Operating Instructions

for

Pressure Sensor with

Ceramic Sensor Element

Model: SEN-9601

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.

1. Contents

Manufactured and sold by:

Kobold Messring GmbH
Nordring 22-24
D-65719 Hofheim
Tel.: +49(0)6192-2990
Fax: +49(0)6192-23398
E-Mail: info.de@kobold.com
Internet: www.kobold.com

2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
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.

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 Sensor with Ceramic Instrument model: SEN-9601
- Operating Instructions

4. Regulation Use

Any use of the Pressure Sensor with Ceramic Sensor Element, model: SEN-9601, 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.

Caution!
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.

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 94/9/CE (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

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

5. General

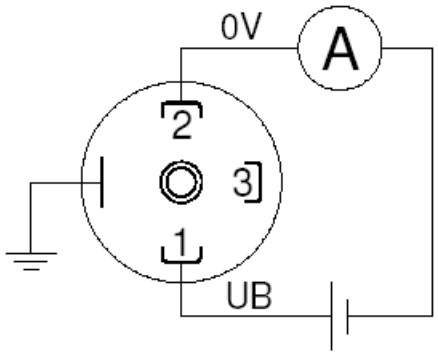
The KOBOLD SEN-96 Standard model is an electronic transmitter with ceramic sensor for air, industrial, technical gases and water and oil, designed to be installed in gas distribution plants, on bottles, on refrigerators, on compressors, on vacuum pumps and hydraulics and water high pressure plants.

6. Installation

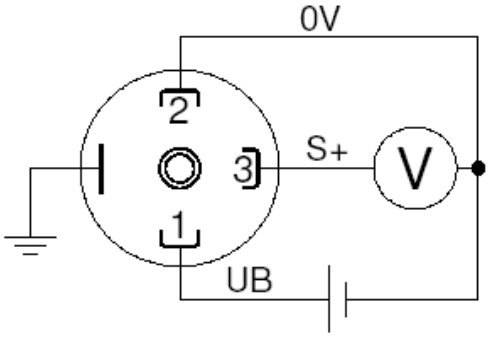
Before installing electrical instrument safely and securely into a plant or a system the user should verify the instrument suitability to the plant characteristics and the correct installation. After installation the user should verify that the instrument is not exposed to any source of heat exceeding the established ambient limits.
Secure the instrument thread through a special key/wrench on the process connection hexagon (20…30 Nm). The correct torque depends on the type of process connection and the type of seal used (form and material).
As for those process connections with a cylindrical thread (Gas-Metric), a head gasket compatible with the measurement gas or fluid should be used.
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.

7. Electrical Connection

Output signal:	4…20 mA
No. of wires:	2
Load max.:	$R_L \leq (UB-8)/0{,}02\ \Omega$
Supply UB:	8…30 VDC
EN 175301-803 Form A	



Output signal:	0…5 VDC 1	0…10 VDC 2	0.5…4.5 VDC ratiometric -3	1...5 VDC 4
No. of wires:	3	3	3	3
Load max.:	$R_L \geq 5$ kΩ	$R_L \geq 10$ kΩ	$R_L \geq 4.5$ kΩ	$R_L \geq 5$ kΩ
Supply UB:	8…30 VDC	14…30 VDC	5 ± 10%	8...30 VDC
EN 175301-803 Form A				



The transmitter metal case should always be connected to ground (GND) through the process connection thread in order to protect the sensor from disturbances due to electromagnetic fields or electrostatic charges.
The sensor can also be connected via the ground connection to the system ground.

8. Maintenance

The SEN-9601 transmitter is *"maintenance free*".
If a fault occurs, contact Kobold.

9. Product Label

10. Technical Information

Ranges:	0 ...1/0 ... 600 bar, relative, -1... 0/-1... +24 bar, relative
Accuracy:	≤ ± 0.5% of full scale*
Non-linearity (BFSL):	≤ ± 0.25 % of full scale, according to EN 61298-2
Non-repeatability:	≤ 0.1 % of full scale, according to EN 61298-2
Output signal deviation of zero:	≤ ± 0.5 % of span, typical; ≤ ± 0.8 % of span, max.
Thermal drift:	0…80 °C, 1 % of span; 2.5 % of span, max.
Long term drift:	≤ 0.1 % of span, according to EN 61298-2
Process fluid temperature, ambient and stocking temperature:	-25 ...+85 °C
Output signals:	4... 20 mA, 0...5 VDC, 0...10 VDC, 1... 5 VDC, 0.5... 4.5 ratiometric VDC
Response time:	<4 ms
Emission and immunity:	According to EN 61326, (group 1 - class B; industrial applications)
Process connection:	In AISI 316L (1.4404), hole ø 2.5 mm
Sensor:	Ceramic in Al2O3
Case:	AISI 316L (1.4404)
Gasket (Sensor):	FKM
Electric connection:	EN 175301-803 Form A
Protection degree:	IP 65 according to IEC 529 / EN 60529**
Weight:	0.12 kg

* Including non-linearity, hysteresis, non-repeatability and output signal deviation of zero at the reference conditions described in standard EN 61298-1

** with properly assembled electric connection .

Measuring ranges [bar, relative]	**Overpressure limit** [bar, relative]
-1...0	5
-1...0.6	5
-1...1.5	5
-1...3	8
-1...5	12
-1...9	20
-1...15	32
-1...24	50
0...1/0...1.6/0...2.5	5
0...4	8
0...6	12
0...10	20
0...16	32
0...25	50
0...40	80
0...60	120
0...100	200
0...160	320
0...250	500
0...400	600
0...600	800

11. Order Codes

Order Details (Example: **SEN-9601 0 B075 A 0**)

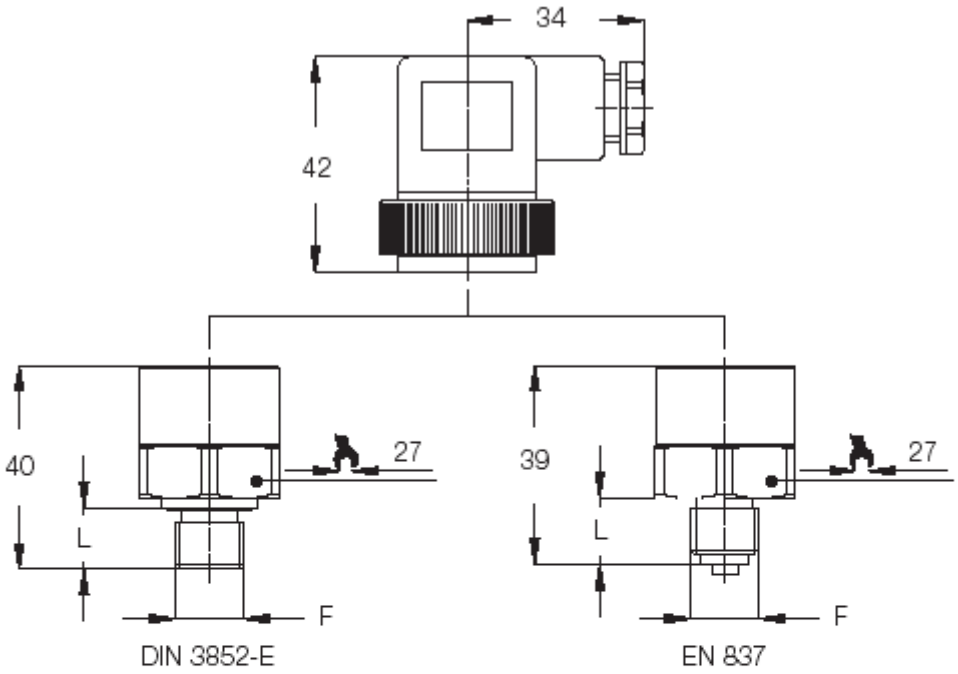
Model	Output	Measuring range	Mechanical Connection	Options
SEN-9601...	**...0...=** 4-20 mA, 2-wire **(standard)** **...1...*=** 0...5 V_{DC} (8...30 V_{DC}) **…2…*=** 0…10 VDC (14…30 VDC) **…3…*=** 0.5…4.5 VDC ratiometric (5 VDC ± 10 %) **…4…*=** 1…5 VDC (8…30 VDC)	C 315 = -1...0 bar C 505* = -1...0.6 bar C 515 = -1...1.5 bar C 525 = -1...3 bar C 535 = -1...5 bar C 545 = -1...9 bar C 555 = -1...15 bar C 565* = -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 B 095 = 0...25 bar B 105 = 0...40 bar B 115 = 0...60 bar B 125 = 0...100 bar B 135 = 0...160 bar B 145 = 0...250 bar B 155 = 0...400 bar A 165*= 0...600 bar	**A** = G½, male (standard) **B*** = G¼,male **E*** = G¼ DIN 3852-E, male **F*** = ½"NPT, male **G*** = ¼"NPT, male	**0** = without **Y*** = special option (specify in clear text)

* Minimum or quantity = 20 pieces per item (identical model code)

Output signal code	**4...20 mA 0**	**0...5 V_{DC} 1**	**0...10 V_{DC} 2**	**0.5...4.5 V_{DC} ratiometric – 3**	**1...5 V_{DC} 4**
No. of wires	2	3	3	3	3
Load max.	$R_L \leq (UB-8)/0.02\ \Omega$	$R_L \geq 5\ k\Omega$	$R_L \geq 10\ k\Omega$	$R_L \geq 4.5\ k\Omega$	$R_L \geq 5\ k\Omega$
Supply: UB	8...30 VDC	8...30 VDC	14...30 VDC	5 ± 10 %	8...30 VDC
Absorbed current (mA) max.	< 25	< 10	< 10	< 10	< 10

All output signals are provided of protection against short circuit and polarity inversion.
Insulation tension 500 V_{DC}

12. Dimensions



F[1]	L (mm)
A - G½, male EN 837	20
B - G¼, male EN 837	13
E - G¼, male DIN 3852-E[2]	13
F - ½ - 14 NPT	20
G - ¼ - 18 NPT	13

[1] Torque 20...30 Nm

[2] For pressures up to 400 bar

13. EU Declaration of Conformance

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

Pressure Sensor with Ceramic Sensor Elements Model: SEN-9601

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)

2014/68/EU **PED**
> 200 bar
Category I
Module D
Notified body: DNV GL
Certificate number: PEDD0000002
mark CE 0575

Hofheim, 02. November 2017

H. Peters
General Manager

M. Wenzel
Proxy Holder