

Pressure switch Model PS01

WIKA data sheet PV 35.61

Applications

- Hydraulics and pneumatics
- Steel
- Power
- Special purpose machine

Special features

- Diaphragm-sealed piston sensor for high static pressure
- Field adjustable setpoint
- Robust design



Fig. Left: Pressure switch, model PS01, weatherproof
Fig. Right: Pressure switch, model PS01, flameproof

Description

These high quality pressure switches have been developed especially for safety-critical applications. High quality of the product with established systems and manufacturing process will ensure reliable monitoring of your plant.

Rugged in construction, supreme in performance PS01 pressure switches are designed as cost effective solutions to meet a variety of applications in oil, gas, power, steel and petrochemical industries.

The sensing element consists of a time-proven diaphragm sealed piston affording high integrity, reliable switching and a very high overload protection. Variety of combinations in features are available to make it versatile.

Specifications

Basic information	
Switch enclosure	<ul style="list-style-type: none"> ■ W1: Aluminium pressure die cast weatherproof as per IS/IEC 60529 ■ F1: GR style aluminium pressure die cast, weatherproof and flameproof to Gr.IIC as per IS/IEC 60079-1
Sealing	<ul style="list-style-type: none"> ■ Nitrile standard ■ EPDM / Teflon® / Viton® optional, depending on setting range and operating conditions
Measuring element	<ul style="list-style-type: none"> ■ 316L SS sealed piston sensors ■ Buna-N diaphragm for diaphragm sensor
Wetted parts	<ul style="list-style-type: none"> ■ 316 SS (standard) for diaphragm sealed piston sensors ■ Aluminium for diaphragm sensor ■ Monel® optional for diaphragm sealed piston sensors

Output signal	
Ranges	Several ranges from -1 ... +700 bar
Switching differential	<ul style="list-style-type: none"> ■ Fixed (standard) ■ Wideband adjustable (available only with diaphragm sensor in weatherproof enclosure)
Repeatability of the setpoint (note 4)	± 1.0% FSR
Maximum working pressure	Refer table 1
Scale accuracy (note 5)	±5% of FSR for W1 enclosure only
Switching contacts with microswitch	<ul style="list-style-type: none"> ■ 1 x SPDT (single pole double throw) ■ 2 x SPDT (single pole double throw)
Switching function (note 9)	Instrument quality snap acting microswitch

Operating condition	
Permissible ambient temperature	-10°C ... +60°C
Permissible medium temperature	<ul style="list-style-type: none"> ■ -20°C ... +110°C for SS and Buna-N ■ -20°C ... +95°C for Neoprene ■ -20°C ... +130°C for EPDM ■ -20°C ... +200°C for Silicone
Ingress protection	IP66
Process connection	1/4" NPT(F) per ASME B1.20.1 direct Other connections through adaptor
Electrical connection	1/2" NPT(F) per ASME B1.20.1 single entry standard Dual entry on request
Mounting	<ul style="list-style-type: none"> ■ Panel ■ Wall ■ On-line ■ 2" pipe
Weight	<ul style="list-style-type: none"> ■ Weatherproof: approx. 1.3 Kg ■ Flameproof: approx. 2.0 Kg

Ordering matrix

Sample model number	PS01	W1	3	B02	F	5	A	P	C	SA
Switch enclosure										
Aluminium pressure die cast weatherproof to IP66		W1								
GR style aluminium pressure die cast, weatherproof to IP66 and flameproof to Gr.IIC.		F1								
Material of measuring element and wetted parts										
Diaphragm sealed piston sensor										
316L SS			3							
Monel			M							
Diaphragm										
Buna-N				B						
Neoprene				N						
EPDM (except range codes M047, B025, B024 & B030)				E						
Silicone (except range codes M047, B025, B024 & B030)				5						
316L SS			3							
Wetted parts										
316 SS			2							
Aluminium (for diaphragm sensors)				A						
Monel (for diaphragm sealed piston sensors)				M						
Range code: Refer table 1 for available ranges										
Differential (Refer table 1 for available differential)										
Fixed					F					
Adjustable (available only in diaphragm sensors with weatherproof enclosure)					A					
Switch code and rating: Refer table 5										
Electrical entry: Refer table 6										
Mounting										
Panel								P		
Surface, wall								W		
2" Pipe								2		
Universal								U		
Mounting material										
Mild steel									C	
316 SS									2	
Not applicable									Z	
Options: Refer table 7										

Remarks

- Weatherproof gasket: Nitrile gasket standard and EPDM on request for ammonia / nuclear service environment
- For special requirements, which is not listed in the above ordering matrix, will be indicated as Code 'Z' at the end of ordering code in quotation.
- 304 SS screws will be provided for panel mounting with weatherproof enclosure and high ranges.

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Viton® is a registered trademark of DuPont Dow Elastomers

Monel® is a registered trademark of The International Nickel Company, Inc

Table 1: Range code and availability

Range code	Range	Fixed (F)	Adjustable (A)	Maximum working pressure
Measuring element, diaphragm sealed piston				
B002	-1 ... 1.5 bar	✓	×	15
B088	-1 ... 7 bar	✓	×	27
B042	0.25 ... 1.6 bar	✓	×	27
B043 *	0.4 ... 2.5 bar	✓	×	27
B044 *	1 ... 6 bar	✓	×	27
B045 *	1.6 ... 10 bar	✓	×	70
B046 *	2.5 ... 16 bar	✓	×	70
B037 *	4 ... 25 bar	✓	×	110
B039 *	10 ... 40 bar	✓	×	110
B047 *	10 ... 100 bar	✓	×	155
B048	7 ... 160 bar	✓	×	1000
B049	25 ... 250 bar	✓	×	1000
B050	50 ... 400 bar	✓	×	1000
B051	100 ... 700 bar	✓	×	1000
Measuring element, diaphragm				
M011	0 ... 2.5 mbar	✓	×	0.5
M036	0.5 ... 5 mbar	✓	✓	0.5
M037	1 ... 10 mbar	✓	✓	0.5
M038	2.5 ... 15 mbar	✓	✓	0.5
M039	2.5 ... 25 mbar	✓	✓	0.5
M041	5 ... 50 mbar	✓	✓	0.5
M045	7.5 ... 75 mbar	✓	✓	0.5
M046	10 ... 100 mbar	✓	✓	0.5
M057	20 ... 200 mbar	✓	✓	0.5
M047	40 ... 400 mbar	✓	×	1
B025	0.2 ... 1 bar	✓	×	4
B024	0.16 ... 1.6 bar	✓	×	4
B030	0.4 ... 4 bar	✓	×	7
M008	-5 ... 0 mbar	✓	✓	0.5
M006	-10 ... 0 mbar	✓	✓	0.5
M004	-20 ... 0 mbar	✓	✓	0.5
M003	-25 ... 0 mbar	✓	✓	0.5
M001	-50 ... 0 mbar	✓	✓	0.5
M049	-100 ... 0 mbar	✓	✓	0.5
M009	-2.5 ... +2.5 mbar	✓	×	0.5
M007	-10 ... +10 mbar	✓	✓	0.5
M005	-20 ... +20 mbar	✓	✓	0.5
M002	-50 ... +50 mbar	✓	✓	0.5

* Optional MWP 600 bar is available

Table 2: Switching differential data for diaphragm sealed piston sensors

Range code	Range in bar	On-off differential in bar						Maximum working pressure	
		Standard maximum working pressure			Optional maximum working pressure			Standard	Optional
		D	5	9 / G	D	5	9 / G		
B002	-1 ... 1.5	0.10	0.25	0.45	×	×	×	15	×
B088	-1 ... 7	0.30	0.50	1.5	×	×	×	27	×
B042	0.25 ... 1.6	0.15	0.15	0.15	×	×	×	27	×
B043	0.4 ... 2.5	0.15	0.15	0.15	0.30	0.50	0.50	27	600
B044	1 ... 6	0.20	0.35	0.40	0.45	0.70	0.75	27	600
B045	1.6 ... 10	0.25	0.50	0.80	0.60	1.00	1.20	70	600
B046	2.5 ... 16	0.30	0.60	1.00	0.60	1.20	2.00	70	600
B037	4 ... 25	1.00	1.20	2.30	1.00	2.00	4.00	110	600
B039	10 ... 40	1.30	1.70	3.50	1.80	2.60	5.00	110	600
B047	10 ... 100	2.25	3.50	5.00	3.50	5.70	8.00	155	600
B048	7 ... 160	5.25	9.00	10	×	×	×	1000	×
B049	25 ... 250	10	10	25	×	×	×	1000	×
B050	50 ... 400	18	20	35	×	×	×	1000	×
B051	100 ... 700	25	25	50	×	×	×	1000	×

- Above differential table is applicable for weatherproof and flameproof enclosures
- To arrive differential for DPDT arrangement apply multiplication factor 1.6
- Tabulated differential value is achievable at midscale
- Differential would be twice at upper limit of the range

Table 3: Switching differential data for diaphragm sensor with 316L SS diaphragm

Range code	Range	Weatherproof switch enclosure				Flameproof switch enclosure								
		on-off differential in mbar												
		Fixed			Adjustable	Fixed								
D	5	9 / G	W	D	5	9 / G								
Positive ranges														
M011	0 ... 2.5 mbar	1.0	1.0	×	×	1.1	1.3	×						
M036	0.5 ... 5 mbar	1.2	1.2	×	×	1.4	1.8	×						
M037	1 ... 10 mbar	1.4	1.4	×	×	1.4	1.8	×						
M038	2.5 ... 15 mbar	1.5	1.5	×	×	1.6	2.3	×						
M039	2.5 ... 25 mbar	1.6	1.6	5	6 ... 15	2.3	2.5	7						
M041	5 ... 50 mbar	1.8	1.9	7	7 ... 30	2.3	3.3	8						
M045	7.5 ... 75 mbar	2.2	2.4	7	10 ... 45	2.6	3.6	8						
M046	10 ... 100 mbar	2.6	2.8	8	12 ... 60	3	4	8.5						
M057	20 ... 200 mbar	40	40	50	25 ... 80	40	50	50						
M047	40 ... 400 mbar	60	65	70	×	50	70	75						
B025	0.2 ... 1 bar	80	85	125	×	70	125	130						
B024	0.16 ... 1.6 bar	100	100	150	×	90	150	175						
B030	0.4 ... 4 bar	130	135	200	×	135	200	220						
Negative ranges														
M008	-5 ... 0 mbar	1.2	1.3	×	×	1.2	2.2	×						
M006	-10 ... 0 mbar	1.4	1.8	×	×	1.8	3.0	×						
M004	-20 ... 0 mbar	1.6	2.8	7	×	2.2	4.6	7						
M003	-25 ... 0 mbar	2.0	3.0	8	6 ... 15.0	3.0	5.0	8						
M001	-50 ... 0 mbar	3.0	3.6	10	10 ... 30.0	4.0	6.0	10						
M049	-100 ... 0 mbar	3.4	4.2	12	15 ... 50.0	5.0	7.0	12						
Compound ranges														
		in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges		in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges
M009	-2.5 ... +2.5 mbar	1.0	1.4	1.0	1.3	×	×	x	1.1	1.6	1.2	2.0	×	×
M007	-10 ... +10 mbar	1.2	1.5	1.3	2.0	×	×	x	1.3	2.2	1.6	3.0	×	×
M005	-20 ... +20 mbar	1.4	2.0	1.5	3.0	5	8	7 ... 20	1.6	3.0	2.8	4.0	6	8
M002	-50 ... +50 mbar	2.0	3.0	2.2	4.0	6	10	9 ... 50	2.2	4.0	3.0	6.0	7	10

■ To arrive differential for DPDT arrangement apply multiplication factor 1.8

Table 4: Switching differential data for diaphragm sensor with elastomer diaphragm

Range code	Range	Weatherproof switch enclosure				Flameproof switch enclosure								
		on-off differential in mbar												
		Fixed				Adjustable		Fixed						
		D	5	9 / G	W	D	5	9 / G						
Positive ranges														
M011	0 ... 2.5 mbar	1.0	1.0	×	×	1.0	1.1	×						
M036	0.5 ... 5 mbar	1.4	1.2	×	×	1.5	1.6	×						
M037	1 ... 10 mbar	1.5	1.2	×	×	1.6	1.6	×						
M038	2.5 ... 15 mbar	1.5	1.2	×	×	1.6	2.1	×						
M039	2.5 ... 25 mbar	1.5	1.5	5	6 ... 15	1.6	2.3	6.5						
M041	5 ... 50 mbar	1.5	1.6	6	7 ... 30	2.0	2.9	7.0						
M045	7.5 ... 75 mbar	1.6	1.8	6	10 ... 45	2.3	3.2	7.0						
M046	10 ... 100 mbar	1.5	2.0	8	12 ... 60	2.7	3.6	10						
M057	20 ... 200 mbar	15	20	40	25 ... 80	27	35	50						
M047	40 ... 400 mbar	20.0	30	60	×	36	40	70						
B025	0.2 ... 1 bar	50	60	100	×	60	90.0	120						
B024	0.16 ... 1.6 bar	70	60	150	×	80	90.0	170						
B030	0.4 ... 4 bar	120	140	200	×	130	135.0	220						
Negative ranges														
M008	-5 ... 0 mbar	1.2	1.1	×	×	3	2.0	×						
M006	-10 ... 0 mbar	1.4	1.5	×	×	8	2.7	×						
M004	-20 ... 0 mbar	1.5	2.3	7	4 ... 12	2.2	4.1	8						
M003	-25 ... 0 mbar	1.6	2.5	8	5 ... 15	3.0	4.5	10						
M001	-50 ... 0 mbar	2.0	3.0	10	5.5 ... 30	4.0	5.4	12						
M049	-100 ... 0 mbar	2.5	3.5	11	10 ... 50	5.0	6.3	13						
Compound ranges														
		in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges		in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges	in +ve ranges	in -ve ranges
M009	-2.5 ... +2.5 mbar	1.0	1.3	0.9	1.3	×	×	×	1.1	1.4	1.1	1.8	×	×
M007	-10 ... +10 mbar	1.1	1.5	1.2	1.6	×	×	3.2 ... 10	1.2	2.0	1.4	2.7	×	×
M005	-20 ... +20 mbar	1.3	1.5	1.3	2.0	4	6	5.0 ... 20	1.4	2.7	1.8	3.6	6	8.0
M002	-50 ... +50 mbar	1.5	2.0	1.5	3.0	6	8	10 ... 50	2.0	3.6	2.7	5.4	8	12

■ To arrive differential for DPDT arrangement apply multiplication factor 1.3

Table 5: Switch code, rating and availability (note 10)

Switch code		Contact version	AC rating	DC rating in Ampere					
SPDT	DPDT			Resistive			Inductive		
				220V	110V	24V	220V	110V	24V
D	DD	General purpose	15A 250, 125V	0.2	0.4	2.0	0.02	0.03	1.0
W *	WW *	General purpose	15A 250, 125V	0.3	0.6	10	0.05	0.1	4.0
5	55	General purpose	5A 250, 125V	0.2	0.4	4.0	0.2	0.4	3.0
9	99	Hermetically sealed, inert gas filled with Silver alloy contact	1A 115V, 400 Hz	-	-	3.0	-	-	1.0
G	GG	Hermetically sealed, inert gas filled with gold plated contact	-	-	-	1.0	-	-	0.25

* Applicable only for adjustable differential model

Table 6: Electrical entry

Size	Single entry		Dual entry	
	W1	F1	W1	F1
1/2" NPT(F) per ASME B1.20.1	A	A	N	N
7 pin connector	C	-	-	-

* Cable gland available on request

Note: 7 pin connector housing material is aluminium alloy.

Table 7: Options

Details
Optional maximum working pressure
Chemical seal *
Ammonia service
Oxygen service
NACE preparation
Blow-out disc **
Seal 'O' ring – Viton *
Seal 'O' ring – EPDM *
Seal 'O' ring – Teflon *
EPDM cover gasket for weatherproof enclosure W1
* Available only with diaphragm sealed piston sensor
** Not applicable for flameproof

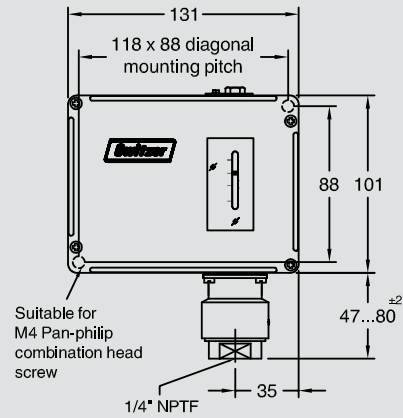
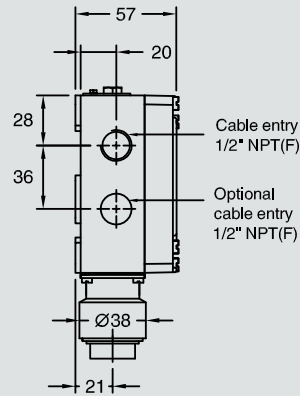
Notes

1. Gr.IIA and IIB of IS/IEC 60079-1 is equivalent to NEC CL.1, Div.1, Gr.C and D. Gr.IIC of IS/IEC 60079-1 is equivalent to NEC CL.1, DIV.1, Gr.A and B.
2. Style W1 is weatherproof only when all entries and joint faces are properly sealed. Style F1 is flameproof only when cover 'O' ring is retained in position and proper FLP cable gland is used. It is recommended to procure cable glands along with F1 instruments to avoid neglect of it while installation.
3. Intrinsic Safety (Exi) — Pressure switches are classified as simple apparatus as they neither generate nor store energy. Hence pressure switches in weatherproof enclosures also may be used in intrinsically safe systems without certification provided the power source is certified Intrinsically Safe. Because of the low voltages and currents it is recommended to use gold contact and / or sealed contacts.
4. The instrument is calibrated in the mounting position depicted in the drawing. Mounting in any other direction will cause a minor range shift, especially in low and compound ranges. Ranges above 1 bar will not experience this shift.
5. A pressure switch is a switching device and not a measuring instrument even though it has a scale in W1 enclosure to assist setting. For this reason, Test Certificates will not contain individual ON-OFF switching values at different scale readings. Maximum differential obtained alone will be declared, besides other specifications.
6. Select working range of the instrument such that the set value lies in the mid 35% of the range i.e., between 35% and 70% of range span.
7. For switching differential values please refer Differential table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
8. On and off settings should not exceed the upper or lower range value.
9. DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., $\pm 2\%$ of FSR. Deadband for DPDT contacts are higher than that of SPDT as force required to actuate the contacts are more. Please refer respective range table for exact values.
10. Fluid Temperature: A pressure switch when connected to the process is not subjected to through flow and therefore is not fully exposed to the fluid temperature. Use of adequate length of impulse piping will greatly reduce excessive heating of the sensing element. For e.g., connection of 75 mm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C. Consult sales for piping nomogram for different temperatures.
11. Ambient temperature range: PS01 suitable for operating within a range of ambient temperature from -10°C ... $+60^{\circ}\text{C}$ provided the process does not freeze within this range. Below 0°C , precautions should be taken in humid atmospheres to prevent frost formation inside the instrument from jamming the mechanism. Occasional escalation beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits -25°C ... $+80^{\circ}\text{C}$.
12. Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port/housing when connections are made.

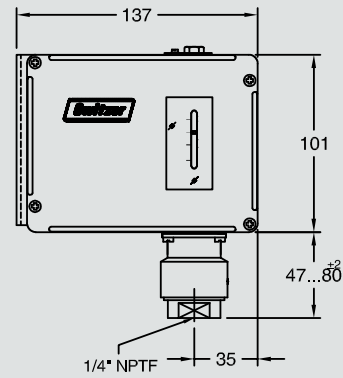
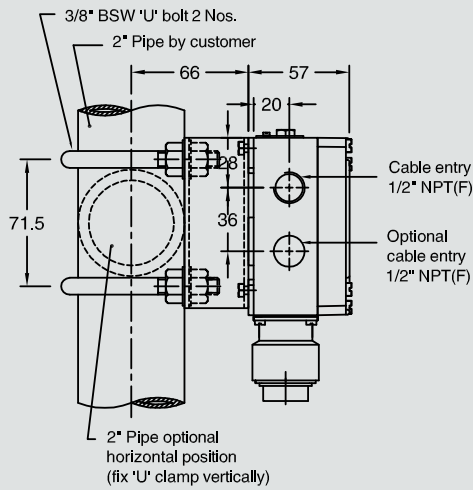
Dimensions in mm

Weatherproof – Diaphragm sealed piston

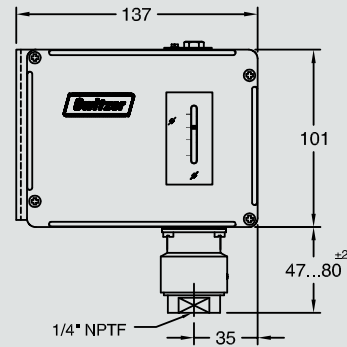
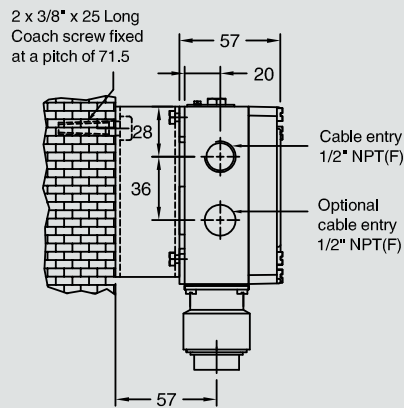
On-line / Panel mounting



2" Pipe mounting



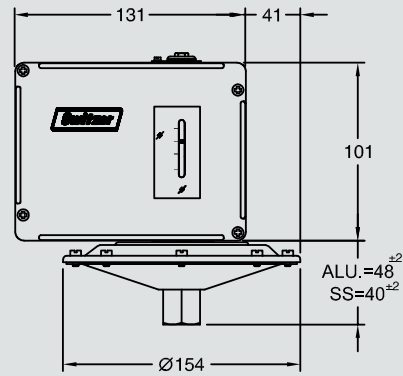
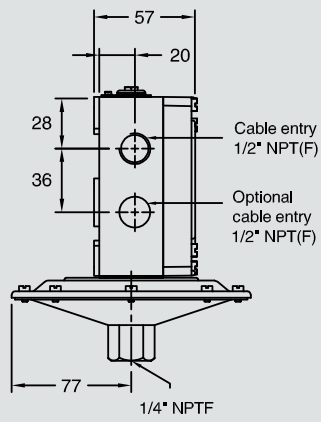
Wall mounting



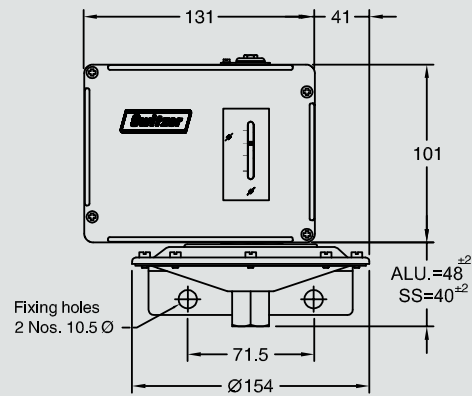
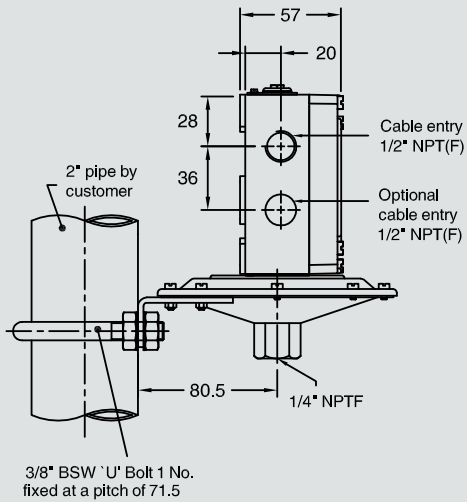
Dimensions in mm

Weatherproof – Diaphragm 148 Ø

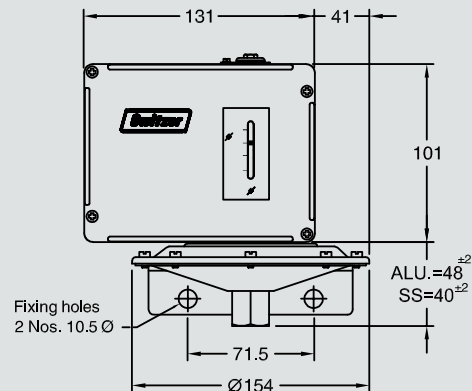
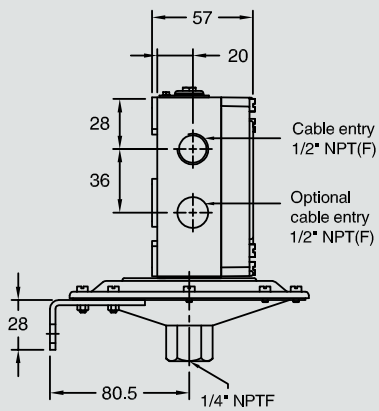
On-line / Panel mounting



2" Pipe mounting



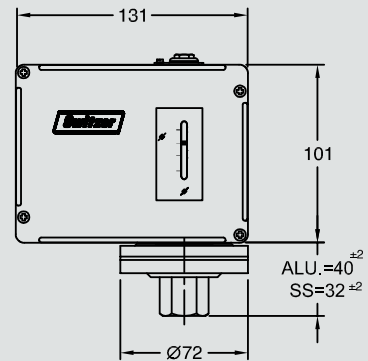
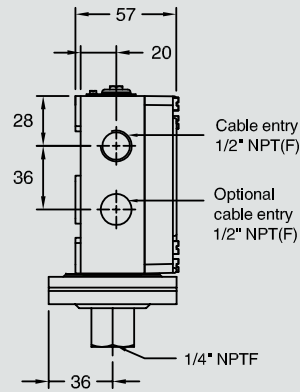
Wall mounting



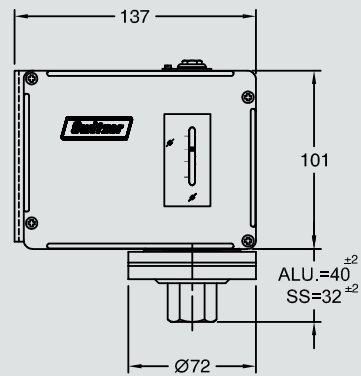
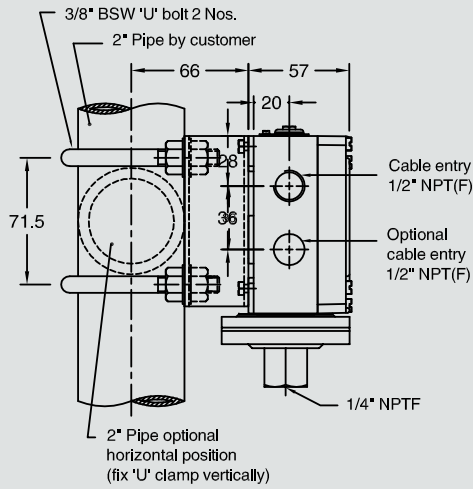
Dimensions in mm

Weatherproof – Diaphragm 72 Ø

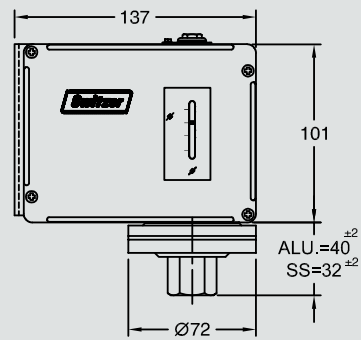
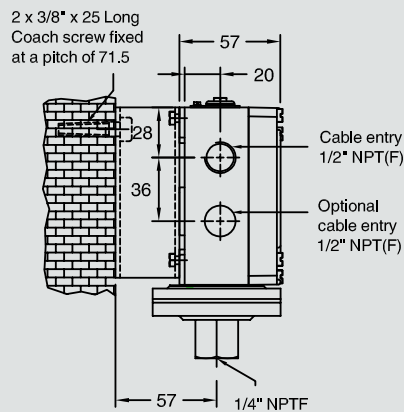
On-line / Panel mounting



2" Pipe mounting



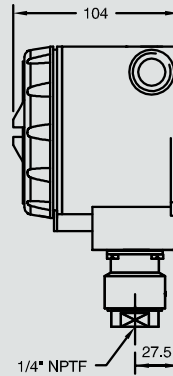
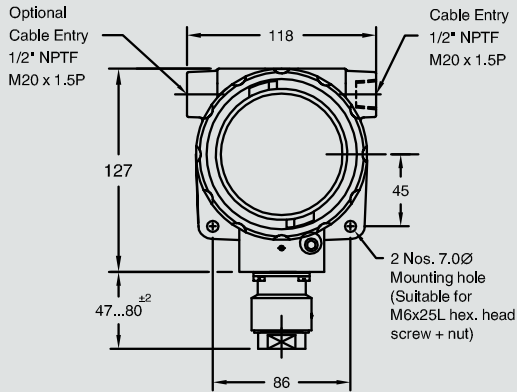
Wall mounting



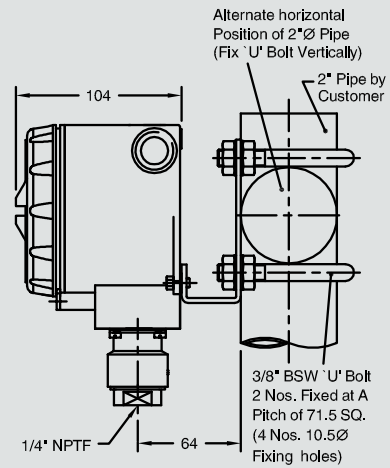
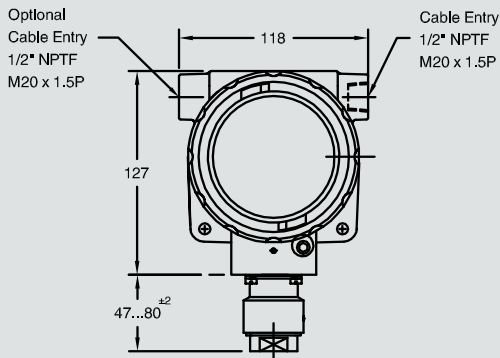
Dimensions in mm

Flameproof – Diaphragm sealed piston

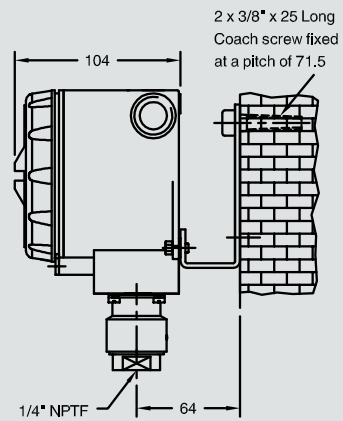
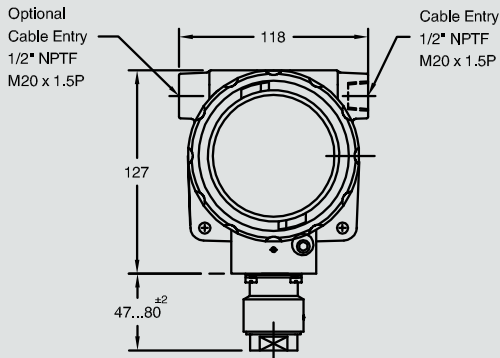
On-line / Panel mounting



2" Pipe mounting



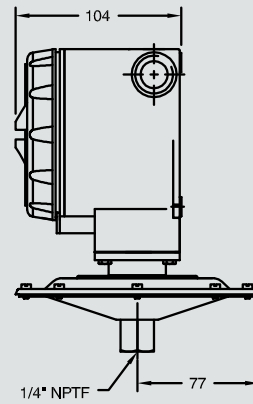
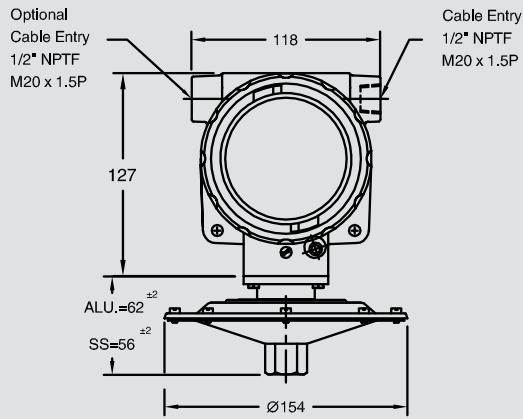
Wall mounting



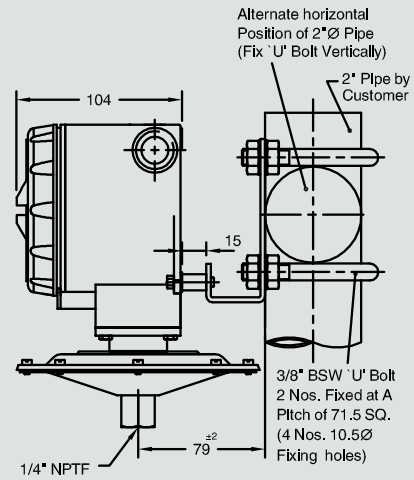
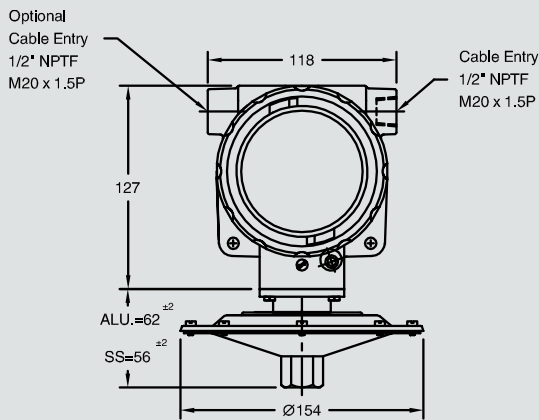
Dimensions in mm

Flameproof – Diaphragm 148 Ø

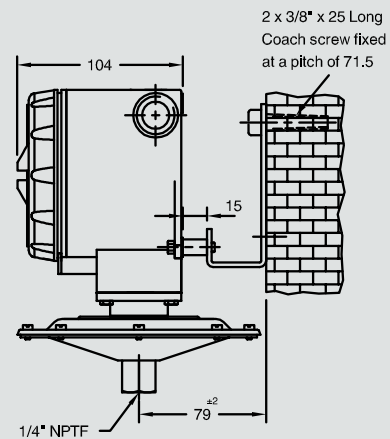
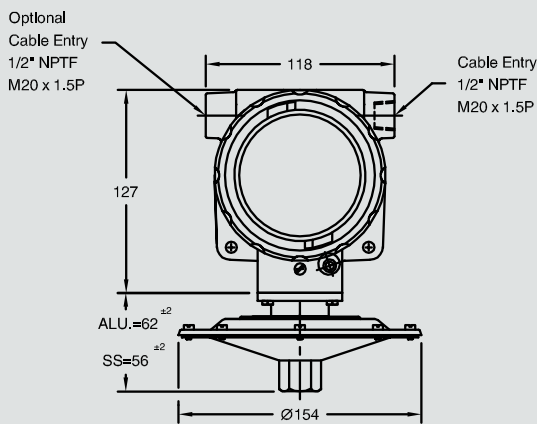
On-line / Panel mounting



2" Pipe mounting



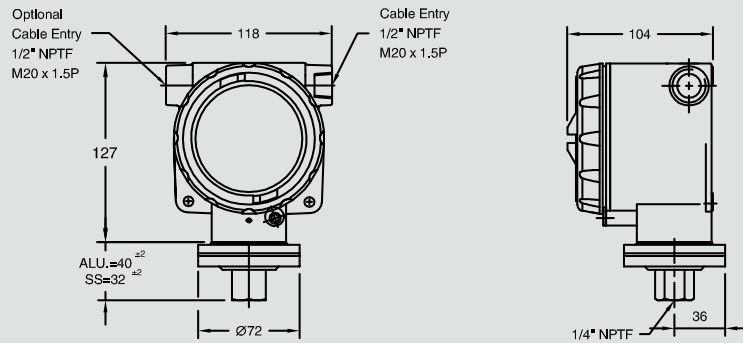
Wall mounting



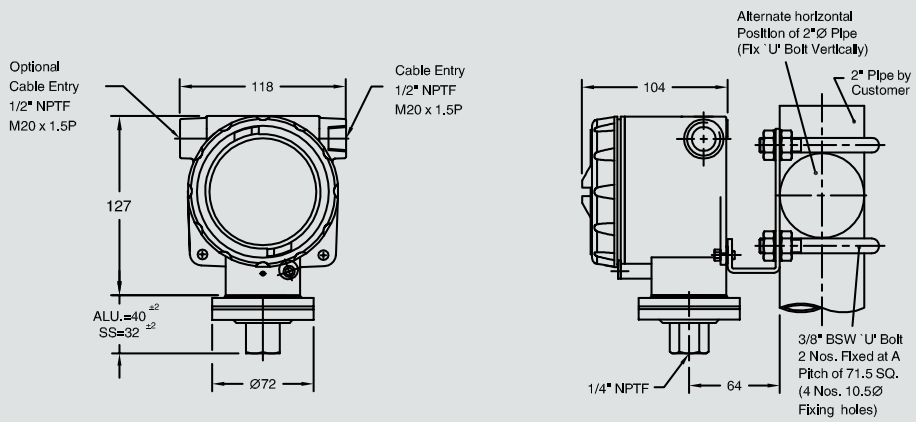
Dimensions in mm

Flameproof – Diaphragm 72 Ø

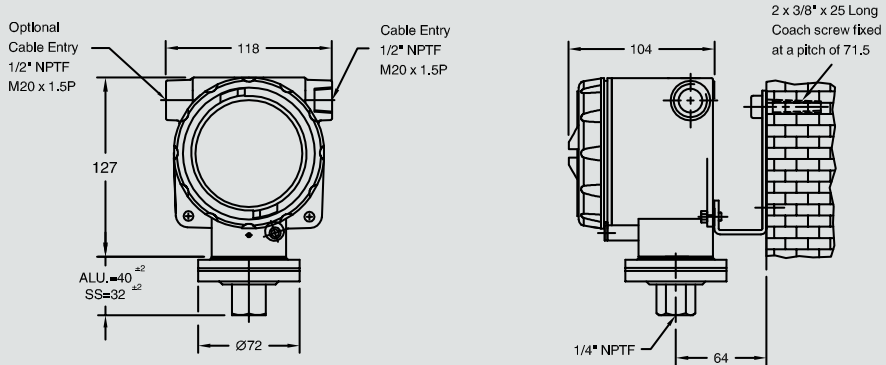
On-line / Panel mounting



2" Pipe mounting



Wall mounting



Ordering information

Model / Switch enclosure / Material of measuring element and wetted parts / Range code / Differential / Switch code and rating / Electrical entry / Mounting / Mounting material

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 We reserve the right to make modifications to the specifications and materials.



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