

Pressure Transmitter

ATM.1ST - High Precision Transmitter



CUSTOMER BENEFITS

- Any measuring ranges between 0 ... 50 mbar und 0 ... 1000 bar available
- Static accuracies available to 0.05 %FS
- Hysteresis and repeatability better than 0.01 %
- Piezoresistive technology suitable for static and dynamic pressure measurements
- Modular design ideal for customization to the application
- Barometric or negative pressure ranges available

Technical Specifications

PRESSURE MEASURING RANGE (BAR)

	0 ... 0.05 to 0 ... < 0.1	0 ... 0.1 to 0 ... < 1	0 ... 1 to 0 ... ≤ 100
Overpressure (Proof)	3 bar	3 bar	3 x FS
Burst pressure	> 200 bar	> 200 bar	> 200 bar
Accuracy, (3) (± % FS)	≤ 0.25	≤ 0.1	≤ 0.1 / ≤ 0.05
Total Error, (4), (5) (± % FS ; typ. / max.)			
0 ... 70°C compensated	≤ 0.4 / 0.6	≤ 0.2 / 0.4	≤ 0.15 / 0.3
-25 ... 100°C compensated	≤ 0.5 / 0.7	≤ 0.3 / 0.5	≤ 0.2 / 0.4
-40 ... 125°C compensated	≤ 0.7 / 1.0	≤ 0.4 / 0.7	≤ 0.3 / 0.6
Response time, (typ.)	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS
Long term stability, (typ./max. per year)	< 1 mbar / < 2 mbar	< 1 mbar / < 2 mbar	< 0.1% FS / < 0.2% FS

	0 ... > 100 to 0 ... ≤ 600, (2)	0 ... > 600 to 0 ... 1000	0.8 ... 1.2, (1)
Overpressure (Proof)	3 x FS (≤ 850 / ≤ 1500 bar)	≤ 850 / ≤ 1500 bar	3 x FS
Burst pressure	> 850 / > 1500 bar	> 850 / > 1500 bar	> 200 bar
Accuracy, (3) (± % FS)	≤ 0.1	≤ 0.2	≤ 0.2 / ≤ 0.1
Total Error, (4), (5) (± % FS ; typ. / max.)			
0 ... 70°C compensated	≤ 0.3 / 0.5	≤ 0.4 / 0.6	≤ 0.2 / 0.4
-25 ... 100°C compensated	≤ 0.5 / 0.7	≤ 0.7 / 1.0	≤ 0.3 / 0.5
-40 ... 125°C compensated	≤ 0.7 / 0.9	≤ 1.0 / 1.2	≤ 0.4 / 0.7
Response time, (typ.)	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS
Long term stability, (typ./max. per year)	< 0.1% FS / < 0.2% FS	< 0.1% FS / < 0.2% FS	< 1 mbar / < 2 mbar

	-0.025...0.025 to -0.1...0.1	>-0.1... >0.1 to -0.5...0.5	>-0.5... >0.5 to -1...100
Overpressure (Proof)	3 bar	3 bar	3 bar / 3 x FS
Burst pressure	> 200 bar	> 200 bar	> 200 bar
Accuracy, (3) (± % FS)	≤ 0.25	≤ 0.2 / ≤ 0.1	≤ 0.1
Total Error, (4), (5) (± % FS ; typ. / max.)			
0 ... 70°C compensated	≤ 0.4 / 0.6	≤ 0.2 / 0.4	≤ 0.15 / 0.3
-25 ... 100°C compensated	≤ 0.5 / 0.7	≤ 0.3 / 0.5	≤ 0.2 / 0.4
-40 ... 125°C compensated	≤ 0.7 / 1.0	≤ 0.4 / 0.7	≤ 0.3 / 0.6
Response time, (typ.)	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS	< 1ms / 10 ... 90 % FS
Long term stability, (typ./max. per year)	< 1 mbar / < 2 mbar	< 1 mbar / < 2 mbar	< 0.1% FS / < 0.2% FS

(1) Typical barometric pressure range, max. offset: 900 mbar, min. span: 400 mbar

(2) Overpressure (proof) and burst pressure 1500 bar (stainless steel) optional

(3) Zero based accuracy according to EN-61298, incl. hysteresis and repeatability at ambient temperature

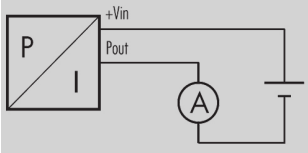
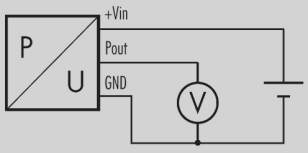
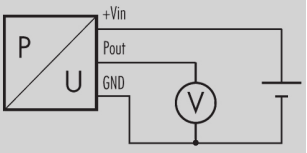
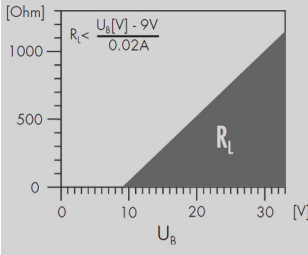
(4) Total error including accuracy and temperature influences at maximum signal span (16 mA / 10 V DC)

(5) Does not apply to titanium solution ≤ 1 bar

TEMPERATURE RANGE

Operating temperature	-40 ... 125°C
Process temperature	Standard: -40 ... 125°C; Optional: -40 ... 150°C (with cooling fins)
Storage temperature	-40 ... 125°C

ELECTRICAL SPECIFICATIONS

	4 ... 20 mA	0 ... 5 V	0 ... 10 V
Power supply	9 ... 33 V DC	10 ... 30 V DC	12 ... 30 V DC
Supply influence	< 0.05% FS	< 0.05% FS	< 0.05% FS
Current consumption (typ.)	n.a.	3 mA	3 mA
Start up time	< 170 ms	< 170 ms	< 170 ms
Circuit diagram			
Load resistance		$R_L > 10k\Omega$	$R_L > 10k\Omega$
Load influence	< 0.05% FS	< 0.05% FS	< 0.05% FS
Reverse polarity protection	Yes	Yes	Yes
Short-circuit resistance	n.a.	Yes	Yes

QUALIFICATIONS

	Description	Level	Typical interferences
EN 60068-2-6	Vibration	10 G (4 ... 2000 Hz)	
EN 60068-2-27	Shock	100 G (impulse duration 6 ms)	
EN 55022	Emission, class B	< 30 dB μ V/m (0.03...1 GHz)	
EN 61000-4-2	Electrostatic discharge	8 kV contact / 15 kV air	
EN 61000-4-3	Irradiated RF	10V/m (0.08...2.7 GHz, 3s)	Radio sets, wireless phones
EN 61000-4-4	Transients (burst)	4 kV	Motors, valves
EN 61000-4-5	Surge	Line-Line: 0.5 kV/42 Ω , Line-Earth: 1 kV/42 Ω	Overvoltage
---	Surge (1)	Line-Line: 2.0 kV/2 Ω , Line-Earth 5 kV/12 Ω	Overvoltage
EN 61000-4-6	Conducted RF	3 V (0.15 ... 80 MHz, 3 s)	Frequency converters

(1) Only with surge (lightning) protection

PHYSICAL SPECIFICATIONS

Oil filling	Standard: Silicone oil AS100; Optional: Anderol Food or PAO4
Transducer	Standard: Stainless steel (316L/1.4435); Optional: Titanium (Gr.2) or Hastelloy C-276
Housing	Standard: Stainless steel (316L/1.4435); Optional: Titanium (Gr.2) or Hastelloy C-276
Weight	typ. 125 gram, depending on the configuration

Accessories

CABLE SOCKET CONNECTOR

HART001	Cable socket connector DIN43650 (EN 175301-803A)
HART002	Cable socket connector Binder 723, 5 pins
HART012	Cable socket connector MIL C26482, 10-6
HART018	Cable socket connector M12x1, 5 pins

Additional documents

OPERATING AND SAFETY INSTRUCTIONS

Article number	
10.88.0092	DMM029

Ordering information

	X.	XXXX.	XXXX.	XX.	XXX
Type					
ATM.1ST					
Pressure type					
Gauge	1				
Absolute	2				
Sealed gauge	3				
Pressure measuring range					
Any measuring ranges between 0 ... 50 mbar and 0 ... 1000 bar available	XX				
Barometric pressure ranges available	XX				
Negative pressure ranges available	XX				
Process connection					
G 1/2 M, bore 14 mm (Fig. 1)	17				
G 1/4 F (Fig. 2)	00				
G 1/4 M (Fig. 3)	11				
G 1/4 M, manometer EN 837 (Fig. 4)	12				
G 1/2 M (Fig. 5)	13				
G 1/2 M, manometer EN 837 (Fig. 6)	16				
1/4 NPT M (Fig. 7)	10				
1/2 NPT M (Fig. 8)	19				
G 1/2 M, frontal diaphragm (Fig. 9), (1)	14				
G 1/2 M, frontal diaphragm Hastelloy C-276 (Fig. 9), (1)	37				
G 1/2 M, with flush diaphragm membrane (Fig. 10), (1)	15				
G 1/4, with flush diaphragm (Fig. 11), (1)	21				
Other pressure connections on request	99				
Electrical connection					
DIN 43650 (EN 175301-803A), demountable, IP 65, (Fig. 12), (2), (3)	01				
Binder 723, 5 pins, IP 67 (Fig. 13), (2)	03				
MIL C26482, 10-6, 316L, IP 67 (Fig. 14), (2)	80				
M12x1, 4 pins, (Fig. 15), (2)	07				
PE cable, black, IP 67, (Fig. 16), (4), (8)	13				
PUR cable, black, IP 67, (Fig. 16), (4), (6)	15				
FEP cable, black, IP 67, (Fig. 16), (4)	21				
FEP cable, (high temperature), black, IP 67 (Fig. 16), (4)	11				
PUR cable, black, IP 68, (Fig. 17), (4), (6)	24				
Other electrical connections on request	99				
Output signal					
0 ... 5 VDC		46			
0 ... 10 VDC		47			
4 ... 20 mA		05			
4 ... 20 mA surge protection		08			
Accuracy					
$\leq \pm 0.25$ % FS (50 mbar ... 99 mbar)			1		
$\leq \pm 0.1$ % FS (100 mbar ... 600 bar)			2		
$\leq \pm 0.05$ % FS (1 bar ... 100 bar)			6		
Temperature range					
0 ... 70°C compensated, (without cooling fins)				0	

-25 ... 100°C compensated, (without cooling fins)	1
-25 ... 100°C compensated, (with cooling fins)	2
-40 ... 100°C compensated, (without cooling fins)	3
-40 ... 100°C compensated, (with cooling fins)	4
-40 ... 125°C compensated, (without cooling fins)	6
Other temperature ranges on request	9
Option 1	
Throttle, (7)	A
Special oil filling: Anderol Food (for food applications)	G
Special oil filling: PAO4 (siliconfree)	Q
Pressure connection elastomerfree	N
Pressure connection welded	V
Option 2	
Electronics packed in gel: Gauge sensors	C
Electronics packed in gel: Absolute and sealed gauge sensors	D
Option 3	
Titanium	K
Seals: FKM (standard)	U
Seals: EPDM	S
Seals: Kalrez (5)	T
Seals: NBR (8)	H

- (1) Process connection available ≤ 600 bar
- (2) Cable socket connector not included
- (3) IP67 if the cable socket connector HART001 is installed correctly
- (4) Please specify the required cable length and medium
- (5) Profile seal not included
- (6) For operating temperature $> 50^{\circ}\text{C}$, PE or FEP cable must be used
- (7) Only with pressure connection Fig. 3, Fig. 5, Fig. 6, Fig. 7 and Fig. 8
- (8) Suitable for drinking water

$P_N \geq 50 \text{ mbar} \dots 25 \text{ bar (1)}$

Fig. 1 - G 1/2 M, bore 14 mm

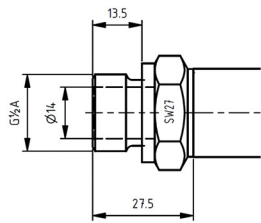


Fig. 5 - G 1/2 M

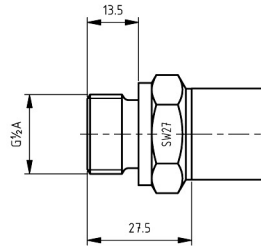


Fig. 2 - G 1/4 F

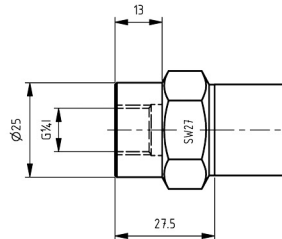


Fig. 6 - G 1/2 M, Manometer EN837

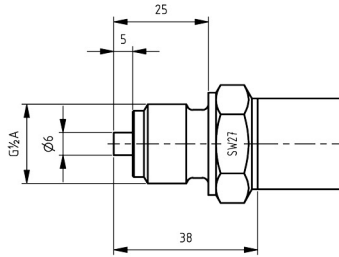


Fig. 3 - G 1/4 M

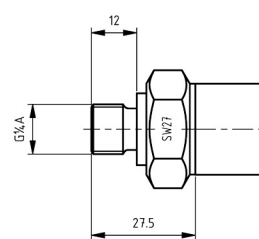


Fig. 7 - 1/4 NPT M

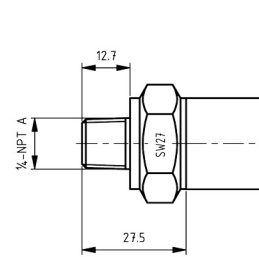


Fig. 4 - G 1/4 M, Manometer EN837

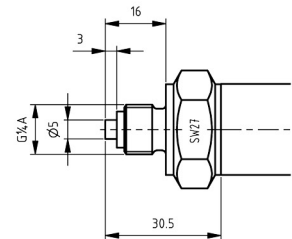
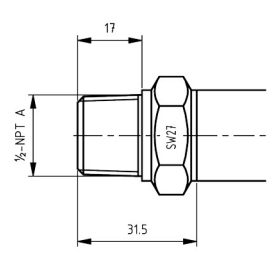


Fig. 8 - 1/2 NPT M



$P_N > 25 \text{ bar} \dots 1000 \text{ bar (1) (2)}$

Fig. 2 - G 1/4 F

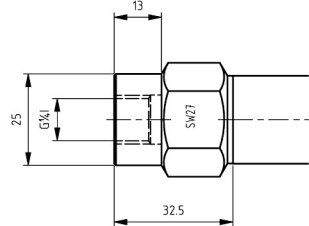


Fig. 5 - G 1/2 M

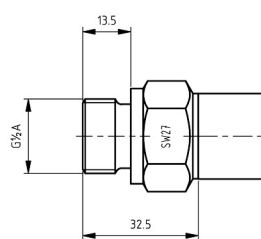


Fig. 3 - G 1/4 M

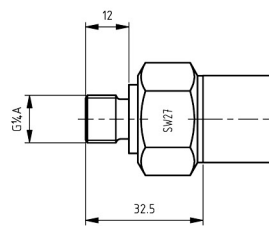


Fig. 6 - G 1/2 M, Manometer EN837

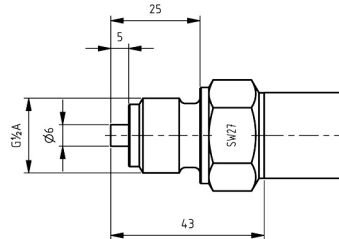


Fig. 4 - G 1/4 M, Manometer EN837

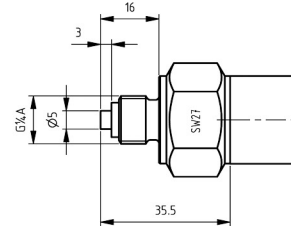


Fig. 7 - 1/4 NPT M

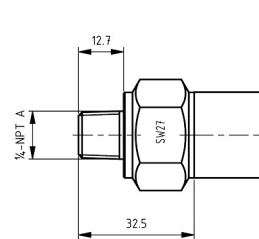
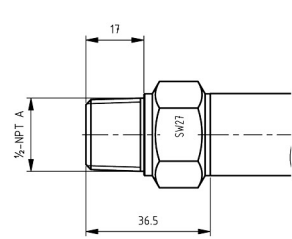
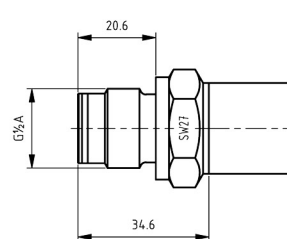


Fig. 8 - 1/2 NPT M



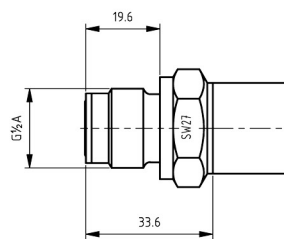
$P_N \geq 50 \text{ mbar} \dots 600 \text{ bar}$

Fig. 9 - G 1/2 M, frontal diaphragm



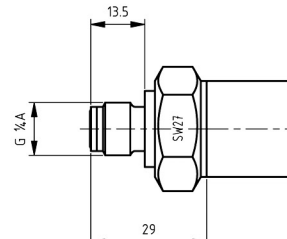
$P_N \geq 100 \text{ mbar} \dots 1000 \text{ bar (3)}$

Fig. 10 - G 1/2 M, flush diaphragm



$P_N \geq 10 \text{ bar} \dots 600 \text{ bar}$

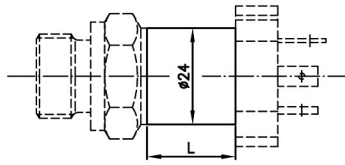
Fig. 11 - G 1/4 M, flush diaphragm



- (1) Dimensions for welded or elastomerfree versions may be different
- (2) Not all process connections available for pressure ranges > 600 bar
- (3) Dimensions for pressure ranges > 600 bar differ

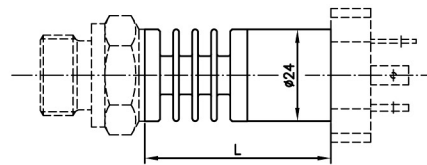
Dimensions

Version for medium temperature up to 125°C



L = 25 mm for connector DIN 43650 (EN 175301-803A)

Version for medium temperature >125°C up to max. 150°C



L = 52 mm for connector DIN 43650 (EN 175301-803A)

Electrical connections

Fig. 12 - DIN43650 (EN 175301-803A)

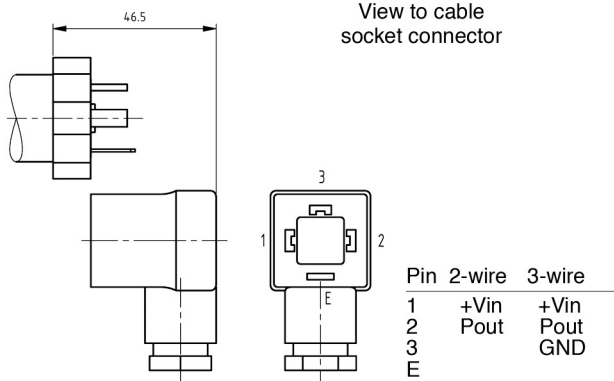


Fig. 13 - Binder 723, 5 pins

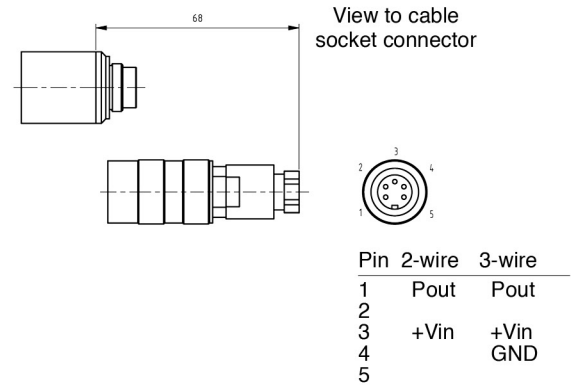


Fig. 14 - MIL C26482, 10-6, 316L

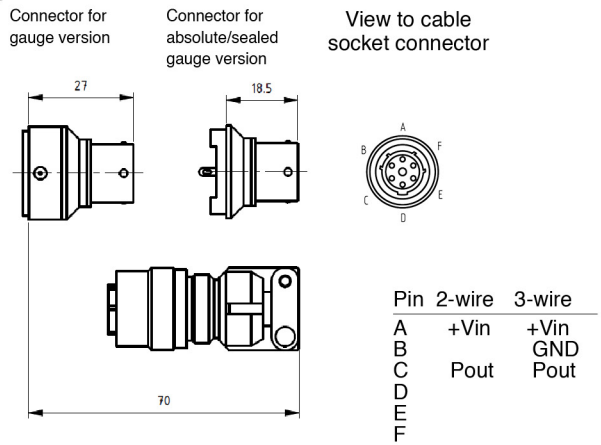


Fig. 15 - M12 x 1, 4 pins (Lumberg RSF4)

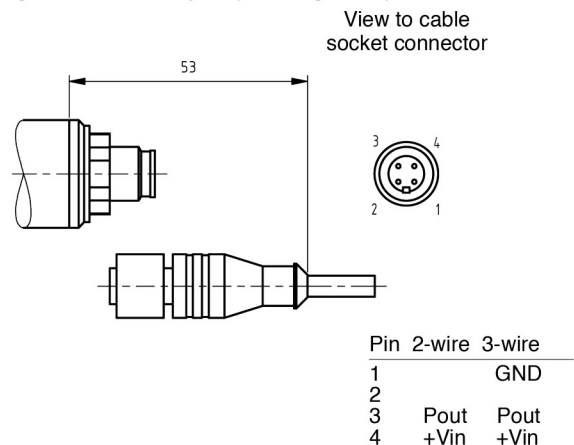


Fig. 16 - Cable connection IP67

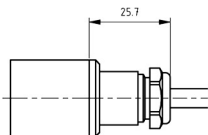
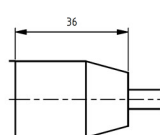


Fig. 17 - Cable connection IP68



Colour	2-wire	3-wire
white	+Vin	+Vin
yellow	Pout	GND
brown		Pout

Specifications may change without notice

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