

ABSOLUTE AND RELATIVE PRESSURE TRANSMITTER

Process purpose version

TPa-101, TPr-101



- Piezoresistive silicon pressure sensor developed and fabricated in MTM
- Ranges 0-50mbar to 0-100 bar
- User-defined changes and adjustments of measurement range
- Standard outputs 4-20mA or 0-20mA
- Rugged process-purpose design
- Twin unit housing, dividing electric connections from amplifier
- High accuracy, repeatability, long term stability and reliability

APPLICATION

Measurement of absolute and relative pressure in processing and industrial plants. Rugged process-purpose design, IP65 mechanical protection, standard separator connection, quality of material in contact with process fluid, excellent technical and measurement characteristics provide reliable application in control and measurement circuits with standard and severe conditions, with full compatibility with standard automatic regulation and control systems.

STRUCTURE

Diaphragm type central section consists of separating diaphragm, section housing and sensor chip. The diaphragm is fabricated in special stainless steel and its purpose is separation of process fluid from oil fill and the sensor. All the parts of the central section are fully welded to each other and the interior is filled with high quality silicon oil. A circuit for passive temperature compensation of zero and span is also housed in the central section.

Process flange with screw connection and central section body are designed as a single unit.

Measuring chamber consists from the central section with the process flange and the amplifier unit. It is produced in two versions, for pressure ranges below and above 200 bar.

Electronic amplifier, with circuits for thermal compensation of measuring range, sensor supply and conversion of central section voltage signal into standard electric signal 4-20 mA, is manufactured in surface mount technology. Two-wire or three wire electrical connection is intended simultaneously for supply and measurement. Zero and range potentiometers fitted in electronic amplifier provide output signal correction within the factory preset range.

OPERATION

Pressure affects separating diaphragms and oil fill, creating internal pressure in central section which deflects the sensor diaphragm. The deflection causes an unbalance of the Wheatstone bridge (four piezoresistors integrated into the diaphragm edge). The bridge unbalance is detected electronically, the obtained signal is further processed in the electronic amplifier and finally sent to the transmitter output. The output signal is linearly dependent on measured pressure.

CHARACTERISTICS

- Available ranges (0... 50... 100), (0... 100... 500), (0...400... 1000) mbar, (0... 0,8... 2), (0... 1... 5), (0... 4... 10), (0... 8... 20), (0... 15... 50), (0... 40... 100), (0... 80... 200), (0... 180... 400), (0... 350... 600), (0... 500... 1000) bar.
- Two-wire (4-20)mA or three-wire (0-20mA) connection
- Electric output: via screw terminals, through cable conduit PG-13,5.
- Zero suppression: 100% of range
- Elevation: standardly 20% of range
- The measurement range is factory-preset, and the user may perform additional corrections during transmitter operation within the preset range.
- Materials: electronic unit housing Al.Cu5.Mg1.55, diaphragm 316 Stainless Steel, separator housing with process flange Al.Cu5.Mg1.55, carbon steel+gal.Zn or stainless steel. Other materials upon request.
- Process flange R 1/2"-M or NPT 1/2"-M
- Mechanical protection IP65
- Exia IIC T4/T5

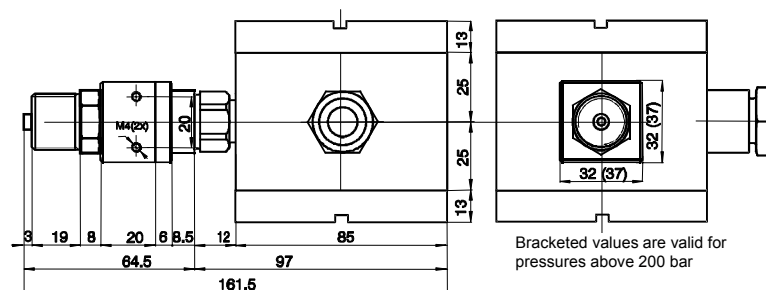


TABLE 1: GENERAL AND OPERATING CONDITIONS

Parameter	Units	Reference conditions	Normal conditions	Limit conditions	Transport conditions
Ambient temperature	°C	20±1	-30 to +80	-40 to +80	-50 to +100
Chamber temperature	°C	20±1	-30 to +80	-40 to +80	-50 to +100
Relative humidity	%	10 to 50	0 to 100	0 to 100	0 to 100
Vibration frequency	Hz			≤500	≤500
Vibration acceleration	9.81 m/s ²			≤2 ¹⁾	≤2 ¹⁾
Vibration amplitude	mm			≤0.21 ²⁾	≤0.21 ²⁾
Shock	9.81 m/s ²			≤100	≤100
Supply voltage	V	24±1	24±1	12 to 36	
Line resistance	Ω	600	600	0 to 1100	

1) Frequency range 60 to 500Hz; 2) Frequency range 10 to 60Hz

MEASUREMENT CHARACTERISTICS

- In accordance with IEC 770/84
- Accuracy (linearity, hysteresis, repeatability), table 2; independent on measuring range.
- Additional effects for minimum (4mA) and maximum (20mA) signal:
 - Power supply effect $\pm 0.01\%$ FS/1V,
 - Line resistance effect, $\pm 0.01\%$ FS/100 Ω .
 - Long term stability $\pm 0.2\%$ FS/1 year.

These effects are independent on measurement range.

- Effects of overload and ambient temperature are dependent on measurement range. They are measured for each transmitter separately and the data are enclosed in the data sheets. For the given measurement range these effects are calculated by multiplying the obtained value with the transmission ratio.

TABLE 2: MEASURING ACCURACY ($\pm\%$ FS)

Class	0.20	0.40	0.60	1.00
Linearity	0.10	0.30	0.40	0.60
Hysteresis	0.05	0.05	0.10	0.20
Repeatability	0.05	0.05	0.10	0.20