OPERATING MANUAL

Precont® PK4 | Ultra-compact electronic pressure transmitter with metal measuring diaphragm up to 200 °C / +392 °F with ATEX/IECEx certification

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07/2026

senseca

Contents

1 Notes on the Document

1.1 Document Purpose

This manual describes the product's design, functions, and use, and helps ensure that the product is operated as intended.

Read the manual carefully before using the product. This will help you avoid potential injury, property damage, and damage to the device.

The operating manual is an integral part of the device and must be kept accessible at all times in the immediate vicinity of the operating site.

The information in this document reflects the knowledge available at the time of printing. Subject to change without notice.

1.2 Terminology

NOTE

Guidelines for preventing malfunctions, operational failures, and damage to equipment or systems.


WARNING

Failure to follow these instructions may result in serious or fatal injury.

[04-5]

Reference to a variant >> Product Code section

1.3 Additional Documentation

In addition to this document, you can find additional documentation online.

2 Safety Instructions

2.1 Authorized Personnel

Installation, electrical connection, commissioning, operation, maintenance, disassembly, and disposal of the device must be performed by a qualified and authorized specialist in accordance with the instructions in the operating manual and applicable standards.

This specialist must have read and understood the operating instructions, particularly the safety instructions. The required personal protective equipment must always be worn when working on or with the device.

If the device is intended for use in potentially explosive atmospheres, the safety instructions for electrical equipment intended for use in potentially explosive atmospheres must be observed in particular.

2.2 Intended Use

The device is an electronic pressure sensor for monitoring, controlling, and continuously measuring pressures in gases, vapors, liquids, and dusts.

The device's operational safety is guaranteed only when used as intended. Improper or unintended use of this product may result in application-specific hazards, such as a container overflow due to incorrect installation or adjustment. This can result in property damage, personal injury, or environmental damage. Furthermore, this may impair the device's performance.

Improper use, failure to follow the operating instructions and technical regulations, the use of inadequately qualified personnel, unauthorized modifications, and damage to the device exclude the manufacturer's liability for any resulting damages. The manufacturer's warranty is void.

2.3 Operational Safety

The device is designed and tested in accordance with the state of the art to ensure operational safety. It may only be operated when it is in technically sound and safe operating condition. The operator is responsible for ensuring the trouble-free operation of the device.

The device may only be used within the permissible operating limits. Any use outside these intended limits may result in significant hazards.

The materials must be checked for compatibility with the application requirements prior to use. An unsuitable material can lead to damage, malfunction, or destruction of the device and the resulting hazards.

The device must not be used as the sole means of preventing hazardous conditions on machines and systems.

For safety and warranty reasons, any interventions beyond the described operating procedures may only be performed by personnel authorized by the manufacturer. Unauthorized modifications or alterations are expressly prohibited. For safety reasons, only accessories specified by the manufacturer may be used.

This device complies with Article 4(3) of EU Directive 2014/68/EU (Pressure Equipment Directive) and is designed and manufactured in accordance with good engineering practice.

Devices with a maximum measurement range of > 200 bar are designed for media in Fluid Group 2.

The device meets the requirements of all relevant EU directives. This is confirmed by the CE marking affixed to the device. The corresponding EU Declaration of Conformity can be requested or downloaded from the website.

2.4 Equipment for Potentially Explosive Atmospheres

If a device is installed and operated in potentially explosive atmospheres, the general Ex installation regulations (EN/IEC 60079-14, VDE 0165), these operating instructions, the EU type examination certificate, or the IECEx certificate of conformity, including any supplements, must be observed. The installation of equipment in potentially explosive atmospheres must be performed by qualified personnel.

The devices are designed for measuring pressures in hazardous areas.
The measured media may also include flammable liquids, gases, mists, vapors, or dusts.

Maximum permissible values for intrinsically safe circuits:

Voltage	Ui	30 V
Current	Ii	300 mA
Power	Pi	900 mW
Effective internal capacitance	Ci	negligible
effective internal inductance	Li	5 µH

The intrinsically safe signal and power supply circuit is safely galvanically isolated from parts that can be grounded.

CATEGORY 1

The device may be installed in hazardous areas where Category 1 equipment is required.

Category 1 equipment may be operated in potentially explosive atmospheres where Category 1 equipment is required only if atmospheric conditions are met (temperature—see the following tables; pressure from 0.8 bar to 1.1 bar).

Category 1 equipment must be connected to intrinsically safe circuits of protection level ia.

CATEGORY 2

The device may be installed in potentially explosive atmospheres where Category 2 equipment is required.

Category 2 equipment may be connected to intrinsically safe circuits with protection level ib.

For applications requiring EPL Ga or Gb devices, the following values apply:

Ex Marking	**Ambient temperature range at the Tamb electronics housing**	**Maximum surface temperature at the sensor Tmax**
(I 1 G Ex ia IIC T6 Ga II 2 G Ex ib IIC T6 Gb	-40…+42 °C	T_M (medium temperature) + 8 K The specific conditions must be observed in this regard.
II 1 G Ex ia IIC T5 Ga II 2 G Ex ib IIC T5 Gb	-40…+57 °C	
II 1 G Ex ia IIC T4 Ga II 2 G Ex ib IIC T4 Gb	-40…+92 °C	
II 1 G Ex ia IIC T3…T1 Ga II 2 G Ex ib IIC T3…T1 Gb	-40…+97 °C	

For applications requiring EPL Da or Db devices, the following values apply:

Ex marking	Ambient temperature range at the electronics housing Tamb	Maximum surface temperature at the sensor Tmax
(II 1 D) Ex ia IIIC T80°C Da (II 2 D) Ex ib IIIC T80°C Db	-40°C...+42°C	T_M (medium temperature) + 8K The specific conditions must be observed in this regard.
(II 1 D) Ex ia IIIC T95°C Da (II 2 D) Ex ib IIIC T95°C Db	-40°C...+57°C	
(II 1 D) Ex ia IIIC T130°C Da (II 2 D) Ex ib IIIC T130°C Db	-40°C...+92°C	
(II 1 D) Ex ia IIIC T195°C Da (II 2 D) Ex ib IIIC T195°C Db	-40°C...+97°C	

Heat transfer from the process that exceeds the transmitter's permissible ambient temperature is not permitted and must be prevented by means of suitable thermal insulation or an appropriate temperature decoupler.

3 Product Description

3.1 Function

The device is an electronic pressure sensor for monitoring, controlling, and continuously measuring pressures in gases, vapors, liquids, and dusts.

Its extremely compact design allows for use especially in confined installation spaces.
High temperature resistance allows it to be used in a wide range of applications, including demanding measurement tasks.

Thanks to its high accuracy and digital calibration via FSK, the device can be adapted to a wide variety of applications.

The long-term stable and robust metal strain gauge sensing element ensures reliably precise measurements at medium to high pressures and enables operation even under demanding environmental conditions, such as low temperatures, high shock and vibration loads, or problematic media.

3.2 Setup

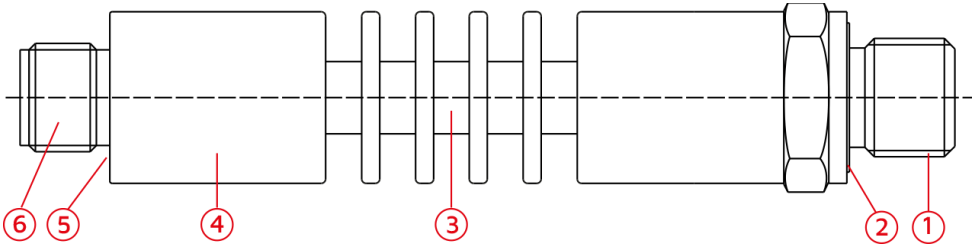

Figure3.1: grf00162_cmp_pk4sh_pt1

1 Process connection
2 Process seal
3 Temperature decoupler—optional
4 Connection housing
5 Pressure-compensating diaphragm
6 Plug-in connector

The device is installed in the respective system via the process connection (1). The process connection is sealed off from the process by a suitable elastomer seal (2)

The process pressure acts directly (dry system) via the internal process diaphragm on the thin-film strain gauge applied to the rear surface, causing a change in resistance there, which are detected by the electronics integrated into the terminal housing (4), processed according to the settings, and output via the outputs on the connector (6).
The process diaphragm is hermetically welded to the process connection (1).

The temperature decoupler (3) allows for use at process temperatures up to +200°C.

The device features a pressure-compensating diaphragm (5) to compensate for changes in atmospheric pressure.

Parameterization and operation of the integrated evaluation electronics are performed via the wired interface.

Laser-etched marking on the nameplate on the housing tube (4) ensures the device's identifiability throughout its entire service life.

3.3 Nameplate

The nameplate contains the most important data for identifying and using the device.

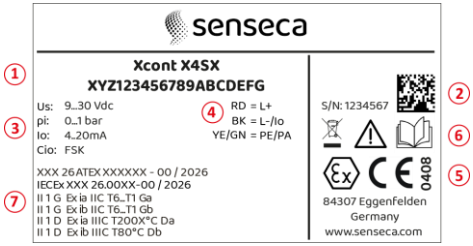

Figure3.2: grf00002_lab001

1 Product code
2 Serial number
3 Technical Specifications
4 Electrical Connection
5 Approvals
6 Safety Instructions
7 Type of protection

3.4 Product Code

PK4 [01][02][03][04][05][06][07][08][09][10][11][12][13][14][95][97][98][99]

	Device	PK4	Ultra-compact pressure sensor
01	Application Type	S	Standard
02	Sensor	M	DMS – Thin Film / Steel 2.4668/Inconel Alloy 718
03	Approval	S	Standard
03		X	ATEX: II 1 G Ex ia IIC T6 Ga / II 1 D Ex ia IIIC Da
04	Process connection	3	Thread ISO 228-1 – G¼"A, ISO 1179-2 E
05	Process Seals	1	FKM/FPM
05		3	EPDM, FDA
06	Process connection	V	CrNi steel
07	Connection housing	C	K41, 316L steel
08	Measuring range	10	0…10 bar
08		13	0…40 bar
08		19	0…100 bar
08		24	0…600 bar
09	Electronics – Output	A	Current 4…20 mA, FSK, 2-wire
10	Electronics – Function	S	Standard
11	Process Temperature	0	-40…+125 °C (-40…+257 °F)
11		1	-40…+200 °C (-40…+392 °F)
12	Pressure variant	R	Relative pressure
13	Measurement Accuracy	4	0.5%
14	Electrical Connection	S	M12-A-4P connector

95	Optional accessory	+ML	Measurement Point Designation / TAG - Laser Mark
97	Optional accessory	+WT	Factory Certificate – Suitable for Drinking Water
98	Optional accessory	+KF	Configuration / Default Settings
99	Optional accessory	+WK	Factory Calibration – Calibration Certificate

Variants are generally identified by the letter Y in the product code.

3.5 Dimensions

Dimensions in mm

Thread ISO 228-1 – G1/4", ISO 1179-2 E / -40...+125°C - [11-0]

Process pressure Pmax = 600 bar

Torque Mmax = 50 Nm

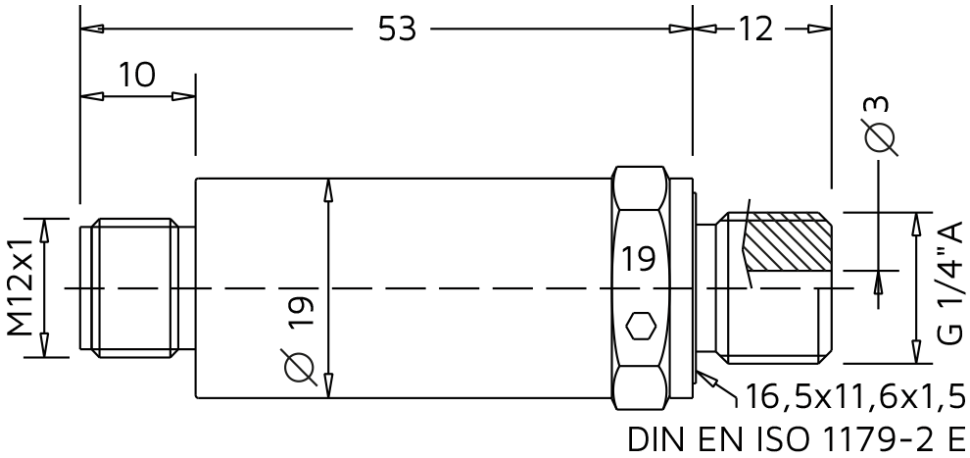

Figure3.3: grf00163_dim_pk4sh_04_3_11_0

Thread ISO 228-1 – G1/4", ISO 1179-2 E / -40...+200°C - [11-1]

Process pressure Pmax = 600 bar

Maximum torque Mmax = 50 Nm

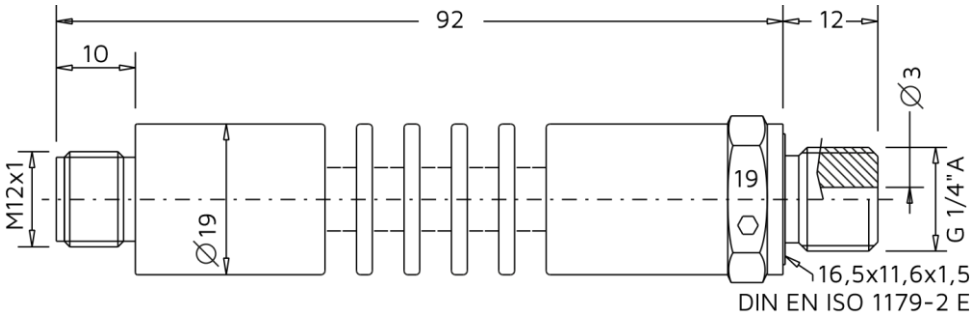

Figure3.4: grf00164_dim_pk4sh_04_3_11_1

3.6 Packaging, Transport, Storage

The device is protected by packaging designed to withstand normal transport stresses. Transport must be carried out in accordance with the instructions on the shipping packaging. Failure to do so may result in damage to the device.

Upon receipt, the shipment must be inspected immediately for correctness, completeness, and any transport damage. Any transport damage or hidden defects found must be handled accordingly.

The packages must be kept sealed until installation and, unless otherwise specified, stored only under the following conditions:

- Do not store outdoors
- Store in a dry, dust-free location
- Do not expose to corrosive substances
- Protect from direct sunlight
- Avoid mechanical shocks
- Storage and transport temperature: -20…+85 °C
- Relative humidity 20–85%

3.7 Accessories

A comprehensive range of accessories, optimally tailored to the device, is available for installation and electrical connection.

4 Installation

4.1 Ambient and Process Conditions

Correct operation of the device within the specified technical data can only be guaranteed if the permissible ambient and process conditions at the installation site (see the Technical Data section) are not exceeded. Therefore, before installation, ensure that all parts of the device in contact with the process (e.g., measuring diaphragm, process seal, process connection) are suitable for the prevailing process conditions (e.g., process pressure, process temperature, chemical properties of the media, abrasion, mechanical stresses).

4.2 Installation Location

Avoid installing the device in a location where high pressure surges may occur.

The device should be installed in temperature-stabilized locations whenever possible. Significant fluctuations in process temperature can cause temporary increases in measurement signal deviations.

At high process temperatures, heat transfer to the connection housing can be reduced by insulating the medium-carrying part of the system or by using a temperature decoupler.

Pressure Measurement in Gases:

Install the device above the connection so that condensate can drain back into the process.

Use a shut-off valve.

Pressure measurement in vapors:

Install the device downstream of a U-bend or loop and a shut-off valve below the sampling port. Condensate forms in the pipe bends, creating a protective water seal. In superheated steam applications, this ensures a medium temperature ≤ 100 °C at the transmitter.

Pressure measurement in liquids:

Install the device downstream of the shut-off valve, either below or at the same level as the sampling port. Install the device below the lowest measurement point. This ensures that the differential pressure line is always filled with liquid, allowing gas bubbles to rise back into the process line. Do not install the device in the flow stream, in the suction zone of a pump, or at a location in the tank where it may be subjected to pressure pulses from an agitator.

4.3 Installation Instructions


WARNING

Install the device only when the system is depressurized. There is a risk of rapidly escaping measured media or a pressure surge.


WARNING

Allow the system to cool sufficiently before installation. There is a risk from escaping, hazardous, and hot measured media.

Do not remove the packaging until immediately before installation, and inspect the device for any damage.

The transport protection cap attached to the process connection or the diaphragm must not be removed until immediately before installation. The transport protection cap must be removed. The diaphragm must not be damaged.

Contamination or damage to the pressure-compensating diaphragm can lead to incorrect measurement results.

Sealing surfaces and threads on the device and at the installation site must be clean and undamaged. Cylindrical threads must be sealed using a suitable O-ring, flat gasket, or profiled gasket. Additional sealing material such as tow, Haf, or PTFE tape should not be used.

Tapered threads must be wrapped with additional sealing material, such as PTFE tape, to ensure a proper seal.

NOTE

Installing a device into a shut-off connection that is completely filled with process fluid can result in the destruction of the measuring diaphragm. The reduction in fluid volume when screwing in the device leads to a very sharp increase in pressure, which can exceed the maximum allowable pressure many times over. Therefore, the connection must be sufficiently drained before installation.

NOTE

The threaded process connection must be tightened only at the hexagon using a suitable wrench, applying no more than the maximum permissible tightening torque (see the “Product Description – Dimensions” section).

5 Electrical Connection

5.1 Electronics Output – Current 4...20 mA, FSK – [09-A]

5.1.1 Function

The digital communication protocol uses Frequency Shift Keying (FSK) technology and is superimposed on the 4…20 mA analog sensor signal. This enables two-way communication with the field and thus the transmission of additional information—beyond the standard process variables—to or from a smart field device.

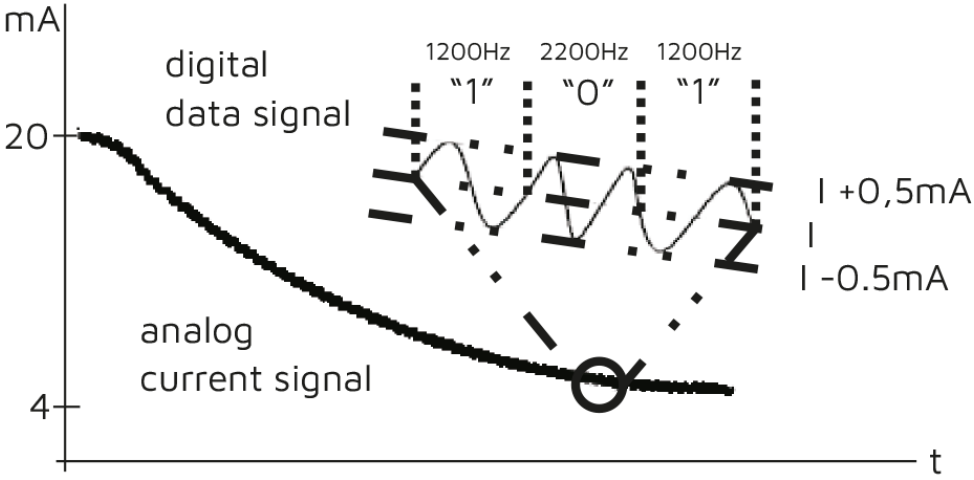

Figure5.1: grf00006_eac_fsk

The communication protocol operates at 1,200 bits/s without interrupting the 4…20 mA signal and enables the host application (master) to receive two or more digital updates per second from a smart field device. The digital signal does not interfere with the 4…20 mA signal.

The communication protocol provides two simultaneous communication channels: the analog 4–20 mA signal and a digital signal. The 4–20 mA signal transmits the primary measured value via the 4–20 mA current loop, the fastest and most reliable industry standard. The digital signal provides additional information from the device, including device status, diagnostic data, additional measured values, or calculated values, etc. The combination of these two principles in a single installation enables a cost-effective and exceptionally robust, comprehensive field communication solution that is easy to use and configure.

5.1.2 Pin Assignment

M12 connector, non-hazardous area

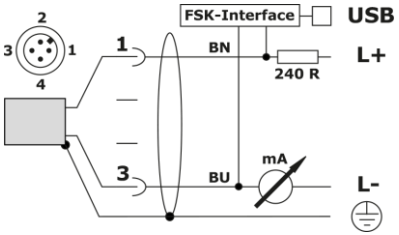

Figure5.2: grf00114_eac_m12_4p_2w_ma_fsk

M12 connector, hazardous area

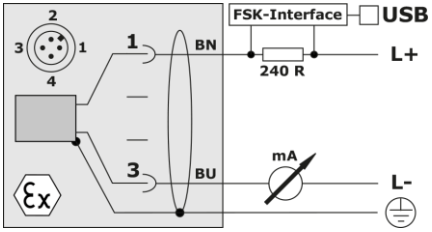

Figure5.3: grf00116_eac_m12_4p_2w_ma_fsk_ex

NOTE

Include a 240-ohm resistor in the +L line for connecting an FSK communication device.

5.1.3 Connection cable

Use a 2-conductor, twisted-pair, shielded cable.

Cable: M12 – A-coded, 1-BN = brown / 2-WH = white / 3-BU = blue / 4-BK = black

5.1.4 Connection Instructions

WARNING

Install the device only when it is de-energized.

NOTE

Switch off all connected control devices before commissioning.

Observe the maximum permissible supply voltage Us at the L+/L- terminals:

- Us = 9…35 Vdc
- Example: Us = 9…30 Vdc

Observe the maximum permissible load resistance RL of the analog output:

- RL ≤ (Us – 9 V) / 22.2 mA

Ground the device, preferably via the metal housing, or alternatively via the cable shield.
Route the cable separately from power-carrying lines.

5.1.5 Analog Output Io

An analog current signal is output, which corresponds to the device's nominal measurement range:

- 4 – 20 mA Output signal range 3.9...20.5 mA

Behavior of the output current value when the output signal range is exceeded:
The output current remains at the end value of 3.9 mA / 20.5 mA

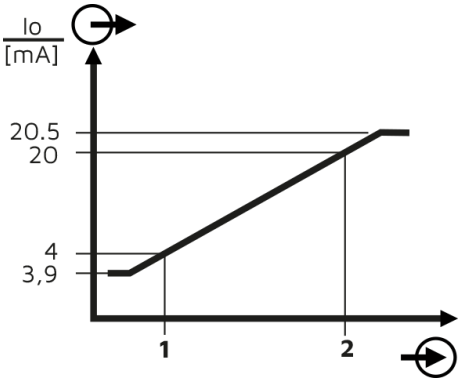

Image5 .4 : grf00181_fun_iout_4_20_hold_39_205

6 Operation

6.1 Electronics Output – Current 4...20 mA, FSK – [09-A]

Configuration and data transmission are performed via a standard FSK interface, e.g., isHRT USB and operating software.

Use of the isHRT CommDTM or ICS Generic HART DTM is recommended.

Instructions for installing and using the FSK interface and configuration software are not included in this manual.

NOTE

If the damping is set to 0 s…<1 s, communication is active for only 20 s after the supply voltage is turned on. Once a communication connection is established, it remains active.

During this time, the damping is set to 1 s. After 4 minutes of inactivity, the connection is terminated and the damping is reset to the set value. When the damping is set to ≥ 1 s, a communication connection can be established at any time.

Factory Settings [Setting Range]

	Factory Setting	**Description**
Address	0 [0…15]	
Damping	1 s [0…60 s]	Time interval, pout = 100% pin
Initial LRV value	Nominal lower setpoint = 4 mA	LRV < URV, pin ≥ 25%
Final value URV	Nominal upper setpoint = 20 mA	LRV < URV, pin ≥ 25%

7 Fault Diagnosis and Troubleshooting

The system operator is responsible for taking appropriate measures to resolve any malfunctions that occur.

In the event of a malfunction, check:

Component / Area	Test	Remedy
Housing	Damage	Replace or return the device
Pressure diaphragm	Contamination	Clean the device or send it in
	Damage	Replace or return the device
Process seals	Damage	Replace the process seal
		If necessary, use a different sealing material
Pressure-compensating capillary	Contamination	Send the device in for repair
Supply voltage	Operating voltage present	Turn on operating voltage
		Check or repair the connection terminals
	Operating voltage polarity reversed	Reverse the polarity of the operating voltage
	Operating voltage too low	Adjust or repair
	Operating voltage too high	Send the device in for repair
	Load resistance too high	Increase operating voltage
	Connection cable is damaged	Send the device in for repair

If the malfunction cannot be resolved, please contact the manufacturer.

8 Maintenance

The device is maintenance-free when used as intended.

Deposits adhering to the diaphragm can cause incorrect readings. In this case, clean the diaphragm regularly. Do not use sharp or hard tools, compressed air, or corrosive chemicals. Device disassembly: See the “Disassembly” section.

9 Repair

The device is not intended for repair by the user. Repairs may only be performed by the manufacturer.

9.1 Disassembly

Wear appropriate protective clothing, e.g., safety goggles and gloves.


WARNING

Allow the device and system to cool sufficiently before disassembly. There is a risk from hot surfaces as well as leaking, hazardous, and hot measured media.


WARNING

Install the device only when the system is depressurized. There is a risk from rapidly escaping measured media or water hammer.


WARNING

Disassemble the device only when it is de-energized.


WARNING

Shut down all connected control devices before disassembly.

After disassembly, the diaphragm must be fitted with a protective cap.

9.2 Returns

Returns can only be accepted if the device is accompanied by a decontamination declaration.

The declaration is available for download on the website and must be fully completed and affixed to the outside of the packaging in a manner that protects it from the elements and ensures safe transport.

9.3 Disposal

Figure9.1: sym00001_weee_can

In accordance with EU Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), the product is marked with the symbol shown to minimize the disposal of WEEE as unsorted household waste. These products must not be disposed of as unsorted household waste and can be returned to the manufacturer for disposal. Returns are subject to the manufacturer's general terms and conditions or individually agreed terms.

10 Technical Specifications

Reference Conditions	Ta = +15...+25 °C (+59...+77 °F) / Pa = 860...1060 kPa / r.F. = 45...75 %
	Us = 24 Vdc ±0.1 V / ton = 240 s / vertical, sensor at the bottom
Measurement Deviation	EN/IEC 60770-1: Characteristic curve deviation – Setpoint adjustment

10.1 Inputs

10.1.1 Pressure input

Sensor type	DMS Thin-Film Cell					
Type Code	[08-10]	[08-13]	[08-19]	[08-24]		
Measuring Range PN – FSI	0…10 bar	0…40 bar	0…100 bar	0…600 bar		
Overload pressure	20 bar	80 bar	200 bar	1,220 bar		
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar		
Burst pressure	300 bar	800 bar	2,000 bar	3,000 bar		
Resolution	FSI ≥ 16 bits					
Characteristic curve deviation	±0.5% FSI					
Effect of auxiliary power	≤ ±0.002% FSI/V					
Hysteresis	≤ ±0.15 %FSI					
Repeatability	≤ ±0.05 %FSI					
Temperature effect	Temperature effect on zero point ≤ ±0.015% FSI/K					
	Temperature effect on span ≤ ±0.015 %FSI/K					
Effect of Mounting Position	negligible					

Long-term zero-point drift	≤ ±0.2 %FSI/year (Tp = +15…+25 °C) / ≤ ±0.5 %FSI/year (Tpmax)

10.2 Outputs

10.2.1 Electronic output – current 4...20 mA, FSK – [09-A]

Interface – Cio	
Specifications	FSK / 1200 bits/s
Coupling resistance	≥ 240 ohms, external
Analog Output – Io	
Signal range	4…20 mA = measurement range >> [08-##], limit value/error = 3.9…20.5 mA
Resolution	≤ 1 µA
Permissible load RL	≤ (Us – 9 V) / 20.5 mA
Time response t90-min	≤ 2 ms (td = 0 s)
Effect of auxiliary power	≤ ±0.5 µA/V
Temperature effect Ta	≤ ±1 µA/K
Auxiliary power	
Supply Voltage Us	9…35 Vdc, reverse-polarity protected / ≤ 2 Vpp
Input current Is	≤ 20.5 mA
Power-on delay time	≤ 0.1 s (td = 0 s)

10.3 Environmental conditions

Process temperature Tp	[11-0]: -40…+125 °C (-40…+257 °F)
	[11-1]: -40…+200 °C (-40…+392 °F)

	[05-1] (FKM/FPM): -25…+200 °C (-13…+392 °F)
	[05-3] (EPDM): -40…+140 °C (-40…+284 °F)
	[03-X]: ATEX/IECEx: see certificate
Pressure cycles	≥ 100 million (1.2x PN)
Ambient temperature Ta	[11-0]: -40...+125 °C (-40…+257°F)
	[11-1]: -40...+125 °C (-40…+257 °F) / Tp -40...+150 °C (-40…+302 °F)
	[11-1]: -40...+100 °C (-40…+212 °F) / Tp -40…+175 °C (-40…+347 °F)
	[11-1]: -40...+85 °C (-40…+185 °F) / Tp -40…+200 °C (-40…+392 °F)
	[03-X]: ATEX/IECEx: see certificate
Protection class	IP69K/IP67 (EN/IEC 60529)
Climate class	4K4H (EN/IEC 60721-3-4)
Impact resistance	500 g [1 ms] (EN/IEC 60068-2-27)
Vibration resistance	20 g [10…2000 Hz] (EN/IEC 60068-2-6)
EMC	Equipment Class B / Industrial Environment (EN/IEC 61326)
Dielectric strength	500 VAC
Protection class	III
Pollution degree	4
Operating altitude	2,000 m above sea level
MTTF	463.4 years
Weight	[11-0]: 0.05 kg
	[11-1]: 0.07 kg

10.4 Materials

In contact with the process	Steel 2.4668/Inconel Alloy 718, Steel 1.4404/316L, FKM/FPM, EPDM
Non-process-contacting	CrNi steel, PUR, acrylic copolymer, FKM/FPM

11 Revision

Version	Changes
UMN07.26	Initial release

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