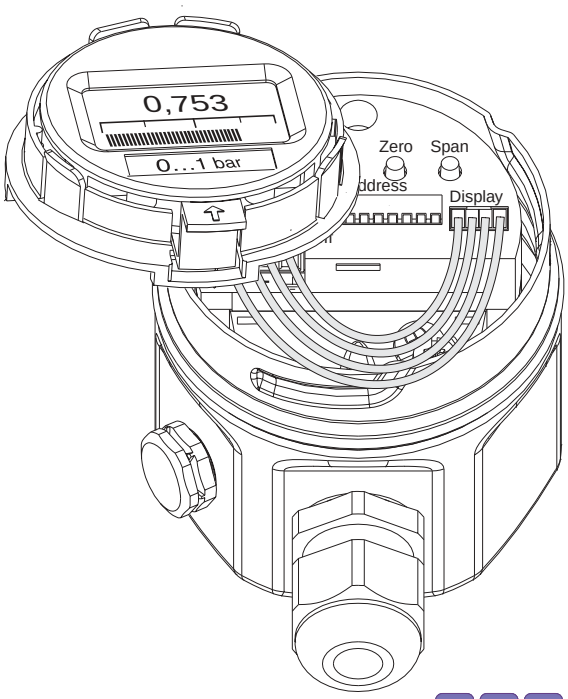
BA222O/98/en/05.02
Software version 1.0
52011573

Barcon Pressure Transmitter
Barcon PPC (with PROFIBUS PA)
Barcon LHC (with PROFIBUS PA)

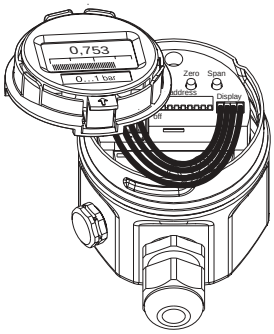
Operating Instructions



PROFI® PROCESS FIELD BUS

PEPPERL+FUCHS

Short operating instructions



Local operation
via electronics

Display (optional)

Remote operation
via configuration tool

Operation:
- Function of the display section 3.2
- Position and function of the operating elements on the electronic insert section 3.3

Commissioning on site:
- section 5.1

Operation:
- via **PACT**ware™ section 3.4

Commissioning:
- via operating program **PACT**ware™

Software history

Software version	Device and Software No.	Changes	Significance
1.0	8210	-	Profile 3.0

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Notes on safety

Approved usage

The Barcon pressure transmitter is a PROFIBUS PA device which is used for the measurement of gauge or absolute pressure depending on the version.

Installation, commissioning, operation

The Barcon has been designed to operate safely in accordance with current technical, safety and EU standards. If installed incorrectly or used for applications for which it is not intended, however, it is possible that application-related dangers may arise, e. g. product overspill by incorrect installation or calibration. For this reason, the instrument must be installed, connected, operated and maintained to the instructions in this manual by personnel that are authorised and suitably qualified. The manual must have been read and understood, and the instructions followed. Modifications and repairs to the device are permissible only when they are expressly approved in the manual.

Explosion hazardous areas

If the device is to be installed in an explosion hazardous area, then the specification in the certificate as well as all national and local regulation must be observed. The instrument can be supplied with the following certificates as listed in the table below. The certificates are identified by the first letter of the order code on the nameplate (see table below).

- Ensure that all personnel are suitably qualified.
- Observe the specifications in the certificate as well as national and local regulations.
- Take special care with regard to the grounding of the bus cable screening. Recommendations are to be found in IEC 79-14.

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Typecode Barcon: □□□-□□□-□□□□-□□□□-□□□□□-□□

Code	Certificate	Protection
NA	Standard	None
EX	ATEX	ATEX II 1/2 G EEX ia IIC T6
E1	ATEX	ATEX II 2 G EEX ia IIC T6
SX	ATEX	ATEX II 1/2 D EEX ia IIC T6
S2	ATEX	ATEX II 1/3 D (non-Ex power supply)
E2	ATEX	ATEX II 3 G EEx nV IIC T5 (Zone 2)
CG	CSA	General Purpose
C1	CSA	CSA IS (suitable for Div. 2) Cl. I, II, III, Div. 1, Groups A…G
CD	CSA	CSA Cl. I, Div. 2, Groups A …D, Cl. II, III, Div. 1, Groups E…G
FM	FM	FM IS (non incendive) Cl. I, II, III, Div. 1, Groups A…G
FD	FM	FM DIP, Cl. II, III, Div. 1, Groups A…G

Table S.1 Certificates for applications in explosion hazardous areas

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Safety conventions

In order to highlight safety-relevant or alternative operating procedures in the manual, the following conventions have been used, each indicated by a corresponding icon in the margin.

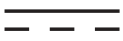
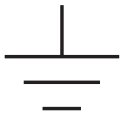
Safety conventions

Symbol	Meaning
 Note!	**Note!** A note highlights actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned
 Caution!	**Caution!** Caution highlights actions or procedures which, if not performed correctly, may lead to personal injury or incorrect functioning of the instrument
 Warning!	**Warning!** A warning highlights actions or procedures which, if not performed correctly, will lead to personal injury, a safety hazard or destruction of the instrument

Explosion protection

	**Device certified for use in explosion hazardous area** If the device has this symbol embossed on its name plate it can be installed in an explosion hazardous area
	**Explosion hazardous area** Symbol used in drawings to indicate explosion hazardous areas. • Devices located in and wiring entering areas with the designation "explosion hazardous areas" must conform with the stated type of protection
	**Safe area (non-explosion hazardous area)** Symbol used in drawings to indicate, if necessary, non-explosion hazardous areas. • Devices located in safe areas stiill require a certificate if their outputs run into explosion hazardous areas.

Electrical symbols

	**Direct voltage** A terminal to which or from which a direct current or voltage may be applied or supplied
	**Alternating voltage** A terminal to which or from which an alternating (sine-wave) current or voltage may be applied or supplied
	**Grounded terminal** A grounded terminal, which as far as the operator is concerned, is already grounded by means of an earth grounding system
	**Protective grounding (earth) terminal** A terminal which must be connected to earth ground prior to making any other connection to the equipment
	**Equipotential connection (earth bonding)** A connection made to the plant grounding system which may be of type e.g. neutral star or equipotential line according to national or company practice

1 Introduction

Application

The Barcon PPC, Barcon LHC pressure transmitter measures the pressure of gases, vapours and liquids and is used in all areas of chemical and process engineering.

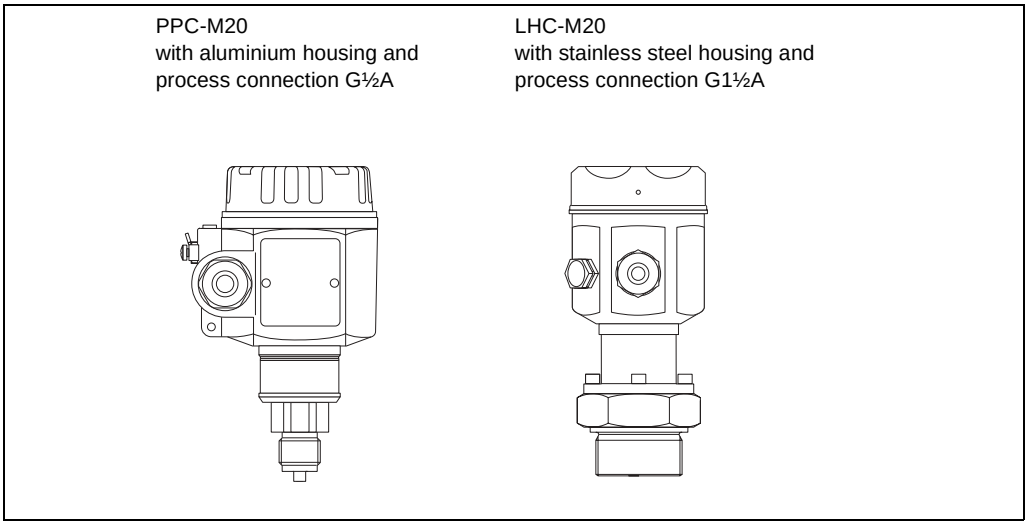


fig. 1.1: Some Barcon versions

Operating principle

Ceramic sensor

The system pressure acts directly on the rugged ceramic diaphragm of the pressure sensor deflecting it by a maximum of 0.025 mm (0.0098 in). A pressure-proportional change in the capacitance is measured by the electrodes on the ceramic substrate and diaphragm. The measuring range is determined by the thickness of the ceramic diaphragm.

Metal sensor

The process pressure deflects the separating diaphragm with a filling liquid transmitting the pressure to a resistance bridge. The bridge output voltage, which is proportional to pressure, is then measured and processed.

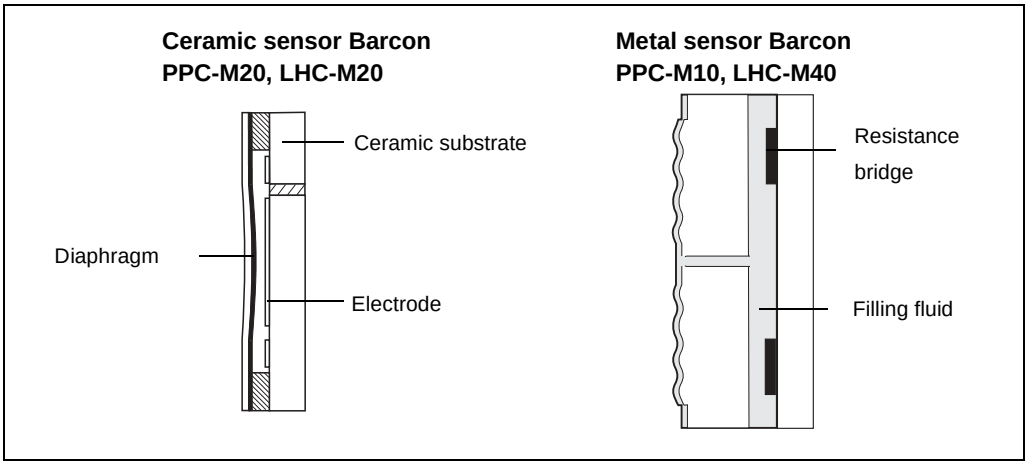


fig. 1.2: Sensor construction

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Measuring system

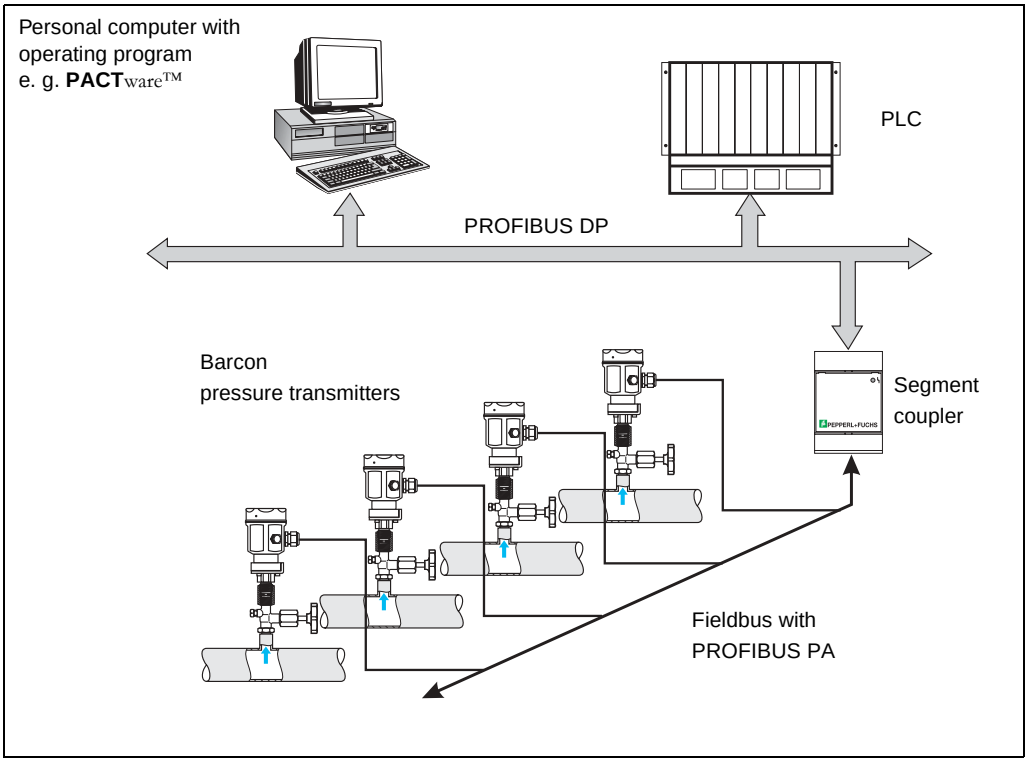


fig. 1.3: Measuring system Barcon with PROFIBUS PA protocol

In the simplest case, the complete measuring system comprises:

- Barcon transmitter with PROFIBUS PA protocol
- PLC or personal computer with an operating programm, e. g. **PACT**ware™
- segment coupler
- PROFIBUS PA terminating resistor

Number of transmitter

The maximum number of transmitter on one bus segment is determined by their consumption, the power of the bus coupler and the required bus length. Normally however:

- max. 10 Barcon for hazardous area applications
- max. 32 Barcon for non-hazardous area applications

can be operated on one bus segment. Barcon consumes max. 11 mA per device.

Refer also to PROFIBUS PA specification EN 50170 (DIN 19245), explosion hazardous areas: EN 50020, FISCO model or to the Internet address "http://www.PROFIBUS.com".

2 Installation

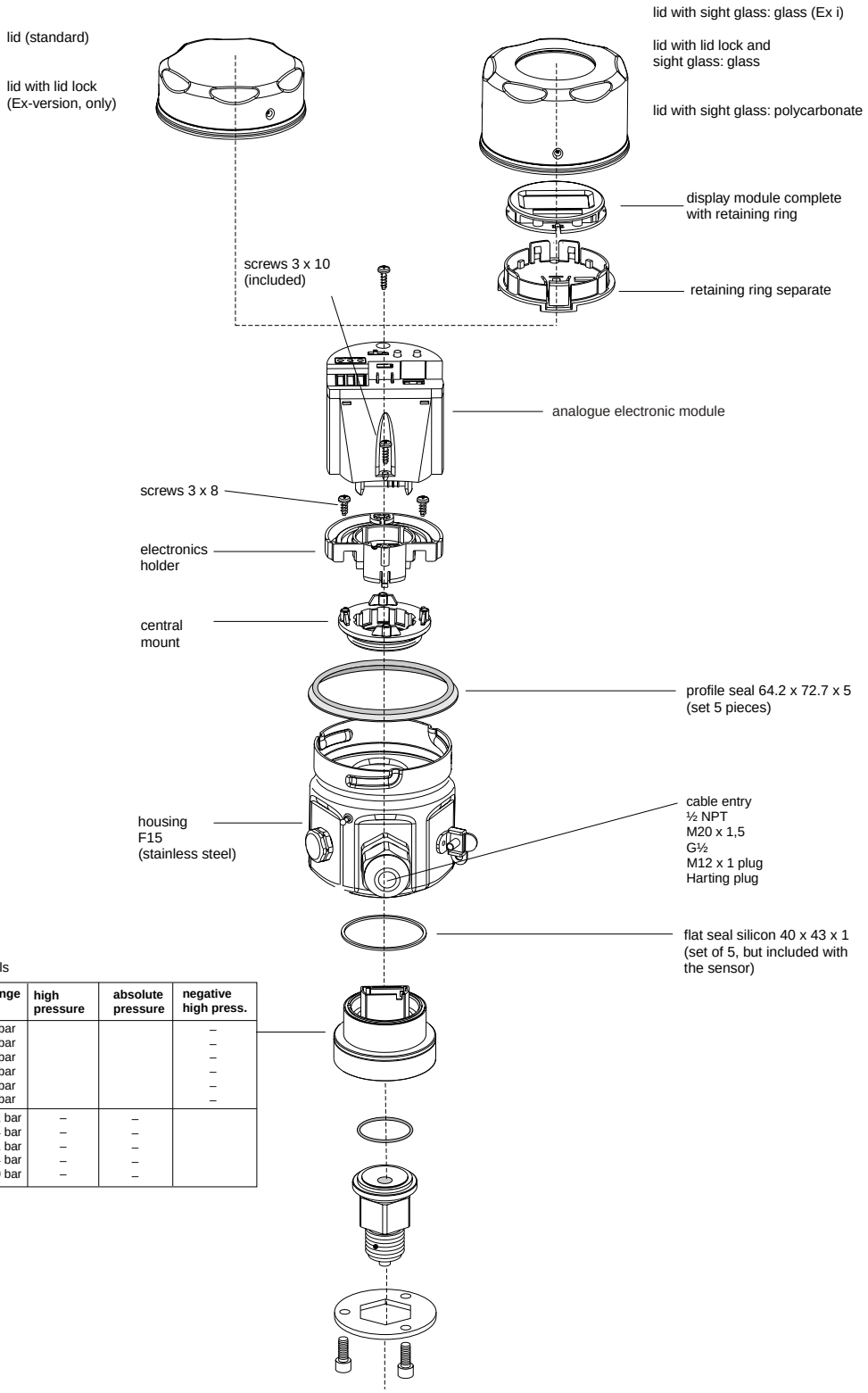
Contents

This section describes:

- the mechanical design of Barcon
- the mechanical installation of Barcon with and without diaphragm seal,
- the electrical connection.

2.1 Mechanical design of devices

Mechanical design of Barcon with stainless steel housing



measuring cells

measuring range	high pressure	absolute pressure	negative high press.
0 bar ... 0,1 bar			–
0 bar ... 0,4 bar			–
0 bar ... 1 bar			–
0 bar ... 4 bar			–
0 bar ... 10 bar			–
0 bar ... 40 bar			–
-0,1 bar ... +0,1 bar	–	–	
-0,4 bar ... +0,4 bar	–	–	
-1bar ... +1 bar	–	–	
-1bar ... +4 bar	–	–	
-1bar ... +10 bar	–	–	

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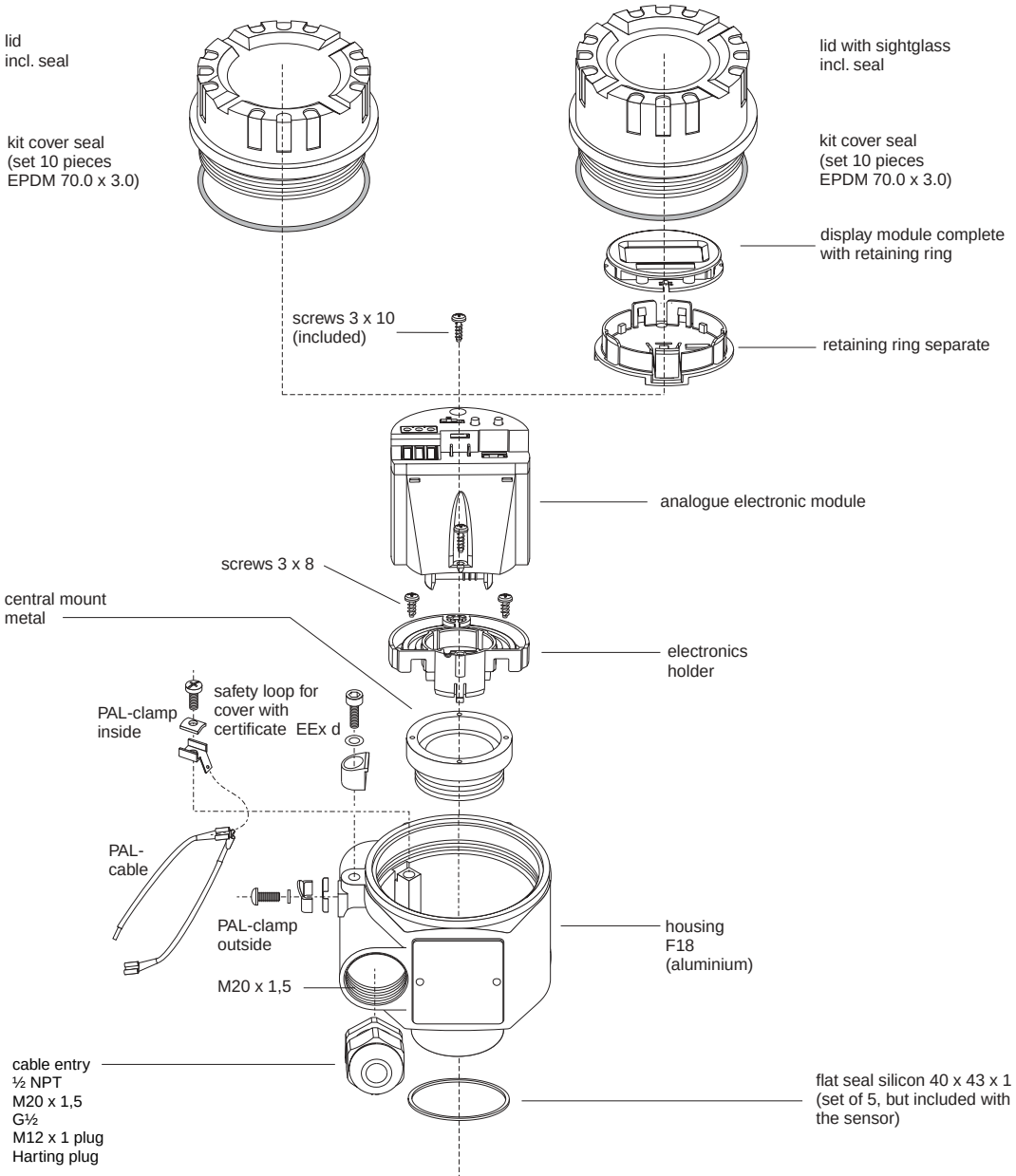
Mechanical design of Barcon with aluminium housing



measuring cells

measuring range	high pressure	absolute pressure	negative high press.
0 bar ... 0,1 bar			–
0 bar ... 0,4 bar			–
0 bar ... 1 bar			–
0 bar ... 4 bar			–
0 bar ... 10 bar			–
0 bar ... 40 bar			–
-0,1 bar ... +0,1 bar	–	–	
-0,4 bar ... +0,4 bar	–	–	
-1bar ... +1 bar	–	–	
-1bar ... +4 bar	–	–	
-1bar ... +10 bar	–	–	

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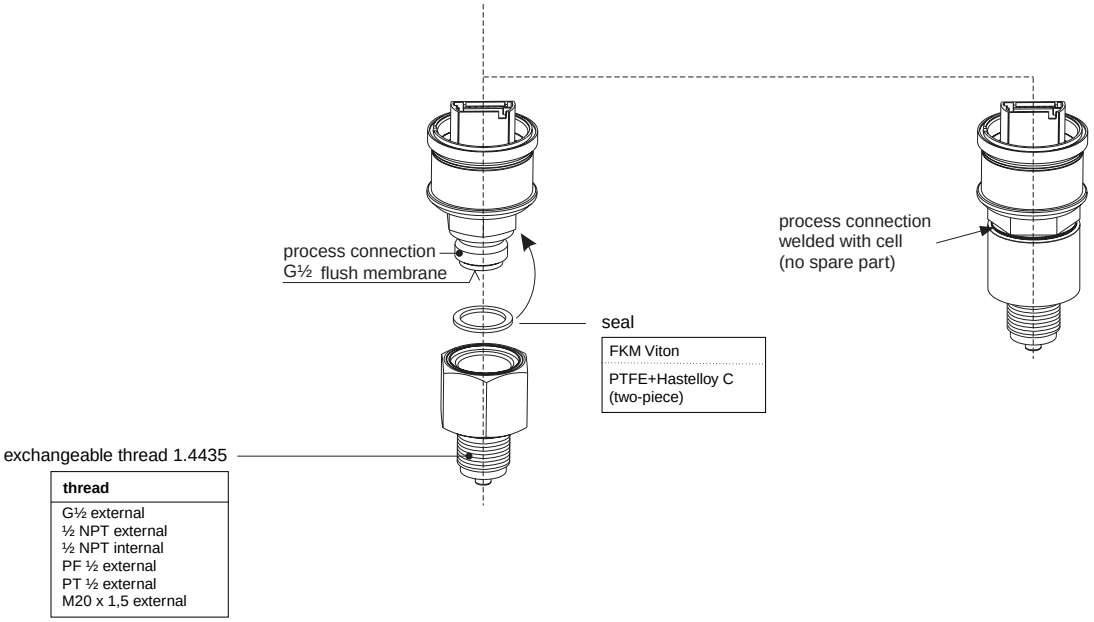
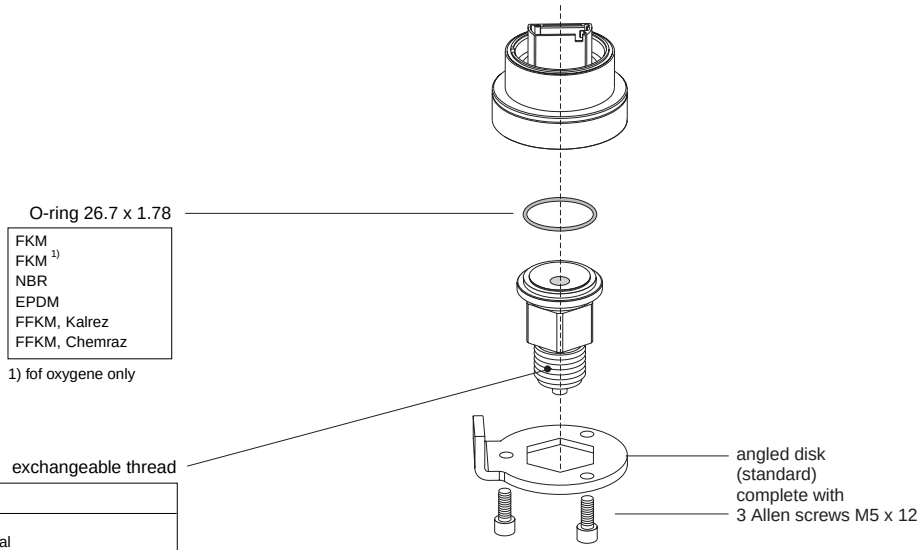
Process connection PPC-M10



thread
G½ external
½ NPT external
½ NPT internal
PF ½ external
PT ½ external
M20 x 1,5 external

Process connection PPC-M20



thread
G½ external
M20 x 1.5 external
½ NPT external, ¼ NPT internal
½ NPT internal, 11.4 mm internal
PT ½ external
G½ external, G¼ internal
G½ external, 11.4 mm internal
PF ½ external
G½ external, Hastelloy
½ NPT external, ¼ NPT internal, Hastelloy

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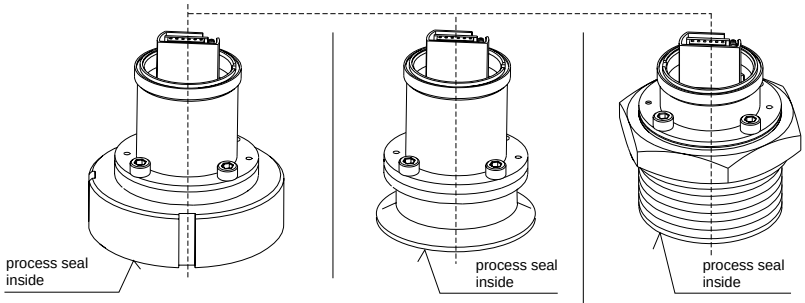
Process connection LHC-M20



measuring cell with sanitary couplings 1.4435

DIN 11851, DN 50
DIN 11851, DN 40
DIN 11864-1-A DN 40
DIN 11864-1-A DN 50
SMS 1½"
SMS 2"

Clamp 2"
Varivent 68 mm
DRD D = 65 mm
APV Inline PN 40

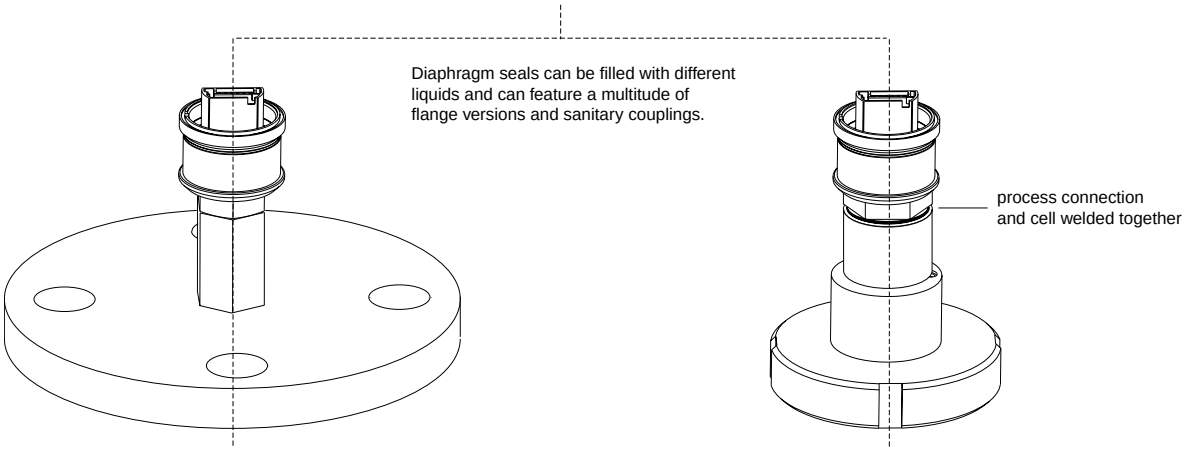
threaded boss 1.4435

G2
2 NPT

process seals of the membrane O-rings 26.7 x 1.78		FKM FFKM Kalrez FKM[1)]	
	FDA listed	EPM NBR	

1) for oxygene only

Process connection LHC-M40



2.2 Mounting instructions without diaphragm seal

Barcon without diaphragm seal
- PPC-M10, PPC-M20
- LHC-M20

The Barcon without diaphragm seal is mounted in the same way as a manometer. The use of shut-off valves and pigtails is recommended. The position depends upon the application.

- Measurement in gases:
  Mount the shut-off valve above the tapping point.

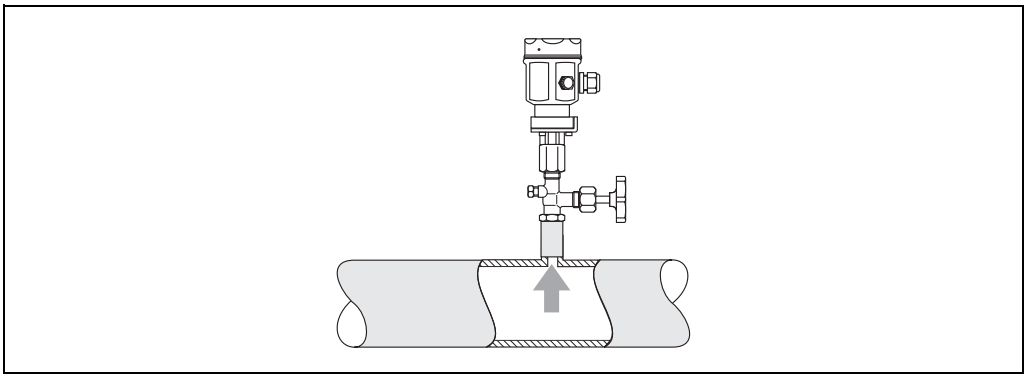


fig. 2.1: Mounting on a shut-off valve for measuring gases

- Measurement in steam:
  Mount with a pigtail above the tapping point.
  The pigtail reduces the temperature in front of the diaphragm to almost ambient temperature. Before start-up, the pigtail must be filled with water.

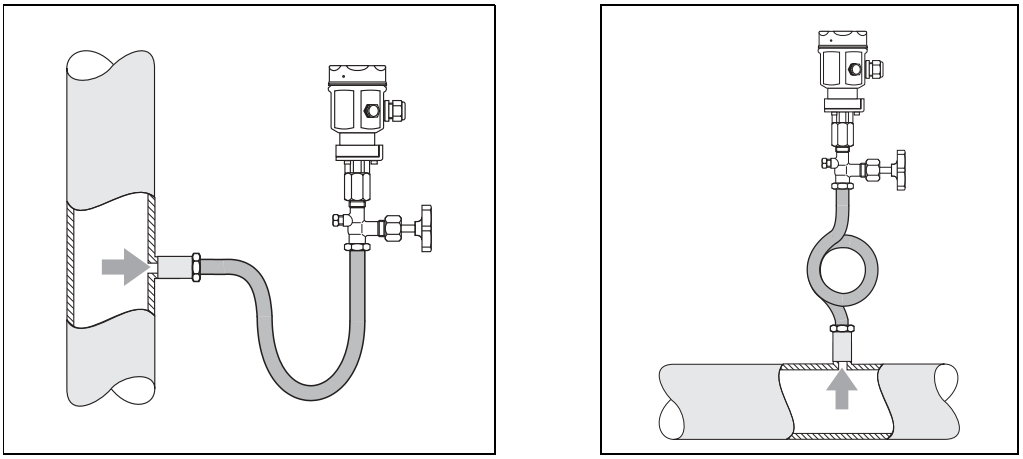


fig. 2.2: left: Mounting with U-shaped pigtail for measuring steam
right: Mounting with circular pigtail for measuring steam

- Measurement in liquids:
  Mount on the shut-off valve below the tapping point or at the same height.

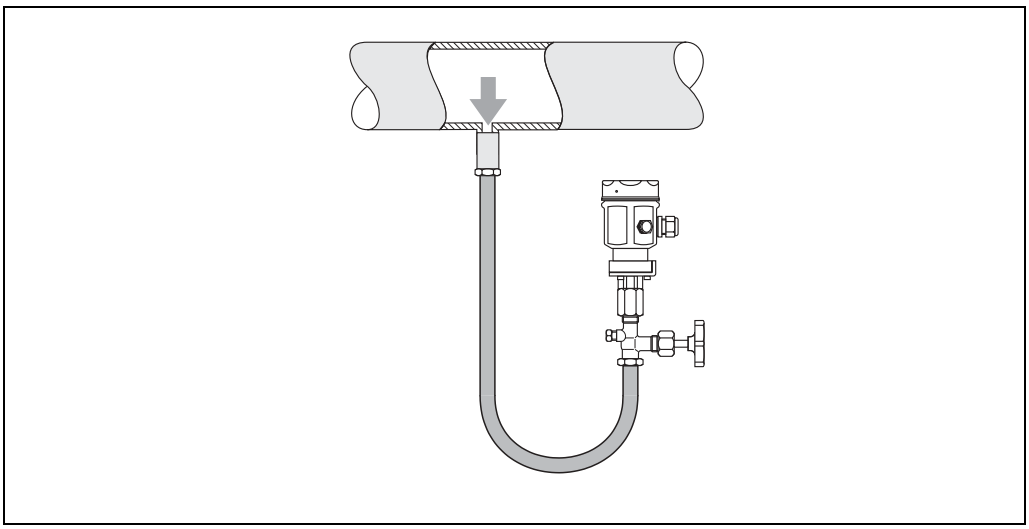


fig. 2.3: Mounting on a shut-off valve for measuring liquids

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2.3 Mounting instructions with diaphragm seal

Barcon with diaphragm seal - LHC-M40

The Barcon with diaphragm seal is screwed in, flanged or clamped, depending on the type of diaphragm seal.

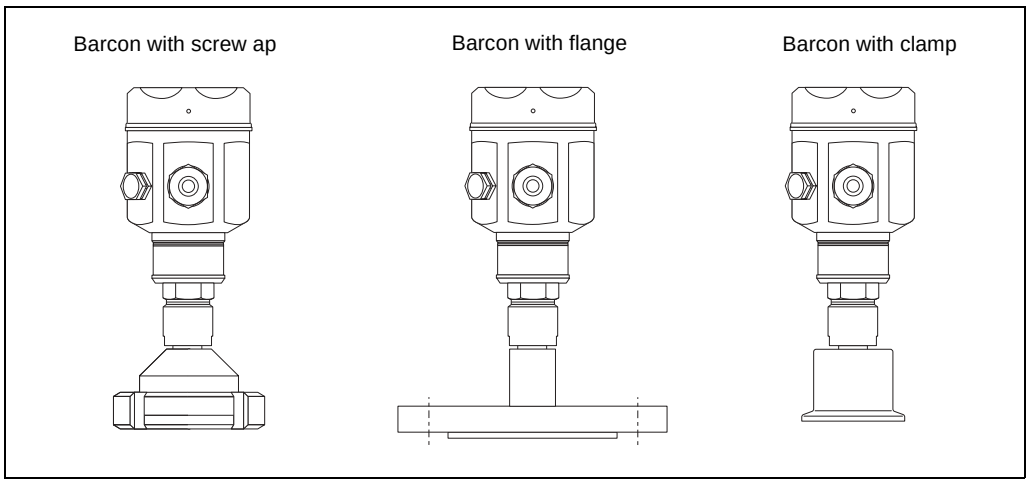

fig. 2.4: Diaphragm seal versions

- The protective cap of the diaphragm seal should only be removed just before mounting in order to protect the diaphragm.
- The diaphragm of the diaphragm seal must not be dented or cleaned with pointed or hard objects.
- The diaphragm seal and the pressure sensor together form a closed and calibrated system which is filled with filling fluid through a hole in the upper part of the sensor. The following rules should be observed:
  - This hole is sealed and is not to be opened.
  - The instrument should only be turned by the diaphragm seal at the point provided and not by the housing.

Mounting with temperature spacer

The use of temperature spacers is recommended for constant extreme product temperatures that can cause the maximum permissible ambient temperature of (100 °C ... 200 °C (212 °F ... 392 °F)) to be exceeded.

- Note when mounting that the temperature spacer increases the maximum height by 100 mm (3.94 in).
- Due to the water column in the temperature spacer, the increased height also causes a zero point shift of approx. 10 mbar (0.15 psi)
  see section 5.2, Seite 38 and 39.

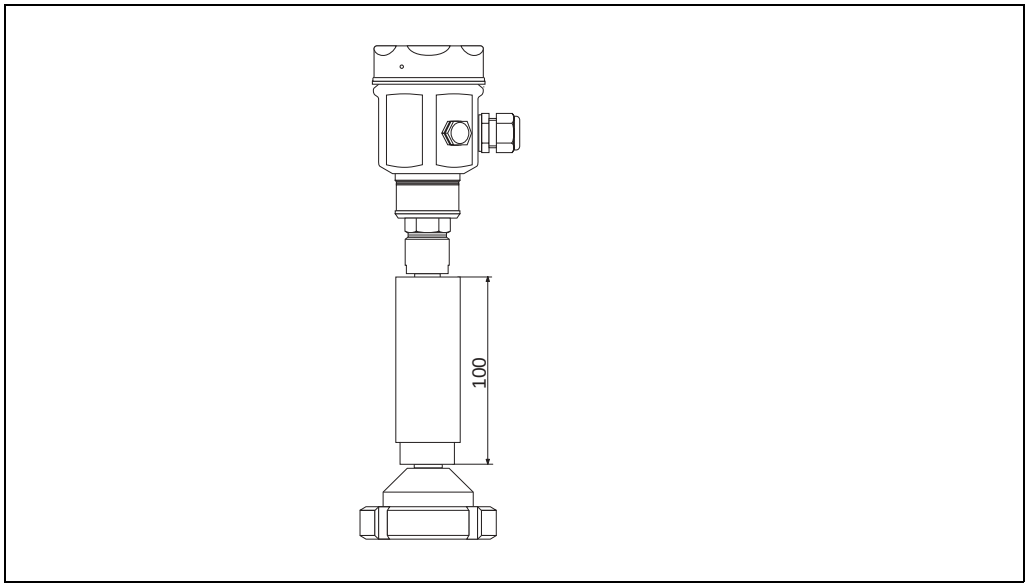

fig. 2.5: Barcon with temperature spacer

Mounting with capillary tubing and with tubing

To protect from high temperature, moisture ,vibration or where the mounting point is not easily accessible, the housing of the Barcon can be mounted with a capillary tube to one side of the measuring point.

A bracket for mounting on a wall or pipe is available for this.

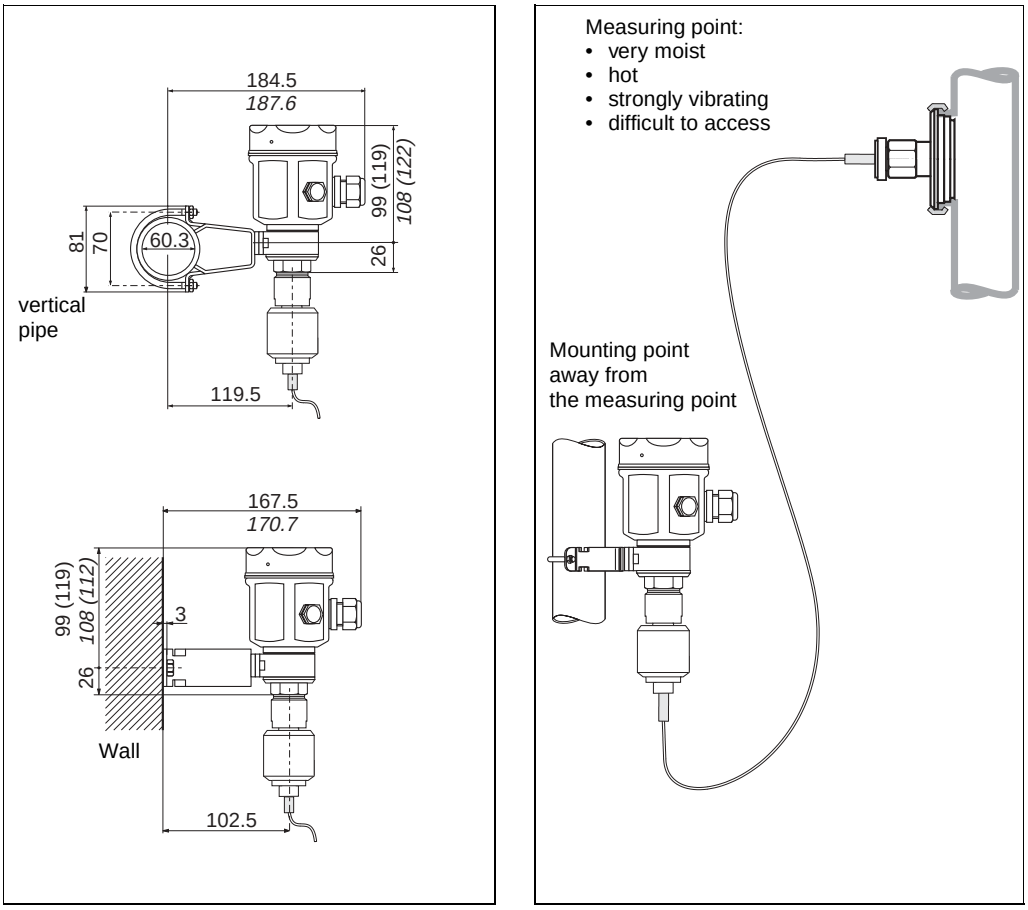

fig. 2.6: Mounting with capillary tubing and bracket away from the measuring point. Values in brackets apply to instruments with a raised cover.
Values in italics apply to instruments with an aluminium housing. All dimensions are in mm (1 in = 25.4 mm, 1 mm = 0.039 in).

2.4 Mounting accessories

PPC-M20, LHC-M20: Wall and pipe mounting with bracket

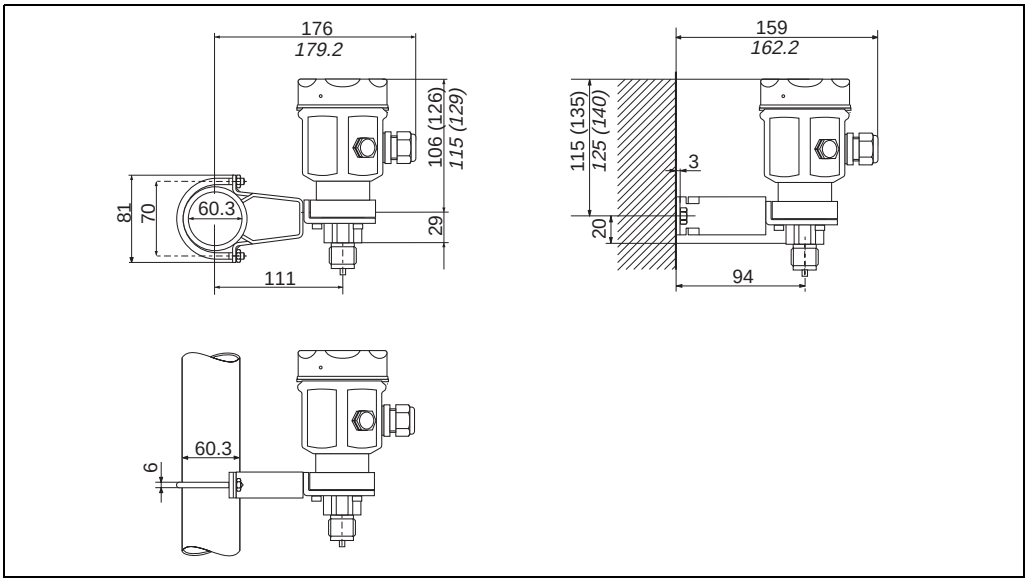

fig. 2.7: left: Mounting with bracket on a vertical pipe
right: Mounting with bracket on a wall
Values in brackets apply to instruments with a raised cover.
Values in italics apply to instruments with an aluminium housing. All dimensions are in mm (1 in = 25.4 mm, 1 mm = 0.039 in).

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PPC-M10:
Wall and pipe mounting with bracket

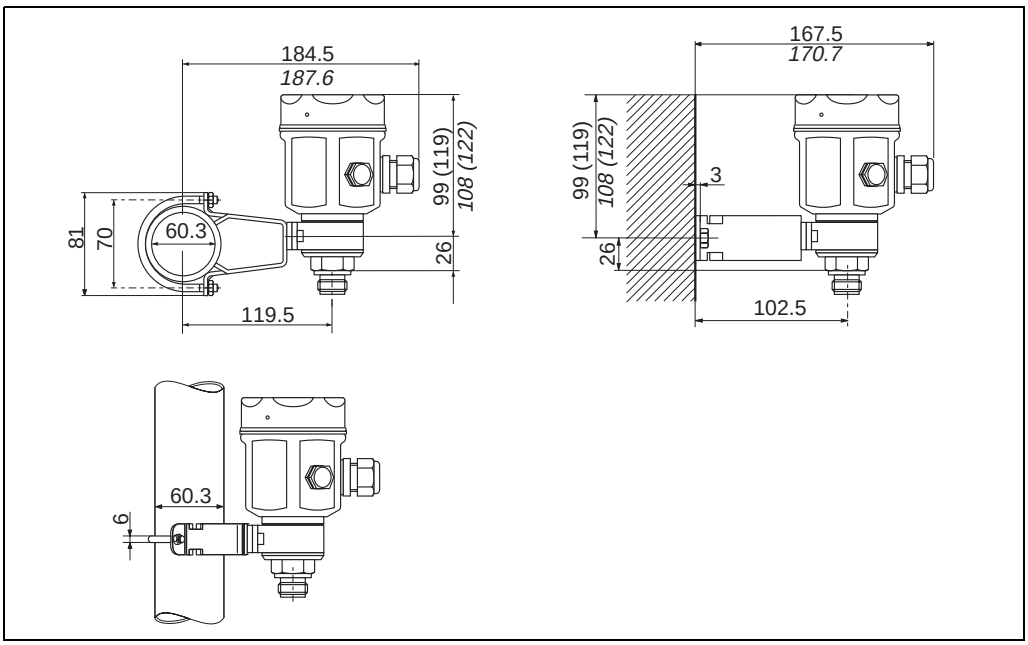


fig. 2.8: left: Mounting with bracket on a vertical pipe
right: Mounting with bracket on a wall
Values in brackets apply to instruments with a raised cover.
Values in italics apply to instruments with an aluminium housing. All dimensions are in mm (1 in = 25.4 mm, 1 mm = 0.039 in).

2.5 Electrical connection

General notes

Barcon is loop-powered transmitter with PROFIBUS PA output. Note the following before connecting up:

- Turn off the power before connecting up.
- Only devices for hazardous area applications: Connect the external ground terminal of the transmitter to the plant grounding system before connecting up.

Power

The Barcon has the following power requirements:

I = 10 mA ± 1 mA
Non-Ex-area: U = 9 ... 32 V DC
Ex-area: U = 9 ... 24 V DC

Bus cable

Twisted, screened pairs must be used. The following specification must be met for explosion hazardous application (EN 50020, FISCO model):

Loop-resistance (DC): 15 ... 150 Ω/km,
Specific inductance: 0.4 ... 1 mH/km,
Specific capacitance: 80 ... 200 nF/km

Non-Ex-area, e. g.:

- Siemens 6XV1 830-5BH10,
- Belden 3076F,
- Kerpen CEL-PE/OSCR/PVC/FRLA FB-02YS(ST)YFL

Ex-area, e. g.:

- Siemens 6XV1 830-5AH10,
- Kerpen CEL-PE/OSCR/PVC/FRLA FB-02YS(ST+C)YFL

Screening

For maximum protection against electromagnetic interference, e. g. when the bus is operating near frequency converters, it is recommended that high integrity potential bonding be provided between the housing and the cable screening (max. wire diameter: 2.5 mm^2, permanently attached cable).

- The external ground terminal on the transmitter must be connected to ground.
- The continuity of the cable screening between tapping points must be ensured.
- The screening must be grounded at each end of the cable.
- If there are large differences in potential between grounding points, the grounding should run via a capacitor that is suitable for high frequency use (e. g. ceramic 10 nF/250 V~). Transposed, screened two-wire cabling is recommended for the connecting cable.


Caution!

Caution!

The multiple grounding of the bus cable in explosion hazardous areas is permissible only under specific conditions, see IEC 60079-14.

Information on the structure and grounding of the network are given in the "Guidelines for planning and commissioning" and the PROFIBUS PA specification EN 50170 (DIN 19245).

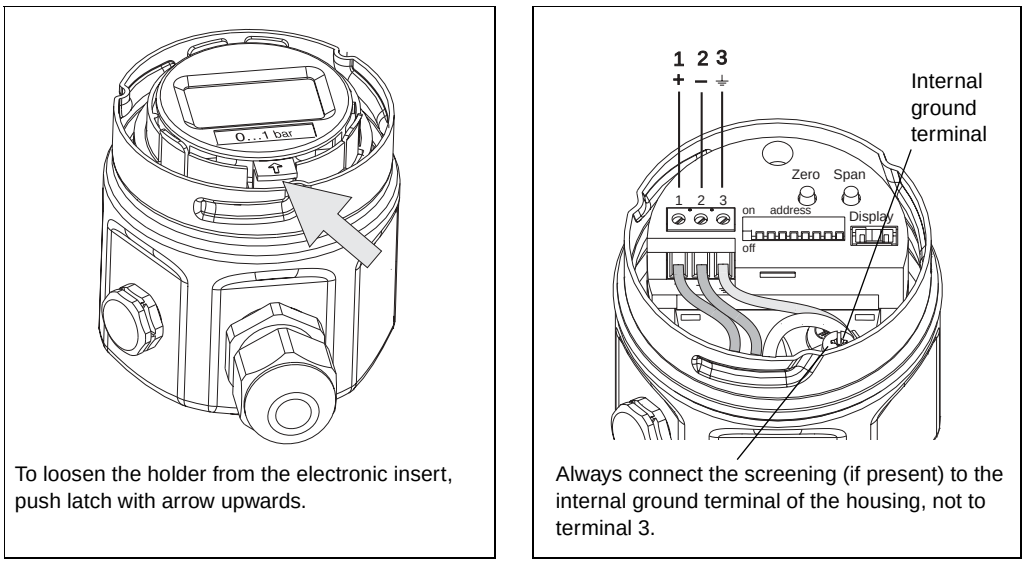
Cable connection

- Only devices for Ex-area applications: Connect external ground terminal to plant grounding system.
- Unscrew the cover.
- If present, remove the retaining ring with digital display. In addition:
  - Push up the latch with the arrow until the grip of theretaining ring is audibly released.
  - Loosen the retaining ring carefully to prevent the display cable from breaking. The plug of the display can remain plugged in.
- Insert the cable through the cable entry.
- Connect cable cores as shown in figure 2.9. Reversed polarity has no effect on operation.
- Connect the screen to the internal ground terminal.
- Where appropriate, replace the retaining ring with digital display. The grip of the retaining ring clips in with an audible click.
- Screw down the cover.

Note!

Terminal 3 on the electronic insert is for grounding and is already wired internally. If the connection cable has a screening cable within it, then this may only be connected to the grounding terminal of the housing and not to terminal 3. The terminals are designed to take one wire each. See fig. 2.9.

Note!



To loosen the holder from the electronic insert, push latch with arrow upwards.

Always connect the screening (if present) to the internal ground terminal of the housing, not to terminal 3.

fig. 2.9: left: Lifting off the display and removing the retaining ring
right: Connection

M12 plug

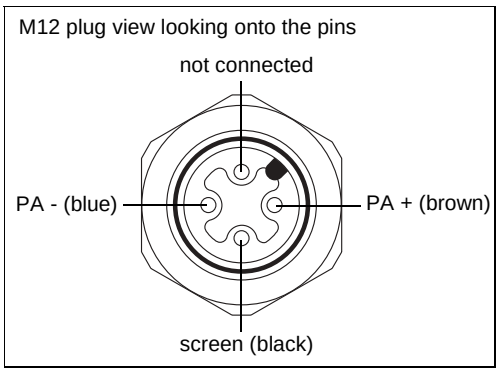
The Barcon PROFIBUS PA sensor version with M12 plug is supplied ready wired and need only be connected to the bus by means of a suitable cord set.

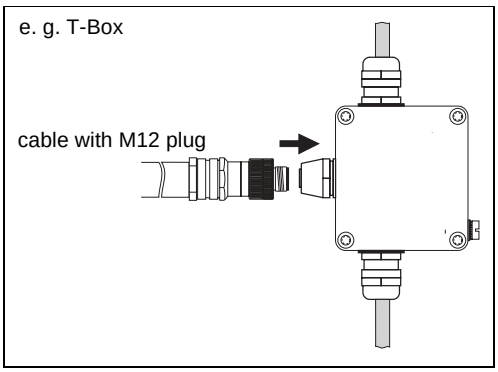
Note!

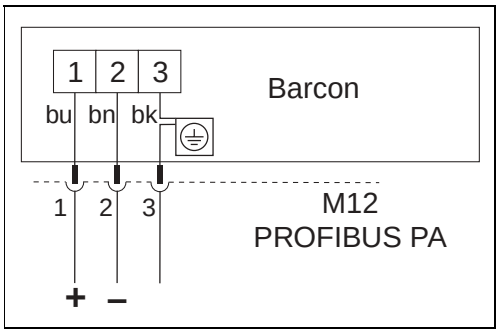
To avoid the effects of vibration, always connect the Barcon using a cable.

Note!

- Push connector into the socket.
- Securely tighten the knurled screw.
- Ground the device and T-Box using the grounding system selected







Type code:
□□□-□□□-□□□□-□□□□-A5PA□-□□
□□□-□□□-□□□□-□□□□-A5PB□-□□
□□□-□□□-□□□□-□□□□-E5PA□-□□
□□□-□□□-□□□□-□□□□-E5PB□-□□

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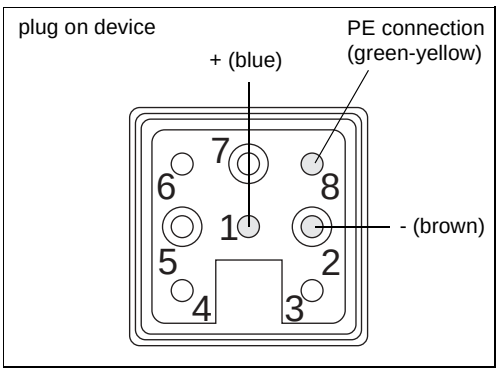
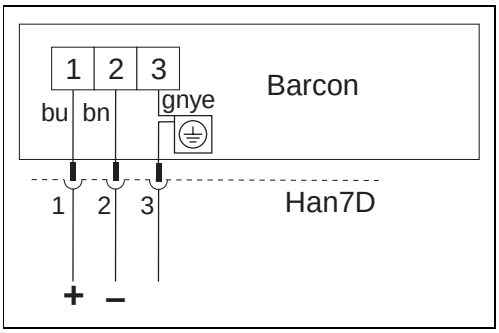
Harting plug

Electrical connection Barcon PROFIBUS PA with Harting plug Han7D:





Type code:
□□□-□□□-□□□□-□□□□-A4PA□-□□
□□□-□□□-□□□□-□□□□-A4PB□-□□
□□□-□□□-□□□□-□□□□-E4PA□-□□
□□□-□□□-□□□□-□□□□-E4PB□-□□

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3 Operation

This section describes:

Contents

- Mounting the digital display (optional)
- Function of the digital display (optional)
- Position and function of the operating elements on the electronic insert
- Operating via **PACT**ware™

3.1 Access to the operating elements

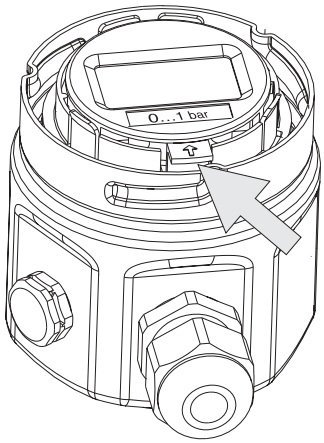
Lift display for operating (optional)

The digital display is delivered already mounted when it is ordered with the instrument. In this case the digital display with the retaining ring must be removed before operating.

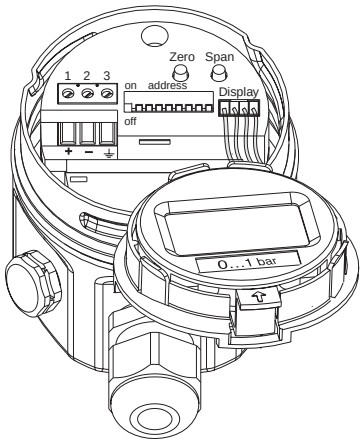
If you want to order an digital display at a later date, then please observe the instructions in section 7.3 "Mounting the display".

Removing the display:

- Push up the latch with the arrow until the grip of the retaining ring on the electronic insert is heard to click.
- Loosen the retaining ring and lift off carefully to prevent the display cable from breaking.
- For reading the display during operation, plug the display onto the edge of the housing or let it hang down loosely by its cable next to the housing.



To loosen the holder from the electronic insert push latch with arrow upwards.



Lifting off the display with retaining ring for operation.

fig. 3.1: left: Loosening the retaining ring
right: Removing the display

3.2 Function of the display

The digital display (optional) has two types of display:

- Display in measurement mode: This is shown as standard
- Display in calibration mode: This is shown after pressing the Zero or Span key once. It returns automatically to measurement mode after 2 seconds.

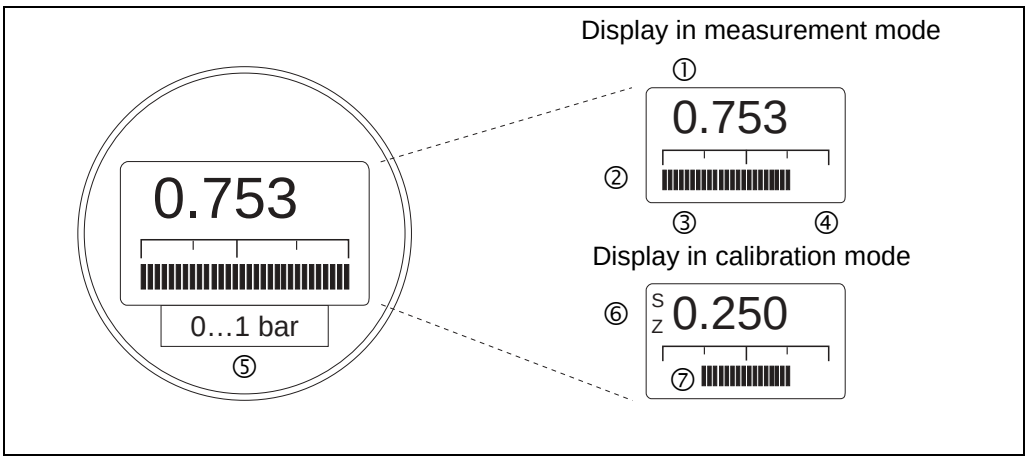


fig. 3.2: Function of the display

Display in measurement mode

① 4-character display of measured values and input parameters
② bargraph of measured value
③ lower range value
④ upper range value
⑤ nominal measuring range:

Additional displays in calibration mode

⑥ display of the calibration point (Z = Zero or S = Span)
⑦ set measuring range within the limits of the measuring cell

3.3 Position and function of the operating elements

Position of the operating elements

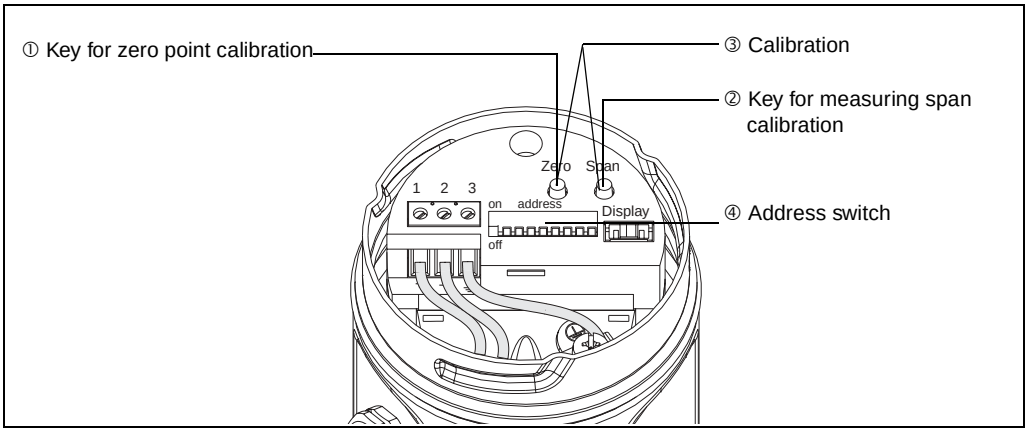


fig. 3.3: Position of the operating elements

Function of the operating elements

No.	Operating element	Function
①	Key for calibrating the zero point	**press once**: The acting pressure for the zero point is shown **press twice**: The acting pressure for the zero point is adopted
②	Key for calibrating the measuring span	**press once**: The acting pressure for the measuring span is shown **press twice**: The acting pressure for the measuring span is adopted
③	Key for calibrating the zero point and key for calibrating the measuring point	**press once simultaneously**: The acting pressure is shown as the bias pressure **press twice simultaneously**: The acting pressure is adopted as the bias pressure
④	Address switch	to adjust the address in the bus, see section 4.2

3.4 Operation using PACTware™

With the **PACT**ware™ display and operating program the Barcon can be calibrated and operated via the graphics operating mode.

The appropriate server PA-DPV1 must be activated. A description of the **PACT**ware™ operating program is found in the operating manual for **PACT**ware™.

Operating parameter

The advanced functions of the Barcon can be accessed in this menu.

- Each row is assigned to a function group.
- Every field displays a parameter.

The calibrating parameters are entered in the appropriate fields and confirmed with ↵.

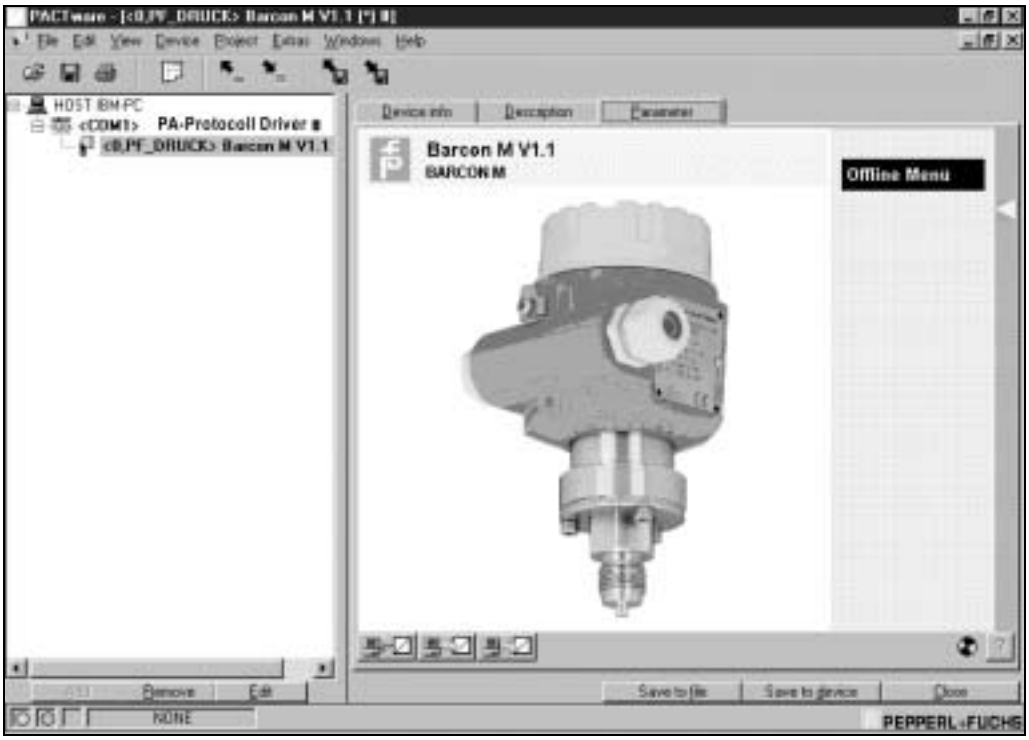


*fig. 3.4: Operating matrix of **PACT**ware™*

4 PROFIBUS PA interface

4.1 Synopsis

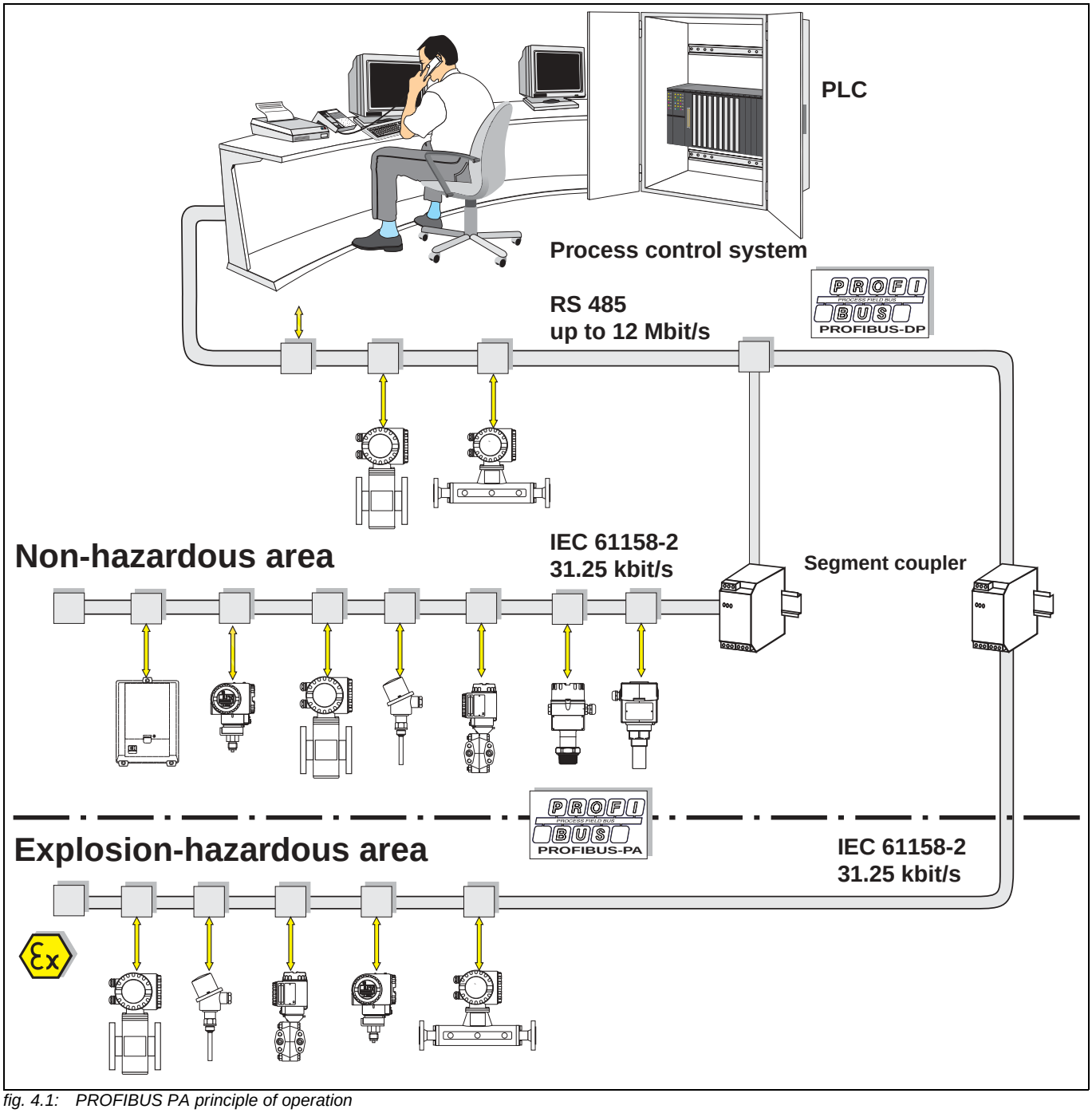


fig. 4.1: PROFIBUS PA principle of operation

4.2 Setting the device address

Every PROFIBUS PA device must be given an address. If the address is not set correctly, the device will not be recognised by the process control system.

- Valid device addresses are in the range 1 and 126. All devices are delivered from the factory with the software address 126.
- A device address may appear only once within a particular PROFIBUS PA network

The default address can be used to check the function of the device and connect it to an operating PROFIBUS PA system. Afterwards the address must be changed to allow other devices to be connected to the network.

There are two possibilities to set the address of the Barcon:

- remotely by using an operating program, e. g. **PACT**ware™, running as a PROFIBUS DP Class 2 master
- locally at the device DIP-switches that are to be found behind the display.

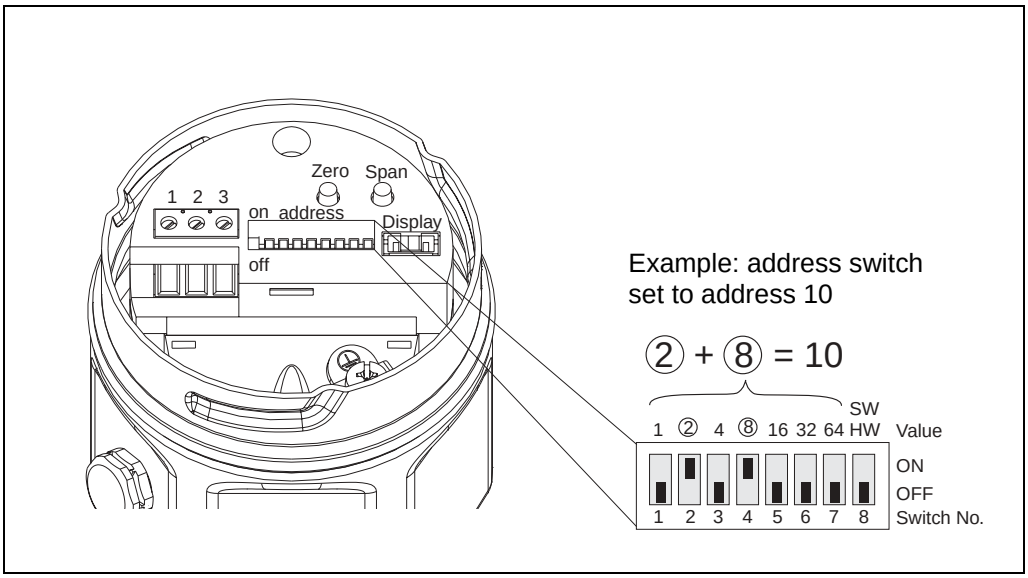


fig 4.2: Barcon address switch

Addressing mode

Set the addressing mode at Switch 8:

- ON = software addressing via the bus system (default setting) (SW)
- OFF = hardware addressing at the device via DIP switches 1 to 7 (HW).

Hardware address

Proceed as follows to set a hardware address:

1. Set Switch 8 to OFF = hardware addressing.
2. Set a unique hardware address at Switches 1 to 7 according to the table below.
3. The address becomes effective 10 s after the switches have been changed.

Switch No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Value in position "ON"	1	2	4	8	16	32	64
Value in position "OFF"	0	0	0	0	0	0	0

Software address

The procedure for changing a software address is described in the **PACT**ware™ operating instructions.

4.3 Device database and type files

A device database file (GSD) contains a description of the properties of the PROFIBUS PA device, e. g. the supported transmission rates and the type and format of the digital information output to the PLC. The bitmap files also belong to the GSD files. These allow the measuring point to be represented by an icon. The device database file and corresponding bitmaps are required by the network design tool of the PROFIBUS DP network.

Every device is allocated an identity code by the PROFIBUS User Organisation (PNO). This appears in the device data base file name (.gsd).

Name of device	ID No.:	Data base file	Type file	Bitmaps
Barcon	0612hex	PF_0612GSD		

The full set of device data base files for Pepperl+Fuchs devices can be obtained as follows:

- via INTERNET: www.pepperl-fuchs.com (Downloads)
  www.PROFIBUS.com (GSD library)
- As diskette direct from Pepperl+Fuchs, Mannheim

Note!

Note!

The PNO also provides a universal database file with the designation PA_x9700.gsd for devices with one analogue output block. Should this be used instead of the Barcon file, then only the process value can be transmitted. The functions secondary and display value are not supported. The universal profile must also be selected in field V6H0 in **PACT**ware™.

Working with GSD files

The GSD files must be loaded into a specific subdirectory in the PROFIBUS DP network design software of your PLC.

- GSD files and bitmaps that are located in the directory "Extended" are required for a planning software, for example, STEP7 used by the Siemens S7-300/400 PLC family.
- x.200 files and bitmaps that are located in the directory "Typdat5x" are required for the planning software COM ET200 for the Siemens S5.
- The GSD files located in the directory "standard" are for PLCs that support the „identifier byte” (0x94) but not the "identifier format". These are for use e. g. with the Allen-Bradley PLC5.

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4.4 Cyclic data exchange

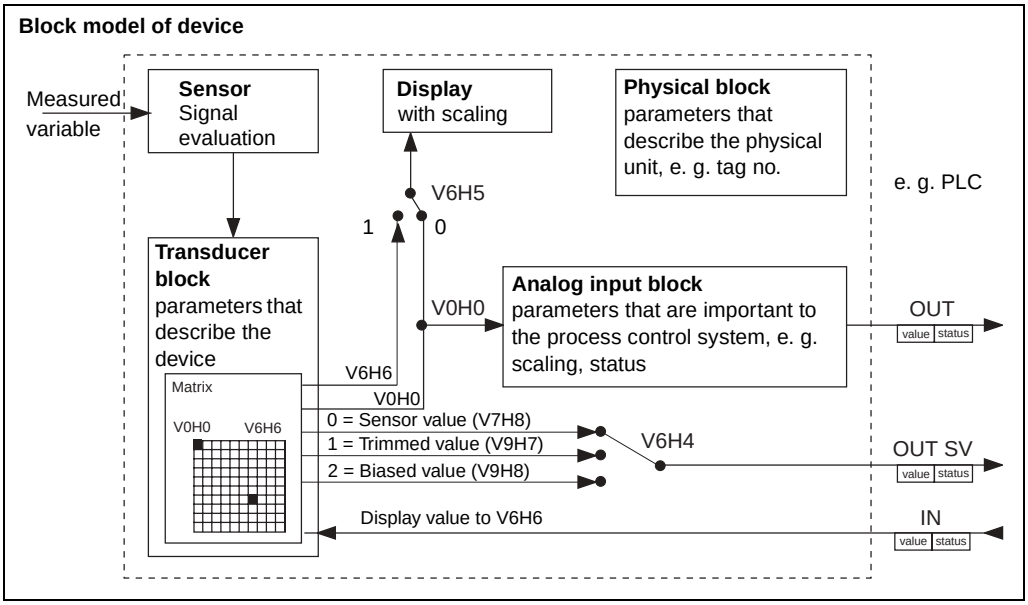

fig 4.3: Block model of the Barcon with PROFIBUS PA profile 3.0

Block model

fig. 4.3 shows a block model of the Barcon. After the device has been calibrated for pressure as described in section 5 respectively, the primary value V0H0 is output by the transducer block and used as the process value for the analog input block. Here it is scaled, processed and rescaled before being output as cyclic data to the PLC as the variable OUT. This comprises a value and status.

The local display and matrix field V0H0 usually show the same value. However, the local display can also show a cyclical output value using the PLC. This is done by setting the Parameter Select V0H0 (matrix field V6H5) to "1".

For example: if two Barcon are monitoring the pressure drop across a filter. The PLC is evaluated in the PLC and then displayed in matrix field V6H6.

Barcon can also output a secondary value to the PLC. The field V6H4 in **PACT**ware™ allows one of two values to be selected.

Configuration

The data exchange is configured in the network design tool and **PACT**ware™.

1. Using the network design tool for your PLC, add the Barcon to the network, taking care that the address assigned corresponds to that set at the device.
2. Select the Barcon and call up the configuration tool: four options appear: "Main Process Value", "2nd Cyclic Value", "Display Value", "FREE PLACE"
3. Select "Main Process Value". If no other values are required, close the configuration window, otherwise
4. Select "2nd Cyclic Value" or "FREE PLACE" (= function deactivated) andselect "Display Value" or "FREE PLACE" (= function deactivated).Then close the configuration window.
5. Start **PACT**ware™ and open the connection using the PA DPV1 server.Generate a live list, locate the device address and click on "Barcon".
6. Open the device menu and select the parameter matrix.
7. If a secondary value is to be output, select the type in V6H4: 0 = Sensor value, 1 = Trimmed value, 2 = Biased value.
8. If a display value is to be shown at the device, set V6H5 = 1 (= display value).
9. The data exchange is now configured for the Barcon in question.

Barcon → PLC (input data)

A PLC can read the input data of Barcon from the response telegram of the Data_Exchange service. The cyclic data telegram has the following structure:

Index input data	Data	Access	Data format/remarks
0, 1, 2, 3	Primary value, pressure	read	32 bit floating point number (IEEE-754)
4	Status code for primary value	read	see status codes
5, 6, 7, 8	Secondary value, sensor value, trimmed value or biased value	read	32 bit floating point number (IEEE-754)
9	Status code for secondary value	read	see status codes

PLC → Barcon (output data)

The output data from the PLC for the local display are structured as follows:

Index output data	Data	Access	Data format/remarks
0, 1, 2, 3	Display value	write	32 bit floating point number (IEEE-754)
4	Status code	write	see status codes

Status codes

The following status codes are supported by the Barcon for the primary and secondary values.

Status-Code	Device status	Significance	Primary value	Secondary value
0F Hex	BAD	Non-specific	x	x
1F Hex	BAD	Out-of-service (target mode)	x	
47 Hex	UNCERTAIN	Last usable value (fail-safe mode active)	x	
4B Hex	UNCERTAIN	Substitute set (fail-safe mode active)	x	
4F Hex	UNCERTAIN	Initial value (fail-safe mode active)	x	
5C Hex	UNCERTAIN	Configuration error (limits not set correctly)	x	
80 Hex	GOOD	OK	x	x
84 Hex	GOOD	Active block alarm (static revision counter incremented)	x	
89 Hex	GOOD	LOW_LIM (alarm active)	x	
8A Hex	GOOD	HI_LIM (alarm active)	x	
8D Hex	GOOD	LOW_LOW_LIM (alarm active)	x	
8E Hex	GOOD	HI_HI_LIM (alarm active)	x	

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4.5 Acyclic data exchange

The device parameters in the physical block, transducer block and analog input block, see fig. 4.3, as well as the device management can be accessed by a Class 2 PROFIBUS DP master using the acyclic data services. fig. 4.4 and fig. 4.5 show block diagrams of the transducer and analog input blocks.

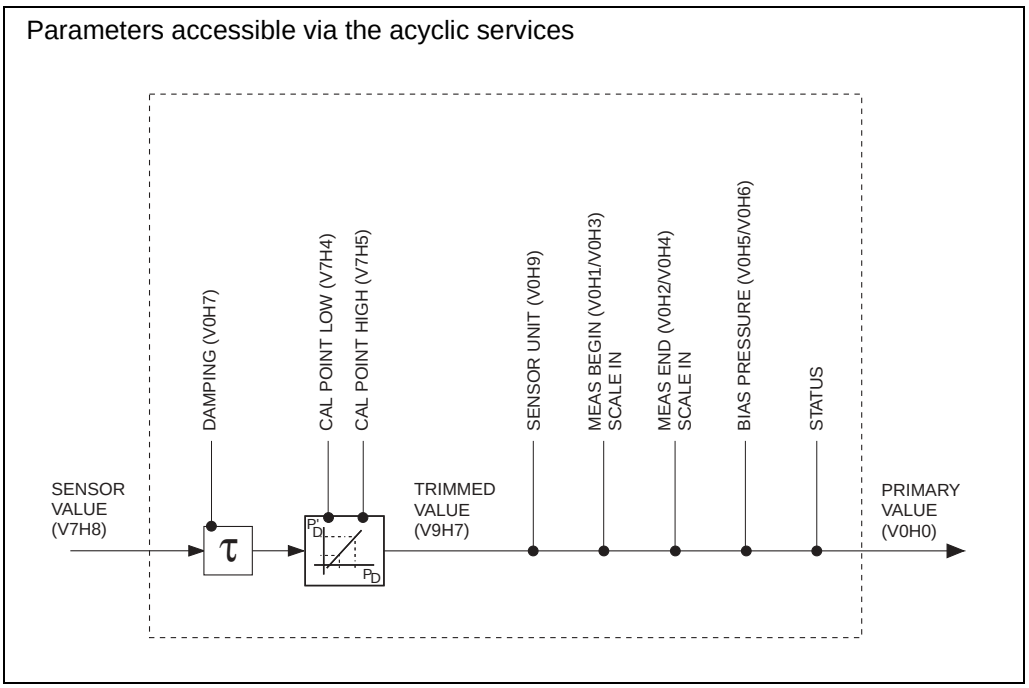

*fig 4.4: Schematic diagram of the Barcon transducer block. Parameters with information about a matrix field can also be accessed using **PACT**ware™.*

Note!

The pressure acting is transmitted in the units to be found on the nameplate.

Note!

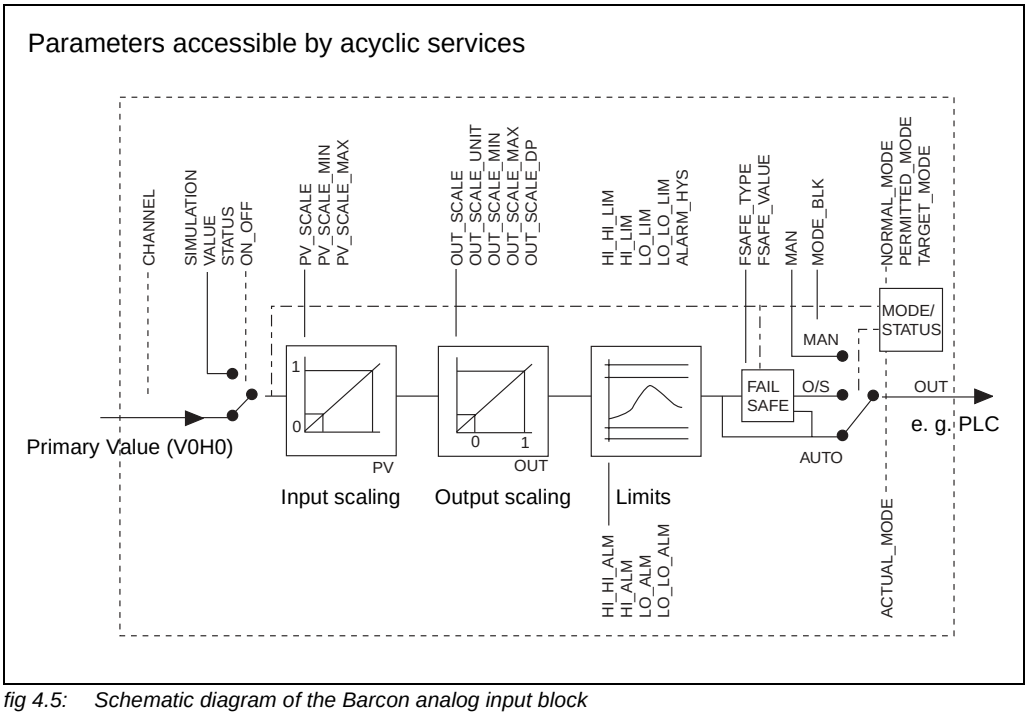

fig 4.5: Schematic diagram of the Barcon analog input block

Slot/index tables

The device parameters are listed in the following tables. The parameters are accessed via the slot and index number. The analog output, transducer and physical blocks contain standard parameters, block parameters and manufacturer-specific parameters.

If **PACT**ware™ is the operating programm used, then the matrix and the graphical operation are available as the user interface. When the device is configured to measure pressure in accordance with section 5, the standard matrix or graphic templates should be used. If the standard operating parameters are to be found in any of the device blocks, then any changes made to them are automatically mapped to the block parameters. The dependencies are indicated in the column „P+F parameter". See also fig. 4.4 and fig. 4.5.

Device management

Parameter	P+F para.	Slot	Index	Size bytes	Type	Read	Write	Storage Class
Directory object header		1	0	12	Array of UNSIGNED16	X		C
Composite list directory entries		1	1	24	Array of UNSIGNED16	X		C
GAP directory continuous		1	2-8					
GAP reserved		1	9-15					

Analog input block

Parameter	P+F para.	Slot	Index	Size bytes	Type	Read	Write	Storage class
Standard parameters								
AI Block data		1	16	20	DS-32*	X		C
Static revision		1	17	2	UNSIGNED16	X		N
Device tag	VAH0	1	18	32	OSTRING	X	X	S
Strategy		1	19	2	UNSIGNED16	X	X	S
Alert key		1	20	1	UNSIGNED8	X	X	S
AI Target mode		1	21	1	UNSIGNED8	X	X	S
AI Mode block		1	22	3	DS-37*	X		D/N/C
AI Alarm summary		1	23	8	DS-42*	X		D
Batch		1	24	10	DS-67*	X	X	S
Gap		1	25					
Block parameters								
OUT	V6H2/3	1	26	5	DS-33*	X		D
PV scale		1	27	8	Array of FLOAT	X	X	S
OUT scale		1	28	11	DS-36*	X	X	S
Linearisation type		1	29	1	UNSIGNED8	X	X	S
Channel		1	30	2	UNSIGNED16	X	X	S
Gap		1	31					
PV fail safe time		1	32	4	FLOAT	X	X	S
Fail safe type		1	33	1	UNSIGNED8	X	X	S
Fail safe value		1	34	4	FLOAT	X	X	S
Alarm Hysteresis		1	35	4	FLOAT	X	X	S
Gap		1	36					
HI HI Limit		1	37	4	FLOAT	X	X	S
Gap		1	38					
HI Limit		1	39	4	FLOAT	X	X	S
Gap		1	40					
LO Limit		1	41	4	FLOAT	X	X	S
Gap		1	42					
LO LO Limit		1	43	4	FLOAT	X	X	S
Gap		1	44-45					
HI HI Alarm		1	46	16	DS-39*	X		D
HI Alarm		1	47	16	DS-39*	X		D
LO Alarm		1	48	16	DS-39*	X		D
LO LO Alarm		1	49	16	DS-39*	X		D
Simulate		1	50	6	DS-50*	X	X	S
OUT unit text		1	51	16	OSTRING	X	X	S
Gap reserved		1	52-60					
Gap		1	61-65					

* See section 4.6, "Data strings" or PROFIBUS PA specification part 1.
C = constant, N = non-volatile (remains stored), S = static (is counted), D = dynamic

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Physical block

Parameter	P+F para.	Slot	Index	Size bytes	Type	Read	Write	Storage Class
Standard parameters								
PB Block data		1	66	20	DS-32*	X		C
Static revision		1	67	2	UNSIGNED16	X		N
Device tag	VAH0	1	68	32	OSTRING	X	X	S
Strategy		1	69	2	UNSIGNED16	X	X	S
Alert key		1	70	1	UNSIGNED8	X	X	S
PB Target mode		1	71	1	UNSIGNED8	X	X	S
PB Mode block		1	72	3	DS-37*	X		D/N/C
PB Alarm summary		1	73	8	DS-42*	X		D
Block parameters								
Software revision		1	74	16	OSTRING	X		C
Hardware revision		1	75	16	OSTRING	X		C
Device manufacturer identity		1	76	2	UNSIGNED16	X		C
Device identity		1	77	16	OSTRING	X		C
Device serial number	VAH2	1	78	16	OSTRING	X		C
Diagnosis		1	79	4	OSTRING	X		D
Diagnosis extension		1	80	6	OSTRING	X		D
Diagnosis mask		1	81	4	OSTRING	X		C
Diagnosis mask extension		1	82	6	OSTRING	X		C
Device certification		1	83	32	OSTRING	X		N
Security locking	V9H9	1	84	2	UNSIGNED16	X	X	N
Factory reset	V9H2	1	85	2	UNSIGNED16		X	S
Descriptor		1	86	32	OSTRING	X	X	S
Device message	VAH1	1	87	32	OSTRING	X	X	S
Device installation date		1	88	16	OSTRING	X	X	S
Gap reserved		1	89					
Identification number	V6H0	1	90	1	UNSIGNED 8	x	x	S
HW write protection		1	91	1	UNSIGNED 8	x		D
Gap reserved		1	92-98					
Gap		1	99-103					
Matrix error code	V2H0	1	104	2	UNSIGNED16	X		D
Matrix last error code	V2H1	1	105	2	UNSIGNED16	X	X	D
UpDown features supported		1	106	1	OSTRING	X		C
UpDown control		1	107	1	UNSIGNED8		X	D
UpDown data		1	108	20	OSTRING	X	X	D
Bus address	V9H4	1	109	1	UNSIGNED8	X		D
Matrix device software number	V2H2	1	110	2	UNSIGNED16	X		C
PA set unit to bus	V6H1	1	111	1	UNSIGNED 8	x	x	S
PA input value	V6H6	1	112	6	FLOAT+U8+U8	x		D
PA select V0H0	V6H5	1	113	1	UNSIGNED8	x	x	S
PA profile revision	V6H7	1	114	16	OSTRING	x		C
Gap		1	115-119					
PA select second cyclic value	V6H4	1	120	1	UNSIGNED8	x	x	S
PA identity number		1	121	2	UNSIGNED16	x		D
PA identity string		1	122	32	OSTRING	x		C
PA DP status		1	123	1	UNSIGNED8	x		D
Gap		1	124-128					

* See section 4.6, "Data strings" or PROFIBUS PA specification part 1.
C = constant, N = non-volatile (remains stored), S = static (is counted), D = dynamic

View_1 parameters

Parameter	P+F para.	Slot	Index	Size bytes	Type	Read	Write	Storage class
View 1 Physical block		1	205	17	OSTRING	X		D/N/C
Gap reserved		1	206-210					
View 1 Transducer block		1	211	22	OSTRING	X		D/N/C
Gap reserved		1	212-216					
View 1 Analog Input block		1	217	18	OSTRING	X		D/N/C
Gap reserved		1	218-222					

Transducer block

Parameter	P+F para.	Slot	Index	Size bytes	Type	Read	Write	Storage class
Standard parameters								
TB Block data		1	129	20	DS-32*	X		C
Static revision		1	130	2	UNSIGNED16	X		N
Device tag	VAH0	1	131	32	OSTRING	X	X	S
Strategy		1	132	2	UNSIGNED16	X	X	S
Alert key		1	133	1	UNSIGNED8	X	X	S
TB Target mode		1	134	1	UNSIGNED8	X	X	S
TB Mode		1	135	3	DS-37*	X		D/N/C
TB Alarm summary		1	136	8	DS-42*	X		D
Block parameters								
Sensor value	V7H8	1	137	4	FLOAT	X		D
Sensor high limit	V7H7	1	138	4	FLOAT	X		N
Sensor low limit	V7H6	1	139	4	FLOAT	X		N
Calibration point high	V7H5	1	140	4	FLOAT	X	X	S
Calibration point low	V7H4	1	141	4	FLOAT	X	X	S
Calibration minimum span		1	142	4	FLOAT	X		N
Sensor unit	V0H9	1	143	2	UNSIGNED16	X	X	N
Trimmed value	V9H7	1	144	5	DS-33*	X		D
Sensor type		1	145	2	UNSIGNED16	X		N
Sensor serial number	VAH3	1	146	4	UNSIGNED32	X		N
Primary value	V0H0	1	147	5	DS-33*	X		D
Primary value unit	V0H9	1	148	2	UNSIGNED16	X	X	S
Primary value type		1	149	2	UNSIGNED16	X	X	S
Gap		1	150-157					
Secondary value 1		1	158	5	DS-33*	X		D
Secondary value 1 unit	V0H9	1	159	2	UNSIGNED16	X	X	S
Secondary value 2		1	160	5	DS-33*	X		D
Secondary value 2 unit	V0H9	1	161	2	UNSIGNED16	X	X	S
Linearisation type		1	162	1	UNSIGNED8	X	X	S
Scale in	V0H1/2	1	163	2*4	Array of FLOAT	X	X	S
Gap		1	164-177					
Gap reserved		1	178-187					
Pepperl+Fuchs Parameter								
Measure begin	V0H1	1	188	4	FLOAT	X	X	S
Measure end	V0H2	1	189	4	FLOAT	X	X	S
Automatically measure begin	V0H3	1	190	1	UNSIGNED8	X	X	S
Automatically measure end	V0H4	1	191	1	UNSIGNED8	X	X	S
Bias pressure	V0H5	1	192	4	FLOAT	X	X	S
Automatically bias pressure	V0H6	1	193	1	UNSIGNED8	X	X	S
Damping	V0H7	1	194	4	FLOAT	X	X	S
Sensor tab index	V2H7	1	195	1	UNSIGNED8	X	X	S
Sensor tab value	V2H8	1	196	4	FLOAT	X	X	S
Sensor trim off	V9H5	1	197	4	FLOAT	X		S
Sensor trim off value	V9H6	1	198	4	FLOAT	X		S
Biased pressure	V9H8	1	199	4	FLOAT	X	X	S
Gap	VAH6	1	200-204					

* See section 4.6, "Data strings" or PROFIBUS PA specification part 1.
C = constant, N = non-volatile (remains stored), S = static (is counted), D = dynamic

4.6 Data formats

IEEE 754 float

The measured value is transmitted as a IEEE 754 floating point number, whereby

Measured value = $(-1)^{Sign} \times 2^{(E-127)} \times (1 + F)$

D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Sign	Exponent (E)								Fraction (F)						
	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}
Fraction (F)															
2^{-8}	2^{-9}	2^{-10}	2^{-11}	2^{-12}	2^{-13}	2^{-14}	2^{-15}	2^{-16}	2^{-17}	2^{-18}	2^{-19}	2^{-20}	2^{-21}	2^{-22}	2^{-23}

fig 4.6: IEEE-754 floating point number

Example

40 F0 00 00 hex = 0**100 0000 1**111 0000 0000 0000 0000 0000 binary

Value $= (-1)^0 \times 2^{(129-127)} \times (1 + 2^{-1} + 2^{-2} + 2^{-3})$

$= 1 \times 2^2 \times (1 + 0.5 + 0.25 + 0.125)$

$= 1 \times 4 \times 1.875$

$= 7.5$

Note!

- Not all PLCs support the IEEE 754 format. For this reason a conversion module must often be used or written.
- Depending on how the data are stored in the PLC (MSB or LSB), it might be necessary to use a byte swapping routine in the PLC.

Note!

Data strings

The data types marked with an asterisk in the slot/index table. e. g. DS-36, are data strings that are structured according to the PROFIBUS PA specification part 1, version 3.0. They comprise several elements that can be addressed via the slot, index and subindices, as shown in the following two examples:

Parameter type	Slot	Index	Element	Subindex	Type	Size
DS-33	1	26	OUT Value	1	FLOAT	4
			OUT Value	5	UNSIGNED8	1

Parameter type	Slot	Index	Element	Subindex	Type	Size
DS-36		27	OUT Scale Max.	1	FLOAT	4
			OUT Scale Min	5	FLOAT	4
			OUT Scale Unit.	9	UNSIGNED16	2
			OUT Scale DP (decimal point).	11	INTEGER8	1

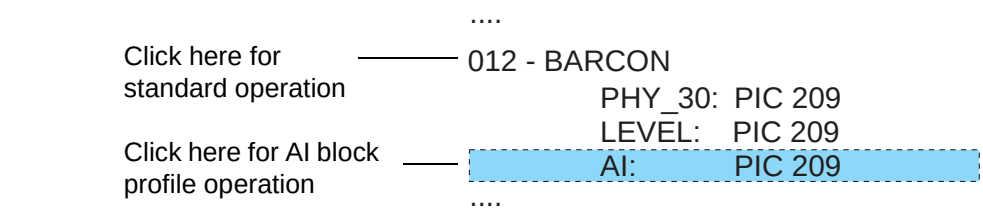
4.7 Configuration of profile parameters

The block parameters can be accessed by a PROFIBUS DP Class 2 master, for example, **PACT**ware™. **PACT**ware™ runs on an IBM-compatible computer or laptop. The computer must be equipped with a PROFIBUS interface, i. e. PROFIBOARD for PCs and PROFICARD for laptops. During the system integration, the computer is registered as a Class 2 master.

Operation

The PA-DPV1 server must be installed. The connection to **PACT**ware™ is opened from the PA-DPV1 server.

- Generate a live list with „Tags”



- Pepperl+Fuchs operation is selected by clicking on the device name, e. g. Barcon.
- Profile operation is selected by clicking on the appropriate tag, e. g. AI: PIC 209 = analog input block Barcon, or by selecting the appropriate device profile in the graphic template.
- The settings are entered in the device menu.

Output scaling

The Barcon display and the digital output operate completely independently of each other. The digital output delivers the pressure in the units on the name plate, no matter what is shown at the display. If it is desired that the display and output offer the same value, then the upper and lower limit values of PV_SCALE and OUT_SCALE must be set to the same value in the AI block. The output can be scaled in the graphical support mode using the template shown in fig. 4.6.

5 Commissioning

Contents

This section contains the following information:

- On-site commissioning using keys on the electronic insert
- Commissioning and operation using remote communication (**PACT**ware™)
- Locking and unlocking the measuring point
- Measuring point information

The Barcon is ready for measurement. The measuring range and pressure units correspond to those on the nameplate. The acting pressure is always transmitted via PROFIBUS PA in these units. Other settings are possible in **PACT**ware™ or on-site.

It is not possible to adjust zero and span in the conventional sense. The resolution of the measured value, however, is such that the specified accuracy of 0.2 % of span is offered for "turndowns" down to 10:1. The "turndown" can be displayed in **PACT**ware™ and the bargraph.

5.1 On-site commissioning

Preparatory work

- Wire up the Barcon (see section 2.5 "Electrical connection")
- Ensure that a pressure can be generated within the required measuring range.

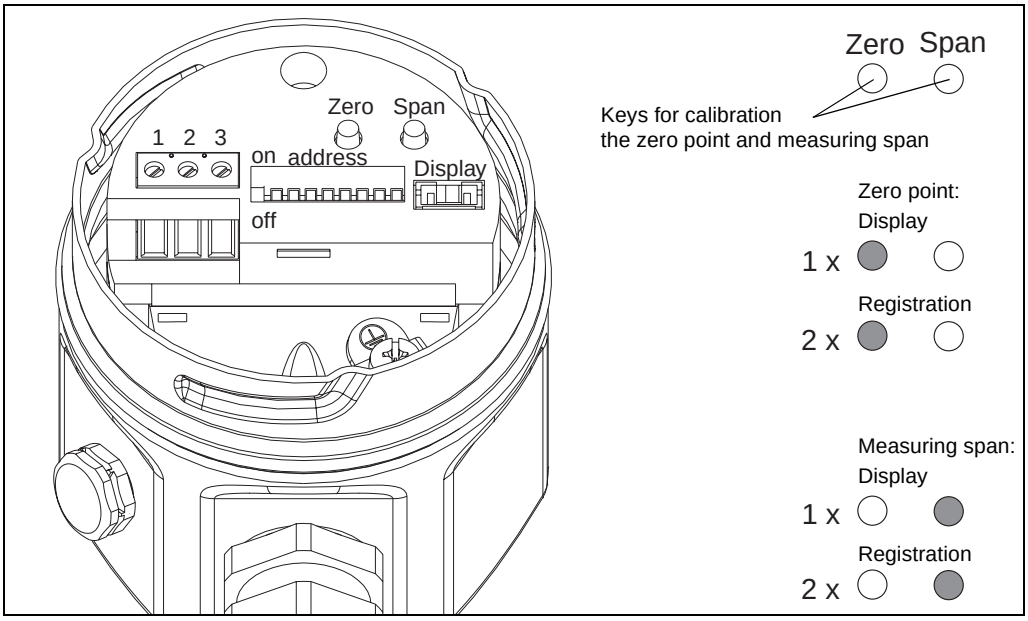


Bild 5.1: Position of keys for calibrating zero point and measuring span

Adjusting the zero point

Zero point adjusting is carried out using the key "Zero". Carry out the zero point adjusting as follows:

- Enter exactly the pressure for the lower range value acting on the sensor.
- Press the Zero key twice.
  The acting pressure is adopted as the zero point.
  By pressing the Zero key once the value can be called up if a digital display is connected.

Adjusting the measuring span

The measuring span is adjusted using the key "Span". Carry out the measuring span adjusting as follows:

- Enter exactly the pressure for the upper range value acting on the sensor.
- Press the Span key twice.
  The acting pressure for the measuring span is adopted.
  By pressing the Span key once the value can be called up if a digital display is connected.

5.2 Commissioning and operation via PACTware™

Preparatory work

Wire up the Barcon (see section 2.5 "Electrical connection").

Operating parameter

The calibration is made via operating matrix (remote operation) using **PACT**ware™:

Parameter field	Description
V0H1	Entry of pressure for lower range-value – zero (bargraph)
V0H2	Entry of upper range-value – span; max. turndown (bargraph)
V0H3	Acting reference pressure is taken as lower range-value (bargraph)
V0H4	Acting reference pressure is taken as upper range-value, max. turndown (bargraph)
V0H5	Entry of bias pressure (affects display module only)
V0H6	Acting pressure is taken as bias pressure (affects display module only)
V0H7	Entry of damping τ (0 ... 40 s)
V0H9	Options pressure units: mbar, bar, Pa, hPa, kPa, MPa, mm H_2O, m H_2O, in H_2O, ft H_2O, psi, g/cm^2, kg/cm^2, kgf/cm^2, atm, lb/ft^2, torr, mm Hg, in Hg
V6H1	Selecting the pressure units determines in which units the pressure-specific parameters are to be shown. After selecting new pressure units all information on the pressure are converted into the new units. Confirm the selection with V6H1, see "Selecting pressure units" in this section.
V9H5	Position correction, see "Zero correction" in this section

Resetting to factory settings (Reset)

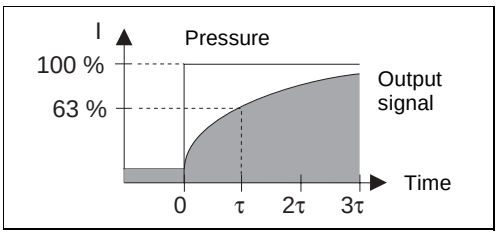
By entering a code, the entries in the matrix are reset partially or completely to factory settings. Further information on the various types of reset and their effects are given in section 6.3 "Reset".

#	Para.	Entry	Remarks
1	V2H0	e. g. 2380	Partially reset to factory settings

Output damping

The damping τ affects the speed with which the output signal and the digital display react to changes in pressure.

#	Para.	Entry	Remarks
1	V0H7	e. g. 30	Damping (s) (0 ... 40 s)



Date of issue 14.05.2002

Selecting pressure units

Selecting the pressure units determines in which units the pressure-specific parameters are to be shown. The pressure units available are given in the table below. After selecting new pressure units all information on the pressure are converted into the new units, e. g. 0 ... 1 bar corresponds to 0 ... 14.5 psi.

#	Para.	Entry	Remarks
1	All pressure parameter are converted in the pressure unit bar. e. g. measured value V0H0 = 1 bar		
2	V0H9	e. g. psi	selecting new pressure unit
3	All pressure parameter are converted in the pressure unit psi. e. g. measured value V0H0 = 14.5 psi		

Units	Units	Units	Units	Units
mbar	kPa	in H_2O	kg/cm^2	Torr
bar	MPa	ft H_2O	kgf/cm^2	mm Hg
Pa	mm H_2O	psi	atm	in Hg
hPa	m H_2O	g/cm^2	lb/ft^2	

Note!

The measured value is transmitted via bus in the pressure unit shown on the nameplate. When selecting a new pressure unit in V0H9, all pressure-specific parameters in the matrix are recalculated and shown in the new unit. To also transmit the selected pressure unit in V0H9 via bus, the message "Set Unit to Bus" in V6H1 must be confirmed once. Example:

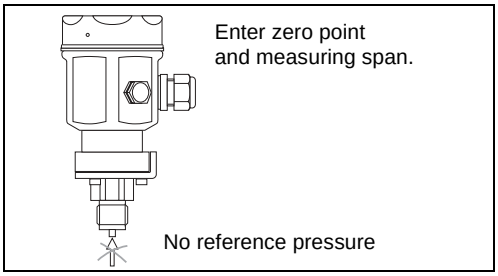
Note!

#	Para.	Entry	Remarks
1	Measured Value V0H0 = 1 bar		
2	V0H9	e. g. psi	Confirm selection
3	Current measured value V0H0 = 14.5 psi The measured value 1 bar is still transmitted via bus. V6H1 shows UNKNOWN Out_Value.		
4	V6H1	Confirm Set Unit To Bus	V6H1 shows: 14.5 psi Out_Value
5	The measured value 14.5 psi is now transmitted via bus.		

Lower and upper range value: calibration without reference pressure

The pressure required for zero point and span is entered into the device. No particular pressure must be acting.

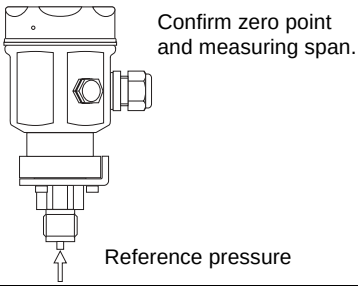
#	Para.	Entry	Remarks
1	V0H9	e. g. bar	select pressure unit
2	V3H0	"Pressure"	select operating mode "Pressure"
3	V0H1	e. g. 0.0	Zero
4	V0H2	e. g. 1.0	Span
5	V0H0	-	e. g. 0.7 bar



Lower and upper range value: calibration with reference pressure

A reference pressure is available that corresponds exactly to the zero point and span required.

#	Para.	Entry	Remarks
1	V0H9	e. g. bar	select pressure unit
2	V3H0	"Pressure"	select operating mode "Pressure"
3	The exact pressure for zero is acting		
4	V0H3	Confirm	Register zero e. g. 0
5	The exact pressure for span is acting		
6	V0H4	Confirm	Register span e. g. 14.5
7	V0H0	-	e. g. 0.7 bar



Bias adjustment

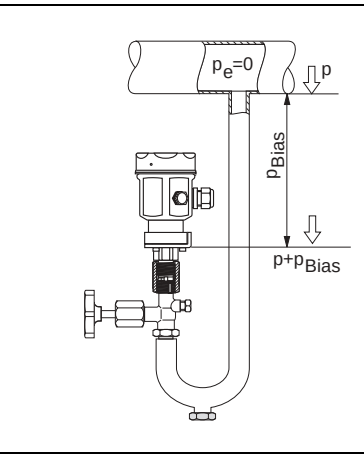
If the display does not show zero after zero point adjustment (due to position of the device), then this can be corrected by entering a bias pressure or by adopting the bias pressure acting.

Entry a bias pressure

#	Para.	Entry	Remarks
1	V0H5	e. g. 0.1	Enter bias pressure
2	If necessary, equate display value with starting value (OUT Value), see note.		
	V6H1	Confirm	Display value equate with starting value.

Registration of an acting bias pressure

#	Para.	Entry	Remarks
1	V0H5	Confirm	Register bias pressure
2	If necessary, equate display value with starting value (OUT Value), see note.		
	V6H1	Confirm	Display value equate with starting value.



Note!

Note!

"Set Unit To Bus" V6H1 must be confirmed to ensure the display and Out_Value in AI Block show the same value.

Zero correction

The parameter "Zero Correction" (V9H5) is another way of carrying out a position correction. Unlike a position correction using bias pressure (V0H5/V0H6), the Out_Value and Out_Scale in the analogue input block are corrected at the same time.

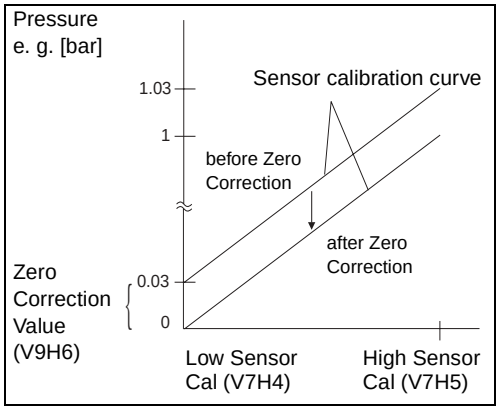
With zero correction, the calibration curve is shifted as shown in the fig. below and the values for "Low Sensor Cal" (V7H4) and "High Sensor Cal" (V7H5) are recalculated. The field "Zero Correction Value" (V9H6) shows the value by which the calibration curve is shifted.

The value for V9H6 is calculated as follows:

Zero Correction Value (V9H6) = Sensor Pressure (V7H8) – Zero Correction (V9H5)

The "Sensor Pressure" (V7H8) shows the current attenuated pressure.

#	Para.	Entry	Remarks
1	Indication V0H0 = 0.03 bar (pressure) OUT Value V6H2 = 0.03		
2	Pressure for zero correction: V7H8 = 0.03 bar (according the pressure)		
3	V9H5	0.0	Value Wert 0.0 be allocated the attenuated pressure.
4	After entering the value in V9H5: • the parameter field V9H6 view the zero correction value: V9H6 = V7H8 – V9H5 V9H6 = 0.03 bar – 0.0 bar V9H6 = 0.03 bar • and the parameter fields views V0H0 = 0.0 bar V6H2 = 0.0		



5.3 Locking/unlocking operation

After calibrating or entering all parameters, the operation can be locked by entering any number from 1 to 9998, except 130 and 2457. This blocks all fields and functions except V9H9 "Locking". Locking is released by entering 130 or 2457.

#	Para.	Entry	Remarks
1	V9H9	e. g. 131	Parameters locked
2	V9H9	130 or 2457	Parameters unlocked

5.4 Measuring point information

The following information about the measuring point can be read via the parameter matrix in **PACT**ware™:

Param. field	Display or entry
Measured values	
V0H0	Main measured value: pressure
V6H2/V6H3	OUT value, OUT value status
V7H8	Sensor pressure (unit selectable in V0H9)
V9H7	Unbiased pressure (current pressure without bias correction)
Sensor data	
V7H4	Lower calibration pressure (unit selectable in V0H9)
V7H5	Upper calibration pressure (unit selectable in V0H9)
V7H6	Lower measurement limit of sensor (unit selectable in V0H9)
V7H7	Upper measurement limit of sensor (unit selectable in V0H9)
Information on transmitter	
V2H2	Software number
V2H7	Sensor data No.: number of entry in the sensor table (1 ... 11). Please remove from sensor pass
V2H8	Sensor data value: entry in sensor table, contains all sensor-specific data. Please remove from sensor pass
Error response	
V2H0	Current diagnostic code
V2H1	Last diagnostic code

Communication level

Param. field	Display
VAH0*	Physical block tag discription
VAH1*	Physical block device message
VAH2*	Device (transmitter) serial number
VAH3*	Sensor serial number

* 32 characters can be entered here (ASCII)

6 Diagnosis and trouble-shooting

6.1 Diagnosis of errors and warnings

Errors

If the Barcon detects an error:

- An error code is transmitted along with the measured value.
- If the display is present, the error code is displayed and flashes.
- The current error code is displayed in the matrix field V2H0, the last one in V2H1.

Warnings

If the Barcon detects a warning:

- An error code is transmitted along with the measured value: the Barcon continues measuring.
- The current error code is displayed in the matrix field V2H0, the last one in V2H1.

Error codes in V2H0 and V2H1

If several codes occur simultaneously, the sequence in which they are displayed corresponds to their order of priority.

Code	Type	Source and Remedy
E 101	Error	Sensor table check sum error • Is shown e. g. when sensor parameters are being entered. The error message disappears when the sensor parameters are entered correctly and in full. • Check sum is faulty. Check sensor data in V2H7 and V2H8 (Sensor Data No./ Sensor Data Value).
E 102	Warning	Electronic fault in maximum counter function. • Electronics defective. Replace electronics, see section 7.4
E 103	Warning	Initialisation in progress • The electronics is initialised when the instrument is connected. Wait until the procedure has been completed.
E 104	Warning	Sensor calibration error • Values in V7H4 and V7H5 (Low Sensor Cal and High Sensor Cal) are too close to each other (smaller than 1/100th of the sensor range), e.g. after recalibrating the sensor. Carry out a reset (Code 2509) and recalibrate the sensor, see section 7.4
E 106	Error	Download active • Wait until the download-procedure has been completed.
E 110	Error	Check sum error • The power supply is interrupted while writing to the processor, e.g. from a defective cable connection (e. g. unplugged) or EMC interference. Carry out a reset (Code 5140) and recalibrate the sensor, see section 7.4
E 114	Error	Electronic fault • Electronics defective. Replace electronics, see section 7.4
E 115	Error	Sensor overpressure • Overpressure present. Reduce pressure. • Cable connection defective (e.g. unplugged) Check connection and reconnect if necessary. • Sensor defective. Replace sensor, see section 7.5
E 116	Error	Up-/Download error • Data were not correctly sent to the processor during a download, e. g. from a unplugged cable connection, voltage peaks (ripple) in the power supply, voltage peaks (ripple) in the power supply, EMC interference. Check the connection and reconnect if necessary. Carry out a reset (Code 5140) and restart the download.
E 120	Error	Sensor underpressure • Pressure to low for sensor. Increase pressure on sensor. • Cable connection defective (e. g. unplugged) Check connection and reconnect if necessary. • Sensor defective. Replace sensor, see section 7.4 • For small ranges, screwing down the cover “E120" may be shown for a short while. The error message disappears as soon as the gauge pressure in the housing is reduced.

6.2 Simulation

Either the Out_Value or the function of the analog input block can be simulated:

Simulation of the OUT_Value

Check that the simulation is enabled.

1. Unlock matrix in matrix field V9H9 (= 130 or = 2457).
2. Set parameter Target_Mode to "manual".
   - Directly enter a value for Out_Value (V0H0).
   - Check the effect on the bus.
3. Reset Target_Mode to "automatic".

Simulation of the analog input block

1. Check that the simulation is enabled. Unlock matrix in matrix field V9H9 (= 130 or = 2457).
2. Set parameter Simulation to "on".
   - Enter a simulation value in parameter Simulation_Out_Value or change value of Out_Scale_Min and Out_Scale_Max.
   - Check the effect on the OUT_Value.
3. Reset Simulation to "off".

6.3 Reset

By entering a code, the entries to the matrix can be reset either partially or fully.

Example:

#	Para.	Entry	Remarks
1	V2H9	e. g. 5140	Reset to factory settings

The Barcon differentiates between several types of reset with various responses. Which parameter is affected by which reset is given in the table below.

Other reset codes are:

- 2506: Warm start of the instrument
- 2509: The lower and the upper sensor calibration limits and the zero correction are reset to the factory settings. i. e.:
  Low Sensor Cal = lower measuring limit (V7H4 = V7H6),
  High Sensor Cal = upper measuring limit (V7H5 = V7H7).
  Zero Correction Value (V9H6) = 0.0
- 2712: The address set via the bus is reset to factory set value 126.

Reset Codes		H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
1 or 5140 2380 2509 731	V0		Lower Range Value 0.0 0.0 0.0	Upper Range Value = V7H7 = V7H7 = V7H7	Set Lower Value deleted deleted deleted	Set Upper Value deleted deleted deleted	Set Bias Pressure 0.0 0.0 0.0	Bias Pressure Autom. deleted deleted deleted	Set Output Damping 0.0 0.0 0.0		Select Pressure Unit bar
	V1										
1 or 5140 2380 2509 731	V2	Diagnost. Code 0 0 0	Last Diagnost. Code 0 0 0	Software-number					Sensor Data No.	Sensor Data Value	Default Values
	V3 ... V5										
1 or 5140 2380 2509 731	V6	Identity Number	Set unit OUT	Out Value 1) 1)	OUT Status	2nd cyclic value	Select V0H0 M. Value M. Value	OUT Value SPS	Profile Version		
1 or 5140 2380 2509 731	V7					Low Sensor Cal = V7H6 = V7H6 = V7H6	High Sensor Cal = V7H7 = V7H7 = V7H7	Low Sensor Limit	High Sensor Limit	Sensor Pressure	
	V8										
1 or 5140 2380 2509 731	V9						Zero Correction	Zero Correction Value 0.0 0.0 0.0	Unbiased Pressure V7H8 2) V7H8 2) V7H8 2)	Biased Pressure V7H8 2) V7H8 2) V7H8 2)	Locking
1 or 5140 2380 2509 731	VA	Set Tag Number deleted deleted	Set User Text deleted deleted								

1) After a reset "5140" or "2380", the parameter field show the actual digital output value: The unit is unknown and the indication show UNKNOWN.

2) After a reset, the matrix fields V9H7 and V9H8 show the current sensor pressure.

7 Maintenance and repair

7.1 Repair

If the Barcon is to be sent to Pepperl+Fuchs for repair, then a note should be enclosed containing the following information.

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

Before sending in the Barcon to Pepperl+Fuchs for repair, please take the following protective measures:

- Remove all traces of the product. This is particularly important if the product is dangerous to health, e. g. corrosive, poisonous, carcinogenic, radioactive, etc.
- We do request that no instrument should be returned to Pepperl+Fuchs without all dangerous material being completely removed first as it can, e. g. penetrate into fissures or diffuse through plastic.


Caution!

Caution!

Instruments with certificates of conformity or design approval must be sent in for repair as complete units only.

7.2 Replacement parts

The diagrams on the following pages show all replacement parts together with their order numbers which can be ordered from Pepperl+Fuchs.

When ordering replacement parts, please **note** the following:


Note!

- If parts given in the order code are to be replaced, then ensure that the order code (instrument designation) on the nameplate is still valid.
- If replacing or adding a part results in a change in product structure (e. g. a display), then a modified nameplate must be ordered. Changes are to be stated on the nameplate which must then be attached to the Barcon.
- If a new sensor is ordered as a spare part, it is usually supplied as the complete mounted device with housing and process connection, but without the electronic insert.
- Only the process connection of the PPC-M10, PPC-M20 and LHC-M20 can be exchanged by the customer. For all other versions, the process connection ordered is supplied with the complete housing, but without the electronic insert.
- It is not possible to convert a standard instrument into an Ex instrument by replacing its parts. The appropriate regulations are to be observed when certified instruments are to be repaired.

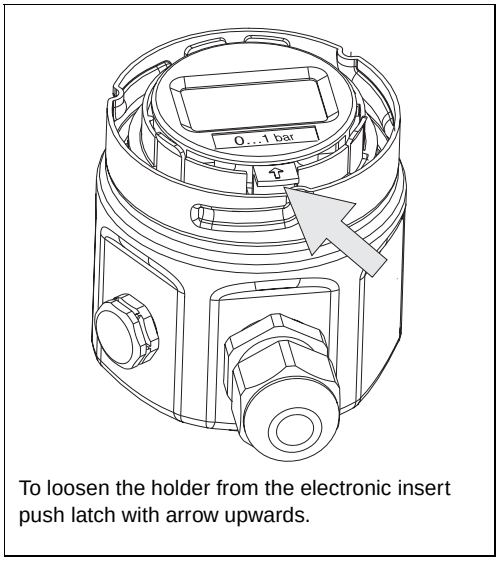
Please contact Pepperl+Fuchs service for further information on service and spare parts.

7.3 Mounting the display

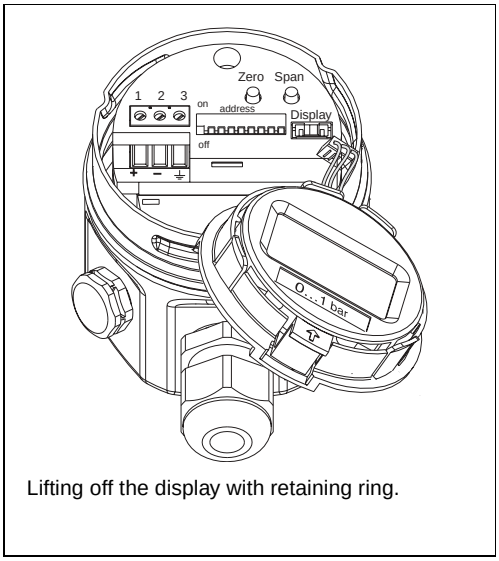
The display is delivered already mounted when it is ordered with the instrument. In cases of damage, accessories can be ordered.

Removing the display

- Push up the latch with the arrow until the grip of the retaining ring on the electronic insert is heard to click.
- Loosen the retaining ring and lift off carefully to prevent the display cable from breaking.
- Remove the plug of the display from the electronic insert.



To loosen the holder from the electronic insert push latch with arrow upwards.

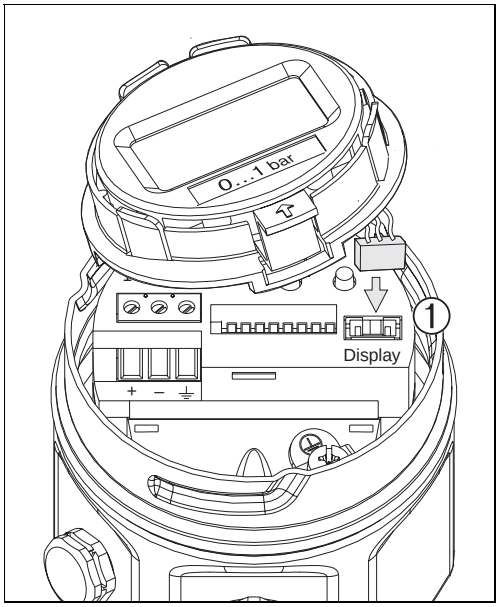


Lifting off the display with retaining ring.

fig. 7.1: left: Loosening the retaining ring
right: Removing the display

Mounting the display

- Insert the plug of the display in the jack in the electronic insert provided for this purpose and clip in ①.
- Insert the pin on the retaining ring into the hole in the electronic insert provided for this purpose ②.
- Firmly press down the retaining ring with the display onto the electronic insert. The stop makes an audible click.



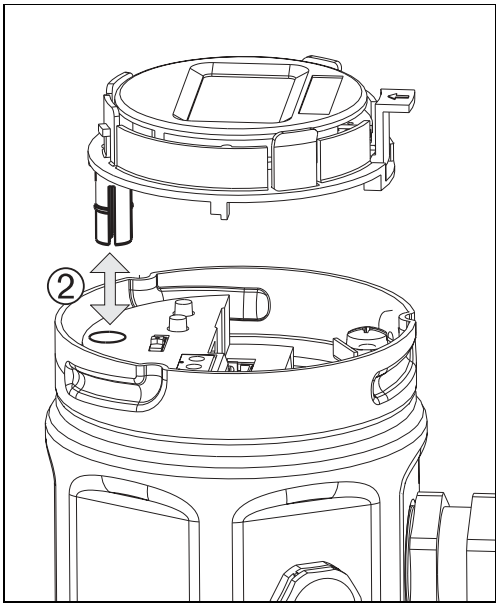


fig. 7.2: Mounting the display

7.4 Changing the electronic insert

When ordering new electronics, the electronic insert is programmed witha default set of data, i. e. the instrument will function, but with less accuracy.In order to restore the defined accuracy, the new sensor parameters should be re-entered after exchanging the electronic insert. All information on this is given in subsection "Entering sensor parameters" in this section.

Note!

Note!

After replacing the electronic insert the instrument must be recalibrated. Information on adjustment is given in section 5 "Commissioning".

Removing the electronic insert

- Where appropriate, loosen the retaining ring and lift off and remove the plug of the display from the electronic insert.
- Remove the cable from the electronic insert.
- Loosen screws ① and ② of the electronic insert.
- Lift out the electronic insert.

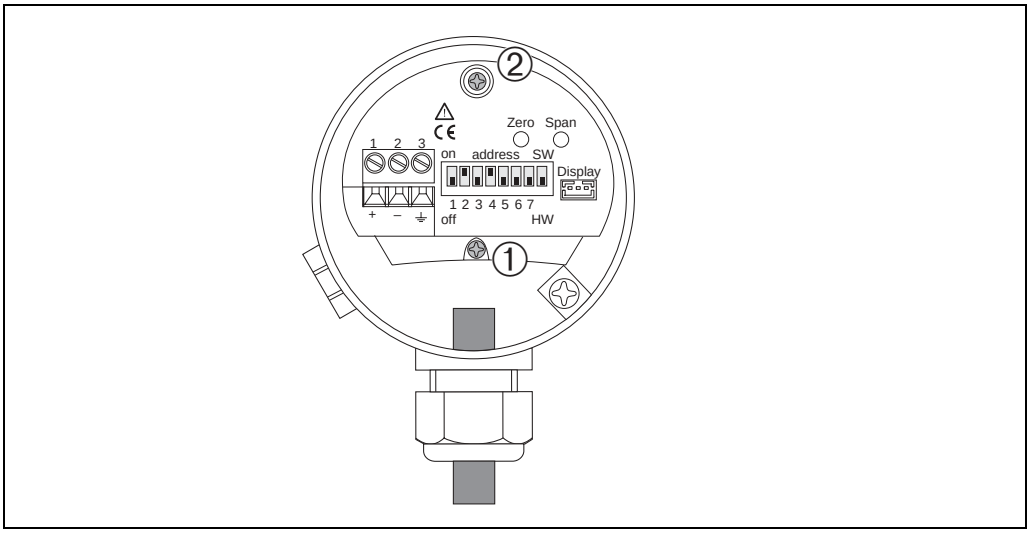


fig. 7.3: Position of screws ① and ② for removing the electronic insert

Mounting the electronic insert

- Plug in the new electronic insert and tighten screws ① and ②.
- Connect the connecting cable as shown in section 2.5 "Electrical connection".
- Carry out a calibration as shown in section 5 "Commissioning".
- Where appropriate, mount the display.

Entering sensor parameters

A sensor pass showing the sensor parameters is located in the housing of each instrument. These parameters must be changed if the electronic insert is replaced.

The following eleven pairs of values must be entered in parameter fields V2H7 and V2H8.

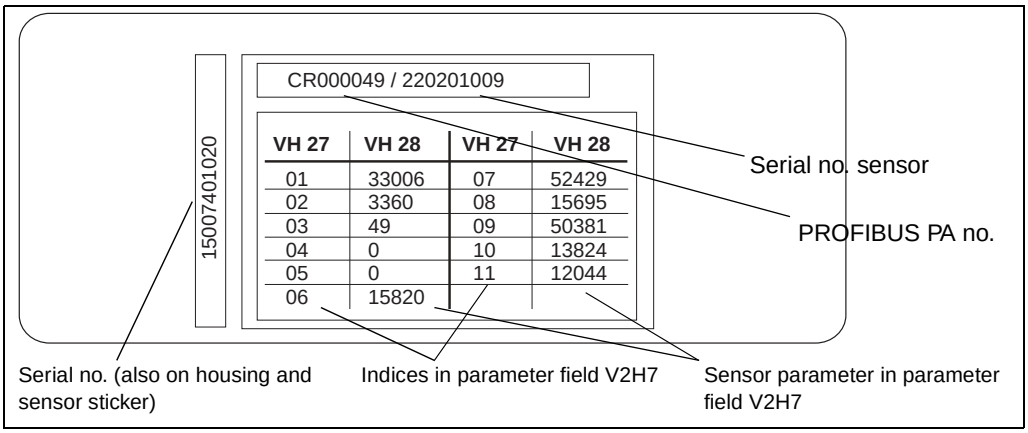


fig. 7.4: Example: sensor pass

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V2H7 Sensor Data No.	Sensor Data Value (data format)
01	Sensor check sum (Word 16)
02	Sensor serial number (HI Word 16)
03	Sensor serial number (LO Word 16)
04	Lower measurement limit (HI Word 16)
05	Lower measurement limit (LO Word 16)
06	Upper measurement limit (HI Word 16)
07	Upper measurement limit (LO Word 16)
08	Sensor coefficient A0 (HI Word 16)
09	Sensor coefficient A0 (LO Word 16)
10	Sensor coefficient A1 (HI Word 16)
11	Sensor coefficient A1 (LO Word 16)

Before entering the sensor parameters, the parameter fields V2H7 and V2H8 are released by the code 333. All other parameter fields are then blocked against unauthorised operation.

Carry out the entry procedure as follows:

#	Para.	Entry	Remarks
1	V9H9	333	Locking the parameter except V2H7 and V2H8
2	V2H7	01	Sensor Data No.
3	V2H8	e. g. 47769	Sensor check sum
4	V2H7	02	Sensor Data No.
5	Enter all other pairs of values		
6	V2H7	11	Sensor Data No.
7	V2H8	e. g. 48112	Sensor coefficient A1
8	V9H9	e. g. 130	Unlocking the parameter matrix

Note!

When entering the sensor parameters, the error code E101 "Sensor table check sum error" is shown. The error message disappears when all sensor parameters are entered correctly.

Note!

7.5 Changing the measuring cell

If the measuring cell has to be changed then Pepperl+Fuchs offers a complete housing with the new measuring cell and process connection required but without an electronic insert. Therefore, when changing the measuring cell, simply remove the electronic insert from the old housing and install it in the new one. After changing the measuring cell, the sensor parameters of the new measuring cell and the Barcon must be recalibrated.

- Ordering a housing with measuring cell and process connection:
  PPC-M□0-□□□□-□□□□-□□NA□-□□
  LHC-M20-□□□□-□□□□-□□NA□-□□
  LHC-M40-□□□□-□□□□□-□□NA□-□□
- For instructions on mounting the electronic insert and for entering sensor parameters see section 7.4 "Changing the electronic insert"
- For instructions on calibration see section 5 "Commissioning".

7.6 Changing the seal

The seal of the Barcon PPC-M10, PPC-M20, LHC-M20 can be replaced. All seals of the PPC-M10, PPC-M20, LHC-M20 can thus be interchanged as required. The different temperature limits should therefore be observed for individual materials.

Seals for PPC-M20, LHC-M20		Lower temperature limits
1	FKM, Viton	-20 °C* (-4 °F)
6	FKM, Viton oil and grease-free for oxygen use (PPC-M20 only)	-10 °C* (+14 °F)
A	FKM, Viton grease-free	-10 °C ... +60 °C (+14 °F ... +140 °F)
2	NBR	-20 °C* (-4 °F)
7	FFKM, Kalrez compound 4079	+5 °C* (+41 °F)
C	FFKM Chemraz	-10 °C* (+14 °F)
4	EPDM	-40 °C* (-40 °F)

* Upper temperature limit:
PPC-M20: + 100 °C (+212 °F)
LHC-M20: + 125 °C (+257 °F)
See also section 8, Process temperature.

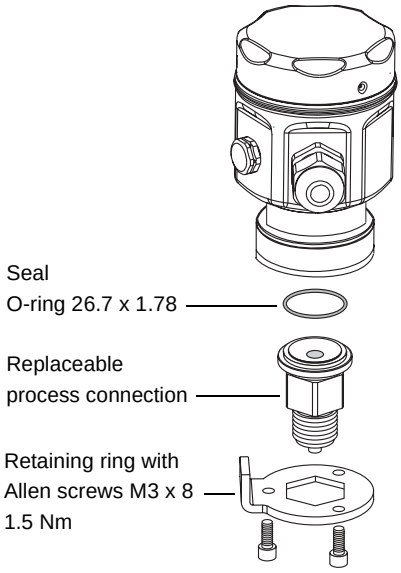
Seals for PPC-M40		Lower temperature limits
1	FKM, Viton	-20 °C** (-4 °F)
P	PTFE + Hastelloy C	-40 °C** (-40 °F)

**Upper temperature limit:
PPC-M10: + 100 °C (+212 °F)
See also section 8, Process temperature.

PPC-M20

Changing the seal PPC-M20

- Loosen the screws on the retaining ring of the process connection.
- Remove the retaining ring and process connection.
- Replace seal. The surfaces each side of the seal and the seal itself must be free from fibres and dirt.
- Secure the process connection with the retaining ring and screws.



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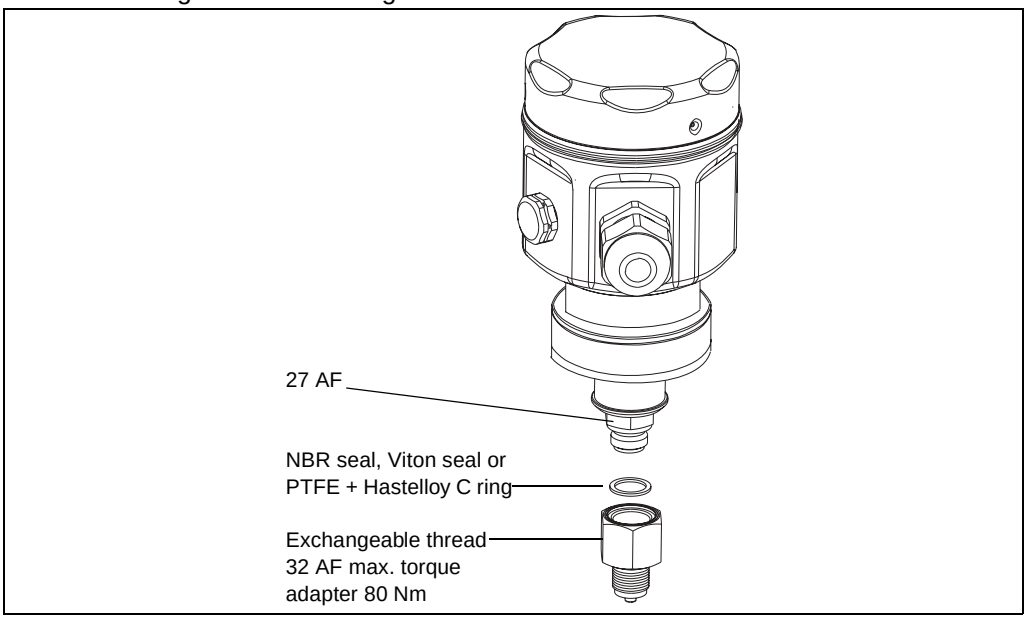
Changing the seal PPC-M10: **PPC-M10**

(only versions with exchangeable thread):

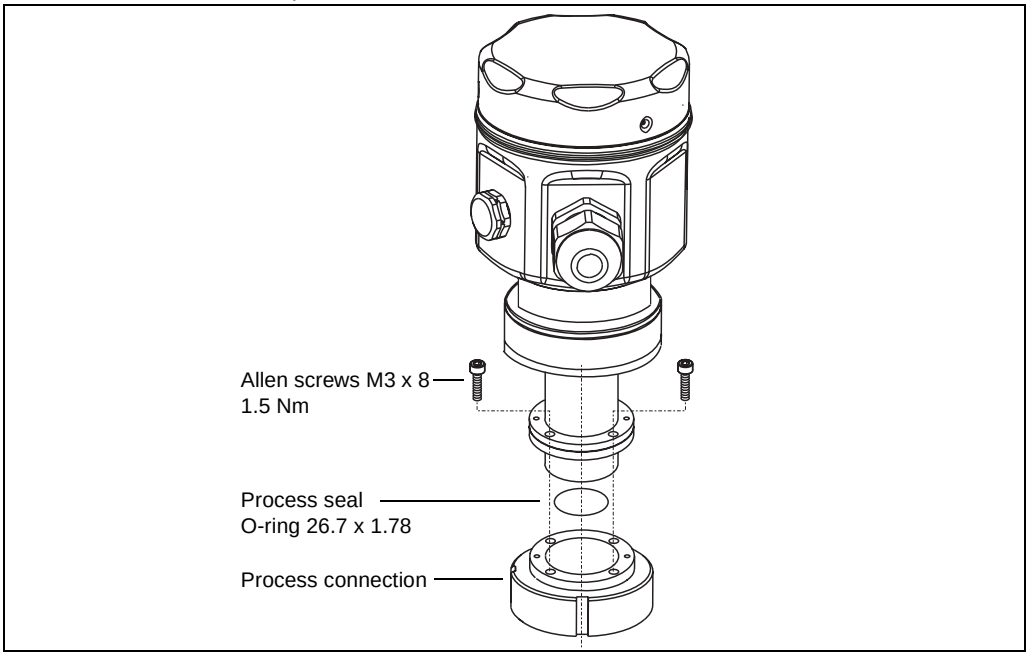
- Loose exchangeable thread.
- Replace seal. The surfaces each side of the seal and the seal itself must be free from fibres and dirt.
- Tighten the exchangeable thread.



Changing the process seal LHC-M20: **LHC-M20**

(The process seal by LHC-M20 with thread G1½, 1½ NPT or M44 x 1,25 is not changable.)

- Loosen the screws of the process connection.
- Replace process seal. The surfaces each side of the seal and the seal itself must be free from fibres and dirt.
- Secure the process connection with the screws.



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8 Technical data

General information

Manufacturer	Pepperl+Fuchs
Instrument	Pressure transmitter
Designation	PPC-M10, PPC-M20, LHC-M20, LHC-M40

Application

Measurement of absolute and gauge pressure in gases, vapours, liquids and dusts

Operation and system design

Measuring principle

Barcon PPC-M20, LHC-M20 with ceramic sensor	The pressure causes a slight deflection of the ceramic diaphragm of the sensor. The change in the capacitance is proportional to the pressure and is measured by the electrodes of the ceramic sensor. Volume of chamber: approx. 2 mm^3 (0.078 in^3)
Barcon PPC-M10, LHC-M40 with metal sensor	The process pressure acting on the metallic separating diaphragm of the sensor is transmitted via a filling fluid to a resistance bridge. The change in the output voltage of the bridge is proportional to the pressure and is then measured. Volume of chamber: smaller than 1 mm^3 (0.039 in^3)

Measuring system

PROFIBUS PA	Connection via segment coupler to PLC or PC, e. g. with **PACT**ware™ operating program
Construction	Stainless steel or aluminium housing, process connections according to European , American and Japanese standards and all common diaphragm seal version For process connections see section 8.1
Signal transmission	PROFIBUS PA: digital communication signal, 2-wire

Input

Conversion factors
1 bar = 14.5 psi
1 psi = 0.069 bar

[1] The stated overload applies to the sensor. Please also note the maximum permissible overloads to the diaphragm seals.

[2] absolut pressure sensor

Measured variables	Absolute or gauge pressure

Measuring ranges

PPC-M20, LHC-M20				PPC-M10, LHC-M40[1]			
Type of pressure	Measure-ment limits	Min. span (TD 10:1)	Overload	Type of pressure	Measure-ment limits	Min. span (TD 10:1)	Overload
	bar	bar	bar		bar	bar	bar
gauge	0 ... 0.1	0.01	4	gauge	0 ... 1	0.1	4
gauge	0 ... 0.4	0.04	7	gauge	0 ... 4	0.4	16
gauge	0 ... 1	0.1	10	gauge	0 ... 10	1	40
gauge	0 ... 4	0.4	25	gauge	0 ... 40[2]	4	160
gauge	0 ... 10	1	40	gauge	0 ... 100[2]	10	400
gauge	0 ... 40	4	60	gauge	0 ... 400[2]	40	600
gauge	-0.1 ... 0.1	0.02	4	gauge	-1 ... +1	0.2	4
gauge	-0.4 ... 0.4	0.08	7	gauge	-1 ... +4	0.5	16
gauge	-1 ... +1	0.2	10	gauge	-1 ... +10	1.0	40
gauge	-1 ... +4	0.5	25				
gauge	-1 ... +10	1.0	40				
absolute	0 ... 0.4	0.04	7	absolute	0 ... 1	0.1	4
absolute	0 ... 1	0.1	10	absolute	0 ... 4	0.4	16
absolute	0 ... 4	0.4	25	absolute	0 ... 10	1	40
absolute	0 ... 10	1	40	absolute	0 ... 40	4	160
absolute	0 ... 40	4	60	absolute	0 ... 100	10	400
				absolute	0 ... 400	40	600

Adjusting the span (Turndown)	to TD 10:1
Resistance to low pressure (vacuum resistance) PPC-M20, LHC-M20: PPC-M10, LHC-M40:	 for sensors with nominal values 0.1 bar: to 0.7 bar_{abs} for all other sensors: to 0 bar_{abs} to 10 $mbar_{abs}$
Zero point increase and decrease	Within measurement limits

PROFIBUS PA

Output

Output signal	Digital communication signal PROFIBUS PA
PA function	Slave
Transmission rate	31.25 kBit/s
Response time	Slave: approx. 20 ms PLC: 300 ... 600 ms (depending on segment coupler) for approx. 30 transmitter
Signal on alarm	Signal status bit is set, last measured value is held
Damping	0 ... 40 s via communication
Communication resistance	None, separate PROFIBUS PA termination-resistor
Physical layer	IEC 1158-2

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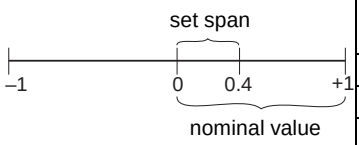
Accuracy

Explanation of terms:
Turn down (TD) =
Nominal value/set span



Example:
Nominal value = 3000 mbar
Set span = 1000 mbar
TD 3:1

Reference conditions	DIN IEC 770 T_U = 25°C (+77 °F)
Linearity including hysteresis and reproducibility (based on the limit point method to DIN IEC 770)	±0.2 % of set span
Linearity at low absolute pressure ranges (due to performance limits of currently available DKD calibration rigs)	PPC-M10, PPC-M20, LHC-M20 for ≥ 40 $mbar_{abs}$ to < 100 $mbar_{abs}$: ±0.3 % of set span
Warm-up time	1 s
Rise time	220 ms
Response time	600 ms
Long-term drift (with reference to set span)	± 0.1 % (FS) per year, ± 0.25 % per 3 years
Thermal effects (with reference to the set span) (Applies to transmitter without diaphragm seals or capillay tubes.)	For -10 ... +60 °C (+14 ... +140 °F): ± (0.2 % x TD + 0.2 %) for -40 ... -10 °C (-40 ... +14 °F) and +60 ... +85 °C (+140 ... +185 °F): ± (0.4 % x TD + 0.4 %) by medium temperature +85 ... +125 °C (+185 ... +257 °F) (LHC-M20): ± (0.6 % x TD + 0.6 %)
Temperature coefficient (maximum TK) (But not exceeding the error due to thermal effects.) (Applies to transmitter without diaphragm seals or capillay tubes.)	For zero signal and span: for -10 ... +60 °C (+14 ... +140 °F): ± 0.08% of nominal value/10 K for -40 ... -10 °C (-40 ... +14 °F) and +60 ... +85 °C (+140 ... +185 °F): ± 0.1% of nominal value/10 K by medium temperature +85 ... +125 °C (+185 ... +257 °F) (LHC-M20): ±0.12 % of nominal value/10 K
Vibration effects	None (4 mm in path peak-to-peak: 5 ... 15 Hz, 2 g: 15 ... 150 Hz, 1 g: 150 ... 2000 Hz)

Process conditions

Installation conditions	Any position, zero point shift due to position can be corrected (see "Zero point increase and decrease" in this table)

Ambient conditions

Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Ambient temperature range (short-term)	-40 ... +100 °C (-40 ... +212 °F)
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Climatic class	4K4H to DIN EN 60721-3
Protection IP66/Nema4X: IP68 (1 m water over 24 h) and Nema6P (1.8 m water over 30 min.):	 with cable gland, cable entry and Harting plug Han7D with assembled cable or M12 plug
Electromagnetic compatibility	Interference emission to EN 61326 electrical equipment B; Interference immunity to EN 61326 Annex A (industrial) and NAMUR directive NE 21, Interference influence to EMC: ≤ 0.5 % Twisted, screened pairs must be used.

Process conditions

Process temperature (PPC-M20, LHC-M20: Please also note the temperature limits of the gasket used. See section 7.6) PPC-M10, PPC-M20: LHC-M20: LHC-M40:	 -40 ... +100 °C (-40 ... +212 °F) -40 ... +125 °C (-40 ... +257 °F) (cleaning temperature: +150 °C (+302 °F) up to 60 minutes) depending on maximum permissible temperature of filling liquid of diaphragm seal and diameter of diaphragm For Ex see "Safety Instructions".
Process pressure	Corresponds to permissible overload

Mechanical construction

Design

Housing	Stainless steel (Type F15) or aluminium (Type F18) Optional electrical connection: • M20 x 1.5 cable gland • Cable entry G½, ½ NPT • Harting plug Han7D, M12 x 1 plug • permanently attached cable with reference air feed
Process connections	All common thread versions, flush-mounted connections and diaphragm seals

Materials

Housing		Stainless steal 1.4404 (AISI 316L) or cast aluminium housing with protective polyester based powder
Nameplate	stainless steel housing aluminium housing	Engraved on housing with laser 1.4301 (AISI 304)
Process connections	PPC-M10 PPC-M20 LHC-M20, LHC-M40	• 1.4435 (AISI 316L), adapter 1.4435 (AISI 316L) • 1.4435 (AISI 316L) or Hastelloy 2.4819 (C 276) • 1.4435 (AISI 316L)
Process diaphragm	PPC-M20, LHC-M20 PPC-M10 LHC-M40	• Al_2O_3 aluminium oxide ceramic (FDA conform) (PPC-M20: 96 %, LHC-M20: 99.9 %) • 1.4435 (SS 316L) • 1.4435 (AISI 316L), Hastelloy 2.4819 (C 276), tantalum, PTFE film on 1.4435 (AISI 316L)
Seals		FKM Viton, FKM Viton grease-free, FKM Viton oil and grease-free for oxygen use, EPDM, FFKM Kalrez, NBR
Mounting accessories		Bracket for pipe and wall mounting 1.4301 (AISI 304)
Filling fluid in diaphragm seals (LHC-M40)		Silicone oil, vegetable oil, glycerine, high-temperature oil, Fluorolube grease-free for oxygen use

Measuring cell

PPC-M20, LHC-M20 PPC-M10, LHC-M40	• None, dry sensor • Optional silicone oil or inert oil (Voltalef) for oxygen use, vegetable oil (FDA conform)

Display and operating interface

Display	Plug-in display module with four-character pressure display and bargraph with 28 segments
Operation on-site	• Adjusting of zero and span via two keys directly on the instrument • Key for calibrating the zero point and key for calibrating the measuring point
Communication interface	PROFIBUS PA

Power supply

Supply voltage	Non-Ex-area: 9 ... 32 V DC Ex-area: 9 ... 24 V DC (see also "Safety instructions")
Current consumption	10 mA ± 1 mA
Power up current	corresponds to table 4, IEC 1158-2

Certificates and approvals

Explosion protection	see "Notes on safety", page 6
CE mark	By attaching the CE Mark, Pepperl+Fuchs confirms that the instrument fulfils all the requirements of the relevant EC directives.

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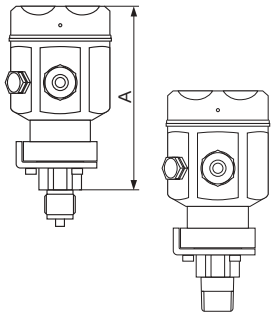
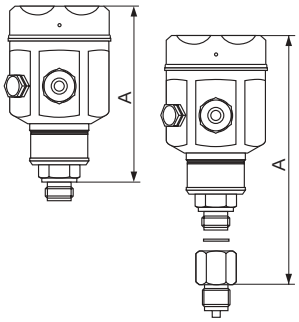
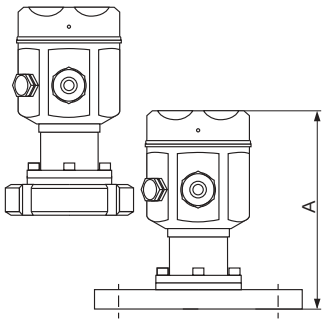
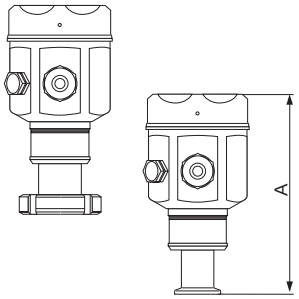
Dimensions

PPC-M20	Thread		
		max. height stainless steel housing	max. height aluminium housing
	• G½ external	155.0 mm	160.0 mm
	• G½ external, G¼ internal	155.0 mm	160.0 mm
	• G½ external, 11.4 mm internal	155.0 mm	160.0 mm
	• ½ NPT external, ¼ NPT internal	155.0 mm	160.0 mm
	• ½ NPT external, Ø11.4 mm int.	155.0 mm	160.0 mm
	• PF½ external	155.0 mm	160.0 mm
	• PT½ external	155.0 mm	160.0 mm
	• M20 x 1.5 external	155.0 mm	160.0 mm

PPC-M10	Thread		
		max. height stainless steel housing	max. height aluminium housing
	Diaphragm flush-mounted		
	• G½ external	145.0 mm	150.0 mm
	• G½ external with O-ring for welded nozzle	145.0 mm	150.0 mm
	with adapter, diaphragm internal		
	• G½ external	171.5 mm	160.5 mm
	• ½ NPT external	171.5 mm	160.5 mm
	• ½ NPT internal	185.0 mm	174.0 mm
	• PF½ external	171.5 mm	174.0 mm
	• PT½ external	171.5 mm	174.0 mm
	• M20 x 1.5 external	171.5 mm	174.0 mm

LHC-M20	Sanitary connections, threaded bosses, flanges		
		max. height stainless steel housing	max. height aluminium housing
	Sanitary connections		
	• Triclamp 2"	173.5 mm	178.5 mm
	• SMS 1½"	173.5 mm	178.5 mm
	• SMS 2"	173.5 mm	178.5 mm
	• DIN 11851, DN 40, PN 40	173.5 mm	178.5 mm
	• DIN 11851, DN 50, PN 40	173.5 mm	178.5 mm
	• DIN 11864-1-A DN 40	173.5 mm	178.5 mm
	• DIN 11864-1-A DN 50	173.5 mm	178.5 mm
	• Varivent, D = 68 mm	173.5 mm	178.5 mm
	• DRD flange, D = 65 mm	173.5 mm	178.5 mm
	• APV Inline PN 40	173.5 mm	178.5 mm
	Threaded bosses		
	• G1½	173.5 mm	178.5 mm
	• G1½	173.5 mm	178.5 mm
	• G2	173.5 mm	178.5 mm
	• 1½ NPT	173.5 mm	178.5 mm
	• 2 NPT	174.5 mm	179.5 mm
	• M44 x 1.25	173.5 mm	178.5 mm
	Flanges		
	• DIN 2527, DN 50, PN 40	173.5 mm	178.5 mm
	• DIN 2527, DN 80, PN 40	173.5 mm	178.5 mm
	• ANSI B16.5, sealing strip, 1½"	173.5 mm	178.5 mm
	• ANSI B16.5 with sealing strip, 2"	173.5 mm	178.5 mm
	• ANSI B16.5 with sealing strip, 3"	173.5 mm	178.5 mm
	• ANSI B16.5 with sealing strip, 4"	173.5 mm	178.5 mm
	• JIS B 2210, JIS 10K 50A RF	173.5 mm	178.5 mm

Dimensions
1 mm = 0.039 inch
1 inch = 25.4 mm

LHC-M40	Sanitary connections, threaded bosses		
		max. height stainless steel housing	max. height aluminium housing
	Sanitary connections		
	• Miniclamp, DN 20, PN 40	167.0 mm	172.0 mm
	• Triclamp 1"	167.0 mm	172.0 mm
	• DIN 11851, DN 25, PN 40	167.0 mm	172.0 mm
	• Varivent, D = 50 mm	167.0 mm	172.0 mm
	Threaded bosses		
	• ¾ NPT external	167.0 mm	172.0 mm
	• G1 external with metal plug for welded nozzle	167.0 mm	172.0 mm
			Dimensions 1 mm = 0.039 inch 1 inch = 25.4 mm

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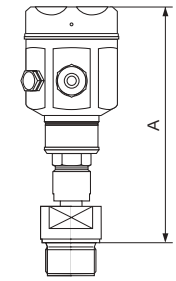
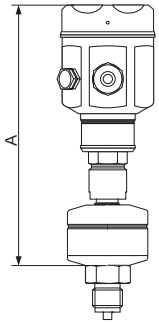
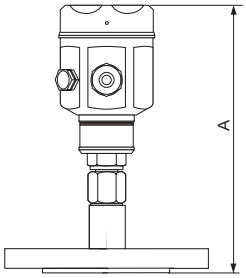
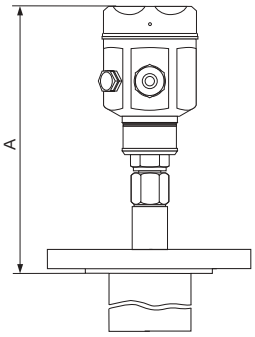
LHC-M40	Diaphragm seal, flange		
		max. height stainless steel housing	max. height aluminium housing
	Threaded boss		
	• G1½, DIN ISO 228/1, from 0.4 bar span	232.5 mm	237.5 mm
	• G2, DIN ISO 228/1, from 0.1 bar span	237.5 mm	242.5 mm
	• 1½ NPT, ANSI B 1.201, from 0.4 bar span	233.5 mm	238.5 mm
	• 2 NPT, ANSI B 1.201, from 0.1 bar span	233.5 mm	238.5 mm
	• Spacer with G½, EN 16288, Form 6kt	237.5 mm	242.5 mm
	• Spacer with ½ NPT, ANSI B 1.201	237.5 mm	242.5 mm
	Flanges, dimensions to DIN 2527		
	• DN 25, PN 64/160	255.0 mm	260.0 mm
	• DN 25, PN 250	255.0 mm	260.0 mm
	• DN 25, PN 400	255.0 mm	260.0 mm
	• DN 50, PN 10/40	255.0 mm	260.0 mm
	• DN 50, PN 64	261.0 mm	266.0 mm
	• DN 50, PN 100/160	265.0 mm	270.0 mm
	• DN 50, PN 250	273.0 mm	278.0 mm
	• DN 50, PN 400	287.0 mm	292.0 mm
	• DN 80, PN 10/40	259.0 mm	264.0 mm
	Flanges with extension, dimensions to DIN 2527		
	• DN 50, PN 10/40, Extension 50 mm	255.0 mm	300.0 mm
	• DN 80, PN 10/40, Extension 50 mm	259.0 mm	264.0 mm
	• DN 50, PN 10/40, Extension 100 mm	255.0 mm	300.0 mm
	• DN 80, PN 10/40, Extension 100 mm	259.0 mm	264.0 mm
	• DN 50, PN 10/40, Extension 200 mm	255.0 mm	260.0 mm
	• DN 80, PN 10/40, Extension 200 mm	259.0 mm	264.0 mm
	Flanges, dimensions to ANSI B16.5 with sealing strip Form RF		
	• 1", 400/600 lbs	250.5 mm	255.5 mm
	• 1", 900/1500 lbs	254.5 mm	259.5 mm
	• 1", 2500 lbs	254.5 mm	259.5 mm
	• 2", 150 lbs	254.5 mm	259.5 mm
	• 2", 300 lbs	257.5 mm	262.5 mm
	• 2", 400/600 lbs	267.0 mm	272.0 mm
	• 2", 900/1500 lbs	280.0 mm	285.0 mm
	• 2", 2500 lbs	295.0 mm	300.0 mm
	• 3", 150 lbs	254.5 mm	259.5 mm
	• 3", 300 lbs	259.0 mm	264.0 mm
	• 4", 150 lbs	259.0 mm	264.0 mm
	• 4", 300 lbs	262.5 mm	267.5 mm
	Flanges with extension, dimensions to ANSI 16.5		
	• 2", 150 lbs, extension 2"	254.5 mm	259.5 mm
	• 3", 150 lbs, extension 2"	254.5 mm	259.5 mm
	• 4", 150 lbs, extension 2"	254.5 mm	259.5 mm
	• 2", 150 lbs, extension 4"	254.5 mm	259.5 mm
	• 3", 150 lbs, extension 4"	254.5 mm	259.5 mm
	• 4", 150 lbs, extension 4"	254.5 mm	259.5 mm
	• 2", 150 lbs, extension 6"	254.5 mm	259.5 mm
	• 3", 150 lbs, extension 6"	254.5 mm	259.5 mm
	• 4", 150 lbs, extension 6"	254.5 mm	259.5 mm
			Dimensions 1 mm = 0.039 inch 1 inch = 25.4 mm

9 Parameter

9.1 Parameter PACTware™

	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
V0 Basic calibration	Measured Value	Lower Range Value	Upper Range Value	Set Lower Value	Set Upper Value	Set Bias Pressure	Bias Pressure Autom.	Set Output Damping		Select Pressure Unit
V1										
V2 Transmitter information	Diagnostic Code	Last Diagnostic Code	Software No.					Sensor Data No.	Sensor Data Value	Default Values
V3 ... V5										
V6 PROFIBUS Parameter	Manufac-turer Ident Number	Set Unit to Bus	Out Value	Out Status	2nd cyclic value	Select V0H0		Profile Version		
V7 Sensordata					Low Sensor Calibration	High Sensor Calibration	Low Sensor Limit	High Sensor Limit	Sensor Pressure	
V8										
V9 Service					Instrument Address	Zero Correction	Zero Correction Value	Unbiased Pressure	Biased Pressure	Security[1)]
VA Commu-nication	Set Tag Number	Set User Text	Serial Number	Serial No. Sensor						Device Profile

Display field

[1)] Locking: ≠ 130/2457, Unlocking: 130/2457, Release V2H7, V2H8: 333
Locking = 333, locking all parameters, except "Sensor Data No." (V2H7) and "Sensor Data Value" (V2H8).

This matrix gives a summary of factory settings.

	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
V0	---	0.0	V7H7	---	---	0.0	---	0.0		bar
V1										
V2	0	0	xxxx					1	0	0
V3 ... V5										
V6	xxxx	---	UNKNOWN	---	---			3.0		
V7					= V7H6	= V7H7	---	---	---	
V8										
V9					xxx	0.0	0.0	---	---	2457
VA	--------	--------	--------	--------						

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9.2 Parameter Analog Input Block (AI Transmitter)

	H0	H1	H2	H3	H4	H5	H6	H7	H8	H9
V0 OUT	OUT Value	OUT Status	OUT Status	OUT Sub Status	OUT Limit		Fail Safe Action	Fail Safe Value		
V1 Scaling	PV Scale Min	PV Scale Max	Type of Linearisation	OUT Scale Min	OUT Scale Max	OUT Unit	User Unit	Decimal Point OUT	Rising Time	
V2 Alarm Limits	Alarm Hysteresis									
V3 HI HI Alarm	HI HI Limit	Value	Alarm State	Switch-on Point	Switch-off Point					
V4 HI Alarm	HI Limit	Value	Alarm State	Switch-on Point	Switch-off Point					
V5 LO Alarm	LO Limit	Value	Alarm State	Switch-on Point	Switch-off Point					
V6 LO LO Alarm	LO LO Limit	Value	Alarm State	Switch-on Point	Switch-off Point					
V7 Simulation	Simulation Value	Simulation Status	Simulation Mode							
V8 Block Mode	Target Mode	Actual	Permitted	Normal		Channel		Unit Mode		
V9 Alarm Config.	Current	Disable				Static Revision				
VA Block Parameter	Set Tag Number	Strategy	Alert Key	Profile Version	Batch ID	Batch Rup	Batch Phase	Batch Operation		Device Profile

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One Company, Two Divisions.

Factory Automation Division

Product Range

- Digital and analogue sensors
- in different technologies
  - Inductive and capacitive sensors
  - Magnetic sensors
  - Ultrasonic sensors
  - Photoelectric sensors
- Incremental and absolute rotary encoders
- Counters and control equipment
- Identification Systems
- AS-Interface

Areas of Application

- Machine engineering
- Conveyor or transport
- Packaging and bottling
- Automotive industry

Process Automation Division

Product Range

- Signal conditioners
- Intrinsically safe interface modules
- Remote Process Interface (RPI)
- Intrinsically safe field bus solutions
- Level control sensors
- Process measuring and control systems engineering at the interface level
- Intrinsic safety training

Areas of Application

- Chemical industry
- Industrial and community sewage
- Oil, gas and petrochemical industry
- PLC and process control systems
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