OPERATING MANUAL

Precont® PU4 | Universal Electronic Pressure Transmitter with ceramic or metal measuring diaphragm with a wide range of configuration options

umn_fam_pu4_vs1.01_en
07/2026

senseca

Contents

1 Notes on the Document

1.1 Document Function

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 Terms

NOTE

Information on how to prevent malfunctions, operational failures, and damage to the device or system.


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 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 work beyond the procedures described here 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.

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

The Electronics Output [09-A] version—current 4…20 mA, FSK interface, 2-wire—is suitable for use in 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 systems in potentially explosive atmospheres must be performed by qualified personnel.

The devices are designed for measuring pressures in potentially explosive atmospheres. 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 electronics housing Tamb**	**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) + self-heating PU4*C: + 19K PU4*K: + 11K PU4*M/H/F: + 8K Please note the special conditions applicable here.
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) + self-heating PU4*C: + 19K PU4*K: + 11 K PU4*M/H/F: + 8K Please note the special conditions applicable here.
(II 1 D) Ex ia IIIC T95°C Since (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 reflux 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.

A wide variety of process connections and electronic configurations allows it to be used in a multitude of applications, including demanding measurement tasks.

Thanks to its high accuracy and the ability to be digitally calibrated via FSK, RS485 Modbus®-RTU, or IO-Link®, the device can be adapted to a wide variety of applications.

The flush-mounted process connection enables process-integrated cleanability of the measuring diaphragm in contact with the medium, including via CIP/SIP cleaning processes. This ensures maintenance-free and trouble-free pressure measurement even in critical applications involving viscous or frequently changing media.

The device series is available with various measuring cells for optimal adaptation to the application:

Type	(K)eramic / (M)etal Membrane	Internal membrane	Diaphragm flush with front	Dry transmission	Oil-filled transmission	Sensor: (C)apacitive / (D)MS	Sensor seal: none	Sensor seal: elastomer	Pressure variant: (R)elative / (A)bsolute	Process pressure: Low pressure	Process pressure: High pressure	Process temperature	Measurement Accuracy	Measurement Accuracy Xcellence	IP Protection	ATEX/IECEx	Food
PU4SE	K	x		x		D		x	R	+	+	+	+		++		
PU4SK	K	x	x	x		D		x	R/A	++	++	++	+	x	++	x	
PU4SC	K	x	x	x		k		x	R/A	++	o	++	++	x	++	x	

PU4SM	M	x	x	x	x	D	x	x	R/A	+	++	++	+	x	++	x	
PU4LM	M		x		x	D		x	R/A	++	o	++	+	x	++	x	x

PU4*C: The highly accurate, long-term stable, and robust capacitive ceramic sensing element reliably ensures highly precise measurements at low to medium pressures and enables operation even under demanding environmental conditions, such as low temperatures, high shock and vibration loads, or problematic media.

PU4*K: The long-term stable and robust strain gauge ceramic sensing element reliably ensures precise measurements at low to high pressures and enables operation even under demanding environmental conditions, such as low temperatures, high shock and vibration loads, or problematic media.

PU4*E: The internal, cost-effective, long-term stable strain gauge ceramic sensing element ensures reliably accurate measurements at medium pressures and enables operation under a wide range of environmental conditions, such as low temperatures or high shock and vibration loads.

PU4SM: The long-term stable and robust strain gauge or piezoresistive metal sensing element ensures reliably precise measurements at low to very high pressures and enables operation even under demanding environmental conditions, such as low temperatures, high shock and vibration loads, or problematic media.

PU4LM: The EHEDG-tested flush-mounted diaphragm, with a surface roughness of Ra < 0.4 µm, is fully welded to the process connection and equipped with a form-fit seal. This ensures a reliable, gap-free, and dead-space-free seal for aseptic applications.

3.2 Design

3.2.1 Ceramic Sensor Diaphragm

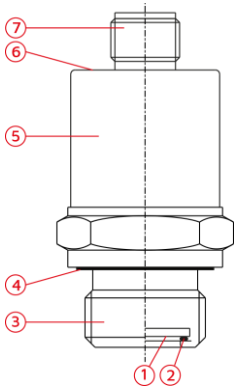

Figure 3 .1 : grf00091_cmp_pu4sc

3.2.2 Metal sensor membrane

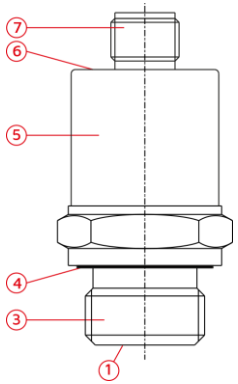

Figure3.2: grf00092_cmp_pu4sm

1 Pressure cell diaphragm
2 Pressure cell seal
3 Process connection
4 Process seal
5 Connection housing
6 Pressure-compensating diaphragm
7 Plug-in connector

The device is installed in the respective system via the process connection (3). Depending on the model, the process connection is sealed off from the process either by a suitable elastomer seal (4) or without an elastomer.

The process pressure acts:

- **PU4*C**: acts directly (dry system) via the process membrane (1) on the capacitor applied to the rear side, causing a change in capacitance there,
- **PU4*K/PU4*E**: acts directly (dry system) via the process membrane (1) on the thick-film strain gauge mounted on the rear side, causing a change in resistance there,
- **PU4SM**: either directly (dry system) via the internal process membrane (1) or via the face-flush process membrane (1) using a pressure-transmitting fluid to the thin-film or piezoresistive strain gauge mounted on the back, causing a change in resistance there,
- **PU4LM**: via the front-flush process membrane (1) using a pressure-transmitting fluid on the piezoresistive strain gauge applied to the rear, causing a change in resistance there,

which is detected by the electronics integrated into the connection housing (5), processed according to the settings, and output via the outputs on the connector (7).

- **PU4*C/PU4*K/PU4*E**: The process diaphragm (1) is sealed to the process connection (3) by the elastomer measuring cell seal (2).
- **PU4SM/PU4LM**: The process diaphragm (1) is hermetically welded to the process connection (3).

The device features a pressure-compensating diaphragm (6) 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 affixed to the housing tube (2) 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.

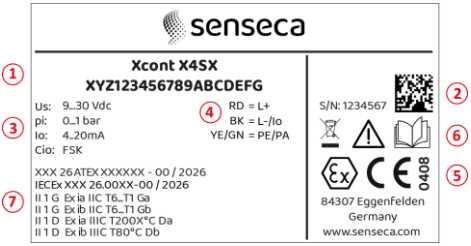

Figure3.3: grf00002_lab001

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

3.4 Product Code

PU4 [01][02][03][04][05][06][07][08][09][10][11][12][13][14][94][95][96][97][98]

	Device	PU4	Compact Pressure Sensor
01	Application Type	S	Standard – [02-C/K/E/M]
01		L	Hygiene – [02-M]
02	Sensor	C	Capacitive, Al_2O_3 ceramic – [01-S]
02		K	Strain Gauge – Thick-film, Al_2O_3 ceramic – [01-S]
02		E	DMS – Thick-film monolithic, Al_2O_3 ceramic – [01-S]
02		M	DMS – Thin-film/piezoresistive, 316Ti/630 steel – [01-S]
02			DMS – piezoresistive, 316L steel – [01-L]
03	Approval	S	Standard
03		X	ATEX: II 1 G Ex ia IIC T6 Ga / II 1 D Ex ia IIIC Da - [09-A]/[14-S]
04	Process connection	3	Thread ISO 228-1 – G¼”A, ISO 1179-2 E - [PU4*C/K]
04		6	Thread ISO 228-1 – G¼"A, EN 837 (pressure gauge)
04		4	Thread ISO 228-1 – G¼"I, female thread - [PU4*C/K]
04		9	Thread ISO 228-1 – G½"A, flush-mounted - [PU4*C]
04		0	Thread ISO 228-1 – G½"B, flush-mounted - [PU4SM]

04		1	Thread ISO 228-1 – G½"A, EN 837 (pressure gauge)
04		2	Thread ISO 228-1 – G½"A, ISO 1179-2 E, internal bore - [PU4*C/K]
04		8	Thread ISO 228-1 – G¾"A, ISO 1179-2 E, flush with front – [PU4*C/K]
04		5	Thread ISO 228-1 – G1"A, ISO 1179-2 E, flush-mounted - [PU4*C/K]
04			Thread ISO 228-1 – G1"B, face-flush - [PS4SM – 08-03/16/17]
04			Thread ISO 228-1 – G1"B, face-flush, EHEDG - [PU4LM]
04		7	ISO 228-1 thread – G1½"B, front-flush – [PU4*C]
04		E	ANSI thread – NPT ¼" - [PU4*C/K]
04		C	ANSI – NPT ½" thread - [PU4*C/K]
04		R	DIN 11851 dairy pipe fitting – DN25 - [PU4*C]
04		N	Milk pipe fitting DIN 11851 – DN40 - [PU4*C] / [PU4LM]
04		M	Milk pipe fitting DIN 11851 – DN50 - [PU4*C] / [PU4LM]
04		P	Varivent N - DN40...162 (1½...6"), Ø68 mm - [PU4*C] / [PU4LM]
04		L	DRD – DN50, Ø65 mm - [PU4*C] / [PU4LM]
04		U	Clamp DIN 32676-A – DN20 - [PU4*C]
04		S	Clamp DIN 32676-A/-C – DN25…40, ISO 2852 – DN25…38 - [PU4*C]
05	Process Seals	0	None / NBR - [PU4SM]
05		1	FKM/FPM
05		3	EPDM, FDA - [PU4*C/K] / [PU4*M]
05		4	FFKM - [PU4*C]
05		6	FFKM, high-density - [PU4*C]

06	Process connection	V	CrNi steel
07	Connection housing	C	U41, 316L steel
08	Measuring range	26	0…50 mbar - [PU4*C]
08		01	0…100 mbar - [PU4*C] / [PU4LM]
08		02	0…200 mbar - [PU4*C] / 0…250 mbar - [PU4*K] / [PU4LM]
08		03	0…400 mbar - [PU4*C/K] / [PU4*M]
08		04	0…600 mbar - [PU4*C/K] / [PU4LM]
08		05	0…1 bar
08		06	0…1.6 bar - [PU4*C/K]
08		07	0…2.5 bar - [PU4*C/K] / [PU4LM]
08		08	0…4 bar
08		09	0…6 bar - [PU4*C/K] / [PU4*M]
08		10	0…10 bar
08		11	0…16 bar - [PU4*C/K] / [PU4*M]
08		12	0…20 bar - [PU4*C] / 0…25 bar - [PU4*K] / [PU4*M]
08		13	0…40 bar - [PU4*C/K] / [PU4SM]
08		14	0…60 bar - [PU4*C/K] / [PU4SM]
08		19	0…100 bar - [PU4*C/K] / [PU4SM]
08		20	0…160 bar - [PU4*K] / [PU4SM]
08		21	0…250 bar - [PU4*K] / [PU4SM]
08		22	0…320 bar - [PU4*K] / [PU4SM]
08		23	0…400 bar - [PU4*K] / [PU4SM]
08		24	0…600 bar - [PU4*K] / [PU4SM]
08		25	0…1000 bar - [PS4SM – 04-1/6]
08		15	-100...0 mbar - [PU4*C]

08		16	-1...0 bar - [PU4*C/K] / [PU4*M]
08		17	-1...+1 bar - [PU4*C/K] / [PU4*M]
08		18	-100...+100 mbar - [PU4*C]
09	Electronics – Output	A	Current 4...20 mA, FSK, 2-wire
09		B	Voltage 0–10 V, 3-wire - [14-C/A]
09		V	RS485 Modbus-RTU, 4-wire - [14-S]
09		L	IO-Link, current 0/4...20 mA / 1x/2x switch PP, 3-/4-wire - [14-S]
10	Electronics – Function	S	Standard
11	Process Temperature	0	-40...+100 °C (-40...+212 °F) - [PU4*C/K] / [PU4SM]
11			-25...+100 °C (-13...+212 °F) - [PU4*E]
11			-20...+150 °C (-4...+302 °F) - [PU4LM]
11		1	-40...+125 °C (-40...+257 °F) - [PU4*C] / [PU4SM]
11			-40...+135 °C (-40...+275 °F) - [PU4*K]
12	Pressure variant	R	Relative pressure
12		A	Absolute pressure - [PU4*C] / [PU4*K ≥ 1 bar / ≤ 40 bar] / [PU4*M]
13	Measurement accuracy	1	0.2% - [PU4*C]
13		3	0.1%, linearity certificate - [PU4*C]
13		4	0.5% - [PU4*K/E] / [PU4*M]
13		6	Xcellence – 0.05% [08 ≥ 200 mbar], Linearity Report - [PU4*C]
13		8	Xcellence – 0.15%, Linearity Report - [PU4*K] / [PU4*M]
14	Electrical Connection	S	M12-A-4P connector

14		C	EN 175-301-803-C (DIN 43650-C) connector
14		A	EN 175-301-803-A connector (DIN 43650-A)
94	Additional option	+SF	LABS-free, silicone-free / Paint-compatible version
95	Additional option	+ML	Measurement point designation / TAG - laser marking
96	Additional option	+MZ	Material Test Certificate – EN 10204 3.1 / [PU4*C/K/E]
97	Additional Option	+WT	Factory Certificate – Suitability for Drinking Water
98	Additional Option	+KF	Configuration / Default Setting

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

3.5 Dimensions

Dimensions in mm

3.5.1 Electrical Connection

M12 connector [14-S] / PU4*C/K/E, PU4SM

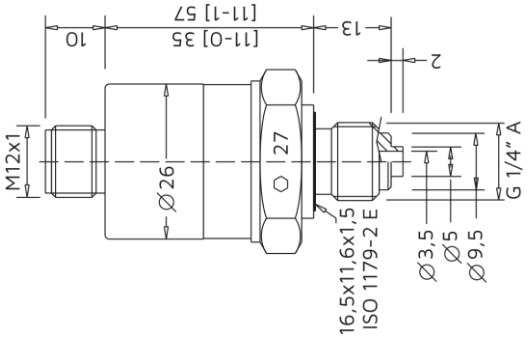

Figure 3 .4 : grf00093_dim_pu4_04_6

M12 connector [14-S] / PU4LM

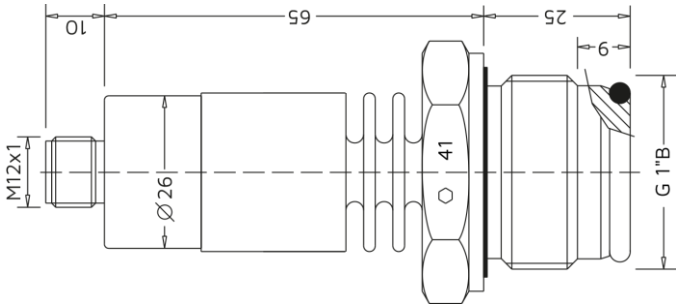

Figure3.5: grf00123_dim_pu4lm_04_5_s

Connector EN 175-301-803-C [14-C] / PU4*C/K/E, PU4SM

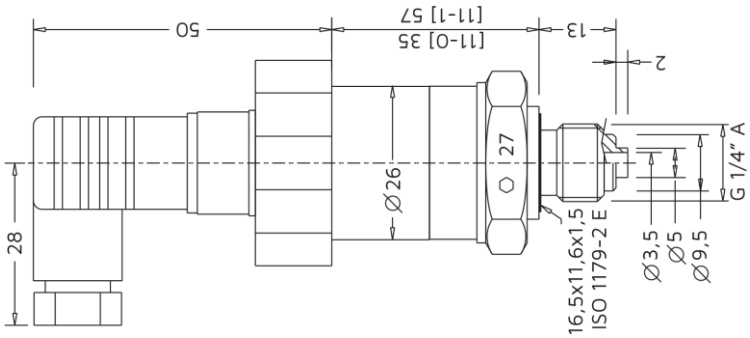

Figure3.6: grf00094_dim_pu4_04_6_14_c

Connector EN 175-301-803-C [14-C] / PU4LM

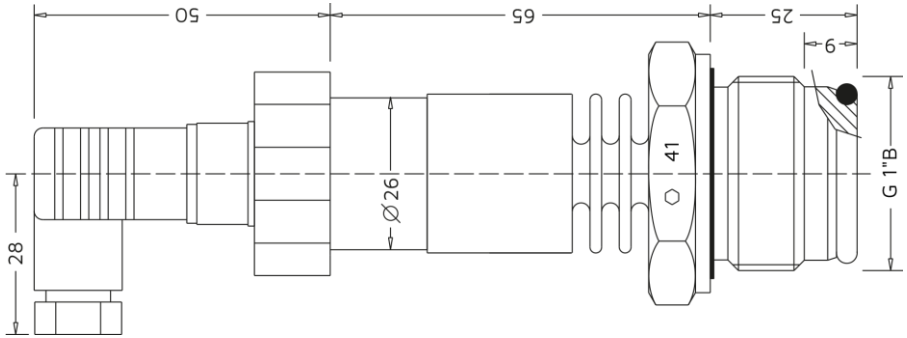

Figure3.7: grf00124_dim_pu4lm_04_5_c

Connector EN 175-301-803-A [14-A] / PU4*C/K/E, PU4SM

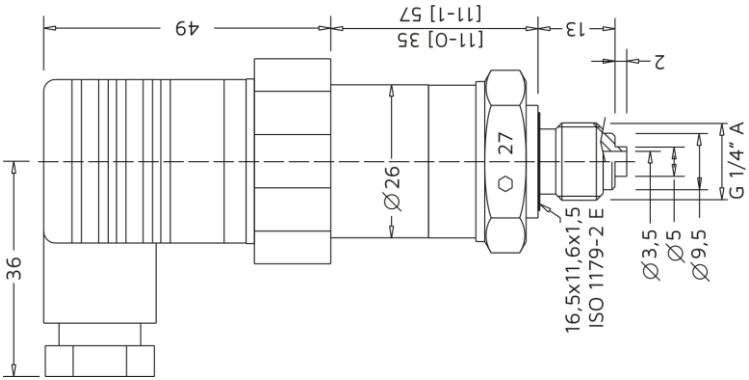

Figure3.8: grf00095_dim_pu4_04_6_14_a

Connector EN 175-301-803-A [14-A] / PU4LM

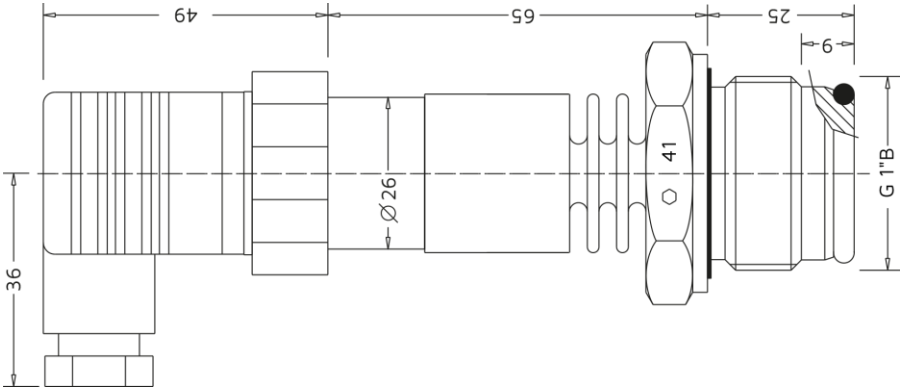

Figure3.9: grf00125_dim_pu4lm_04_5_a

3.5.2 Internal process diaphragm

Thread ISO 228-1 – G1/4", EN 837 / PU4*C/K/E - [04-6]

Process pressure Pmax = 100 bar

Torque Mmax = 50 Nm

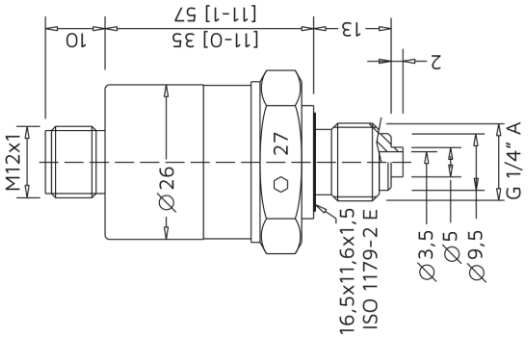

Figure3.10: grf00093_dim_pu4_04_6

Thread ISO 228-1 – G1/4", EN 837 / PU4SM - [04-6]

Process pressure Pmax = 1000 bar

Maximum torque Mmax = 50 Nm

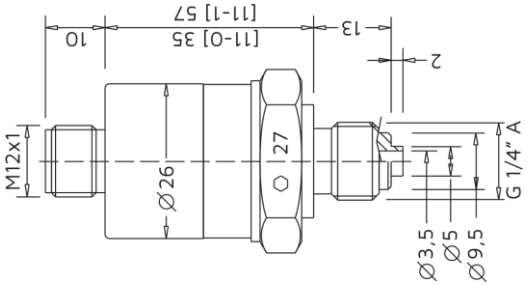

Figure3.11: grf00119_dim_pu4sm_04_6

Thread ISO 228-1 – G1/2", EN 837 / PU4*C/K/E - [04-1]

Process pressure Pmax = 100 bar

Maximum torque Mmax = 50 Nm

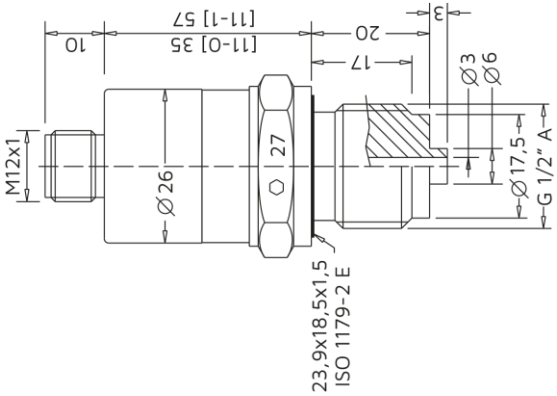

Figure3.12: grf00096_dim_pu4_04_1

Thread ISO 228-1 – G1/2", EN 837 / PU4SM - [04-1]

Process pressure Pmax = 1000 bar

Torque Mmax = 50 Nm

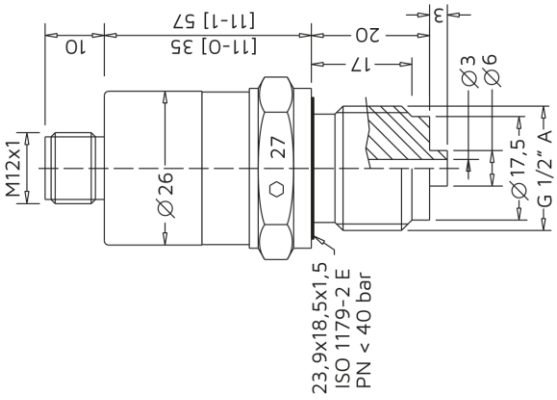

Figure3.13: grf00120_dim_pu4sm_04_1

Thread ISO 228-1 – G1/4", ISO 1179-2 E / PU4*C/K - [04-3]

Process pressure Pmax = 100 bar

Maximum torque Mmax = 50 Nm

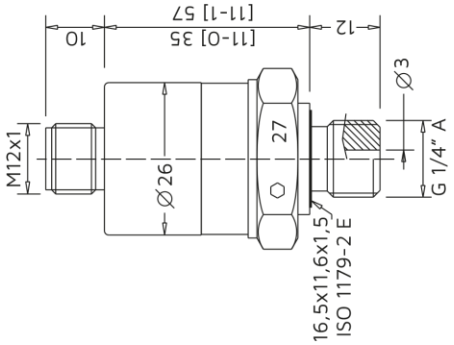

Figure3.14: grf00097_dim_pu4_04_3

Thread ISO 228-1 – G1/4"I, female thread / PU4*C/K - [04-4]

Process pressure Pmax = 100 bar

Torque Mmax = 50 Nm

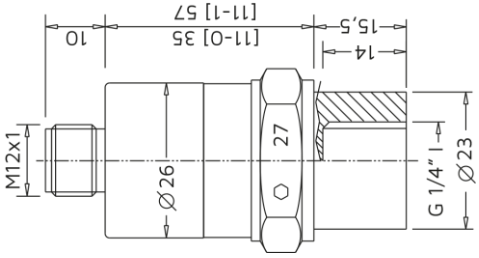

Figure3.15: grf00098_dim_pu4_04_4

Thread ISO 228-1 – G1/2", internal bore / PU4*C/K - [04-2]

Process pressure Pmax = 100 bar

Torque Mmax = 50 Nm

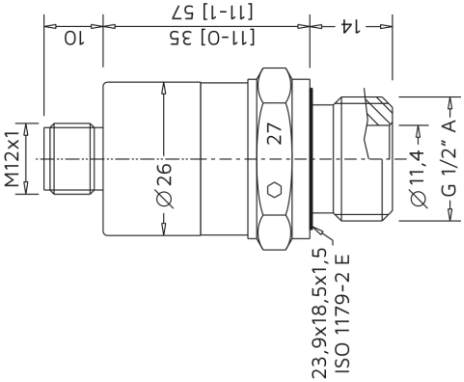

Figure3.16: grf00099_dim_pu4_04_2

ANSI thread – NPT 1/4" / PU4*C/K - [04-E]

Process pressure Pmax = 100 bar

Maximum torque Mmax = 50 Nm

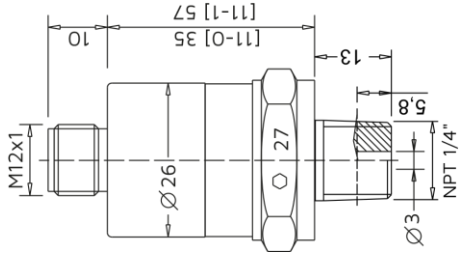

Figure3.17: grf00100_dim_pu4_04_e

ANSI – NPT 1/2" thread / PU4*C/K - [04-C)

Process pressure Pmax = 100 bar

Maximum torque Mmax = 50 Nm

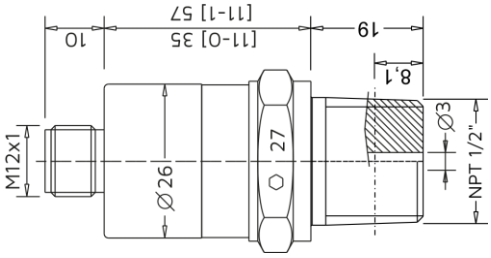

Figure3.18: grf00101_dim_pu4_04_c

3.5.3 Flush-mounted process diaphragm

Thread ISO 228-1 – G1/2" / PU4*C - [04-9]

Process pressure Pmax = 20 bar

Maximum torque Mmax = 20 Nm

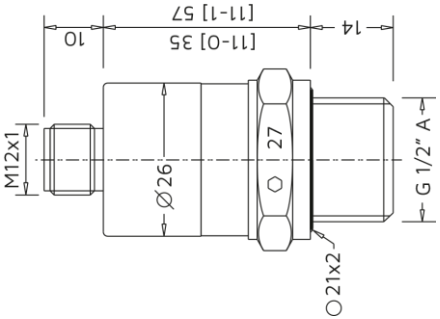

Figure3.19: grf00102_dim_pu4_04_9

Thread ISO 228-1 – G1/2" / PU4SM - [04-0]

Process pressure Pmax = 600 bar (> 1 bar]

Maximum torque Mmax = 50 Nm

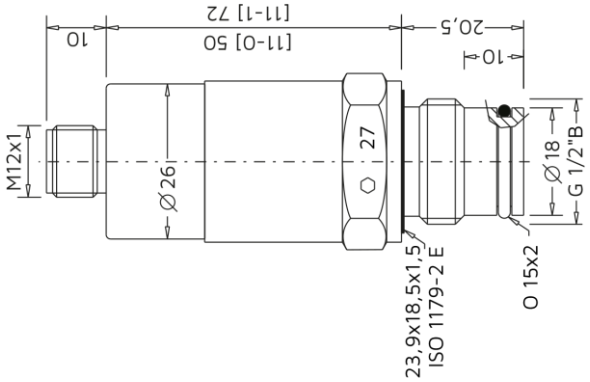

Figure3.20: grf00121_dim_pu4sm_04_0

Thread ISO 228-1 – G3/4", ISO 1179-2 E / PU4*C/K - [04-8]

Process pressure Pmax = 100 bar [02-C] / 60 bar [02-K]

Maximum torque Mmax = 50 Nm

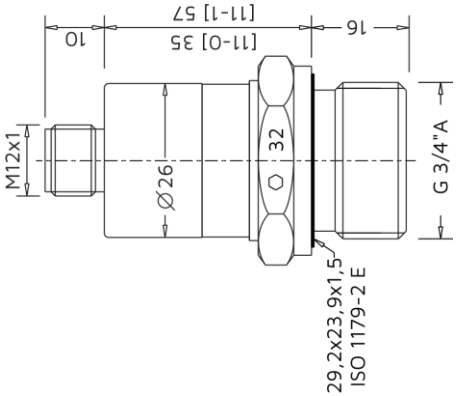

Figure3.21: grf00103_dim_pu4_04_8

Thread ISO 228-1 – G1", ISO 1179-2 E / PU4*C/K - [04-5]

Process pressure Pmax = 100 bar [02-C] / 1 bar [02-K]

Maximum torque Mmax = 50 Nm

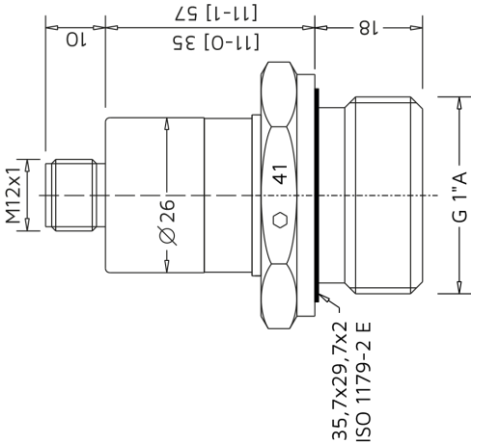

Figure3.22: grf00104_dim_pu4_04_5

Thread ISO 228-1 – G1" / PU4SM - [04-5]

Process pressure Pmax = 1 bar

Maximum torque Mmax = 50 Nm

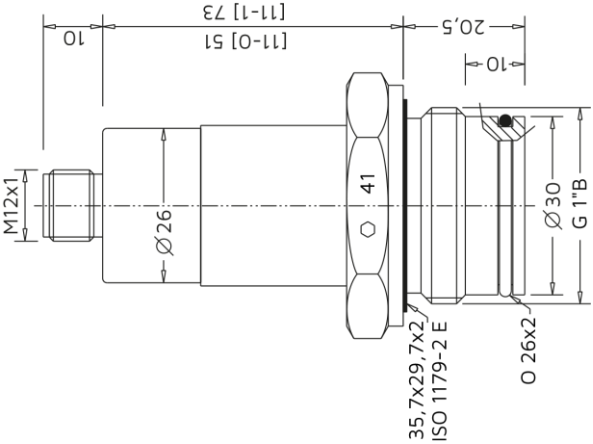

Figure3.23: grf00122_dim_pu4sm_04_5

Thread ISO 228-1 – G1" / PU4LM - [04-5]

Process pressure Pmax = 25 bar

Maximum torque Mmax = 50 Nm

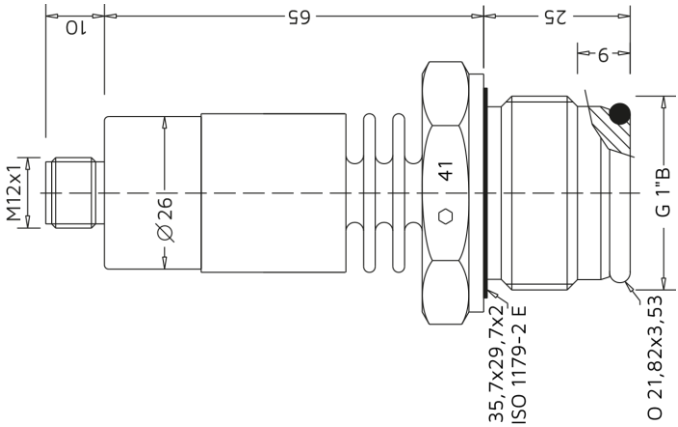

Figure3.24: grf00126_dim_pu4lm_04_5

Thread ISO 228-1 – G1½" / PU4*C - [04-7]

Process pressure Pmax = 40 bar

Maximum torque Mmax = 50 Nm

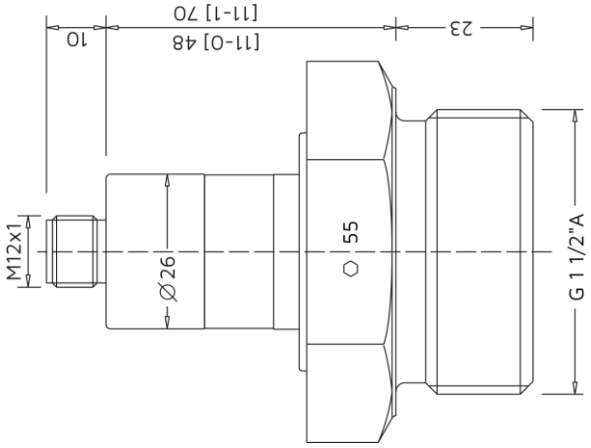

Figure3.25: grf00105_dim_pu4_04_7

Milk pipe DIN 11851 DN25, PN40 / PU4*C - [04-R]

Process pressure Pmax = 40 bar

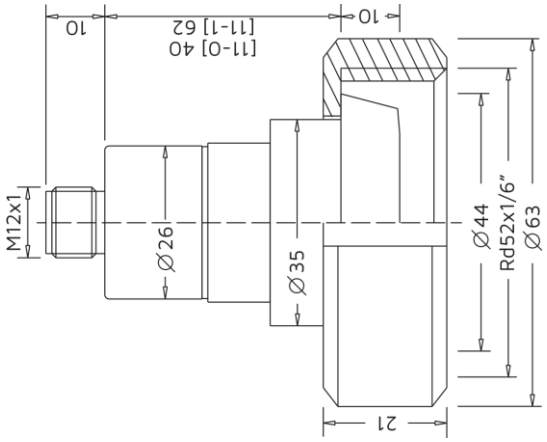

Figure3.26: grf00106_dim_pu4_04_r

Milk pipe DIN 11851 DN40, PN40 / PU4*C - [04-N]

Process pressure Pmax = 40 bar

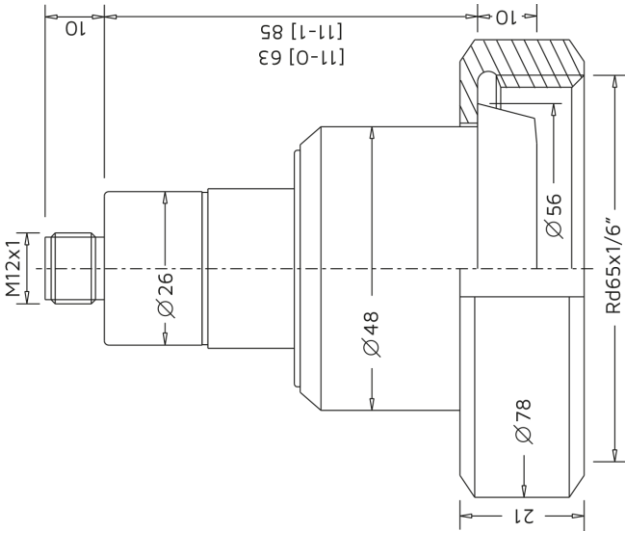

Figure3.27: grf00107_dim_pu4_04_n

Milk pipe DIN 11851 DN40 / PU4LM - [04-N]

Process pressure Pmax = 25 bar

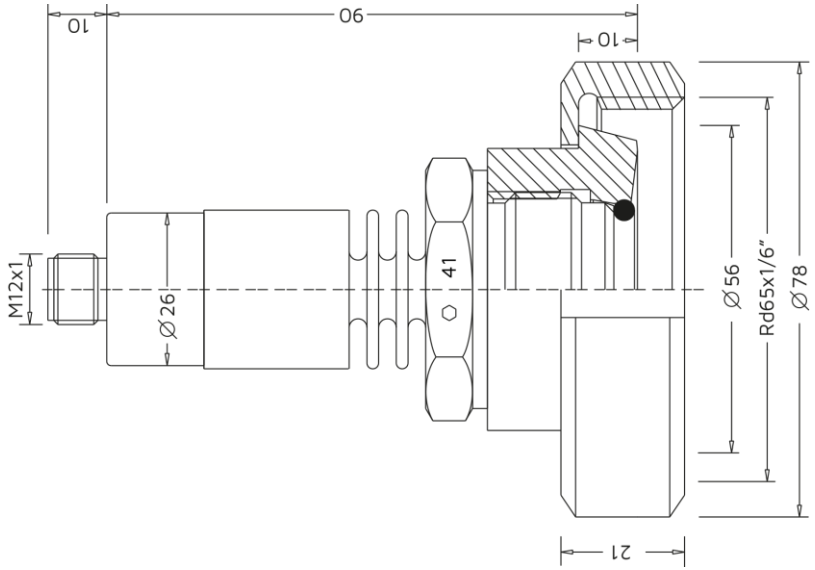

Figure3.28: grf00127_dim_pu4lm_04_n

Milk pipe DIN 11851 DN50, PN25 / PU4*C - [04-M]

Process pressure Pmax = 25 bar

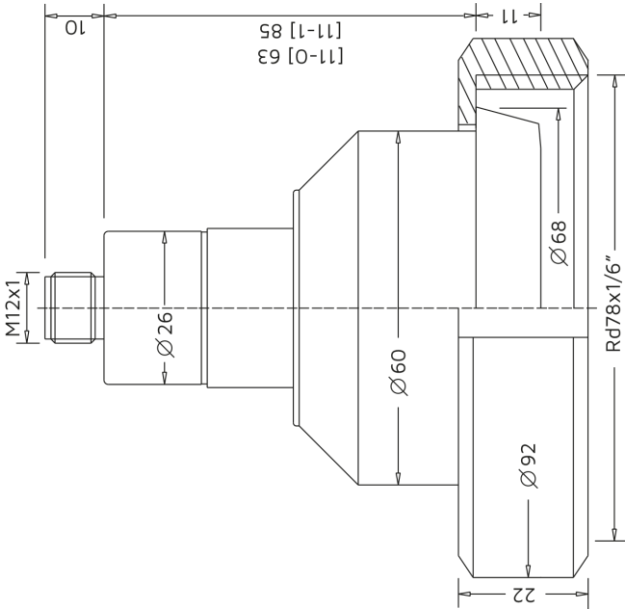

Figure3.29: grf00108_dim_pu4_04_m

Milk pipe DIN 11851 DN50 / PU4LM - [04-M]

Process pressure Pmax = 25 bar

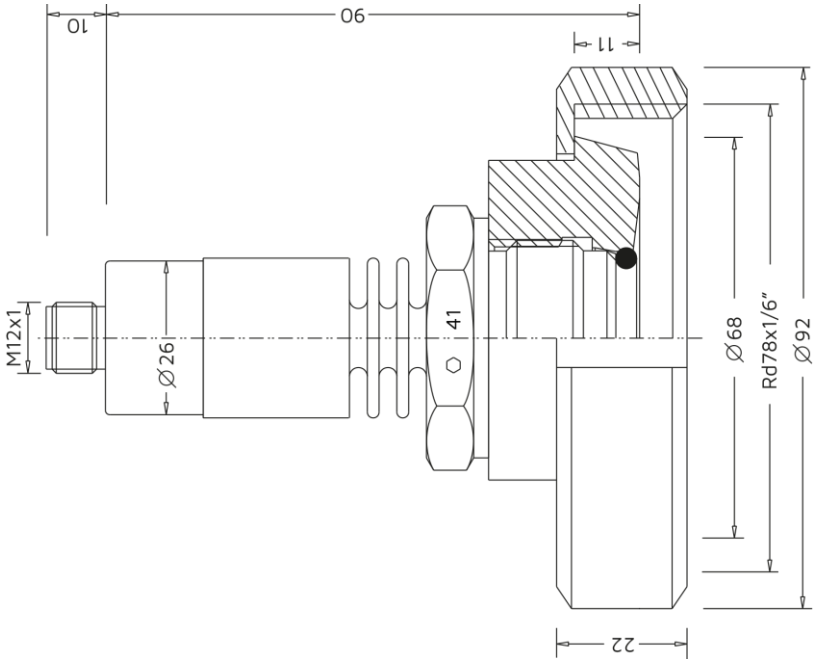

Figure3.30: grf00128_dim_pu4lm_04_m

Varivent N - DN40-162 (1½...6"), Ø68 mm, PN40 / PU4*C - [04-P]

Process pressure Pmax = 40 bar

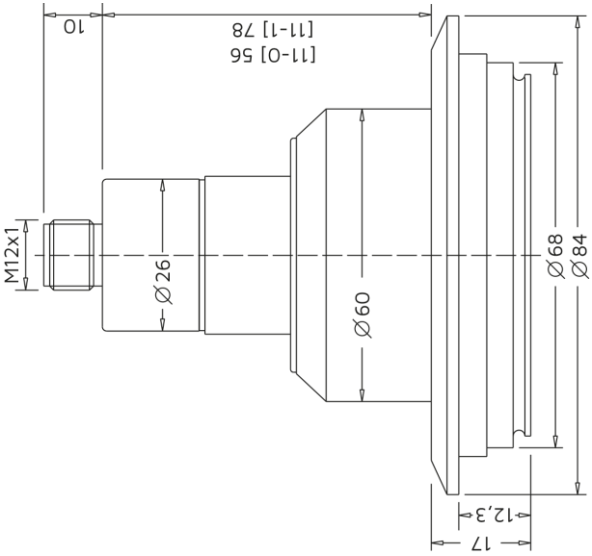

Figure3.31: grf00109_dim_pu4_04_p

Varivent N - DN40-162 (1½...6"), Ø68 mm / PU4LM - [04-P]

Process pressure Pmax = 25 bar

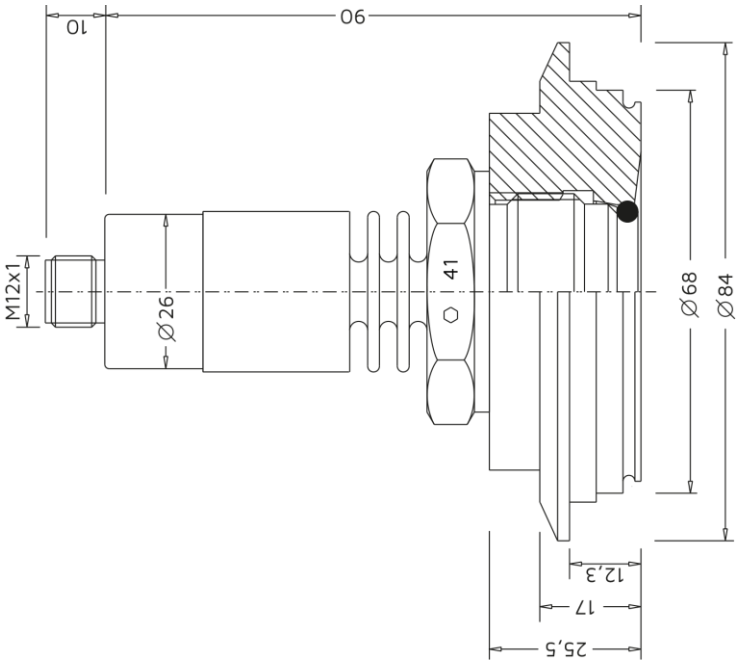

Figure3.32: grf00129_dim_pu4lm_04_p

DRD – DN50, Ø65 mm, PN25 / PU4*C - [04-L]

Process pressure Pmax = 25 bar

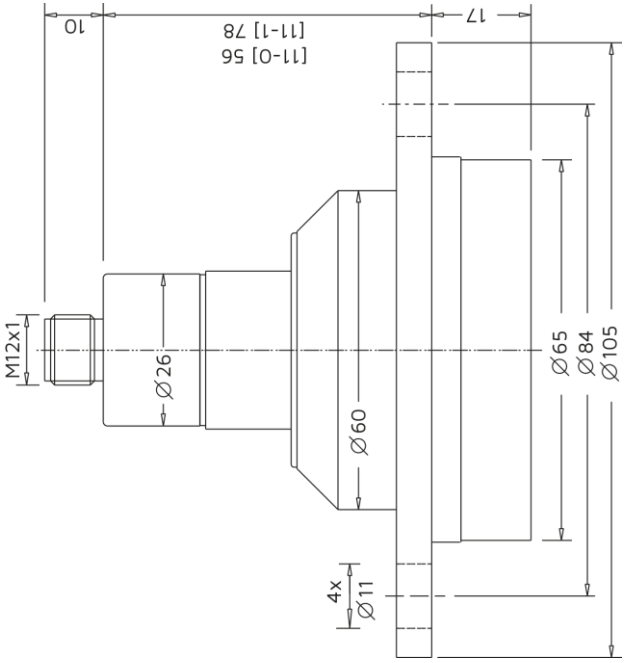

Figure3.33: grf00110_dim_pu4_04_l

DRD – DN50, Ø65 mm / PU4LM - [04-L]

Process pressure Pmax = 25 bar

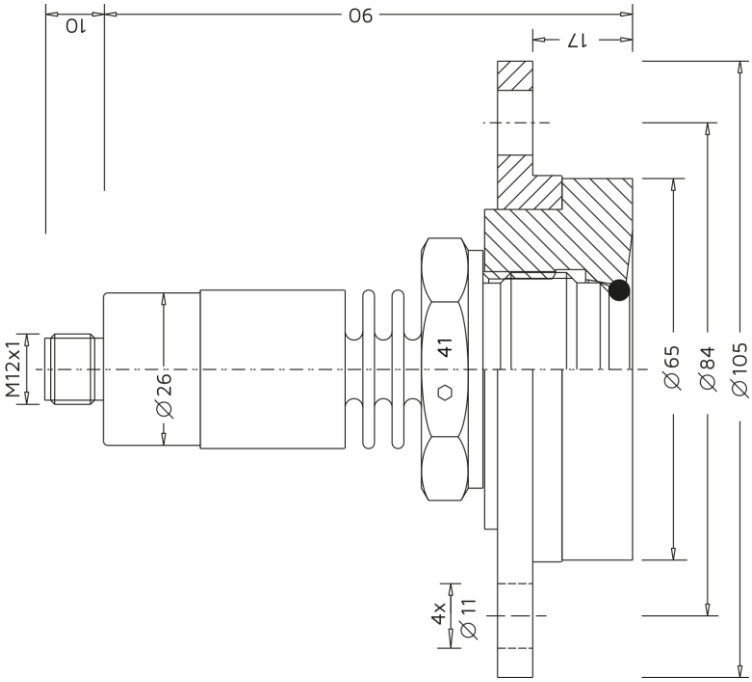

Figure3.34: grf00130_dim_pu4lm_04_l

Clamp DIN 32676 – DN20, PN25 / PU4*C - [04-U]

Process pressure Pmax = 40 bar

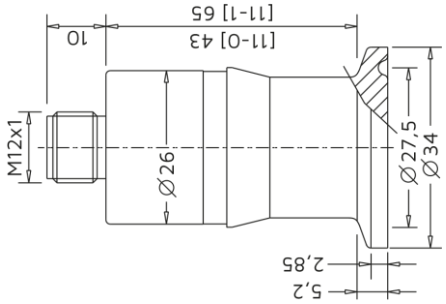

Figure3.35: grf00111_dim_pu4_04_u

Clamp DIN 32676 – DN25...40/1...1½", ISO 2852 – DN25...38, PN25 / PU4*C - [04-S]

Process pressure Pmax = 40 bar

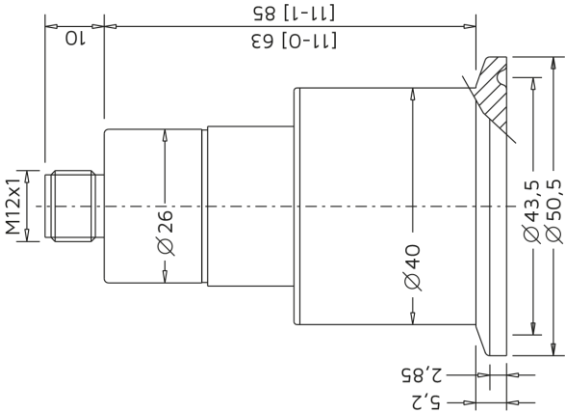

Figure3.36: grf00112_dim_pu4_04_s

Clamp DIN 32676 – DN50/2", ISO 2852 – DN40...51, PN25 / PU4*C - [04-T]

Process pressure Pmax = 25 bar

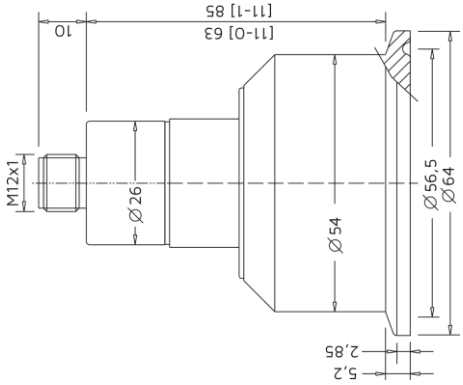

Figure3.37: grf00113_dim_pu4_04_t

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 a location with a stable temperature 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.

PU4*C: If the temperature falls below the dew point—e.g., cold process medium at high ambient temperatures—condensation may form inside the pressure transducer, which can lead to temporary increased measurement deviations or malfunctions. These deviations are completely reversible once the condensation has dried out. The use of a device with a strain gauge pressure transducer is recommended in this case.

The installation orientation may cause a zero-point shift (see Technical Data section) due to the weight of the measuring diaphragm.

Pressure Measurement in Gases:

Install the device above the connection so that condensate can drain 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 water seal that protects against . In superheated steam applications, this ensures a medium temperature of ≤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 path, 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 and 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.

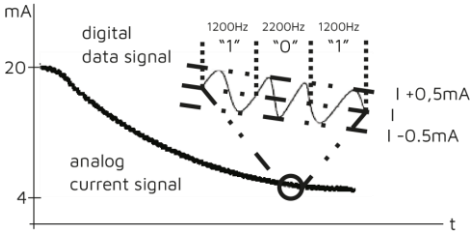

Figure5.1: grf00006_eac_fsk

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, exceptionally robust, and comprehensive field communication solution that is easy to use and configure.

5.1.2 Pin Assignment

M12 connector, non-hazardous area

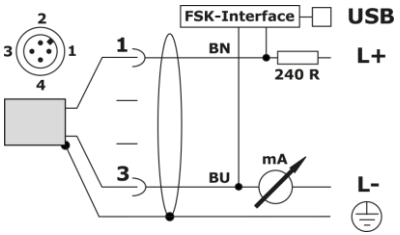

Figure5.2: grf00114_eac_m12_4p_2w_ma_fsk

EN 175-301-803 connector, non-hazardous area

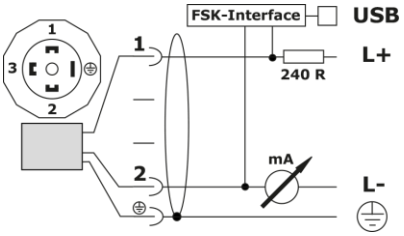

Figure5.3: grf00115_eac_en175301803_4p_2w_ma_fsk

M12 connector, hazardous area

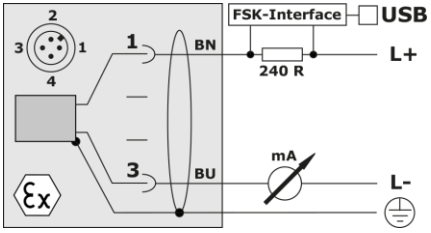

Figure5.4: grf00116_eac_m12_4p_2w_ma_fsk_ex

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 is held at the end value of 3.9 mA / 20.5 mA

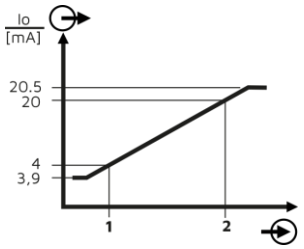

Figure 5 .5 : grf00181_fun_iout_4_20_hold_39_205

5.2 Electronics Output – Voltage 0...10 V – [09-B]

5.2.1 Function

The measured value is converted into a continuous voltage signal of 0...10 V.

5.2.2 Pin Assignment

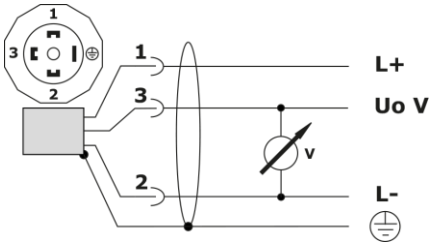

Figure5.6: grf00117_eac_en175301803_4p_3w_uo_v

5.2.3 Connection Cable

Use a 3-wire, twisted-pair, shielded cable.

5.2.4 Connection Notes

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 = 14...35 Vdc

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

- RL ≥ 5500 ohms

Ground the device, preferably via the metallic process connection, or alternatively via the cable shield.

Route the cable separately from power-carrying lines; ground the cable shield.

5.2.5 Analog Output Uo

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

- 0 – 10 V Output signal range 0...10.25 V

Behavior of the output voltage value when the output signal range is exceeded:
The output voltage is held at the end value of 0 V / 10.25 V

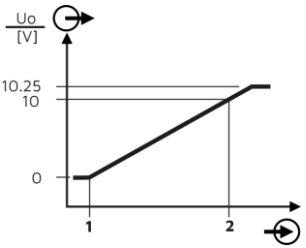

Figure5.7: grf00118_fun_uout_0_10_h_0_1025

5.3 Electronics Output – RS485 Modbus-RTU – [09-V]

5.3.1 Function

The Modbus protocol is a communication protocol based on a master/slave architecture.
All devices are connected via two data lines (A+ / B-) and a COMMON line (C/L-).

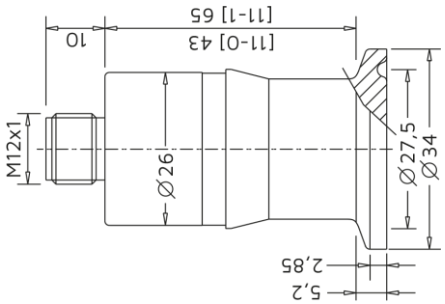

Figure5.8: grf00011_eac_modbus_line_termination

A standard RS485 allows for the connection of 32 slaves in a single segment. The device has a load of only 1/8 of the standard load (Rin ≥ 96 kOhm), so that theoretically up to 256 of these devices can be operated in a single network segment. However, the number is limited to 247 by the Modbus address space.

The two terminating resistors RT prevent reflections on the data lines. The optimal resistance value depends on the characteristic impedance of the cable used; however, a value of 120 ohms is a common choice.

The polarization network is required to ensure appropriate potentials when none of the devices are transmitting and the A+ and B- lines are therefore undefined (high-impedance). The value of RP depends, for example, on the bus load or the terminating resistors. Recommended values range from 450 to 650 ohms.
The use of a polarization network is recommended to maintain a stable network. Typically, the polarization resistors are built into the master device or can be enabled as needed.

Arrange the devices in a bus topology (line). Avoid branch lines.

5.3.2 Pin Assignment

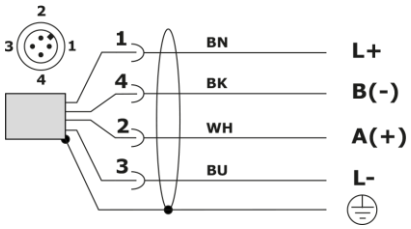

Figure5.9: grf00029_eac_m12_4p_4w_rs485

5.3.3 Connection Cable

Cable: M12 – A-coded, 1-BN = brown / 2-WH = white / 3-BU = blue / 4-BK = black
Use a 4-wire cable in accordance with the EIA485 recommendation:

Impedance	135…165 ohms @ 3…20 MHz
Cable capacitance	< 30 pF/m
Cable diameter	> 0.64 mm
Cable cross-section	0.34 mm² / AWG 22
Loop resistance	< 110 ohms/km
Shielding	Braided shield / shielding foil

Cable length	38,400 baud ≤ 1,200 m

5.3.4 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 = 6...35 Vdc

Ground the device, preferably via the metallic process connection, or alternatively via the cable shield.

Route the cable separately from power-carrying lines; ground the cable shield.

5.4 Electronics Output – IO-Link – [09-L]

5.4.1 Function

IO-Link is a globally standardized I/O technology for communicating with sensors. It is a serial, bidirectional point-to-point connection.

IO-Link communication requires an IO-Link master.

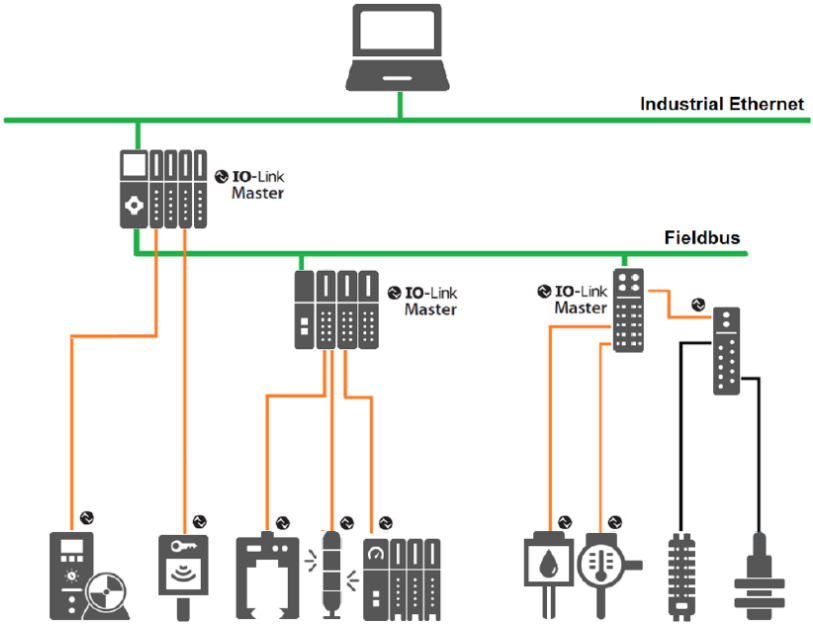

Figure5.10: grf00030_eac_io_link

5.4.2 Pin Assignment

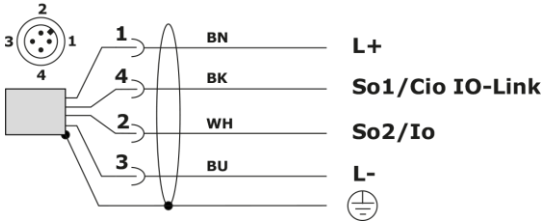

Figure5.11: grf00031_eac_m12_4p_4w_io

5.4.3 Connection Cable

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

Use a cable that is max. 20 m long, 3-wire or 4-wire, unshielded.

When using the analog output, a shielded cable must be used.

5.4.4 Connection Instructions


WARNING

Install the device only when it is de-energized.

NOTE

Switch off all connected control units before commissioning.

NOTE

Operate inductive loads (auxiliary contactors, solenoid valves) at switching outputs only with a free-wheeling diode or an RC circuit.

NOTE

Default configuration of the outputs:

- So1 >> Switch PP + Cio IO-Link
- So2 >> Analog Io 4...20 mA

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

- Us = 9…35 Vdc
- Us = 18…30 Vdc, IO-Link

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

- RL ≤ (Us – 8 V) / 22 mA

Ground the device, preferably via the metallic process connection, or alternatively via the cable shield.

Route the cable separately from power-carrying lines; ground the cable shield.

Out1 – IO-Link / Out2 – Current 0/4…20 mA

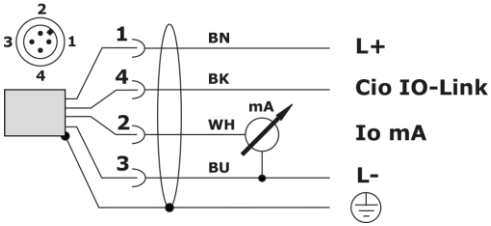

Figure 5 .12 : grf00033_eac_m12_4p_4w_io_ma

Out1 – IO-Link / Out2 – p-contact switch

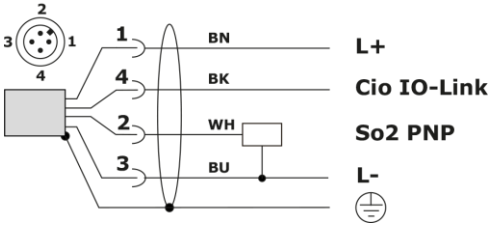

Figure 5 .13 : grf00034_eac_m12_4p_4w_io_spnp

Out1 – IO-Link / Out2 – Normally Open Switch

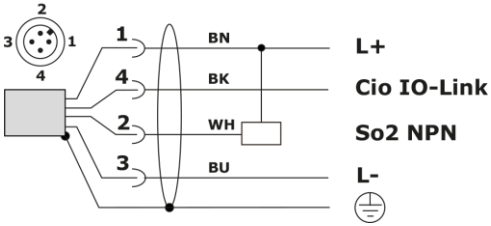

Figure 5 .14 : grf00035_eac_m12_4p_4w_io_snpn

Out1 – Current 0/4...20 mA / Out2 – p-contact switch

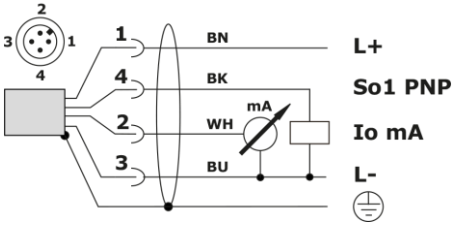

Figure5.15: grf00036_eac_m12_4p_4w_ma_spnp

Out1 – Current 0/4...20 mA / Out2 – Switch (normally open)

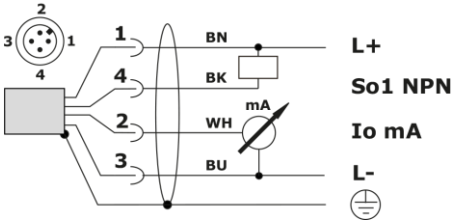

Figure5.16: grf00037_eac_m12_4p_4w_ma_snpn

Out1 – P-contact switch / Out2 – P-contact switch

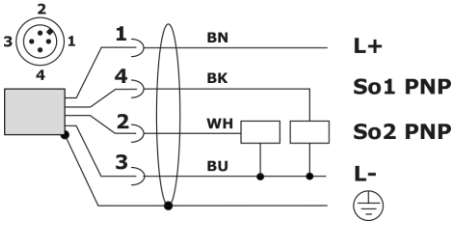

Figure5.17: grf00038_eac_m12_4p_4w_2spnp

Out1 – normally open switch / Out2 – normally open switch

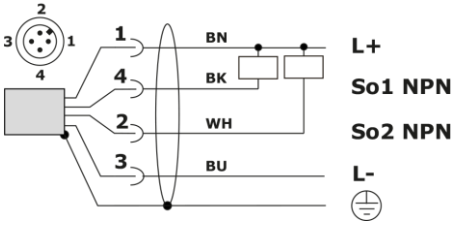

Figure5 .18 : grf00039_eac_m12_4p_4w_2snpn

6 Operation

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

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

6.2 Electronics Output – Voltage 0...10 V – [09-B]

Parameterization and operation are not possible.

6.3 Electronic output – RS485 Modbus-RTU – [09-V]

Operation is performed via the wired interface.

Information regarding installation and use of the interface and operating software is not included in this manual.

Parameters

The parameter file and description can be downloaded from the manufacturer's website. Setting ranges and default values are specified for all parameters.

6.4 Electronic Output – IO-Link – [09-L]

Operation is performed via the wired interface.

Information regarding installation and use of the interface and operating software is not included in this manual.

6.4.1 Parameters

The parameter file and description can be downloaded from the manufacturer's website. Setting ranges and default values are specified for all parameters.

6.4.2 Switching Output So

Operating Functions - Operation Mode

Depending on the function [O1_Conf/O2_Conf+Operation Mode], the output is switched differently:

- PP (Push-Pull) Auxiliary power supply +L <--> Auxiliary power supply -L
- NPN Auxiliary power supply -L <--> Off - high impedance
- PNP Auxiliary power supply +L <--> Off - high impedance
- Analog OutCurrent output Io 0/4...20 mA

For the switching output So1, only the PP operating mode can be selected.

Switching Functions - Switch Mode

Various switching functions [O1_Conf/O2_Conf+Switch Mode] can be set for the switching outputs:

Deactivated

The switching output is deactivated and therefore high-impedance.

Single-Point Mode

The switching output is activated when the measured value exceeds the switching point [O1_SP/O2_SP] and the turn-on delay time [O1_dS/O2_dS] has elapsed.

The switching output is deactivated when the measured value falls below the switching point [O1_SP/O2_SP] and the deactivation delay time [O1_dR/O2_dR] has elapsed.

For polarity [O1_Conf/O2_Conf+Polarity+NO], the reset point is [O1_HY/O2_HY] lower than the set switching point [O1_SP/O2_SP]

For polarity [O1_Conf/O2_Conf+Polarity+NC], the actual switching point is greater than the set switching point [O1_SP/O2_SP] by the hysteresis [O1_HY/O2_HY]

Operating Mode - Polarity: NO / Normally Open

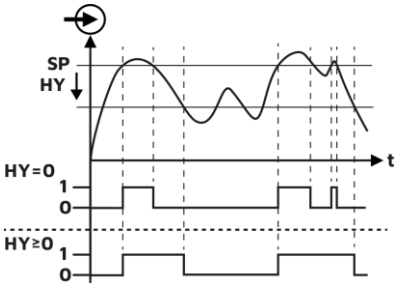

Figure6.1: grf00048_fun_sw_sp_no

Operating Mode - Polarity: NC / Normally Open

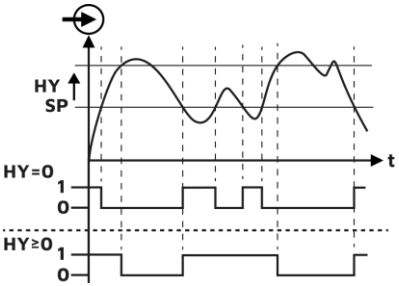

Figure6.2: grf00049_fun_sw_sp_nc

Window Function - Window Mode

The switching range is defined by specifying the switching point [O1_SP/O2_SP] and the reset point [O1_RP/O2_RP].

The switching output is activated when the measured value lies within the range defined by the switching point [O1_SP/O2_SP] and the reset point [O1_RP/O2_RP], and the turn-on delay time [O1_dS/O2_dS] has elapsed.

The switching output is deactivated when the measured value is outside the range defined by the switching point [O1_SP/O2_SP] and the reset point [O1_RP/O2_RP] and the reset delay time [O1_dR/O2_dR] has elapsed.

The hysteresis [O1_HY/O2_HY] creates a switching offset symmetrical about the switching point [O1_SP/O2_SP] and the return switching point [O1_RP/O2_RP].

Operating Mode - Polarity: NO / Normally Open

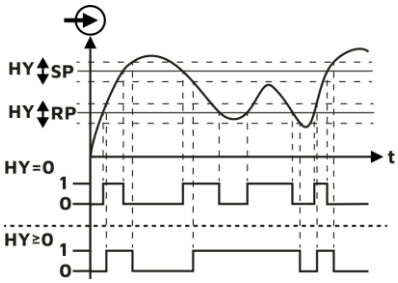

Figure6.3: grf00050_fun_sw_win_no

Operating Mode - Polarity: NC / Normally Closed

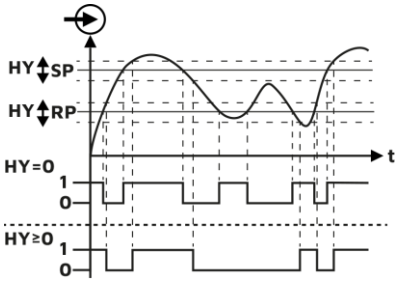

Figure6.4: grf00051_fun_sw_win_nc

Two-Point Function - Two-Point Mode

The switching range is defined by specifying the switching point [O1_SP/O2_SP] and the reset point [O1_RP/O2_RP].

The switching output is activated when the measured value exceeds the switching point [O1_SP/O2_SP] and the turn-on delay time [O1_dS/O2_dS] has elapsed.

The switching output is deactivated when the measured value falls below the switching point [O1_SP/O2_SP] and the reset delay time [O1_dR/O2_dR] has elapsed.

Operating Mode - Polarity: NO / Normally Open

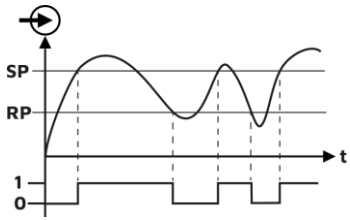

Figure6.5: grf00052_fun_sw_tp_no

Operating Mode - Polarity: NC / Normally Closed

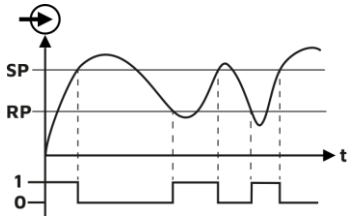

Figure6.6: grf00053_fun_sw_tp_nc

Fault Indication Function

The switching output signals a detected functional error (see the section on Fault Diagnosis and Troubleshooting)

6.4.3 Analog Output Io

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

- 0 – 20 mA Output signal range 0...20.5 mA
- 4 – 20 mA Output signal range 3.8...20.5 mA
- 20 – 0 mA Output signal range 20.5...0 mA
- 20 – 4 mA Output signal range 20.5...3.8 mA

Free assignment to measurement input values within the nominal measurement range is possible.

Behavior of the output current value when the output signal range is exceeded, in accordance with NAMUR NE43:

1 Hold final value at 0 / 3.8 mA / 20.5 mA
2 Step ≤ 3.6 mA
3 Step ≥ 21 mA (22 mA)

Output signal 4–20 mA

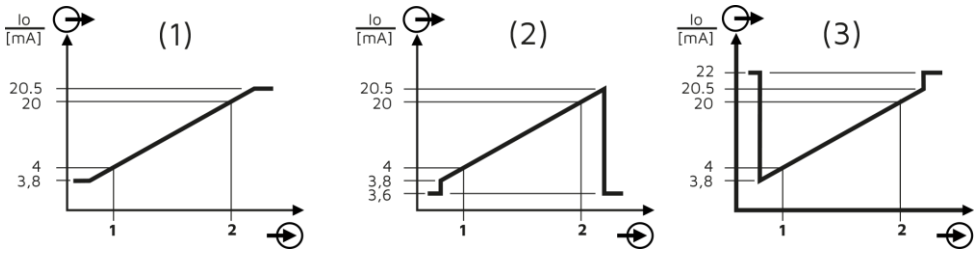

Figure6.7: grf00054_fun_iout_4_20_h_36_22

Output signal 0–20 mA

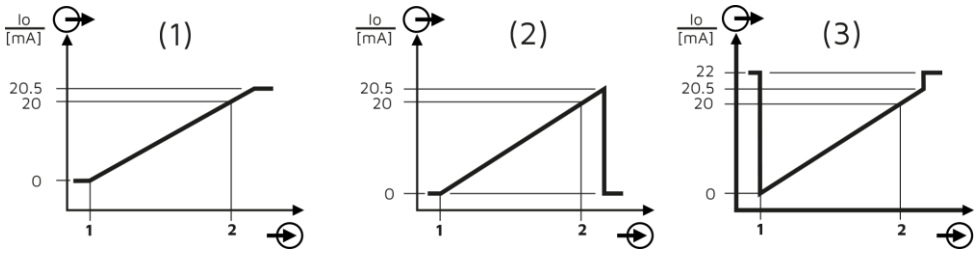

Figure6.8: grf00055_fun_iout_0_20_h_0_22

7 Troubleshooting and Fault Resolution

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

Error Messages for Electronic Output – IO-Link – [03-L]:

IO-Link Code	Description	Resolution
20480 (0x5000)	Device hardware error	Replace or return the device
35856 (0x8C10)	Measurement range exceeded	Check measurement range calibration
35888 (0x8C30)	Measurement range undershoot	Check Measurement Range Calibration
36346 (0x8DFA)	Analog output error 3.6 mA	Check current output calibration
36347 (0x8DFB)	Analog output error 22 mA	Check current output calibration

In case of a fault, 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
		Use a different sealing material if necessary
Pressure-compensating capillary	Contamination	Send the device in for repair
Supply voltage	Operating voltage present	Turn on operating voltage
		Check or repair the connection contacts
	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 unit 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 covered 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 securely attached to the outside of the packaging to withstand weather and transport conditions.

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 / RH = 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 – PU4*C sensor – Relative pressure [12-R] – Measurement range [08-##]

Process connection	ISO 228-1 – [04-1/2/3/4/5/6/8/9]			AISI NPT – [04-E/C]		
Diaphragm D18mm	DIN 11851 – [04-R]			Clamp DIN 32676-A – [04-U]		
Sensor Type	Capacitive cell					
Type code	[08-15]	[08-18]	[08-16]	[08-17]	[08-26]	[08-01]
Measurement range PN– FSI	-0.1..0 bar	-0.1...0.1 bar	-1..0 bar	-1..1 bar	0..0.05 bar	0..0.1 bar
Overload/burst pressure, rel	4 bar	5 bar	10 bar	18 bar	4 bar	4 bar
Vacuum, abs.	0.7 bar	0 bar	0 bar	0 bar	0.7 bar	0.7 bar
Type code	[08-02]	[08-03]	[08-04]	[08-05]	[08-06]	[08-07]
Measurement Range PN – FSI	0..0.2 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..1.6 bar	0..2.5 bar
Overload/burst pressure, rel.	5 bar	6 bar	10 bar	10 bar	18 bar	25 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar

Type code	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]	[08-13]
PN – FSI Measurement Range	0..4 bar	0..6 bar	0–10 bar	0…16 bar	0–20 bar	0–40 bar
Overload/burst pressure, rel.	25 bar	40 bar	40 bar	40 bar	40 bar	60 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Type code	[08-14]	[08-19]				
Measuring range PN – FSI	0..60 bar	0..100 bar				
Overload/burst pressure, rel.	150 bar	150 bar				
Vacuum, abs.	0 bar	0 bar				

Process connection	ISO 228-1 - [04-7]			DIN 11851 - [04-N/M]		
Diaphragm D32mm	Varivent - [04-P]			DRD - [04-L]		
	Clamp DIN 32676-A/-C / ISO 2852 - [04-S/T]					
Sensor Type	Capacitive cell					
Type code	[08-15]	[08-18]	[08-16]	[08-17]	[08-26]	[08-01]
Measurement Range PN – FSI	-0.1..0 bar	-0.1..0.1 bar	-1..0 bar	-1..1 bar	0..0.05 bar	0..0.1 bar
Overload/burst pressure, rel.	4 bar	5 bar	10 bar	18 bar	4 bar	4 bar
Vacuum, abs.	0.7 bar	0.5 bar	0 bar	0 bar	0.7 bar	0.7 bar
Type code	[08-02]	[08-03]	[08-04]	[08-05]	[08-06]	[08-07]

Measurement range PN– FSI	0..0.2 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..1.6 bar	0..2.5 bar
Overload/burst pressure, rel.	5 bar	8 bar	10 bar	10 bar	18 bar	25 bar
Vacuum, abs.	0.5 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Type code	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]	[08-13]
Measurement Range PN – FSI	0..4 bar	0..6 bar	0–10 bar	0…16 bar	0–20 bar	0–40 bar
Overload/burst pressure, rel.	25 bar	40 bar	40 bar	60 bar	60 bar	60 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar

10.1.2 Input Pressure – PU4*C Sensor – Absolute Pressure [12-A] – Measurement Range [08-##]

Process connection	ISO 228-1 - [04-1/2/3/4/6/8/9]			AISI NPT - [04-E/C]		
Diaphragm D18mm	DIN 11851 - [04-R]			Clamp DIN 32676-A - [04-U]		
Sensor Type	Capacitive cell					
Type code	[08-01]	[08-02]	[08-03]	[08-04]	[08-05]	[08-06]
Measurement Range PN – FSI	0..0.1 bar	0..0.2 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..1.6 bar
Overload pressure, abs.	4 bar	5 bar	6 bar	10 bar	10 bar	18 bar
Type code	[08-07]	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]
Measuring range PN – FSI	0..2.5 bar	0..4 bar	0..6 bar	0..10 bar	0…16 bar	0–20 bar
Overload pressure	25 bar	25 bar	40 bar	40 bar	40 bar	40 bar

Type code	[08-13]	[08-14]	[08-19]			
Measuring range PN – FSI	0..40 bar	0..60 bar	0..100 bar			
Overload pressure	60 bar	150 bar	150 bar			

Process connection	ISO 228-1 - [04-7]			DIN 11851 - [04-N/M]		
Diaphragm D32mm	Varivent - [04-P]			DRD - [04-L]		
	Clamp DIN 32676-A/-C / ISO 2852 - [04-S/T]					
Sensor Type	Capacitive cell					
Type code	[08-01]	[08-02]	[08-03]	[08-04]	[08-05]	[08-06]
Measurement Range PN – FSI	0..0.1 bar	0..0.2 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..1.6 bar
Overload pressure	4 bar	5 bar	8 bar	10 bar	10 bar	18 bar
Type code	[08-07]	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]
Measuring range PN – FSI	0..2.5 bar	0..4 bar	0..6 bar	0..10 bar	0…16 bar	0–20 bar
Overload pressure	25 bar	25 bar	40 bar	40 bar	60 bar	60 bar
Type code	[08-13]					
Measuring range PN – FSI	0..40 bar					
Overload pressure	60 bar					

10.1.3 Input Pressure – Sensor PU4*K – Relative Pressure [12-R] – Measurement Range [08-##]

Sensor type	Thick-film strain gauge cell					
Type code	[08-02]	[08-03]	[08-04]	[08-05]	[08-06]	[08-07]
Measuring Range PN – FSI	0..0.25 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..1.6 bar	0–2.5 bar
Overload pressure	0.75 bar	1.2 bar	1.8 bar	3 bar	6 bar	6 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Type code	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]	[08-13]
Measurement Range PN – FSI	0..4 bar	0..6 bar	0..10 bar	0…16 bar	0..25 bar	0–40 bar
Overload pressure	15 bar	15 bar	20 bar	40 bar	40 bar	100 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Type code	[08-14]	[08-19]	[08-20]	[08-21]	[08-22]	[08-23]
Measurement Range PN – FSI	0..60 bar	0..100 bar	0..160 bar	0..250 bar	0..320 bar	0–400 bar
Maximum pressure	100 bar	200 bar	400 bar	400 bar	800 bar	800 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Model code Measurement range	[08-24]	[08-16]	[08-17]			
Measuring range PN – FSI	0..600 bar	-1..0 bar	-1..1 bar			
Overload pressure	900 bar	3 bar	6 bar			
Vacuum, abs.	0 bar	0 bar	0 bar			

10.1.4 Input Pressure – PU4*K Sensor – Absolute Pressure [12-A] – Measurement Range [08-##]

Sensor type	Strain Gauge Thick-Film Cell					
Type code	[08-05]	[08-06]	[08-07]	[08-08]	[08-09]	[08-10]
Measurement Range PN – FSI	0..1 bar	0..1.6 bar	0..2.5 bar	0..4 bar	0..6 bar	0–10 bar
Overload pressure	3 bar	6 bar	6 bar	15 bar	15 bar	20 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Type code	[08-11]	[08-12]	[08-13]	[08-11]	[08-12]	[08-13]
Measurement Range PN – FSI	0…16 bar	0..25 bar	0..40 bar	0…16 bar	0..25 bar	0..40 bar
Overload pressure	40 bar	40 bar	100 bar	40 bar	40 bar	100 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar

10.1.5 Input Pressure – PU4*E Sensor

Sensor Type	Strain gauge thick-film cell, monolithic					
Type code	[08-05]	[08-08]	[08-10]	[08-13]	[08-19]	
Measurement Range PN – FSI	0..1 bar	0..4 bar	0..10 bar	0–40 bar	0–100 bar	
Overload pressure	4 bar	12.5 bar	25 bar	125 bar	200 bar	
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	

10.1.6 Input Pressure – PU4SM Sensor

Sensor Type	Strain Gauge Thin-Film Cell / Piezoresistive Strain Gauge Cell					
Type code	[08-03]	[08-05]	[08-08]	[08-09]	[08-10]	[08-11]
Measuring range PN – FSI	0..0.4 bar	0..1 bar	0..4 bar	0..6 bar	0..10 bar	0…16 bar

Overload pressure	2 bar	5 bar	17 bar	35 bar	35 bar	35 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Burst pressure	2.4 bar	6 bar	20.5 bar	42 bar	42 bar	42 bar
Type code	[08-12]	[08-13]	[08-14]	[08-19]	[08-20]	[08-21]
Measurement Range PN – FSI	0..20 bar	0..40 bar	0..60 bar	0..100 bar	0..160 bar	0–250 bar
Overload pressure	80 bar	80 bar	80 bar	200 bar	320 bar	500 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Burst pressure	96 bar	400 bar	400 bar	800 bar	1,000 bar	1,200 bar
Type code	[08-22]	[08-23]	[08-24]	[08-25]	[08-16]	[08-17]
Measurement Range PN – FSI	0..320 bar	0..400 bar	0..600 bar	0..1000 bar	-1..0 bar	-1..1 bar
Overload pressure	800 bar	800 bar	1200 bar	1,500 bar	5 bar	10 bar
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Burst pressure	1,700 bar*	1,700 bar*	2,400 bar*	3,000 bar	6 bar	12 bar
* [04-0] / [04-5]: Burst pressure when sealed with a sealing ring below the hexagon; otherwise, max. 1,500 bar						

10.1.7 Inlet Pressure – PU4LM Sensor

Sensor Type	Piezoresistive strain gauge cell					
Type code	[08-01]	[08-02]	[08-03]	[08-04]	[08-05]	[08-07]
Measurement Range PN – FSI	0..0.1 bar	0..0.25 bar	0..0.4 bar	0..0.6 bar	0..1 bar	0..2.5 bar
Overload pressure	1 bar	2 bar	2 bar	4 bar	5 bar	17 bar

Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	0 bar
Burst pressure	2 bar	2.4 bar	2.4 bar	4.8 bar	6 bar	20.5 bar
Type code	[08-08]	[08-09]	[08-10]	[08-11]	[08-12]	
Measurement Range PN – FSI	0..4 bar	0..6 bar	0..10 bar	0…16 bar	0..25 bar	
Overload pressure	17 bar	35 bar	35 bar	80 bar	80 bar	
Vacuum, abs.	0 bar	0 bar	0 bar	0 bar	0 bar	
Burst pressure	20.5 bar	42 bar	42 bar	96 bar	96 bar	
Type code	[08-16]	[08-17]				
Measuring range PN – FSI	-1..0 bar	-1..1 bar				
Overpressure	5 bar	10 bar				
Vacuum, abs.	0 bar	0 bar				
Burst pressure	6 bar	12 bar				

10.1.8 Input pressure

Resolution	FSI ≥ 16 bits
Characteristic curve deviation	PU4*C: ≤ ±0.05% FSI / ±0.1% FSI / ±0.2% FSI
	PU4*K: ≤ ±0.15% FSI / ±0.5% FSI
	PU4*E: ≤ ±0.5% FSI
	PU4*M: ≤ ±0.15% FSI / ±0.5% FSI
Effect of auxiliary power	≤ ±0.002 %FSI/V

Hysteresis	PU4*C: negligible
	PU4*K/E / PU4*M: ≤ ±0.1% FSI
Repeatability	PU4*C: negligible
	PU4*K/E: ≤ ±0.1% FSI
	PU4*M: ≤ ±0.03% FSI
Temperature effect	PU4*C:
	Temperature coefficient of zero point ≤ ±0.015 %FSI/K, ≤ ±0.75 %FSI
	Tk span ≤ ±0.015 %FSI/K, ≤ ±0.5 %FSI (≥0.4 bar/4 mH_2O)
	Tk span ≤ ±0.8 %FSI (<0.4 bar/4 mH_2O)
	PU4*K/E: Tk ≤ ±0.05 %FSI/K
	PU4SM:
	Tk ≤ ±0.02 %FSI/K (-20…+85 °C)
	Tk ≤ ±0.03 %FSI/K (-40…-20 °C / +85…+125 °C)
	PU4LM:
	Tk zero point
	[≤ 250 mbar]: ≤ ±0.04 %FSO/K (0…+80 °C) / ≤ ±0.06 %FSO/K (-20…0 °C / +80…+150 °C)
	[≥ 400 mbar]: ≤ ±0.02 %FSO/K (0…+80 °C) / ≤ ±0.03 %FSO/K (-20…0 °C / +80…+150 °C)
	Temperature range: ≤ ±0.02 %FSO/K (0…+80 °C) / ≤ ±0.03 %FSO/K (-20…0 °C / +80…+150 °C)
Effect of mounting orientation	PU4*C: Measurement range < 1 bar: ≤ +0.2 mbar (orientation: vertical, sensor at the top)
	PU4*C: Measurement range ≥ 1 bar: ≤ +0.1 mbar (orientation: vertical, sensor at the top)
	PU4*K/E: ≤ 0.2 mbar (position: vertical, sensor at the top)
	PU4SM: ≤ 4 mbar (position: vertical, sensor at the top)

	PU4SM: ≤ 10 mbar (orientation: vertical, sensor at the top) - [04-5]: G1”
	PU4LM: ≤ 10 mbar (orientation: vertical, sensor at the top)
Long-term zero-point drift	PU4*C: ≤ ±0.15% F.S. per year
	PU4*K/E / PU4*M: ≤ ±0.2% F.S. per year

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	PU4*C: ≤ 8 ms (td = 0 s)
	PU4*K/E / PU4*M: ≤ 5 ms (td = 0 s)
Effect of Auxiliary Power	≤ ±0.5 µA/V
Temperature Ta influence	≤ ±1 µA/K
Auxiliary Power	
Supply Voltage Us	9…35 Vdc, reverse-polarity protected / ≤ 2 Vpp
Input current Is	≤ 20.5 mA
Turn-on delay time	≤ 0.1 s (td = 0 s)

10.2.2 Electronics Output – Voltage 0...10 V – [09-B]

Analog output – Uo	
Signal range	0…10.25 V, measurement range [08] = 0...10 V, error 0 V / ≥ 10.25 V
Resolution	≤ 1 mV
Permissible load RL	≥ Uo / 2 mA
Time response t90-min	PU4*C: ≤ 8 ms (td = 0 s)
	PU4*K / PU4*M: ≤ 5 ms (td = 0 s)
Effect of auxiliary power	≤ ±0.5 mV/V
Temperature Ta influence	≤ ±1 mV/K
Auxiliary power	
Supply voltage Us	14…35 Vdc, reverse-polarity protected / residual ripple ≤ 2 Vpp
Input current Is	≤ 25 mA (Io = 0 mA)
Turn-on delay time	≤ 0.1 s (td = 0 s)

10.2.3 Electronics Output – RS485 Modbus-RTU – [09-V]

Interface - Cio	
Specifications	RS485, bidirectional / Modbus-RTU / 9600 baud (4800…38400 baud)
Input resistance	112 kOhm
Time response t90-min	≤ 2 ms (td = 0 s)
Auxiliary power	
Supply voltage Us	6…35 Vdc, reverse-polarity protected / residual ripple ≤ 2 Vpp
Input current Is	≤ 10 mA (Cio = 0 mA)
Turn-on delay time	≤ 0.1 s (td = 0 s)

10.2.4 Electronics Output – IO-Link – [09-L]

Interface - Cio	
Specifications	IO-Link V1.1 / Port Class A / Com2 (38.4 kBaud), Com3 (230.4 kBaud)
Cycle time	≥ 2.3 ms
Time response t90-min	≤ 2 ms (td = 0 s)
Switching output - So	
Specification	2x PP (push-pull), switching to +L/-L
Output signal Uo	≤ 0.2...≥ (Us – 2 V) / Io = 0…200 mA (current-limited to ≤ 450 mA, short-circuit-proof)
Time response t90-min	≤ 2 ms (td = 0 s)
Switching delay time	≤ 30 µs (RL ≤ 3 kOhm / Io ≥ 4.5 mA)
Switching cycles	≥ 100,000,000
Analog output – Io	
Signal range	4…20 mA: Signal range 3.8…20.5 mA, error ≤ 3.6 mA / ≥ 21 mA (22 mA)
	0…20 mA: Signal range 0…20.5 mA, error ≤ 0.05 mA / ≥ 21 mA (22 mA)
Resolution	≤ 1 µA
Permissible load RL	≤ (Us – 8 V) / 22 mA
Time response t90-min	≤ 2 ms (td = 0 s)
Effect of auxiliary power	≤ ±0.5 µA/V
Temperature effect Ta	≤ ±0.5 µA/K
Auxiliary power	
Supply Voltage Us	IO-Link inactive: 9…35 Vdc, reverse-polarity protected / residual ripple ≤ 2 Vpp

	IO-Link active: 18…30 Vdc, reverse-polarity protected / residual ripple ≤ 2 Vpp
Input current Is	≤ 20 mA (Cio / So / Io = 0 mA)
Turn-on delay time	≤ 0.1 s (td = 0 s)

10.3 Ambient conditions

Process temperature Tp	PU4*C - [11-0]: -40…+100 °C (-40…+212 °F)
	PU4*C - [11-1]: -40…+125 °C (-40…+257 °F) / +140 °C (+284 °F) – 1 h
	PU4*K - [11-0]: -40…+100 °C (-40…+212 °F)
	PU4*K - [11-1]: -40…+135 °C (-40…+275 °F) / +150 °C (+302 °F) – 1 h
	PU4*E: -25…+100 °C (-13…+212 °F)
	PU4SM - [11-0]: -40…+100 °C (-40…+212 °F)
	PU4SM - [11-1]: -40…+125 °C (-40…+257 °F)
	PU4LM - [11-0]: -20…+150°C (-13°F…+302°F)
	[05-0] (NBR): -20…+100 °C (-4…+212 °F)
	[05-1] (FKM/FPM): -20…+150 °C (-4…+302 °F)
	[05-3] (EPDM): -40…+140 °C (-40…+284 °F)
	[05-4/6] (FFKM): -15…+150 °C (+5…+284 °F)
	[03-X]: ATEX/IECEx: see certificate
Pressure cycles	≥ 100 million (1.2x PN)
Ambient temperature Ta	PU4*C/K/E / PU4SM - [03-S]: -40…+100 °C (-40…+212 °F)
	PU4LM - [03-S]: -20…+100 °C (-13…+212 °F)
	[03-X]: ATEX/IECEx: see certificate
Protection Class	IP69K/IP67 (EN/IEC 60529)

Climate class	4K4H (EN/IEC 60721-3-4)
Impact resistance	50 g [11 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	[09-A]: 745 years / [09-B]: 610 years / [09-V]: 561 years / [09-L]: 601 years
Weight	PU4*C/K/E / PU4SM: 0.2...0.5 kg
	PU4LM: 0.3...1.2 kg

10.4 Materials

Process membrane	PU4*C: 99.9% Al_2O_3 ceramic
in contact with the process	PU4*K/E: Al_2O_3 ceramic, 96%
	PU4SM: Steel 1.4571/316Ti
	PU4SM: [04-1]/[04-6] (EN 837) ≥ 40 bar: Steel 1.4542/630, Steel 1.4534/SI13800
	PU4LM: Steel 1.4435/316L
Process connection	PU4*C/K/E / PU4SM: Steel 1.4404/316L, Steel 1.4571/316Ti
In contact with the process	PU4LM: Steel 1.4435/316L
Process seal	NBR, FKM/FPM, EPDM, FFKM
In contact with the process	

Not in contact with the process	CrNi steel, PUR, PA, acrylic copolymer, FKM/FPM, NBR
Filling oil	PU4SM - [04-0/5] (flush-mounted) / [04-1/6] (EN 837) ≤ 25 bar: Synthetic oil
	PU4LM: Synthetic oil

11 Revision

Version	Changes
UMN07.26	Initial release

senseca.com

Senseca Germany GmbH
Lauterbachstr. 57 ½
84307 Eggenfelden
GERMANY
INFO.EGGENFELDEN@SENSECA.COM