

ABSOLUTE AND RELATIVE PRESSURE TRANSMITTER Compact version TPa-110, TPr-110



- Piezoresistive silicon pressure sensor developed and fabricated in MTM
- Ranges 0-4bar to 0-200 bar.
- Standard outputs 4-20mA or 0-20mA
- Compact and economical design, small overall dimensions, low weight.
- High accuracy, repeatability, long term stability and reliability

APPLICATION

Measurement of absolute and relative pressure in machine tools and transportation plants, ship equipment, heating and climatization plants, laboratories, etc.

Compact and economical design, IP65 mechanical protection, choice of material in contact with process fluid, and good technical and metrological characteristics provide its wide application and compatibility with standard automatic regulation and control systems.

STRUCTURE

Diaphragm type central section consists of diaphragm, section housing and sensor chip. The diaphragm is fabricated in special stainless steel and its purpose is to separate 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 the central section housing are designed as a single unit. The whole central section is fabricated in one piece, and its material is stainless steel only. The central section is in the same time the measurement chamber, which makes the whole unit simpler and more reliable.

Electronic amplifier, fabricated in the surface mount technology, supplies sensors and converts its output signal into the standard electric signal. Two or three wire electrical connection at the transmitter output is intended simultaneously for supply and measurement.

The zero and range potentiometers fitted in the electronic amplifier provide additional correction of the manufacturer-preset range in the limits up to $\pm 5\%$.

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... 4... 10), (0... 8... 20), (0... 15... 50), (0... 40... 100) and (0... 80... 200) bar.
- Two-wire (4-20)mA or three-wire (0-20mA) connection
- Electric output is either cable (standard length 2m) or connector.
- Zero suppression: 100% of range
- Elevation: standardly 20% of range
- The measurement range is manufacturer-preset, and the user may perform additional corrections during transmitter operation in the range $\pm 5\%$.
- Materials: electronic unit housing Al.Cu5.Mg1.55, diaphragm 316 Stainless Steel, central section housing and process flange stainless steel. Other materials upon request.
- Process connection M12x1.5, 1/4"R-M or 7/16"UNF
- Mechanical protection IP65

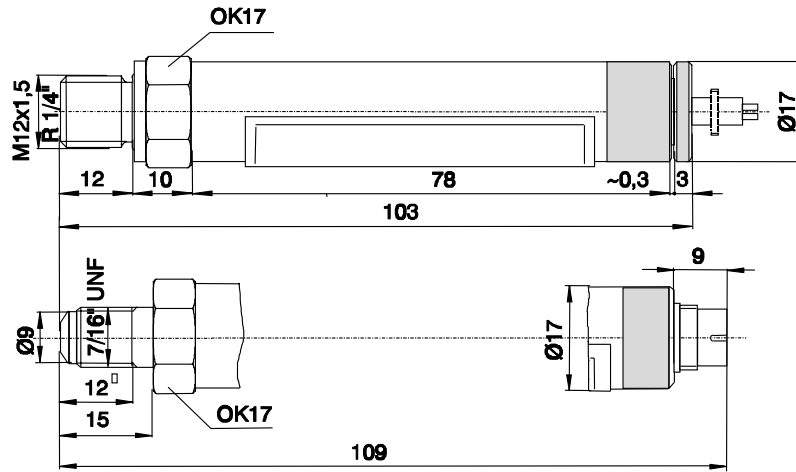


TABLE 1: GENERAL AND OPERATING CONDITIONS

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.

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