Operating Instructions

for

Pressure Sensors

Model: SEN-3

1. Contents

Manufactured and sold by:

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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

2.1. Notes on the machine and pressure equipment directive

When used in machines, the measuring unit should be used only when the machines fulfil the EC-machine guidelines.

as per PED 2014/68/EU

"Pressure gauges with a volume ≤ 0.1 L"
In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

Diagram 2
Vessels referred to in Article 4(1)(a)(i), second indent

3. Regulation Use

Any use of the Pressure Sensors Model: SEN-3 which exceeds the manufacturer’s specification may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

4. Operating Principle

Pressure sensors transmit the mechanical quantity pressure into an electrical output signal. The media's which are in contact with the instrument should be chemically compatible with the instrument materials used. Do not use standard sensors in hazardous areas and for oxygen applications.

5. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should the damage to a device be visible, we recommend a thorough inspection of the delivery packing. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

- Pressure Sensors model: SEN-3

6. Mechanical Connection

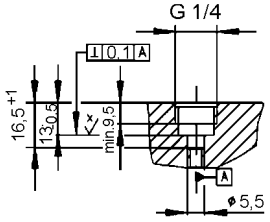
The places where pressures are taken should be prepared according the following specifications for the screw-in threads. This is very important for pressure sensors with front diaphragm, because otherwise the diaphragm could be damaged. For sealing, please use sealing discs acc. DIN 16258 or profile washers. The maximum initial tension depends on the material, the shape of the used sealing and the mechanical connection of the pressure sensor.
The given tensions should not be exceeded.

- 50 Nm for pressure sensors with metallic sealing cone (hereby, there could be for small measure ranges a deviation of the zeropoint of maximum 1%. This deviation could be adjusted, with the zero point potentiometer see chapter "Maintenance").

- 80 Nm for pressure sensors with pressure connection acc. DIN 16288, and/or flash front diaphragm with O-ring.

There should be no vibrations and/or no radiation of heat near the mounting position of the sensors. Please pay attention that the giving operating limits are not exceeded. After the mechanical and electrical connection, the sensor is ready for operation.

Srew in hole for diaphragm on inside



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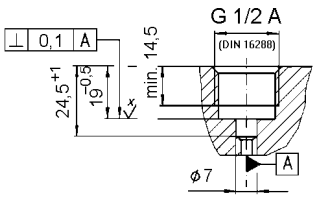
Sealing acc. DIN 16288



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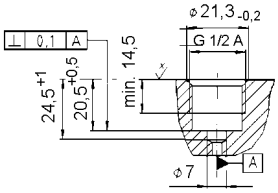
Sealing with flat gasket ring



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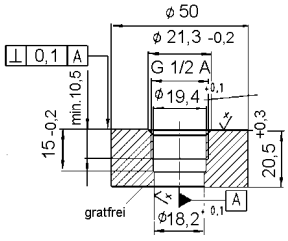
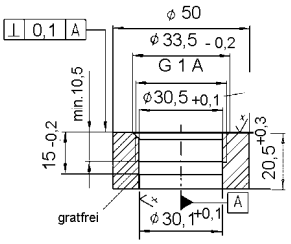
Screw in hole/Screw in socket for flush front diaphragm with o-ring sealing

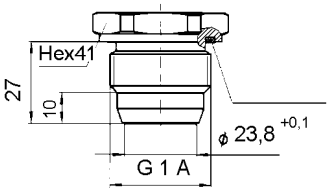


G 1/2 A

with metallical sealing cone



G 1A



G 1A

7. Electrical Connection

- Ensure that the power is disconnected during connection of the cable.
- The electrical connection is made either via plug and pin or by cable.
- The exact wiring scheme is shown on the sketches hereafter or at the type plate of your sensor.

Attention! to the different wire systems.

Meaning of the different connector markings

UB+	positive pole of the supply voltage
OV	negative pole of the supply voltage
S+	positive pole of the output signal
S-	negative pole of the output signal
Shielding	Cable protection enclosure-earth

Pressure sensors for relative pressures with cable output are equipped with an atmospheric pressure compensation cable. Please take this into account if you want to extend the cable. The relative pressure sensor with pressure ranges up to 25 bar are vented due to a venting sealing between housing and plug.
The sensor could be supplied with an unregulated DC source with the specified voltage range. The minimum supply voltage for pressure sensors with current output, should be the minimum UB plus the minimum voltage, which is needed to operate the external indicator or input device:

Current output

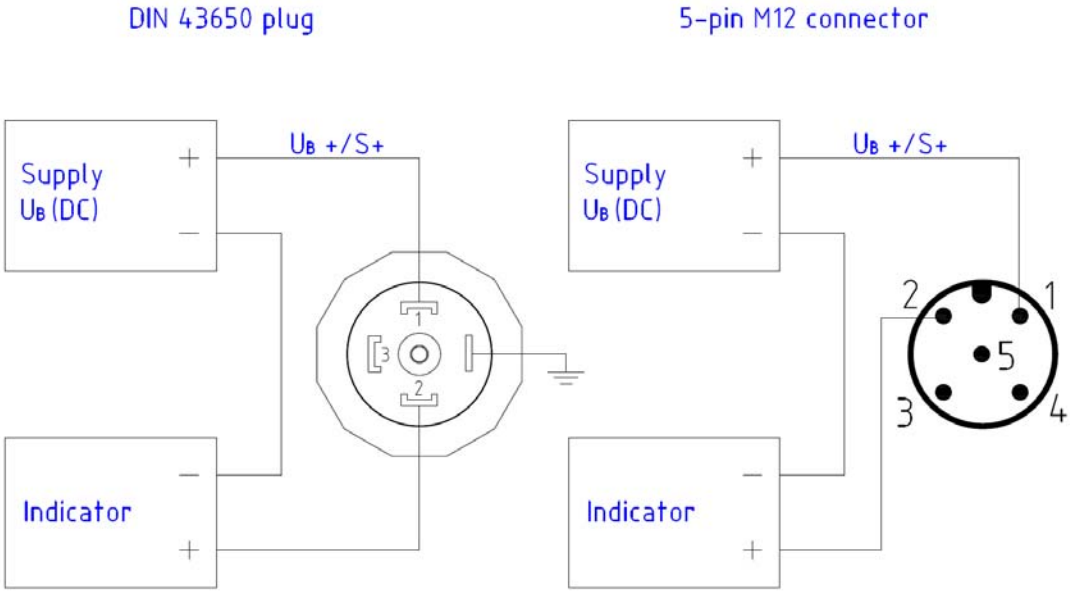
	2-wire system	**3-wire system**
Output signal	4...20 mA	0...20 mA
Supply voltage	UB= 10 ... 30 V_{DC}	
Permissible load	RA[Ohm] = (UB[V] - 1 0 V) / 0,02 A	
Wiring scheme	see scheme	

Voltage output

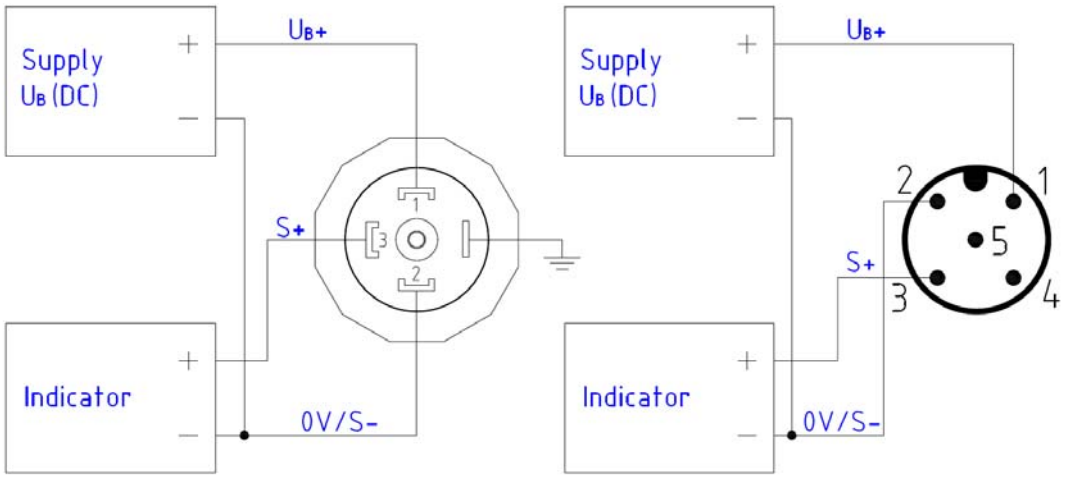
	3-wire system	**3-wire system**
Output signal	0...5 V	0...10 V
Supply voltage	U_B = 10…30 V_{DC}	UB = 14…30 V_{DC}
Permissible load	RA >5 kOhm	RA >10 kOhm
Wiring scheme	see scheme	

Electrical connection, principle drawings, pin assignment, cable marking

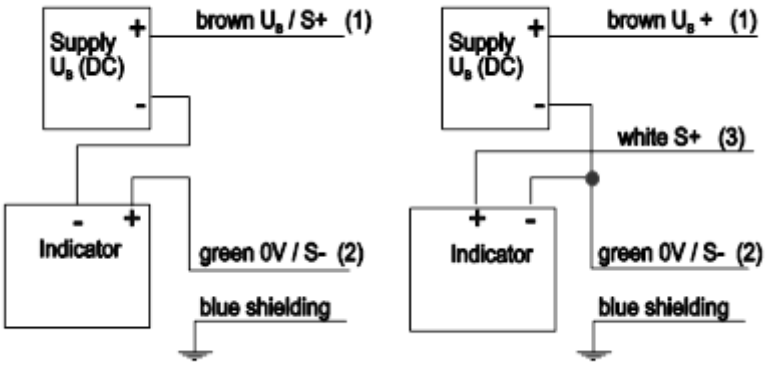
2-wire-system



3-wire-system



free cable



8. Trouble Shooting

Trouble	Possible reason	What's to do
No signal	no supply voltage broken wire	Check your power supply and wiring. If necessary replace defective parts
	Sensor has been wired improperly	Check the wiring according to the sketches and adjust wiring if necessary.
	No pressure	Check your tubing, valves open?
	Defective electronics caused by excessive supply voltage or by external voltage	Return sensor to us for repair
Unchanged signal by changing pressure	Pressure port is blocked	Clean the pressure port
	Defective electronics caused by excessive supply voltage or by external voltage	Return sensor to us for repair
	Pressure sensor over pressurized	Return sensor to us for repair
To high, even on changing pressure unchanged signal	Defective electronics caused by excessive supply voltage or by external voltage	Return sensor to us for repair
Span of signal too small	Supply voltage too low or loop resistance too high	Adjust supply voltage to overcome loop resistance
	Span adjustment potentiometer deregulated	Recalibrate sensor
Zero Signal too low	Zero adjustment potentiometer deregulated	Recalibrate sensor
Zero signal too high	Zero adjustment potentiometer deregulated	Recalibrate sensor
	Mechanical damage	Recalibrate sensor Return to us for repair
Output signal non linear	Mechanical damage	Recalibrate sensor Return to us for repair

9. Technical Information

Sensor element:	**Model: SEN-32...**	Piezoresistive
	Model: SEN-33...	Thin film
Material housing:	Stainless steel 1.4301	
Material wetted parts:	Stainless steel 1.4571 and 1.4542	
Accuracy:	0.1; 0.25; 0.5 or 1% of FS (depending on type)	
Repeatability:	≤ ± 0.05% of FS (± 0.03 % of FS for SEN-3382)	
Stability/year:	≤ ± 0.2 % of FS (under reference conditions) (± 0.1 % of FS for SEN-3382)	
Overload limit:	≤ 16 bar 3.5-times (3-times for SEN-3382) ≤ 600 bar 2-times ≥ 600 bar 1.5-times	
Temperature comp. Range:	0...+80 °C	
Effect of temperature:	see data sheet	
Protection:	IP 65	
Temperature ranges:	store room: -40...+100 °C (-40...+85 °C for SEN-3382) Measured media: -30...+100°C (-20...+80 °C for SEN-3382) Ambient: -20...+80 °C	
Response time:	≤ 1 ms (within 10-90% of FS)	

10. Maintenance

The pressure sensors described in this manual are maintenance free! They do not contain any components which may be repaired or exchanged locally.
Repairs are only possible in our factory.

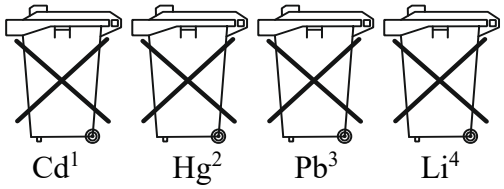
11. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment

12. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Pressure Sensor **Model: SEN-3...**

to which this declaration relates is in conformity with the standards noted below:

EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 61326-2-3:2013
Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

EN IEC 63000:2018 Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe

Also, the following EC guidelines are fulfilled:

2014/30/EU **EMC Directive**
2011/65/EU **RoHS** (category 9)

Hofheim, 08 November 2022

H. Volz
General Manager

M. Wenzel
Proxy Holder

13. UK Declaration of Conformity

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Pressure Sensor **Model: SEN-3...**

to which this declaration relates is in conformity with the standards noted below:

BS EN 61326-1:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements

BS EN 61326-2-3:2013
Electrical equipment for measurement, control and laboratory use. EMC requirements. Particular requirements. Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

BS EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Also, the following UK guidelines are fulfilled:

S.I. 2016/1101	**Electrical Equipment (Safety) Regulations 2016**
S.I. 2012/3032	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Hofheim, 08 November 2022

H. Volz
General Manager

M. Wenzel
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