



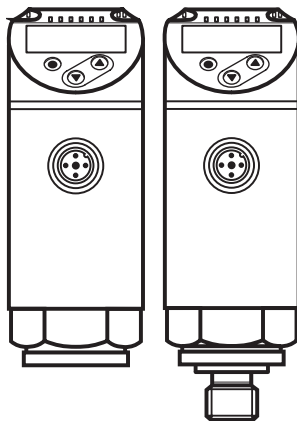
CE

Operating instructions  
Electronic pressure sensor

PN7xxx

UK

11420492 / 00 10 / 2021



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## 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

## 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 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.

## 3 Functions and features

The device monitors the system pressure of machines and installations.

## 3.1 Applications

Type of pressure: relative pressure



Information on pressure rating and bursting pressure → data sheet.



Avoid static and dynamic overpressure exceeding the specified overload pressure 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. NOTE: Risk of injury!



The units are vacuum resistant.



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!

## 4 Function

- The unit displays the current system pressure.
- It generates output signals according to the operating mode and the parameter setting.
- It moreover provides the process data via IO-Link.
- The unit is designed for fully bidirectional communication.

So the following options are possible:

- Remote display: reading and displaying the current system pressure.
- Remote parameter setting: reading and changing the current parameter setting.
- IO-Link parameter setting (→ 4.4)

## 4.1 Operating modes



The following units are only supplied with operating mode [3]: PN2x12, PN2x43, PN2x14, PN2x15. These units do not feature any other operating mode and therefore menu item [CMPT] (→ 9.2) is not available.


### Operating mode 1




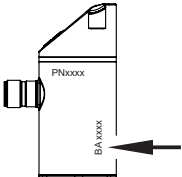
If operating mode 1 is used, note the operation instructions of the old devices, as the device functions may differ from these operating instructions. Operating instructions: → [www.ifm.com](http://www.ifm.com)


|                  |  |
|------------------|--|
| Description      | In this operating mode the sensor behaves like its previous version. The following old devices are concerned:<br>PE7002, PE7003, PE7004, PE7006, PE7009.<br>PN7000, PN7001, PN7002, PN7003, PN7004, PN7006, PN7007, PN7009, PN7060, PN7200, PN7201, PN7202, PN7203, PN7204, PN7206, PN7207, PN7209, PN7300, PN7302, PN7303, PN7304.<br>PY7000, PY7001, PY7002, PY7003, PY7100. |
| Application      | To ensure compatibility to old devices if sensors are replaced.  |
| IODD designation | IO Device Description - IODD:<br>At <a href="http://www.ifm.com">www.ifm.com</a> in the download area of the corresponding old device.   |

### Operating mode 2

|                  |  |
|------------------|--|
| Description      | Operating mode on delivery.<br> For exceptions, see note at the beginning of this chapter. |
| Application      | Standard applications.   |
| IODD designation | E.g. PN7094 Factory setting / (CMPT = 2):<br>At <a href="http://www.ifm.com">www.ifm.com</a> in the download area of the corresponding article.                              |

## Operating mode 3

|                  |   |
|------------------|---|
| Description      | <p>High IO-Link process value and parameter resolution (device-specific: see IODD suitable for the operating mode).<br/>The menu items [ou1] and [ou2] are extended by the setting option [OFF] (→ 9.4.1).<br/>IO-Link standard command "Flash on" is available (→ 4.4.2).<br/>The following IO-Link markings are available: Application Specific Tag, Function Tag and Location Tag (→ 4.4.2).</p> <p> This operating mode is available as of device status BA. For the device status see the labelling on the device.</p> <div style="text-align: center;">  </div> |
| Application      | <p>Improved controllability via IO-Link.<br/>Highly granular setting of switch-on and switch-off points.</p>  |
| IODD designation | <p>E.g. PN7094 Status_B High Resolution / (CMPT = 3):<br/>E.g. PN7012 Status_B</p> <p>At <a href="http://www.ifm.com">www.ifm.com</a> in the download area of the corresponding article.</p>  |

 Manual selection of the operating mode see (→ 9.2), selection of the operating mode via IO-Link interface see → additional document on the selection of the operating mode at [www.ifm.com](http://www.ifm.com)

## 4.2 Communication, parameter setting, evaluation

|              |   |
|--------------|---|
| OUT1 (pin 4) | <ul style="list-style-type: none"> <li>• Switching signal for system pressure limit</li> <li>• Communication via IO-Link</li> </ul> |
| OUT2 (pin 2) | <ul style="list-style-type: none"> <li>• Switching signal for system pressure limit</li> </ul>                                      |

### 4.3 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:

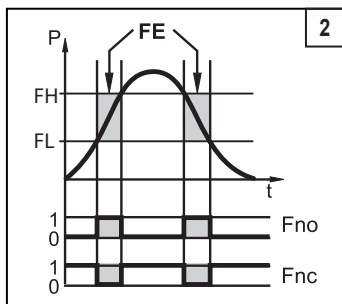
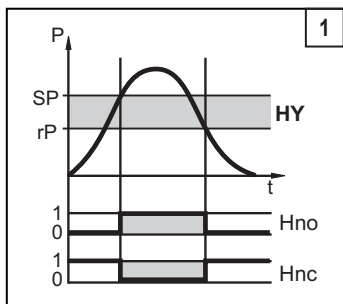
- Hysteresis function / normally open: [OUx] = [Hno] (→ fig. 1).
- Hysteresis function / normally closed: [OUx] = [Hnc] (→ fig. 1).

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: [OUx] = [Fno] (→ fig. 2).
- Window function / normally closed: [OUx] = [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.



## 4.4 IO-Link

### 4.4.1 General information

This device 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 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](http://www.ifm.com).

### 4.4.2 Functions only available via IO-Link communication

- HIPC: number of overload processes (→ 9.6.2).
- HIPS: threshold for the overload counter (→ 9.6.2).
- Flash on: via this standard command, the sensor can be localised in the plant. When the command is used, the switching status LEDs flash and "IO-L" is displayed. (Function only available in operating mode [3]).
- Application Specific Tag: freely definable text assigned to the unit.
- Function Tag: freely definable text describing the device function in the plant. (Function only available in operating mode [3]).
- Location Tag: freely definable text describing the installation location in the plant. (Function only available in operating mode [3]).

For more detailed information refer to the device-specific IO Device Description PDF at [www.ifm.com](http://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 G $\frac{1}{4}$  process connection.
- ▶ Tighten firmly. Recommended tightening torque:

| Pressure range in bar                           | Tightening torque in Nm |
|---|-------------------------|
| -1...400  | 25...35                 |
| 600   | 30...50                 |
| Depends on lubrication, seal and pressure load. |                         |

The sensor housing can be rotated by 345° with regard to the process connection.



Do not rotate past the end stop!

## 6 Electrical connection

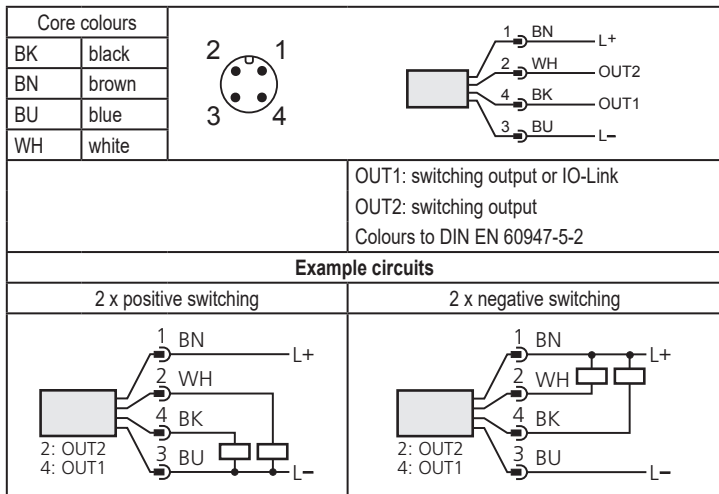


The device must be connected by a qualified electrician.

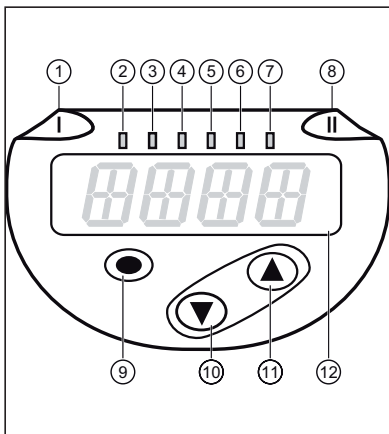
The national and international regulations for the installation of electrical equipment must be adhered to.

Voltage supply according to EN 50178, SELV, PELV.

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



## 7 Operating and display elements



### 1 to 8: Indicator LEDs

|            |   |
|------------|---|
| LED 1      | Switching status OUT1 (on if output 1 is switched).   |
| LED 8      | Switching status OUT2 (on if output 2 is switched).   |
| LEDs 2 - 7 | System pressure in the indicated unit of measurement. |

### 9: Enter button [●]

- Selection of the parameters and acknowledgement of the parameter values.

### 10 to 11: Arrow keys up [▲] and down [▼]

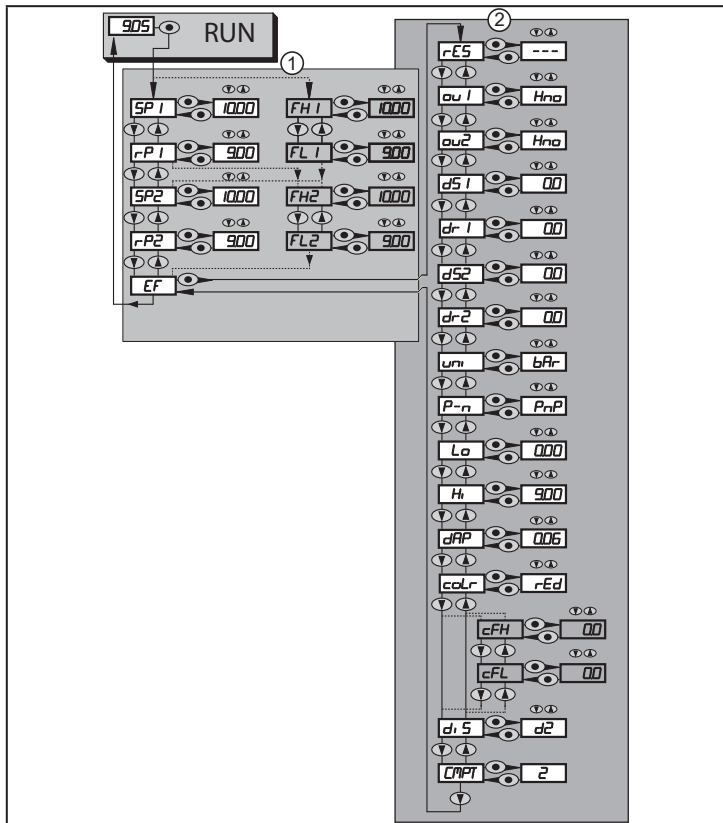
- Setting of the parameter values (scrolling by holding pressed, incrementally by pressing once).


### 12: Alphanumeric display, 4 digits


- Display of the current system pressure.
- Display of the parameters and parameter values.

# 8 Menu

## 8.1 Menu structure: main menu



 Menu items highlighted in grey, e.g. **[FH1]** are only active when assigned parameters have been selected.


 Menu item [CMPT] is not available for all articles (→ 4.1).


## 8.2 Explanation of the menu

### 8.2.1 Explanation of menu level 1

|         |  |
|---------|--|
| SPx/rPx | Upper / lower limit for system pressure at which OUTx switches with hysteresis setting. SPx/rPx is displayed if the parameter [Hno] or [Hnc] was set for OUTx in the menu Extended Functions "EF". |
| FHx/FLx | Upper / lower limit for system pressure at which OUTx switches with window setting. FHx/FLx is displayed if the parameter [Fno] or [Fnc] was set for OUTx in the menu Extended Functions "EF".     |
| EF      | Extended functions / opening of menu level 2.  |

### 8.2.2 Explanation of menu level 2

|           |  |
|-----------|--|
| rES       | Restore factory setting.   |
| ou1       | Output function for OUT1: <ul style="list-style-type: none"><li>• Switching signal for the pressure limits: hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].</li><li>• Output off [OFF] (function only available in operating mode [3]).</li></ul>   |
| ou2       | Output function for OUT2: <ul style="list-style-type: none"><li>• Switching signal for the pressure limits: hysteresis function [H . .] or window function [F . .] as normally open [. no] or normally closed [. nc] each.</li><li>• Output off [OFF] (function only available in operating mode [3]).</li></ul> |
| dS1 / dS2 | Switching delay for OUT1 / OUT2.   |
| dr1 / dr2 | Switch-off delay for OUT1 / OUT2.  |
| uni       | Standard unit of measurement for system pressure (display):<br>[bAr] / [mbar] / [MPa] / [kPa] / [PSI] / [inHG].<br> The selectable units of measurement depend on the respective unit. See table Setting ranges (→ 11.1.1).     |
| P-n       | Output logic: PnP / nPn.   |
| Lo        | Minimum value memory for system pressure.  |
| Hi        | Maximum value memory for system pressure.  |
| dAP       | Damping of the measured signal.  |
| coLr      | Assignment of the display colours "red" and "green" within the measuring range.  |
| cFH / cFL | Upper / lower value for colour change. Parameter only active after selection of a freely definable colour window in the coLr parameter: [r-cF] or [G-cF].  |
| diS       | Update rate and orientation of the display.  |

|      |  |
|------|--|
| CMPT | Selection of the operating mode<br> Menu item [CMPT] is not available for all articles (→ 4.1). |
|------|--|

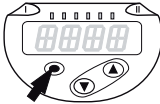


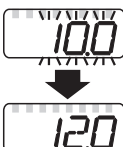

## 9 Parameter setting

During parameter setting the unit remains in the operating mode. It continues its monitoring functions with the existing parameters until the parameter setting has been completed.

### 9.1 Parameter setting in general


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3 steps must be taken for each parameter setting:

|  |  |  |
|--|--|--|
| 1  | <b>Select parameter</b><br>▶ Press [●] to get to the menu.<br><br>▶ Press [▲] or [▼] until the required parameter is displayed.  | <br>   |
| 2  | <b>Set parameter value</b><br>▶ Press [●] to edit the selected parameter.<br>▶ Press [▲] or [▼] for at least 1 s.<br>> After 1 s: setting value is changed: incrementally by pressing the button once or continuously by keeping the button pressed. | <br> |
| Numerical values are incremented continuously with [▲] or decremented with [▼].              |  |  |
| 3  | <b>Acknowledge parameter value</b><br>▶ Briefly press [●].<br>> The parameter is displayed again.<br>The new setting value is saved.   |   |
| <b>Set other parameters</b><br>▶ Press [▲] or [▼] until the required parameter is displayed. |  |  |

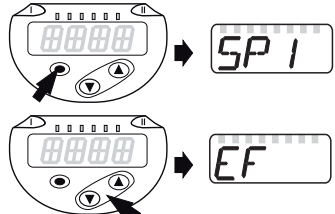
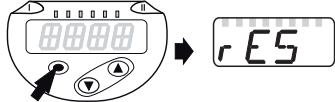
### Finish parameter setting


- ▶ Press [▲] or [▼] several times until the current measured value is displayed or wait for 30 s.
- > The unit returns to the process value display.

 If [C.Loc] is displayed when an attempt is made to modify a parameter value, an IO-Link communication is active (temporary locking).

 If [S.Loc] is displayed, the sensor is permanently locked via software. This locking can only be removed with a parameter setting software.

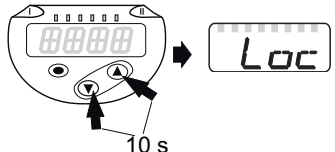
- Change from menu level 1 to menu level 2:

|  |   |
|--|---|
| <ul style="list-style-type: none"><li>▶ Press [●] to get to the menu.</li><li>▶ Press [▲] or [▼] until [EF] is displayed.</li></ul>      |  |
| <ul style="list-style-type: none"><li>▶ Press [●].</li><li>&gt; The first parameter of the submenu is displayed (here: [rES]).</li></ul> |  |

 Change from menu level 1 to menu level 2 when a parameter setting software is used:  
Activate the [EF] button.

- Locking / unlocking

The unit can be locked electronically to prevent unintentional settings.

|  |   |
|--|---|
| <ul style="list-style-type: none"><li>▶ Make sure that the unit is in the normal operating mode.</li><li>▶ Press [▲] + [▼] simultaneously for 10 s.</li><li>&gt; [Loc] is displayed.</li></ul> |  |
|--|---|

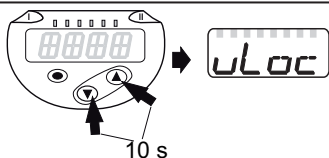


During operation: [Loc] is briefly displayed if you try to change parameter values.

For unlocking:

▶ Press [▲] + [▼] simultaneously for 10 s.

> [uLoc] is displayed.



On delivery: not locked.

• Timeout:

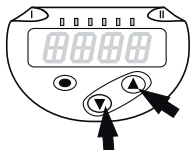
If no button is pressed for 30 s during parameter setting, the unit returns to the operating mode with unchanged values.

• Exit a parameter without applying the settings

To exit a parameter without applying the settings:

▶ Press [▲] + [▼] simultaneously.

> Return to the menu level.

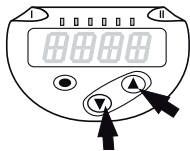


• Exit menu level

To exit the menu level:

▶ Press [▲] + [▼] simultaneously.




> Menu level 2 changes to level 1 or level 1 changes to display.





## 9.2 Define the operating mode (optional)



Menu item [CMPT] is not available for all articles (→ 4.1).



|  |             |
|--|-------------|
| <p>▶ Select [CMPT] and set the operating mode</p> <ul style="list-style-type: none"><li>- [1] = operating mode 1</li><li>- [2] = operating mode 2</li><li>- [3] = operating mode 3</li></ul> | <b>CMPT</b> |
|  Description of the operating modes see (→ 4.1)  |             |
|  When using IO-Link, an IODD suitable for the operating mode must be used.                                   |             |
|  When the operating mode is changed, all parameters are reset to factory setting.                            |             |

## 9.3 Configure display (optional)

|  |             |
|--|-------------|
| <p>▶ Select [uni] and set the unit of measurement:</p> <ul style="list-style-type: none"><li>- [bAr], [mbAr],</li><li>- [MPa], [kPa],</li><li>- [PSI],</li><li>- [inHG]</li></ul>  | <b>UNI</b>  |
|  The selectable units of measurement depend on the respective unit. See table Setting ranges (→ 11.1.1).   |             |
| <p>▶ Select [diS] and set the update rate and orientation of the display:</p> <ul style="list-style-type: none"><li>- [d1]: update of the measured values every 50 ms.</li><li>- [d2]: update of the measured values every 200 ms.</li><li>- [d3]: update of the measured values every 600 ms.</li><li>- [rd1], [rd2], [rd3]: display as for d1, d2, d3; rotated by 180°.</li><li>- [OFF] = the measured value display is deactivated in the Run mode. The LEDs remain active even if the display is deactivated. Error messages are displayed even if the display is deactivated.</li></ul> | <b>d, S</b> |
|  Even with unsteady pressure characteristics [d1] provides optimum readability; the corresponding algorithms are stored.   |             |

## 9.4 Set output signals

### 9.4.1 Set output functions

|   |             |
|---|-------------|
| <p>▶ Select [ou1] and set the switching function:</p> <ul style="list-style-type: none"><li>- [Hno] = hysteresis function/normally open,</li><li>- [Hnc] = hysteresis function/normally closed,</li><li>- [Fno] = window function/normally open,</li><li>- [Fnc] = window function/normally closed,</li><li>- [OFF] = output off.</li></ul> <p> Parameter [OFF] is only available in operating mode 3 ([CMPT] = [3]).</p> | <i>ou 1</i> |
| <p>▶ Select [ou2] and set the function:</p> <ul style="list-style-type: none"><li>- [Hno] = hysteresis function/normally open</li><li>- [Hnc] = hysteresis function/normally closed</li><li>- [Fno] = window function/normally open,</li><li>- [Fnc] = window function/normally closed,</li><li>- [OFF] = output off.</li></ul> <p> Parameter [OFF] is only available in operating mode 3 ([CMPT] = [3]).</p>             | <i>ou2</i>  |

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### 9.4.2 Set switching limits for the hysteresis function

|   |                            |
|---|----------------------------|
| <p>▶ [ou1] / [ou2] must be set as [Hno] or [Hnc].</p> <p>▶ Select [SP1] / [SP2] and set the value at which the output switches.</p>   | <i>SP 1</i><br><i>SP 2</i> |
| <p>▶ Select [rP1] / [rP2] and set the value at which the output is reset.</p> <p>rPx is always smaller than SPx. The unit only accepts values which are lower than the value for SPx.</p> | <i>rP 1</i><br><i>rP 2</i> |

### 9.4.3 Set switching limits for the window function

|  |                            |
|--|----------------------------|
| <p>▶ [ou1] / [ou2] must be set as [Fno] or [Fnc].</p> <p>▶ Select [FH1] / [FH2] and set the upper limit value.</p>   | <i>FH 1</i><br><i>FH 2</i> |
| <p>▶ Select [FL1] / [FL2] and set the lower limit value.</p> <p>FLx is always lower than FHx. The unit only accepts values which are lower than the value for FHx.</p> | <i>FL 1</i><br><i>FL 2</i> |

## 9.5 User settings (optional)

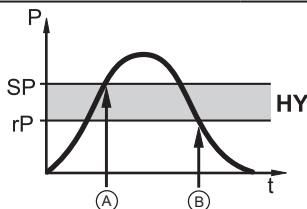
### 9.5.1 Set delay time for the switching outputs

[dS1] / [dS2] = switching delay for OUT1 / OUT2.

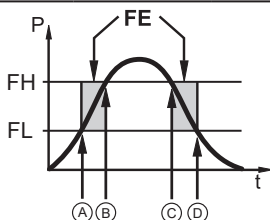
[dr1] / [dr2] = reset delay for OUT1 / OUT2.

- ▶ Select [dS1], [dS2], [dr1] or [dr2] and set a value between 0 and 50 s (at 0 the delay time is not active).

dS1  
dr1  
dS2  
dr2



|                  |    |    |
|------------------|----|----|
| Output function: | A: | B: |
| [Hno] / [Hnc]    | dS | dr |



|                  |    |    |    |    |
|------------------|----|----|----|----|
| Output function: | A: | B: | C: | D: |
| [Fno] / [Fnc]    | dS | dr | dS | dr |

P = system pressure; SP = set point; rP = reset point; HY = hysteresis;  
FE = window; FH = upper value; FL = lower value.



If operating mode 1 is used, the delay time will not behave as described here. Refer to the operating instructions of the old device for details: → [www.ifm.com](http://www.ifm.com)




For this unit the parameters [dSx] and [drx] for the set and reset points are designed strictly to the VDMA guideline.


### 9.5.2 Set output logic for the switching outputs

|  |             |
|--|-------------|
| ▶ Select [P-n] and set [PnP] or [nPn]. | <i>P--n</i> |
|--|-------------|

### 9.5.3 Set damping for the switching signal

|  |            |
|--|------------|
| ▶ Select [dAP] and set the damping constant in seconds<br>( $\tau$ value: 63 %); setting range 0.000...4.000 s.  | <i>dAP</i> |
|  Damping [dAP] affects the switch point / process data flow (IO-Link communication) and the display. |            |

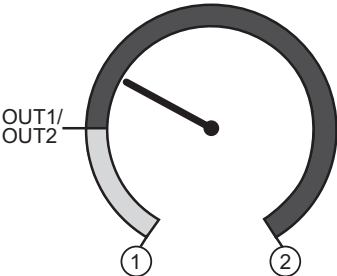
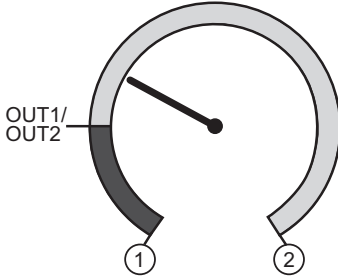
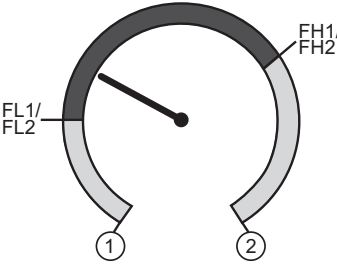
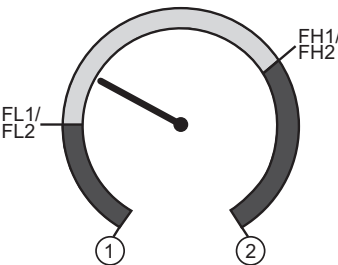


### 9.5.4 Reset all parameters to factory setting

|   |            |    |
|---|------------|----|
| ▶ Select [rES].<br>▶ Press [•].<br>▶ Press [▲] or [▼] and keep pressed until [----] is displayed.<br>▶ Briefly press [•].<br>We recommend noting down your own settings before carrying out a reset (→ 12). | <i>rES</i> | UK |
|  The operating mode [CMPT] will also be reset to the factory setting ([CMPT] = [2]).  |            |    |

## 9.5.5 Set colour change of the display

|  |             |
|--|-------------|
| <p>▶ Select [coLr] and set the function:</p> <ul style="list-style-type: none"><li>- [rEd] = display colour red (independent of the measured value).</li><li>- [GrEn] = display colour green (independent of the measured value).</li><li>- [r1ou] = display colour red when OUT1 switches.</li><li>- [G1ou] = display colour green when OUT1 switches.</li><li>- [r2ou] = display colour red when OUT2 switches.</li><li>- [G2ou] = display colour green when OUT2 switches.</li><li>- [r-12] = display colour red when the measured value is between the limit values of OUT1 and OUT2.</li><li>- [G-12] = display colour green when the measured value is between the limit values of OUT1 and OUT2.</li><li>- [r-cF] = display colour red when the measured value is between the freely definable limits [cFL]<sup>*)</sup> and [cFH]<sup>*)</sup>.</li><li>- [G-cF] = display colour green when the measured value is between the freely definable limits [cFL]<sup>*)</sup> and [cFH]<sup>*)</sup>.</li></ul> <p>*) The parameters [cFL] and [cFH] can only be selected in the menu tree if [r-cF] or [G-cF] has been activated.</p> | <i>coLr</i> |
| <p>▶ Select [cFL] and set the lower limit (only possible if [r-cF] or [G-cF] has been activated).</p> <p>&gt; The setting range corresponds to the measuring range and its maximum limit is [cFH].</p>   | <i>cFL</i>  |
| <p>▶ Select [cFH] and set the upper limit (only possible if [r-cF] or [G-cF] has been activated).</p> <p>&gt; The setting range corresponds to the measuring range and its minimum limit is [cFL].</p>   | <i>cFH</i>  |

## 9.5.6 Graphical depiction of the colour change of the display

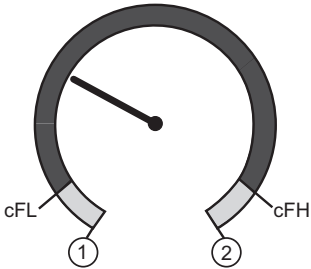
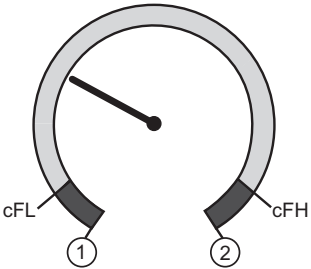
|   |   |
|---|---|
| Display colour change for the parameters <b>[r1ou] / [r2ou]</b> , mode <b>hysteresis function</b> | Display colour change for the parameters <b>[G1ou] / [G2ou]</b> , mode <b>hysteresis function</b> |
|                   |                  |
| Measured value > switch point OUT1/OUT2; display = red  | Measured value > switch point OUT1/OUT2; display = green  |
| Display colour change for the parameters <b>[r1ou] / [r2ou]</b> , mode <b>window function</b>     | Display colour change for the parameters <b>[G1ou] / [G2ou]</b> , mode <b>window function</b>     |
|                  |                 |
| Measured value between FL1/FL2 and FH1/FH2; display = red   | Measured value between FL1/FL2 and FH1/FH2; display = green                                       |
|                 | Colour change display green   |
|                 | Colour change display red   |
| 1   | Initial value of the measuring range  |
| 2   | Final value of the measuring range  |



|   |   |
|---|---|
| Display colour change for the parameter [r-12], mode <b>hysteresis function</b> | Display colour change for the parameter [G-12], mode <b>hysteresis function</b> |
|   |   |
| Measured value between OUT1 and OUT2; display = red                             | Measured value between OUT1 and OUT2; display = green                           |

|   |   |
|---|---|
| Display colour change for the parameter [r-12], mode <b>window function</b> | Display colour change for the parameter [G-12], mode <b>window function</b> |
|   |   |
| Measured value outside FL1...FH1 and FL2...FH2; display = red               | Measured value outside FL1...FH1 and FL2...FH2; display = green             |

|         |   |
|---------|---|
|         | Colour change display green                           |
|         | Colour change display red                             |
| 1       | Initial value of the measuring range                  |
| 2       | final value of the measuring range                    |
| FL1/FL2 | Lower limit value window function outputs OUT1 / OUT2 |
| FH1/FH2 | Upper limit value window function outputs OUT1 / OUT2 |



| Display colour change with parameter <b>[r-cF]</b> independent of OUT1 / OUT2.   | Display colour change with parameter <b>[G-cF]</b> independent of OUT1 / OUT2     |
|--|---|
|  |  |
| Measured value between cFL and cFH;<br>display = red                             | Measured value between cFL and cFH;<br>display = green                            |


|  |  |
|--|--|
|  | Colour change display green                      |
|  | Colour change display red                        |
| 1  | Initial value of the measuring range             |
| 2  | Final value of the measuring range               |
| cFL  | Lower limit (independent of the output function) |
| cFH  | Upper limit (independent of the output function) |

## 9.6 Diagnostic functions

### 9.6.1 Read min/max values for the system pressure

|   |                        |
|---|------------------------|
| <ul style="list-style-type: none"><li>▶ Select [Hi] or [Lo] and briefly press [•].<br/>[Hi] = maximum value, [Lo] = minimum value.<br/>Delete memory:<ul style="list-style-type: none"><li>▶ Select [Hi] or [Lo].</li><li>▶ Press [▲] or [▼] and keep pressed until [----] is displayed.</li><li>▶ Briefly press [•].</li></ul></li></ul> | <i>Hi</i><br><i>Lo</i> |
|---|------------------------|

### 9.6.2 Read overload processes

|   |                            |
|---|----------------------------|
| <ul style="list-style-type: none"><li>• HIPC: Number of overload processes<br/>HIPC counts how often the limit HIPS has been exceeded.<br/>The limit must be exceeded for at least 0.5 ms.</li><li>• HIPS: Setting of the threshold for the overload counter.</li></ul> | <i>HIPC</i><br><i>HIPS</i> |
|  The parameters HIPC and HIPS are only available via IO-Link communication.   |                            |

## 10 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.

Operation indication (→ 7 Operating and display elements).

### 10.1 Read the set parameters

- ▶ Press [•].
- ▶ Press [▲] or [▼] until the required parameter is displayed.
- ▶ Briefly press [•].
- > The unit displays the corresponding parameter value for approx. 30 s; then it changes to the process value display.

## 10.2 Self-diagnostics / fault indications

The unit has many self-diagnostic options.

- It monitors itself automatically during operation.
- Warnings and faults are displayed (even if the display is deactivated), in addition they are available via IO-Link.

| Display     | Status LED OUT1 | Status LED OUT2 | Type of fault *) | Fault / warning  | Corrective measures   |
|-------------|-----------------|-----------------|------------------|--|---|
| none        |                 |                 | F                | Supply voltage too low.  | ▶ Check / correct the supply voltage.   |
| SC flashes  | flashes         | flashes         | F                | Excessive current on switching outputs OUT1 and OUT2 **).  | ▶ Check switching outputs for short-circuit or excessive current; remove the fault.     |
| SC1 flashes | flashes         |                 | F                | Excessive current on switching output OUT1 **).  | ▶ Check switching output OUT1 for short-circuit or excessive current; remove the fault. |
| SC2 flashes |                 | flashes         | F                | Excessive current on switching output OUT2 **).  | ▶ Check switching output OUT2 for short-circuit or excessive current; remove the fault. |
| Loc         |                 |                 | W                | Parameter setting locked via pushbuttons.  | ▶ Unlock buttons (→ 9.1 Parameter setting in general) → "Locking / unlocking".          |
| C.Loc       |                 |                 | W                | Parameter setting locked via pushbuttons, parameter setting is active via IO-Link communication (→ 9.1). | ▶ Wait until parameter setting via IO-Link is finished.                                 |
| S.Loc       |                 |                 | W                | Setting buttons locked via parameter software. Parameter change is rejected (→ 9.1).                     | ▶ Unlocking only possible via IO-Link interface/parameter setting software.             |
| OL          |                 |                 | W                | Process value too high (measuring range exceeded).   | ▶ Check / reduce system pressure / select unit with corresponding measuring range.      |

| Display     | Status LED OUT1 | Status LED OUT2 | Type of fault *) | Fault / warning                                      | Corrective measures  |
|-------------|-----------------|-----------------|------------------|--|--|
| UL          |                 |                 | W                | Process value too low (value below measuring range). | ► Check / increase system pressure / select unit with corresponding measuring range. |
| Err flashes |                 |                 | F                | Internal fault / malfunction.                        | ► Contact the manufacturer.  |

\*) F = fault

W = warning

\*\*) The output remains deactivated as long as the excessive current / short circuit continues.

## 11 Technical data

### 11.1 Setting ranges



The setting ranges depend on the operating mode (→ 4.1).

#### 11.1.1 Setting ranges in operating mode 2

|                                |     | rP / SP       |               | cFL / cFH     |               | ΔP  |
|--------------------------------|-----|---------------|---------------|---------------|---------------|-----|
|                                |     | Setting range | Min. distance | Setting range | Min. distance |     |
| <b>PN7160</b><br><b>PN7560</b> | bar | 2...600       | 2             | 0...600       | 2             | 2   |
|                                | psi | 20...8700     | 40            | 0...8700      | 40            | 20  |
|                                | MPa | 0.2...60      | 0.2           | 0...60        | 0.2           | 0.2 |
| <b>PN7070</b><br><b>PN7570</b> | bar | 2...400       | 2             | 0...400       | 2             | 2   |
|                                | psi | 20...5800     | 40            | 0...5800      | 40            | 20  |
|                                | MPa | 0.2...40      | 0.2           | 0...40        | 0.2           | 0.2 |
| <b>PN7071</b><br><b>PN7571</b> | bar | 1...250       | 2             | 0...250       | 2             | 1   |
|                                | psi | 20...3620     | 20            | 0...3620      | 20            | 20  |
|                                | MPa | 0.1...25      | 0.2           | 0...25        | 0.2           | 0.1 |

ΔP = step increment

|                          |      | rP / SP       |               | cFL / cFH     |               | ΔP    |
|--------------------------|------|---------------|---------------|---------------|---------------|-------|
|                          |      | Setting range | Min. distance | Setting range | Min. distance |       |
| <b>PN7092<br/>PN7592</b> | bar  | 0.5...100     | 0.5           | 0...100       | 0.5           | 0.5   |
|                          | psi  | 5...1450      | 10            | 0...1450      | 10            | 5     |
|                          | MPa  | 0.05...10     | 0.05          | 0...10        | 0.05          | 0.05  |
| <b>PN7093<br/>PN7593</b> | bar  | 0.1...25      | 0.2           | 0...25        | 0.2           | 0.1   |
|                          | psi  | 2...362       | 2             | 0...362       | 2             | 2     |
|                          | MPa  | 0.01...2.5    | 0.02          | 0...2.5       | 0.02          | 0.01  |
| <b>PN7094<br/>PN7594</b> | bar  | -0.95...10    | 0.05          | -1...10       | 0.05          | 0.05  |
|                          | psi  | -14...145     | 1             | -14.5...145   | 1             | 0.5   |
|                          | MPa  | -0.095...1    | 0.005         | -0.1...1      | 0.005         | 0.005 |
| <b>PN7096<br/>PN7596</b> | bar  | 0.01...2.5    | 0.02          | 0...2.5       | 0.02          | 0.01  |
|                          | psi  | 0.2...36.2    | 0.2           | 0...36.2      | 0.2           | 0.2   |
|                          | kPa  | 1...250       | 2             | 0...250       | 2             | 1     |
| <b>PN7097<br/>PN7597</b> | mbar | 5...1000      | 5             | 0...1000      | 5             | 5     |
|                          | psi  | 0.05...14.5   | 0.1           | 0...14.5      | 0.1           | 0.05  |
|                          | kPa  | 0.5...100     | 0.5           | 0...100       | 0.5           | 0.5   |
|                          | inHG | 0.1...29.5    | 0.2           | 0...29.5      | 0.2           | 0.1   |
| <b>PN7099<br/>PN7599</b> | mbar | -990...1000   | 10            | -1000...1000  | 10            | 10    |
|                          | psi  | -14.4...14.5  | 0.2           | -14.5...14.5  | 0.2           | 0.1   |
|                          | kPa  | -99...100     | 1             | -100...100    | 1             | 1     |
|                          | inHG | -29.4...29.6  | 0.4           | -29.6...29.6  | 0.4           | 0.2   |

ΔP = step increment

### 11.1.2 Setting ranges in operating mode 3

|                          |     | rP / SP       |               | cFL / cFH     |               | ΔP  |
|--------------------------|-----|---------------|---------------|---------------|---------------|-----|
|                          |     | Setting range | Min. distance | Setting range | Min. distance |     |
| <b>PN7160<br/>PN7560</b> | bar | 2...600       | 2             | 0...600       | 2             | 1   |
|                          | psi | 26...8702     | 21            | 0...8702      | 27            | 1   |
|                          | MPa | 0,2...60      | 0,2           | 0...60        | 0,2           | 0,1 |

ΔP = Schrittweite

|                          |     | rP / SP       |               | cFL / cFH     |               | $\Delta P$ |
|--------------------------|-----|---------------|---------------|---------------|---------------|------------|
|                          |     | Setting range | Min. distance | Setting range | Min. distance |            |
| <b>PN7070<br/>PN7570</b> | bar | 1...400       | 2             | 0...400       | 2             | 1          |
|                          | psi | 20...5802     | 30            | 0...5802      | 30            | 1          |
|                          | MPa | 0,1...40      | 0,2           | 0...40        | 0,2           | 0,1        |
| <b>PN7071<br/>PN7571</b> | bar | 1...250       | 2             | 0...250       | 2             | 1          |
|                          | psi | 12...3626     | 19            | 0...3626      | 19            | 1          |
|                          | MPa | 0,1...25      | 0,2           | 0...25        | 0,2           | 0,1        |
| <b>PN7012<br/>PN7512</b> | bar | 0,5...160     | 0,8           | 0...160       | 0,8           | 0,1        |
|                          | psi | 7...2321      | 12            | 0...2321      | 12            | 1          |
|                          | MPa | 0,05...16     | 0,08          | 0...16        | 0,08          | 0,01       |
| <b>PN7092<br/>PN7592</b> | bar | 0,3...100     | 0,5           | 0...100       | 0,5           | 0,1        |
|                          | psi | 5...1450      | 8             | 0...1450      | 8             | 1          |
|                          | MPa | 0,03...10     | 0,05          | 0...10        | 0,05          | 0,01       |
| <b>PN7043<br/>PN7543</b> | bar | 0,1...40      | 0,2           | 0...40        | 0,2           | 0,1        |
|                          | psi | 2...580       | 3             | 0...580       | 3             | 1          |
|                          | MPa | 0,012...4     | 0,02          | 0...4         | 0,02          | 0,001      |
| <b>PN7093<br/>PN7593</b> | bar | 0,1...25      | 0,2           | 0...25        | 0,2           | 0,1        |
|                          | psi | 1...363       | 2             | 0...363       | 2             | 1          |
|                          | MPa | 0,01...2,5    | 0,02          | 0...2,5       | 0,02          | 0,01       |
| <b>PN7014<br/>PN7514</b> | bar | -0,95...16    | 0,08          | -1...16       | 0,08          | 0,01       |
|                          | psi | -13,8...232,1 | 1,2           | -14,5...232,1 | 1,2           | 0,1        |
|                          | MPa | -0,095...1,6  | 0,008         | -0,1...1,6    | 0,008         | 0,001      |
| <b>PN7094<br/>PN7594</b> | bar | -0,97...10    | 0,05          | -1...10       | 0,05          | 0,01       |
|                          | psi | -14...145     | 0,8           | -14,5...145   | 0,8           | 0,1        |
|                          | MPa | -0,097...1    | 0,005         | -0,1...1      | 0,005         | 0,001      |
| <b>PN7015<br/>PN7515</b> | bar | -0,98...6     | 0,03          | -1...6        | 0,03          | 0,001      |
|                          | psi | -14,2...87    | 0,5           | -14,5...87    | 0,5           | 0,1        |
|                          | kPa | -98...600     | 3             | -100...600    | 3             | 1          |

$\Delta P$  = Schrittweite

|                                |      | rP / SP       |               | cFL / cFH     |               | $\Delta P$ |
|--------------------------------|------|---------------|---------------|---------------|---------------|------------|
|                                |      | Setting range | Min. distance | Setting range | Min. distance |            |
| <b>PN7096</b><br><b>PN7596</b> | bar  | 0,01...2,5    | 0,02          | 0...2,5       | 0,02          | 0,01       |
|                                | psi  | 0,1...36,3    | 0,2           | 0...36,3      | 0,2           | 0,1        |
|                                | kPa  | 1...250       | 2             | 0...250       | 2             | 1          |
| <b>PN7097</b><br><b>PN7597</b> | mbar | 3...1000      | 5             | 0...1000      | 5             | 1          |
|                                | psi  | 0,05...14,5   | 0,08          | 0...14,5      | 0,08          | 0,01       |
|                                | kPa  | 0,3...100     | 0,5           | 0...100       | 0,5           | 0,1        |
|                                | inHG | 0,1...29,5    | 0,2           | 0...29,5      | 0,2           | 0,1        |
| <b>PN7099</b><br><b>PN7599</b> | mbar | -993...1000   | 10            | -1000...1000  | 10            | 1          |
|                                | psi  | -14,4...14,5  | 0,2           | -14,5...14,5  | 0,2           | 0,1        |
|                                | kPa  | -99...100     | 1             | -100...100    | 1             | 1          |
|                                | inHG | -29,3...29,5  | 0,3           | -29,5...29,5  | 0,3           | 0,1        |

$\Delta P$  = Schrittweite

## 11.2 Further technical data



Further technical data and scale drawing at: [www.ifm.com](http://www.ifm.com).

## 12 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 / mbAr      |              |
| colr    | rEd             |              |
| diS     | d2              |              |
| cFH     | VMR             |              |
| cFL     | MAW             |              |
| HIPS**  | VMR             |              |
| CMPT*** | 2               |              |

VMR final value of the measuring range, (MAW) initial value of the measuring range

\* = The indicated percentage of the final value of the measuring range (VMR) of the respective sensor (for PN7xx9 the percentage of the measuring span) is set.

\*\* = HIPS is only available via IO-Link communication.

\*\*\* = Menu item [CMPT] is not available for all articles (→ 4.1).

More information at [www.ifm.com](http://www.ifm.com)



