



PRESSURE SWITCHES

**WEATHERPROOF
FLAMEPROOF**

S20 / 920 SERIES

- DIAPHRAGM-SEALED PISTON SENSOR ● HIGH STATIC PRESSURE ●
- FIELD ADJUSTABLE SETPOINT ● RUGGED DESIGN ●



MODEL 924 IN GH ENCLOSURE



MODEL S21 IN GM ENCLOSURE



MODEL S24 IN GK ENCLOSURE

Rugged in construction, supreme in performance the S20 and 920 series pressure switches are designed as cost effective solutions to meet a variety of applications in the oil, gas, power, steel, Nuclear energy 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.

GENERAL SPECIFICATIONS

Enclosure

GM	Pressure die cast Aluminium, weatherproof to IP:66
GA	316SS, investment cast, weatherproof to IP:66
GK	Die cast Aluminium, weatherproof to IP:66 and flameproof to Gr.IIA,IIB or IIC (Note 1)
GH	Pressure die cast Aluminium, weatherproof to IP:66
Ranges	0 – 700 bar -several std. ranges. Refer Tables
Sensor	316SS Diaphragm-sealed piston std. Monel optional

Wetted Parts

Diaphragm Housing	316SS – Std ; Monel® – Optional
Diaphragm Seals	Nitrile – Std ; Viton® – Optional
Repeatability	± 1 % FSR (Note 4)
Scale Accuracy	± 5 % FSR (Note 6)

Mounting

Max. Working Pr.	Available between 1.5 and 240 times FSR
Max. Working Temp.	– 20 to + 80°C for all ranges except – 20 to + 60°C for ranges U7, V7, W7 & Y4 (Note 14)

Switching

Element	Instrument quality snap-acting SPDT microswitch
Differential	Fixed; for values refer tables 'A' & 'B'
Connection	
Process	1/4" NPTF Std., others through Adaptor
Electrical	For GM, GA & GK enclosures – 3/4" ETF std; 1/2" NPTF optional. Dual entry on request. For GKGr.IIC enclosure, 1/2" NPTF dual entry is standard For GH enclosure, skin-tight 3/4" ET PVC cable gland std.

Conformity

Generally to BS : 6134 : 1981

* Monel® is a registered trademark of The International Nickel Company, Inc
Viton® is a registered trademark of DuPont Dow Elastomers

ORDERING MATRIX

ENCLOSURE

Pressure Die Cast Aluminium weatherproof to IP:66. **GM**

Investment cast 316 SS weatherproof to IP:66 with overall size as style GM — for aggressive atmospheres. Ideal for offshore. **GA**

Die Cast Aluminium flameproof cum weatherproof. CMRS approved to Gr.IIA, IIB & IIC for flameproofness and IP : 66 for weatherproofness. **GK**

Compact housing, pressure Die Cast Aluminium weatherproof to IP:66. **GH**

MODEL

S20 Series

(available in Style GM, GA & GK enclosures only)

Fixed differential with maximum working pressures upto 155 bar as per table 'A'. **S 2 1**

Fixed differential with maximum working pressures upto 1000 bar as per table 'B'. **S 2 4**

920 Series

(available in Style GH enclosure only)

Fixed differential with maximum working pressures upto 155 bar as per table 'A'. **9 2 1**

Fixed differential with maximum working pressures upto 1000 bar as per table 'B'. **9 2 4**

MATERIAL OF WETTED PARTS

316SS diaphragm, Nitrile 'O' ring and 316 SS wetted parts. **0 G**

Monel diaphragm, Nitrile 'O' ring and 316 SS wetted parts. **0 P**

Monel diaphragm, Viton 'O' ring and 316 SS wetted parts for NACE MR-01-75. **0 K**

316 SS diaphragm and 316 SS wetted parts – Welded* construction for S21 / S24. **0 S**

Monel diaphragm and Monel wetted parts – Welded* construction for S21 / S24 for NACE MR-01-75. **0 T**

* For reduced risk against leakage under extreme or exceptional conditions the diaphragm is welded to the pressure housings eliminating the 'O' ring.

RANGE CODE & AVAILABILITY

RANGE CODE	RANGE (in bar)	MODELS			
		S21	S24	921	924
G3	(-)1 to (+) 1.5	✓	✗	✓	✗
DB	0.25 to 1.6	✓	✗	✓	✗
DC	0.4 to 2.5	✓	✓	✓	✓
DE	1 to 6	✓	✓	✓	✓
EA	1.6 to 10	✓	✓	✓	✓
EB	2.5 to 16	✓	✓	✓	✓
EC	4 to 25	✓	✓	✓	✓
ED	10 to 40	✓	✓	✓	✓
EF	15 to 75	✓	✓	✓	✓
FA	10 to 100	✓	✓	✓	✓
U7	7 to 160	✗	✓	✗	✓
V7	25 to 250	✗	✓	✗	✓
W7	50 to 400	✗	✓	✗	✗
Y4	100 to 700	✗	✓	✗	✗

SWITCH CODE RATING & AVAILABILITY (Note 8)

SWITCH CODE (SPCO)	AC RATING	DC RATING IN AMPS						AVAILABILITY OF SPDT AND DPDT IN MODELS
		RESISTIVE			INDUCTIVE			
		220V	110V	24V	220V	110V	24V	
D	15A 250 / 125V	0.2	0.4	2.0	0.02	0.03	1.0	S21, S24, 921 & 924
3	15A 250 / 125V	N.R.	N.R.	N.R.	N.R.	N.R.	N.R.	S21, S24, 921 & 924
4	1A 125V	N.A.	0.5	0.5	N.A.	0.25	0.25	S21, S24, 921 & 924
5	5A 250 / 125V	0.2	0.4	4.0	0.2	0.4	3.0	S21, S24, 921 & 924
6	0.1A 125V	N.A.	N.R.	0.1	N.R.	N.R.	N.A.	S21, S24, 921 & 924
7	N.R.	N.R.	N.R.	1.0	N.R.	N.R.	0.5	S21, S24, 921 & 924
8	5A 250 / 125V	N.A.	N.A.	5.0	N.A.	N.A.	3.0	S21, S24, 921 & 924
9	4A 115V 400 Hz.	N.A.	N.A.	3.0	N.A.	N.A.	1.0	S21, S24, 921 & 924
G	N.R.	N.R.	N.R.	1.0	N.R.	N.R.	0.25	S21, S24, 921 & 924
S	5A 250 / 125V	0.25	0.5	3.0	0.1	0.2	2.0	S21, S24, 921 & 924

Codes D, 3 – For General purpose usages.

Code 4 – With Gold alloy contact.
Codes 5 – For General purpose with good DC rating.

Codes 6 – With Noble metal contact (Low Rating)

Codes 7 – Environmentally sealed switch with Gold plated contact.

Code 8 – Environmentally sealed switch with Silver alloy contact.

Code 9 – Hermetically sealed, inert gas filled with Silver alloy contact.

Code G – Hermetically sealed, inert gas filled with Gold plated contact.

Code S – IP:67 sealed microswitch with silver – Nickel contact.

For DPCO, change switch code to "DD", "33", etc., while ordering

N.A. – Not Available

N.R. – Not Recommended

SWITCHING DIFFERENTIAL DATA

TABLE – A

Range Code	Range (bar)	On-off Differentials in bar					MWP (bar)
		S21 / 921					
		3/D/6	4	5	9 / G	7/8/S	
G3	-1 to 1.5	0.05	0.06	0.25	0.45	0.40	15
DB	0.25 to 1.6	0.05	0.06	0.07	0.15	0.20	27
DC	0.4 to 2.5	0.05	0.06	0.07	0.15	0.20	
DE	1 to 6.0	0.10	0.12	0.35	0.40	0.25	
EA	1.6 to 10	0.20	0.25	0.50	0.50	0.90	70
EB	2.5 to 16	0.25	0.30	0.60	0.60	1.00	110
EC	4 to 25	0.75	0.80	1.20	2.30	1.80	
ED	10 to 40	1.20	1.25	1.70	3.50	3.00	
EF	15 to 75	1.50	1.60	2.80	4.50	4.50	
FA	10 to 100	2.25	2.30	3.50	7.00	6.00	155

Since the force required to operate the microswitches is higher to DPDT arrangement, for DPDT switching apply a multiplication factor of 1.6 on the differential values with SPDT arrangement. The above stated differentials are at midscale. It would be twice at maximum range and half at minimum range.

TABLE – B

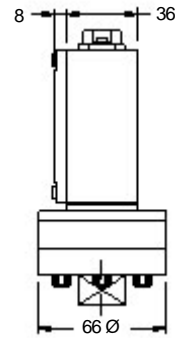
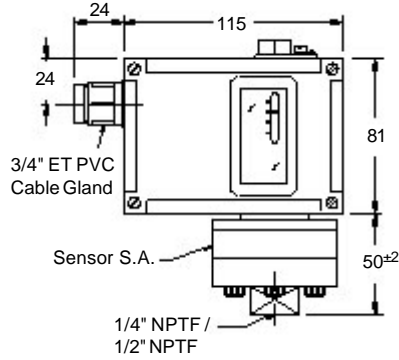
Range Code	Range (bar)	On-off Differentials in bar					MWP (bar)	
		S24 / 924						
		3/D/6	4	5	9 / G	7/8/S		
DC	0.4 to 2.5	0.30	0.35	0.50	0.50	0.50	600	
DE	1.0 to 6.0	0.45	0.50	0.70	0.75	0.70		
EA	1.6 to 10	0.60	0.65	1.00	1.20	0.70		
EB	2.5 to 16	0.60	0.65	1.20	1.20	0.70		
EC	4 to 25	1.00	1.10	2.00	2.30	0.90		
ED	10 to 40	1.80	1.85	2.60	3.50	2.20		
EF	15 to 75	2.30	2.40	5.40	4.00	3.20		
FA	10 to 100	3.50	3.60	5.70	5.00	4.50		
U7	7 to 160	5.25	5.80	9.00	10.0	8.00		1000
V7	25 to 250	9.00	9.50	10.0	22.0	25.0		
W7	50 to 400	15.0	16.0	20.0	30.0	35.0		
Y4	100 to 700	20.0	22.0	25.0	45.0	50.0		

NOTES

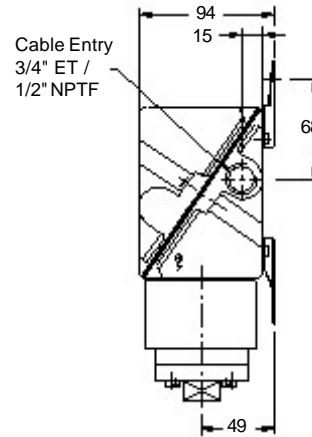
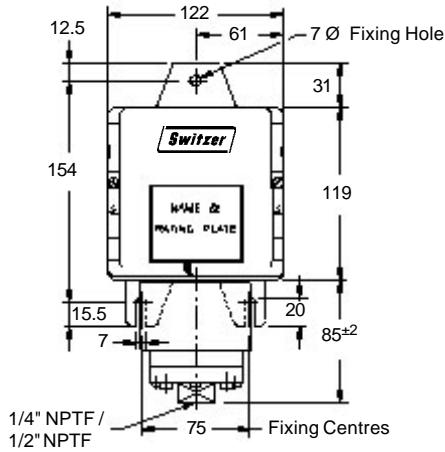
- Gr.IIA & IIB of IS:2148 is equivalent to NEC CL.1, Gr.C & D. Gr.IIC of IS:2148 is equivalent to NEC CL.1, DIV.1, Gr.A & B.
- Style GM / GA / GH is weatherproof only if all entries and joint faces are properly sealed. Style GK is weatherproof only if cover 'O' ring is retained in position and flameproof only if proper FLP cable gland is used. It is recommended to procure cable glands along with GK instruments to avoid neglect of it while installation.
- Intrinsic Safety (Exi) — Pressure Switches are classified as simple electrical apparatus as per BS 5345-6.3.3. Hence Pressure Switches with GM / GA / GH enclosures may be used in intrinsically safe systems without certification if energy levels are limited to 1.2V, 0.1A or 25 mW.
- Accuracy & Repeatability are not different for all blind pressure switches. A shift of $\pm 2\%$ may be observed in setpoint when pressure falls from full static pressure. Settings will also shift with varying temperature.
- 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.
- A pressure switch is a switching device and not a measuring instrument — eventhough it has a scale 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.
- 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.
- For switching differential values please refer respective Range Table. Switching differentials furnished are nominal values under test conditions at mid-scale and will vary with range settings and operating conditions.
- On and off settings should not exceed the upper or lower range value.
- DPDT action is achieved by two SPDT switches synchronised to practical limits i.e., $\pm 2\%$ of FSR.
- Contact life of microswitches are 5×10^5 switching cycles for nominal load. To quench DC sparks, use diode in parallel with inductance, ensuring polarity. A 'R-C' network is also recommended with 'R' value in Ohms equal to coil resistance and 'C' value in micro Farads equal to holding current in Amps.
- All models of S20 and 920 series pressure switches can withstand full vacuum.
- Ambient temperature range: All models are suitable for operating within a range of ambient temperature from (-) 10°C to (+) 60°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 excursions beyond this range are possible but accuracy might be impaired. The microswitch is the limiting factor which should never exceed the limits (-) 25°C to (+) 80°C .
- 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 7.5 cm of 12 mm dia impulse piping will reduce water temperature of 100°C to 65°C at an ambient temperature of 50°C . Ask factory for temperature nomogram for different temperatures.
- Ensure that impulse pipework applies no stress on sensing element housing and use spanners to hold pressure port / housing when connections are made.
- Accuracy figures are exclusive of test equipment tolerance on the claimed values.**
- All performance data are guaranteed to $\pm 5\%$.**

MOUNTING DIMENSIONS

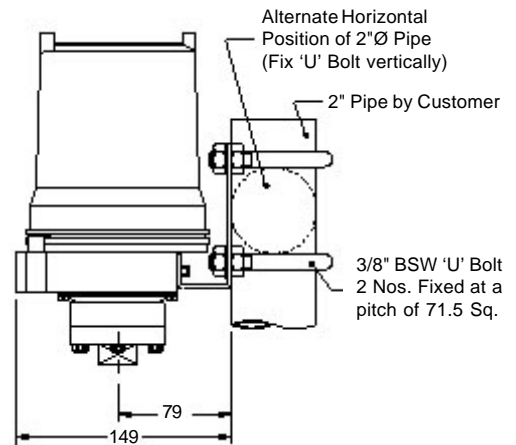
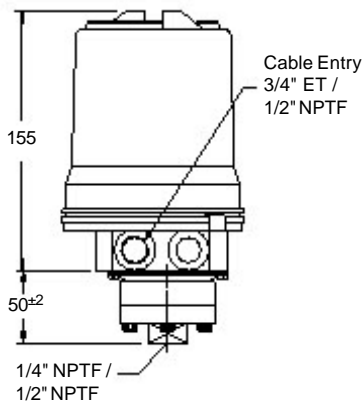
'GH' ENCLOSURE



'GM' ENCLOSURE



'GK' ENCLOSURE



All dimensions are in mm

Prior notification of changes in specification is impracticable due to continuous improvement.

FOR **SWITZER'S** OFFICES IN INDIA

CHECK AT:

<http://www.switzerinstrument.com/offices.htm>