# Operating Instructions


**NDR - Pressure Measuring Transducer**

## NDR

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# 1 General

## 1.1 For Your Information

- These operating instructions contain important information on handling the NDR measuring transducer. Working safely requires that all safety instructions and work instructions are observed.
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the sensor and readily accessible to skilled personnel at any time.
- Observe the relevant local accident prevention regulations and general safety regulations for the sensor‘s range of use.
- If the serial number gets illegible (e. g. by mechanical damage), retraceability of the device becomes impossible.
- The pressure measuring transducer NDR described in this manual is carefully designed and manufactured using state-of-the-art technology. Every component undergoes strict quality inspection in all stages of manufacture.
- The manufacturer‘s liability is void in the case of any damage caused by using the product contrary to its intended use, non-compliance with these operating instructions, unauthorised modifications to the NDR or assignment of insufficiently qualified skilled personnel.

## 1.2 Signs and Abbreviations


**Warning!**
Noncompliance can cause injuries to persons and/or the demolition of the device.
There can be a danger to life.

**Attention!**
Noncompliance can cause a faulty operation of the device or lead to property damage.

**Information!**
A noncompliance can have influence on the operation of the device or cause unintentional reactions of the device.


**Danger!**
Failure to comply to the safety instructions risks serious or fatal injury caused by electrical power.

# 2 Transport, Packaging, Storage

## 2.1 Transport

Check the device for any damage that may have been caused during transportation. Report obvious damage at once.

NDR pressure transducers with differential measuring ranges have to be transported with both pressure inputs open.

NDR pressure transducers with absolute pressure measuring ranges carried as air cargo have to be transported inside pressurized cabins.

## 2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, returns).

## 2.3 Storage

Warning

**Warning!**
Please remove all rest media before storing the device after operation. Please note for NDR with option for corrosive gases: This is especially important if the media are hazardous materials. Examples for hazardous materials: Corrosive, toxic, radioactive media and carcinogens.

Attention: Please ensure compliance to safe environmental conditions. See page 14.

For longer term storage avoid the following influences:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (rough deployment)
- Soot, vapour, dust and corrosive gases
- Damp or wet environment
- Hazardous areas, ignitable atmosphere

If possible store the device in its original package or an equivalent one

# 3 Safety Instructions

Warning

Before installation, start-up and operation select the appropriate pressure transmitter in terms of function and equipment.
**Noncompliance can cause heavy injuries and/or damage!**

Warning

**Open the process connections only when unpressurized!**
Attention: Please comply with the performance parameters as per chapter *7 Technical Data*.

More safety instructions can be found in the individual chapters.

## 3.1 Intended Use of the Product

The device has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the device outside of its technical specifications requires the device to be taken out of service immediately and an inspection by the manufacturer.

When the device is transported from a cold into a warm environment, the formation of condensation may cause the device to malfunction. Before putting it back into operation, wait for the device temperature and the room temperature to equalise.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

## 3.2 Personnel Qualification


**Risk of injury if qualification is insufficient**

Improper handling can result in considerable injury and damage to equipment.

- The activities described in these operating instructions may only be carried out by skilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

For installation and start-up of the NDR the personnel has to be familiar with the relevant regulations and directives of the country and must have the required qualification. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can independently recognise potential hazards. Depending on the operational conditions they need to have the corresponding knowledge, e.g. of aggressive media.

## 3.3 Special Hazards


Please comply with your country-specific norms and regulations. In the case of special applications, please comply with the relevant norms and regulations.
**Noncompliance can cause heavy injuries and damage!**


Hazardous materials like corrosive gases make it necessary to comply with relevant regulations beyond the general rules.


Rest media in dismantled pressure transducers can be hazardous to persons, the environment and the installation.
**Use sufficient safety measures!**


A protection from electrostatic discharge (ESD) is required.
The proper use of grounded work surfaces and personal wrist straps is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.


There is a danger of death caused by electric current.
Upon contact with live parts, there is a direct danger of death.

Electrical instruments may only be installed and connected by skilled electrical personnel.

Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening voltages at the device.


Do not use this instrument in safety or emergency stop devices. Incorrect use of the device can result in injury.

# 4 Start-Up, Operation

## 4.1 Function

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 does not exist.

The valid pressure range for the pressure transmitter NDR can be found on the product label.

An option for corrosive gases is available. See data sheet.

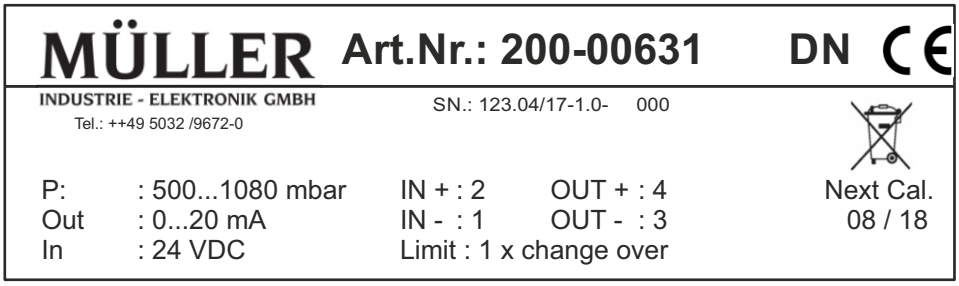
## 4.2 Before Mounting

- Check if the supplied NDR has been assembled completely.
- Inspect the sensor for potential damage accrued during transportation. If obvious damage can be found, inform the transport company and supplier immediately.
- Keep the packaging to ensure optimal protection during transportation.
- Make sure to keep the mounting thread and the connection contacts from being damaged.

**Warning**

Attention: Read the operating instructions before mounting and start-up of the device!

## 4.3 Product Label (Example)



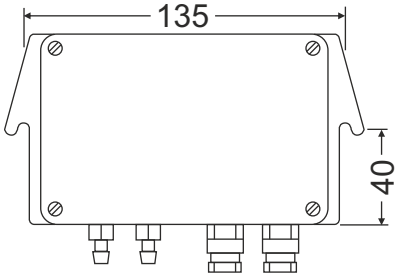

Art.Nr.: Article number

SN : Serial number

## 4.4 Mounting

- Check the shipment on completeness and visible defects immediately after receiving the device.
- If parts are missing or visible defects are detected, immediately inform the transport company and the supplier.

## 4.4 Mounting (Continued)




2 mounting strips for screws up to 4,5 mm

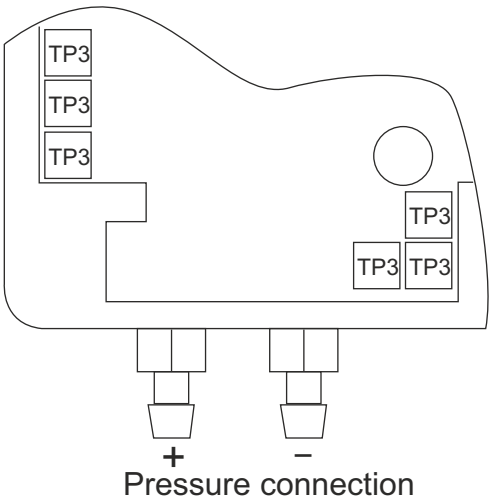
Mount the pressure transducer using the two mounting links at the sides. Avoid the proximity of interference (transformer, motors, etc.) and heat sources. Shocks and vibrations at the site of installation can corrupt the output signal.

Appropriate mounting should be done in vertical position, with pressure connections pointing downwards. The sensors are calibrated for this mounting position as a factory preset. This mounting position can also prevent condensed moisture from intruding into the sensor over the pressure lines.

### Mounting Process Connection

**!** Attention: Please don‘t blow into the pressure connections. Measuring cells smaller than 100 hPa can be destroyed by lung pressure.

Connect measuring pressure to input „+“. See illustration below. Please note: NDR pressure transducers with absolute pressure ranges only have one pressure connection.




Pressure connection

**Differential pressure:**
positive measurement pressure at connection “+”
negative measurement pressure at connection “-”

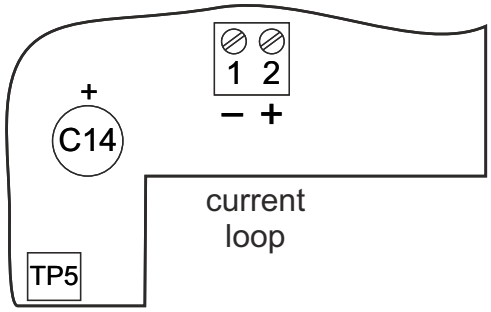
**Positive overpressure:**
Measurement pressure at connection “+”
Connection “-” remains open

**Negative overpressure:**
Measurement pressure at connection “-”
Connection “+” remains open

**Absolute pressure:**
Only one pressure connection available.

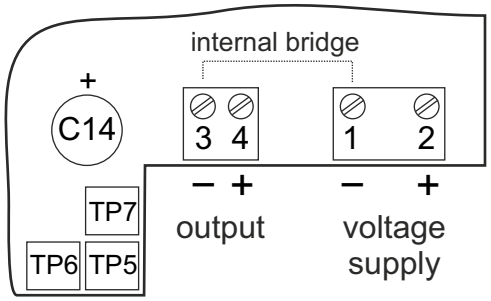
## 4.5 Electrical Connection and Start-Up

**Connection** 2-wire system( VDC, current loop)



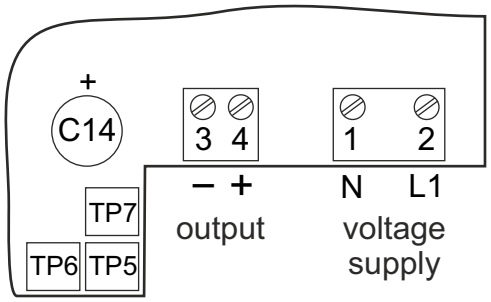

| | |
|---|---|
| Voltage range: | 12...32 VDC, smoothed |
| Supply DC: | Terminal 1: - (0 / grounding)<br>Terminal 2: + DC |

**Connection** 3-wire system (VDC)




| | |
|---|---|
| Supply range see product label on device | |
| Supply DC: | Terminal 1: - (0 / grounding)<br>Terminal 2: + DC |
| Output: | Terminal 3: - (0 / grounding)<br>Terminal 4: + (current or voltage) |
| Terminals 1 and 3 are internally connected | |

**Connection** 4-wire system (AC)




| | |
|---|---|
| Supply range see product label on device | |
| Supply AC: | Terminal 1: N<br>Terminal 2: L1 |
| Output: | Terminal 3: - (0 / grounding)<br>Terminal 4: + (current or voltage) |

To begin start-up, remove sensor cover. The electrical connection is done by using wiring terminals. Connect the terminals according to the connection diagram refering to your system. (See above for connection diagrams.)

Do not connect to the output terminals when applying supply voltage. Devices with direct current supply have a reverse voltage protection. The output signal of the sensors is short-circuit proof. The output signal can be measured after applying voltage supply. A deviation of the output signal can be caused by:

1) The sensor has a break-in period of ca. 1 hour. After break-in time the sensor signal has to stay stable when at differential pressure „zero“ and under a constant environmental temperature.

2) For small measurement ranges, the influence of shifting positions can cause a noticeable zero-point shift. This error can be corrected after the break-in period of the sensor by setting the potentiometer (zero-point; when pressure inputs are open, the output signal of the sensor has to be set to a set value).

For other deviations, see chapter 5 *Error Detection*.

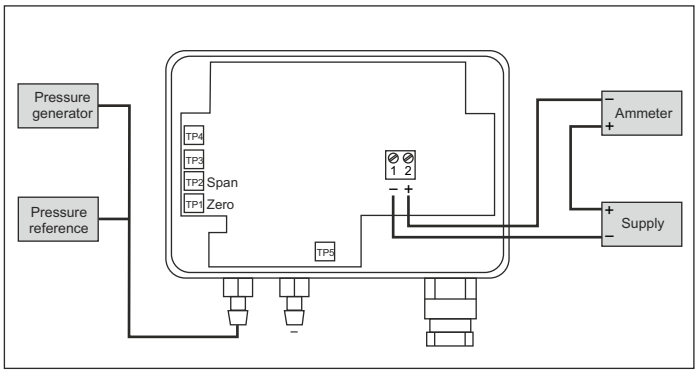
## 4.6 Calibration

The pressure measuring transducer NDR is calibrated at factory. If recalibration is necessary, please follow this calibration instruction.

**Tools / resources for calibration:**

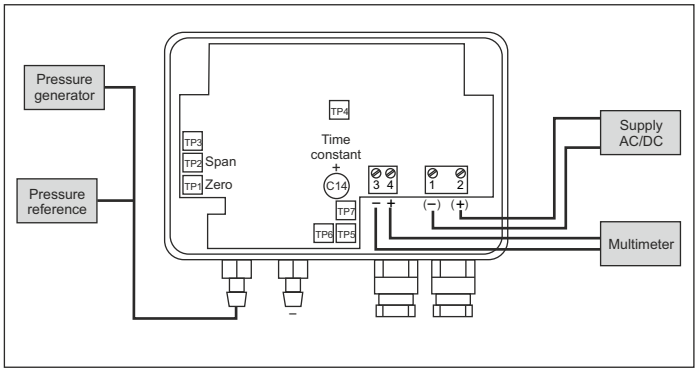
| | |
|---|---|
| **Pressure source:** | e. g. pump, bellows |
| **Pressure reference:** | e. g. precision manometer, digital manometer |
| **for absolute pressure:** | absolute pressure reference |
| **Supply:** | depending on type/version of transducer (see product label) |
| **Measuring instrument:** | multimeter to measure the output signal (current/voltage) |

**Calibration** 2-wire system




- Connect supply (and measuring instrument, e. g. ammeter) to terminals 1 and 2.
- Wait for 1 hour break-in period to run through.
- For zero point adjustment, all pressure inputs have to be open. Use the trimmer TP1 to set the display value of the measuring instrument to 0 Volt (for current output 0(4) mA).
- For amplitude adjustment, apply absolute pressure to the pressure input. The pressure should have the value you want to be equivalent to an output signal of 20 mA. Use the trimmer to set the display value of the instrument correspondingly.

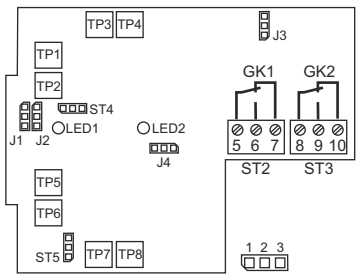
**Calibration** 3- and 4-wire system




- Connect supply to terminals 1 and 2.
- Connect multimeter for measuring the output signal (current or voltage) to terminals 3 and 4.
- Wait for 1 hour break-in period to run through.
- For zero point adjustment, all pressure inputs have to be open. Use the trimmer TP1 to set the display value of the multimeter to 0 Volt (for current output 0(4) mA).
- For amplitude adjustment, apply nominal pressure (by using a T-piece) to the pressure source, pressure reference and pressure connection of the sensor. Use the trimmer TP2 to set the display value accordingly.

## 4.6 Calibration (Continued)

**Calibration** limit contacts system




**Legend**

| | |
|---|---|
| **GK1:** | limit contact 1 |
| **GK2:** | limit contact 2 |
| **TP1:** | potentiometer for GK1 |
| **TP2:** | potentiometer for hysteresis GK1 |
| **TP3:** | potentiometer for rise-delay time GK1 |
| **TP4:** | potentiometer for turn off delay time GK1 |
| **TP5:** | potentiometer for GK2 |
| **TP6:** | potentiometer for hysteresis GK2 |
| **TP7:** | potentiometer for rise-delay time GK2 |
| **TP8:** | potentiometer for turn off delay time GK2 |
| **J1:** | jumper for positive or negative pressure range GK1 |
| **J2:** | jumper for positive or negative pressure range GK2 |
| **J3:** | jumper for relay function GK1 |
| **J4:** | jumper for relay function GK2 |
| **ST4:** | pins to connect a digital multimeter to adjust GK1 |
| **ST5:** | pins to connect a digital multimeter to adjust GK2 |
| **LED1:** | light emitting diode for GK1 |
| **LED2:** | light emitting diode for GK2 |

Adjustability of the limit contacts:
0...100% of end scale value

Switching hysteresis adjustable:
1...99% of the limit value setting

Output per limit contact:
1 changeover contact (potential free)

Contact load:
6 A / 230 VAC

- To adjust limit contacts, first apply supply voltage according to product label of sensor.
- For “±” measuring ranges (eg ±100 hPa) the switching range has to be defined with jumper J1 (J2 for GK2) first. If the jumper J1 (J2 for GK2) is put on pin 1 and 2, the limit contact switches in the positive pressure range. If the limit contact is required to switch in the negative pressure range, the jumper has to be put on pin 2 and 3.
- With jumper J3 (J4 for GK2) the relay function can be inverted.
- Adjustment for maximum limit contact:
  - jumper on Pin 2 and 3
- Adjustment for minimum limit contact:
  - jumper on Pin 1 and 2
- The limit contacts can be adjusted using a digital multimeter. For that the voltage is measured between pin 1 and 3 of pin plug ST4 (ST5 for GK2) with eg test prod. The measuring range of 0...100% corresponds to a voltage range of 0...1,00 V. If e. g. a switching value of 50% is required, with potentiometer TP1 (TP5 for GK2) a voltage value of 0,50 V is adjusted. For “±” pressure ranges 100% measuring ranges corresponds to a voltage range of 1 V.

  Examples:
  Pressure range 0...+3 hPa:
  corresponds to a voltage range of 0...+1 V

  Pressure range -3...+3 hPa
  corresponds to a voltage range of -0,5...+0,5 V

  Pressure range -2...+8 hPa
  corresponds to a voltage range of -0,2...+0,8 V
- The switching hysteresis for GK1 has to be adjusted with potentiometer TP2 (TP6 for GK2). For that the voltage is measured between pin 1 and 2 of ST4 (ST5 for GK2). A switching hysteresis of eg 10%, referring to a voltage of 0,50 V of the switching value, means that with potentiometer TP2 (TP6 for GK2) a voltage of 0,45 V has to be adjusted.
- When the pressure reaches the adjusted value the relay responds and LED1 (LED2 for GK2) illuminates.
- With potentiometer TP3 (TP7 for GK2) it is possible to adjust a rise-delay time between 0 and 10 s for GK1. At the left limit stop of the potentiometer the rise-delay time amounts to 0 s, at the right limit stop approx. 10 s.
- With potentiometer TP4 (TP8 for GK2) it is possible to adjust a turn off delay time between 0 and 10 s for GK1. At the left limit stop of the potentiometer the turn off delay time amounts 0 s, at the right limit stop approx. 10 s.

## 4.6 Calibration (Continued)

The adjustment of the limit contacts can also be done with a pressure calibrator. First, the potentiometers for the time factors TP3 and TP4 (TP7 and TP8 for GK2) have to be put to left limit stop, in order to have all time function elements with 0 s. Then change the output of the pressure calibrator to the required switching value.

Turn potentiometer TP1 (for GK1) or TP5 (for GK2) until LED1 (GK1) or LED2 (GK2) illuminates.

Now change the output of the pressure calibrator to that pressure where the relay has to be released. Turn potentiometer TP2 (for GK1) or TP6 (for GK2) until LED1 (GK1) or LED2 (GK2) goes dark.

The adjustment of the delay times works as described on page 10.

## 4.7 Function Test

The output signal must be proportional to the pressure. If this is not the case, it can be a sign of a wrong mounting position or a bad adjustment. Please read under chapter 5 *Error Detection* for a solution.

## 5 *Error Detection*

Warnung

- Only the manufacturer is allowed to conduct repairs.

- Do not use any pointed or hard objects for cleaning to prevent damage to the electrical contacts.
- Verify in advance if the right voltage supply has been chosen.

Warnung

**Attention!**

If faults cannot be eliminated by using the measures listed on this page, take the pressure transducer out of service immediately and ensure there is no signal and no pressure at the device.

Protect the device against accidental start-up and contact the manufacturer.

If a return becomes necessary, please observe the instructions in chapter 6.3 *Return.*

| Fault | Possible Cause | Measure |
|---|---|---|
| Not output signal | Cable break | Control passage |
| | No/wrong supply voltage | For correct supply voltage see product label or manual |
| No/wrong output signal | Connection error | Control connections |
| Steady output signal during pressure changes | Overpressure causes mechanical overload | Replace sensor / if repeated failure occurs, contact manufacturer |
| Signal span too small / falling | Overpressure causes mechanical overload | Replace sensor / if repeated failure occurs, contact manufacturer |
| | CuBe-membrane damaged / no transmission medium | Replace sensor / if repeated failure occurs, contact manufacturer |
| Output signal does not conform to expectations | Pressure sensor not suitable or defect | Select correct sensor or replace defect device |
| Signal span fluctuates / is imprecise | EMC-interference sources in proximity, e. g. converter | Shield sensor, shield cable, remove interference source |
| | Operating temperatures too high / too low | Comply with valid temperatures as per manual |
| | Device not grounded | Control grounding connections of device |
| Deviating zero point signal | Operating temperatures too high / too low | Comply with valid temperatures as per manual |
| | Deviating mounting position | Correct zero point |
| | Overload-limit exceeded | Reduce pressure |

Note: In case of unjustified reclamation an additional charge is possible.

Make sure that the unit is working properly after modifications. In case the error continues to exist send the instrument for reparation (or replace the unit).

Returned goods: Purge / clean dismounted instruments before returning them in order to protect the environment and people from any hazard caused by adherent remaining media.

## 6 Maintenance, Dismounting, Return, Cleaning, Disposal

### 6.1 Maintenance

- The NDR pressure transducers are maintenance-free.
- Only the manufacturer should carry out repairs.

### 6.2 Dismounting

Create dead voltage condition on device. Disconnect electrical connections. Use chapter 4.4 in reversed order.

### 6.3 Return

Warning

Before returning the device, follow the instructions in chapter 6.4.

To return a device, use the original packaging or something comparable.

To protect against damages, use anti-static foil, insulating material or identification as sensitive measurement equipment.

Please make sure NDR pressure transducers with differential measuring ranges have both their pressure inputs open for transport.

NDR pressure transducers with absolute pressure measuring ranges carried as air cargo have to be transported inside pressurized cabins.

### 6.4 Cleaning

Clean the device regularly to prevent dust formation on device. The electrical contacts need to stay dry and clean!

Warning

Rest media in dismounted devices can represent a danger to people, the environment and the facility.

Please take sufficient security measures!

Property damage!
Abrasive agents or aggressive solvents can damage the contacts.

- Power down and create dead voltage condition on the device before cleaning.
- Use only a soft, moist piece of cleaning cloth for cleaning.
- Do not use pointed, sharp or hard objects for cleaning. The CuBe-membrane of the process connection can be damaged.
- Clean the device before returning. All rest media sticking to the device have to be removed!

### 6.5 Disposal

Dispose device components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the NDR is supplied.

Collect electrical and electronic parts separately. Separate metals and plastics. Dispose of printed circuit board assemblies professionally.

## 7 Technical Data

### Pressure Input

Positive / negative overpressure,
Differential pressure: 0...0,1 hPa up to 0...1000 hPa
Absolute pressure: 0...500 up to 800...1200 hPa
Ranges: see tables page 15

### Output

| | | |
|---|---|---|
| 0...20 mA: | Load: | ≤ 500 Ω |
| 4...20 mA[1]: | Load: | ≤ 500 Ω |
| ±10 V: | Load: | ≥ 2 kΩ |
| ±5 V: | Load: | ≥ 2 kΩ |

Special options:

| | |
|---|---|
| Square root output signal[2]: | 0...10 V |
| Square root output signal[2]: | 0(4)...20 mA |
| 0...20 mA: | 3-wire, 4-wire |
| 4...20 mA: | 2-wire |
| Limit contacts: | 1 or 2 relay, changeover contacts, 6A 230 VAC |

Important notes:
1.) Voltage of square root output signal is: U = (10 x UL) Current: I = (20 x IL) (UL/IL=linear output)
2.) An output of 4...20 mA is incompatible with measurement ranges using non-zero starting points

### Supply

| | | |
|---|---|---|
| Version: | 2-wire / 3-wire / 4-wire (special model option) | |
| Standard: | 24 VDC | |
| Options: | 19...35 VDC (Note: For 2-wire version 12...32 VDC) | |
| | 230 VAC | |
| | 115 VAC | |
| | 24 VAC | |
| Consumption: | approx.10 mA without load | |
| | auto zero: | approx. 50 mA |
| | limit contacts: | approx. 35/45 mA |

### Accuracy

| | | |
|---|---|---|
| Linearity: | Standard: | ±1% of end scale value (FS) |
| | Options: | for positive/negative overpressure and differential pressure: |
| | | ±0,5% FS < 1 hPa |
| | | ±0,2% FS < 2,5 hPa |
| | | for absolute pressure: |
| | | ±0,5% FS ΔP < 200 hPa |
| | | ±0,2% FS ΔP < 100 hPa |

Note: 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: | T90 approx. 0,02 s |

### Environmental Conditions

| | | |
|---|---|---|
| Operating temperature: | Standard: | +10...+50°C |
| | Option: | -10...+60°C (extended range) |
| Storing: | -10...+70°C | |
| Humidity: | up to 80% relative humidity | |
| Material: | Standard: | non-corrosive gases |
| | Option: | stainless steel version for corrosive gases |
| in contact with medium: | Ni, Al, CuBe, PU | |

## 7 Technical Data (Continued)

### Display

| | |
|---|---|
| Standard: | No |
| Option: | LC-display, 3.5 digits |

### Mechanics

| | | |
|---|---|---|
| Dimensions: | see page 3 | |
| Material casing: | Standard: | ABS |
| | Option: | stainless steel |
| 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 nominal pressure |
| | range > 400 hPa: | 2x nominal pressure |
| | 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 and guidelines:

| | |
|---|---|
| 2014/35/EU: | Low voltage directive |
| 2014/30/EU: | EMC directive |
| 2011/65/EU: | RoHS directive |
| DIN EN 61326-1:2013: | Electr. equip. for measurement, control and laboratory use -EMC req.- Part 1 |
| DIN EN 61000-3-2:2014: | Electromagnetic compatibility (EMC) - Part 3-2 |
| DIN EN 61000-3-3:2013: | Electromagnetic compatibility (EMC) - Part 3-3 |
| DIN EN 50581:2012: | TD for the assessment of electr. and electronic products with respect the restriction of hazardous substances |

### Pressure Ranges

**Table positive / negative overpressure, differential pressure (in hPa)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Measurement range | 0...0,1 | 0...0,2 | 0...0,3 | 0...0,4 | 0...0,5 | 0...0,6 | 0...1,0 | 0...1,6 |
| Overload limit | 0,5 | 1 | 1,5 | 2 | 2,5 | 3 | 5 | 8 |
| Measurement range | 0...2,5 | 0...4 | 0...5 | 0...6 | 0...10 | 0...40 | 0...16 | 0...20 |
| Overload limit | 12,5 | 20 | 25 | 30 | 50 | 80 | 80 | 100 |
| Measurement range | 0...25 | 0...50 | 0...100 | 0...160 | 0...200 | 0...250 | 0...400 | 0...500 |
| Overload limit | 125 | 250 | 500 | 800 | 1000 | 1250 | 800 | 1000 |
| Measurement range | 0...600 | 0...1000 | | | | | | |
| Overload limit | 1200 | 2000 | | | | | | |

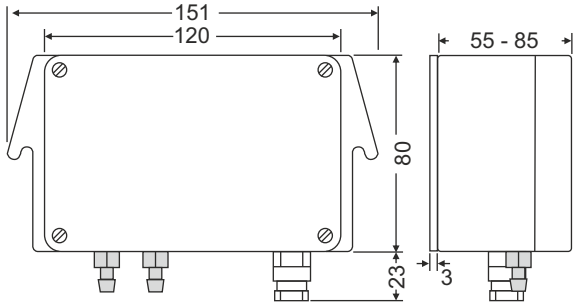
**Table absolute pressure (in hPa)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Measurement range | 0...500 | 0...1000 | 500...1080 | 900...1100 | 800...1200 | | | |
| Overload limit | 1000 | 2000 | 2160 | 2200 | 2400 | | | |

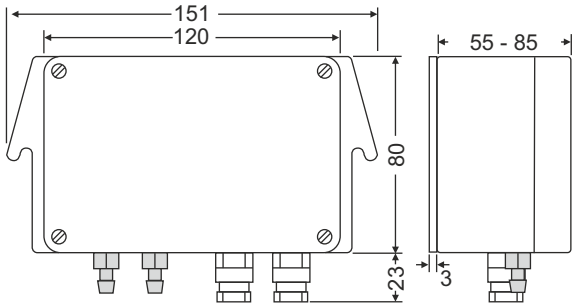
More measurement ranges on request.

## 8 Dimensions (in mm)

2-wire version




3- / 4-wire version




**Dimensions of enclosure**

| Dimensions of enclosures of the pressure measuring transducers (length x width x height) in mm | 120x80x55 | 120x80x70 | 120x80x85 | 122x120x75 | 122x120x105 |
|---|---|---|---|---|---|
| ≥ 0,5 hPa, standard | X | | | | |
| ≥ 0,5 hPa, limit contact | | | X | | |
| ≥ 0,5 hPa, LCD display | | X | | | |
| ≥ 0,5 hPa, limit contact, LCD display | | | X | | |
| ≥ 0,5 hPa, auto zero | | | | X | |
| ≥ 0,5 hPa, auto zero, LCD display | | | | X | |
| ≥ 0,5 hPa, auto zero, limit contact, LCD display | | | | | X |
| < 0,5 hPa, standard, auto zero | | | | X | |
| < 0,5 hPa, auto zero, LCD display | | | | | X |
| < 0,5 hPa, auto zero, limit contact | | | | X | |
| < 0,5 hPa, auto zero, limit contact, LCD display | | | | | X |