Pressure measuring transducer

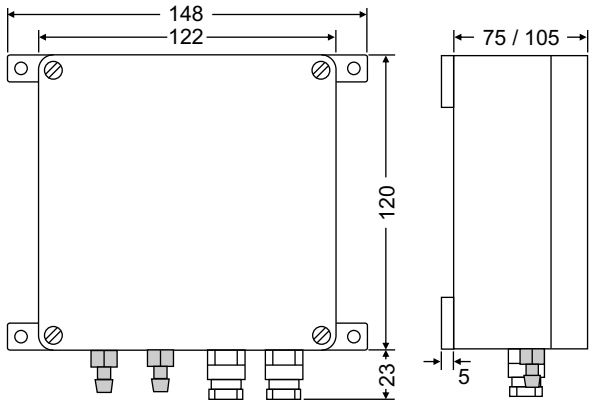
General: When mounting, initiating and operating this transducer the safety precautions and regulations have to be observed. Only staff with a corresponding qualification should work with the transducer. A non-observance of the safety regulations may cause serious injuries and/or damages. Check before initial operation the suitability of the transducer for this area of application. The technical data of this manual have to be followed.

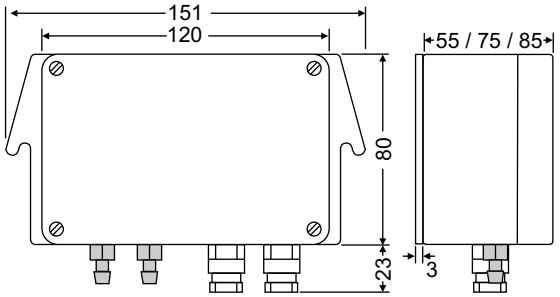
Documentation

The following documents are available for the pressure measuring transducer:

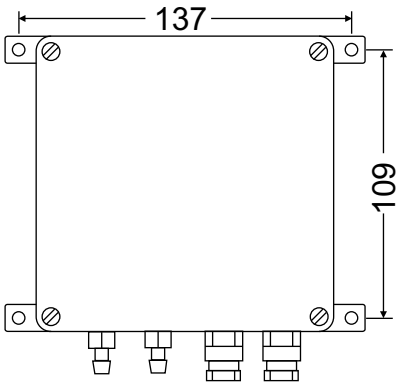
NDR: data sheet
NDR-M: this manual
NDR-S-M: Calibration instructions for standard model
NDR-R-M: Calibration instructions for model with square root output
NDR-Z-M: Calibration instructions for 2-wire model
NDR-G-M: Calibration instructions for model with limit contacts

Dimensions

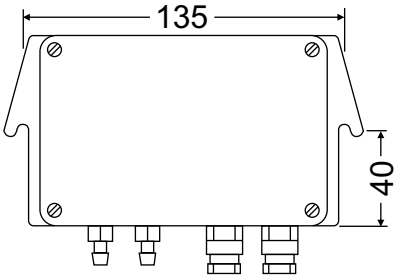




Mounting



4 mounting holes for srews up to 4,5 mm



2 mounting strips for screws up to 4,5 mm

Notes for transportation and storage

The sensors can be stored within a temperature range of -10...+70°C.

For transportation or return of differential pressure sensors take care, that the both pressure inputs are still open.

If absolute pressure sensors are flown, cabins with pressure compensation have to be used.

General

NDR pressure sensors are used for the measurement of very low and difference pressure. A sensitive membrane made of CuBe and matched to the pressure range is used to measure the pressure. The membrane system is sensed with an inductive system without influence. The pressure sensors are suitable for non-aggressive gases. An Ex approval is not existing.

Calibration

The pressure sensors are calibrated in the factory. If necessary, a recalibration has to be done according to the calibration instructions.

Mounting

The pressure sensors are fastened on the desired location by using the mounting holes or mounting straps. Avoid mounting right next to sources of interference (transformer, electric motor, transmitter) and heat sources. In situ shocks and vibrations can falsify the output signal. It's avisable to mount the sensor horizontal, that means the pressure connections are pointing down. The sensors are calibrated in the factory for this fitting position. Mounting this way prevents the going in of possible condensate of the pressure pipes into the sensor.

Note

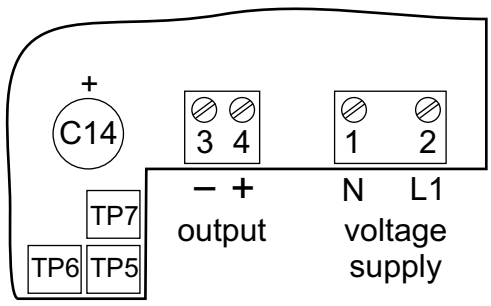
For the correct and safe use of the sensor the VDE (or similar associations) safety precautions for working with mains voltage have to be observed, as well as the the regulations of the employer's liability insurance association concerning the working with electric devices and installations.

Putting into operation

General

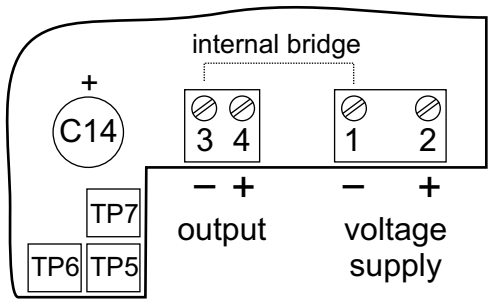
For startup the sensor has to be uncovered. The electrical connection is made with terminals. Take care when connecting the voltage supply! Never connect the voltage supply to the output terminals. Devices with DC power supply have a reverse battery protection. The output signal of the sensor is short circuit-proof.

Connection (alternating voltage (AC), 4-wire system)



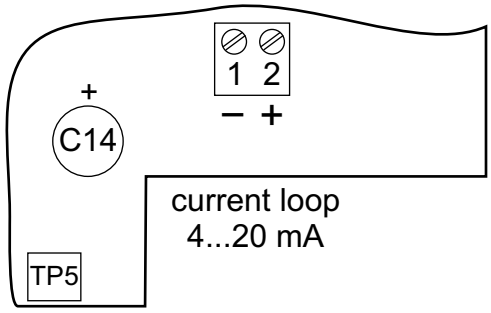
Mains voltage see type plate on device.	
Supply AC:	terminal 1: N terminal 2: L1
Output:	terminal 3: - (⊥ reference potential) terminal 4: + (current or voltage)

Connection (direct voltage (DC), 3-wire system)



Mains voltage see type plate on device.	
Supply DC:	terminal 1: –(⊥ reference potential) terminal 2: + DC
Output:	terminal 3: –(⊥ reference potential) terminal 4: + (current or voltage)
Terminals 1 and 3 are interconnected internally	

Connection (direct voltage (DC), 2-wire system, current loop)



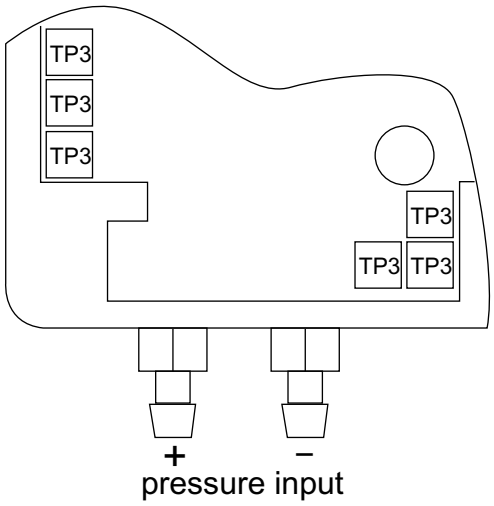
Range of voltage 12...32 VDC, smoothed
Versorgung DC: Klemme 1: – (⊥ Masse)
Klemme 2: + DC

Notes for start up

After the voltage supply is applied (pressure input open), the output signal can be measured. When there is a deviation from the desired value, 2 things have to be taken into consideration:

- The warm-up time of the sensor is about 1 hour. After this period the the sensor signal should be stable for zero differential pressure and constant ambient conditions.
- For small pressure ranges there is a measurable, physically conditioned shift of zero point (reason: influence of situation). This error of measurement can be adjusted after warm-up time with the potentiometer for zero point (TP1) by setting the output signal to the setpoint (pressure inputs have to be open).

Connection pressure input



Differential pressure:
positive pressure to hose connection “+”
negative pressure to hose connection “-”

Positive overpressure:
pressure to hose connection “+”
hose connection “-” kept open

Negative overpressure:
pressure to hose connection “-”
hose connection “+”kept open

Absolute pressure: For this kind of pressure there is only one connection

Please do not blow into the pressure input. Measuring cells up to 100 hPa can be damaged or destroyed, when doing this.

Technical data

Measuring range (input)

For differential pressure, positive and negative overpressure:
0,1 / 0,2 / 0,3 / 0,4 / 0,5 / 0,6 / 1 / 1,6 / 2,5 / 4 / 5 / 6 / 10 / 16/ 20 / 25 / 50 / 100 / 160 / 200 / 250 / 400 / 500 / 600 / 1000 hPa (mbar)
Measuring ranges <2,5 hPa will have a surcharge

For absolute pressure:
900...1100 / 800...1200 / 0...1000 / 0...500 hPa (mbar)

Other measuring ranges on request

Output

Analog: 0...10 V (load ≥2kohms)
0(4)...20 mA (load ≤500 ohms) (optional)
4...20 mA, 2-wire (U_B = 12...32 VDC,
load(ohms) = U_B -12/I_{max})
±5 V or ±10 V / load: ≥2 kohms

Option: square root output signal (0...10 V / 0(4)...20 mA)
Voltage: U = $\sqrt{(10 \times U_L)}$ Current: I = $\sqrt{(20 \times I_L)}$ (U_L/I_L=linear output)

Option: Limit contacts
(1 or 2 relay, changeover contacts, 6A 230 VAC)

Accuracy

Linearity:	± 1% of end scale value (FS)
	± 0,5% FS (optionally)
	differential pressure: ≥1hPa
	absolute pressure:ΔP ≤200 hPa
	± 0,2% FS (optionally)
	differential pressure: ≥2,5 hPa
	absolute pressure: ΔP ≤100 hPa

The options are not available with square root function

Hysteresis:	±0,1% FS maximum
Temp. drift:	Zero: ±0,3% FS, 10 K maximum
	Span: ±0,3% of end scale value / 10 K (maximum)
Stability:	±0,5% per year, typically (long term)
Time constant:	T_{90} approx. 0,02 s
Auto zero:	ranges <0,5 hPa: standard
	other ranges: optionally

Display

Option:	LCD indicator, 3½ digits

Power supply

Voltage:	19...31 VDC
	230 / 115 / 24 VAC; (±10%, 50/60 Hz) (option)
Consumption:	approx. 10 mA without load
	auto zero: approx. 50 mA
	limit contacts: approx. 35/45 mA
Protection:	interference protection and filter elements (option)
Fuse:	250 mAT
Influence:	<0,05%

Ambient conditions

Operating temperature:	+10...+50°C
	-10...+60°C (extended range) (option)
Storing:	-10...+70°C
Humidity:	up to 80% relative humidity
Medium:	non-aggressive gases
Parts in contact with medium:	Ni, Al, CuBe, PU

Mechanics

Material case:	ABS
Dimension case:	see table page 1
Pressure terminal:	Ø 6,6 x 11 mm (for flexible hose Ø = 6 mm)
Protection:	class II, IP 54
Weight:	approx. 300 g, with power unit approx. 400 g
Connection:	terminal screw (maximum 1,5 mm²)
	via screwed cable gland M12x1,5
Overload capacity:	range up to 400 hPa: 5x
	range >400 hPa: 2x
	ΔP: maximum system pressure 1 bar
Option:	up to 2 bar
Principle:	inductive (measurement)
Shock resistance:	10 g
Volume of sensor:	approx. 3 ml
Increase in volume:	approx. 0,2 ml (nominal pressure)

Standards: EN50081-1 + 2 / EN 50082-1 + 2 / EN 16010