



Operating instructions
Electronic pressure sensor
for industrial applications

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PV2801

PV2802

PV2804

PV2404

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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.

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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.



Note on PV2404:

For these units the ventilation diaphragm used for pressure compensation of the measuring cell and the environment is closed.

When these sensors are used, a deviation of measurement caused by fluctuations of the atmospheric pressure and pressure fluctuations inside the units ($\Delta 10 \text{ K} \leq 30 \text{ mbar}$) are possible.

The use of these sensors is only recommended for applications with stable ambient temperatures or where large tolerances of precision are permissible.

► Check if the application is suitable for use without the pressure compensation being active.

3.1 Applications

- Type of pressure: relative pressure

Order number	Measuring range		Pressure rating		Bursting pressure	
Pressure sensors with G1/8 external thread						
	bar	psi	bar	psi	bar	psi
PV2801	0...250	0...3626	625	9060	1200	17400
PV2802	0...100	0...1450,5	250	3625	1000	14500
PV2804 / PV2404	-1...10	-14,6...145,05	25	360	300	4350

$$\text{MPa} = \text{bar} \div 10 / \text{kPa} = \text{bar} \times 100$$



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 comply with the Pressure Equipment Directive and are designed and manufactured for group 2 fluids in accordance with the sound engineering practice. Use of group 1 fluids on request!



The units are vacuum resistant.

3.2 Use in hydraulic systems



The PV2801 and PV2802 devices are equipped with a restrictor in the process connection.

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)	<ul style="list-style-type: none"> • Switching signal for system pressure limit value • Communication via IO-Link
OUT2 (pin 2)	<ul style="list-style-type: none"> • Switching signal for system pressure limit value

4.2 Switching function

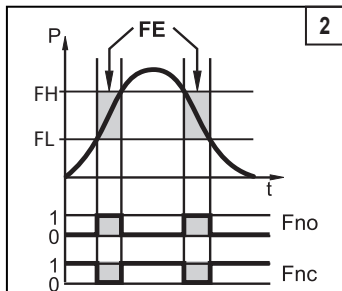
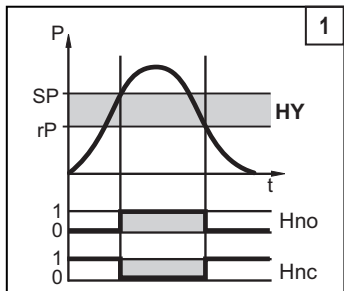
OUTx changes its switching status if it is above or below the set switching limits (SPx, rPx). The following switching functions can be selected:

- 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.

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5 Installation



Before installing and removing the unit:

Make sure that no pressure is applied to the system.

- ▶ Insert the unit in a G1/8 process connection.
- ▶ Tighten firmly. Recommended tightening torque 25...35 Nm.
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 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.

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.
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

	PV2804 / PV2404	PV2802	PV2801
SP1 [bar]	4,5	65	195
rP1 [bar]	3,5	60	190
ou1	Hno	Hno	Hno
ou2	Hnc	Hnc	Hnc
SP2 [bar]	1,9	4	4
rP2 [bar]	1,0	2	2
dS1	0,0	0,0	0,0
dr1	0,0	0,0	0,0
dS2	0,0	0,0	0,0
dr2	0,0	0,0	0,0
P-n	PnP	PnP	PnP
dAP	0,06	0,06	0,06
uni	bar	bar	bar
coF	0	0	0
HIPS	MEW	MEW	MEW
HIPC	0	0	0

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More information at www.ifm.com