

Instruction Manual Differential Pressure Transducer PS27



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Purpose of instruction manual

This instruction manual describes the features of the PS27 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 this 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 device is state of the art. It complies with the legal requirements of EC directives. This is shown by the CE mark.



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The manufacturer owns the copyright to this instruction manual. It contains technical data, instructions and drawings detailing the device's features and how to use it. It must not be copied either wholly or in part or made available to third parties.

1. Safety precautions

1.1 Appropriate use

In addition to differential pressure data, the PS27 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 inlets during shipping. Changes in barometric pressure may damage devices with low measuring ranges.

Assembly and the electrical connections should only be handled by professionals. They should be given proper training and be authorised by the operator of the facility.

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

Do not carry out a function test with compressed or breathable air. This would damage instruments with low measuring 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 switch off the power to the instrument before opening!

This instrument requires no maintenance.

Repairs should only be carried out by the manufacturer.

The electronic components of the instrument contain environmentally hazardous materials and materials that can be reused. The instrument must therefore be sent to a recycling plant when you no longer wish to use it. The environment codes of your particular country must be complied with.

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.



CAUTION! 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

Type PS27 pressure transducers are pneumatic, electrical sensors for pressure measurement (positive or negative overpressure, or differential pressure). Typical applications include, for instance, pressure measurements in air-conditioning and ventilation ducts. The transducer's core is a piezoresistive pressure transducer.

3. Start-up

3.1 Features

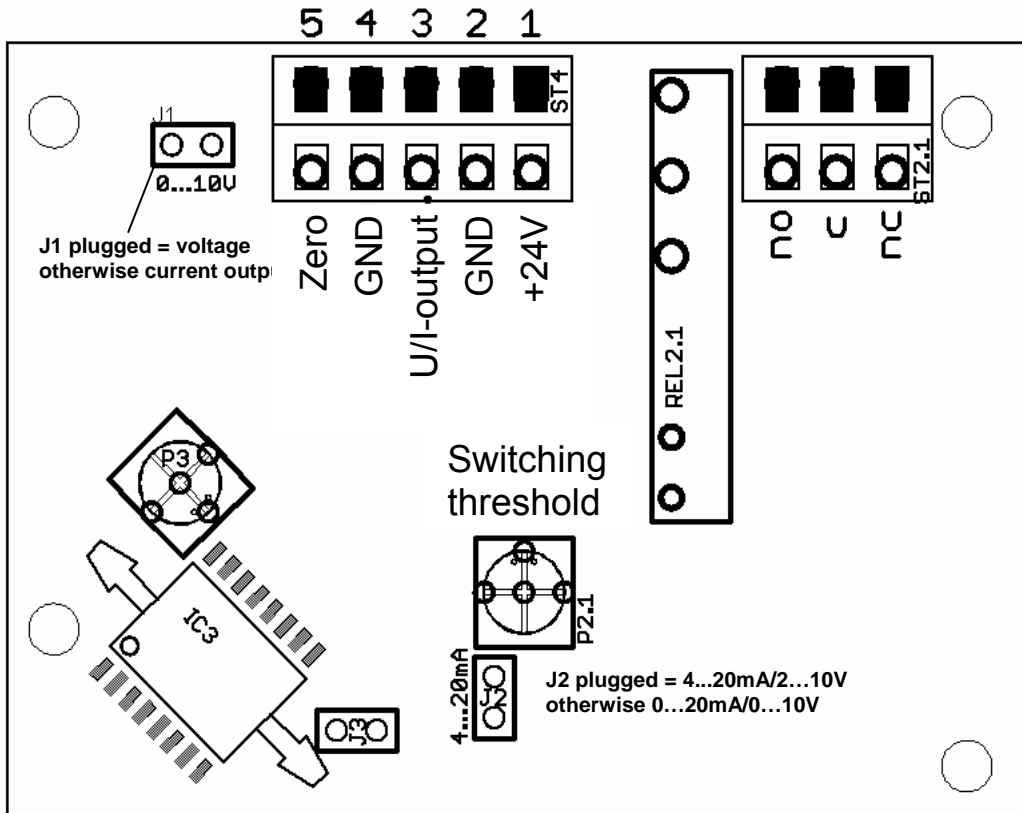
Although the PS 27 pressure transducers are highly robust, they are nevertheless precision instruments and should be handled with care. Avoid mounting the instrument in the direct vicinity of any sources of radiation or heat, such as heaters, as this could result in measurement errors. Ideally, the instrument 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.

Type of pressure	Connect pressure to	Example
overpressure	+ input port	0...1 kPa
vacuum	- input port	0...- 500 Pa
differential pressure	higher pressure at + port lower pressure at - port	0...125 Pa, e.g. via a differential pressure transducer (e.g., a measuring orifice)
symmetrical pressure ranges	+ input port	± 200 Pa
asymmetrical pressure ranges	input port corresponding to the high end of the pressure range	-300 Pa ... + kPa (here connect to + input)

3.2 Supply voltage connections in the instrument:

Figure 1: Position of components (not all components are shown)



Connection No.	Connection Name	Meaning
1	+24V	24VAC/DC power supply input
2	GND	Ground for power supply
3	U/I connection	Voltage or current output
4	GND	Ground for output signal
5	Zero-point calibration	Zero-point calibration input (+24V zero-point calibration is active)



Observe the correct supply voltage (see rating plate). Also follow the connection diagram on the housing cover / circuit board mount.

The transducer outputs are protected from short circuits. Instruments supplied with direct current are also protected from reverse polarity.

4. Zeroing



After starting the pressure transducer, please allow it about 15 minutes to warm up. During this time, the output signal may be unstable.

Zero-point calibration of the device is only carried out via the input provided for it. The user must ensure that the device is not subjected to any pressure during the calibration process, as this might lead to a wrong offset value, which would cause an incorrect output signal. The 24V input makes it possible to activate a 3/2 control valve with the same signal which switches the PS27's pressure inputs at zero pressure during the zero calibration process. In this case, the zero-point calibration signal must be applied until the pressure has fallen safely to zero.

5. Configuring the output signal

The user can configure the PS27's output signal. There are various possibilities

Output voltage range	J1	J2	Remarks
0 ... 10V	Plugged		$R_{Load} > 50k \Omega$
2 ... 10V	Plugged	Plugged	$R_{Load} > 50k \Omega$
0 ... 20mA			Max. load 500Ω
4 ... 20mA		Plugged	Max. load 500Ω

The two-wire model must be configured by the manufacturer.

6. Adjusting the relay switching threshold (optional)

The relay switching threshold can be adjusted with the aid of the P2.1 potentiometer. Adjustment is easiest when the desired switching pressure is applied and the potentiometer adjusted so that the relay is just triggered.

Please note: The relay is connected to the sensor's output, so any adjusted time delays will also cause a delay in the relay triggering.

7. Programming the time delay and min./max. pressures



The following adjustment procedures should only be carried out by trained staff, because they directly influence the sensor's measuring accuracy.

- Switch off the PS27
- Plug in J1 (voltage output), unplug J2
- Bridge the J3 jumper (e.g. with tweezers)
- Switch on the PS27
- Pressure input ports are open. Do not apply any pressure during this adjustment, because the offset value for pressure adjustments is also being determined.
- Remove the bridge over J3 when it is switched on
- A voltage between 4.0 and 6.6 V is issued at the output. This voltage shows the set time delay.

Output voltage	Time delay
4.01V	20 ms
4.02V	30 ms
4.04V	60 ms
4.08V	120 ms
4.16V	240 ms
4.32V	480 ms
4.64V	960 ms
5.28V	1.9 s
6.56V	3.8 s

- By short-term bridging of the J2 or J3, the time delay adjustment can be increased.
- The time delay adjustment can be terminated by short-term activation of zero-point calibration input (connect with +24V).
- The PS27 displays a voltage of 3 V.
- Max. Pressure is applied to the PS27(1000Pa for a xxx...1000Pa range). This is the pressure that will lead to 10V(20mA) at the output.
- If the pressure is stable, short-term bridging J2 or J3 will end this step.
- The pressure is programmed in. The pressure value for the 0V output voltage is set to 0.0 Pa.
- The PS27 displays a voltage of 2 V at the output.
- Disconnect the PS27 from the pressure source. Leave the input ports open.
- Short-term bridging J2 or J3 will programme the offset value to the PS27.
- The PS27 displays a voltage of 1 V.
- If you want to set a measurement range like 0...xxx, the programming is done. Switch off and on will set the PS27 to the normal operation mode. If you want to set a measurement range like -100Pa ... +100Pa you have to execute the next steps as well.
- Min.Pressure is applied to the PS27(for example -100Pa for a -100 ... xxxPa Range). This pressure will set the output to 0 V (0 or 4 mA) when the programming is done.
- If the pressure is stable, short-term bridging J2 or J3 will end this step and sets the PS27 to its normal operation mode.

All adjustments are thus concluded. After a switching off and on procedure and another zero-point calibration (pressure connections open!), the device is ready for operation with the new settings.



Note: The 0V pressure should only be programmed in if it is not 0. (e.g. -1 hPa ... + 1 hPa) For 0 ... ranges, the adjustment should be terminated after the offset vale has been programmed in.

If the instrument has shut down during this process, only those adjustments that have finished are effective.

Example: The time delay was reset and confirmed with the zero-point calibration input. If the PS27 is now switched off and then back on, the pressure settings remain the same.

8. Troubleshooting

Error description	Potential cause	Corrective action
no output signal	<ul style="list-style-type: none"> • supply voltage is not connected incorrect supply voltage defective input protection diode only for DC power: defective reverse polarity protection diode 	<ul style="list-style-type: none"> connect correct supply voltage connect the correct supply voltage (see rating plate). • send the instrument to the manufacturer for repair • send the instrument to the manufacturer for repair
output signal is constant, despite change in pressure	<ul style="list-style-type: none"> • defective output protection diode • pressure ports reversed 	<ul style="list-style-type: none"> • send the instrument to the manufacturer for repair • connect the pressure as described in Section 3
output signal incorrect	<ul style="list-style-type: none"> • pressure sensor faulty for current output: • output load too high for voltage output • load resistance too low 	<ul style="list-style-type: none"> • send the instrument to the manufacturer for repair • observe maximum output load of 500 Ω • observe minimum load resistance of 50 kΩ (see "7 Technical data")

9. Technical data

Linearity:	1.0% of the upper range value
TK offset:	+/- 0.1%/°C
TK span:	+/- 0.1%/°C
Accuracy:	2.0% of the upper range value
Measurement ranges:	+/-10hPa (+/-100Pa...10hPa) +/-50hPa (+/-10hPa...50hPa) +/-250hPa (+/-50hPa...250hPa) +/-2000hPa (+/-250hPa...2000hPa)
Min. response time:	20 ms
Pressure ports:	Nominal width of 4 or 6 mm for hose
Output signals:	0/2...10V or ($R_L > 50k\Omega$) 0/4...20 mA ($R_L \leq 500\Omega$) 4...20 mA (two-wire 17...32V, $R_L \leq 500\Omega$)
Contact point:	max. 230VAC, 6A; min. 500mW
Overload range:	12 x upper range value (measuring range ≤ 250 hPa) 4 x upper range value (measuring range ≥ 250 hPa)
Temperature Range:	Storage temperature: -10°C ... +70°C Working temperature range: 10°C ... 60°C
Supply Voltage:	24 VDC/VAC +/-15% (no galvanic separation) 15 ... 32VDC (two-wire) (no relay output)
Power consumption:	Approx. 1W
Operating position:	Ideally vertical
Housing:	See drawing
Safety class:	IP 65
Installation:	The instrument can be installed either on a DIN mounting rail or on a wall with mounting holes
Testing:	EN61000-4-2 EN61000-4-3...-6 EN61000-4-11 ENV50204

10. Dimension drawing

