)*
H07	0.5 - 7.0 *(7.25 - 101.50)*	0.40 *(5.80)*	12 *(174.05)*
H10	0.5 - 10.0 *(7.25 - 145.04)*	0.60 *(8.70)*	25 *(362.6)*
H15	1.0 - 15.0 *(14.50 - 217.56)*	0.60 *(8.70)*	25 *(362.6)*
H30	5.0 - 25.0 *(72.52 - 362.6)*	0.80 *(11.60)*	35 *(507.63)*

*Minimum differential increases with setpoint (Graphs available on request), results for neoprene diaphragm.
†Range not available in SS316 L diaphragm.

HOW TO ORDER PROCESS HIGH RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale in bar **PF3** = pressure switch, fixed differential with scale in psi ***PA2** = pressure switch, adjustable differential with scale in bar ***PA3** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**LP** = (0.067 - 0.213) **LP5** = (0.1 - 0.5) **H01** = (0.1 - 1.0) **H02** (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6) **H07** = (0.5 - 7.0) **H10** = (0.5 - 10.0) **H15** = (1.0 - 15.0) **H30** = (5.0 - 25.0)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon **2** = SS 316L **4** = Monel

eg. A process pressure switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	PF2	H01	A8	S1	0

Please specify full model number to avoid ambiguity.

MZ HIGH PROOF HIGH RANGE PRESSURE SWITCHES

Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

SS316 & teflon as wetted parts to switch a wide variety of media

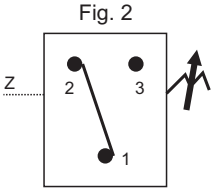
Approximate Weight : 0.900 Kg.

Some Applications :

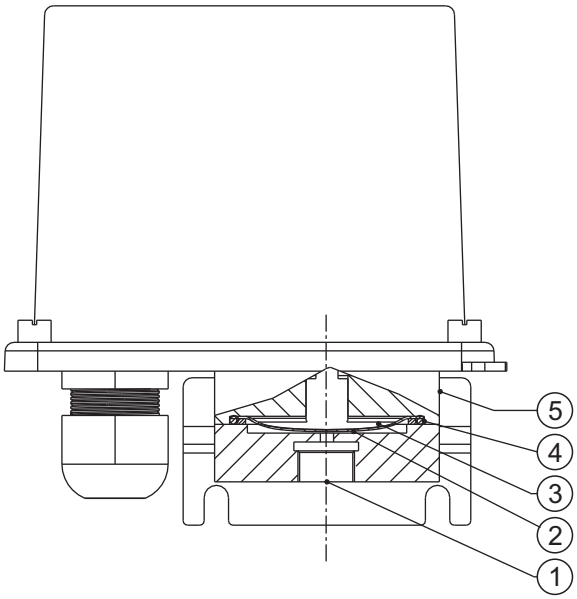
Used where low set point and high proof pressure is required like tyre moulding machines, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

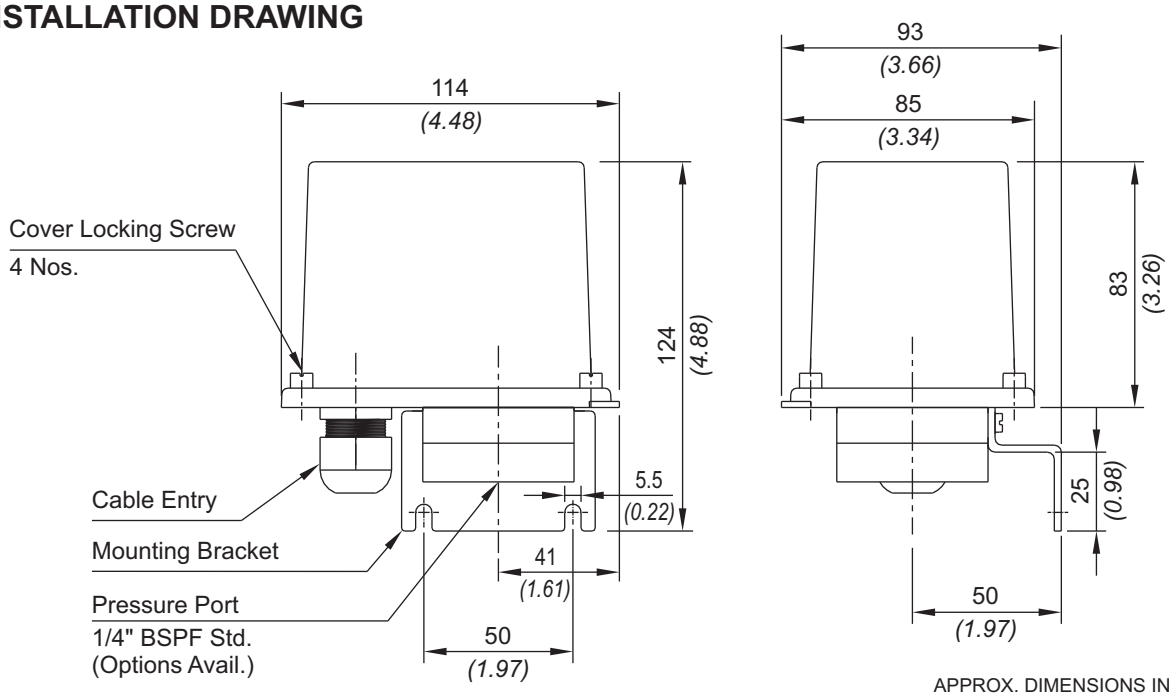


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *O-Ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ HIGH PROOF HIGH RANGE PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
PP5	0.1 - 0.5 *(1.45 - 7.25)*	0.20 *(2.90)*	70 *(1015.26)*
P01	0.1 - 1.0 *(1.45 - 14.50)*	0.20 *(2.90)*	70 *(1015.26)*
P02	0.1 - 1.5 *(1.45 - 21.76)*	0.40 *(5.80)*	70 *(1015.26)*
P03	0.2 - 2.6 *(2.90 - 37.71)*	0.40 *(5.80)*	70 *(1015.26)*
P04	0.2 - 3.6 *(2.90 - 52.21)*	0.50 *(7.25)*	70 *(1015.26)*
P07	0.5 - 7.0 *(7.25 - 101.53)*	1.00 *(14.50)*	70 *(1015.26)*
P10	0.5 - 10.0 *(7.25 - 145.04)*	1.00 *(14.50)*	70 *(1015.26)*
P15	1.0 - 15.0 *(14.50 - 217.56)*	1.5 *(21.76)*	70 *(1015.26)*
P30	5.0 - 25.0 *(72.52 - 362.6)*	1.5 *(21.76)*	70 *(1015.26)*

*Minimum differential increases with setpoint (Graphs available on request), results for neoprene diaphragm.

HOW TO ORDER PROCESS HIGH PROOF HIGH RANGE PRESSURE SWITCHES

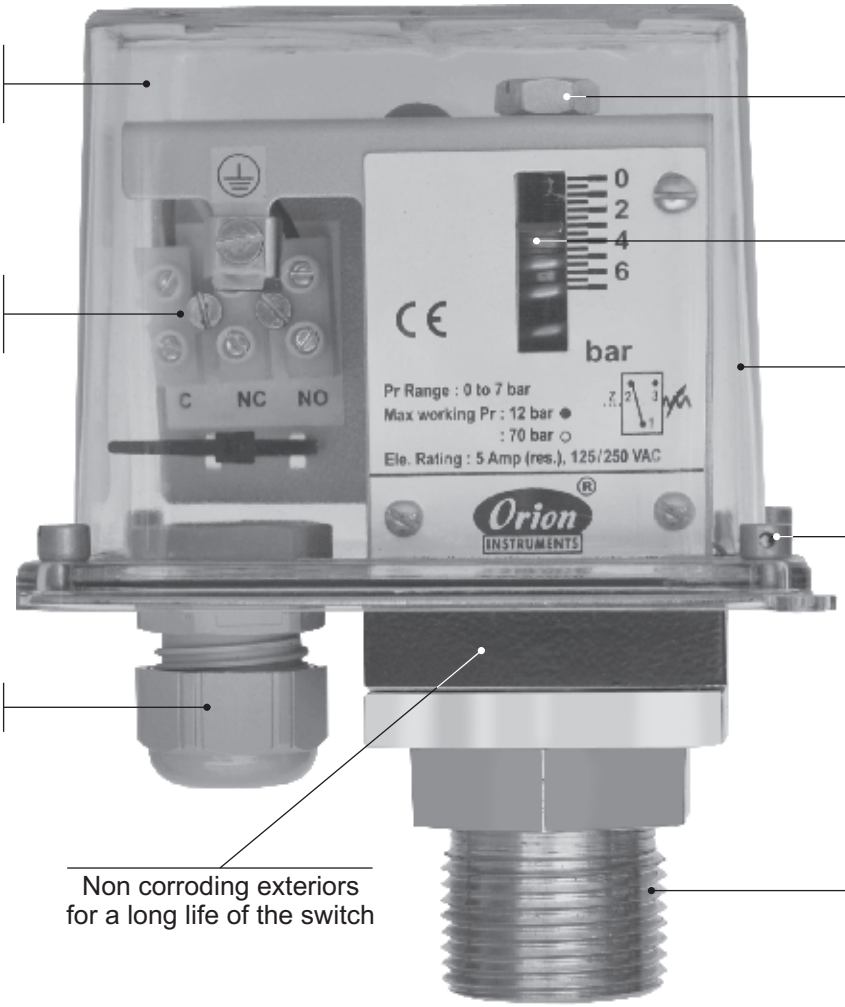
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale **PF3** = pressure switch, fixed differential with scale in psi **PA2*** = pressure switch, adjustable differential with scale in bar **PA3*** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**PP5** = (0.1 - 0.5) **P01** = (0.1 - 1.0) **P02** (0.1 - 1.5) **P03** = (0.2 - 2.6) **P04** = (0.2 - 3.6) **P07** = (0.5 - 7.0) **P10** = (0.5 - 10.0) **P15** = (1.0 - 15.0) **P30** = (5.0 - 25.0)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon **2** = SS 316L

eg. A process pressure switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	PF2	P01	A8	S1	0

Please specify full model number to avoid ambiguity.

MZ LARGE BORE HIGH RANGE PRESSURE SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Non corroding exteriors for a long life of the switch

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

SS316 & teflon as wetted parts to switch a wide variety of media

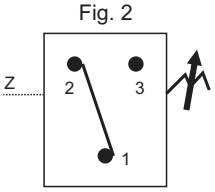
Approximate Weight : 0.900 Kg.

Some Applications :

Applications requiring a large bore, for slurries, sludges, etc.

Electrical Connection :

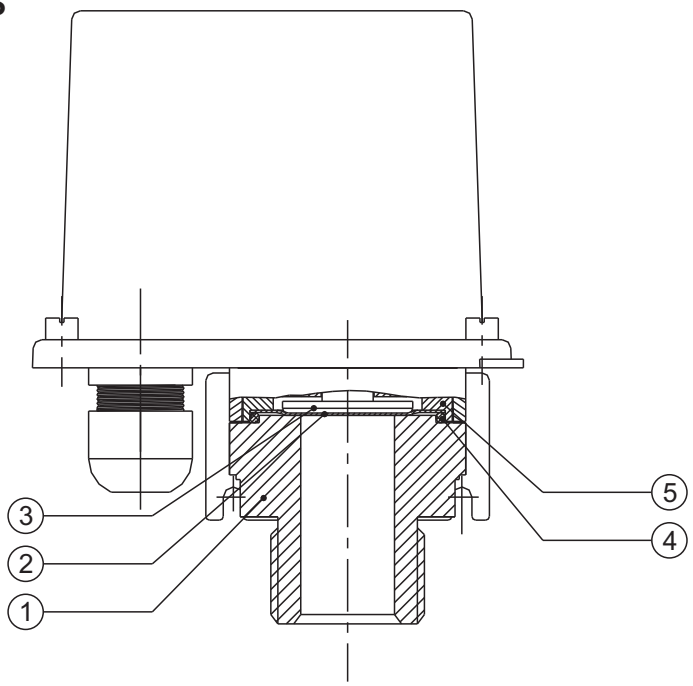
Fig. 2



PRESSURE CAPSULE DETAILS

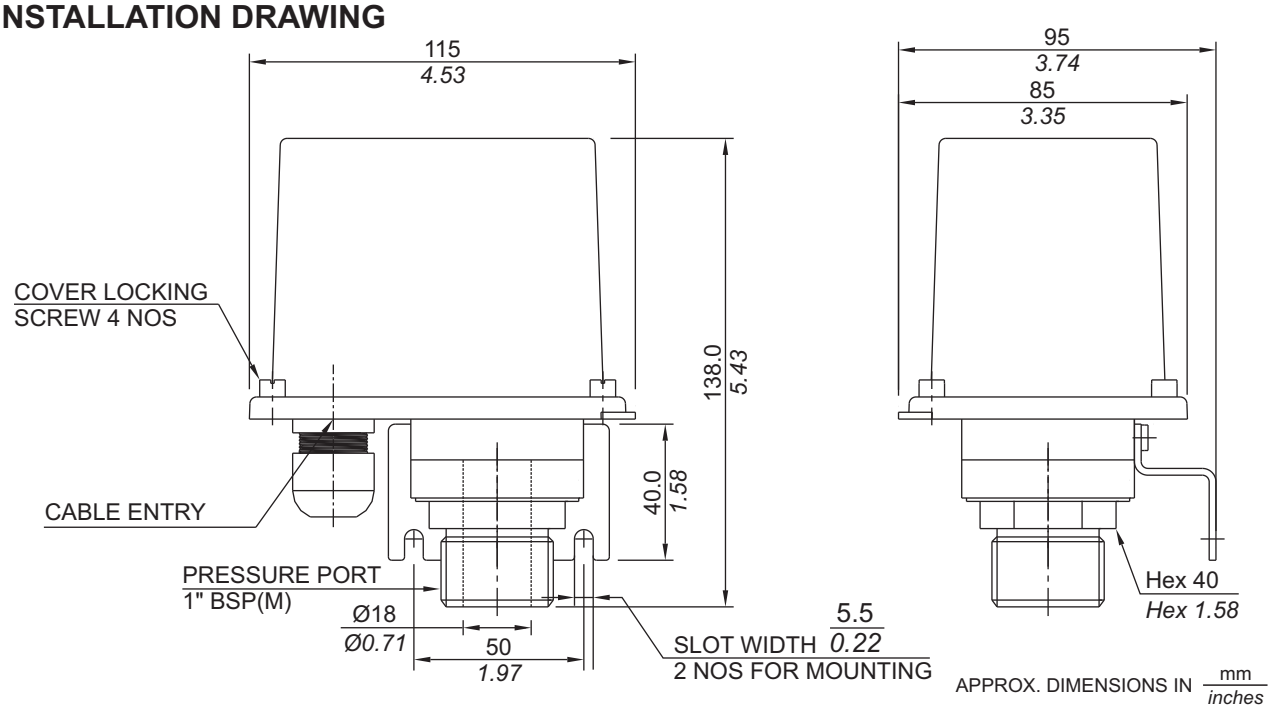
No. Description

1. *Pressure Port (SS316)*
2. *Diaphragm (Teflon®)*
3. Plunger
4. *O-Ring (Teflon®)*
5. Disc



Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ LARGE BORE HIGH RANGE PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.10 *(1.43)*	12 *(171.43)*
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.20 *(2.86)*	12 *(171.43)*
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.20 *(2.86)*	12 *(171.43)*
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.20 *(2.86)*	12 *(171.43)*
H07	0.5 - 7.0 *(7.25 - 101.50)*	0.40 *(5.72)*	12 *(171.43)*
H10	0.5 - 10.0 *(7.14 - 142.86)*	0.60 *(8.58)*	25 *(357.14)*
H15	1.0 - 15.0 *(14.29 - 214.29)*	0.60 *(8.58)*	25 *(357.14)*
H30	5.0 - 25.0 *(71.43 - 357.14)*	0.80 *(11.44)*	35 *(500.00)*

*Minimum differential increases with setpoint (Graphs available on request), results for neoprene diaphragm.

Note: Welded diaphragm also available as shown

HOW TO ORDER PROCESS LARGE BORE HIGH RANGE PRESSURE SWITCHES

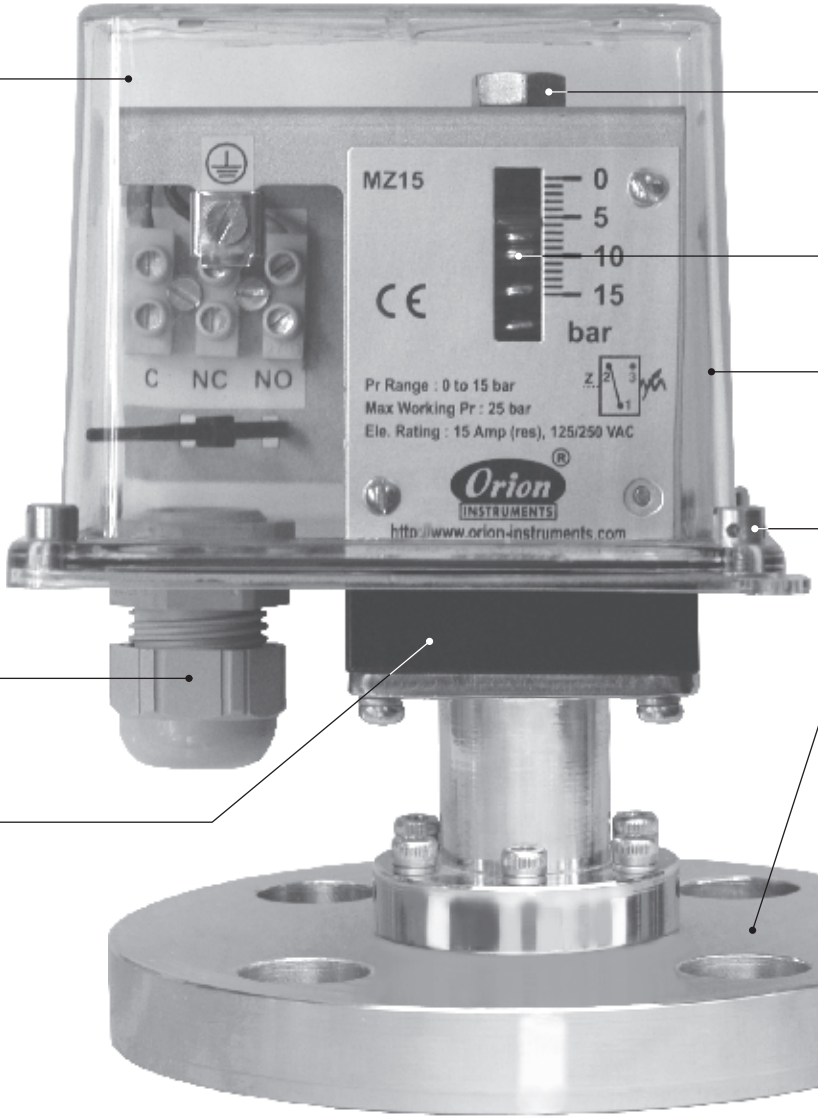
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale in bar **PF3** = pressure switch, fixed differential with scale in psi ***PA2** = pressure switch, adjustable differential with scale in bar ***PA3** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**H01** = (0.1 - 1.0) **H02** (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6) **H07** = (0.5 - 7.0) **H10** = (0.5 - 10.0) **H15** = (1.0 - 15.0) **H30** = (5.0 - 25.0)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S3** = SS316 / 1” BSP(M) **N3** = Monel / 1" BSP(M) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon **2** = SS 316L **4** = Monel

eg. A process pressure switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with 1” BSPM port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	PF2	H01	A8	S3	0

Please specify full model number to avoid ambiguity.

MZ FLANGED PRESSURE SWITCHES



Transparent tough polycarbonate cover for visibility

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Cable gland as a standard accessory

ANSI Flange

Non corroding exteriors for a long life of the switch

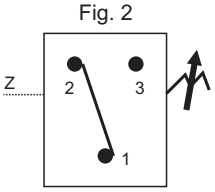
Approximate Weight : 0.900 Kg.

Some Applications :

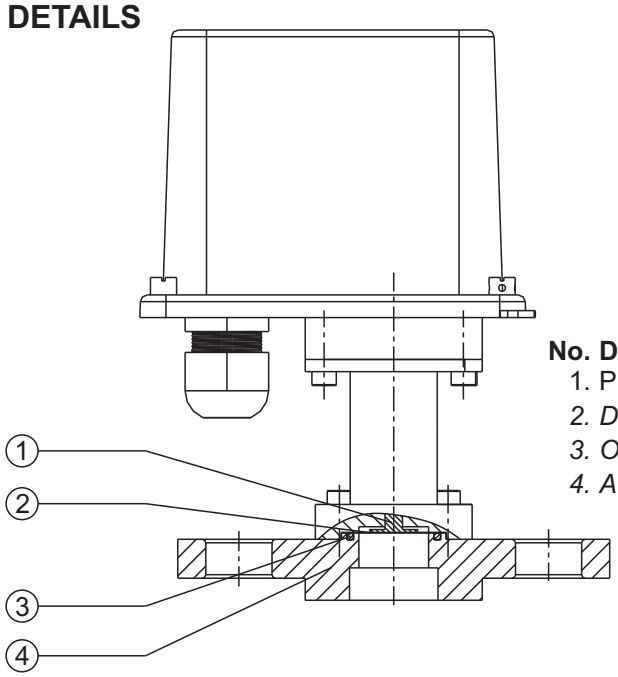
In non-hazardous areas for slurry, colloidal solutions, corrosive & non-corrosive working media (unclean working media), etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

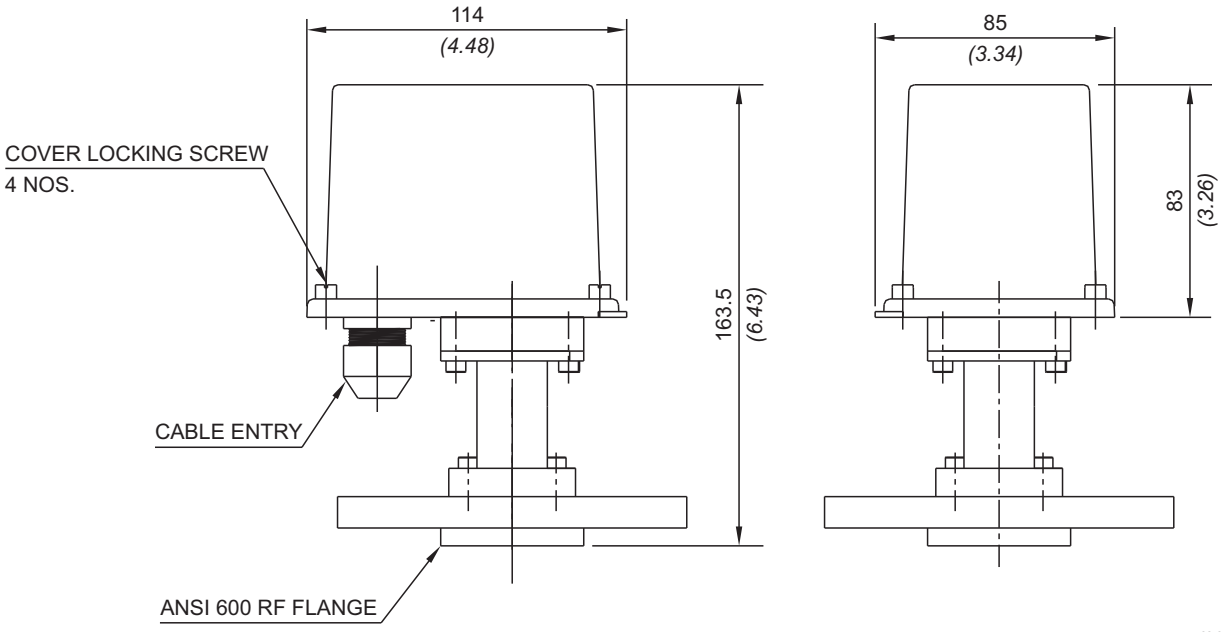


No. Description

1. Plunger
2. *Diaphragm (Teflon)®*
3. *O-Ring (Teflon)®*
4. *ANSI 600 Flange (SS316)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ FLANGED PRESSURE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)* Approximate Maximum for "A8" microswitch	Maximum Working Pressure bar *(psi)*
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.10 *(1.45)*	As per the class of flange
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.12 *(1.74)*	
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.17 *(2.46)*	
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.20 *(2.90)*	Please consult Sales Office in case you need clarification on availability of maximum working pressure for a particular range.
H07	0.5 - 7.0 *(7.25 - 101.50)*	0.40 *(5.80)*	
H10	0.5 - 10.0 *(7.25 - 145.04)*	0.40 *(5.80)*	
H15	1.0 - 15.0 *(14.50 - 217.71)*	0.80 *(11.60)*	
H30	5.0 - 25.0 *(72.52- 362.6)*	0.80 *(11.60)*	
H4T	5 - 40 *(72.52 - 580.15)*	5 *(72.52)*	
H1H	10 - 100 *(145.04 - 1450.38)*	12 *(174.05)*	
H2H	7 - 200 *(101.52 - 2900.76)*	24 *(348.09)*	

* Minimum differential increases with setpoint (Graphs available on request)
* Differentials of miroswitches A2 through A9 will vary. Differentials for A7 are typically twice that for A1 microswitch.
Please indicate specifically the differential value in enquiry/order, when it is critical in your application.

FLANGE CODE TABLE (Please refer page no. 228 & 229 for more options)

	SS316L		Hastelloy C276		Monel		Titanium		Tantalum	
	RF*	FF*	RF*	FF*	RF*	FF*	RF*	FF*	RF*	FF*
150 #										
1" NB	AC	BS	DI	EY	GO	IE	JU	LK	NA	OQ
2" NB	AF	BV	DL	FB	GR	IH	JX	LN	ND	OT
300#										
1" NB	AI	BY	DO	FE	GU	IK	KA	LQ	NG	OW
2" NB	AL	CB	DR	FH	GX	IN	KD	LT	NJ	OZ
2500#										
1" NB	BM	DC	ES	GI	HY	JO	LE	MU	OK	QA
2" NB	BP	DF	EV	GL	IB	JR	LH	MX	ON	QD

*RF = Raised Face
*FF = Flat Face

RANGE AVAILABILITY AS PER BORE SIZES

	H01 to H04	H07	H10	H15	H30	H2T to H2H
1" NB	NA	Yes	Yes	Yes	Yes	Yes
2" NB	Yes	Yes	Yes	Yes	Yes	Yes

HOW TO ORDER PROCESS FLANGED PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type ANSI flanged	Range Code (values in bar)	Microswitch Type	Flange Size and Material	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 threads for aluminum housing	**AF2** = pressure switch, fixed differential with scale in bar **AF3** = pressure switch, fixed differential with scale in psi ***AA2** = pressure switch, adjustable differential with scale in bar ***AA3** = pressure switch, fixed differential with scale in psi *Available with A9 (in group 6) only	**H01** = 0.1 - 1.0 **H02** = 0.1 - 1.5 **H03** = 0.2 - 2.6 **H04** = 0.2 - 3.6 **H07** = 0.5 - 7.0 **H10** = 0.5 - 10.0 **H15** = 1.0 - 15.0 **H30** = 5.0 - 25.0 **H4T** = 5 - 40 **H1H** = 10 - 100 **H2H** = 7 - 200	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	Please select as per Flange Code Table For other classes and sizes please refer page no. 228 & 229	**0** = Neoprene **1** = Teflon **2** = SS316L **3** = Hastelloy C **4** = Monel 400 **5** = Titanium **6** = Tantalum

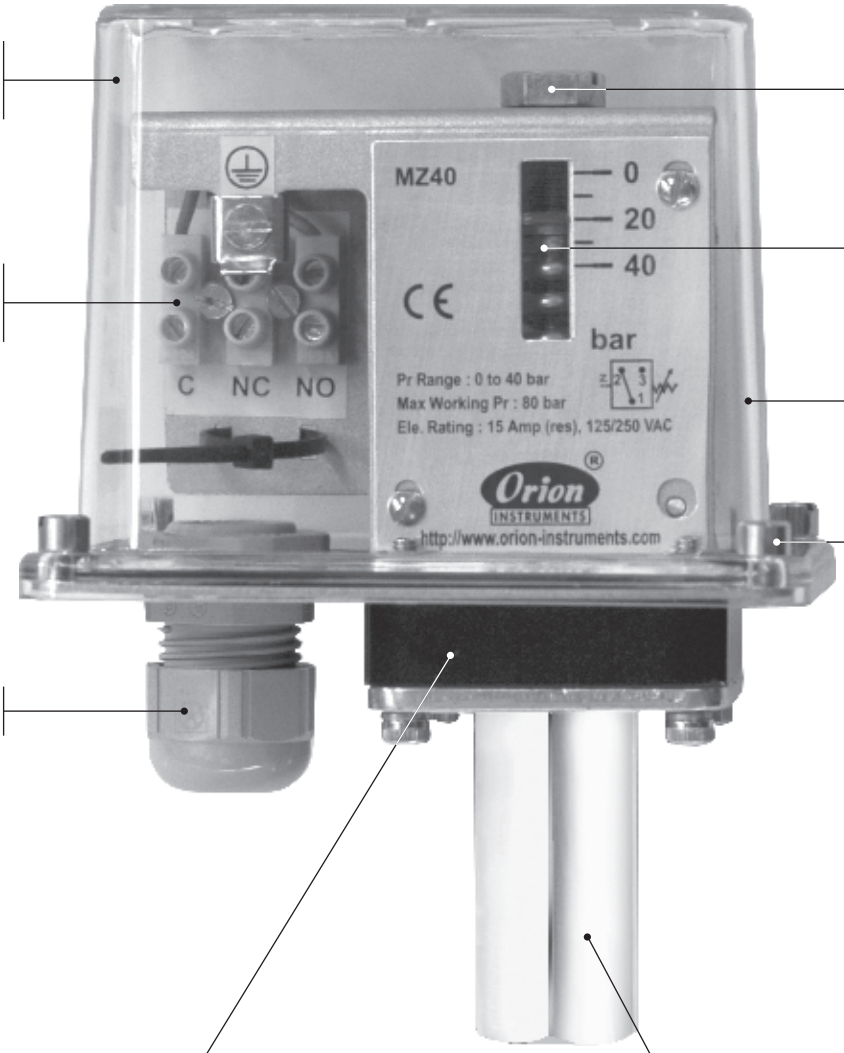
eg. A high range Industrial ANSI flanged pressure switch with ½" NPT cable entry with fixed differential without scale, having 0.1 bar to 1 bar pressure range, with 15 Amp. microswitch, and 2" 150# RF SS316L flange & SS316L diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MD	1	AF1	H01	A1	AF	2

Please specify full model number to avoid ambiguity.

Bulletin No. KA121024

MZ HYDRAULIC RANGE PRESSURE SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

SS316 & teflon as wetted parts to switch a wide variety of media

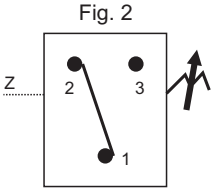
Approximate Weight : 0.680 Kg.

Some Applications :

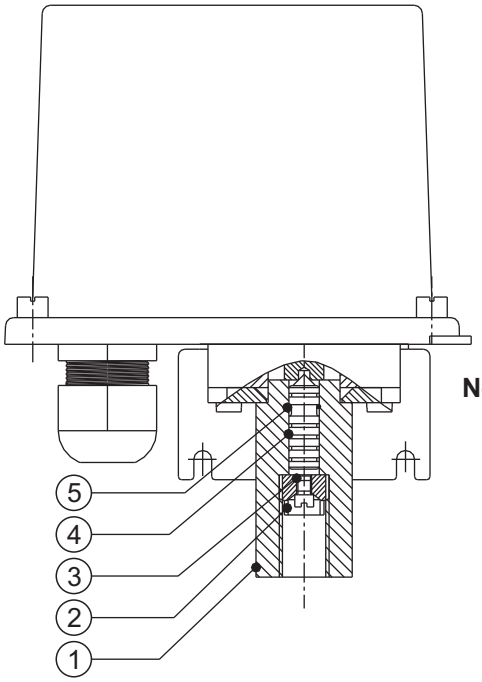
Used where pressure surges and fluctuations may be present like oil hydraulic systems, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

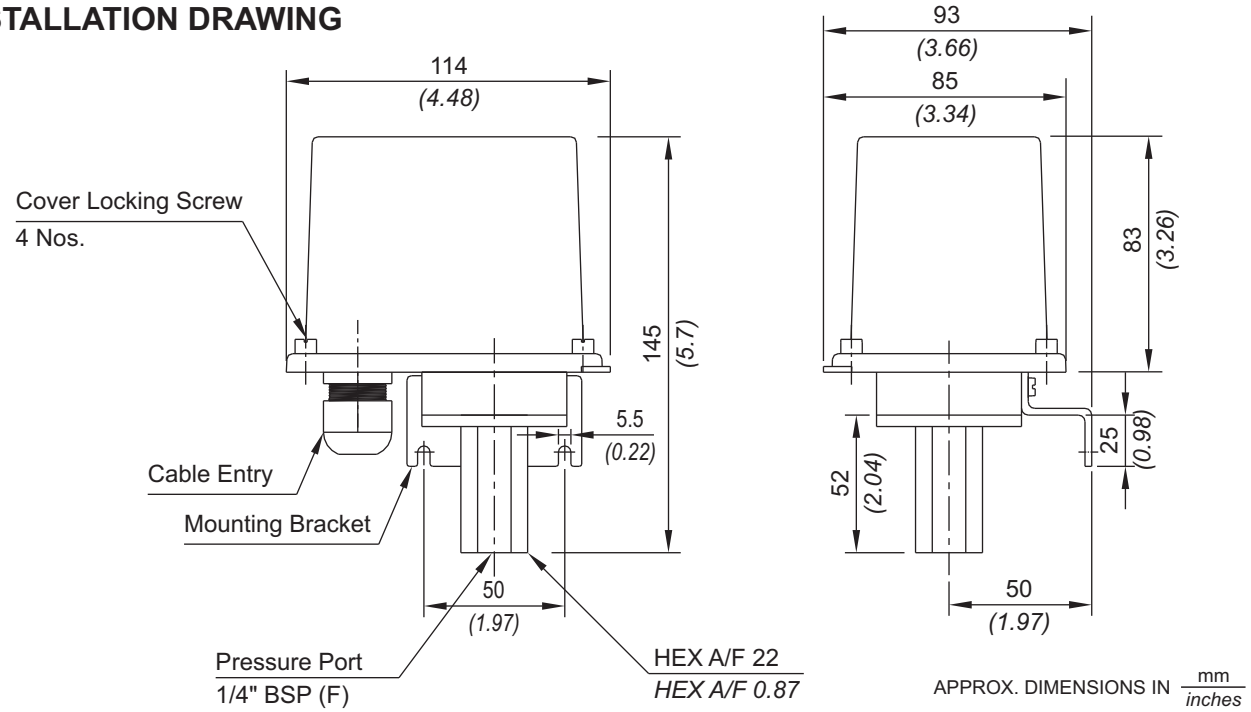


No. Description

1. *Pressure housing (SS)*
2. *Surge Arrestor (SS)*
3. *Surge Reducer (SS)*
4. *Piston (SS)*
5. *O-Ring (Viton®)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
040	5 - 40 *(72.52 - 580.15)*	5 *(72.52)*	80 *(1160.31)*
100	10 - 100 *(145.04 - 1450.38)*	12 *(174.05)*	120 *(1740.45)*
200	7 - 200 *(101.63 - 2900.75)*	24 *(348.09)*	200 *(2900.75)*
350	35 - 350 *(101.53 - 2900.75)*	24 *(348.09)*	500 *(7251.89)*
400	100 - 400 *(1450.38 - 5801.51)*	30 *(435.11)*	400 *(5801.59)*

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

HOW TO ORDER PROCESS HYDRAULIC RANGE PRESSURE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size and Material of Enclosure	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Piston
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale in bar **PF3** = pressure switch, fixed differential with scale in psi ***PA2** = pressure switch, adjustable differential with scale in bar ***PA3** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**040** = (5 - 40) **100** = (10 - 100) **200** = (7 - 200) **350** = (35 - 350) **400** = (100 - 400)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**2** = SS

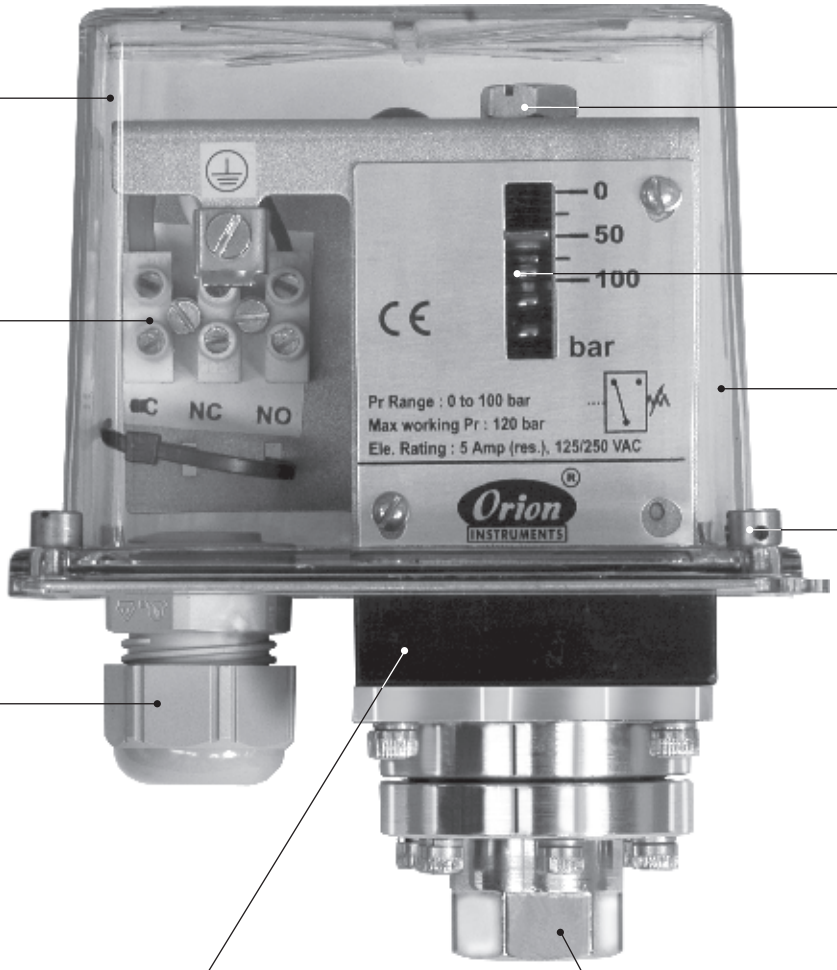
eg. A process pressure switch with fixed differential having 5 bar to 40 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	PF2	040	A8	S1	0

Please specify full model number to avoid ambiguity.

Bulletin No. KA121024

MZ HYDRAULIC DIAPHRAGM PRESSURE SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

SS316 & teflon as wetted parts to switch a wide variety of media

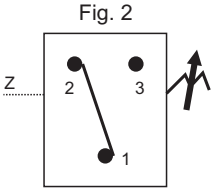
Approximate Weight : 0.680 Kg.

Some Applications :

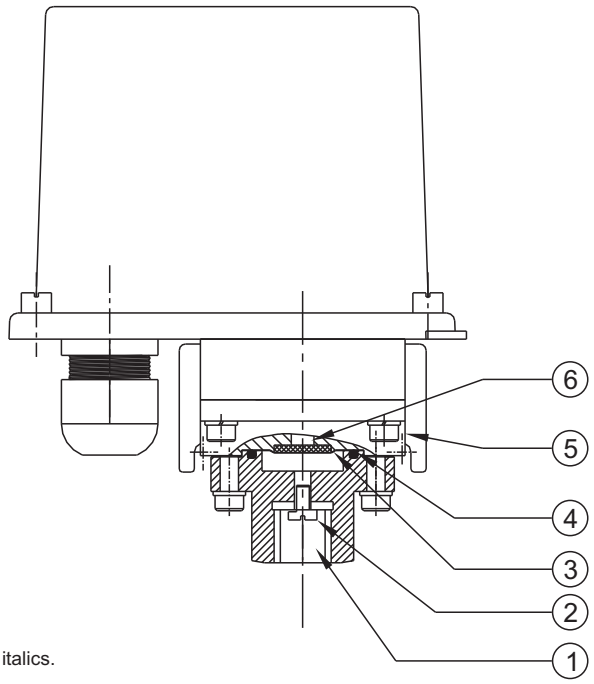
High Pressure applications requiring diaphragm as sensing element like water treatment plants, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

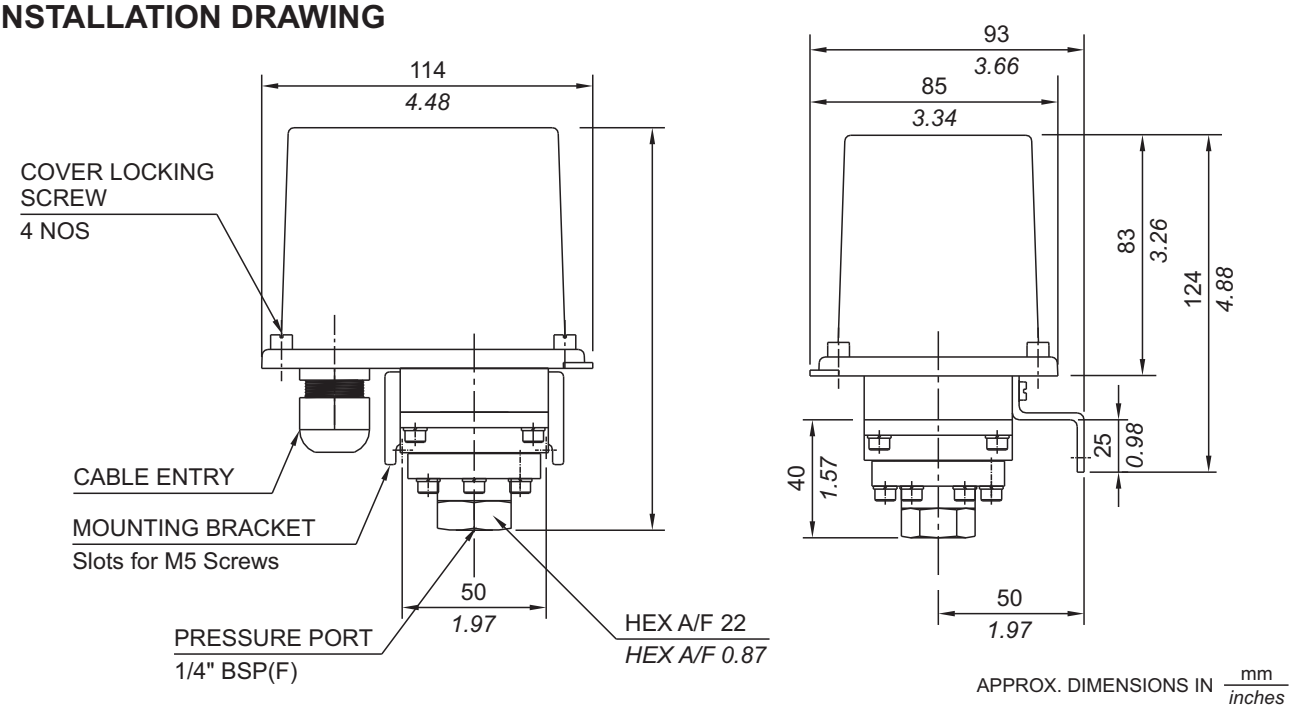


No. Description

1. *Pressure Housing*
2. *Surge Reducer*
3. *Diaphragm*
4. *O-Ring*
5. *Disc*
6. *Plunger*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
H1T	0.5 - 10 *(7.25 - 145.04)*	0.5 *(7.25)*	150 *(2175.51)*
H2T	2 - 20 *(29.00 - 290.07)*	2 *(29.00)*	200 *(2900.76)*
H4T	5 - 40 *(72.52 - 580.15)*	5 *(72.52)*	200 *(2900.76)*
H1H	10 - 100 *(146.04 - 1450.38)*	12 *(174.05)*	200 *(2900.76)*
H2H	7 - 200 *(101.52 - 2900.76)*	24 *(348.09)*	400 *(5801.52)*
H4H	40 - 400 *(580.15 - 5801.52)*	70 *(1015.27)*	500 *(7251.88)*

* Minimum differential increases with setpoint (Graphs available on request)
* Differentials of miroswitches A2 through A9 will vary. Differentials for A7 are typically twice that for A1 microswitch. Please indicate specifically the differential value in enquiry/order, when it is critical in your application.

HOW TO ORDER PROCESS HYDRAULIC DIAPHRAGM PRESSURE SWITCHES

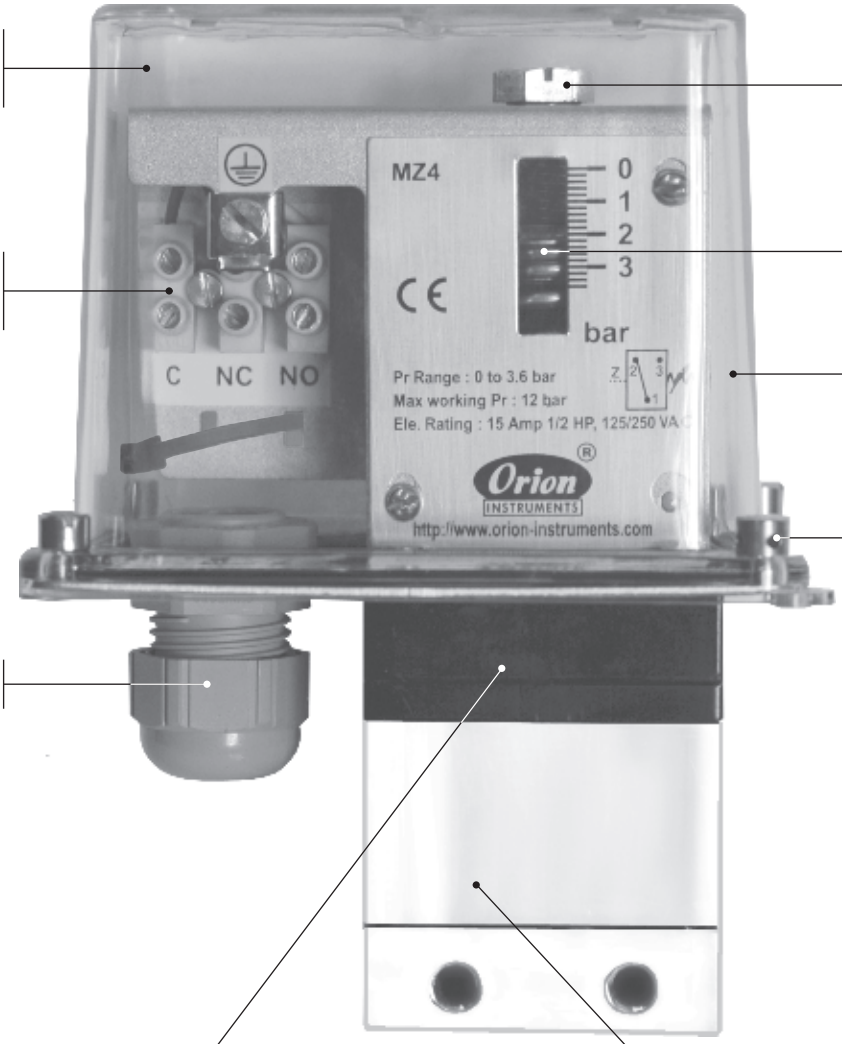
Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size and Material of Enclosure	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**PF2** = pressure switch, fixed differential with scale in bar **PF3** = pressure switch, fixed differential with scale in psi ***PA2** = pressure switch, adjustable differential with scale in bar ***PA3** = pressure switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**H1T** = (0.5 - 10) **H2T** = (2 - 20) **H4T** = (5 - 40) **H1H** = (10 - 100) **H2H** = (7 - 200) **H4H** = (40 - 400)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**2** = SS316 **4** = Monel

eg. A process pressure switch with fixed differential having 5 bar to 40 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	PF2	040	A8	S1	0

Please specify full model number to avoid ambiguity.

MZ HIGH RANGE PRESSURE DIFFERENCE SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

SS316 & teflon as wetted parts to switch a wide variety of media

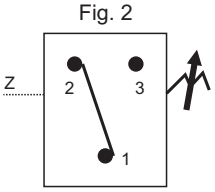
Approximate Weight : 1.400 Kg.

Some Applications :

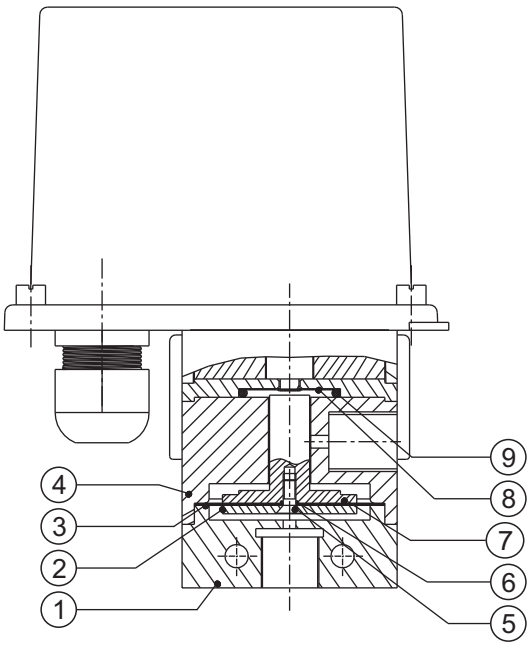
In non-hazardous areas for filters, strainers, cooling systems, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

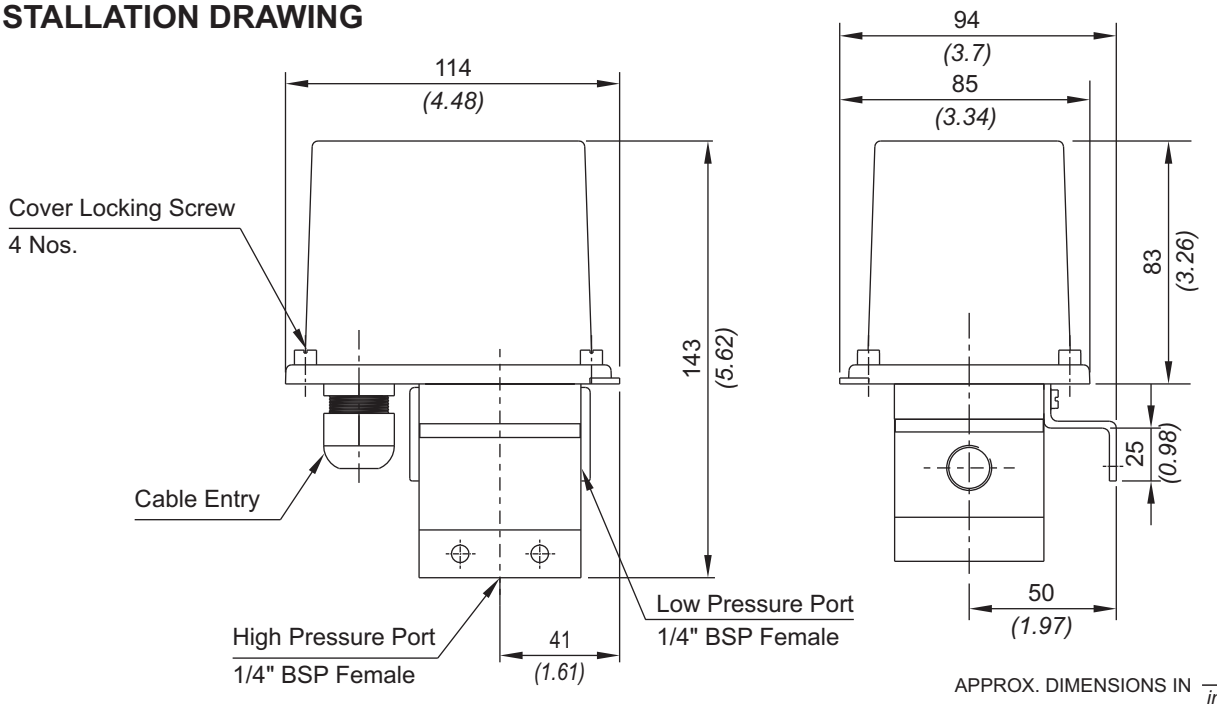


No. Description

1. *Pressure Housing*
2. *HP Plunger (SS316)*
3. *Diaphragm*
4. *Disc*
5. *CSK Screw (SS)*
6. *'O' ring (Teflon)*
7. *LP Plunger (SS316)*
8. *Sealing Diaphragm (Teflon)*
9. *Sealing O-Ring (Teflon)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ HIGH RANGE PRESSURE DIFFERENCE SWITCHES

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
H01	0.1 - 1.0 *(1.45 - 14.50)*	0.12 *(1.74)*	12 *(174.05)*
H02	0.1 - 1.5 *(1.45 - 21.76)*	0.20 *(2.90)*	12 *(174.05)*
H03	0.2 - 2.6 *(2.90 - 37.71)*	0.20 *(2.90)*	12 *(174.05)*
H04	0.2 - 3.6 *(2.90 - 52.21)*	0.30 *(4.35)*	12 *(174.05)*

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

HOW TO ORDER PROCESS HIGH RANGE PRESSURE DIFFERENCE SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**DF2** = pressure difference switch, fixed differential with scale in bar **DF3** = pressure difference switch, fixed differential with scale in psi ***DA2** = pressure difference switch, adjustable differential with scale in bar ***DA3** = pressure difference switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**H01** = (0.1 - 1.0) **H02** = (0.1 - 1.5) **H03** = (0.2 - 2.6) **H04** = (0.2 - 3.6)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**A1** = Aluminium / ¼" BSP(F) **A2** = Aluminium / ¼" NPT(F) **S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon

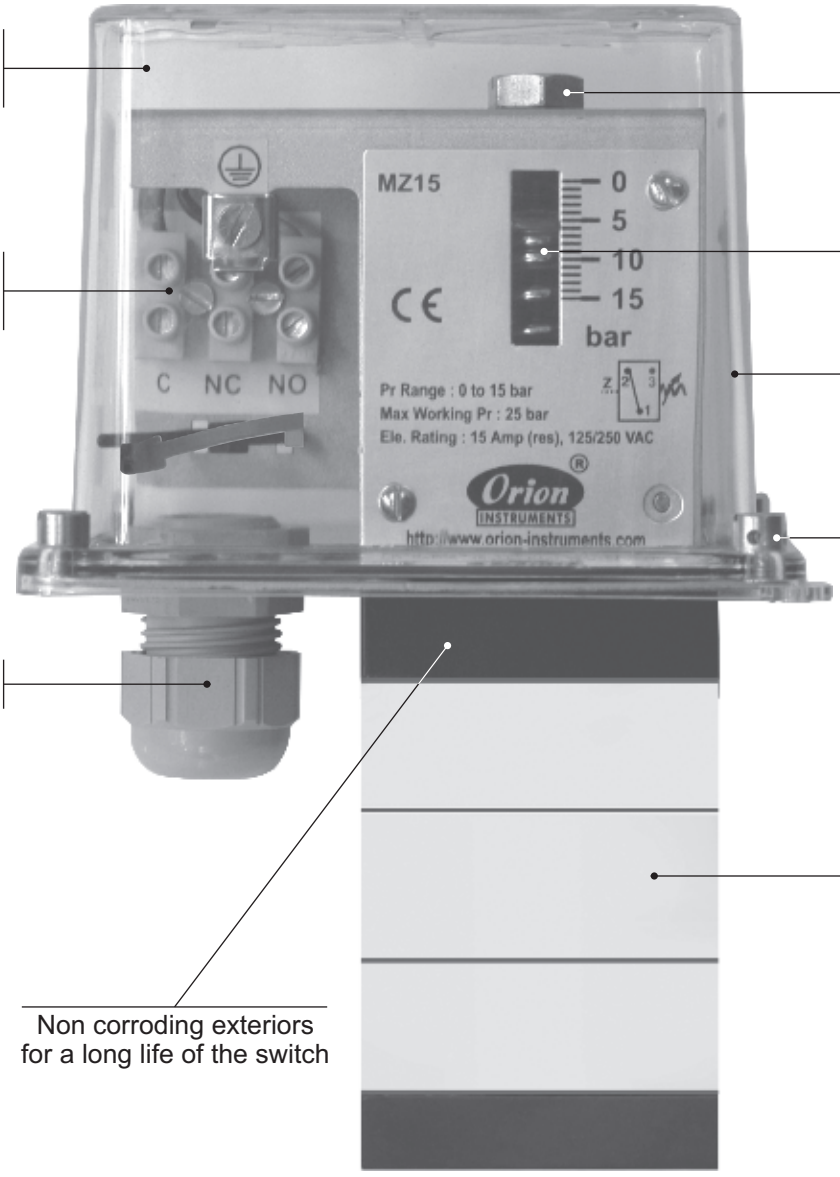
eg. A process pressure difference switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	DF2	H01	A8	S1	0

Please specify full model number to avoid ambiguity.

Bulletin No. KA121024

MZ HIGH RANGE DP



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Non corroding exteriors for a long life of the switch

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

SS316 & teflon as wetted parts to switch a wide variety of media

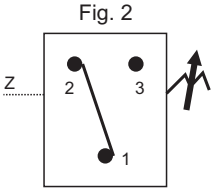
Approximate Weight : 1.800 Kg.

Some Applications :

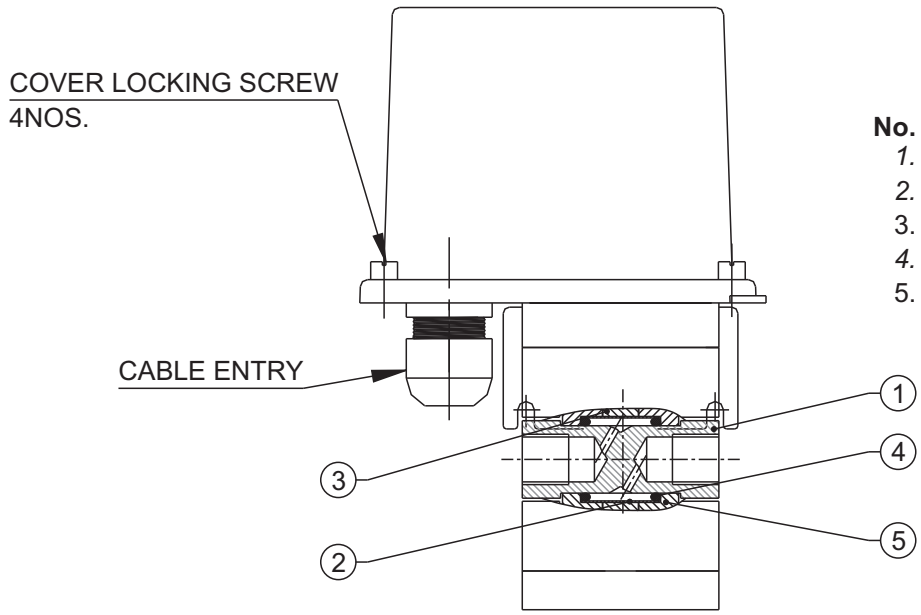
Applications requiring high static/system pressure but low pressure difference.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

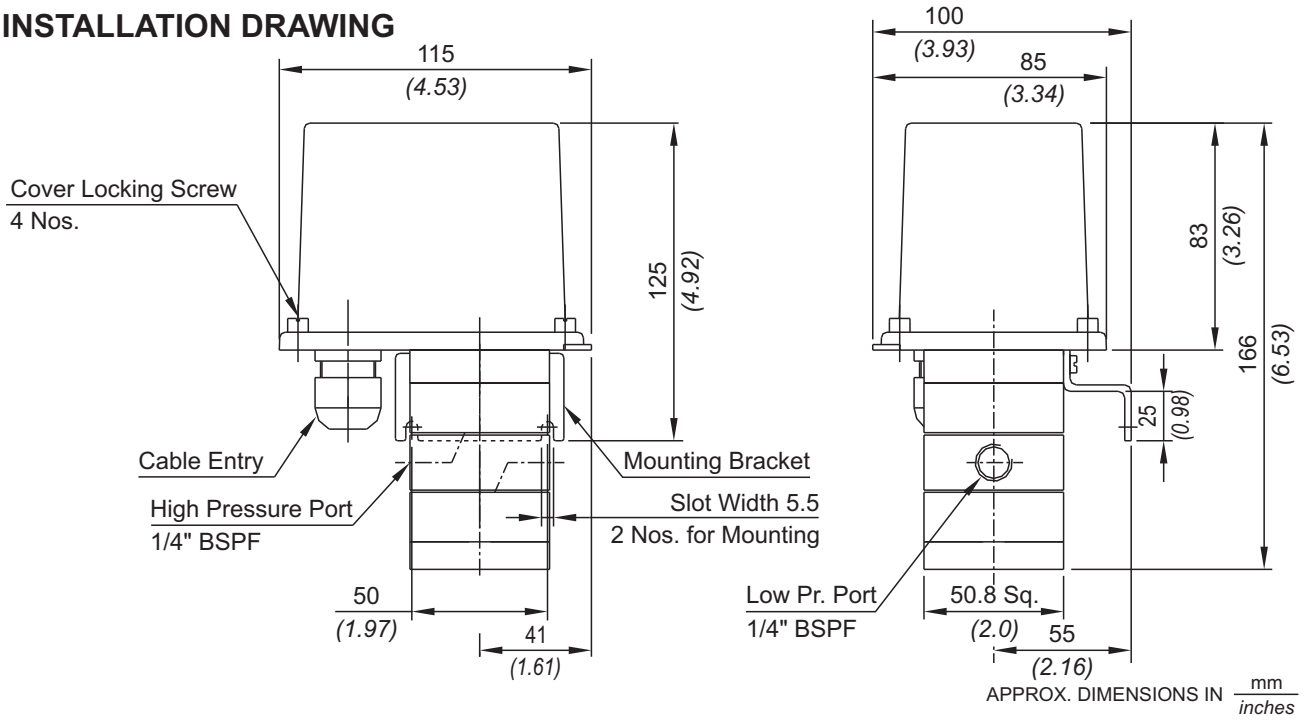


No. Description

1. *Pressure Housing*
2. *Diaphragm*
3. Plunger
4. *'O' ring*
5. Disc

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

MZ HIGH RANGE DP

RANGE SELECTION TABLE

Range Code	Range bar *(psi)*	Differential* bar *(psi)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
D01	0.1 - 1.0 *(1.45 - 14.50)*	0.12 *(0.30)*	70 *(1000.00)*
D02	0.1 - 1.5 *(1.45 - 21.76)*	0.20 *(1.14)*	70 *(1000.00)*
D03	0.2 - 2.6 *(2.90 - 37.71)*	0.20 *(1.14)*	70 *(1000.00)*
D04	0.2 - 3.6 *(2.90 - 52.21)*	0.30 *(1.43)*	70 *(1000.00)*
D07	0.5 - 7.0 *(7.25 - 101.50)*	0.40 *(5.72)*	70 *(1000.00)*
D10	0.5 - 10.0 *(7.14 - 142.86)*	0.50 *(7.14)*	70 *(1000.00)*
D15	1.0 - 15.0 *(14.29 - 214.29)*	0.50 *(7.14)*	70 *(1000.00)*
D30	5.0 - 25.0 *(71.43 - 357.14)*	0.80 *(11.44)*	70 *(1000.00)*

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

* **Note :**
Microswitches A2 through A9 can be supplied in some ranges and differentials will vary with microswitch used. Please contact sales office for details. Please check availability of adjustable differential with sales office.

HOW TO ORDER PROCESS HIGH RANGE DP SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in bar)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**DF2** = pressure difference switch, fixed differential with scale in bar **DF3** = pressure difference switch, fixed differential with scale in psi ***DA2** = pressure difference switch, adjustable differential with scale in bar ***DA3** = pressure difference switch, adjustable differential with scale in psi *Available only with option A9 in Group 6	**D01** = (0.1 - 1.0) **D02** (0.1 - 1.5) **D03** = (0.2 - 2.6) **D04** = (0.2 - 3.6) **D07** = (0.5 - 7.0) **D10** = (0.5 - 10.0) **D15** = (1.0 - 15.0) **D30** = (5.0 - 25.0)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) **N1** = Monel / ¼" BSP(F) **N2** = Monel / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon **2** = SS316L **4** = Monel

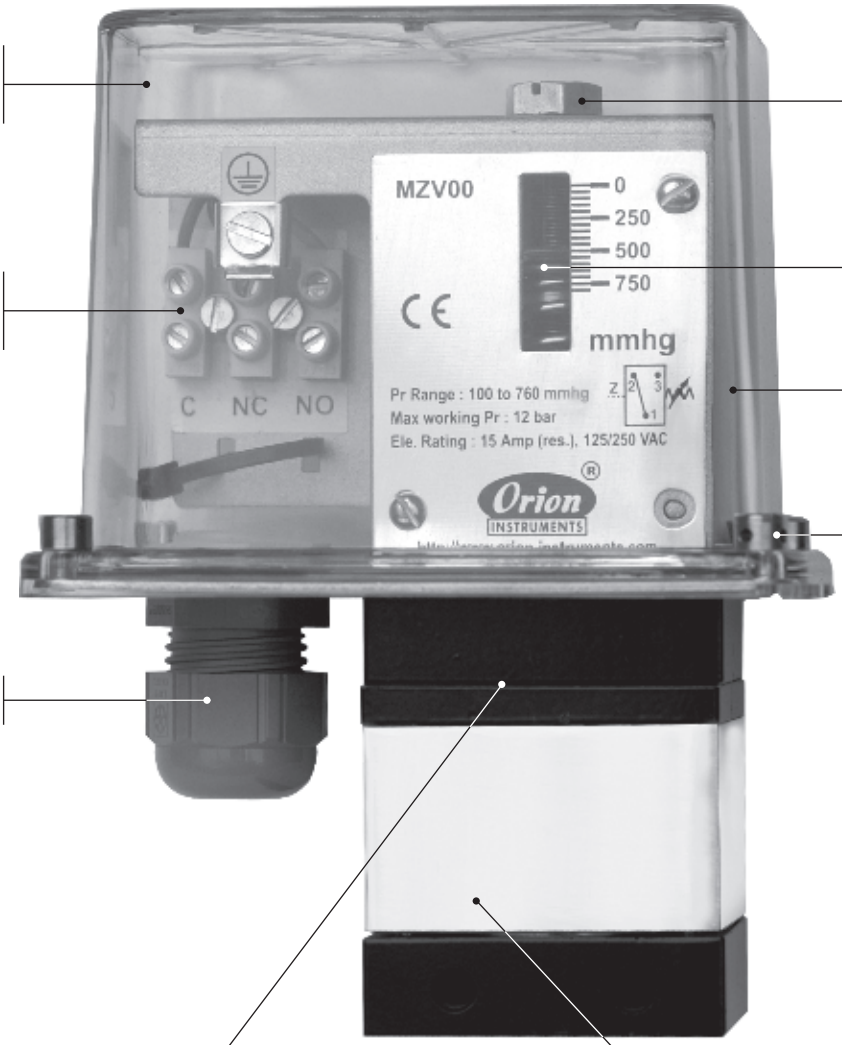
eg. A process pressure difference switch with fixed differential having 0.1 bar to 1 bar pressure range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	DF2	D01	A8	S1	0

Please specify full model number to avoid ambiguity.

Bulletin No. KA121024

MZ VACUUM SWITCHES



Transparent tough polycarbonate cover for visibility

Separate terminal block for wiring

Cable gland as a standard accessory

Internal setscrew to avoid easy access to setpoint

Large spring for ease of setpoint

IP66 enclosure for excellent ingress protection

Sealing facility to avoid tampering of working switch

Non corroding exteriors for a long life of the switch

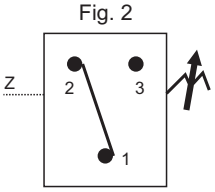
SS316 & teflon as wetted parts to switch a wide variety of media

Approximate Weight : 1.160 Kg.

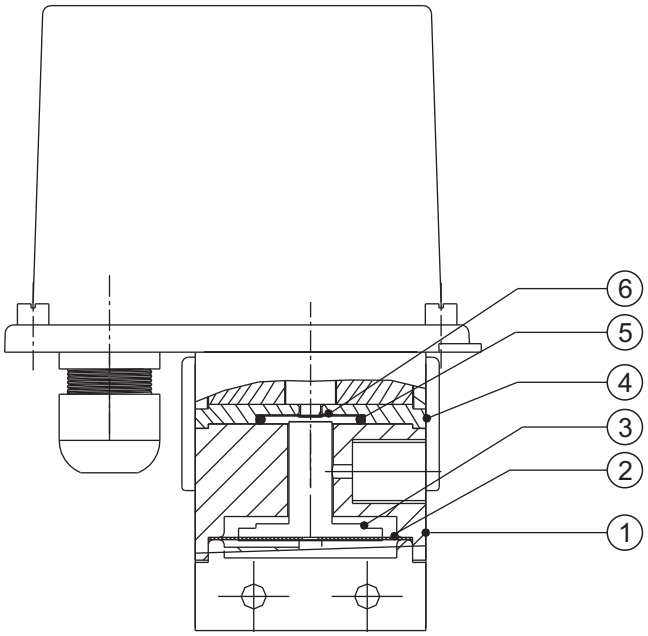
Some Applications :
Used in filters, vacuum pumps, blower systems, etc.

Electrical Connection :

Fig. 2



PRESSURE CAPSULE DETAILS

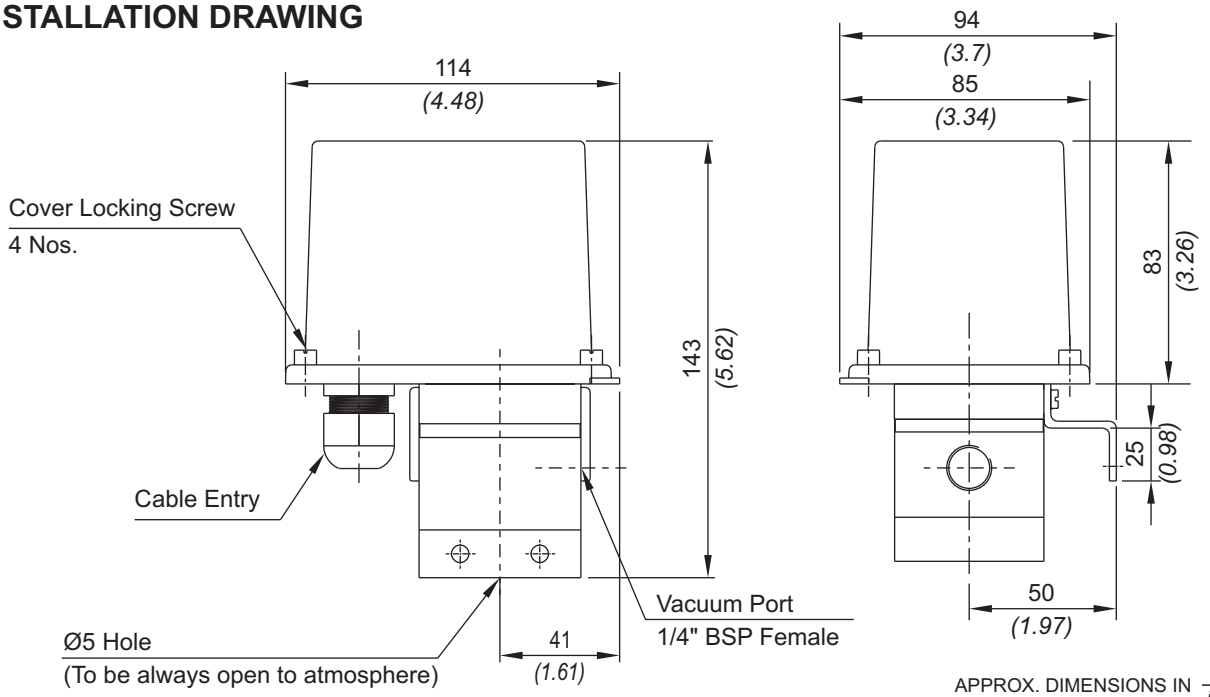


No. *Description*

1. *Disc*
2. *Diaphragm*
3. *Plunger (SS316)*
4. Junction Plate
5. *Sealing 'O' Ring (Teflon®)*
6. *Sealing diaphragms (Teflon®)*

Note : *wetted parts* are mentioned in italics.

INSTALLATION DRAWING



APPROX. DIMENSIONS IN mm / *inches*

RANGE SELECTION TABLE

Range Code	Range mm Hg *(" Hg)*	Differential* mm Hg *("Hg)*	Maximum Working Pressure bar *(psi)*
		Approximate Maximum for "A8" microswitch	
V00	† 760 - 100 *(29.92 - 3.94)*	50 *(1.97)*	12 *(174.05)*

*Minimum differential increases with setpoint (Graphs available on request)
† Typical values achieved at sea level, total vacuum that can be achieved varies mainly with altitude.

HOW TO ORDER PROCESS VACUUM SWITCHES

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Non standard allocation	Model	Cable Entry Size	Switch Type	Range Code (values in mmHg)	Microswitch Type	Pressure Port Material / Size	Diaphragm
☐ Reserved for non-standard options not covered in catalogue. Will be given by manufacturer, only after agreement of supply details with customer.	**MZ** = Process pressure switch with tough transparent polycarbonate enclosure to IP66 as per IS2147	**3** = M20 X 1.5 cable gland	**VF2** = vacuum switch, fixed differential with scale in mmHg **VF3** = vacuum switch, fixed differential with scale in "Hg ***VA2** = vacuum switch, adjustable differential with scale in mmHg ***VA3** = vacuum switch, adjustable differential with scale in "Hg *Available only with option A9 in Group 6	**V00** = († 760 - 100)	**A8** = General purpose microswitch rated at 5 A; 250 VAC **A7** = 2SPDT microswitches **A9** = General purpose microswitch rated @ 5A, 250 VAC * Please refer note under Range Selection Table	**A1** = Aluminium / ¼" BSP(F) **A2** = Aluminium / ¼" NPT(F) **S1** = SS316 / ¼" BSP(F) **S2** = SS316 / ¼" NPT(F) Please refer page no. 226 & 227 for more pressure port options	**0** = Neoprene **1** = Teflon

eg. A process vacuum switch with fixed differential having 760 mmHg vac to 100 mmHg vac vacuum range, with 5 Amp. microswitch, SS316 pressure housing with ¼" BSP port size & neoprene diaphragm shall be specified by

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
☐	MZ	3	VF2	V00	A8	S1	0

Please specify full model number to avoid ambiguity.

Bulletin No. KA121024

PRESSURE PORT OPTIONS

Material		Stainless Steel (SS)			Hastelloy C				
Pressure Port Code		S3	S4	S5	H1	H2	H3	H4	H5
Size	Page No.	1" BSP(M)	½" NPT(F)	½" NPT(M)	¼" BSP(F)	¼" NPT(F)	1" BSP(M)	½" NPT(F)	½" NPT(M)
Flameproof Switches									
FC High Pressure Range	25	✓	✓	✓	✓	✓	✓	✓	✓
FC High Proof High Range	29	✗	✓	✓	✓	✓	✗	✓	✓
FC Low Pressure Range	37	✗	✗	✗	✗	✗	✗	✗	✗
FC Hydraulic Range	41	✗	✗	✗	✓	✓	✗	✗	✗
FC High Range Pressure Difference	49	✗	✗	✗	✓	✓	✗	✗	✗
FC High Proof High Range PD	53	✗	✗	✗	✓	✓	✗	✗	✗
FC High Range DP	57	✗	✗	✗	✗	✗	✗	✗	✗
FC Low Range Pressure Difference	61	✗	✗	✗	✗	✗	✗	✗	✗
FC Low ΔP High Proof	65	✗	✗	✗	✗	✗	✗	✗	✗
FC Vacuum Range	69	✗	✗	✗	✓	✓	✗	✗	✗
FC Compound Range	73	✗	✗	✗	✓	✓	✗	✗	✗
Industrial Switches									
MD High Range	99	✓	✓	✓	✓	✓	✓	✓	✓
MD High Proof High Range	103	✗	✓	✓	✓	✓	✗	✓	✓
MD Low Range	123	✗	✗	✗	✗	✗	✗	✗	✗
MD Hydraulic Range	127	✗	✗	✗	✗	✗	✗	✗	✗
MD Hydraulic Diaphragm	131	✗	✗	✗	✓	✓	✗	✗	✗
DS Dual High Range	135	✗	✗	✗	✓	✓	✗	✗	✗
MD High Range Pressure Difference	139	✗	✗	✗	✓	✓	✗	✗	✗
MD High Proof High Range PD	143	✗	✗	✗	✓	✓	✗	✗	✗
MD High Range DP	147	✗	✗	✗	✓	✓	✗	✗	✗
MD Low Range Pressure Difference	153	✗	✗	✗	✗	✗	✗	✗	✗
MD Low ΔP High Proof	157	✗	✗	✗	✗	✗	✗	✗	✗
MD Vacuum Range	161	✗	✗	✗	✗	✗	✗	✗	✗
MD High Range Compound	165	✗	✗	✗	✗	✗	✗	✗	✗
MD Low Range Compound	169	✗	✗	✗	✗	✗	✗	✗	✗
Process Switches									
MZ High Range	189	✓	✓	✓	✓	✓	✗	✓	✓
MZ High Proof High Range	193	✗	✓	✓	✓	✓	✗	✓	✓
MZ Hydraulic Range	205	✗	✗	✗	✓	✓	✗	✗	✗
MZ Hydraulic Diaphragm	209	✗	✗	✗	✓	✓	✗	✗	✗
MZ High Range Pressure Difference	213	✗	✗	✗	✓	✓	✗	✗	✗
MZ High Range DP	217	✗	✗	✗	✓	✓	✗	✗	✗
MZ Vacuum Range	221	✗	✗	✗	✓	✓	✗	✗	✗

✓ - Available ✗ - Not Available

Material		Monel				
Pressure Port Code		N1	N2	N3	N4	N5
Size	Page No.	¼" BSP(F)	¼" NPT(F)	1" BSP(M)	½" NPT(F)	½" NPT(M)
Flameproof Switches						
FC High Pressure Range	25	✓	✓	✓	✓	✓
FC High Proof High Range	29	✓	✓	✗	✓	✓
FC Low Pressure Range	37	✗	✗	✗	✗	✗
FC Hydraulic Range	41	✓	✓	✗	✗	✗
FC High Range Pressure Difference	49	✓	✓	✗	✗	✗
FC High Proof High Range Pressure Difference	53	✓	✓	✗	✗	✗
FC High Range DP	57	✓	✓	✗	✗	✗
FC Low Range Pressure Difference	61	✗	✗	✗	✗	✗
FC Low ΔP High Proof	65	✗	✗	✗	✗	✗
FC Vacuum Range	69	✓	✓	✗	✗	✗
FC Compound Range	73	✓	✓	✗	✗	✗
Industrial Switches						
MD High Range	99	✓	✓	✓	✓	✓
MD High Proof High Range	103	✓	✓	✗	✓	✓
MD Low Range	123	✗	✗	✗	✗	✗
MD Hydraulic Range	127	✗	✗	✗	✗	✗
MD Hydraulic Diaphragm	131	✓	✓	✗	✗	✗
DS Dual High Range	135	✓	✓	✗	✗	✗
MD High Range Pressure Difference	139	✓	✓	✗	✗	✗
MD High Proof High Range Pressure Difference	143	✓	✓	✗	✗	✗
MD High Range DP	147	✓	✓	✗	✗	✗
MD Low Range Pressure Difference	153	✗	✗	✗	✗	✗
MD Low ΔP High Proof	157	✗	✗	✗	✗	✗
MD Vacuum Range	161	✓	✓	✗	✗	✗
MD High Range Compound	165	✓	✓	✗	✗	✗
MD Low Range Compound	169	✗	✗	✗	✗	✗
Process Switches						
MZ High Range	189	✓	✓	✗	✓	✓
MZ High Proof High Range	193	✓	✓	✗	✓	✓
MZ Hydraulic Range	205	✓	✓	✗	✗	✗
MZ Hydraulic Diaphragm	209	✓	✓	✗	✗	✗
MZ High Range Pressure Difference	213	✓	✓	✗	✗	✗
MZ High Range DP	217	✓	✓	✗	✗	✗
MZ Vacuum Range	221	✓	✓	✗	✗	✗

✓ - Available ✗ - Not Available

FLANGE CODE TABLE

Flanges conform to ANSI B16.5; maximum pressure is limited by flange rating

Class	Stainless Steel		Hastelloy		Alloy 400		Titanium		Tantalum	
	316 L		C276		Monel					
150#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AA	BQ	DG	EW	GM	IC	JS	LI	MY	OO
3/4"	AB	BR	DH	EX	GN	ID	JT	LJ	MZ	OP
1"	AC	BS	DI	EY	GO	IE	JU	LK	NA	OQ
1 1/4"	AD	BT	DJ	EZ	GP	IF	JV	LL	NB	OR
1 1/2"	AE	BU	DK	FA	GQ	IG	JW	LM	NC	OS
2"	AF	BV	DL	FB	GR	IH	JX	LN	ND	OT
300#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AG	BW	DM	FC	GS	II	JY	LO	NE	OU
3/4"	AH	BX	DN	FD	GT	IJ	JZ	LP	NF	OV
1"	AI	BY	DO	FE	GU	IK	KA	LQ	NG	OW
1 1/4"	AJ	BZ	DP	FF	GV	IL	KB	LR	NH	OX
1 1/2"	AK	CA	DQ	FG	GW	IM	KC	LS	NI	OY
2"	AL	CB	DR	FH	GX	IN	KD	LT	NJ	OZ
400#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AM	CC	DS	FI	GY	IO	KE	LU	NK	PA
3/4"	AN	CD	DT	FJ	GZ	IP	KF	LV	NL	PB
1"	AO	CE	DU	FK	HA	IQ	KG	LW	NM	PC
1 1/4"	AP	CF	DV	FL	HB	IR	KH	LX	NN	PD
1 1/2"	AQ	CG	DW	FM	HC	IS	KI	LY	NO	PE
2"	AR	CH	DX	FN	HD	IT	KJ	LZ	NP	PF
600#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AS	CI	DY	FO	HE	IU	KK	MA	NQ	PG
3/4"	AT	CJ	DZ	FP	HF	IV	KL	MB	NR	PH
1"	AU	CK	EA	FQ	HG	IW	KM	MC	NS	PI
1 1/4"	AV	CL	EB	FR	HH	IX	KN	MD	NT	PJ
1 1/2"	AW	CM	EC	FS	HI	IY	KO	ME	NU	PK
2"	AX	CN	ED	FT	HJ	IZ	KP	MF	NV	PL
900#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	AY	CO	EE	FU	HK	JA	KQ	MG	NW	PM
3/4"	AZ	CP	EF	FV	HL	JB	KR	MH	NX	PN
1"	BA	CQ	EG	FW	HM	JC	KS	MI	NY	PO
1 1/4"	BB	CR	EH	FX	HN	JD	KT	MJ	NZ	PP
1 1/2"	BC	CS	EI	FY	HO	JE	KU	MK	OA	PQ
2"	BD	CT	EJ	FZ	HP	JF	KV	ML	OB	PR

FLANGE CODE TABLE

Flanges conform to ANSI B16.5; maximum pressure is limited by flange rating

Class	**Stainless Steel**		**Hastelloy**		**Alloy 400**		**Titanium**		**Tantalum**	
	316 L		C276		Monel					
1500#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	BE	CU	EK	GA	HQ	JG	KW	MM	OC	PS
3/4"	BF	CV	EL	GB	HR	JH	KX	MN	OD	PT
1"	BG	CW	EM	GC	HS	JI	KY	MO	OE	PU
1 1/4"	BH	CX	EN	GD	HT	JJ	KZ	MP	OF	PV
1 1/2"	BI	CY	EO	GE	HU	JK	LA	MQ	OG	PW
2"	BJ	CZ	EP	GF	HV	JL	LB	MR	OH	PX
2500#	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat	Raised	Flat
1/2"	BK	DA	EQ	GG	HW	JM	LC	MS	OI	PY
3/4"	BL	DB	ER	GH	HX	JN	LD	MT	OJ	PZ
1"	BM	DC	ES	GI	HY	JO	LE	MU	OK	QA
1 1/4"	BN	DD	ET	GJ	HZ	JP	LF	MV	OL	QB
1 1/2"	BO	DE	EU	GK	IA	JQ	LG	MW	OM	QC
2"	BP	DF	EV	GL	IB	JR	LH	MX	ON	QD

RANGE AVAILABILITY AS PER BORE SIZES

	H01 to H04	H07	H10	H15	H30	H2T to H2H
1" NB	NA	Yes	Yes	Yes	Yes	Yes
2" NB	Yes	Yes	Yes	Yes	Yes	Yes

Following table lists standard microswitches and there electrical ratings that can be supplied with most FC and MD models. Some can be supplied on MZ models too. Please get in touch with sales office for feasibility of options on each model. Please write to us on electrical rating options you need, but are not mentioned below.

		AC Rating			DC Rating		
		Current		Voltage	Current		Voltage
Code	General Description	Resistive (A)	Inductive (A)	VAC	Resistive (A)	Inductive (A)	VDC
A1	General Purpose Microswitch	15	NA	125/250/480	NA	NA	NA
A2	Hermetically Sealed for Corrosive Environments	4	2	115	4	2	28
A3	Gold Plated Contacts for Low Voltage Applications	1	NA	125	NA	NA	NA
A4	DPDT Configuration	10	NA	125/250	0.3/0.15	NA	125/250
A5	For High DC Ratings	NA	NA	NA	10/3	7.5/2	125/250
A6	Elements with Adjustable Deadband	15	NA	115/250	1	NA	24
A7	2SPDT Switching Elements	5	NA	250	5	3	28
A8	General Purpose Microswitch	5	NA	250	5	3	28
A9	General Purpose Microswitch	5	NA	125/250	NA	NA	NA
B2	2SPDT Hermetically Sealed Microswitches	4	2	115	4	2	28
B3	2SPDT Gold Plated Contacts for Low Voltage Applications	1	NA	125	1	0.5	30
B4	2SPDT Hermetically Sealed Microswitches	NA	NA	NA	1	0.25	28
B5	1SPDT Hermetically Sealed Gold Plated Contacts	NA	NA	NA	1	0.25	28
B6	2SPDT Hermetically Sealed Gold Plated Contacts	NA	NA	NA	1	0.25	28
B7	2SPDT Switching Elements	15	NA	125/250	NA	NA	NA
B9	2SPDT Switching Elements for Adjustable	5	NA	125/250	NA	NA	NA

Introduction

The initial of our product lines, these switches are meant for light duty applications for the OEM industry. Many of them need to be used in clean atmospheres, sometimes inside a panel. These are compact, low cost and built just for the intended use. Most of them can be configured for a particular purpose by selecting the wetted parts, but electrical ratings are restricted to 5 A, 250 VAC.

APPLICATIONS

- Lubrication Systems
- Steam Sterilisers
- Hospital Equipment
- Water treatment
- Fire protection
- Machine Tools
- Boilers and Compressors
- Furnaces
- Textile Machinery
- Pharmaceuticals
- Hydraulics & Pneumatics
- Automobiles

PRODUCT SPECIFICATIONS:

- Storage temperature : Atmospheric temperature
- Operating ambient temperature : - 20° C to + 60° C
- Media temperature : for rubber diaphragms 80° C max
- Can be offered for higher temperatures with other capsule combinations
- Setpoint repeatability : ± 1 % of FSR
- Enclosure : Pressed steel powder coated with plastic cover
- Switch output : Choice of SPDT, 2SPDT, hermetically sealed, gold plated contacts
- Process connection : ¼" BSP standard, other options like flanges, triclover clamps, diaphragm seals available.
- Accessories : Adaptors, 2" pipe-mounting brackets, syphons, impulse tubes etc.

FEATURES

- Compact
- Scale for easier setpoint (optional)
- Enclosure protection : upto IP 65 (varies with model)
- Reliable accurate microswitches for long life switching
- Customized arrangements for switching values on request
- Easy safe wiring options
- Field adjustable
- Accuracy +/- 1 % FSR
- Warranty : 2 years

*Accuracy changes with switch configuration

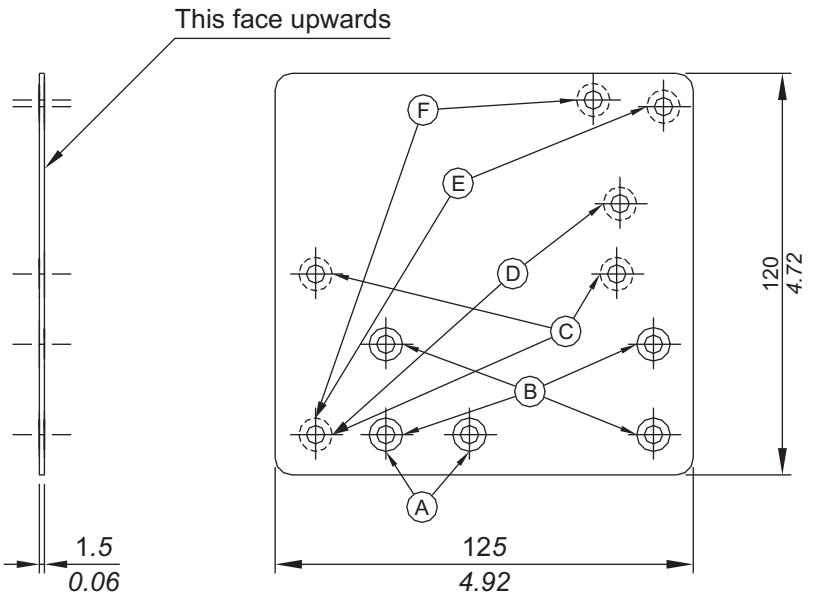
ACCESSORIES

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

Flameproof enclosures
Chemical seals (or diaphragm seals)
adaptors to suit customer's process connection
switch savers
impulse tubes
syphons
manifolds
pipe mounting brackets
mounting plates to suit other makes on the market
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



A. Mounting holes for MN / MA models
B. Mounting holes for MG / ME models
C. Three no.s holes on 90 X 48 (mm)
D. Two no.s holes on 91 X 69 (mm)
E. Two no.s holes on 104 X 98 (mm)
F. Two no.s holes on 83 X 100 (mm)

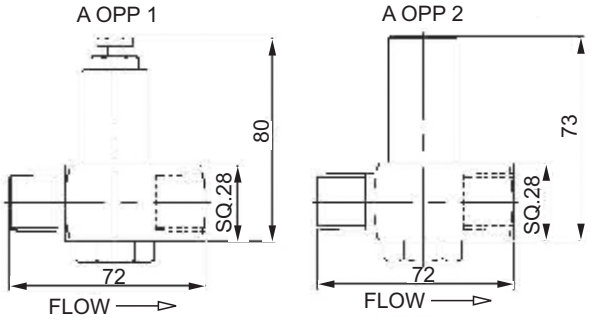
Note : Mounting screws, washers and spacers will be provided with this plate.

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

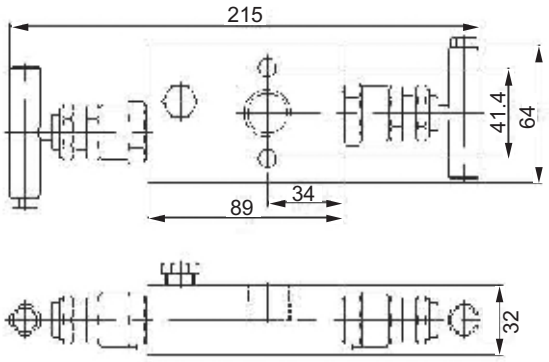
ACCESSORIES

Gauge Saver

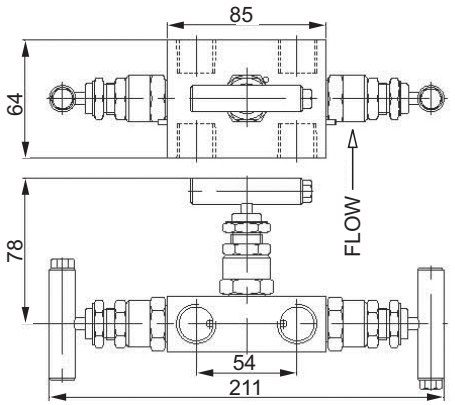
A OPP 1 = Set Pressure: 0.6 to 2.0 bar
A OPP 2 = Set Pressure: 2.5 to 200 bar



2 Valve Manifold

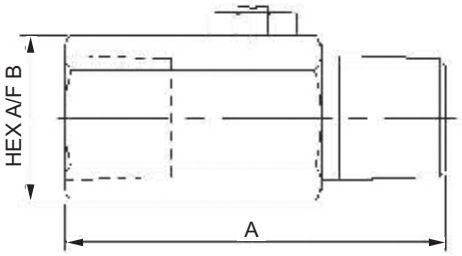


3 Valve Manifold



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:

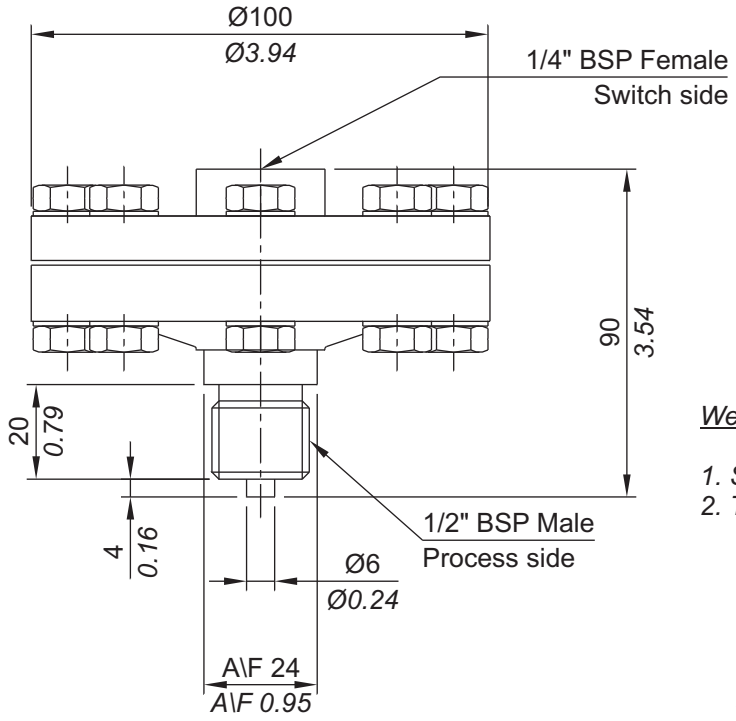
- HASTELLOY B2
- HASTELLOY C4
- HASTELLOY C22
- HASTELLOY C276
- INCONEL ALLOY 600
- MONEL ALLOY 400
- MONEL ALLOY K500
- NICKEL
- PLATINUM
- TANTALUM
- TITANIUM
- ZIRCONIUM
- SILVER
- PTFE

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)

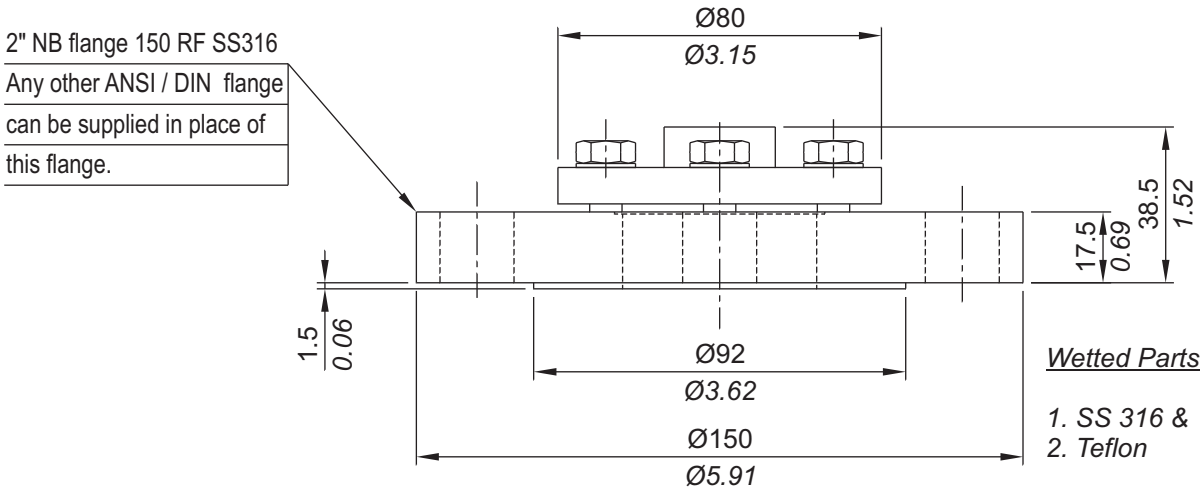


Wetted Parts

1. SS 316 &
2. Teflon

APPROX. DIMENSIONS IN mm / *inches*

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



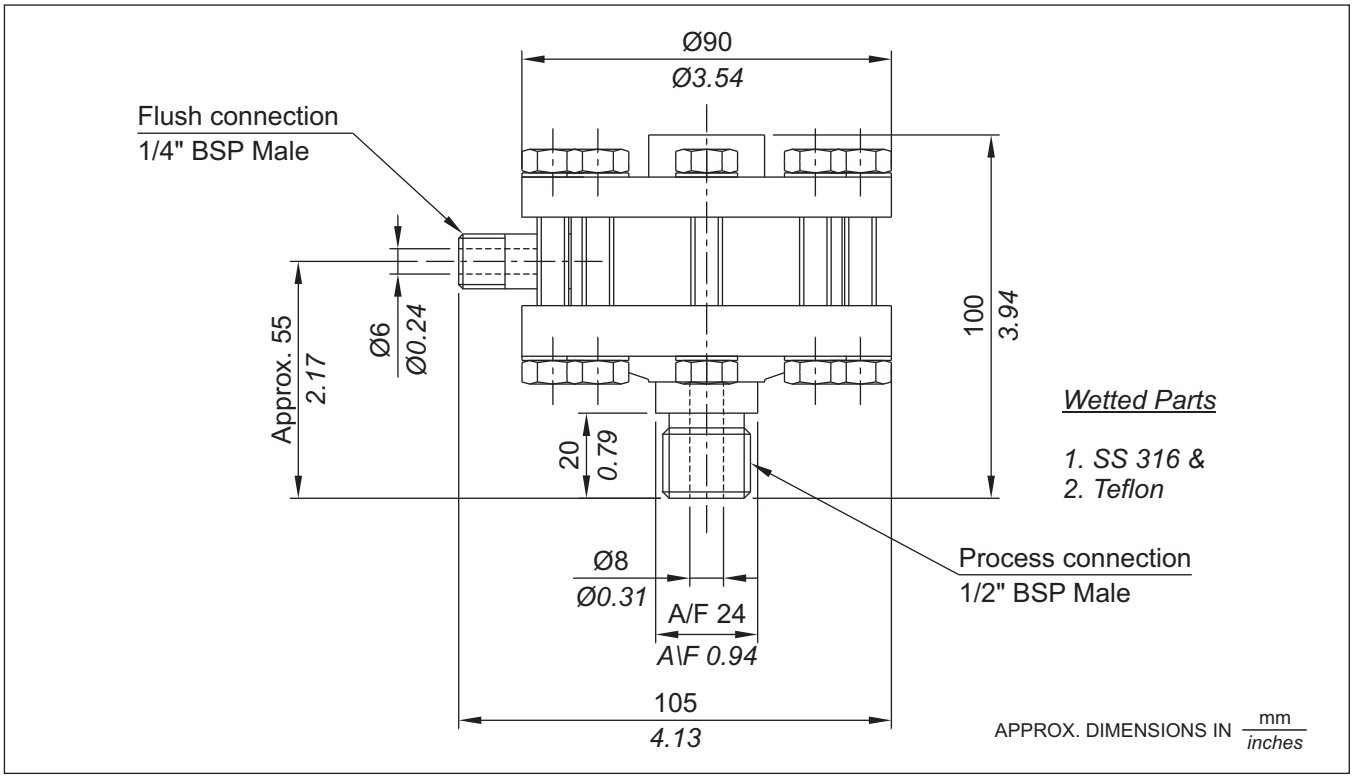
Wetted Parts

1. SS 316 &
2. Teflon

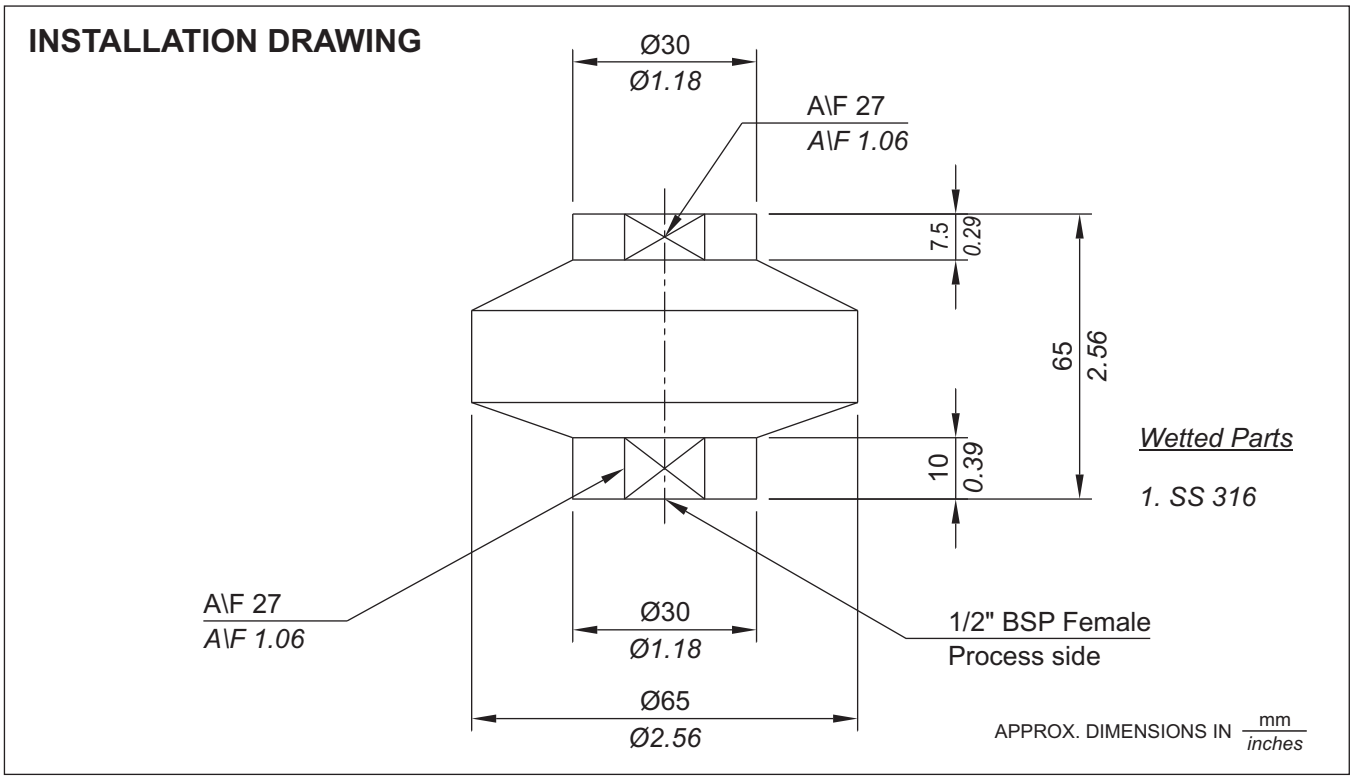
APPROX. DIMENSIONS IN mm / *inches*

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, Hysterisis):- 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 "hysterisis".

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.

Step1.

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.