
Instruction Manual

PIZ

Two-Wire Differential Pressure Transducer



halstrup-walcher GmbH

Stegener Straße 10
D-79199 Kirchzarten
Germany

Phone: +49 (0) 76 61/39 63-0
Fax: +49 (0) 76 61/39 63-99

E-Mail: info@halstrup-walcher.com
Internet: www.halstrup-walcher.com

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Purpose of instruction manual

This instruction manual describes the features of the PIZ differential pressure transducer and provides guidelines for its use.

Improper use of this instrument or failure to follow these instructions may cause injury or equipment damage. Every person who uses the device must therefore read the manual and understand the possible risks. The instruction manual, and in particular the safety precautions contained therein, must be followed carefully. **Contact the manufacturer if you do not understand any part of this instruction manual.**

Handle this manual with care:

- It must be readily available throughout the lifecycle of the instrument.
- It must be provided to any individuals who assume responsibility for operating the instrument at a later date.
- It must include any supplementary materials provided by the manufacturer.

The manufacturer reserves the right to continue developing this instrument model without documenting such development in each individual case. The manufacturer will be happy to determine whether this manual is up-to-date.

Conformity

This instrument corresponds to the state of the art and meets all legal requirements set forth in EC directives as evidenced by the CE label.



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The manufacturer owns the copyright to this instruction manual. This manual contains data, instructions and drawings pertaining to the features and usage of this instrument; copying this manual in part or in full or distributing it to third parties is prohibited.

1 Safety precautions

1.1 Appropriate use

In addition to differential pressure data, the PIZ differential pressure transducer also records positive and negative overpressures.

Always observe the operating requirements—particularly the permissible supply voltage—indicated on the rating plate and in the "Technical data" section of this manual.

The instrument may only be handled as indicated in this manual. Modifications to the instrument are prohibited. The manufacturer is not liable for damages caused by improper use or failure to follow these instructions. Violations of this type render all warranty claims null and void.

1.2 Shipping, assembly, electrical connections and start-up

Do not close the pressure input ports when shipping, as changes in barometric pressure could damage instruments with low measuring ranges.

Only technical personnel who are appropriately trained and authorized by the operator of the facility may assemble the instrument and set up its electrical connections.

The instrument may only be operated by appropriately trained individuals who have been authorized by the operator of the facility.

Pressurized air or breath is not to be used for performance tests, as this could damage instruments with low measurement ranges.

Measurement errors may occur if the instrument is not kept protected from sunlight.

Specific safety precautions are given in individual sections of this manual.

1.3 Troubleshooting, maintenance, repairs, disposal

The individual responsible for the electrical connections must be notified immediately if the instrument is damaged or if errors occur that cannot be corrected as indicated in section 5.

This individual must take the instrument out of service until the error has been corrected and ensure that it cannot be used unintentionally.

Always unplug the power cord before opening the instrument!

This instrument requires no maintenance.

Only the manufacturer may perform repairs that require the housing to be opened.

The electronic components of the instrument contain environmentally hazardous materials and materials that can be reused. For this reason the instrument must be recycled in accordance with the environmental guidelines of the jurisdiction in question once it has been taken permanently out of service.

1.4 Symbols

The symbols given below are used throughout this manual to indicate instances when improper operation could result in the following hazards:



WARNING! This warns you of a potential hazard that could lead to bodily injury up to and including death if the corresponding instructions are not followed.



WARNING:

This warns you of a potential hazard that could lead to significant property damage if corresponding instructions are not followed.



INFORMATION: This indicates that the corresponding information is important for operating the instrument properly.

2 Instrument description

The PIZ pressure transducer is a pneumatic, electrical sensor for measuring overpressures, vacuum pressures and differential pressures. Typical applications include, for instance, pressure measurements in air-conditioning and ventilation ducts. At the heart of the transducer is a pressure measurement capsule with a beryllium bronz membrane spring, which is displaced by the pressure difference between the two chambers of the measurement capsule. Inductive displacement transducers measure membrane deflection without contacting the membrane. The instrument has no frictional parts or parts subject to mechanical wear.

3 Start-up

3.1 Features

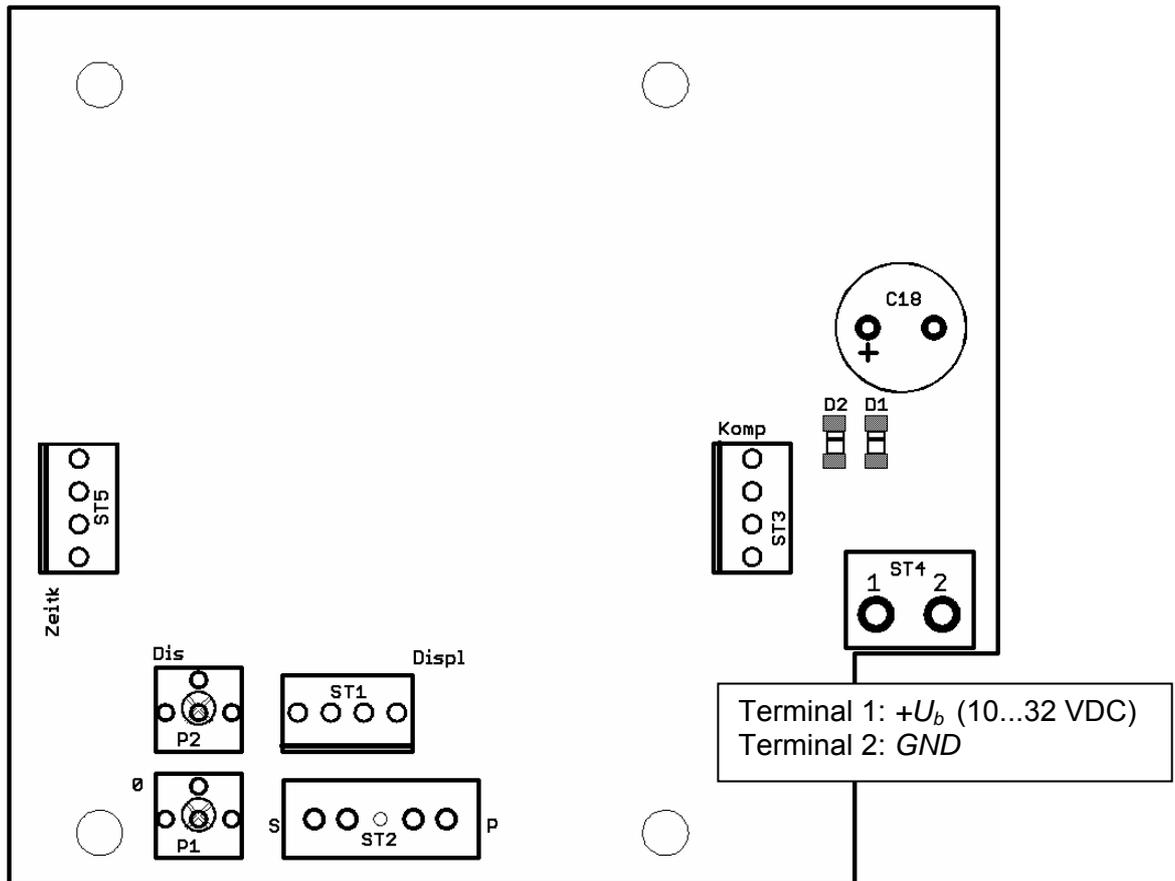
Although the PIZ pressure transducer is highly robust, it is nevertheless a precision instrument and should be handled with care. Avoid mounting the instrument in the direct vicinity of any sources of radiation or heat, such as heaters, as this could result in measurement errors. Ideally, the instrument should be mounted vertically on a wall not subject to vibration. Pressure (+) and vacuum (-) ports should be pointing down in order to prevent any condensation from entering the measurement cell.

When connecting pressure to the transducer, use the following table to ensure that the sign of the pressure (+ or -) is correct.

overpressure / pos. differential pressure	+ input port	0...1 kPa
vacuum / neg. differential pressure	- input port	0...- 500 Pa
symmetrical overpressure / vacuum	+ input port	± 200 Pa

3.2 Supply voltage connections in the instrument:

(not all components are shown)



Please note:

The maximum load resistance is dependent upon the supply voltage and may be calculated as follows:

$$R_L \leq \frac{U_b[V] - 10V}{20mA}$$

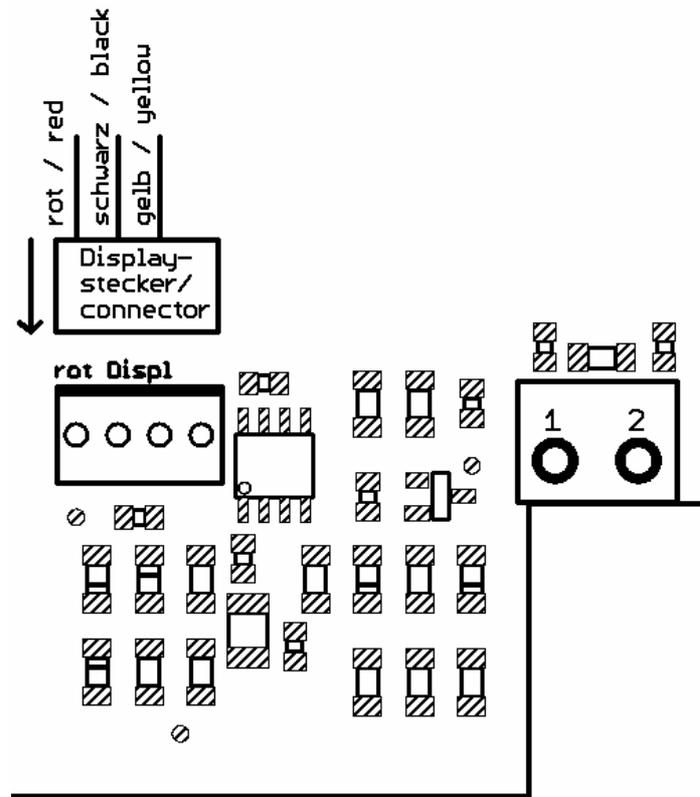
Example:

U_b : 24 V

R_L : max. 1.1 k Ω

$$R_L \leq \frac{24V - 10V}{20mA} = 700\Omega$$

Display-connector



4 Calibrating the zero point



Please remember that it takes roughly 30 to 60 minutes for the pressure transducer to warm up after it is switched on. The output signal may not remain stable during this period.

It is recommended that the zero point after a long operating time (approximately 6 months) is checked and if necessary calibrate it again.

Once the pressure transducer has warmed up, the P1 trimmer can be used to calibrate the zero point. The following table may be used to look up the value to which the analogue output must be set when the ports are open; this value is dependent upon the measurement range.

Measurement range	Example	Set to
0...nominal pressure	0...1 kPa	4 mA
± nominal pressure	± 200 Pa	12 mA

5 Troubleshooting

Error description	Potential cause	Corrective action
no output signal	supply voltage is not connected incorrect supply voltage defective reverse polarity protection diode	connect correct supply voltage connect the correct supply voltage (see rating plate). replace D1 / D2 diode (model LL103A)
output signal is constant, despite change in pressure	pressure ports reversed	connect pressure as outlined in section 3.1.
output signal incorrect	defective pressure measurement cell	Send the instrument to the manufacturer for repair
zero point cannot be adjusted using P1	defective pressure measurement cell	Send the instrument to the manufacturer for repair

6 Technical data

Measurement data	
measurement ranges	0...50 Pa to 0...100 kPa or ±50 Pa to ±100 kPa (others available upon request)
overload capacity	10 x the final value of the measurement range (for measurement ranges ≤ 20 kPa) 2 x the final value of the measurement range (for measurement ranges > 20 kPa)
hysteresis	0.1 %
warm-up period	approx. 30 min.
time required for adjustment	approx. 20 ms (up to 5 s available upon request)
deviation from characteristic curve (setting limiting value)	1 % 0.5 % only for meas. ranges ≥250 Pa (optional) 0.2 % only for meas. ranges ≥250 Pa (optional)
temperature-dependent drift in zero point	0.04%/ K (within the +10°C...+50 °C range)
temperature-dependent drift in measurement range	0.04%/ K (within the +10°C...+50 °C range)
dead volume	approx. 2000 mm ³ (for measurement ranges ≥ 250 Pa) approx. 9000 mm ³ (for measurement ranges < 250 Pa)
control volume	max. 200mm ³
max. system pressure	100 kPa
Ambient conditions	
medium	air, all non-aggressive gases
nominal temperature	+10° C to +50° C
operating temperature	0° C to +60° C
storage temperature	-10° C to +70° C
relative humidity	0...80 %
EMC standards	corresponds to EN 50 081 part 1 and EN 50 082 part 1
conformity	 declaration of conformity available upon request
Electrical data	
power consumption	max. 1 W
supply voltage	10...32 VDC (permissible peak-to-valley ratio < 0.2 V _{ss})
load resistance R _L	max. R _L = 1.1 kΩ <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $R_L \leq \frac{U_b [V] - 10V}{20mA}$ </div> U _b → supply voltage in volts effect of load resistance: <0.2 %
display	3½ or 4½-place LCD, character height = 13 mm (optional)
output signal	4...20 mA

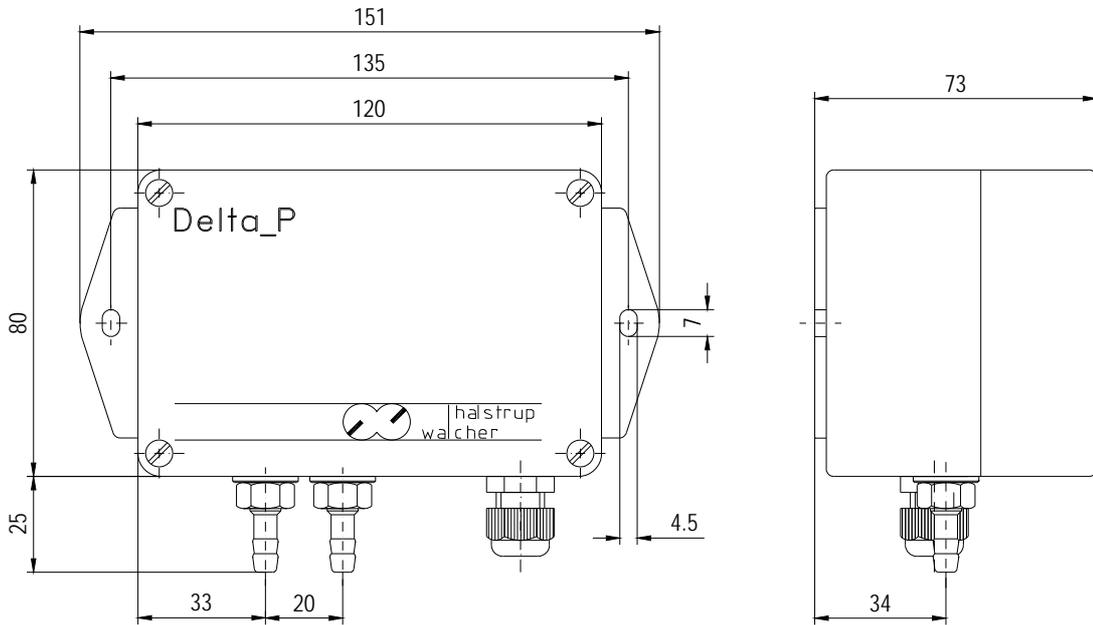
Physical data	
pressure port	Ø 6.5 mm for NW5 tubing (interior tubing diameter = 5 mm)
electrical connection	screw terminals for cables up to 2.5 mm ² PG9 cable gland
mounting orientation	vertical (when placing your order, please indicate if a horizontal orientation is required)
dimensions (w x h x d)	80 x 120 x 70 mm 120 x 122 x 75 mm (for LCD option)
protection class	IP54
weight	0.3 kg
options	<ul style="list-style-type: none"> • 3½-place LCD • 4½-place LCD • linearity protocol • DKD calibration certificate • cable gland: PG11 threaded connection • output signal attenuation up to 5 s

Appendix A: Parts in contact with measurement medium

- Beryllium bronze CuBe2
- Mu metal (nickel alloy)
- Brass CuZn39Pb3
- Aluminium AlCuMgPb / AlMg3
- Silicon (tubing) optional: Viton
- Crastin (PTBP)
- Araldite CY236 / HY988
- Loctite 242e
- Carbonyl iron
- KEL (FPM: fluorinated rubber)
- Vepuran Vu 4457/51
- UHU-Plus endfest 300 binder

7 Dimension drawings

PIZ (standard)



PIZ with LCD

