$C \epsilon$
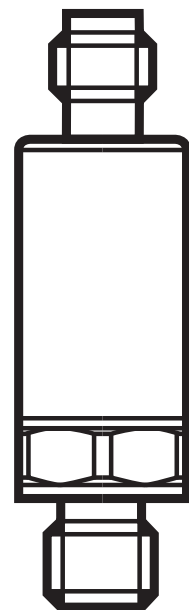
Operating instructions
Electronic pressure sensor
with integrated temperature sensor
for industrial applications

UK

PV80xx

Contents

1 Preliminary note

1.1 Symbols used

▶   Instruction

>   Reaction, result

[…]   Designation of keys, buttons or indications

→   Cross-reference

▯!   Important note
Non-compliance may result in malfunction or interference

▯ⓘ   Information
Supplementary note

⚠	**CAUTION**
	Warning of personal injury.
	Slight reversible injuries may result.

2 Safety instructions

- The device described is a subcomponent for integration into a system.

  - The manufacturer is responsible for the safety of the system.

  - The system manufacturer undertakes to perform a risk assessment and to create a documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the manufacturer of the system.

- 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 (→ Functions and features).

- Only use the product for permissible media (→ Technical data).

- 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, programming, configuration, operation and maintenance of the product must be carried out by personnel qualified and authorised for the respective activity.
- Protect units and cables against damage.

> ⚠ **CAUTION**
>
> For medium temperatures above 40 °C, parts of the unit may heat up to over 70 °C.
>
> > Risk of burns
>
> ▶ Do not touch the unit
>
> ▶ Protect the housing against contact with flammable substances and unintentional contact.

3 Functions and features

The unit measures and monitors the system pressure and the medium temperature of machines and installations.

3.1 Applications

- Medium temperature Measuring range of all sensors -40...90°C / -40...194°F
- Type of pressure: relative pressure

Order number	Measuring range		Pressure rating		Bursting pressure	
Pressure sensor with G¼ external thread						
	bar	psi	bar	psi	bar	psi
PV8060	0...600	0...8702	1500	21755	2500	36255
PV8000	0...400	0...5802	1000	14500	1700	25655
PV8001	0...250	0...3626	625	9060	1200	17400
PV8002	0...100	0...1450.5	250	3625	1000	14500
PV8023	0...60	0...870	150	2175	900	13050
PV8003	-1...25	-14.6...362.6	65	940	600	8700
PV8004	-1...10	-14.6...145.05	25	360	300	4350
MPa = (measured value in bar) ÷ 10 kPa = (measured value in bar) x 100						

	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!

	Pressure Equipment Directive (PED): The units with a pressure rating of ≤ 1000 bar comply with the Pressure Equipment Directive. They are designed for group 2 fluids and are manufactured in accordance with sound engineering practice. Use of group 1 fluids on request.

	Pressure Equipment Directive (PED): The units with a final value of the measuring range of 600 bar comply with the Pressure Equipment Directive. They are designed for group 2 fluids and are manufactured and tested according to module A. Use of group 1 fluids on request.

	The units are vacuum resistant.

	If the cable length exceeds 30 m or if used outside buildings, there is a risk of overvoltage pulses from external sources. We recommend to use the unit in protected operating environments and to limit overvoltage pulses to max. 500 V.

3.2 Use in hydraulic systems

Restrictor in the process connection:

In hydraulic systems, highly dynamic effects such as pressure peaks, cavitation etc. may arise depending on the operating conditions. To reduce these effects on the measuring element of the sensor, a diaphragm attachment is integrated into the process connection. The specific thread pitch of the diaphragm attachment has the effect of a hole of 0.3 mm.

	Please note: High viscosity may reduce the response time by some milliseconds. Heavy soiling may affect the functionality.

4 Function

- The unit generates output signals according to the operating mode and the parameter setting.
- It also provides the process data, output signals and diagnostic messages via IO-Link.

4.1 Communication, parameter setting, evaluation

OUT1 (pin 4)	• Switching signal for system pressure limit • Communication via IO-Link
OUT2 (pin 2)	• Switching signal for system pressure limit or medium temperature limit

4.2 Switching function

OUTx changes its switching status if it is above or below the set switching limits (SPx, rPx). The following switching functions can be selected:

- Hysteresis function / normally open: [ou1] / [ou2] = [Hno] ($\rightarrow$ Fig. 1).
- Hysteresis function / normally closed: [ou1] / [ou2] = [Hnc] ($\rightarrow$ Fig. 1).

  First the set point (SPx) is set, then the reset point (rPx).
   The hysteresis defined remains even if SPx is changed again.

- Window function / normally open: [ou1] / [ou2] = [Fno] ($\rightarrow$ Fig. 2).
- Window function / normally closed: [ou1] / [ou2] = [Fnc] ($\rightarrow$ Fig. 2).
  The width of the window can be set by means of the difference between FHx and FLx. FHx = upper value, FLx = lower value.
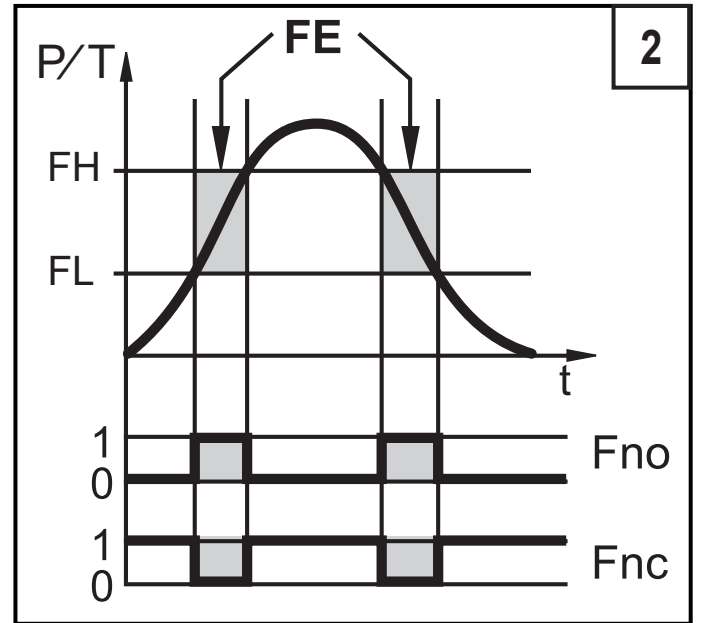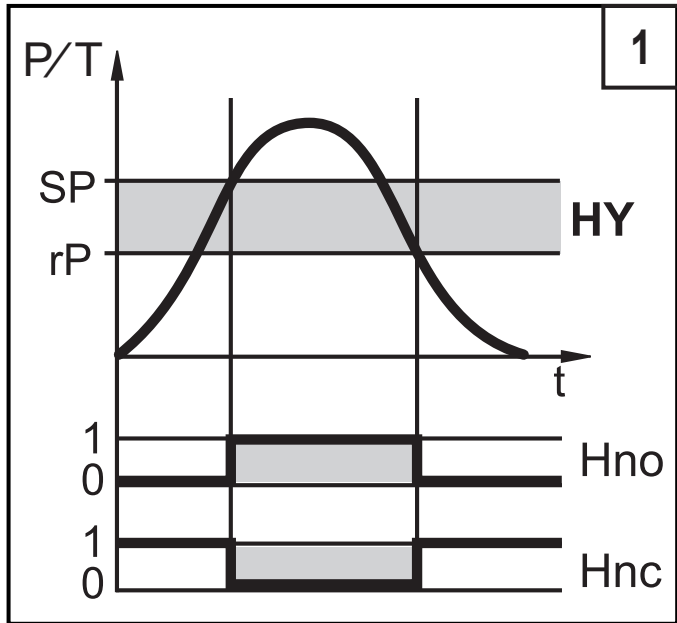
P = system pressure; T = medium temperature; HY = hysteresis; FE = window

> ⓘ When set to the window function the set and reset points have a fixed hysteresis of 0.25 % of the measuring span.

4.3 IO-Link

4.3.1 General information

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

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.

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

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

4.3.2 Functions only available via IO-Link communication

- Switching cycles counter: The switching cycles on OU1 and OU2 are counted. Both counters can be read via a sub-index and reset via a system command.

- Operating hours counter: If the sensor is in the operating mode (connected to the power supply), this counter is incremented by 1 at an interval of 60 minutes. If the power supply is interrupted during an interval, this interval will not be counted. When the connection is re-established, the interval starts again from the first minute. The operating hours counter cannot be reset.

- Device temperature: The internal temperature of the sensor can be read via the A-cyclic IO-Link channel. Measuring range: -40...95° C (-40...203° F).

- Application Specific Tag: freely definable text assigned to the unit.

- Function Tag: freely definable text describing the device function in the plant.

- Location Tag: freely definable text describing the installation location in the plant.

For detailed information, please refer to the device-specific
IO Device Description PDF at www.ifm.com.

5 Installation

⚠ Before installing and removing the unit:Make sure that no pressure is applied to the system.

▶ Insert the unit in a G¼ process connection.

▶ Tighten firmly. Recommended tightening torque:

Pressure range in bar	Tightening torque in Nm
up to 400	25...35
600	30...50
Depends on lubrication, seal and pressure load!	

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 to EN 50178, SELV, PELV.

▶ Disconnect power.

▶ Connect the unit as follows:

Core colours	
BK	black
BN	brown
BU	blue
WH	white

1 BN — L+
2 WH — OUT2
4 BK — OUT1
3 BU — L−

	OUT1: Switching output or IO-Link
	OUT2: Switching output
	Colours to DIN EN 60947-5-2

Example circuits

2 x positive switching	2 x negative switching
1 x positive switching, 1 x IO-Link	1 x negative switching, 1 x IO-Link

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7 Parameter setting

> The unit can only 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 (→ 7.3).

7.2 Parameter setting via the memory plug

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

▶ Load suitable parameter set (e.g. using a PC) to the memory plug.

▶ Connect the memory plug between sensor and socket.

> When voltage is supplied, the parameter set is transferred from the memory plug to the sensor.

▶ Remove the memory plug.

▶ Put the unit into operation.

Adjustable parameters (→ 7.3).

| ⓘ | The memory plug can also be used to save the current parameter setting of a unit and to transfer it to other units of the same type. |

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

7.3 List of parameters

Parameter	Function
SP1/rP1	Upper / lower limit for system pressure at which OUT1 switches with hysteresis setting. Requirement: OUT1 setting is [Hno] or [Hnc].
FH1/FL1	Upper / lower limit for system pressure at which OUT1 switches with window setting. Requirement: OUT1 setting is [Fno] or [Fnc].
SP2/rP2	Upper / lower limit value for system pressure or medium temperature at which OUT2 switches with hysteresis setting. Requirement: OUT2 setting is [Hno] or [Hnc].
FH2/FL2	Upper / lower limit for system pressure or medium temperature at which OUT2 switches with window setting. Requirement: OUT2 setting is [Fno] or [Fnc].
ou1	Output function for OUT1: Switching signal for the pressure limits: hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc], output off [OFF].

Parameter	Function
ou2	Output function for OUT2: Switching signal for pressure limit values or medium temperature limit values: Hysteresis function [H ..] .] or window function [F ..], either normally open [. no] or normally closed [. nc], output off [OFF].
SEL2	Standard measured variable for evaluation by OUT2: PRES (pressure) or TEMP (temperature).
uni.P	Standard unit of measurement for system pressure: [bAr] / [MPA] / [PSI]
uni.T	Standard unit of measurement for medium temperature: [°C] / [°F]
FOU1	Behaviour of output 1 in case of an internal fault
FOU2	Behaviour of output 2 in case of an internal fault
dS1 / dS2	Switch-on delay for OUT1 / OUT2
dr1 / dr2	Switch-off delay for OUT1 / OUT2
P-n	Output logic: pnp / npn
dAP	Damping of the standard measured variable pressure
Lo.P	Minimum value memory for system pressure (memory can be reset)
Hi.P	Maximum value memory for system pressure (memory can be reset)
Lo.T	Minimum value memory for medium temperature (memory can be reset)
Hi.T	Maximum value memory for medium temperature (memory can be reset)
HIPS	Setting of the pressure limit for the counter [HIPC]
HIPC	Number of times the pressure limit is exceeded [HIPS] (the limit must be exceeded for at least 0.5 s)
HITS	Setting of the temperature limit for the counter [HITC]
HITC	Number of times the temperature limit is exceeded [HITS] (the limit must be exceeded for at least 0.5 s)
coF	Zero-point calibration

For more information refer to the IODD description or the context-specific parameter descriptions of the used IO-Link software.

8 Maintenance, repair, disposal

▶ It is not possible to repair the unit.

▶ After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.

▶ In case of returns ensure that the unit is free from dangerous and toxic substances.

9 Factory setting

	Factory setting	User setting
SP1	25% MEW*	
rP1	23% MEW*	
ou1	Hno	
ou2	Hno	
SP2	75% MEW*	
rP2	73% MEW*	
SEL2	PRES	
uni.P	bar	
uni.T	°C	
dS1	0.0	
dr1	0.0	
dS2	0.0	
dr2	0.0	
P-n	PnP	
dAP	0.06	
HIPS	MEW	
HIPC	0	
HITS	MEW	
HITC	0	
coF	0	

*= The indicated percentage of the final value of the measuring range (MEW) of the corresponding sensor is set in bar.