

Operating Instructions for Pressure Transmitter

Model: SEN-98/-99



We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.

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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.

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

Devices with max. allowable pressure ≤ 200 bar:

as per PED 2014/68/EU

In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

The instrument safety level depends on the right choice and installation of the instrument model and on the maintenance, procedures established by the manufacturer.

Technicians in charge of the instrument selection, installation and maintenance should be able to understand if the instrument conditions of use could affect its right functioning and lead to any premature damage or breaking.

It is essential that these procedures included in the plants regulations should be carried out by qualified staff. An improper use could be dangerous for the instrument itself and cause damages to the staff and to the plant.

In order to choose correctly the right instrument, it is highly recommended to read the most recent catalogue sheets available on-line at www.kobold.com

3. Instrument Inspection

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

Scope of delivery:

The standard delivery includes:

- Pressure Transmitter model: SEN-98/-99

4. Regulation Use

The pressure transmitter turns the input pressure into an output electrical signal. The electrical signal changes in proportion to the input pressure level.

Any use of the Pressure Transmitter, model: SEN-98/-99, 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.



Warning!

The manufacturer disclaims all responsibility in case of damages caused by the improper use of the product and by the non-respect of the instructions reported in this manual.

- Follow carefully the specific safety rules in case of measuring oxygen pressure, acetylene, inflammable or toxic gas or liquids.
 - Disconnect the instruments only after depressurization of the system.
 - The process fluids residuals in the disassembled instruments could affect people, the environment and the system. It is highly recommended to take proper precautions.
-



Warning!

Before installation be sure that the right instrument has been selected following the working conditions and in particular the range, the working temperature and the compatibility between the material used and the process fluid.

- This manual does not concern the instruments conforming to standard 2014/34/EU (ATEX).
 - The product warranty is no longer valid in case of non-authorized modifications and of wrong use of the product.
 - The user is totally responsible for the instrument installation and maintenance.
 - Handle and carefully stock the instrument used for toxic or inflammable liquids measurement
-

5. Electrical Connection

		EN 175301-803 Form A	M12x1	Cable output
		EN 175301-803 Form C		
Output signal:	4...20 mA			
N° of wires:	2			
Charge (Ohm):	$R_L - (V_{in}-10)/0,02$			
Input +Vin:	10...30			

			EN 175301-803 Form A	M12x1	Cable output
			EN 175301-803 Form C		
Output signal:	0...5 Vdc	0...10 Vdc			
N° of wires:	3	3			
Charge (Ohm):	min. 5Kohm	min. 10Kohm			
Input +Vin:	8...30	14...30			

The transmitter metal case should always be connected to ground through the process connection thread in order to protect it from disturbances due to electromagnetic fields or electrostatic charges.

If it wouldn't be possible to do so connect the transmitter to ground through the connector and the cable screen.

6. Installation

Before installing electrical instrument safely and securely into a plant or a system the user should verify the instrument suitability to the plant characteristics and the correct installation. After installation the user should verify that the instrument is not exposed to any source of heat exceeding the established ambient limits. Secure the instrument thread through a special key/wrench on the process connection hexagon without grasping the case by the hands.

Secure the instrument thread through a special key/wrench on the process connection hexagon (20...30Nm). The correct torque depends on the type of process connection and the type of seal used (form and material).

If the connection thread is conical the instrument is tightened through a simple screwing on the plug. In order to improve the thread tightness, it is recommended to place a PTFE layer on the male thread.

If the instrument is equipped with a fluid diaphragm seal the connection should be clamped on the diaphragm otherwise the calibration could be compromised.

Connector Assembling EN 175301-803 Form A

Disassemble the connectors as in fig. 1 and connect the cables as in fig. 2. Reassemble the connector and fix it on the transmitter.



Figure 1 – Exploded view of the connector

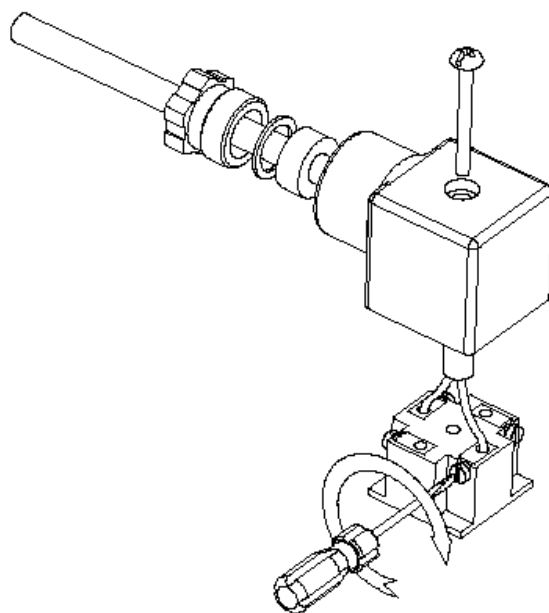


Figure 2 – Wires connection



Warning!

The IP grade according to standard EN 60529:2014 is guaranteed only if the female connector equipped with a connection cable is mounted on the instrument and all the other components are assembled correctly.

7. Recalibration and maintenance

In models the zero and the full scale range can be adjusted as follows (see figure 3):

- Connector disassembling (see fig. 1)
- Zero adjustment (Z)
- Span adjustment(S)

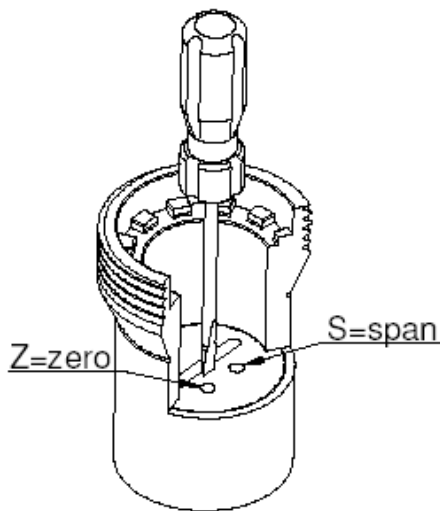


Figure 3 - Adjustment

In case a complete recalibration is necessary please contact KOBOLD.

8. Technical Information

Ranges:	0 ... 1/0 ... 600 bar, relative, (0 ... 15/0 ... 10 000 psi, relative) -1... 0/-1... + 24 bar, relative; (-30" ... 0/-30" ... 350 psi, relative) 0 ... 1/0 ... 16 bar, absolute (0 ... 15/0 ... 200 psi, absolute)
Accuracy (% span):	≤0.25 typical; \pm 0.5 max.
Calibration:	Limit-point as per DIN 16086
Repeatability:	≤0.15% of span
Thermal drift:	≤0.04 % span / °C (for ranges < 2 bar) ≤0.02 % span / °C (for ranges \geq 2 bar)
Process fluid temperature:	-25 ... +100 °C; depending on gasket type
Ambient temperature:	-25 ... +85 °C
Storage temperature:	-40 ... +85 °C
Output signals:	4 ... 20 mA, 0 ... 5 VDC, 0...10 VDC
Supply and max. load:	See on page 3
Response time (10 ... 90%):	< 3 ms
Zero calibration:	\pm 10% span typical
Span calibration:	\pm 10% span typical
Compensated temperature range:	0 ... +80 °C
Process connection:	AISI 316L stainless steel
Sensor:	Ceramic
Case:	Stainless steel, vented for pressure ranges ≤230 psi (≤ 16 bar)
O-ring:	FKM
Electric connection:	*EN 175301-803 form A, exit for cables \varnothing 0.23 ... 0.35" (6 ... 9 mm)
Protection degree:	IP 65 as per IEC 529 / EN 60529
Weight:	0.39 lbs (0.18 kg)

Ranges bar, relative	Overpressure bar, relative	Burst pressure bar, relative
-1...0	5	7
-1...0.6	5	7
-1...1.5	5	7
-1...3	10	12
-1...5	20	25
-1...9	20	25
-1...15	40	50
-1...24	100	120
0...1/0...2.5	5	7
0...4	10	12
0...6/0...10	20	25
0...16	40	50
0...25/0...40	100	120
0...60/0...100	200	250
0...160/0...250	500	600
0...400	600	800
0...600	800	900

Other ranges available on demand. Units of measurement available in MPa, kPa too
 Absolute pressure ranges have same overpressure limits as gauge pressure ranges

Ranges psi, relative	Overpressure psi, relative	Burst pressure psi, relative
-30...0 in Hg/psi	72	100
-30...30 in Hg/psi	72	100
-30...60 in Hg/psi	145	175
-30...100 in Hg/psi	290	360
-30...150 in Hg/psi	290	360
0...15/0...30	72	100
0...60	145	175
0...100/0...160	290	360
0...300	580	725
0...600	1450	1740
0...1000/0...1500	2900	3625
0...2000/0...3000	7250	8700
0...5000/0...6000	8700	11600
0...10000	11600	13050

Other ranges available on demand. Units of measurement available in MPa, kPa too

9. Order Codes

Order Details (Example: SEN-9800 0 B075 A 0)

Model	Output	Measuring range	Mechanical connection	Options	
Gauge pressure ranges SEN-9800... (with electrical plug connection EN 175301-803) SEN-9830³⁾... (M12x1 male electrical connection) SEN-9840¹⁾³⁾... (2m PVC cable, IP65) SEN-9850¹⁾³⁾... (2m Polyurethane cable, IP68)	0 = 4-20 mA, 2-wire (standard) 1³⁾ = 0...5 V _{DC} (8...30 V _{DC}) 2³⁾ = 0...10 V _{DC} (14...30 V _{DC})	Gauge pressure ranges C 315 = -1...0 bar C 505³⁾ = -1...0.6 bar C 515³⁾ = -1...1.5 bar C 525³⁾ = 1...3 bar C 535³⁾ = -1...5 bar C 545³⁾ = -1...9 bar C 555³⁾ = -1...15 bar C 565³⁾ = -1...24 bar B 025 = 0...1 bar B 035 = 0...1.6 bar B 045 = 0...2.5 bar B 055 = 0...4 bar B 065 = 0...6 bar B 075 = 0...10 bar B 085 = 0...16 bar A 095 = 0...25 bar A 105 = 0...40 bar A 115 = 0...60 bar A 125 = 0...100 bar A 135 = 0...160 bar A 145 = 0...250 bar A 155 = 0...400 bar A 165³⁾ = 0...600 bar	H 315³⁾ = -30...0 in Hg H 317³⁾ = 30 in Hg/psig H 319³⁾ = -30...60 in Hg/psig H 321³⁾ = -30...100 in Hg/psig H 323³⁾ = -30...150 in Hg/psig P 025³⁾ = 0...15 psig P 045³⁾ = 0...30 psig P 057³⁾ = 0...60 psig P 065³⁾ = 0...100 psig P 077³⁾ = 0...160 psig P 085³⁾ = 0...200 psig P 086³⁾ = 0...250 psig P 088³⁾ = 0...300 psig P 100³⁾ = 0...500 psig P 105³⁾ = 0...600 psig P 115³⁾ = 0...1000 psig P 126³⁾ = 0...1500 psig P 130³⁾ = 0...2000 psig P 140³⁾ = 0...3000 psig P 147³⁾ = 0...4000 psig P 150³⁾ = 0...5000 psig P 157³⁾ = 0...6000 psig P 162³⁾ = 0...8000 psig P 165³⁾ = 0...10000 psig	A = G ½ , male (standard) B³⁾ = G ¼ , male F³⁾ = ½ " NPT, male G³⁾ = ¼ " NPT, male	0 = without K²⁾³⁾ = accuracy ≤0.25% of span S³⁾ = oxygen service Y³⁾ = special option (specify in text)
Absolute pressure ranges SEN-9900³⁾... With electrical plug connection EN 175301-803) SEN-9830³⁾... (M12x1 male electrical connection) SEN-9840¹⁾³⁾... (2 m PVC cable, IP65) SEN-9850¹⁾³⁾... (2 m Polyurethane cable, IP68)		Absolute pressure ranges³⁾ B 025 = 0...1 bar B 035 = 0...11.6 bar B 045 = 0...2.5 bar B 055 = 0...4 bar B 065 = 0...6 bar B 075 = 0...10 bar B 085 = 0...16 bar B 095 = 0...25 bar			

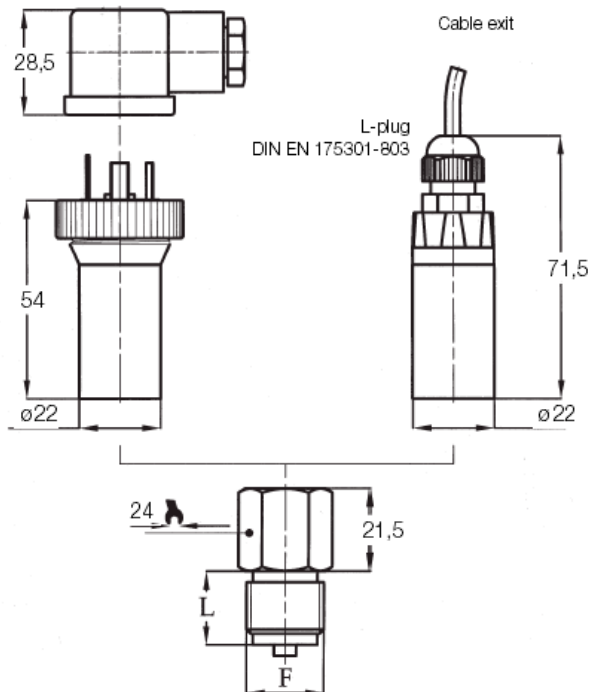
¹⁾zero calibration not available

²⁾for pressure ranges ≤600 psi (40 bar); not for model SEN-99...

³⁾ minimum order quantity = 10 pieces per item (identical model code)

Output signal code	4...20 mA (standard) 0	0...5 V _{DC} 1	0...10 V _{DC} 2
No. of wires	2	3	3
Load max. (Ω)	$R_L \leq (V_{in}-8)/0.02$	$R_L \geq 5 \text{ K}\Omega$	$R_L \geq 10 \text{ K}\Omega$
Supply: + V _{in} (V _{DC})	10...30	8...30	14...30
Ground	(please refer to chapter 6)		

10. Dimensions (in mm)



F	L (mm)
A – G ½ A (standard)	20
B – G ¼ A	13
F – ½ -14 NPT	20
G – ¼ -18 NPT	13

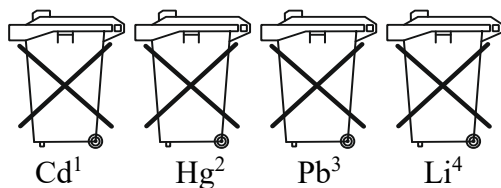
11. Disposal

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.

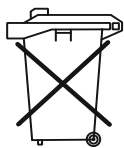
Batteries

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 Transmitter Model: SEN-98/-99

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

Also, the following EC guidelines are fulfilled:

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

Additionally for devices > 200 bar:

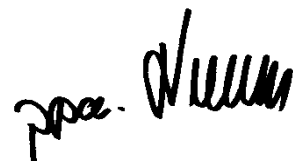
2014/68/EU PED

- Category I
- Module D1, marking CE0575
- Notified body: DNV AS
- Certificate No. PEDD1000000B

Hofheim, 15 March 2023



H. Volz
General Manager



M. Wenzel
Proxy Holder