

## **ABSOLUTE AND RELATIVE PRESSURE TRANSMITTER WITH DIRECTLY MOUNTED FLAT OR TUBULAR SEPARATOR**

### **Process purpose version TPa-121, TPr-121**



- 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
- Convenient for corrosive and unstable fluids
- High accuracy, repeatability, long term stability and reliability

#### **APPLICATION**

Measurement of absolute and relative pressure in processing and industrial plants with corrosive, very viscous, poisonous and unstable fluids. Transmitter design allows cleaning and flushing of reservoirs or tubing of the process plant without removing the measurement unit.

The variant with tubular separator is used in processes with operating temperature up to 300°C.

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 full compatibility with standard automatic regulation and control systems.

#### **STRUCTURE**

Diaphragm type central section consists of separating diaphragm, separator housing in versions for flat or tubular separator, capillary tube 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.

Measuring chamber consists from the central section with the flat flange compatible to the flange in measuring point. Measuring chambers sizes are in the range DN25/PN40 do DN100/PN40 according to DIN 2635. The standard ASA B.16.5 is applied upon request.

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 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.

When using tubular separator, if the contact temperature of measuring fluid is above 100°C, it is necessary to furnish cooling of oil fill. Cooling may be either natural, by air, or forced, using cooling liquid.

## 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) and (0... 40... 100) 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 seal ring stainless steel, process flange Al.Cu5.Mg1.55 or carbon steel+gal.Zn or stainless steel. Other materials upon request.
- Process connection: flange DN25/PN40, DN32/PN40, DN50/PN40, DN80/PN40 ili DN100/PN40 according to DIN 2635; upon request according to ASA B.16.5.

- Flat separator: DN25/PN40, DN32/PN40, DN50/PN40, DN80/PN40 or DN100/PN40.
- Tubular separator: DN25/PN40, DN32/PN40, DN50/PN40, DN80/PN40 or DN100/PN40, tube lengths 50 mm or 100 mm.
- Mechanical protection IP65

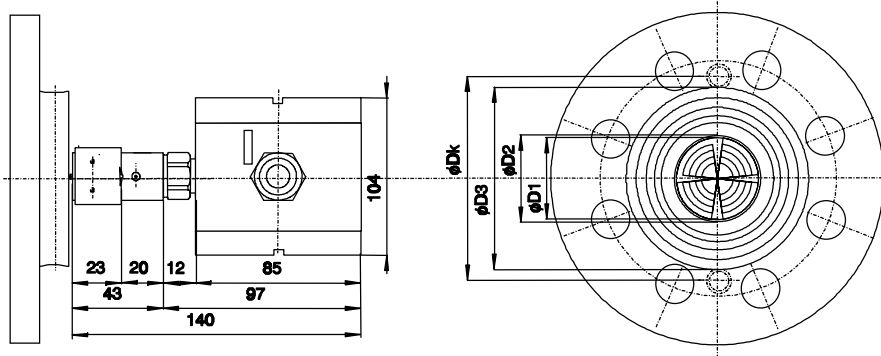


TABLE 1: GENERAL AND OPERATING CONDITIONS

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 <sup>2</sup>			≤2 <sup>1)</sup>	≤2 <sup>1)</sup>
Vibration amplitude	mm			≤0.21 <sup>2)</sup>	≤0.21 <sup>2)</sup>
Shock	9.81 m/s <sup>2</sup>			≤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 $\Omega$ .
  - 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