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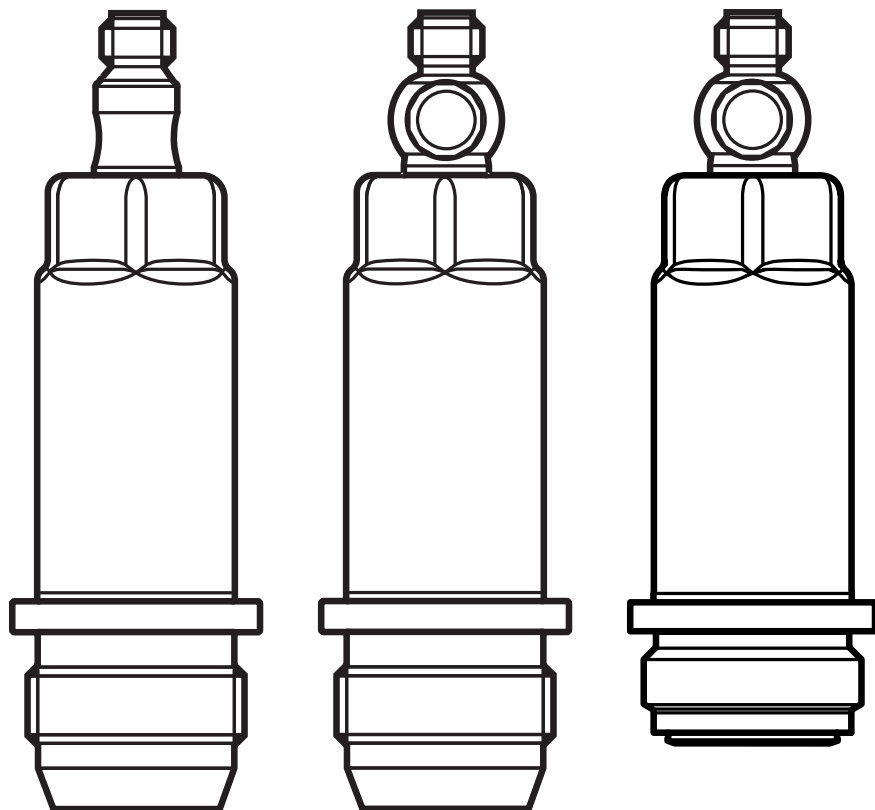
Operating instructions
Electronic pressure sensor

PM16xx

PM17xx

UK

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Contents

1	Preliminary note.....	3
1.1	Symbols used	3
2	Safety instructions	3
3	Functions and features	4
3.1	Applications	4
4	Function.....	6
4.1	Set-up via IO-Link.....	6
4.2	Scalable measuring range.....	6
4.3	Process data via IO-Link	6
4.4	Defined state in case of a fault	6
4.5	Operating modes	6
4.5.1	2-wire operation.....	7
4.5.2	3-wire operation.....	7
4.6	Analogue function	7
4.7	IO-Link	7
5	Installation.....	8
5.1	G1A Aseptoflex Vario (PM17xx).....	10
5.2	G1A sealing cone connection (PM16xx).....	10
5.3	Filter cover (not PM1602).....	11
6	Electrical connection.....	12
7	Parameter setting	13
7.1	Parameter setting via PC.....	13
7.2	Parameter setting via the memory plug.....	14
7.3	Teach offset with the teach button	14
7.4	List of the parameters	15
8	Operation	15

1 Preliminary note

1.1 Symbols used

► Instructions

> Reaction, result

[...] Designation of keys, buttons or indications

→ Cross-reference



Important note

Non-compliance may result in malfunction or interference



Information

Supplementary note

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2 Safety instructions

- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ 3 Functions and features).
- Only use the product for permissible media (→ 3.1 Applications).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.
- If the units are used in gas applications >25 bar the metal seal must be used, not an elastomer seal. Should this be the case, please contact ifm for further advice.



The operator is responsible for ensuring that the device is suitable for the application. The manufacturer assumes no liability for consequences of misuse by the operator. Improper installation and use of the devices result in a loss of the warranty claims.

3 Functions and features

The device monitors the system pressure of machines and installations.

2 outputs are available:

- OUT1: Measured pressure value via IO-Link.
More information → 4.7 and → 7.
- OUT2: Analogue signal proportional to pressure 4...20 mA.

3.1 Applications

Type of pressure: relative pressure

Order number	Measuring range		Pressure rating (max. permissible pressure) *)		Bursting pressure	
Pressure sensors with G1 Aseptoflex Vario						
	bar	psi	bar	psi	bar	psi
PM1703	-1...25	-14.6...362.6	100	1450	350	5075
PM1714	-1...16	-14.6...232	75	1085	250	3625
PM1704	-1...10	-14.5...145	50	725	150	2175
PM1715	-1...6	-14.5...87	30	435	100	1450
PM1705	-1...4	-14.5...58	30	435	100	1450
	mbar	psi	mbar	psi	bar	psi
PM1706	-125...2500	-1.82...36.26	20000	290	50	725
PM1717	-100...1600	-1.45...23.21	15000	215	40	580
PM1709	-1000...1000	-14.5...14.5	10000	145	30	435
PM1707	-50...1000	-0.73...14.5	10000	145	30	435
PM1708	-12.5...250	-0.182...3.626	10000	145	30	435
PM1789	-5...100	-0.073...1.450	4000	58	30	435

*) With static overload pressure.

MPa = (measured value in bar) ÷ 10
kPa = (measured value in bar) x 100

Order number	Measuring range		Pressure rating (max. permissible pressure) *)		Bursting pressure	
Pressure sensors with G1 A sealing cone						
	bar	psi	bar	psi	bar	psi
PM1602	-1...100	-15...1450	200	2900	650	9425
PM1603	-1...25	-14.6...362.6	100	1450	350	5075
PM1614	-1...16	-14.6...232	75	1085	250	3625
PM1604	-1...10	-14.5...145	50	725	150	2175
PM1615	-1...6	-14.5...87	30	435	100	1450
PM1605	-1...4	-14.5...58	30	435	100	1450
	mbar	psi	mbar	psi	bar	psi
PM1606	-125...2500	-1.82...36.26	20000	290	50	725
PM1617	-100...1600	-1.45...23.21	15000	215	40	580
PM1609	-1000...1000	-14.5...14.5	10000	145	30	435
PM1607	-50...1000	-0.73...14.5	10000	145	30	435
PM1608	-12.5...250	-0.182...3.626	10000	145	30	435
PM1689	-5...100	-0.073...1.450	4000	58	30	435
*) With static overload pressure.						
MPa = (measured value in bar) ÷ 10 kPa = (measured value in bar) x 100						

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Avoid static and dynamic overpressure exceeding the indicated pressure rating by taking appropriate measures.

The indicated bursting pressure must not be exceeded.

Even if the bursting pressure is exceeded only for a short time, the unit may be destroyed.

ATTENTION: Risk of injury!



Not suitable for systems that have to meet the criteria of E1.2 / 63-03 of the 3A standard 63-03.



The units are vacuum resistant. For nominal pressure ranges ≤ 300 mbar (4.35 psi), there are restrictions. Adhere to the specifications in the data sheet!

4 Function

The unit converts the system pressure into an analogue output signal (4...20 mA). Moreover, it provides the process data via IO-Link.

4.1 Set-up via IO-Link

The device parameters can be set via IO-Link:

- The device parameters are set via the IO-Link interface (→ 4.7 and → 7).
- All settings can also be carried out before installation of the unit.

4.2 Scalable measuring range

The measuring range can be scaled to up to 20% of the final value of the measuring range:

- Setting the parameter [ASP2] defines at which measured value the output signal is 4 mA.
- Setting the parameter [AEP2] defines at which measured value the output signal is 20mA.

4.3 Process data via IO-Link

All process data is available via IO-Link:

- The unit is designed for fully bidirectional communication.
- The following options are available:
 - Remote display: reading and displaying the current system pressure.
 - Remote parameter setting: reading and changing the current parameters via IO-Link parameter setting (→ 4.7).

4.4 Defined state in case of a fault

- If a fault is detected, the analogue output passes into a defined state (= 21.5 mA).



In case of a fault indication (= 21.5 mA)

► Read parameters via IO-Link or contact the manufacturer

4.5 Operating modes

The operating mode is defined by the wiring (→ 6 Electrical connection) and automatically recognised.

4.5.1 2-wire operation

OUT2 (pin 2)	Analogue signal proportional to pressure 4...20 mA
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4.5.2 3-wire operation

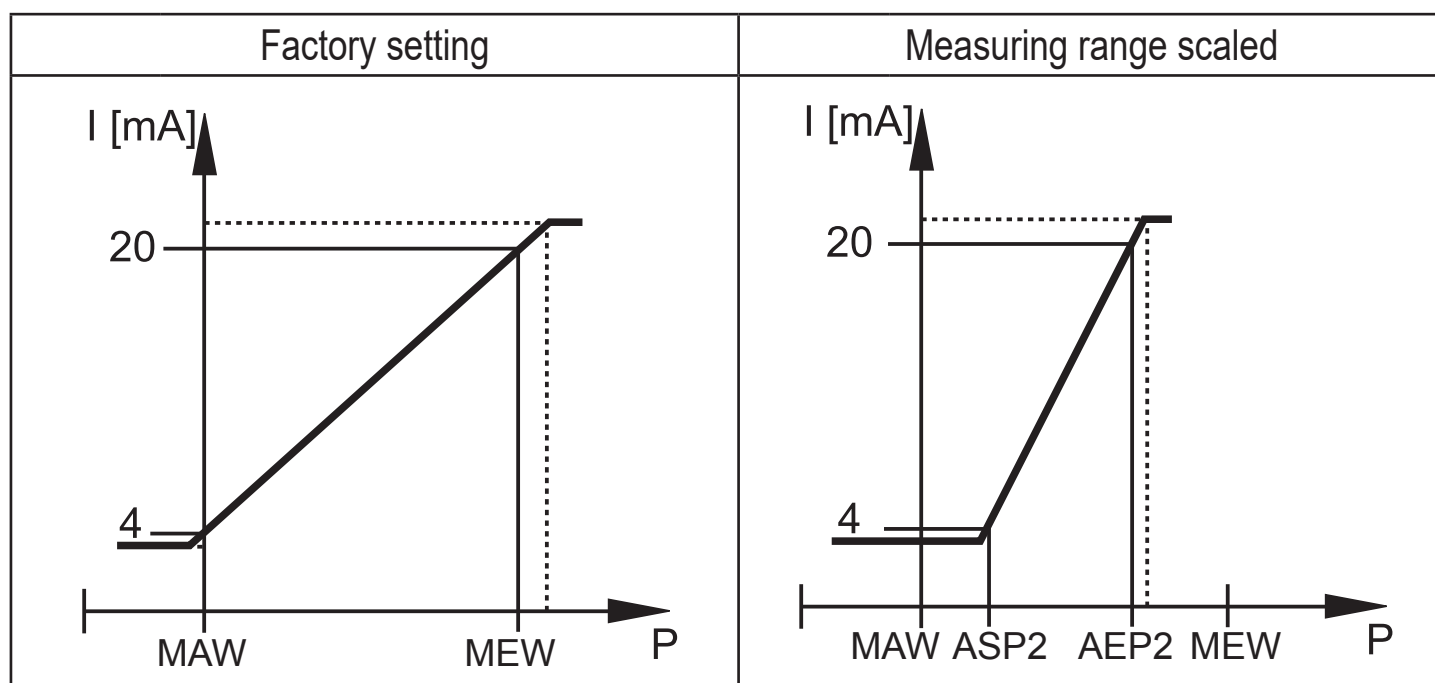
OUT1 (pin 4)	Communication via IO-Link
OUT2 (pin 2)	Analogue signal proportional to pressure 4...20 mA

4.6 Analogue function

OUT2 is an analogue output:

Minimum distance between [ASP2] and [AEP2] = 20 % of the measuring span.

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P = System pressure

MAW = Initial value of the measuring range MEW = Final value of the measuring range

ASP2 = Analogue start point [ASP2] AEP2 = Analogue end point [AEP2]

In the set measuring range, the output signal range is between 4 and 20 mA.

It is also indicated:

- System pressure above [AEP2]: 20...20.5 mA.
- System pressure below [ASP2]: 4...3.8 mA.
- Fault indication according to Namur: 21.5 mA.

4.7 IO-Link





This unit has an IO-Link communication interface which requires an IO-Link-capable module (IO-Link master) for operation.

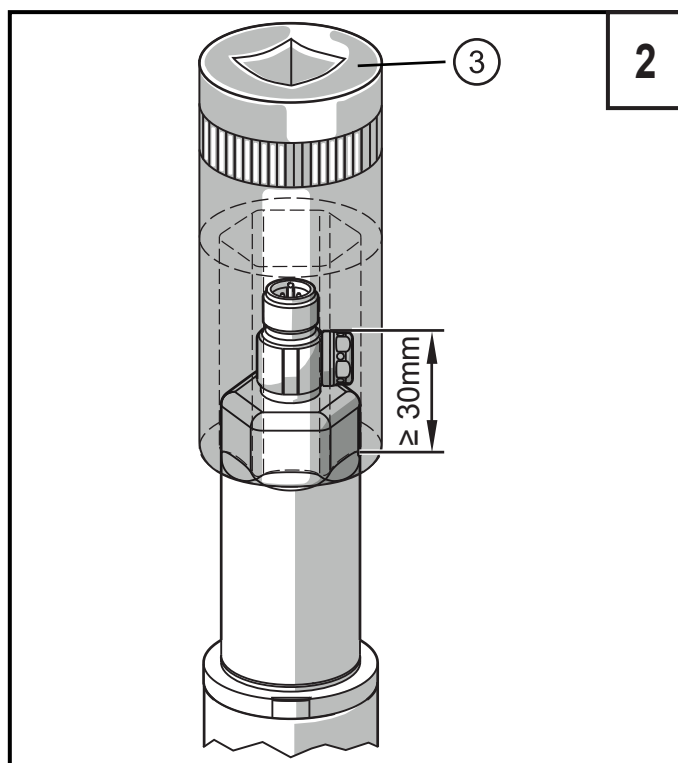
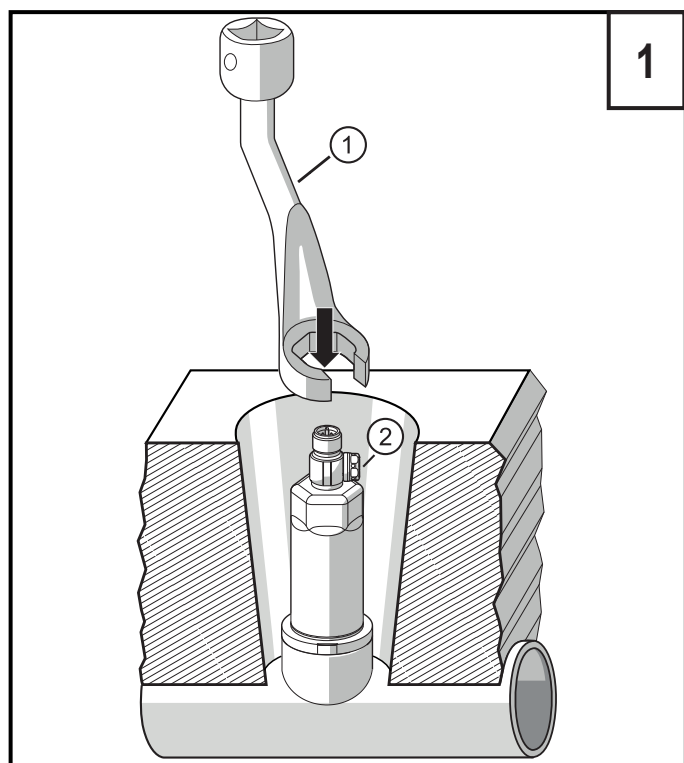
The IO-Link interface enables direct access to the process and diagnostic data and provides the possibility to set the parameters of the unit during operation.

In addition, communication is possible via a point-to-point connection with a USB adapter cable.

The IODDs necessary for the unit's configuration, detailed information about process data structure, diagnostic information, parameter addresses and the necessary information about required IO-Link hardware and software can be found at www.ifm.com.

5 Installation

-  Before installing and removing the unit: Make sure that no pressure is applied to the system.
-  In case of a recessed sensor installation, please use an open ring spanner or a hexagon socket with the corresponding inside contour.
-  During sensor installation, do not exert any axial leverage with the tool (1) on the rotatable filter cover (2) (→ Fig. 1).
-  In case of installation by means of a hexagon socket (3), make sure that the tool's spanner flat has an inner height of at least 30 mm (→ Fig. 2). Align the rotatable filter cover so that it is flush with one of the spanner flats.



- ▶ Insert the unit in a process connection.
- ▶ Tighten firmly. Recommended tightening torque:

Process connection	Tightening torque in Nm
G1A Aseptoflex Vario	35
G1A sealing cone	20
Depends on the sealing type, the pressure load and the lubrication!	



A zero-point calibration of the measured value is possible via the teach function (→ 7.3 Teach offset with the teach button)

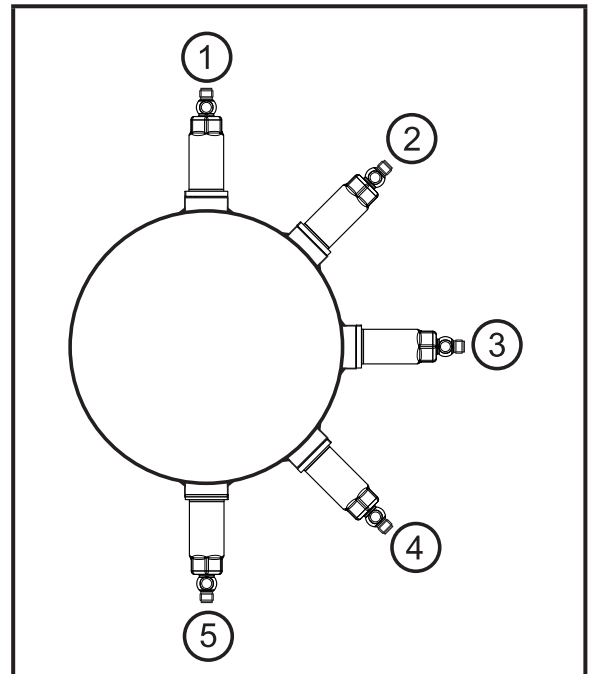
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Use in hygienic areas to 3A

Orientation of the unit in pipes and tanks

For optimised cleaning of the measuring element according to the 3A criteria for hygienic areas please take the following into account:

Do not install the unit at the lowest point of the pipe or tank (see fig., position 5) in order that the medium can run off the area of the measuring element.



Use in hygienic areas to EHEDG

- ▶ Make sure that the sensor is integrated into the system according to EHEDG. See documents of the EHEDG work group.

5.1 G1A Aseptoflex Vario (PM17xx)

The unit can be fixed to different process connections:

1	Installation using an adapter with sealing ring (order no. E332xx / E333xx)
	The adapters are supplied with EPDM O-ring (order no. E30054). More sealing rings are available as accessories: FKM O-ring (order no. E30123); PEEK sealing ring (order no. E30124). On the installation process → Installation instructions enclosed to the adapter.
2	Installation using an adapter with metal-to-metal seal
	Order no. E337xx On the installation process → Installation instructions enclosed to the adapter.
3	Installation using a welding adapter
	<ul style="list-style-type: none">• Order no. E30122• Order no. E30130; adapter with leakage port The adapters are supplied with EPDM O-ring (order no. E30054). More sealing rings are available as accessories: FKM O-ring, order no. E30123. On the installation process → Installation instructions enclosed to the adapter.
4	Installation to G 1 flange / G 1 threaded ferrule
	The sealing ring on the sensor is used as process seal. The sealing area on the process connection must be flush with the tapped hole and have a surface characteristic of min. Rz 6.3. <ul style="list-style-type: none">▶ Grease the sensor thread with a suitable paste.▶ Insert the unit into the process connection.▶ Tighten it using a spanner. Tightening torque: 35 Nm.



A guarantee for a long-term stable and maintenance-free fitting, with no bug traps in the hygienic sealing of the metal seal (Aseptoflex connection) is only valid for once-only mounting.

5.2 G1A sealing cone connection (PM16xx)

The unit can be fixed to different process connections:

1	Installation using a clamp adapter
	Order no. E3360x. On the installation process → Installation instructions enclosed to the adapter.
2	Installation using a welding adapter
	<ul style="list-style-type: none">• Order no. E30013 (Sealing: metal-to-metal)• Order no. E30072 (Sealing: with sealing ring) On the installation process → Installation instructions enclosed to the adapter.

3 Installation using an adapter G 1 to G ½

Order no. E30116

On the installation process → Installation instructions enclosed to the adapter.



A guarantee for a long-term stable and maintenance-free fitting, with no bug traps in the sealing of the metal seal is only valid for once-only mounting.

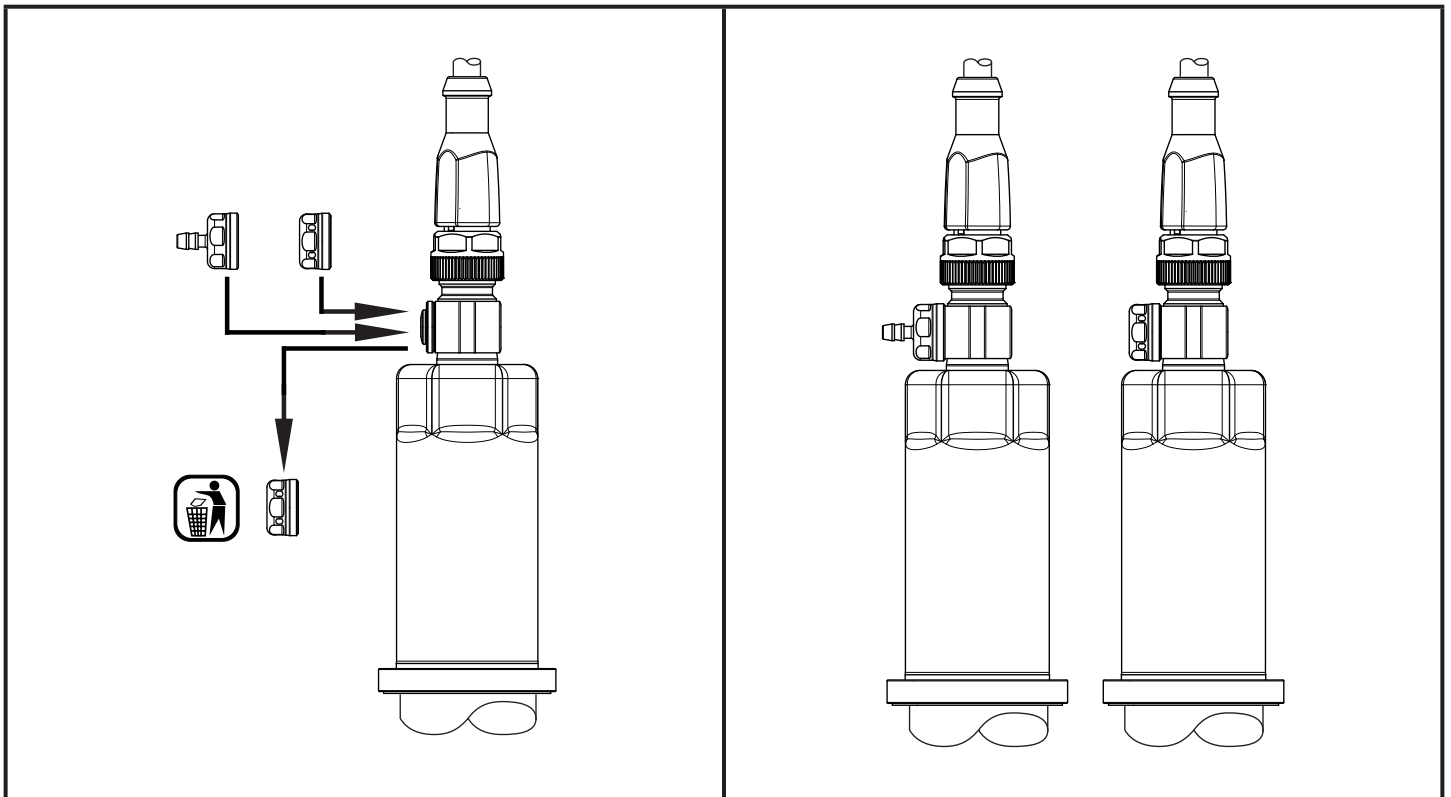
5.3 Filter cover (not PM1602)

The filter cover is freely rotatable around the sensor's axis and thus adaptable to the local operating conditions (protection against ingress of media).

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For particularly rough operating conditions, the sensor protection can be improved by using ifm accessories (not PM1602).

- The filter cover can be replaced with a cover cap with a tube fitting and a vent tube that ends in a protected and dry area.
- The filter cover can be replaced with a closed cover cap.



When using the closed cover cap, there is no pressure compensation any more of the measuring cell.

The following factors lead to a measurement deviation:

- Fluctuation of the atmospheric pressure
- Fluctuation of the internal device pressure in case of a temperature change ($\Delta 10 \text{ K} \leq 30 \text{ mbar}$).

6 Electrical connection



The unit must be connected by a qualified electrician.

The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply according to EN 50178, SELV, PELV.

- ▶ Disconnect power.
- ▶ Connect the unit as follows:

Core colours				2-wire operation			
1	BN	brown					
2	WH	white		<th colspan="2">3-wire operation</th>		3-wire operation	
3	BU	blue					
4	BK	black		<p>OUT1: Communication via IO-Link OUT2: Analogue output Colours to DIN EN 60947-5-2</p>			

Wiring example

1 x analogue	1 x analogue
1 x analogue / 1 x IO-Link	1 x IO-Link



EMC test to EN 61000-4-5 Surge: 0.5kV

7 Parameter setting



The unit can be configured via the IO-Link function.

- ▶ Prepare IO-Link hardware and software for parameter setting.
- ▶ Connect the unit with e.g. an IO-Link interface (→ 7.1) or a programmed memory plug (→ 7.2).
- ▶ Set the parameters.
- ▶ Put the unit into operation.

The parameters can be set before installation or during operation.



Changing parameters during operation can influence the function of the plant.

- ▶ Ensure that there will be no malfunctions in your plant.

7.1 Parameter setting via PC

For parameter setting, an IO-Link-capable software is necessary (e.g. LINERECORDER DEVICE).

IO-Link interfaces from ifm are available for the connection of the unit via the USB interface of a computer → www.ifm.com.

- ▶ Prepare computer, software and interface.
- ▶ Connect the unit with the IO-Link interface.
- ▶ Follow the menu of the IO-Link software.
- ▶ Set the parameters.
- ▶ Put the unit into operation.

Adjustable parameters (→ 7.4).

7.2 Parameter setting via the memory plug

A parameter set can be written to the unit / can be recorded by the unit via a memory plug (ifm storage module) → www.ifm.com.



In order to allow for data to be written from the memory plug to the sensor, the sensor must have the factory setting.



If the sensor has been configured, the memory plug records the parameter set which can then be transferred to other sensors of the same type.

- ▶ Load a suitable parameter set (e.g. from a PC or from a sensor of the same type) to the memory plug.
- ▶ Connect the memory plug between sensor and socket.
- > Sensor with factory setting: When voltage is supplied, the parameter set is transferred from the memory plug to the sensor.
- > Sensor with changed settings: When voltage is supplied, the memory plug records the sensor's parameter set.
- ▶ Remove the memory plug.
- ▶ Put the unit into operation.

Adjustable parameters (→ 7.4).

You can find more information about the memory plug in the corresponding technical documentation → www.ifm.com.

7.3 Teach offset with the teach button

An external teach button (E30425) allows for a zero-point calibration (calibration offset). The current measured value is taken as internal zero point if it lies within a range of +/- 3% of the final value of the measuring range.



For connection information see data sheet of E30425

If a teach button is connected, no IO-Link communication is possible

- ▶ Integrate the teach button between the installed sensor and the supply cable.
- ▶ Maintain the plant pressure constantly at zero (configurable range = +/- 3% of the measuring span).
- ▶ Press the button for > 2 ... < 10 s.
- > When voltage is supplied, the LED in the button flashes at 2 Hz and configures the zero point (calibration offset).
- > In case of a fault, the LED flashes at 8 Hz.

7.4 List of the parameters

Parameter	Function
ASP2	Analogue start point Measured value at which 4 mA is provided
AEP2	Analogue end point Measured value at which 20 mA is provided Minimum distance between ASP and AEP = 20 % of the measuring span
Lo	Minimum value memory for system pressure
Hi	Maximum value memory for system pressure
tcoF	Zero-point calibration (calibration offset) Compared to the real measured value, the internal measured value (operating value of the sensor) is shifted. • Teach range: - 3...+ 3 % of the measuring span
dAA	Damping for analogue output Pressure peaks of short duration or high frequency can be filtered out using this function.
dAP	Damping of the process value (only applies to IO-Link evaluation)
uni	Standard unit of measurement for system pressure

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8 Operation

After power on, the unit is in the Run mode (= normal operating mode). It carries out its measurement and evaluation functions and provides output signals according to the set parameters.

Further technical data



Further technical data and scale drawing at www.ifm.com

More information at www.ifm.com