PGX100 and PAX100 with IO-Link Communication

Gauge and absolute pressure transmitters



Engineered solutions for all applications

Measurement made easy

PGX100/PAX100 model

Introduction

The present manual provides information on installing, operating, troubleshooting the PGX100 and PAX100 pressure transmitter models. Every section of the present manual is specifically dedicated to the specific phase of the transmitter lifecycle starting from the receipt of the transmitter and its identification, passing to the installation, to the electrical connections, to the configuration and to the troubleshooting and maintenance operations, as applicable.

The pressure transmitters model PGX100 and PAX100 are field mounted, microprocessor based electronic transmitters. Accurate and reliable measurement of gauge and absolute pressure is provided. These models can be configured to provide specific industrial output signals according to 4 to 20 mA with IO-Link digital communication.

Additional Information

Additional documentation on PGX100 and PAX100 with IO-Link Communication is available for download free of charge at www.abb.com/pressure. Alternatively simply scan one of this codes:

PGX100

PAX100

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1 Safety

General information and instructions

These instructions are an important part of the product and must be retained for future reference.
Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly. The specialist personnel must have read and understood the manual and must comply with its instructions.
For additional information or if specific problems occur that are not discussed in these instructions, contact the manufacturer.
The content of these instructions is neither part of nor an amendment to any previous or existing agreement, promise or legal relationship.
Modifications and repairs to the product may only be performed if expressly permitted by these instructions.
Information and symbols on the product must be observed. These may not be removed and must be fully legible at all times.
The operating company must strictly observe the applicable national regulations relating to the installation, function testing, repair and maintenance of electrical products.

Warnings

The warnings in these instructions are structured as follows:

⚠ DANGER

The signal word '**DANGER**' indicates an imminent danger. Failure to observe this information will result in death or severe injury.

⚠ WARNING

The signal word '**WARNING**' indicates an imminent danger. Failure to observe this information may result in death or severe injury.

⚠ CAUTION

The signal word '**CAUTION**' indicates an imminent danger. Failure to observe this information may result in minor or moderate injury.

NOTICE

The signal word *'**NOTICE**'* indicates possible material damage.

Note
'**Note**' indicates useful or important information about the product.

Intended use

PAX100 pressure transmitters measure absolute pressure and PGX100 pressure transmitters gauge pressure or the level of gases, vapors and liquids.

For information on measuring ranges and permissible overload, refer to the corresponding data sheet.

Repairs, alterations and enhancements, or the installation of spare parts are only permissible as far as these are described in the manual. Approval by ABB must be requested for any activities beyond this scope. Repairs performed by ABB-authorized centers are excluded from this.

Improper use

The following are considered to be instances of especially improper use of the device:

- For use as a climbing aid, for example for mounting purposes.
- For use as a bracket for external loads, for example as a support for piping, etc.
- Material application, for example by painting over the housing, name plate or welding/soldering on parts.
- Material removal, for example by spot drilling the housing.

The device is designed for use exclusively within the values stated on the name plates and within the technical limit values specified on the data sheets.

The following technical limit values must be observed:

- The Maximum Working Pressure may not be exceeded.
- The Maximum ambient operating temperature may not be exceeded.
- The Maximum process temperature may not be exceeded.
- The enclosure method of protection type must be observed.

Obligations of the operator

Prior to using corrosive and abrasive materials for measurement purposes, the operator must check the level of resistance of all parts coming into contact with the materials to be measured.

ABB will gladly support you in selecting the materials, but cannot accept any liability in doing so.

The operators must strictly observe the applicable national regulations with regard to installation, function tests, repairs, and maintenance of electrical devices.

Qualified personnel

Installation, commissioning, and maintenance of the device may only be performed by trained specialist personnel who have been authorized by the plant operator. The specialist personnel must have read and understood the manual and comply with its instructions.

Warranty provisions

Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using underqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

Cyber security disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is operator's sole responsibility to provide and continuously ensure a secure connection between the product and your network or any other network (as the case may be).
Operator shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.
ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Note
The IO-Link protocol is an unsecured protocol (in the sense of IT or cyber security), as such the intended application should be assessed before implementation to make sure that this protocol is suited.

Note
The user can disable all access to device (including factory / service specific communication) by setting the write protection, see **Write protection** on page 23.

Software downloads

By visiting the web pages indicated below, you will find notifications about newly found software vulnerabilities and options to download the latest software. It is recommended that you visit this web pages regularly:
www.abb.com/cybersecurity

IODD-finder – download the IODD-File

... 1 Safety

Manufacturer's address

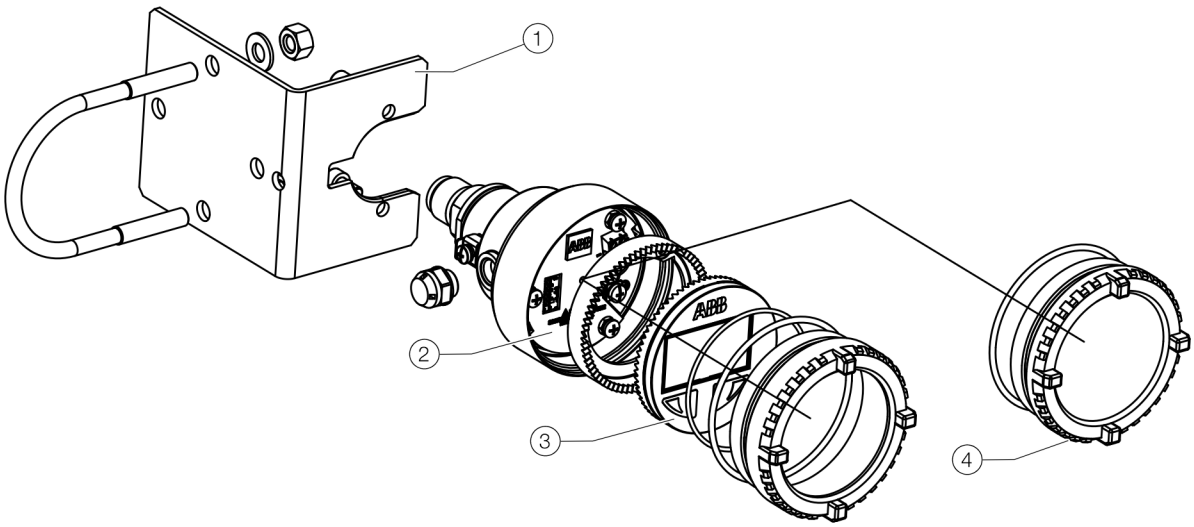
ABB S.p.A.
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Service address

Customer service center
Tel: 0180 5 222 580
Email: automation.service@de.abb.com

2 Design and function

Components of the pressure transmitter



1 Bracket
2 Communication board
3 LCD indicator with keypad
4 Housing cover

Figure 1: Gauge / absolute pressure transmitter components

Product description

The different models of the PXX100 series have different mechanical constructions of the process interface.

PGS100/PAS100 models have a single hydraulic circuit for which filling fluid is selected directly in the ordering information. PXF100 and PXD100 models have a 2-circuit construction:

- The primary circuit (i.e., the sensor/transducer circuit) is always filled as per factory standard (silicon oil).
- The second circuit filling fluid (i.e., process connection circuit) can be selected by the customer as per the ordering information.

The secondary circuit filling in PXF100 is the one to be selected during the device configuration (i.e., fill fluid type) while for PXD100 the secondary circuit filling can be selected during the codification of the S26 remote seal accessory.
In case of need for a different filling on the primary circuit (i.e., the sensor/transducer circuit), this can be requested via the special request (SR) process active in ABB.

… 2 Design and function

Measuring range limits and span limits

The PGX100 and PAX100 Transmitter data sheet provides all information concerning the Range and Span limits in relation to the model and the sensor code.

The terminology currently used to define the various parameters is as follows:

Abbreviation	Description
URL	Measuring range upper limit of a specific sensor. The highest value of the measured value that the transmitter can be adjusted to measure.
LRL	Lower Range Limit of a specific sensor. The lowest value of the measured value that the transmitter can be adjusted to measure.
URV	Upper Range Value. The highest measured value to which the transmitter is calibrated.
LRV	Lower Range Value. The lowest measured value to which the transmitter is calibrated.
SPAN	The algebraic difference between the Upper and Lower Range Values. The minimum span (MIN SPAN) is the minimum value that can be used without degradation of the specified performance. The calibration span (CAL SPAN) is the difference between Upper Range Value (URV) and Lower Range Value (LRV).
TD	(or Turn Down Ratio) is the ratio between the maximum span and the calibrated span.

The transmitter can be calibrated with any range between the LRL and the URL with the following limitations:

- LRL ≤ LRV ≤ (URL - CAL SPAN)
- CAL SPAN ≥ MIN SPAN
- URV ≤ URL

3 Product identification

Name plates

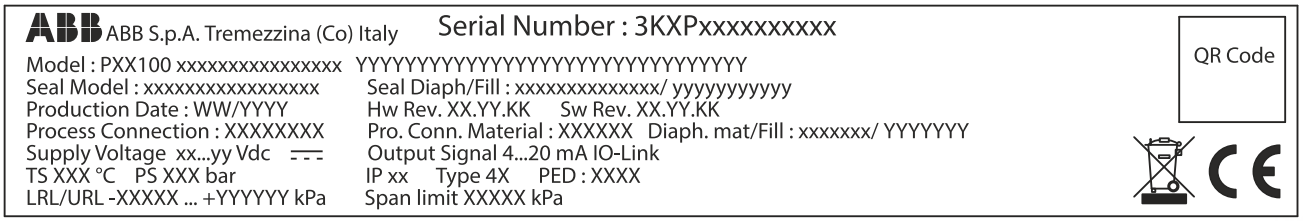


Figure 2: Name plate for pressure transmitter model PGXxxx/PAXxxx

The name plate in Figure 2 provides detailed information associated with the transmitter, concerning the model code, date of production, hardware and software revisions, process wetted materials, power supply range, output signal, maximum working temperature (TS) and pressure (PS), IP rating, PED identification code, range and span limits, calibration range and special request number (if applicable) in another section.

Note

- For information on the individual letters/numbers that make up the order code, please refer to the order confirmation or associated data sheet. For information about labeling in accordance with the Pressure Equipment Directive, please observe the information in **Pressure Equipment Directive (PED) – 2014/68/EU** on page 11.
- The instrument may be used as a pressure accessory (category III) as defined by the Pressure Equipment Directive 2014/68/EU. In this case you will find the number of the notified body (0474) that have verified the compliance. PGX100 and PAX100 pressure transmitters are in compliance with EMC 2014/30/EU.
- The IO-Link communication protocol is standardized in IEC 61131-9.

Tag plate



Figure 3: Tag plate for pressure transmitter model PGXxxx/PAXxxx

The tag plate in Figure 3 is dedicated for detailing the tag number, the calibrated span as upper and lower range values with associated unit of measurement and the special request number, as applicable, if specified.

Optional wired-on plate

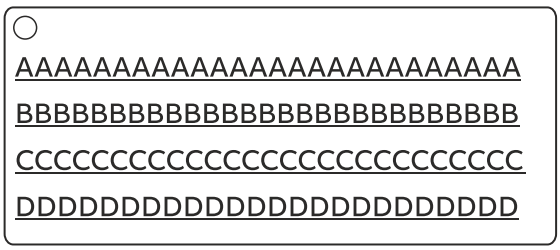


Figure 4: 4-line layout of the optional wired-on Stainless Steel plate

Models PGX100 and PAX100 transmitter can be supplied with the optional “Wired On Stainless Steel plate” (Figure 4) which is permanently laser printed with a custom text specified in phase of order.

The available space consists in 4 lines with 32 characters per line. The plate will be connected to the transmitter with a Stainless Steel wire.

4 Transport and storage

Transport safety instructions

Observe the following instructions:

- Do not expose the device to humidity during transport. Pack the device accordingly.
- Pack the device so that it is protected against vibrations during transport, for example, by using air-cushioned packing.

Inspection

Check the devices immediately after unpacking for possible damage that may have occurred from improper transport. Details of any damage that has occurred in transit must be recorded on the transport documents.
All claims for damages must be submitted to the shipper without delay and before installation.

Identification

Identify the device in accordance with the instructions in **Product identification** on page 9 to ensure it is the right device.

Handling

Special precautionary measures are not required for handling of the device. However, standard procedures must be complied with.

Storing the device

Bear the following points in mind when storing devices:

- Store the device in its original packaging in a dry and dust-free location.
- Observe the permitted ambient conditions for transport and storage.
- Avoid storing the device in direct sunlight.
- In principle, the devices may be stored for an unlimited period. However, the warranty conditions stipulated in the order confirmation of the supplier apply.

Ambient conditions

Model PGx100, PAx100	Storage temperature limits
Storage temperature range	−50 to 85 °C (−58 to 185 °F)
LCD display	−40 to 85 °C (−40 to 185 °F)
Relative humidity	Up to 75 %

Model PGx100, PAx100	Humidity during storage
Relative humidity	Up to 75 %

Returning devices

For the return of devices, follow the instructions in **Maintenance / Repair** on page 44.

5 Installation

General

Study these installation instructions carefully before proceeding.

Failure to observe the warnings and instructions may cause a malfunction or personal hazard. Before installing the transmitter, check whether the device design meets the requirements of the measuring point from a measurement technology and safety point of view.

This applies in respect of the:

- Measuring range
- Gauge pressure stability
- Temperature (Ambient and Process)
- Operating voltage and current

The suitability of the materials must be checked as regards their resistance to the media. This applies in respect of the:

- Process connection, isolating diaphragm, etc.

In addition, the relevant directives, regulations, standards, and accident prevention regulations must be observed. Measurement accuracy is largely dependent on correct installation of the pressure transmitter and, if applicable, the associated impulse line (s). As far as possible, the measuring setup should be free from critical ambient conditions such as large variations in temperature, vibrations, or shocks.

Note

- If unfavorable ambient conditions cannot be avoided for reasons relating to building structure, measurement technology, or other issues, the measurement quality may be affected.
- If a remote seal with capillary tube is installed on the transmitter, the additional operating instructions for remote seals and the related data sheets must be observed.

IP rating

The housings for PGX100 and PAX100 transmitters are certified as conforming to IP rating IP 67 (according to ISO 20653) or NEMA 4X (according to NEMA 250).

The **first** digit indicates the IP rating the integrated electronics have against the entry of foreign bodies, including dust.

- '**6**' means that the housing is dust-proof (i.e., no ingress of dust).

The **second** digit indicates the IP rating the housing has against the entry of water.

- '**7**' means that the housing is protected against the effects of temporary immersion in water under standardized water pressure and temporal conditions.
- '**8**' means that the housing is protected against the effects of continuous immersion in water under 2 m water pressure and 30 minutes temporal conditions.
- '**9K**' means that the housing is protected against the effects of powerful high-temperature water jets under standardized water pressure, temperature and temporal conditions.

The device and its accessories (i.e. cable glands and other electrical connections) must be carefully and duly tightened to meet expected IP rating. When using/mounting cable glands, they have to meet expected IP rating.

Pressure Equipment Directive (PED) – 2014/68/EU

Devices with PS > 200

Devices with a permissible pressure PS > 200 bar have been subject to a conformity validation. The data label includes the following specifications: Pressure Equipment Directive (PED) (2014/68/EU).

Devices with PS ≤ 200

Devices with a permissible pressure PS ≤ 200 bar correspond to article 4 paragraph 3. They have not been subject to a conformity validation. These instruments were designed and manufactured according to SEP Sound Engineering Practices.

… 5 Installation

Mounting

Transmitter factory configuration consideration

The PGX100 and PAX100 pressure transmitter in your hands has been factory calibrated to reflect the published declared performance specification; no further calibration is required in normal condition.

ABB typically configures PGX100 and PAX100 pressure transmitters according to the user requirements.

A typical configuration includes:

- TAG number
- Calibrated span
- Output linearization
- LCD display configuration

Installing the connection cables

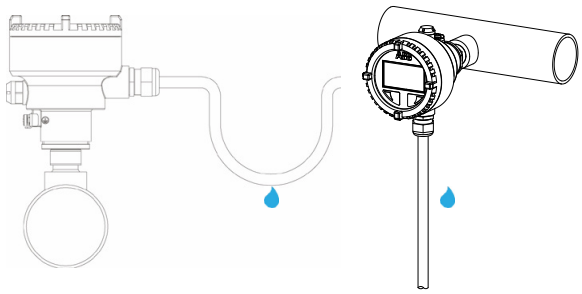


Figure 5: Steps for preventing the ingress of humidity

Use suitable cables and tighten connectors securely. The transmitter can also be protected against the ingress of humidity by routing the connection cable downward before securing it. This allows rain and condensation to drip down.

This is especially important for installation in outdoor areas and rooms that are exposed to humidity (e.g., due to cleaning processes) or on cooled or heated tanks.

Mounting the transmitter using bracket kit

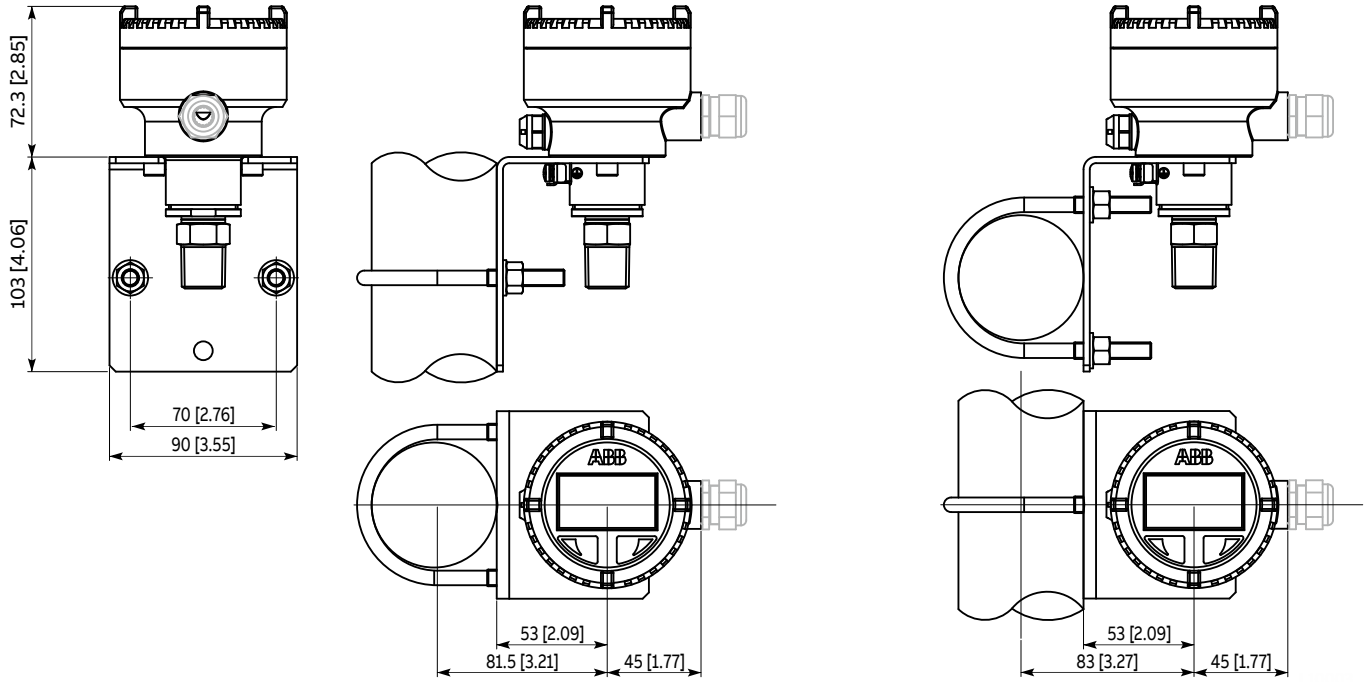


Figure 6: Pipe and wall mounting bracket kits for PXS100 transmitter

A mounting bracket for wall or pipe mounting (2 in pipe) is also available as an accessory. Bracket is suggested for PxS and PxD models (when ordered with extended capillary, as for other configurations devices are self sustaining i.e. F&B models).

Ideally, the pressure transmitter should be mounted in a vertical position to prevent subsequent zero shifts. The pressure transmitter can also be mounted directly on the manifold.

NOTICE

Impairment of measurement accuracy

If the transmitter is installed inclined with respect to the vertical, the filling liquid exerts hydrostatic pressure on the measuring diaphragm, resulting in a zero shift.

- In such an event, the zero point can be corrected via the zero push-button or via the ‘set PV to zero’ command. Please refer to **Adjusting lower range value / oblique sensor** on page 27 for further details.

… 5 Installation

… Mounting

Additional mounting information about PxS100 – sealing and screw connections

Connecting G ½ B spigot:

For sealing, a flat gasket must be used in accordance with DIN EN 837-1.

NPT threaded connection:

Seal the threads with PTFE or another approved resistant sealant.

Process connection with flush diaphragm:

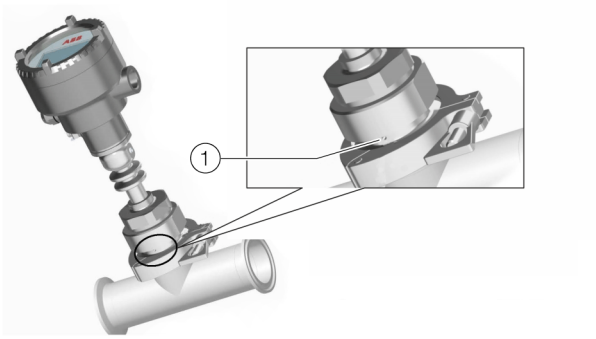
Prior to mounting the device, install a welded connection or tapped hole according to relevant soldering standards (for process connection and welded connection dimensions, refer to data sheet).

Impulse line

In order for the pipes to be laid correctly, the following points must be observed:

- Keep the impulse line as short as possible and avoid sharp bends.
- Lay the impulse line in such a way that no deposits can accumulate in it. Gradients should not be less than approx. 8 % (ascending or descending).
- The impulse line should be blown through with compressed air or, better yet, flushed through with the measuring medium before connection.
- Completely depressurize the impulse line if the medium is a fluid.
- Lay the impulse line in such a way that gas bubbles (when measuring fluids) or condensate (when measuring gases) can flow back into the process line.
- When measuring steam, lay the impulse line in such a way that hot steam cannot flow back into the process connection (water trap, e.g., a water trap pipe that is filled with water before installation).
- Check the tightness of the connection.

Additional mounting information about PxF100



(1) The leakage hole must be orientated to the ground

Figure 7: Installation instructions for G1 in universal connection

Transmitter can be installed using a universal connection G1 in with its adapter, as in above figure.

Installation instructions for food & beverage applications

The PAF/PGF100 transmitter for food & beverage applications must be installed where is granted the self-draining and the drainability of both process and cleaning fluids, without stagnation areas.

For food & beverage applications if the instrument was joined to a tee connection, both should be installed on a horizontal plane (see Figure 8). Moreover, the tee connection should be of the short outlet type with its length less than the inside diameter.

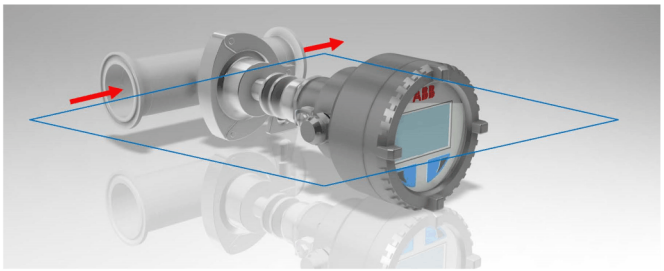


Figure 8: Mounting in F&B applications

For applications with tank the dead outlet must have the length smaller than its inside diameter and the transmitter must be put where the dead area around the diaphragm seal can be directly hit from the washing jet.

When installing a PAF/PGF100 transmitter for EHEDG applications, respect the EHEDG Positon Paper “Easy cleanable Pipe couplings and Process connections”.

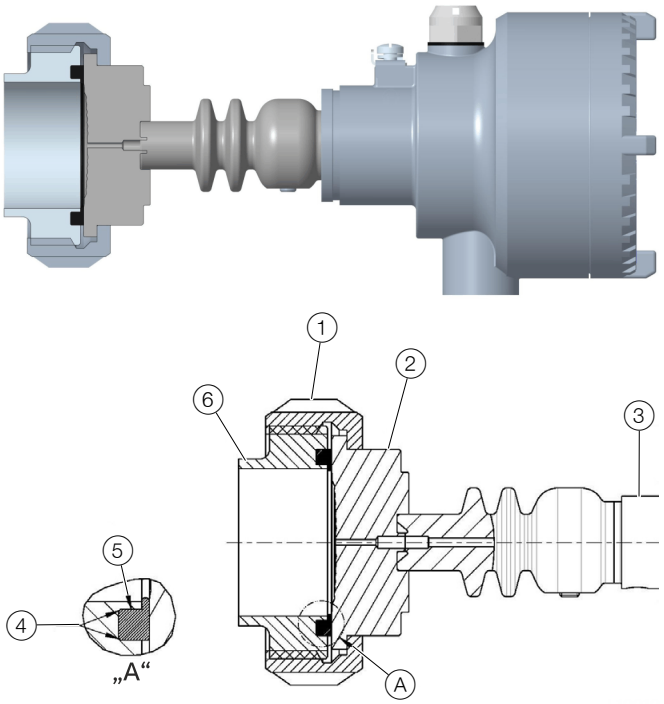
Cleaning instructions for food & beverage applications

The PAF/PGF100 transmitter has been realized with specific process connections able to be cleaned in place (CIP). To be easy cleanable, the circuit of the plant must guarantee a minimum flow velocity of 1.5m/s. It should be attained a turbulent flow.

In case of manual cleaning, be careful during the disassembly to avoid impacts on the diaphragm seal. Do not use abrasive substances to clean it.

Special conditions for use of SMS process connection according to 3A requirements

The PAF/PGF100 transmitter for F&B applications when chosen with SMS SS1145 process connection (Process connection size – 13th character ‘H’ and ‘L’) is according to 3A requirements (gauge coupling) only if the counter-flange (male welding counterpart) and the gasket respect the following instructions.



1. Union nut acc. to SS 1148 (supplied by ABB)
2. ABB Diaphragm remote seal sleeve connection acc. to SS 1147
3. ABB transmitter
4. R = 0.4 mm min.
5. Gasket (special version approved for F&B applications)
6. Male welding part (special version approved for F&B applications)

Figure 9: PAF/PGF100 transmitter with SMS SS1145 process connection

It is responsibility of the customer that the male welding counterpart and the gasket follow the 3A requirements in terms of groove radii and flange gasket. ABB does not provide nor the gasket nor the counter flange.

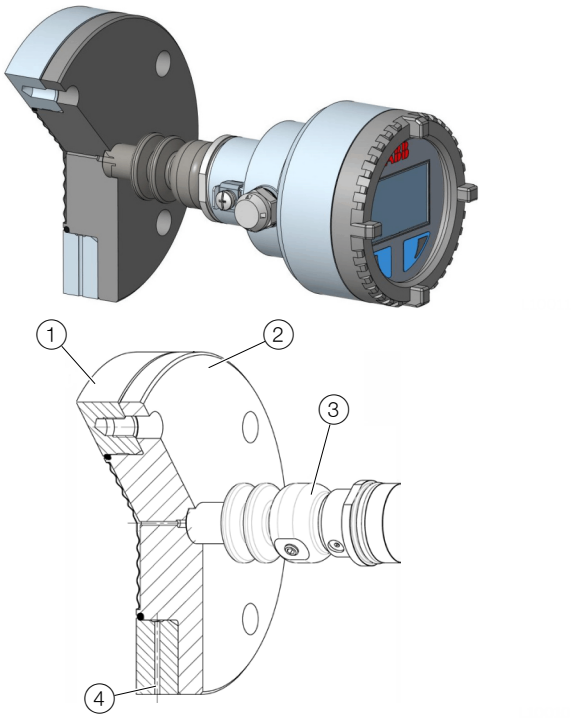
Avoid to tighten the union nut too much as not to excessively squeeze the gasket leading to an escape from its groove.

… 5 Installation

… Installation instructions for food & beverage applications

Special conditions for use of Neumo BioControl® process connection according to 3A requirements

The PAF/PGF100 transmitter for food & beverage applications when chosen with Neumo BioControl® process connection (Process connection size – 13th character 'P' and 'Q') is according to 3A certification (pipe coupling) only if the block flange (counter-part) is installed on a horizontal plane and the leak detect port (which has to be 2.4 mm diameter min) is oriented towards the ground (according to the requirements of standard 3A 7407/07-/08-/09).



1 Block flange
2 Neumo Biocontrol® diaphragm seal
3 ABB transmitter
4 Leakage hole oriented towards the ground

Figure 10: PAF/PGF100 transmitter with Neumo BioControl® process connection

It is responsibility of the customer that the block flange counterpart and the gasket follow the 3A requirements in terms of groove radii and flange gasket. ABB does not provide nor the gasket nor the counter flange.

6 Electrical connections

Safety instructions

⚠ WARNING

Risk of injury due to live parts.
Improper work on the electrical connections can result in electric shock.

- Connect the device only with the power supply switched off.
- Observe the applicable standards and regulations for the electrical connection.

NOTICE

Damage to components!
The electronic components of the printed circuit board can be damaged by static electricity (observe ESD guidelines).

- Make sure that the static electricity in your body is discharged before touching electronic components.

The electrical connection may only be established by authorized specialist personnel and in accordance with the connection diagrams.

The electrical connection information in this manual must be observed; otherwise, the IP rating may be adversely affected. Ground the measurement system according to requirements.

The relevant directives must be complied with for the electrical installation!

Because the transmitter cannot be switched off, surge protection devices, lightning protection, or grid disconnect possibilities must be provided at the plant.

Check that the existing supply voltage corresponds to that indicated on the rating plate. The same lines are used for both the power supply and the output signal.

Electrical data

Note
The IO-Link protocol is an unsecured protocol (in the sense of IT or cyber security), as such the intended application should be assessed before implementation to make sure that this protocol is suited.

Power supply	
Minimum power supply voltage	9 V DC
Minimum power supply voltage for IOLINK specifications	18 V DC
Maximum power supply voltage	35 V DC
Current consumption without loads (BL enable)	13 mA
Maximum power consumption	0.7 W @ 35 V DC - 20 mA output
Start up time	<3 s
Polarity inversion protection	Yes

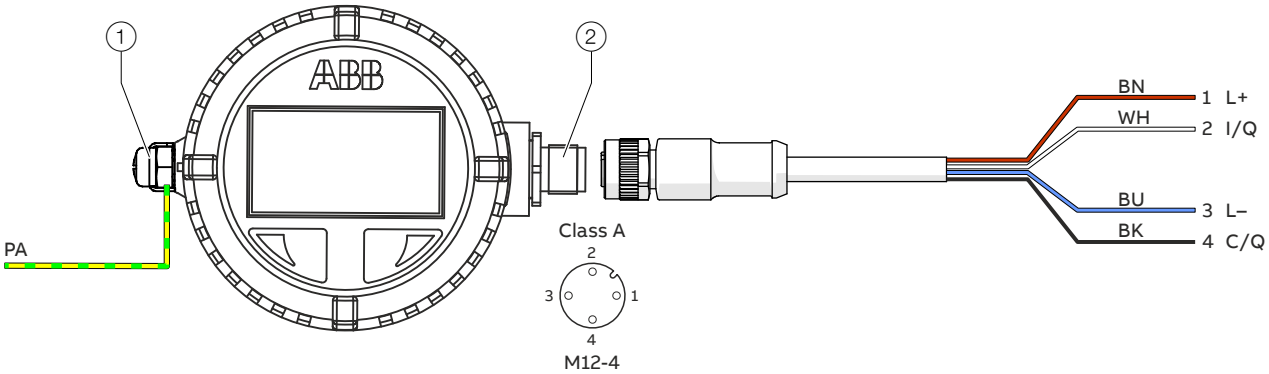
Transistor output functions	
Output 1	IO-Link or transistor output
Output 2	4 to 20 mA or transistor output
Transistor mode	PNP, NPN, PP
Maximum current for each transistor	250 mA
Max transistors power dissipation	2 W
Max load for each transistor	8 W
High level voltage drop	<2 V @ 250 mA
Low level voltage drop	<1 V @ 250 mA
Transistors dead time	<10 ms
Delay function	10 ms to 60 s
Short circuit resistance	Yes
Current limiter	Disable, 50, 100, 200, 250 mA
Leakage current NPN	20 µA max.
Leakage current PNP	40 µA max.

Current output 4 to 20 mA	
Output current	3.6 to 22 mA
Max resistive load at 9 Vdc	285 Ω @ 20.5 mA
Max resistive load at 24 Vdc	960 Ω @ 20.5 mA
Fail mode Low/High	3.6 / 22 mA

IO-Link interface	
Standard	IEC61131-9
Communication speed	38.4 Kbaud

… 6 Electrical connections

Terminal assignment



(1) Ground terminal
PA Potential equalization
(2) M12 IO-Link connector plug, 4-pin, A-encoded

Figure 11: Wiring diagram IO-Link®

Output (IO-Link) transmitter wiring

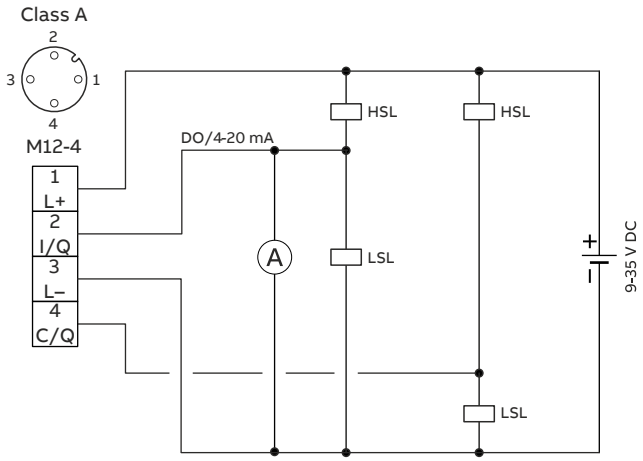


Figure 12: Transmitter connection scheme

Pin	Signal	Core color
1	L+	BN - brown
2	I/Q (i.e. D/O)	WH - white
3	L–	BU - blue
4	C/Q	BK- black

Maximum cable length

To comply with EN 61326-1, the maximum connection cable length may not exceed 20 m (65.6 ft).

Grounding

The pressure transmitter housing should be grounded in accordance with national and local electrical codes.
The potential equalization terminal (PA) is available outside the housing of the transmitter.
The most effective transmitter case grounding method is direct connection to ground with impedance equal or less of 5 Ω.

Start-up phase

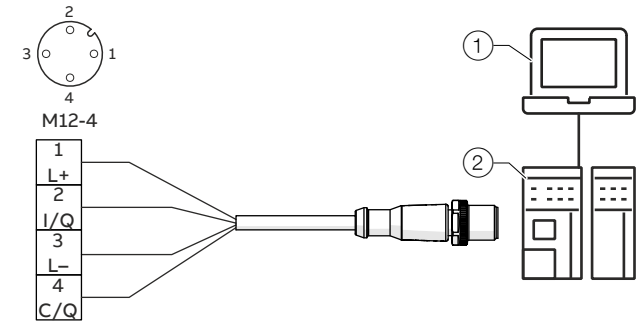
After switching on, during the start-up phase (<3 s), the state of the outputs is not well defined.

Note

After several weeks, increased force will be required to unscrew the housing cover.
This is not caused by the threads, but instead is due to the type of gasket.

Connection examples

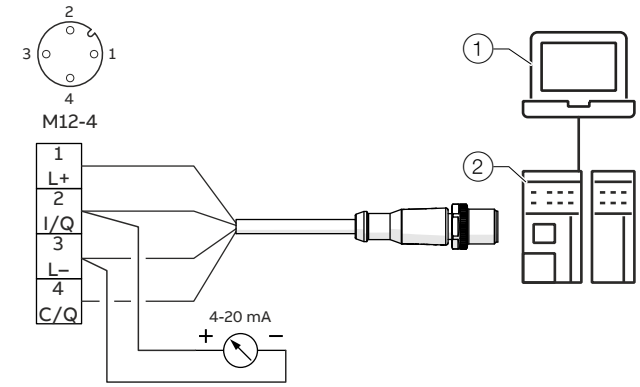
IO-Link® only



① PC ② IO-Link master / PLC

Figure 13: Configuration and process control by IO-Link

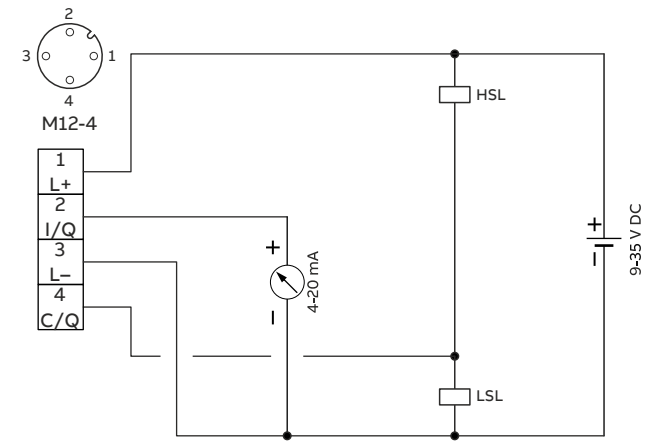
IO-Link® and current output 4 to 20 mA



① PC ② IO-Link master / PLC

Figure 14: Mixed signals

Digital output and current output 4 to 20 mA



HSL High side load LSL Low side load

Figure 15: Digital sensor and 4 to 20 mA

7 Commissioning

Safety instructions

If there is a chance that safe operation is no longer possible, take the device out of operation and secure it against unintended startup.

General Notes

Once the pressure transmitter has been installed, it is put into operation by switching on the operating voltage.
Check the following before switching on the operating voltage:

- Process connections
- Electrical connection
- Fill the impulse line and measuring chamber of the measuring cell completely with measuring medium.

The transmitter can then be put into operation.
To do this, the shut-off valves must be actuated in the following order (in the default setting, all valves are closed):

1. Open the discharge shut-off valve if present.
2. Open the shut-off valve.

Decommissioning of the transmitter is executed in the reverse sequence.

Note

- In the case of pressure transmitters for absolute pressure and measuring ranges of ≤ 40 kPa absolute, please note that the pressure measuring cell has been overloaded over a long period by the atmospheric pressure during transport and storage. For this reason, you will need to allow a starting time of approx. 3 hours after commissioning until the sensor has stabilized to such an extent that the specified accuracy can be maintained.
- Only passive or explosion-proof test devices or display instruments may be connected.
- If the output signal stabilizes only slowly, it is likely that a large damping time constant has been set on the transmitter.

Analog output signal

If the applied pressure is within the values indicated on the name plate, the analog output current ranges between 4 and 20 mA.
If the pressure applied falls outside the set range, the output current will be driven as per defined configurations, as follows:

Output current limits for output 2 (4 to 20 mA mode)
Overload condition

- Lower limit: 3.8 mA
- Upper limit: 20.5 mA

Alarm current

- Lower alarm value: 3.6 mA
- High alarm value: 21 mA
- Default setting: 3.6 mA

NAMUR NE 43 defines as alarm threshold the lower ≤ 3.6 mA and the upper ≥ 21 mA.

Note
A brief interruption in the power supply might result in initialization of the electronics (program restarts).

Opening and closing the housing

⚠ CAUTION

Risk of burns due to hot measuring media

The device surface temperature may exceed 70 °C (158 °F), depending on the measuring medium temperature!

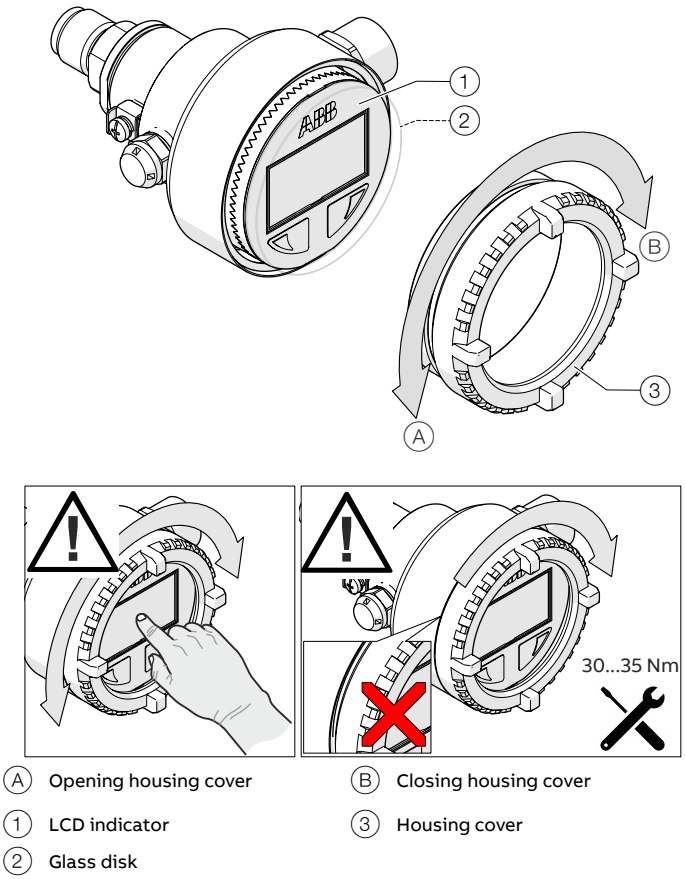
- Before starting work on the device, make sure that it has cooled sufficiently.

NOTICE

Impairment of the IP rating

Transmitter cover needs to be tightly closed to ensure that the IP rating performances are granted.

- Ensure that housing threads, cover threads and gaskets are free from dirt and not damaged or deformed.
- Place the cover O-ring into its seat and position the cover to match housing threads.
- Cover ending position has to be almost in a metal-to-metal position with the housing.



Ⓐ Opening housing cover
Ⓑ Closing housing cover
① LCD indicator
③ Housing cover
② Glass disk

Figure 16: Opening and closing the Housing

Open the housing

Unscrew the housing cover as shown in the direction of arrow Ⓐ.

– Take care to avoid any damage when removing the cover, due to possible detaching of the LCD indicator which can also cause the flat cable extension.

Close the housing

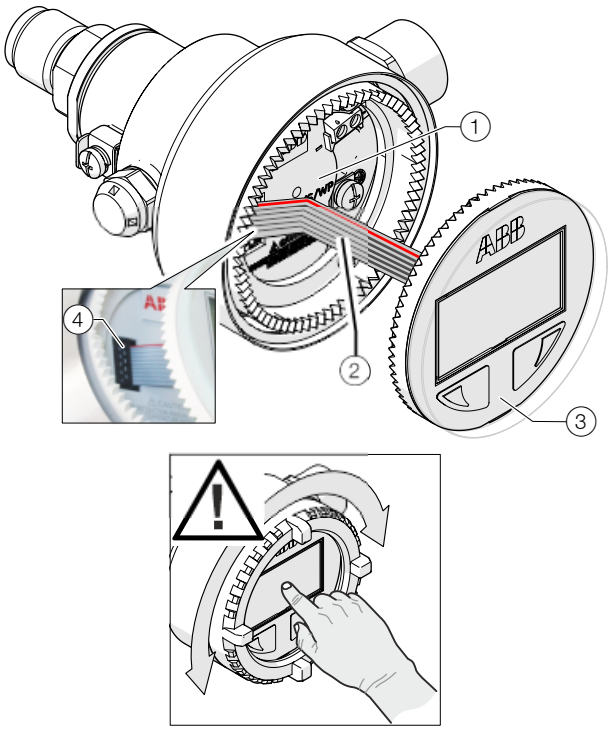
Screw on the housing cover as shown in the direction of arrow Ⓑ.

– Gently push the LCD display to ensure its positioning as needed, while tightening the housing cover.
– Close the cover ensuring that a 30 to 35 Nm tightening torque is applied.
– The Cover ending position has to be almost in a metal-to-metal position with the housing.

… 7 Commissioning

Rotate, install or replace LCD indicator

The LCD indicator is attached to the electronic board of the pressure transmitter.



① Communication board
② Flat ribbon cable
③ LCD indicator
④ Connector (Black)

Figure 17: Rotating the LCD indicator, Installing / replacing the LCD indicator

Rotate the LCD indicator

The position of the LCD indicator can be adjusted to suit the installation position of the transmitter, to ensure that the display is legible.

The LCD indicator can be rotated with increments of 5°.

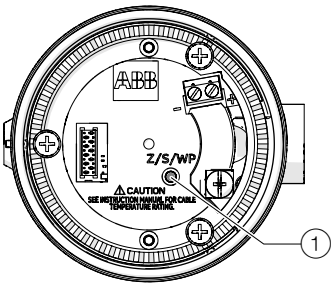
1. Open the housing cover, refer to **Open the housing** on page 21.
2. Carefully detach the LCD indicator from the communication board.
   – Make sure the flat ribbon cable does not get twisted or torn when rotating the LCD indicator .
3. Rotate the LCD indicator to the desired position.
   – Take care not to pinch the flat ribbon cable when rotating the LCD indicator.
4. Screw on the housing cover for the transmitter, refer to **Close the housing** on page 21.
   – Gently push the LCD indicator to ensure its positioning as needed, while tightening the housing cover.

Install / replace the LCD indicator

The LCD indicator can be replaced, e.g., if defective.

1. Open the housing cover, refer to **Open the housing** on page 21.
2. For replacement carefully remove the LCD indicator from the inset connector of the transmitter. The LCD indicator just stay in position on the electronic board and is firmly kept by properly screwing the housing cover. Take care to avoid any damage when removing the cover, due to possible detaching of the LCD which can also cause the flat cable extension.
3. The length of the flat cable allows to carry out the wiring connection to the terminals without disconnecting the LCD indicator.
4. No tools are required to insert the LCD connector of the replacement display. Carefully insert without forcing to avoid wrong positioning and make sure the black connector of the flat fits into the connector on the electronic board, as shown in **Figure 17**.
5. Make sure that the connector is fully inserted.
6. Screw on the housing cover for the transmitter, refer to **Open the housing** on page 21.
   – Gently push the LCD indicator to ensure its positioning as needed, while tightening the housing cover.

Write protection



(1) Pushbutton Z/S/WP

Figure 18: Pushbutton on the electronic board

There is only one push button behind the display. It changes its function depending on the presence of the display.

When the display is installed, it works as hardware write protection switch.

- When the write protection is disabled, and it is kept pressed for some 1 second, then the write protection becomes enabled.
- In the opposite logic, when the write protection is enabled, and the button is kept pressed, then the write protection becomes disabled.

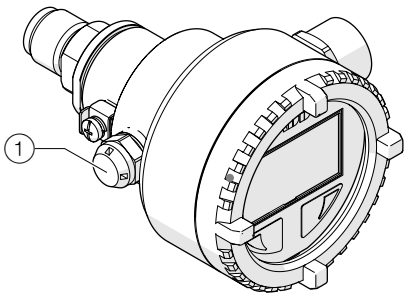
This enable/disable condition can be observed/confirmed by looking at the lock symbol appearing or disappearing on the top line of the display.

Write protection prevents the configuration/modification of device data from being overwritten by unauthorized users. If write protection is enabled, both local and remote writings are refused. The Z (Zero) and S (Span) button cannot be used to set new range values because their writing is disabled while their use to enter and navigate into the local easy setup menu for the read/review of the device parameterization is still allowed.

However, when write protect is enabled, it is still possible to read out the configuration data using graphical user interface or communication tools (DD or FDI based).

Note
Transmitter without display requires the communication tool to activate write protection.

Pressure sensor ventilation (PGX100 only)



(1) Ventilation port

Figure 19: Reference port

The Transmitter has a reference port vented to the atmosphere and duly protected.

Care must be taken to avoid obstruction of the port (i.e. covered, dirty) as it can affect the measurement.

… 7 Commissioning

IO-Link parameter overview

The table below shows the parameters available through the IO-Link interface. Only some of these can be configured via the 'Easy Setup' menu.

Name	Index	Subindex	Bit offset	Data type	Range	Single values	RW	Default
Direct parameters								
Direct Parameters - Page 1	0	0		RecordT	—	—	ro	
Reserved		1	120	UIntegerT_8	—			
Master Cycle Time		2	112	UIntegerT_8	—			
Min Cycle Time		3	104	UIntegerT_8	10ms			
M-Sequence Capability		4	96	UIntegerT_8	0x2B			
IO-Link Revision ID		5	88	UIntegerT_8	0x11			
Process Data Input Length		6	80	UIntegerT_8	4			
Process Data Output Length		7	72	UIntegerT_8	0			
Vendor ID 1		8	64	UIntegerT_8	0x0616			
Vendor ID 2		9	56	UIntegerT_8	—			
Device ID 1		10	48	UIntegerT_8	100			
Device ID 2		11	40	UIntegerT_8	—			
Device ID 3		12	32	UIntegerT_8	—			
Reserved		13	24	UIntegerT_8	—			
Reserved		14	16	UIntegerT_8	—			
Reserved		15	8	UIntegerT_8	—			
System Command		16	0	UIntegerT_8	—			
System Command								
System Command	2	0		UIntegerT_8	0 to 63, 132 to 159	Device Reset (128), Application Reset (129), Restore Factory Settings (130), Back-to-box (131), Set4mA (wet LRV) (160), Set 20mA (wet URV) (161), Set PV to zero (162), ResetOffsetBias (163), ResetConfConfChangeCounter (164), SetFixedCurrentMode4mA (165), SetFixedCurrentMode20mA (166), ExitFixedCurrentMode (167), ResetToFactorySensorTrim (168), ResetToFactoryDACTrim (169), ResetToUserSensorTrim (170), ResetMinMaxPressValues (171), ResetMinMaxTempValues (172), SaveUserSensorTrim (173)	wo	
Identification								
Device Access Locks	12	0		RecordT			rw	
Parameter Write Access		1	0	BooleanT		Locked (true), Unlocked (false)		
Data Storage		2	1	BooleanT		Locked (true), Unlocked (false)		
Local Parameterization		3	2	BooleanT		Locked (true), Unlocked (false)		
Local User Interface		4	3	BooleanT		Locked (true), Unlocked (false)		
Vendor Name	16	0		StringT [64]		ABB M&A	ro	
Vendor Text	17	0		StringT [64]		www.abb.com/measurement	ro	
Product Name	18	0		StringT [64]		Pxx100	ro	
Product ID	19	0		StringT [64]		PGS100,PAS100,PGD100,PAD100, PGF100,PAF100,PGP100,PAP100	ro	
Product Text	20	0		StringT [64]		Pressure transmitter with IO-Link interface	ro	

Name	Index	Subindex	Bit offset	Data type	Range	Single values	RW	Default
Identification								
Serial Number	21	0		StringT [16]		3K64xxxxxxx	ro	
Hardware Revision	22	0		StringT [64]		1.0.0	ro	
Firmware Revision	23	0		StringT [64]		1.0.1	ro	
Application-specific Tag	24	0		StringT [32]		P1000	rw	
Function Tag	25	0		StringT [32]		***	rw	
Location Tag	26	0		StringT [32]		***	rw	
Device Status	36	0		UIntegerT_8		Device is OK (0), Maintenance required (1), Out of specification (2), Functional check (3), Failure (4)	ro	
Detailed Device Status	37	0		ArrayT			ro	
Process data								
PD Input	40	0		RecordT			ro	
Pressure		1	2	IntegerT_30				
SO1		2	0	BooleanT		false (false), true (true)		
SO2		3	1	BooleanT		false (false), true (true)		
Parameters								
Output 1 Mode	64	0		UIntegerT_8		Disable (0), Windowed NO (1), Windowed NC (2), Threshold NC (3), Threshold NO (4)	rw	4
Output 2 mode	65	0		UIntegerT_8		Disable (0), 4...20mA (1), Windowed NO (2), Windowed NC (3), Threshold NC (4), Threshold NO (5), Alarm Beacon (6)	rw	0
Pressure Unit	66	0		UIntegerT_8		inH2O 68°F (1), Psi (6), bar (7), mbar (8), Pa (11), KPa (12), atm (14), MPa (237), inH2O 4°C (238)		
Temperature Unit	67	0		UIntegerT_8		°C (32), °F (33), °R (34), °K (35)	rw	32
Sensor Limit High	68	0		Float32T			ro	0
Sensor Limit Low	69	0		Float32T			ro	0
Minimum Span	70	0		Float32T			ro	0
Max Working Pressure	71	0		Float32T			rw	0
Temperature Limit High	72	0		Float32T			ro	0
Temperature Limit Low	73	0		Float32T			ro	0
Lower Range Value	74	0		Float32T			rw	0
Upper Range Value	75	0		Float32T			rw	0
Damping	76	0		Float32T			rw	0
Integration Time	77	0		UIntegerT_8			rw	32
Bias Offset	78	0		Float32T			ro	0
Set PV To Value	80	0		Float32T			wo	0
Analog Fail Safe Type	81	0		UIntegerT_8		Up (0), Down (1), Hold (239)	rw	1
Switch 1 Source	89	0		UIntegerT_8		Pressure (0), Out % (1), Out mA (2)	rw	0
Switch 2 Source	90	0		UIntegerT_8		Pressure (0), Out % (1)	rw	0
Transistor 1 Function	91	0		UIntegerT_8		NPN (0), PNP (1), PP (2)	rw	0
Transistors Current Limit	92	0		UIntegerT_8		Disable (0), 50mA (1), 100mA (2), 200mA (3), 250mA (4)	rw	0
Transistor 2 Function	93	0		UIntegerT_8		NPN (0), PNP (1), PP (2)	rw	0
Switch Point 1	95	0		Float32T			rw	0
Reset Point 1	96	0		Float32T			rw	0

… 7 Commissioning

… IO-Link parameter overview

Name	Index	Subindex	Bit offset	Data type	Range	Single values	RW	Default
Parameters								
Switch Delay 1	97	0		UIntegerT_32	0 to 60000		rw	0
Reset Delay 1	98	0		UIntegerT_32	0 to 60000		rw	0
Switch Point 2	101	0		Float32T			rw	0
Reset Point 2	102	0		Float32T			rw	0
Switch Delay 2	103	0		UIntegerT_32	0 to 60000		rw	0
Reset Delay 2	104	0		UIntegerT_32	0 to 60000		rw	0
Short Tag	106	0		StringT [8]			rw	0
HMI BackLight	107	0		UIntegerT_8		On (0), Off (1), On Touch (2), On - Blink On Alarm (3), Off - Blink On Alarm (4)	rw	0
HMI Language	108	0		UIntegerT_8		EN (0), DE (1)	rw	0
HMI Contrast	109	0		UIntegerT_8	0 to 100		rw	50
HMI Mode	110	0		UIntegerT_8		One Line (5), Two Lines (9), One Line With Bargraph (6), Two Lines With Bargraph (10)	rw	5
HMI Line 1 View	111	0		UIntegerT_8		Pressure (0), Current (2), Sensor Temp (7), Out % (3)	rw	0
HMI Line 2 View	112	0		UIntegerT_8		Pressure (0), Current (2), Sensor Temp (7), Out % (3)	rw	2
HMI Bargraph View	113	0		UIntegerT_8		Pressure (0), Out mA (2), Out		
% (3), Temperature (7)	rw							
Num Decimals Line 1	114	0		UIntegerT_8			rw	2
Num Decimals Line 2	115	0		UIntegerT_8			rw	2
Trimmed Value	116	0		Float32T			ro	0
High Trim Point	117	0		Float32T			rw	0
High DAC Trim	119	0		Float32T			wo	0
Low DAC Trim	120	0		Float32T			wo	0
Op Current Value	121	0		Float32T			ro	0
Current Loop Test	122	0		UIntegerT_8		Disable (0), Enable (1)	rw	0
Current Simulation Value	123	0		Float32T			rw	0
Pressure Value	124	0		Float32T			ro	0
Pressure Simulation	125	0		UIntegerT_8		Disable (0), Enable (1)	rw	0
Pressure Simulation Value	126	0		Float32T			rw	0
Switch 1	127	0		UIntegerT_8			ro	0
Switch 1 Simulation	128	0		UIntegerT_8		Disable (0), Enable (1)	rw	0
Switch 1 Simulation Value	129	0		UIntegerT_8		Off (0), On (1)	rw	0
Switch 2	130	0		UIntegerT_8			ro	0
Switch 2 Simulation	131	0		UIntegerT_8		Disable (0), Enable (1)	rw	0
Switch 2 Simulation Value	132	0		UIntegerT_8		Off (0), On (1)	rw	0
Sensor Temperature Value	133	0		Float32T			ro	0
Electronic Temp Value	134	0		Float32T			ro	0
MAX Pressure Value	135	0		Float32T			ro	0
MIN Pressure Value	136	0		Float32T			ro	0
MAX Sensor Temp Value	137	0		Float32T			ro	20
MIN Sensor Temp Value	138	0		Float32T			ro	0
Diagnostic Simulation	142	0		UIntegerT_8		Disable (0), Enable (1)	rw	0
Diagnostic Simulation Value	143	0		RecordT			rw	
Diagnosis Alarm Selection	144	0		RecordT			rw	
Conf Changed Counter	149	0		UIntegerT_8			ro	0
Advanced Diagnostic	150	0		UIntegerT_8		Disable (0), Enable (1)	rw	0

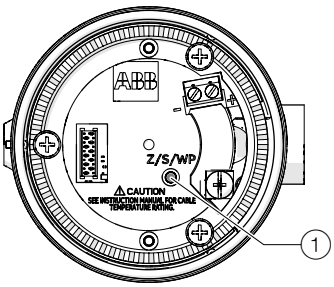
Adjusting lower range value / oblique sensor

During installation of the transmitter, zero position shifts may occur due to the mounting position; these must be corrected. Possible cause includes the transmitter mounting position when different from recommended vertical mounting position.

Note
The transmitter must have reached its operating temperature (approx. 5 min. after startup, if the transmitter has already reached the ambient temperature) in order to perform the zero shift correction.

There are two options (variant **'A'** or **'B'**) for calibrating the 4 to 20 mA output signal directly on the transmitter.

Variant 'A' – without LCD indicator



(1) Pushbutton Z/S/WP

Figure 20: Pushbutton on the electronic board

In variant A, the calibration is carried out via the pushbutton on the electronic board.

1. Make sure that the measured variable corresponds to the lower range value for the measurement process, i.e., that the pressure that the process exerts on the transmitter is the level of pressure required to generate a 4 mA output signal. The pressure must be stable (observe set damping level).
2. Unscrew the housing cover and press the pushbutton (1) on the electronic unit using a pin with diameter of ≤ 2.5 mm. Hold the pushbutton down for about 5 to 10 s. The output signal is set to 4 mA. The span remains unchanged.
3. Make sure that the measured variable corresponds to the upper range value for the measurement process, i.e., that the pressure that the process exerts on the transmitter is the level of pressure required to generate a 20 mA output signal. The pressure must be stable (observe set damping level).
4. Press the pushbutton (1) on the electronic unit using a pin with diameter of ≤ 2.5 mm. Hold the pushbutton down for at least 15 to 20 s. The output signal is set to 20 mA.
5. Screw the housing cover back on.

Note
The procedure described in "A" above does not affect the physical pressure shown; it only corrects the analog output signal. For this reason, the analog output signal may differ from the physical pressure shown on the digital display or the communication tool.

- To avoid this discrepancy, you need to correct the zero position shift (zero shift) as described under variant "B".

Variant 'B' – with LCD indicator
In variant 'B', the calibration is carried out via the touchscreen keys on the optional LCD indicator.

For PGX100/PAX100 models, when in operating mode, the device shows respectively "**Z-S**" on the left and configuration menu icon on the right side of the display. Pressing left button for approx. 8 s leads to the sub-menu for Zero and Span, showing letters "**Z**" and "**S**" respectively in the left and right bottom corners.

1. Press the 'Z' button for less than 5 s, on the display appears the text "Do you want to proceed with Zero?" and the two buttons change their meaning to **Yes** / **No**.
2. Pressing **No**, the "Zero" operation is aborted, while pressing **Yes** the "Zero" operation is confirmed/accepted and executed.
3. The "Zero" operation executed with this modality set the "Lower Range Value" with the pressure value measured in that instant while the "Upper Range Value" is shifted of the same quantity maintaining the "Span", as difference between the Lower and Upper Range values, same as before of the "Zero" operation.
4. As soon as the Yes button is pressed, and the operation executed, in the bottom line of the display it appears for 5 s a message relating the result of the operation.
5. In case of success it appears "Oper Done", otherwise, it is displayed one message describing the reason for failure.
6. Likewise, when you press the S button for less than 5 s, on the display appears the text "Do you want to proceed with Span?" and the two buttons change their meaning to **Yes** / **No**.
7. Pressing **No**, the "Span" operation is aborted, while pressing **Yes** the "Span" operation is confirmed/accepted and executed, displaying a feed-back of the result in the bottom line of the display.
8. The "Span" operation executed with this modality set the "Upper Range Value" with the pressure value measured in that instant while the "Lower Range Value" is not changed.
9. With this operation the "Span" value is changed.

… 7 Commissioning

Parameterization via the menu function Easy Setup

PGX100/PAX100 models feature only the Easy Setup menu in a dedicated structure. Once accessed the menu should be completed until the last step is reached, then to return to the normal display view.

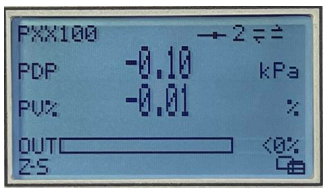
For each step follow the instructions on the screen and consider that for alfa/numeric parameters it is required to move digit by digit until the right bottom corner displays OK.

Pressing the right on-board button the operation is confirmed, while pressing the left on-board button the display change to Cancel to abort the operation by the associated button.

Follow the instruction on the screen to perform the configuration of the different parameters.
This menu allows the verification and the parameterization of the basic configuration of the PGX100/PAX100 pressure transmitter.

Note
After 50 seconds without action on on-board buttons, the transmitter automatically exits the configuration menu.

Open the Menu Easy Setup



1. Press and hold for 8 s.
2. Press and hold for 3 s to enter the Easy Set-Up Menu.

Selection of the menu language – 1

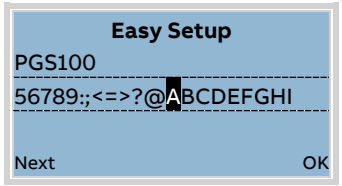




1. Use to call up the edit mode.
2. Use to select the desired language.
3. Confirm the selection with .

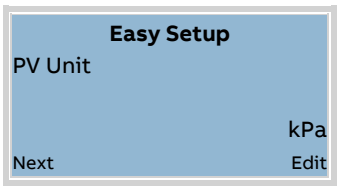
Enter the TAG number (8 digits maximum) – 2

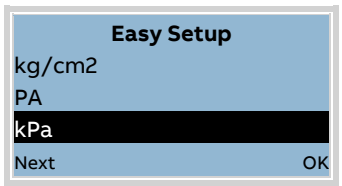




1. Use to call up the edit mode.
2. Use to select the desired character.
3. Confirm the selection with .
4. Select the other characters as described.
5. Confirm the entered TAG with .

Selection of the PV unit – 3

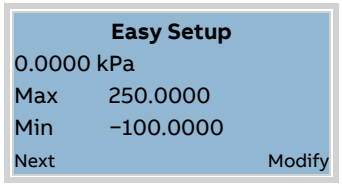


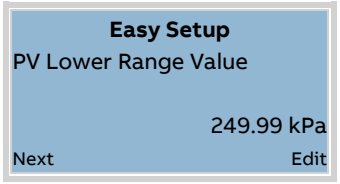


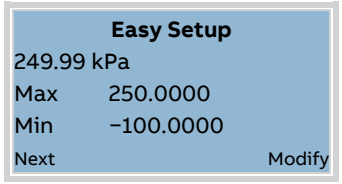
1. Use to call up the edit mode.
2. Use to select the desired unit.
3. Confirm the selection with .

Enter the PV upper and lower range value – 4, 5







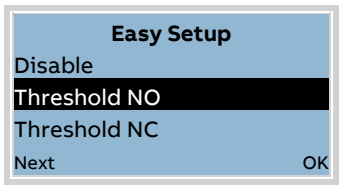


1. Use (Edit) to call up the edit mode.
2. Use (Next) to select the first digit.
3. Use (Modify) to change digit.
4. Repeat previous steps.
5. Confirm the entered value with OK.

Select Output 1 mode – 6

Select the output mode for Output 1. If output 1 is deactivated, IOLink communication is still active. IOLink communication is always active when an IOLink master is detected. For detailed information on the output configuration, refer to chapter '**Output configuration** on page 31'.

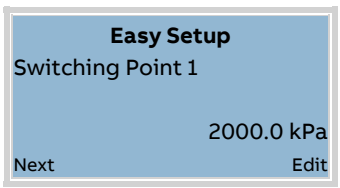


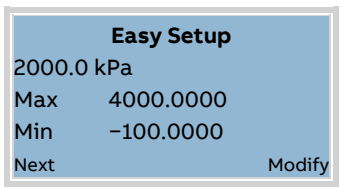


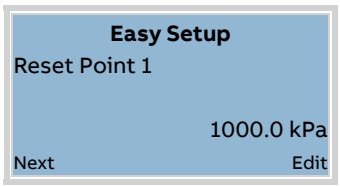
1. Use to call up the edit mode.
2. Use to select the desired function.
3. Confirm the selection with .

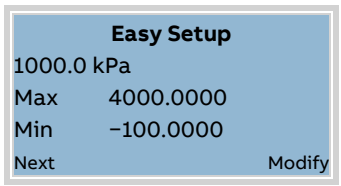
Set the switching points for Output 1 – 7, 8

The parameters Switching Point 1 and Reset Point 1 are only displayed when Output mode 1 is activated.





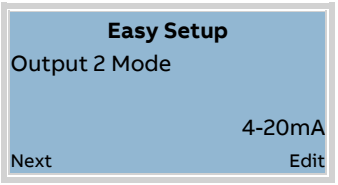


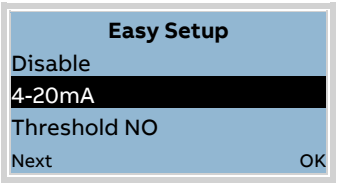


1. Use (Edit) to call up the edit mode.
2. Use (Next) to select the first digit.
3. Use (Modify) to change digit.
4. Repeat previous steps.
5. Confirm the entered value with OK.

Select Output 2 mode – 9

Select the output mode for Output 2. If output 2 is deactivated, the switch output and the 4 to 20 mA output is disabled. For detailed information on the output configuration, refer to chapter '**Output configuration** on page 31'.

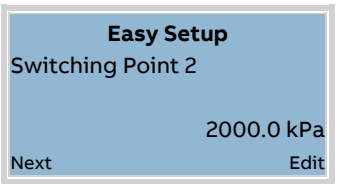


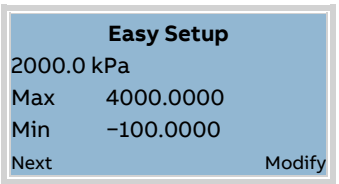


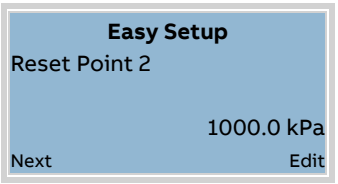
1. Use to call up the edit mode.
2. Use to select the desired function.
3. Confirm the selection with .

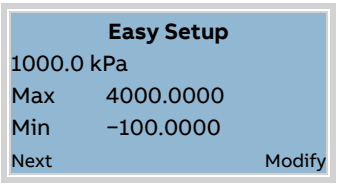
Set the switching points for Output 2 – 10, 11

The parameters Switching Point 2 and Reset Point 2 are only displayed when Output mode 2 is activated.









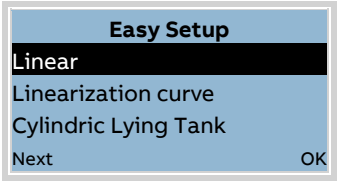
1. Use (Edit) to call up the edit mode.
2. Use (Next) to select the first digit.
3. Use (Modify) to change digit.
4. Repeat previous steps.
5. Confirm the entered value with OK.

… 7 Commissioning

… Parameterization via the menu function Easy Setup

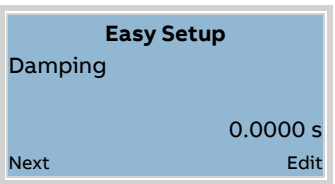
Selection of the linearization type – 12

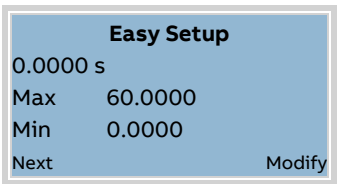




1. Use to call up the edit mode.
2. Use to select the desired linearization type.
3. Confirm the selection with .

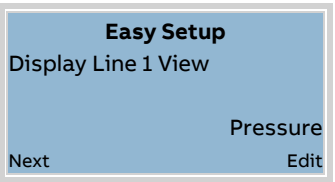
Set the damping value – 13

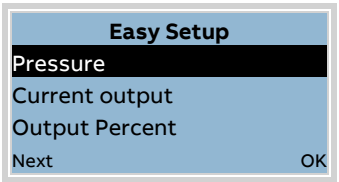




1. Use (Edit) to call up the edit mode.
2. Use (Next) to select the first digit.
3. Use (Modify) to change digit.
4. Repeat previous steps.
5. Confirm the entered value with OK.

Selection of the diplayed value in Line 1 – 14

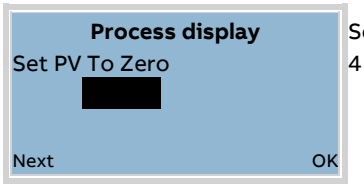




1. Use to call up the edit mode.
2. Use to select the desired linearization type.
3. Confirm the selection with .

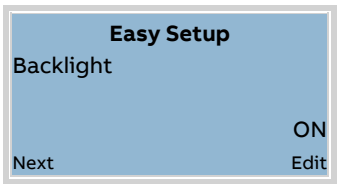
Set PV to Zero – 15

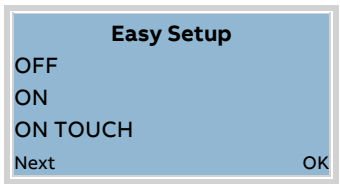
Only if the 'Set PV To Zero' action has not yet been set! Refer to **Adjusting lower range value / oblique sensor** on page 27.



Set the input measured value to 4 mA and the PV value to 0

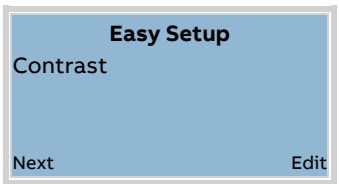
Set the backlight function – 16

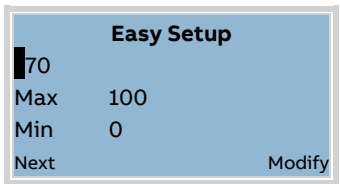




1. Use to call up the edit mode.
2. Use to set the digit.
3. Use to select the next digit.
4. Confirm the selection with .
5. Select the other digits as described.
6. Confirm the entered value with .

Set the display contrast – 17



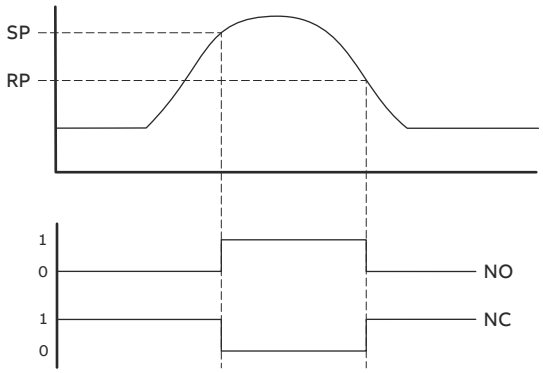
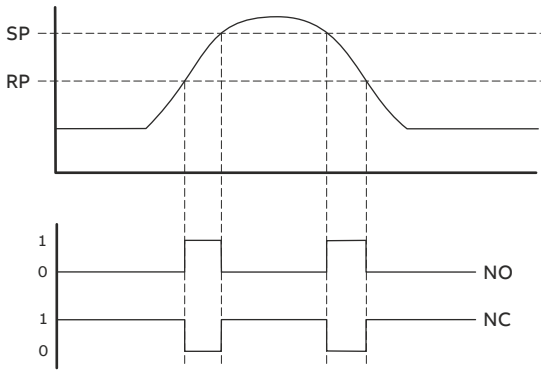


1. Use (Edit) to call up the edit mode.
2. Use (Next) to select the first digit.
3. Use (Modify) to change digit.
4. Repeat previous steps.
5. Confirm the entered value with OK.

The LCD indicator now shows the process display, the Easy Set-Up menu has been completed.

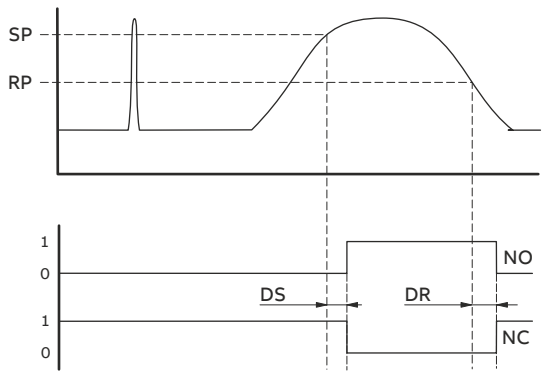
Output configuration

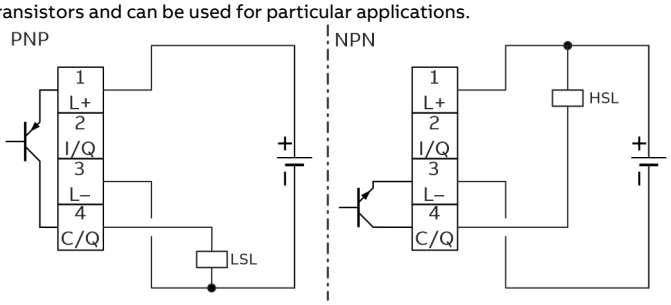
All parameters can be configured via I/O-LINK. Only some of these can be configured via the HMI menu. Some menus are not visible when the linked functionality is not active. All functions can be set independently for each channel (except for the Current limiter value, which is common to both outputs).

Menu / Parameter	Description	IOLink	HMI
Switching Point 1 / 2 Reset Point 1 / 2	In this menu/window it is possible to set the intervention points (Set and reset points) of the digital outputs (Output 1 and Output 2) when activated. Values can be chosen in pressure units, % or mA.	●	●
Output 1 Mode / Threshold NC Output 1 Mode / Threshold NO Output 2 Mode / Threshold NC Output 2 Mode / Threshold NO	In this mode the output is activated when the input value reaches the SET point and is deactivated when the input value drops below the RESET point. In this way a hysteresis effect is obtained on the output. It is also possible to select the NC (normally closed) or NO (normally open) output to obtain an inversion of the logic function. 	●	●
Output 1 Mode / Windowed NC Output 1 Mode / Windowed NO Output 2 Mode / Windowed NC Output 2 Mode / Windowed NO	In this mode the output is activated when the input value is between the SET point and the RESET point. In this way the output will be activated only in the desired window. It is also possible to select the NC (normally closed) or NO (normally open) output to obtain an inversion of the logic function. 	●	●

… 7 Commissioning

… Output configuration

Menu / Parameter	Description	IOLink	HMI
Output 2 Mode / Alarm Beacon	In this mode the output is activated when a fault or a diagnostic is detected by the device. The diagnostics that can generate a switching of the output can be selected as desired. This feature is only available on OUTPUT 2.	●	●
Output 2 Mode / 4-20mA	In this mode the output is used for the generation of 4 to 20 mA. The current output is non-passive; therefore it does not require an additional power supply. The maximum load is proportionate to the supply voltage (see electrical specifications). This feature is only available on OUTPUT2. There is also a function for readback the current generated to signal any connection problems (for example output 2 not connected to the DCS). As for a normal 4 to 20mA transmitter, all Ranging, trimming, fail mode, etc. operations can be performed on the output.	●	●
Backlight	The Backlight operating mode can be changed to adjust visibility and power consumption. It is possible to set the backlight ON, OFF, ON KEY PRESS, or BLINK in case of FAILURE. In this latter mode, the backlight flashes when a fault or a diagnostic is detected by the device to signal the problem remotely (it is possible to select whether the default is on or off).	●	●
Switch Delay 1 Reset Delay 1 Switch Delay 2 Reset Delay 2	It is possible to introduce an output switching delay on both the rising and falling edges. The values on the two fronts can be different (up to 60 s). The delay feature also introduces a filtering effect to eliminate glitches or peaks shorter than the delay time. This delay value acts only on the switching of the outputs and not on the pressure measurement (which uses damping). 	●	—

Menu / Parameter	Description	IOLink	HMI
Transistor 1 Function	It is possible to select the configuration of the output transistors between NPN, PNP and PP depending on the load to drive. In NPN mode, load must be connected between the output and L+. In PNP mode the load must be connected between the output and L-. The PP (Push pull) mode uses both transistors and can be used for particular applications.  **NOTICE – Damage to the connected load!** • The transistor function must be selected correctly according to the type of installation, otherwise the load could be damaged.	●	—
Transistor 2 Function		●	—
Transistors Current Limit	It is possible to select the maximum current that can be supplied by the outputs (50, 100, 200, 250 mA) to protect the load. The selected current value is common for both outputs. If the limiter is "disabled" the outputs will supply the maximum available current, in this case the protection will intervene only in case of overtemperature of the device. In the event of overtemperature, the output will be disabled until the minimum conditions are restored. In any case it is necessary to respect the maximum powers that can be dissipated by the switches (see electrical parameters). **Note** The power dissipated by each switch can be calculated as $I_{out} \times \Delta V_{switch}$.	●	—

8 Operation

Safety instructions

⚠ CAUTION

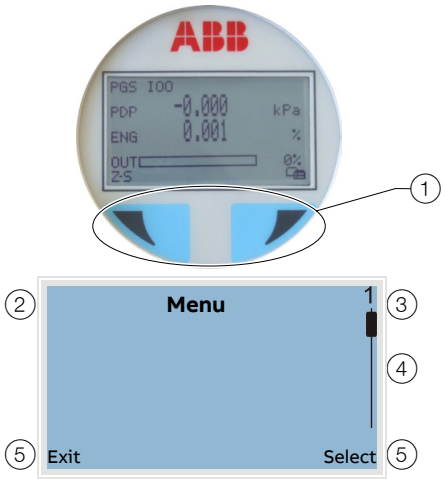
Risk of burns due to hot measuring media

The device surface temperature may exceed 70 °C (158 °F), depending on the measuring medium temperature!

- Before starting work on the device, make sure that it has cooled sufficiently.

If there is a chance that safe operation is no longer possible, take the device out of operation and secure it against unintended startup.

Menu navigation



1. Operating buttons for menu navigation
2. Menu name display
3. Menu number display
4. Marker for indicating relative position within the menu
5. Display showing the current functions of the ◥ and ◢ operating buttons

Figure 21: LCD display

Different functions can be assigned to the ◥ and ◢ operating buttons. The function (5) that is currently assigned to them is shown on the LCD display.

For PGX100/PAX100 models, when in operating mode, the device shows respectively “Z-S” on the left and configuration menu icon on the right side of the display.

Pressing left button ◥ for approximately 3 s leads to the sub-menu for Zero and Span, showing letters Z and S respectively in the left and right bottom corners.

- Zero trim can be performed by pressing the left button ◥ again. A confirmation to proceed is subsequently requested by pushing on the opposite button.
- With the same logic but pressing the right button ◢ in the Z-S sub-menu page, user can perform Span adjustment. A confirmation to proceed is subsequently requested also for Span.

In order to access the sub-menu for configuration and diagnostic, press the right button ◢ for approximately 8 s from operating mode view.

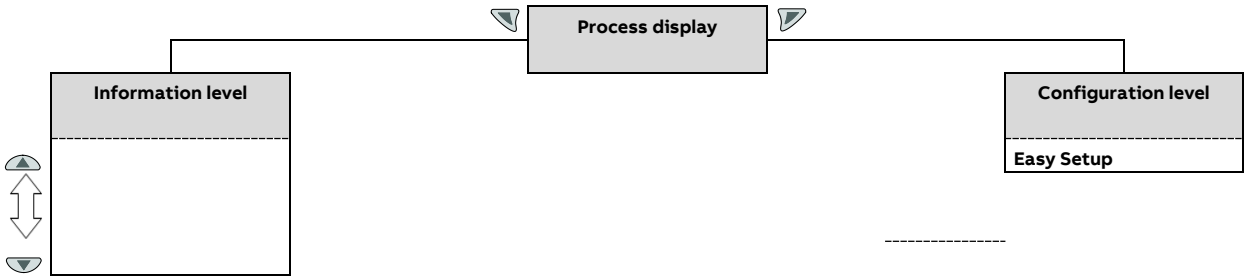
Press then for 2 s the right button ◥ to access the menu or press the left button ◢ to access signals view or diagnostic messages. Without action on buttons associated to bottom icons after few seconds the transmitter returns to normal display view.

Control button functions

◥	**Meaning**
Exit	Exit menu
Back	Go back one submenu
Cancel	Cancel a parameter entry
Next	Select the next position for entering numerical and alphanumeric values

◢	**Meaning**
Select	Select submenu / parameter
Edit	Edit parameter
OK	Save parameter entered

Menu levels



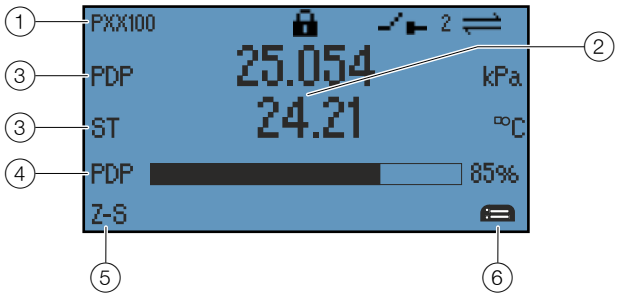
Process display
The process display shows the current process values.
From the level of the process display, you can branch out into two menu levels (information level, configuration level).

Information level
The information level contains the parameters and information that are relevant for the operator.
The device configuration cannot be changed on this level.

Configuration level (Easy Setup)
The configuration level contains all the parameters required for device commissioning and configuration. The device configuration can be changed on this level. For additional information on the parameters, see **IO-Link parameter overview** on page 24.

… 8 Operation

Process display



1. Row displays the IO-Link short tag and icons for the device status
2. Current process value (one or two lines)
3. ID of process variables
4. Bargraph
5. Zero / Span setting with
6. Enter 'Easy Set-up' menu with

Figure 22: Process display (example)

The process display appears on the LCD display when the device is switched on. It shows information about the device and current process values.
The way in which the current process values are shown can be adjusted on the configuration level.
The symbols at the bottom of the process display are used to indicate the functions of the operating buttons and , in addition to other information.

Row 1
Row 1 displays the following information:

- The IO-Link short TAG, as a string of maximum 8 characters.
- Icons for the device status according to the following table:

Icon	Description
	Shows a low output of the CQ value (transistors´ state varies according to the chosen switch configuration)
	Shows a high output of the CQ value (transistors´ state varies according to the chosen switch configuration)
	Shows up when the pin is set in current out mode
	Shows up when the device is connected to master via IO-Link
	Shows up when the IO-Link connection has been interrupted
	Shows up when local parametrization is set to Locked or write protect is enabled
	Shows up when local user interface is set to Locked

Current process value
Displays the actual process value with up to 6 digits, sign and decimal point, for one line visualization or up to 8 digits, sign and decimal point, for two lines visualization.

ID of process variables
The ID of Variables, is a kind of acronym which identifies the variable currently displayed, with following possibilities:

- **PDP:** Pressure value before transfer function/linearization
- **OUT:** Analog current value in mA
- **PV%:** Analog output current in percentage of calibrated range
- **ST:** Sensor temperature

The unit of measurement code of the displayed measure that can be any of the IO-Link list.

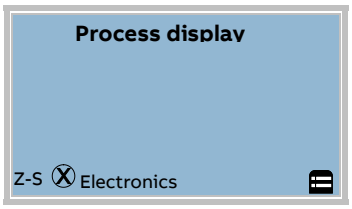
Symbol	Unit
Pressure	
inH2O at 68 °F	Inches of water (68 °F)
psi	Pound-force per square inch
bar, mbar	Bar, Milibar
Pa, kPa, MPa	Pascal, Kilopascal, Megapascal
Atm	Standard atmosphere
inH2O at 4 °C	Inches of water (4 °C)
Temperature	
°C	Degrees Celsius
°F	Degrees Fahrenheit
°R	Rankine
°K	Kelvin
Current	
mA	Milliampere
%	Percentage of 4 to 20 mA

Switching to the information level

From the operating mode view, press the right button for approx. 3 s, then pushing the left button, the display enters in the local diagnostic menu displaying the status and device health.

Error messages on the LCD display

The LCD HMI in case of transmitter errors or malfunctioning is capable of displaying specific error/fault messages to help the user in identifying the problem and resolve it.
In the event of an error, a message consisting of a symbol and text (e.g. Electronics) appears at the bottom of the process screen.
The text displayed provides information about the area in which the error has occurred.



The error messages are divided into four groups in accordance with the NAMUR classification scheme.

Symbol	Description
	Error / failure
	Function check
	Outside of the specification
	Maintenance required

The error messages are also divided into the following areas:

Range	Description
Electronics	Error / alarm of the electronics.
Sensor	Error / alarm of the pressure sensor.
Configuration	Error / alarm due to device configuration.
Operation	Error / alarm due to the current operating conditions.
Process	Error / alarm due to the current process conditions.

Note
For a detailed description of errors and troubleshooting instructions, please see **Diagnosis / error messages** on page 38.

From the operating mode view, press the right button for approx. 3 s, then pushing the left button, the display enters in the local diagnostic menu displaying the status and device health.

- When no errors are active, it appears the string “All Alarms Clear”.
- When one or more error conditions are active at the same time, on the left side it is displayed the NAMUR Classification icon of the most severe condition while, in the right side, is displayed the error code plus a short textual description and a brief suggested action about how it could be fixed.

The error code is the combination of the letter relating its NAMUR NE107 classification (F, M, S, C) assigned by the manufacturer at each individual error, plus its internal priority number and a three digits code.

If more errors are active together, they are displayed into this page according to their priority. They can be visualized by scrolling down the screen with the left button assuming the function of ‘Next’ and their order is indicated by the bar and number on the right side of the display.

Switching to the configuration level (parameterization)

Refer to **Parameterization via the menu function Easy Setup** on page 28.

9 Diagnosis / error messages

Calling up the error description

From the operating mode view, press the right button for approx. 3 s, then pushing the left button, the display enters in the local diagnostic menu displaying the status and device health.

- When no errors are active, it appears the string “All Alarms Clear”.
- When one or more error conditions are active at the same time, on the left side it is displayed the NAMUR Classification icon of the most severe condition while, in the right side, is displayed the error code plus a short textual description and a brief suggested action about how it could be fixed.

The error code is the combination of the letter relating its NAMUR NE107 classification (F, M, S, C) assigned by the manufacturer at each individual error, plus its internal priority number and a three digits code.

If more errors are active together, they are displayed into this page according to their priority. They can be visualized by scrolling down the screen with the left button assuming the function of ‘Next’ and their order is indicated by the bar and number on the right side of the display.

Error states and alarms

HMI - NAMUR Code	Error	Description	Possible cause	Suggested action	Tx Response
F 116.023	Electronic memory failure	The device data loaded at the start up from the electronics NV-memory are corrupted precluding the correct functionality of the device. During the start-up the device firmware execute a check of the device database and if the CRC doesn't match what expected the firmware stops its execution and the output signal goes to fail safe value.	EMC problems like electrostatic discharge (ESD), burst, surge outside the specification limits and/or soft errors (ionic radiation) could corrupt memory data.	The device must be replaced or the database must be reloaded.	Analog signal to alarm
F 108.040	Output read-back failure	The reading of the 4-20mA output signal is too different from what should have been generated.	The output circuit could be broken or not correctly calibrated. PIN no. 2 could be wrongly connected (only applicable to IOLINK version)	A DAC (digital to output converter) trimming should be performed and if the error persists consider to replace the device.	Analog signal to alarm
F 109.001	Driver Failure	Driver Failure	Electronic damaged or wrong power supply	Check the power supply, restart the device. Replace the device in case of failure	—
F 118.017	Sensor memory failure	The data in the sensor memory are corrupted precluding the correct functionality of the device. During the start-up the device firmware execute a check of the device data-base and if the calculated CRC doesn't match what expected the firmware stops its execution and the output signal goes to fail safe value.	The Sensor data/coefficients in the sensor memory are corrupted precluding the correct functionality of the device	The device must be replaced	Analog signal to alarm
F 114.000	P-dP sensor failure	The sensor signal value is missing or incorrect due to a mechanical failure.	There could be a bad or broken connection between sensor and electronics and/or a mechanical damage of the sensor not generating anymore valid primary signals. Loss of fill fluid from the cell, ruptured diaphragm, other.	The device must be replaced	Analog signal to alarm
F 110.002	Sensor temperature failure	The measurement accuracy is decreased. The current process value is compensated with the last valid value of the Sensor temperature.	The circuitry for the sampling of the temperature has failed.	The device must be replaced	Analog signal to alarm
F 102.004	P-dP out of limits	The measured Pressure value is outside the sensor limits and no longer representing the true applied pressure value.	The measurement range has not been correctly calculated OR an incorrect transducer model has been selected.	The compatibility of pressure transmitter model and process conditions has to be checked. Probably a different transmitter type is required.	No effect

… 9 Diagnosis / error messages

… Error states and alarms

HMI - NAMUR Code	Error	Description	Possible cause	Suggested action	Tx Response
F 102.004	P-dP out of limits	The measured Pressure value is outside the sensor limits and no longer representing the true applied pressure value.	The measurement range has not been correctly calculated OR an incorrect transducer model has been selected.	The compatibility of pressure transmitter model and process conditions has to be checked. Probably a different transmitter type is required.	No effect
F 098.034	Analog output saturated	The analog output (4 to 20 mA) is frozen to one of its Saturation limits between High or Low and no longer represents the true applied process. This is not a device error, but it is consequence of its configured working range in relation to the dynamic of the process measurement.	The applied/measured pressure is beyond the configured working range represented by the Low and High range values.	Use a IO-Link master in order to: 1. Recognize in detail at which limit (high or low) the analog output is saturated. 2. Adjust the Saturation Limit or the working range if possible.	No effect
S 054.006	Sensor temperature out of limits	The sensor temperature is outside its operational limits as specified in the product data-sheet. This is not a device issue but if its sensor is subject to work at abnormal temperature conditions for long time, then the device components could degrade affecting its accuracy and reliability.	The temperature of the process environment affects the pressure transmitter; In some situation, the device installation could be the cause of a sensor overheating.	The compatibility of pressure transmitter model and process conditions has to be checked. It could be required to perform a new sensor trimming or device replacement. A different installation type could be also considered/ required e.g. use of remote seals.	No effect
S 052.031	Max working pressure exceeded	The measured process pressure is higher than the acceptable mechanical limit of the process connection elements. When this condition occurs, there is the risk to damage the transmitter and to be dangerous for the personnel.	The selected transmitter and/or the process connection elements are not adequate for the specific process conditions.	The compatibility of the pressure transmitter model with process conditions must be checked and, if necessary, replace the instrument with another having the correct characteristics.	No effect
C 090.033	Loop test	The 4 to 20 mA signal in output by the transmitter is simulated by the user and no longer represents the true applied process.	The operator could have enabled the loop test function in order to simulate the current output for testing purposes but, at the end, forgot to return it back to normal condition disabling the loop test function.	Use a IO-Link master to place device back into normal operating mode (disable the analog output simulation).	No effect

HMI - NAMUR Code	Error	Description	Possible cause	Suggested action	Tx Response
C 080.030	Input simulation active	FOR HART MODELS ONLY: At least one of the following variables produced by the transmitter is simulated and doesn't represent the real calculated value: The pressure value the Sensor temperature value the Scaled output value.	The operator could have enabled the input simulation of one or more device variables for testing purposes but, at the end, forgot to return it back to normal condition disabling the input simulation condition.	Use a IO-Link master in order to: recognize in detail which variable is under simulation condition place device back into normal operating mode (disable the input simulation). Otherwise just power off/on the device in order to disable the input simulation.	No effect
C 080.030	Input simulation active	FOR IO-LINK MODELS ONLY: At least one of the following variables produced by the transmitter is simulated and doesn't represent the actual value/ condition: The Pressure Value Switch 1 status Switch 2 status	The operator could have enabled the input simulation of one or more device variables for testing purposes but, at the end, forgot to return it back to normal condition disabling the input simulation condition.	Use a IO-Link master in order to: recognize in detail which variable is under simulation condition place device back into normal operating mode (disable the input simulation). Otherwise just power off/on the device in order to disable the input simulation.	No effect
M xxx.003	Electronics temperature failure	The measurement accuracy could be decreased because the digital to analog converter (DAC) remains compensated with the last valid value of the electronic temperature.	The circuitry for the sampling of the electronics temperature has failed.	The device should be replaced as soon as possible.	No effect
M 026.024	Electronics NV-memory burn error	Permanent storing of modified data into the electronic Non-Volatile memory has not been successfully executed. The device continues to work without problems but, after the next power cycle there is the risk to lose the last used device setting/configuration.	The device could have been powered off immediately after the modification of the data that was not fully written in the NV-memory. The NV-memory has reached its limit of maximum number of allowed writings Generic defect of the memory component.	The device should be replaced as soon as possible.	No effect
M 028.007	Switch 1 Driver Overload	Switch 1 Driver Overload	The load connected to the output 1 is too high	Reduce the load (if the current limiter is active, load reduction is not required)	—
M 027.008	Switch 2 Driver Overload	Switch 2 Driver Overload	The load connected to the output 2 is too high	Reduce the load (if the current limiter is active, load reduction is not required)	—
M 028.018	Sensor NV-Memory burn error	Permanent storing of modified data into the Sensor Non-Volatile memory has not been successfully executed. The device continues to work without problems but, after the next power cycle there is the risk to lose the last used device setting/configuration.	The device could have been powered off immediately after the modification of the data that was not fully written in the NV-memory. The NV memory has reached its limit of maximum number of allowed writings Generic defect of the memory component	Retry to write the same configuration values but, if the error persists, consider to replace the device as soon as possible	No effect

… 9 Diagnosis / error messages

… Error states and alarms

HMI - NAMUR Code	Error	Description	Possible cause	Suggested action	Tx Response
M 024.036	Power supply warning	FOR HART MODELS ONLY: The device power supply has been detected too close to its higher or lower acceptable limits.	If the power supply is close to the highest limit very probably it is due to a not correct external power supply while if the power supply is close to the lowest limit, it could be due to a defective or not adequate external power supply or anomalous voltage drop on the loop i.e. too long or not correct wires.	Check the voltage at the terminal block and if it is not within the valid range check the external power supply or the loop.	No effect
M 024.036	Power supply warning	FOR IO-LINK MODELS ONLY: The Device Power Supply has been detected too close to its low acceptable limit (9 V) therefore its functioning can be affected.	If the power supply is close to the highest limit very probably it is due to a not correct external power supply while if the power supply is close to the lowest limit, it could be due to a defective or not adequate external power supply or anomalous voltage drop on the loop i.e. too long or not correct wires.	Check the voltage at the terminal block and if it is not within the valid range check the external power supply or the loop.	No effect
M 024.036	Power supply readback Out of HI Limit	Power supply readback Out of HI Limit	Power supply voltage lower than minimum required for operation	Check the power supply voltage	—
M 025.035	Power supply readback Out of Lo Limit	Power supply readback Out of Lo Limit	Power supply voltage lower than minimum for IO-Link specification	Check the power supply voltage	—
M 026.009	Driver Over Temperature	Driver Over Temperature	The total load connected or the service temperature are too high. The device goes in protection state	Reduce the total load connected or wait the device to cool down	—
M 022.041	Electronics temperature out of limits	The electronics temperature is working beyond its High or Low specification limits.	This condition could be due to the circuitry for the sampling of the temperature that has failed or due to the transmitter installation e.g. steam leakage directed on to transmitter housing, or critical ambiental conditions.	If necessary, use a IO-Link master in order to know in detail of which limit (high or low) the electronics temperature is beyond. Check the transmitter installation to identify possible cause of the abnormal measured temperature and take possible actions to minimize the temperature impact/ influence like to insulate the device from the external temperature influence.	No effect

QR code Digital Advanced Diagnostic (DAD)



Figure 23: DAD QR-code

Digital Advanced Diagnostic (DAD) QR Code is an option (only available with the backlight display), which allows the user to retrieve information about device status directly in the field.
With DAD option activated and in presence of a failure / malfunction, the device will alternatively show the operator page with the standard diagnostic message and a QR code that user can scan using any QR code reader.

By scanning the QR code, user will have access to a specific .pdf format document indicating the suggested action to be taken to resolve the failure / malfunctioning.
Access to document can happen directly or via clicking on a link depending on the QR code reader setting, which is independent from ABB devices.

In the same Digital Advanced Diagnostic document it is as well available the full list of error codes that can be resolved with the suggested action.

Leveraging the .pdf document with the error list on the device (i.e. mobile or tablet) and by accessing the diagnostic section on the device, user can exactly retrieve the effective cause of the failure / malfunction and react properly.
Digital Advanced Diagnostic is very helpful in the field to have immediate access to information previously unavailable in the field in a fast and digital way.

QR code Channel Partner Support

Channel Partner Support QR Code is instead an option that allows ABB channel partners to provide more information to customer by loading a series of data like physical and/or mail address, phone number, etc directly on the device.

The Channel Partner Support QR Code is part of the personalization option set available at ABB channel partners.
Using the above, customer can always have on hand and directly in the field an immediate contact point for assistance and support.

10 Maintenance / Repair

Safety instructions

⚠ WARNING

Risk of injury due to process conditions.

The process conditions, for example high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when working on the device.

- Before working on the device, make sure that the process conditions do not pose any hazards.
- If necessary, wear suited personal protective equipment when working on the device.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

⚠ CAUTION

Risk of burns due to hot measuring media

The device surface temperature may exceed 70 °C (158 °F), depending on the measuring medium temperature!

- Before starting work on the device, make sure that it has cooled sufficiently.

NOTICE

Damage to components!

The electronic components of the printed circuit board can be damaged by static electricity (observe ESD guidelines).

- Make sure that the static electricity in your body is discharged before touching electronic components.

If transmitters are used as intended under normal operating conditions, no maintenance is required. It is sufficient to check the output signal at regular intervals (in accordance with the operating conditions). If deposits are expected to accumulate, the equipment should be cleaned on a regular basis, in accordance with the operating conditions.

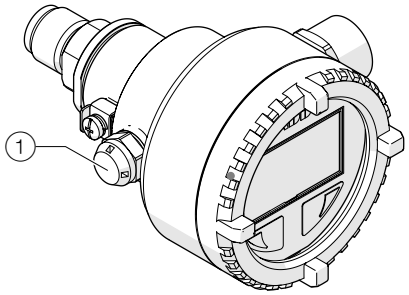
- Cleaning should ideally be carried out in a workshop.
- Repair and maintenance activities may only be performed by authorized customer service personnel. PGX100 and PAX100 user repair is not permitted.
- When replacing or repairing individual components, original spare parts must be used.

Check whether hazardous materials have been used as materials to be measured before opening the device. Residual amounts of hazardous material may still be present in the device and could escape when it is opened.

Within the scope of operator responsibility, check the following as part of a regular inspection:

- the pressure-carrying walls / lining of the pressure device
- the measurement-related function
- the leak tightness
- the wear (corrosion)

Pressure sensor ventilation port



① Ventilation port

Figure 24: Reference port

PGX100/PAX100 transmitters have a reference port vented to the atmosphere and duly protected (see picture). During maintenance check that this port is free from dirt, deposits, anything that can obstruct it, as this can affect the measurement performance.

Returning devices

Use the original packaging or a secure transport container of an appropriate type if you need to return the device for repair or recalibration purposes.
Fill out the return form (see **Return form** on page 47) and include this with the device.
In accordance with the EU Directive governing hazardous materials, the owner of hazardous waste is responsible for its disposal or must observe the following regulations for shipping purposes:
All devices delivered to ABB must be free from any hazardous materials (acids, alkalis, solvents, etc.).

Address for returns:
Please contact Customer Center Service acc. to page 6 for nearest service location.

11 Dismounting and disposal

Dismounting

⚠ WARNING

Risk of injury due to process conditions.
The process conditions, for example high pressures and temperatures, toxic and aggressive measuring media, can give rise to hazards when dismantling the device.

- If necessary, wear suited personal protective equipment during disassembly.
- Before disassembly, make sure that the process conditions do not pose any safety risks.
- Depressurize and empty the device / piping, allow to cool and purge if necessary.

Bear the following points in mind when dismantling the device:

- Switch off the power supply.
- Disconnect electrical connections.
- Allow the device / piping to cool and depressurize and empty. Collect any escaping medium and dispose of it in accordance with environmental guidelines.
- Use suited tools to disassemble the device, taking the weight of the device into consideration.
- If the device is to be used at another location, the device should preferably be packaged in its original packing so that it cannot be damaged.
- Observe the notices in **Returning devices** on page 45.

Disposal

Note



Products that are marked with the adjacent symbol may **not** be disposed of as unsorted municipal waste (domestic waste).
They should be disposed of through separate collection of electric and electronic devices.

This product and its packaging are manufactured from materials that can be recycled by specialist recycling companies.

Bear the following points in mind when disposing of them:

- As of 8/15/2018, this product will be under the open scope of the WEEE Directive 2012/19/EU and relevant national laws (for example, ElektroG - Electrical Equipment Act - in Germany).
- The product must be supplied to a specialist recycling company. Do not use municipal waste collection points. These may be used for privately used products only in accordance with WEEE Directive 2012/19/EU.
- If there is no possibility to dispose of the old equipment properly, our Service can take care of its pick-up and disposal for a fee.

12 Specification

Note
The device data sheet is available in the ABB download area at www.abb.de/pressure.

13 Additional documents

Note
All documentation, declarations of conformity, approvals, certificates and additional documentation are available in the ABB download area.
www.abb.com/pressure

Trademarks

BioControl is a registered trademark of the NEUMO Ehrenberg Group

HART is a registered trademark of FieldComm Group, Austin, Texas, USA

14 Appendix

Return form

Statement on the contamination of devices and components
Repair and/or maintenance work will only be performed on devices and components if a statement form has been completed and submitted.
Otherwise, the device/component returned may be rejected. This statement form may only be completed and signed by authorized specialist personnel employed by the operator.

Customer details:

Company:	
Address:	
Contact person:	Telephone:
Fax:	Email:

Device details:

Type:	Serial no.:
Reason for the return/description of the defect:	

Was this device used in conjunction with substances which pose a threat or risk to health?

☐ Yes ☐ No

If yes, which type of contamination (please place an X next to the applicable items):

☐ biological	☐ corrosive / irritating	☐ combustible (highly / extremely combustible)
☐ toxic	☐ explosive	☐ other toxic substances
☐ radioactive		

Which substances have come into contact with the device?

1.
2.
3.

We hereby state that the devices/components shipped have been cleaned and are free from any dangerous or poisonous substances.

Town/city, date	Signature and company stamp

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/pressure

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