PBT Pressure Transmitter

The PBT is a universal electronic pressure transmitter used in general industrial applications.

The pressure transmitter PBT is designed for pressure measurement in liquid and gaseous media. The PBT is suited for general industrial applications such as machine and plant engineering, in machine tool systems, in hydraulic and pneumatic systems, for pressure control systems and for pumps and compressors.

The PBT has a circularly welded stainless steel membrane. Hence, it is well suited for a large variety of corrosive media. The measurement ranges for gauge pressure are available from 0...1 bar to 0...600 bar. In addition, the PBT offers absolute and compound ranges. The PBT is available in two accuracy classes with non-linearities of ≤± 0.5% and ≤± 0.25% of span (BFSL, according to IEC 61298-2), respectively.

A large variety of customary process connectors is available as standard. As an option, the PBT is available with an extended medium temperature range up to 100 °C.

The pressure transmitter is characterized by its simple and quick installation. The device has a compact design and can be used in limited installation space.

The PBT is wear-free and does not require maintenance. The PBT offers the industry standard output signals 4...20mA, 0...5 V or 0...10 V. For electrical connection, M12x1 connectors, L-connectors according to DIN 175301-803 A, and cable outlets are available.

Benefits

- Excellent price-performance ratio
- No moving parts: No mechanical wear, fatigue-proof
- Maintenance-free
- Insensitive against corrosive media through hermetically sealed stainless steel membrane
- Quick and simple installation

CE

SICK
Sensor Intelligence.

Technical Data

Measuring ranges	Unit	Pressure ranges	Overpressure safety	Burst pressure	Pressure ranges	Overpressure safety	Burst pressure
	bar	0...1	2	5	0...40	80	400
		0...1.6	3.2	10	0...60	120	550
		0...2.5	5	10	0...100	200	800
		0...4	8	17	0...160	320	1000
		0...6	12	34	0...250	500	1200
		0...10	20	34	0...400	800	1700
		0...16	32	100	0...600	1200	2400
		0...25	50	100			
	bar abs	0...1	2	5	0...6	12	34
		0...1.6	3.2	10	0...10	20	34
		0...2.5	5	10	0...16	32	100
		0...4	8	17	0...25	50	100
	bar	-1...0	2	5	-1...+5	12	34
		-1...+0.6	3.2	10	-1...+9	20	34
		-1...+1.5	5	10	-1...+15	32	100
		-1...+3	8	17	-1...+24	50	100
	Unit	**Pressure ranges**	**Overpressure safety**	**Burst pressure**	**Pressure ranges**	**Overpressure safety**	**Burst pressure**
	MPa	0...0.1	0.2	0.5	0...4	8	40
		0...0.16	0.32	1	0...6	12	55
		0...0.25	0.5	1	0...10	20	80
		0...0.4	0.8	1.7	0...16	32	100
		0...0.6	1.2	3.4	0...25	50	120
		0...1	2	3.4	0...40	80	170
		0...1.6	3.2	10	0...60	120	240
		0...2.5	5	10			
	MPa abs	0...0.1	0.2	0.5	0...0.6	1.2	3.4
		0...0.16	0.32	1	0...1	2	3.4
		0...0.25	0.5	1	0...1.6	3.2	10
		0...0.4	0.8	1.7	0...2.5	5	10
	MPa	-0.1...0	0.2	0.5	-0.1...+0.5	1.2	3.4
		-0.1...+0.06	0.32	1	-0.1...+0.9	2	3.4
		-0.1...+0.15	0.5	1	-0.1...+1.5	3.2	10
		-0.1...+0.3	0.8	1.7	-0.1...+2.4	5	10

Measuring ranges	Unit	Pressure ranges	Overpressure safety	Burst pressure	Pressure ranges	Overpressure safety	Burst pressure
	psi	0...15	30	75	0...500	1000	2500
		0...25	60	150	0...1000	1740	7975
		0...30	60	150	0...1500	2900	11600
		0...50	100	250	0...2000	4000	14500
		0...100	200	500	0...3000	6000	17400
		0...160	290	500	0...5000	10000	24650
		0...200	400	1500	0...8000	17400	34800
		0...300	600	1500			
	psi abs	0...15	30	75	0...100	200	500
		0...25	60	150	0...150	290	500
		0...30	60	150	0...200	400	1500
		0...50	100	250	0...300	600	1500
	psi	-30 InHg...0	30	75	-30 InHg...+100	290	500
		-30 InHg...+15	60	150	-30 InHg...+160	400	1500
		-30 InHg...+30	100	250	-30 InHg...+200	400	1500
		-30 InHg...+60	200	500	-30 InHg...+300	600	1500

	Unit	Pressure ranges	Overpressure safety	Burst pressure	Pressure ranges	Overpressure safety	Burst pressure
	kg/cm²	0...1	2	5	0...40	80	400
		0...1.6	3.2	10	0...60	120	550
		0...2.5	5	10	0...100	200	800
		0...4	8	17	0...160	320	1000
		0...6	12	34	0...250	500	1200
		0...10	20	34	0...400	800	1700
		0...16	32	100	0...600	1200	2400
		0...25	50	100			
	kg/cm² abs	0...1	2	5	0...6	12	34
		0...1.6	3.2	10	0...10	20	34
		0...2.5	5	10	0...16	32	100
		0...4	8	17	0...25	50	100
	kg/cm²	-1...0	2	5	-1...+5	12	34
		-1...+0.6	3.2	10	-1...+9	20	34
		-1...+1.5	5	10	-1...+15	32	100
		-1...+3	8	17	-1...+24	50	100

Technical Data

Vacuum resistance	For measurement ranges from 0 ... 10 bar	
Fatigue life	10 Mio. max. load cycles	
Materials		
■ Wetted parts		
» Pressure Connection	316 L	
» Pressure sensor	316 L (for measurement ranges from 0 ... 10 bar rel: 13-8 PH)	
■ Internal transmission fluid	Silicone oil (only with pressure ranges < 0 ... 10 bar and ≤ 0 ... 25 bar abs)	
■ Case	316 L	
Supply voltage L^+	8 ... 30 VDC	
	14 ... 30 (required for output signal 0 ... 10 VDC)	
Signal output and maximum ohmic load R_A	4 ... 20 mA, 2-wire	$R_A \leq (L^+ - 8\ V) / 0.02\ A$ [Ohm]
	0 ... 10 V, 3-wire	$R_A > 10$ kOhm
	0... 5 V, 3-wire	$R_A > 5$ kOhm
Response time	< 4 ms	
Current consumption	Signal current (max. 25 mA) for current output	
	Max. 8 mA for voltage output signal	
Insulation voltage	500 VDC [1]	
	[1] For power supply use a circuit with energy limitation (EN/UL/IEC 61010-1. section 9.3) with the following maximum values for the current: $L^+ = 30$ V (DC): 5 A. Provide a separate switch for the external power supply. Alternative for North America: The connection may also be made to „Class 2 Circuits“ or „Class 2. Power Units“ according to CEC (Canadian Electrical Code) or NEC (National Electrical Code).	
Non-linearity	≤ ± 0.25 % of span (optional)	(BFSL) according to IEC 61298-2
	≤ ± 0.5 % of span	(BFSL) according to IEC 61298-2
	Adjusted in vertical mounting position with pressure connection facing downwards	
Accuracy [2]	≤ ± 0.5 % of span	(with non-linearity 0.25 %)
	≤ ± 0.6 % of span	(with non-linearity 0.25 % and with signal output 0 ... 5 V)
	≤ ± 1.0 % of span	(with non-linearity 0.5 %)
	[2] Including non-linearity. hysteresis. zero point and full scale error (corresponds to error of measurement per IEC 61298-2)	
Zero offset	≤ 0.15 typ.. ≤ 0.4 max. % of span	(with non-linearity 0.25 %)
	≤ 0.5 typ.. ≤ 0.8 max. % of span	(with non-linearity 0.5 %)
Hysteresis	≤ 0.16 % of span	
Non-repeatability	≤ 0.1 % of span	
Long-term drift	≤ 0.1 % of span	according to IEC 61298-2
Signal noise	≤ 0.3 % of span	
Permissible temperature of		
■ Medium	0 ... +80 °C	-30 ... +100 °C optionally available
■ Ambience	0 ... +80 °C	-30 ... +100 °C optionally available
■ Storage	-20 ... +80 °C	-30 ... +100 °C optionally available
Rated temperature range	0 ... +80 °C	
Temperature error within rated temperature range	≤ 1.0 typ., ≤ 2.5 max. % of span	
CE-conformitiy		
■ Pressure equipment directive	97/23/EC	
■ EMC directive	2004/108/EC	
	EN 61 326-2-3	
Enclosure rating	IP 67	
	IP 65 for configuration with L-connector	
Shock resistance	500g according to IEC 60068-2-27	(mechanical shock)
Vibration resistance	10g according to IEC 60068-2-6	(vibration under resonance) {20 g on request}

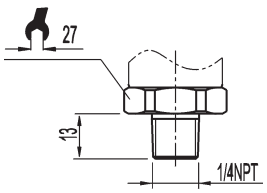
Technical Data

Wiring protection	
■ Protection class	III
■ Overvoltage protection	32 VDC; 36 VDC with 4 ... 20 mA
■ Short-circuit proofness	Q_A towards M
■ Reverse polarity protection	L^+ towards M
Reference conditions	According to IEC 61298-1
■ Relative humidity	45 ... 75%
Weight	Approx. 80g

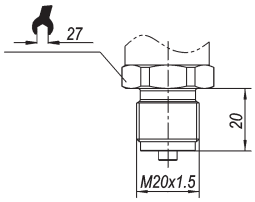
Dimensions in mm

Pressure connections

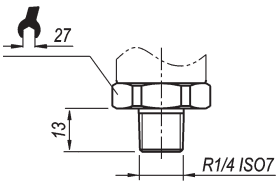
1/4“ NPT
Order code: N1



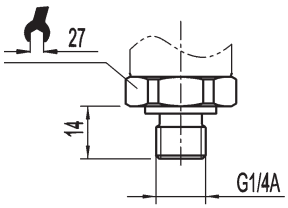
M 20 x 1,5
with sealing copper or stainless steel
Order code: M2



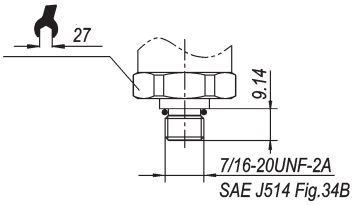
R 1/4 ISO 7
Order code: R1



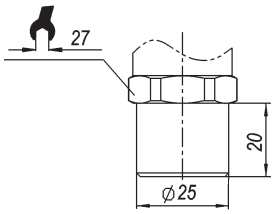
G 1/4 acc. to DIN 3852-E with sealing NBR or FKM
over pressure safety max. 600 bar
Order code: G1



7/16-20 UNF with Boss O-ring FKM
max. permitted temperature
-10 ... +100 °C
Order code: U1



G 1/4 female
EN 837 with sealing copper or stainless steel
Order code: G2

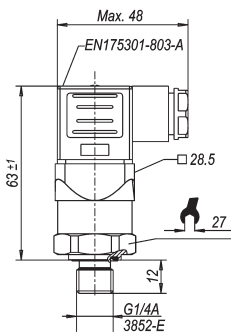


Pressure port: Internal diameter 3.5 mm. Reduced diameters 0.3 mm or 0.6 mm optionally available for process connection G1/4 acc. to DIN3852 E. (0.3 mm for p ≥ 10 bar) Extended pressure port upon request.

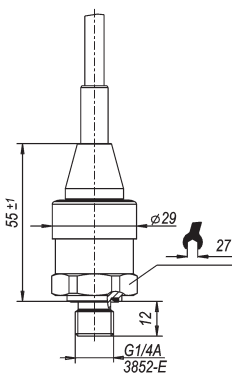
Electrical connectors

Ingress protection IP per IEC 60529. The ingress protection classes specified only apply while the pressure transmitter is connected with female connectors that provide the corresponding ingress protection.

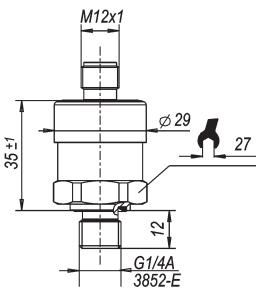
DIN 175301-803 A
L-connector
for conducter cross section up to max. 1.5 mm ^{2},
conducter outer diameter 6-8 mm, IP 65
Order code: L



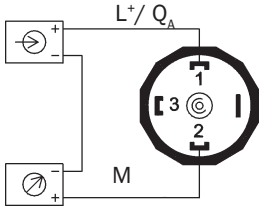
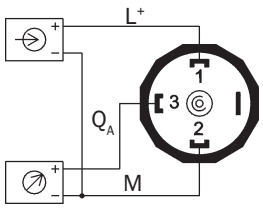
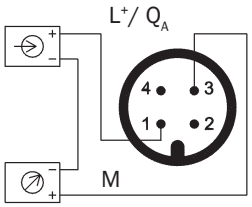
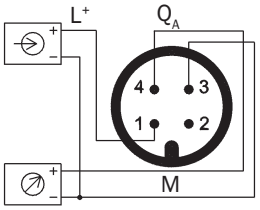
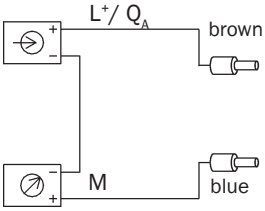
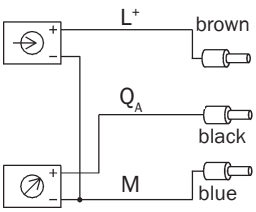
Flying leads,
conducter cross section
3x 0.34 mm ^{2},
conducter outer diameter 6.6 mm,
PUR cable - unshielded, IP 67
Order code: 2 (2 m)
5 (5 m)



M 12x1, 4-pin
IP 67
Order code: M



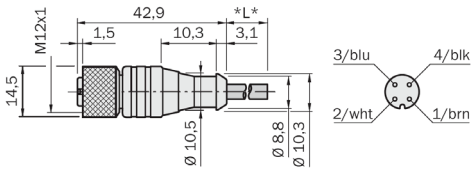
Electrical connections

	2-wire	3-wire
DIN 175301-803 A L-connector		
M 12x1, 4-pin without angle socket or female cable connectors		
Flying leads power supply lead (e.g.display)		

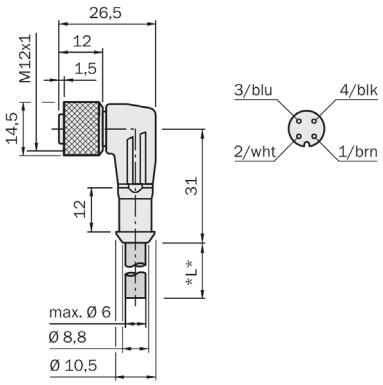
Accessories

PVC circular plug-in connector, M12, 4-pin

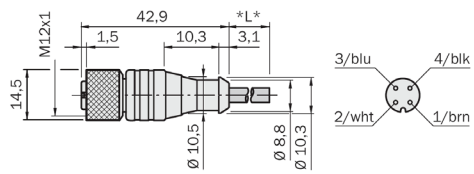
DOL – 12 04 – G 02M	6009382	2 m
DOL – 12 04 – G 05M	6009866	5 m
DOL – 12 04 – G 10M	6010543	10 m
DOL – 12 04 – G 15M	6010753	15 m
DOL – 12 04 – G 20M	6034401	20 m



DOL – 12 04 – W 02M	6009383	2 m
DOL – 12 04 – W 05M	6009867	5 m
DOL – 12 04 – W 10M	6010541	10 m
DOL – 12 04 – W 15M	6036474	15 m
DOL – 12 04 – W 20M	6033559	20 m

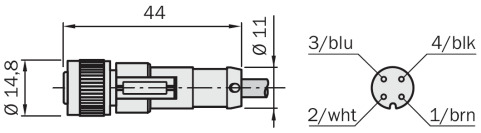


DOL – 12 04 – G 01M S02	6033686	1 m, coating colour gray
DOL – 12 04 – G 04M S02	6033687	4 m, coating colour gray
DOL – 12 04 – G 05M S02	6033688	5 m, coating colour gray
DOL – 12 04 – G 07M S02	6033690	7 m, coating colour gray

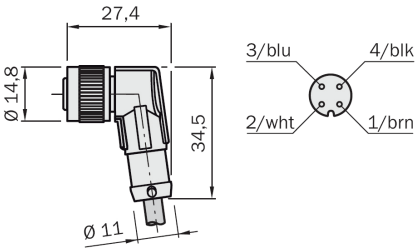


PUR circular plug-in connector M12, 4-pin

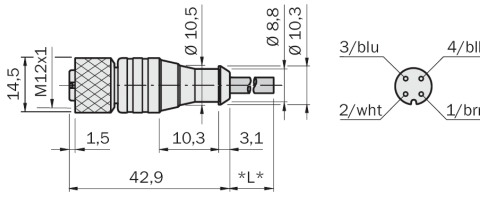
DOL – 12 04 – G 02M C	6025900	2 m
DOL – 12 04 – G 05M C	6025901	5 m
DOL – 12 04 – G 10M C	6025902	10 m
DOL – 12 04 – G 15M C	6034749	15 m
DOL – 12 04 – G 20M C	6034750	20 m
DOL – 12 04 – G 25M C	6034751	25 m



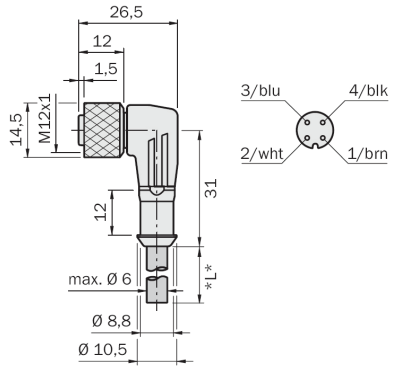
DOL – 12 04 – W 02M C	6025903	2 m
DOL – 12 04 – W 05M C	6025904	5 m
DOL – 12 04 – W 10M C	6025905	10 m
DOL – 12 04 – W 15M C	6034752	15 m
DOL – 12 04 – W 20M C	6034753	20 m
DOL – 12 04 – W 25M C	6034754	25 m



DOL – 12 04 – G 05M D	6026250	5 m, welding spark-proof



DOL – 12 04 – W 05M D	6020399	5 m, welding spark-proof



Type Code

Pressure type

R	Gauge
A	Absolute
C	Compound

Pressure Unit

B	bar
M	MPa
P	psi
K	kg/cm²

Standard measurement range acc. to data sheet

Non-Linearity

S	Non-linearity +/-0.5 % of Span (BFSL)
A	Non-linearity +/-0.25 % of Span (BFSL)

Process Connector

G1	G 1/4 A according to DIN 3852-E
G2	G 1/4 female
N1	1/4" NPT
M2	M20 x 1.5
U1	7/16"-20 UNF SAE #4 J514 male with O-ring Boss (FKM)
R1	R 1/4 ISO 7 (DIN2999)

Pressure Port

S	Standard
N	0.3 mm pressure port [1) 2)]
M	0.6 mm pressure port [1)]

Process temperature

S	0...+80 °C
E	-30...+100 °C

Sealing

N	NBR [1)]
F	FPM/FKM [3)]
C	Copper [4)]
S	Stainless steel [4)]
0	Without sealing [5)]

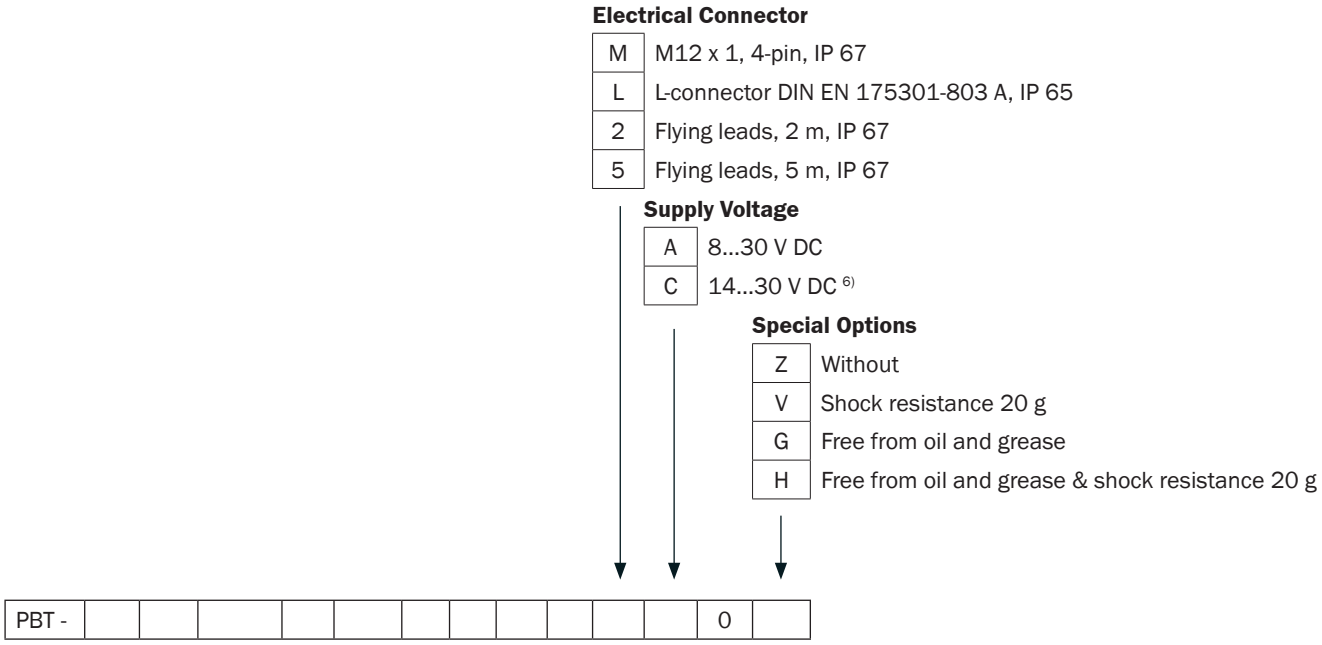
Output Signal

A	4...20 mA, 2-wire
V	0...10 V, 3-wire [6)]
U	0...5 V, 3-wire

PBT -												0	

[1)] Only with process connection G 1/4 A acc. to DIN3852 E
[2)] ≥ 10 bar
[3)] Only with process connections G 1/4 A acc. to DIN 3852E and 7/16“-20 UNF SAE #4 J514 male with O-ring boss (FKM)
[4)] Only with process connection M20 x 1.5
[5)] Only with process connections G 1/4 female, 1/4“ NPT, R 1/4 ISO 7 (DIN2999) and M20 x 1.5
[6)] Output signal 0...10 V requires supply voltage 14 ... 30 V DC

Type Code



6) Output signal 0...10 V requires supply voltage 14 ... 30 V DC

Type Code

Measurement ranges	bar / Gauge Pressure		bar / Absolute Pressure		bar / Compound Pressure	
	1X0	0...1 bar	1X0	0...1 bar abs	1X0	-1...0 bar
	1X6	0...1.6 bar	1X6	0...1.6 bar abs	1X6	-1...+0.6 bar
	2X5	0...2.5 bar	2X5	0...2.5 bar abs	2X5	-1...+1.5 bar
	4X0	0...4 bar	4X0	0...4 bar abs	4X0	-1...+3 bar
	6X0	0...6 bar	6X0	0...6 bar abs	6X0	-1...+5 bar
	010	0...10 bar	010	0...10 bar abs	010	-1...+9 bar
	016	0...16 bar	016	0...16 bar abs	016	-1...+15 bar
	025	0...25 bar	025	0...25 bar abs	025	-1...+24 bar
	040	0...40 bar				
	060	0...60 bar				
	100	0...100 bar				
	160	0...160 bar				
	250	0...250 bar				
	400	0...400 bar				
	600	0...600 bar				

Measurement ranges	MPa / Gauge Pressure		MPa / Absolute Pressure		MPa / Compound Pressure	
	X10	0...0.1 MPa	X10	0...0.1 MPa abs	X10	-0.1...0 MPa
	X16	0...0.16 MPa	X16	0...0.16 MPa abs	X16	-0.1...+0.06 MPa
	X25	0...0.25 MPa	X25	0...0.25 MPa abs	X25	-0.1...+0.15 MPa
	X40	0...0.4 MPa	X40	0...0.4 MPa abs	X40	-0.1...+0.3 MPa
	X60	0...0.6 MPa	X60	0...0.6 MPa abs	X60	-0.1...+0.5 MPa
	1X0	0...1 MPa	1X0	0...1 MPa abs	1X0	-0.1...+0.9 MPa
	1X6	0...1.6 MPa	1X6	0...1.6 MPa abs	1X6	-0.1...+1.5 MPa
	2X5	0...2.5 MPa	2X5	0...2.5 MPa abs	2X5	-0.1...+2.4 MPa
	4X0	0...4 MPa				
	6X0	0...6 MPa				
	010	0...10 MPa				
	016	0...16 MPa				
	025	0...25 MPa				
	040	0...40 MPa				
	060	0...60 MPa				

Type Code

Measurement ranges	psi / Gauge Pressure		psi / Absolute Pressure		psi / Compound Pressure	
	015	0...15 psi	015	0...15 psi abs	015	-30 InHg...0 psi
	025	0...25 psi	025	0...25 psi abs	030	-30 InHg...+15 psi
	030	0...30 psi	030	0...30 psi abs	045	-30 InHg...+30 psi
	050	0...50 psi	050	0...50 psi abs	075	-30 InHg...+60 psi
	100	0...100 psi	100	0...100 psi abs	115	-30 InHg...+100 psi
	160	0...160 psi	150	0...150 psi abs	175	-30 InHg...+160 psi
	200	0...200 psi	200	0...200 psi abs	215	-30 InHg...+200 psi
	300	0...300 psi	300	0...300 psi abs	315	-30 InHg...+300 psi
	500	0...500 psi				
	1K0	0...1000 psi				
	1K5	0...1500 psi				
	2K0	0...2000 psi				
	3K0	0...3000 psi				
	5K0	0...5000 psi				
	8K0	0...8000 psi				

Measurement ranges	kg/cm^2 / Gauge Pressure		kg/cm^2 / Absolute Pressure		kg/cm^2 / Compound Pressure	
	1X0	0...1 kg/cm^2	1X0	0...1 kg/cm^2 abs	1X0	-1...0 kg/cm^2
	1X6	0...1.6 kg/cm^2	1X6	0...1.6 kg/cm^2 abs	1X6	-1...+0.6 kg/cm^2
	2X5	0...2.5 kg/cm^2	2X5	0...2.5 kg/cm^2 abs	2X5	-1...+1.5 kg/cm^2
	4X0	0...4 kg/cm^2	4X0	0...4 kg/cm^2 abs	4X0	-1...+3 kg/cm^2
	6X0	0...6 kg/cm^2	6X0	0...6 kg/cm^2 abs	6X0	-1...+5 kg/cm^2
	010	0...10 kg/cm^2	010	0...10 kg/cm^2 abs	010	-1...+9 kg/cm^2
	016	0...16 kg/cm^2	016	0...16 kg/cm^2 abs	016	-1...+15 kg/cm^2
	025	0...25 kg/cm^2	025	0...25 kg/cm^2 abs	025	-1...+24 kg/cm^2
	040	0...40 kg/cm^2				
	060	0...60 kg/cm^2				
	100	0...100 kg/cm^2				
	160	0...160 kg/cm^2				
	250	0...250 kg/cm^2				
	400	0...400 kg/cm^2				
	600	0...600 kg/cm^2				

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