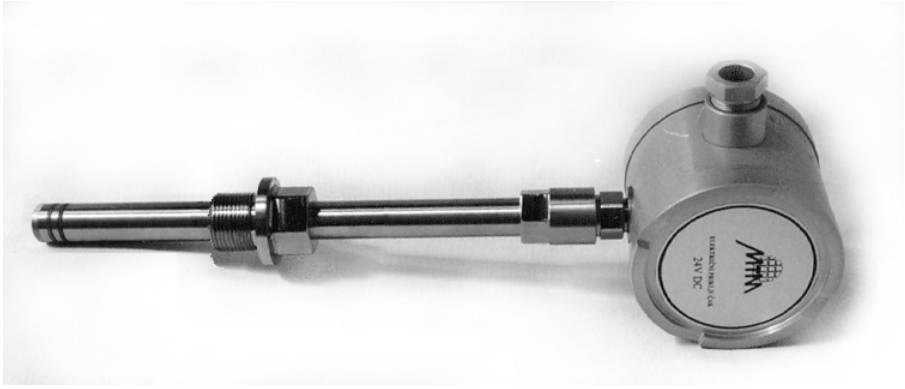
TRANSMITTER OF ABSOLUTE OR RELATIVE PRESSURE AND TEMPERATURE
Process purpose version
TPart-101



- Piezoresistive silicon pressure and temperature sensor developed and fabricated in MTM
- Ranges: temperature (–200^{0}C, 0^{0}C) to (0^{0}C, 120^{0}C), pressure (0...100) mbar to (0... 50) bar
- User-defined changes and adjustments of measuement range
- Standard outputs 4-20mA three-wire electrical connection
- Rugged process-purpose design
- Twin unit housing, dividing electric connections from amplifier
- High accuracy, repeatability, long term stability and reliability

APPLICATION

Simultaneous measurement of absolute or relative pressure and temperature in plants with standard process fluids.
Rugged process-purpose design, IP65 mechanical protection, stadardized process flanges, quality of material in contact with process fluid and excellent technical and measurement characteristics provide reliable application in control and measurement circuits under normal process conditions, with full compatibility with standard automatic regulation and control systems.
Three-wire electrical connection furnishing two continuous standard signals enables us to replace two conventional pressure and temperature transmitters by this one device.

STRUCTURE

Central section consists from the stainless steel measurement chamber fabricated with various optional diameters, a separating diaphragm made from special stainless steel and the welded sensor chip structure with temperature and pressure sensor, while the interior is filled with silicon oil.
Measurement chamber consists from the central section, the external tube housing with optional diameters and measurement chamber tube mounts with the screw process flange welded to the chamber housing. Central section is connected by a screw to the housing of the measurement chamber. The connection is made airtight by the use of Loctite glue. At the bottom of the measurement chamber a protective plug is situated with welded filter mesh, easy to remove in order to clean it or replace it.
Electronic amplifier, fabricated in the surface mount technology, supplies pressure and temperature sensors and converts their output signal into the standard electric signal. Three-wire electrical connection at the transmitter output is intended simultaneously for supply and measurement. Zero and range potentiometers fitted in electronic amplifier provide output signal correction within the factory preset ranges for pressure and temperature.

OPERATION

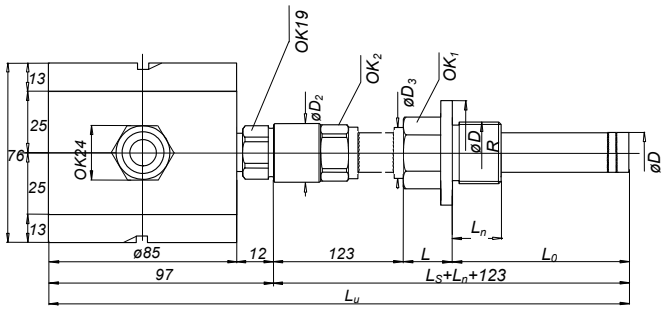
The temperature of the measured fluid is conducted through the central section and the separating membrane, causing a change of resistivity of a special resistor built by planar technologies into the chip containing a Wheatstone bridge for pressure sensing. The measured pressure is transferred via the separating membrane and the oil fill and 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 signals are further processed in the electronic amplifier and finally sent to the transmitter output. Thus one of the output signals is linearily dependent on measured fluid temperature, and the other one on pressure.

CHARACTERISTICS

- Available ranges: temperature (–200...–100...0), (–100...–50...0), (–50...–25...0), (–25...0...+50), and (0...50...120) ^{0}C, pressure (0... 100... 500) mbar, (0... 0.4... 1), (0... 0.8... 2) (0... 1... 5), (0... 4... 10), (0... 8...20), (0... 15... 50) bar.
- Three-wire connection 2x (4-20)mA.
- Electric output via screw terminals, through cable conduit PG-13,5.
- Zero suppression: 100% of range for both signals.
- Elevation: standardly 20% of range for both signals.
- The measurement ranges are manufacturer-preset, and the user may perform additional corrections during transmitter operation within the preset range.
- Materials: electronic unit housing Al.Cu5.Mg1.55, measurement chamber 316 stainless steel, measurement chamber housing Al.Cu5.Mg1.55, separating membrane 316 stainless steel, central section housing and process flange

stainless steel with galvanic Zn or 316 stainless steel. Other materials upon request.

- Measurement chamber housing diameter ∅13.5, ∅17 ili ∅21.
- standard lengths of measurement chamber 80, 100, 160, 200, 250, 360 i 400.
- Process connection R3/4" or 3/4" NPT-M for ∅17, R1" or 1"NPT-M for ∅21.
- Mechanical protection IP65



C	21	1"	41	32	32	27	27	32
B	17	3/4"	32	27	25	22	22	21
A	13.5	1/2"	27	22	25	17	17	16
Var.	D	R	D_1	OK_1	D_2	OK_2	D_3	L_n

C	112	132	192	232	282	392	432
B	101	121	181	221	271	381	421
A	96	116	176	216	266	376	416
Var.	80	100	160	200	250	360	400
	L_S for standard lengths						

C	364	384	444	484	534	644	684
B	342	362	422	462	512	622	662
A	332	353	412	452	502	612	652
Var.	80	100	160	200	250	360	400
	L_u for standard lengths						

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	–200 to 120	–200 to 120	–200 to 120	-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/s²			≤2[1)]	≤2[1)]
Vibr. amplit.	mm			≤0.21[2)]	≤0.21[2)]
Shock	9.81 m/s²			≤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

Operating conditions for measurement fluid:

- Temperature max. 120^0C
- Pressure max. 50 bar
- Permitted gas flow velocity 12 or 15 m/s for measurement probe diameters ∅17 or ∅21, respectively.
- Water flow velocity 2.5, 3.5 m/s for measurement probe diameters ∅17 or ∅21, respectively.

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 for both measured quantities are:
  - Power supply effect ±0.01% FS/1V,
  - Line resistance effect, ±0.01%FS/100Ω.
  - Long term stability ±0.2%FS/1 year.

These effects are independent on measurement range.

- Effects of overtemperature and temperature of the ambient around the amplifier are dependent on measurement ranges of temperature and pressure. They are measured for each transmitter separately and the data are enclosed in the data sheets. For the given measurement ranges these effects are calculated by multiplying the obtained values with the transmission ratio.

TABLE 2: MEASURING ACCURACY (±% 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