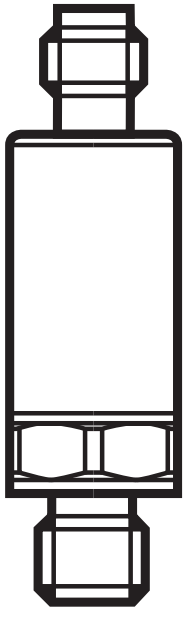
CE

Operating instructions
Electronic pressure sensor
for industrial applications

UK

PV70xx



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1 Preliminary note

Symbols used

▶ Instructions

→ 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 of the system 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, operation and maintenance of the unit must be carried out by qualified personnel authorised by the machine operator.
- 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 device monitors the system pressure of machines and installations.

3.1 Applications

- Type of pressure: relative pressure

Order number	Measuring range		Pressure rating		Bursting pressure	
Pressure sensors with G¼ external thread						
	bar	psi	bar	psi	bar	psi
PV7060	0...600	0...8700	1500	21755	2500	36255
PV7000	0...400	0...5802	1000	14500	1700	24655
PV7001	0...250	0...3626	625	9060	1200	17400
PV7002	0...100	0...1450.5	250	3625	1000	14500
PV7023	0...60	0...870	150	2175	900	13050
PV7003	-1...25	-14.6...362.6	65	940	600	8700
PV7004	-1...10	-14.6...145.05	25	360	300	4350

MPa = bar ÷ 10 / kPa = bar × 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.

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.

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 manufactured in accordance with sound engineering practice.
Use of group 1 fluids on request.

The units are vacuum resistant.

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 manufactured and tested according to Module A.
Use of group 1 fluids on request!

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 diaphraghm 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 value • Communication via IO-Link
OUT2 (pin 2)	• Switching signal for system pressure limit value

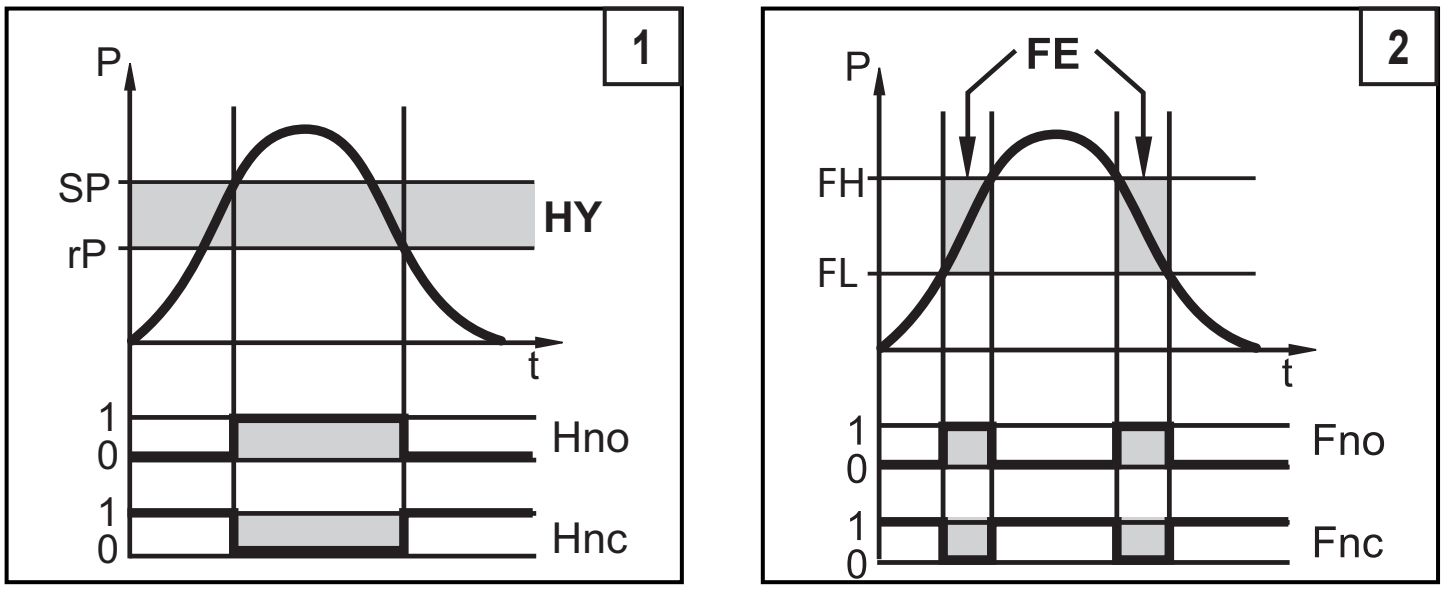
4.2 Switching function

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] (→ Fig. 1).
- Hysteresis function / normally closed: [ou1] / [ou2] = [Hnc] (→ 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] (→ Fig. 2).
- Window function / normally closed: [ou1] / [ou2] = [Fnc] (→ 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; 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

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 (→ 7).
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.

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
up to 600	30...50
Depends on lubrication, seal and pressure load!	

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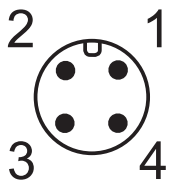
6 Electrical connection

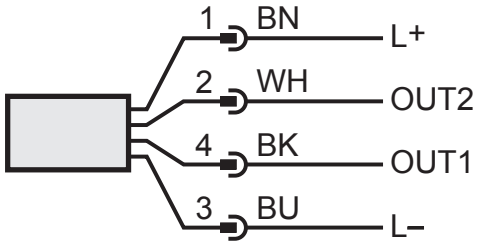
The unit must be connected by a qualified electrician.
The national and international regulations for the installation of electrical equipment must be adhered to.
Voltage supply to EN 50178, SELV, PELV.

▶ Disconnect power.

▶ Connect the unit as follows:

Core colours	
BK	black
BN	brown
BU	blue
WH	white

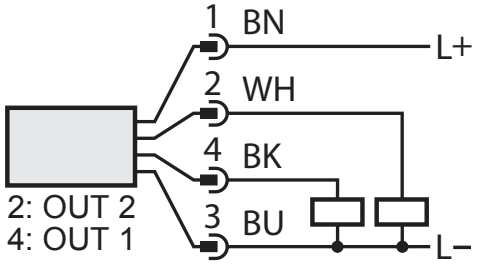




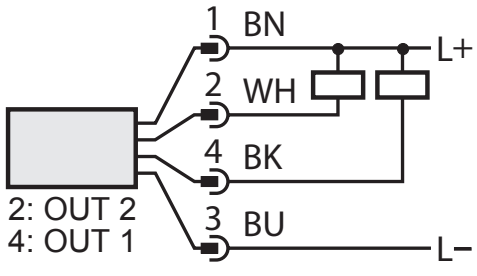
OUT1: switching output or IO-Link
OUT2: switching output
Colours to DIN EN 60947-5-2

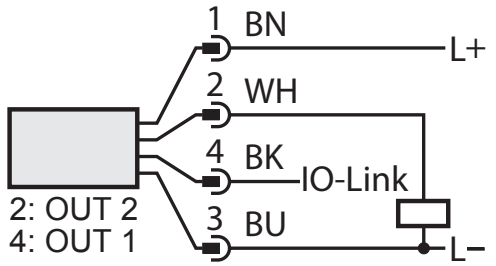
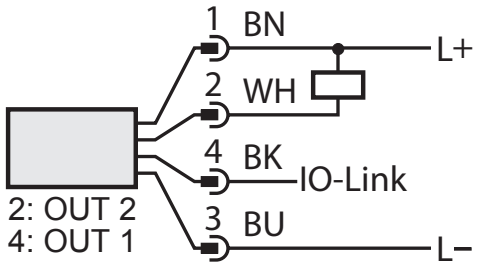
Example circuits

2 x positive switching



2 x negative switching



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

7 Parameter setting

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

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

The parameters can be set prior to installation and setup of the unit or while in operation.

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

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

7.1 Parameter setting via PC

For parameter setting an IO-Link 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 unit with 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 memory plug between sensor and socket

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

▶ Remove 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 technical documentation → www.ifm.com.

7.3 List of the parameters

Parameter	Function
SPx/rPx	Upper / lower limit for system pressure at which OUT1 switches with hysteresis setting. Prerequisite: Setting OUTx is [Hno] or [Hnc].
FHx/FLx	Upper / lower limit for system pressure at which OUTx switches with window setting. Prerequisite: OUTx setting is [Fno] or [Fnc].
ou1	Output function for OUT1: Switching signal for the pressure limit values: hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].
ou2	Output function for OUT2: Switching signal for the pressure limit values: hysteresis function [H . .] or window function [F . .] as normally open (. no) or normally closed (. nc) each.
dS1 / dS2	Switching delay for OUT1 / OUT2.
dr1 / dr2	Switch-off delay for OUT1 / OUT2.
uni	Standard unit of measurement for system pressure: [bAr] / [MPA], [PSI].
P-n	Output logic: PNP / NPN.
Lo	Minimum value memory for system pressure.

Parameter	Function
Hi	Maximum value memory for system pressure.
dAP	Damping of the switch point.
coF	Zero-point calibration
HIPS	Setting of the threshold for the overload counter
HIPC	Number of overload processes

For more information see the IODD description (→ www.ifm.com) or the context-specific parameter descriptions of the used IO-Link software.

8 Factory setting

	Factory setting	User setting
SP1	25% VMR*	
rP1	23% VMR*	
ou1	Hno	
ou2	Hno	
SP2	75% VMR*	
rP2	73% VMR*	
dS1	0.0	
dr1	0.0	
dS2	0.0	
dr2	0.0	
P-n	PnP	
dAP	0.06	
uni	bAr	
coF	0	
HIPS	VMR	
HIPC	0	

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