

Precont PU4

Pressure transmitter for general industrial applications
Operating manual BA09.18



Technical modifications reserved.

1 Safety instructions

The operating manual is part of the device and must be kept always accessible nearest its installation location.

Installation, electrical connection, commissioning, operation, dismantling and disposal of the device must be made by a qualified and authorized expert according to the information's in this Operating Manual and the relevant standards and rules.

This expert must have read and understood this Operating Manual and especially the safety notes. Complementary the Technical Information TI has to be adhered to, that can be ordered by the manufacturer or downloaded from the homepage.

If the device is intended for use in explosion-hazardous areas, additionally the safety instructions for electrical apparatus for explosion-hazardous areas must be observed.

1.1 Operational safety

The device is safely built and tested according to state-of-the-art technology.

The device meets the legal requirements of all relevant EU directives. This is confirmed by attaching the CE mark. The associated EU-Declaration of Conformity can be ordered or downloaded from the homepage.

This measuring device meets article 4 (3) of the EU directive 2014/68/EU (pressure equipment directive) and is designed and produced in good engineer practice.

Devices with measurement end value > 200 bar are constructed for media of fluid group 2.

1.2 Intended use

The device is an electronic pressure transmitter / pressure switch for monitoring, control and continuous measurement of pressures in gases, vapors, liquids and dusts.

The device may only be used within the permitted operation limits. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be checked for compatibility with the respective application requirements (contacting materials, process temperature) before use. An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers. The sensors may not be used as sole device for prevention of dangerous conditions in machines and plants.

The operational reliability of the device is ensured only at the intended use.

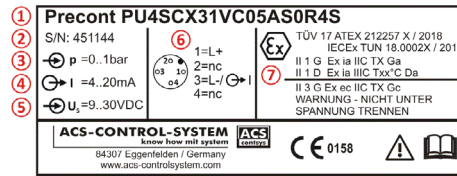
An inappropriately use, disregarding the Operating Manual and the technical rules, using under-qualified personnel, making unauthorized alterations as well as damage of the device releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

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2 Installation

2.1 Product label



- ① Type code
- ② Serial number
- ③ Input signal / Measuring range
- ④ Output signal
- ⑤ Power supply
- ⑥ Pin assignment
- ⑦ Ignition protection type

2.2 Installation place

The correct function of the device within the specific technical data can only be guaranteed, if the permitted process and environmental conditions at the installation place (see Technical Information TI) will not be exceeded.

The installation of the device at locations where high pressure blows can occur should be avoided. Pressure measurement in gases: Install device above the tapping point, so that the condensate can flow into the process.

Pressure measurement in steams: Install device after a siphon and a shut-off device below the tapping point. Fill the siphon with fluid before commissioning.

Pressure measurement in liquids: Install device after a shut-off device below or at the same level as the tapping point. Install device below the lowest measuring point. Do not mount the device in the fill flow, in the suction area of a pump, in the tank outlet or at a point in the container which could be affected by pressure pulses from an agitator.

The installation position can generate a zero value shift because of the deadweight of the measuring diaphragm (see Technical Information TI).

The installation of the device should be made if possible at temperature calmed places. High process temperature steps can produce short-time higher measuring signal deviations.

At high process temperatures a heat transfer to the terminal enclosure can be reduced by isolation of the medium carrying part of the plant or by the use of a temperature decoupler.

At underdun of the dew point, e.g. cold process medium at high environmental temperature, there is the possibility of condensate formation within the pressure measuring sensor (Type C, capacitive), which can lead to temporary increased measurement deviations resp. malfunctions. These deviations are fully reversible by drying the condensate. The use of a device with a strain gauge pressure measuring sensor (Type E/K/M) is recommended.

2.3 Installation notes

Do not remove packaging until just before mounting and check the device for any damage.

The protective cap, which is attached at the process connection resp. the diaphragm, must only be removed immediately before the installation. The diaphragm may not be damaged.

Pollution or damaging of the pressure compensation opening (Hole besides the electrical connection) can lead to faulty measuring results.

DANGER - Install the device only when the system is pressureless. There is a risk of fast escaping media resp. pressure blow.

DANGER - Let the system cool down sufficiently before installing the device. There is a risk of dangerous and hot media escaping.

Sealing faces and threads on the device and at the mounting point must be clean and without damage.

Parallel threads must be sealed by a suitable O-ring, flat or profile gasket. An additional sealing material such as yam, hemp or PTFE tape should not be used. Tapered threads should be wound with additional sealing material, e.g. PTFE tape for sealing.

The installation of the device into a closed off completely with process liquid filled connection can lead to destruction of the measuring diaphragm. The reduction of the volume of the liquid at screw-in leads to a very high pressure boosting, which can exceed the permitted maximum value by a multiple. Thus, before installation, the connection must be sufficiently emptied.

The tightening of the thread process connection may only be done at the hexagon by a suitable spanner at most with the maximum permitted torque strength ($\leq 50\text{Nm}$ / Type PU4SC – Process connection type 9 – Thread G $\frac{1}{2}$ “, front-flush $\leq 20\text{Nm}$).

3 Electrical connection

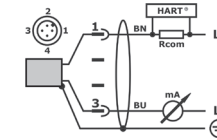
Danger – Install the device only when power supply is off. There is a risk of electric shock.

Note – For inauguration deactivate all connected control devices, to avoid unwanted control reactions.

The device must be grounded, e.g. by the metallic process connection.

Install cable separated from power leading cables, if existing connect shield to earth.
Cable: M12 – A-coded, 1-BN = brown / 2-WH = white / 3-BU = blue / 4-BK = black

3.1 Electronic type A – Current 4...20mA HART®



Use a cable 2-core, twisted, shielded.

Observe maximum permitted supply voltage:

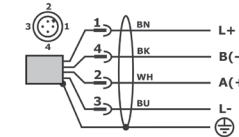
- Us = 9...35VDC
- Ex: Us = 9...30VDC

Observe maximum permitted load resistor of the analogue output:

- RL \leq (Us - 9V) / 22mA

Observe a communication resistance of 250Ω for HART®.

3.2 Electronic type V – RS485 Modbus®-RTU



Connect the device at bus topology (line). A stub line must be avoided.

Observe line termination resistors 120Ω (A+ to B-) and bias network resistors 720Ω (A+ to L+ / B- to L-).

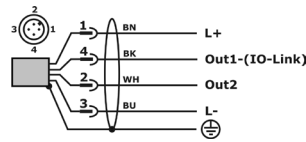
Use a cable 4-core acc. to the EIA485 recommendations:

Impedance	135...165Ω @ 3...20Mhz
Cable capacity	< 30pF/m
Cable diameter	> 0,64mm
Cable cross section	0,34 mm ² / AWG 22
Loop resistance	< 110Ω/km
Shielding	Braided shield /shield foil
Cable length	38400 Baud \leq 1200m

Observe maximum permitted supply voltage:

- Us = 6...35VDC

3.3 Electronic type L – IO-Link®



The IO-Link® communication requires an IO-Link®-Master.

Use a cable max. 20m, 3- resp. 4-core, unshielded.

Analogue output: A shielded cable must be used.

Observe maximum permitted supply voltage:

- $U_s = 9 \dots 35\text{VDC}$
- $U_s = 18 \dots 30\text{VDC}$, IO-Link®

Observe maximum permitted load resistor of the analogue output:

- $RL \leq (U_s - 8\text{V}) / 22\text{mA}$

Note – Inductive loads at the switch outputs, e.g. contactors or magnetic vents may only be used with a free-wheeling diode or a RC protection circuit.

<p>Out1 – IO-Link® Out2 – Current 0/4...20mA</p>	
<p>Out1 – IO-Link® Out2 – Switch p- switching</p>	<p>Out1 – IO-Link® Out2 – Switch n- switching</p>
<p>Out1 – Current 0/4...20mA Out2 – Switch p- switching</p>	<p>Out1 – Current 0/4...20mA Out2 – Switch n- switching</p>
<p>Out1 – Switch p- switching Out2 – Switch p- switching</p>	<p>Out1 – Switch n- switching Out2 – Switch n- switching</p>

4 Operation

4.1 HART®

Configuration via HART®-communication device e.g. E+H Field, software e.g. PACTware™ and device driver DTM e.g. ICS Generic HART DTM

Damping 0s...<1s: The HART® communication for 20s after power-up the supply voltage.

Deactivation after 4 minutes of inactivity.

Default settings [Adjustment range]:

- Address: 0 [0...15]
- Damping [s]: 0 [0...100]
- Current alarm: 3,9...20,5mA [3,9...20,5mA / 3,8mA / 22mA]
- Start value LRV: Nominal lower adjustment value = 4mA
- End value URV: Nominal upper adjustment value = 20mA

4.2 Modbus®-RTU

Knowledge concerning Modbus®-RTU is provided.

Function code	Function
03	Read Holding Register
04	Read Input Register
06	Write Single Register
16	Write Multiple Register

Holding Register – Device settings		2 Byte – Uint16 - R/W	
Address	Description	Default	Comment
2000	Modbus ID	1	Modbus ID / 1 ... 247
2001	Baud-Rate	3	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
2002	Parity	2	0 = None 1 = Odd 2 = Even
2003	Number Stopbits	0	0 = 1 Stop Bit 1 = 2 Stop Bit
2004	Word Order	0	0 = ABCD 1 = CDAB

Input Register – Values		2 Byte – Read only	
Address	Data Type	Description	
1000	Uint16	Device Type	
1001	Uint32	Serial Number	
1003	Uint16	Calibration Date	
1004	Uint16	Hardware Version	

Input Register – Values		4 Byte – Float – Read only	
Address	Data Type	Description	
1010	Upper Range	PV = Pressure	
1012	Lower Range	PV = Pressure	
1014	Maximum	PV = Pressure	
1016	Minimum	PV = Pressure	
1018	Upper Range	SV = Temperature	
1020	Lower Range	SV = Temperature	
1022	Maximum	SV = Temperature	
1024	Minimum	SV = Temperature	

Input Register – Values			Read only
Address	Byte Type	Description	Comment
1100	2 Uint16	Status	Bit 0: 1 = Invalid Measure Value PV Bit 1: 1 = Invalid Measure Value SV
1101	2 Uint16	Unit	PV = Pressure
1102	4 Float	Measure Value	PV = Pressure
1104	2 Uint16	Unit	SV = Temperature
1105	4 Float	Measure Value	SV = Temperature

Holding Register – Values			2 Byte – Uint16 – R/W
Address	Description	Default	Comment
2020	Damping Tau	1000	ms / PV = Pressure
2021	Damping Tau	1000	ms / SV = Temperature

4.3 IO-Link®

Configuration via IO-Link®-Master, software and device driver IODD.

The IODD file as well as the IODD description can be ordered by the manufacturer or downloaded from the homepage.

5 Maintenance

The device is free of maintenance.

Solid coatings on the diaphragm can lead to faulty measurement results. The diaphragm must be regularly cleaned. Don't use sharp resp. hard tools, pressured air or aggressive chemicals. For dismantling the device see safety information's of the chapter "Dismounting".

6 Dismounting

Use suitable protective clothing, e.g. goggles, gloves.

Danger - Dismount the device only when power supply is off. There is a risk of electric shock.

Danger - Let the device and the system cool down sufficiently fore dismantling it. There is a risk of hot surfaces as well as dangerous and hot media escaping.

Danger - Dismount the device only when the system is pressureless. There is a risk of fast escaping media resp. pressure blow.

After dismantling the diaphragm resp. the process connection as well as the electrical connection plug must be fitted with protective caps.

7 Troubleshooting / Repair

In case of malfunction check:

- Enclosure >> Damage
- Pressure compensation opening >> Pollution
- Diaphragm >> Damage / Pollution
- Process gaskets >> Damage
- Supply voltage >> Polarity / Voltage / Load / Contact
- Cable >> Damage / Short circuit / Wire break

For dismantling the device see safety information's of the chapter "Dismounting".

A repair may only be carried out by the manufacturer.

8 Return

Enclose necessary information's for return:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

Before returning the device, the following measures must be performed:

- Adhesive product residues e.g. caustic, toxic, radioactive etc. must be removed.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthy product completely.

9 Disposal

This instrument is not subject to the WEEE directive and the respective national laws. Hence, pass the instrument directly on to a specialized recycling company and do not use the municipal collecting points.