



Pressure switches

Hydraulic-electric signal converter with IO-Link, 2 switching outputs / 1 analogue output, and optional teach-in function



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1 Description

These pressure switches measure the pressure in hydraulic systems and convert it into electrical signals.

All devices are provided with 2 outputs. While output 1 is a freely programmable switching output, output 2 can be selected as analogue output, switching output or alarm output.

The switching and reset points, the output logic and time delays can be programmed with the push-buttons. In addition, the pressure switches can be configured via the IO-Link.

Display and analogue output are equipped with adjustable damping for dynamic measurements.

1.1 Function

The device display shows the current system pressure.

- It generates output signals that correspond to the operating mode and parameter settings.
- It also makes the process data available via the IO-Link.
- The device is designed for full bidirectional communication.

This provides the following options:

- Remote display: Read and display the current system pressure.
- Remote parameter setting: Read and change the current parameter settings.
- IO-Link parametrisation.

1.2 Communication, configuration, evaluation

OUT1 (PIN4)	• Switching signal for system pressure limit • Communication via IO-Link
OUT2 (PIN2)	• Switching signal for system pressure limit • Analogue signal 4...20 mA/ 0 to 10 V

1.3 Switching function

OUTx changes its switching status when the set switching limits (SPx, rPx) are exceeded or undershot. The following switching functions can be selected:

- Hysteresis function / interlock: [ou1/ou2] = [Hno] (→ Fig. 1).
- Hysteresis function / break contact: [ou1/ou2] = [Hnc] (→ Fig. 1).

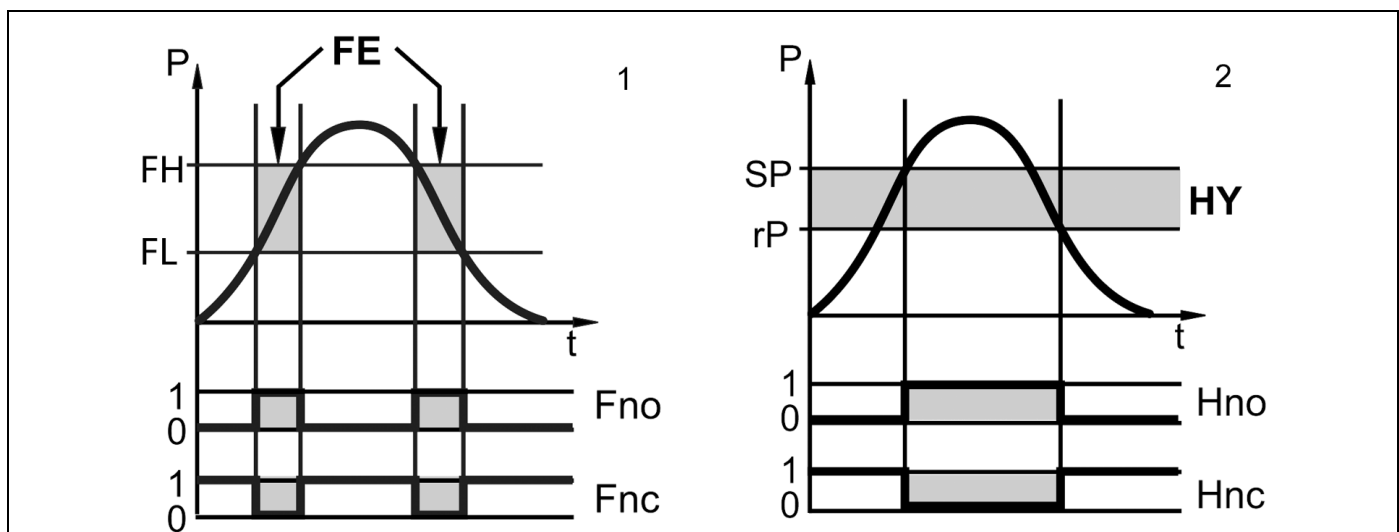
For pressure switch 9740079 only

First, the switching point (SPx) is set, then the return point (rPx). The hysteresis defined in this way is retained even if SPx is changed again.

- Window function / interlock: [ou1/ou2] = [Fno] (→ Fig. 2).
- Window function / break contact: [ou1/ou2] = [Fnc] (→ Fig. 2).

The width of the window can be adjusted by changing the distance between FHx and FLx.

FHx = upper value, FLx = lower value.



P System pressure	HY Hysteresis	FE Window
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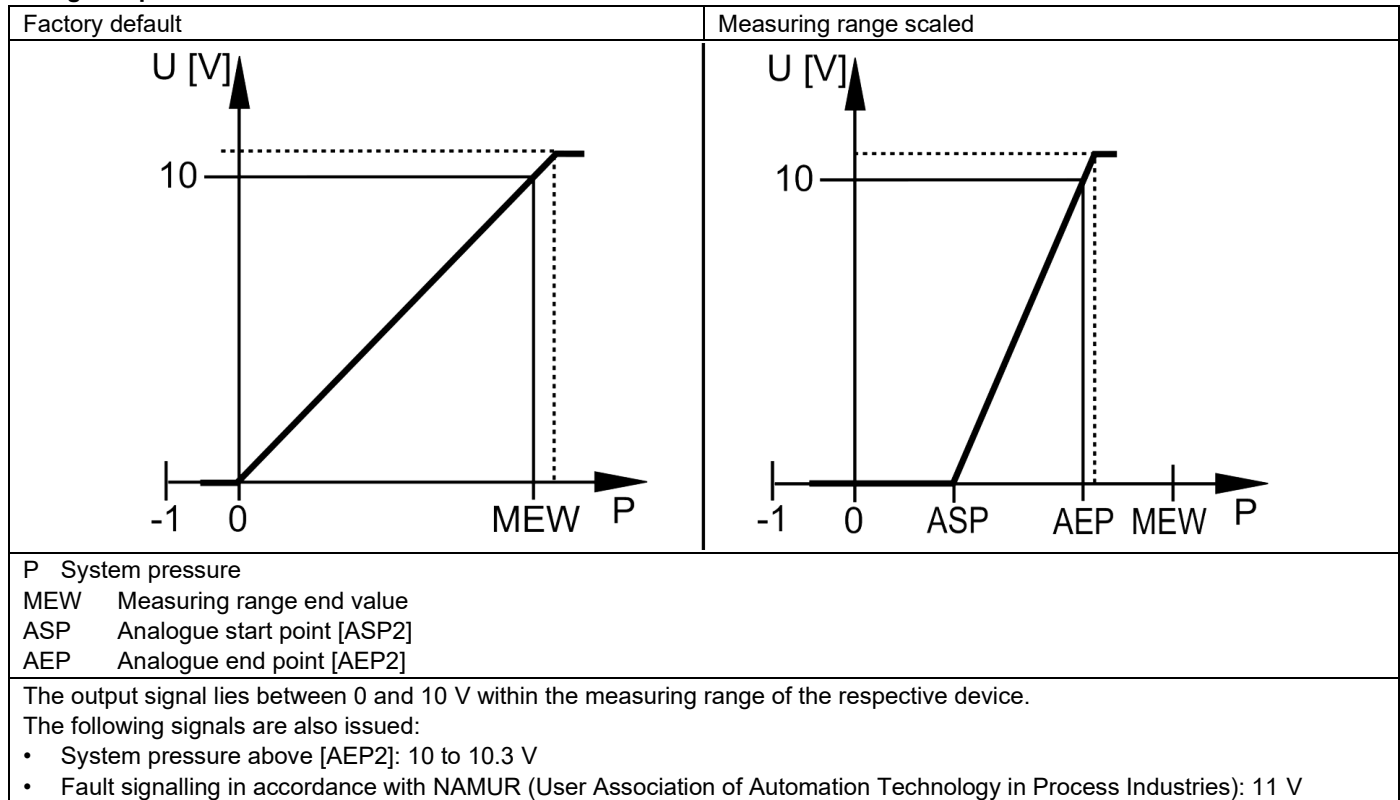
1.4 Analogue function

OUT2 provides an analogue output:

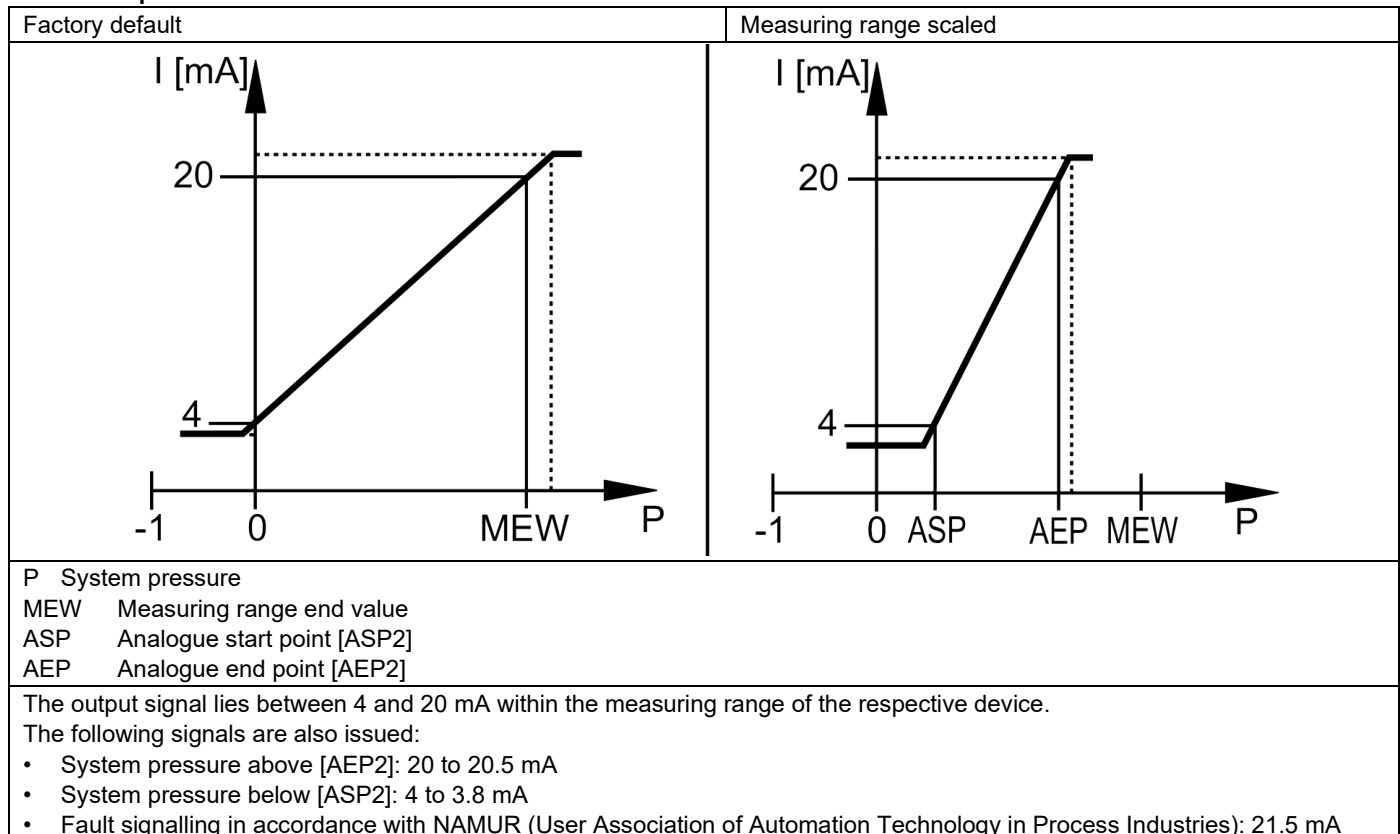
- [ou2] determines whether the set measuring range is represented by 4 to 20 mA ([ou2] = [I]) or by 0 to 10 V ([ou2] = [U]).
- Analogue start point [ASP2] determines the measurement value at which the output signal is 4 mA or 0 V.
- Analogue end point [AEP2] determines the measured value at which the output signal is 20 mA or 10 V.

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

Voltage output 0 to 10V:



Current output 4 to 20 mA:



1.5 IO-Link

1.5.1 General information

This device is equipped with an IO-Link communication interface, which requires an IO-Link-compatible module (IO-Link master) for operation.

The IO-Link interface enables direct access to process and diagnostic data and allows the device to be configured during operation.

Furthermore, communication is possible via a point-to-point connection using a USB adapter cable.

The IODDs required to configure the device, You can find it here:

9740079



9740080



1.5.2 Functions available only via IO-Link communication

HIPC: Number of overload occurrences (→see the section "Reading out overload events")

- HIPS: Threshold for the overload counter
 - Flashing: The sensor can be located within the system using this standard command
- When this command is used, the switching status LEDs flash and "IO-L" appears on the device display
- Application-specific label: Freely definable text, assigned to the device
 - System description: Freely definable text, describing the device's function within the system
 - Location description: Freely definable text, describing the installation location within the system

Detailed information can be found in the device-specific IO Device Description PDF at <https://ioddfinder.io-link.com/>.

1.5.3 Functions not available via IO-Link communication

The 9740080 unit functions identically to the 9740079 via IO-Link:

- Device parameters PSP1, PSP2, PrP1, PrP2 and CYC are available only on the device
- Not available via IO-Link

2 Validity of the documentation

This document applies to the following products:

Pressure switches of data sheet F9735. The following types or part numbers are concerned:

- 9740 079
- 9740 080

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydraulic expert knowledge.
- Specialists, fitters and set-up men of machines and installations with expert knowledge in electrical engineering.

Qualification of the personnel

Expert knowledge means that the personnel must

- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he

- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

4 Symbols and signal words

WARNING

Person damage

Stands for a possibly dangerous situation.

If it is not avoided, death or very severe injuries will result.

⚠ CAUTION

Easy injuries / property damage

Stands for a possibly dangerous situation.

If it is not avoided, minor injuries or material damages will result.



Hazardous to the environment

The symbol stands for important information for the proper handling with materials that are hazardous to the environment.

Ignoring these notes can lead to heavy damages to the environment.

i Note

This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

5 For your safety

5.1 Basic information

The operating instructions serve for information and avoidance of dangers when installing the products into the machine as well as information and references for transport, storage and maintenance.

Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the products can be guaranteed.

Furthermore, the consideration of the operating instructions will:

- avoid injuries
- reduce down times and repair costs,
- increase the service life of the products.

5.2 Safety instructions

The product has been manufactured in accordance with generally accepted engineering principles and reflects the current state of technology. The device described is intended to be a component for installation in a system or machine.

The safety of the complete system is the responsibility of the system or machine manufacturer. The system manufacturer is obliged to carry out a risk assessment and to prepare documentation in accordance with the applicable legal and standard requirements. This documentation must contain all necessary information and safety instructions for operators, users and, where applicable, authorised service personnel.

Please observe the following safety instructions and guidelines to prevent personal injury and damage to property:

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep the operating instructions for the entire duration of use and ensure that they are accessible to all users at all times.
- Observe the applicable safety regulations, accident prevention regulations and the relevant national environmental protection regulations.
- Use the product only if it is in perfect technical condition.
- The product must be suitable for the specific application and the existing environmental conditions.
- Use the product only for its intended purpose.
- The product must only be operated with the permitted media (see Technical Characteristics).
- Observe all instructions and labels on the product.
- Installation, electrical connection, commissioning, operation, servicing and maintenance must only be carried out by qualified personnel authorised by the plant operator.
- Use only accessories and spare parts approved by the manufacturer.
- Devices and connecting cables must be protected from damage.
- The product must be stored in its original packaging when not in use or during transport.
- Failure to follow the application notes and technical information may result in personal injury or damage to property.
- The manufacturer accepts no liability for damage resulting from improper use, unauthorised operation or unauthorised tampering with the product.
- The product must not be commissioned until it has been established that the machine or plant into which the product is to be installed complies with the applicable national regulations, safety requirements and standards.

6 Application

6.1 Intended use

The device is used to measure and monitor the system pressure of machines and the plant. Its applications include relative pressure applications in industrial and commercial sectors.

Pressure switches are used:

- for switching pump motors on and off,
- for controlling the unpressurised cycle,
- for sequentially controlling solenoid valves,
- for pressure-dependent machine tool interlock.

The device must only be operated within the performance limits specified in the technical characteristics or in the data sheet. Details regarding compressive strength and burst pressure can be found in the data sheet.

Take appropriate measures to prevent static and dynamic overpressures that exceed the specified compressive strength. The specified burst pressure must not be exceeded under any circumstances. Even momentary instances of exceeding these limits can lead to the destruction of the device.

The device is vacuum-resistant. Please observe the relevant specifications in the data sheet.

The devices comply with the Pressure Equipment Directive (PED), are designed for fluids in fluid group 2 and are manufactured in accordance with sound engineering practice. Usage with fluids in fluid group 1 is permitted only on request.

Intended use also includes:

- the use of the product in accordance with the information in these operating instructions,
- adherence to the prescribed maintenance intervals,
- the deployment of suitably qualified or trained personnel,
- the installation of spare parts only if they have identical specifications to the original part.

6.2 Misapplication

WARNING

Injuries, material damages or malfunctions!

Modifications can lead to weakening of the components, reduction in strength or malfunctions.

- Do not modify the product!

The use of the products is not authorised:

- For domestic use.
- For use at fairgrounds and amusement parks.
- In food processing or in areas with special hygiene regulations.
- In mines.
- In ATEX areas (in explosive and aggressive environments, e.g. explosive gases and dusts).
- If physical effects (welding currents, vibrations or others) or chemically acting media damage the seals (resistance of the seal material) or components and this can lead to functional failure or premature failure.

In an environment with high risk of contamination, for example

- dust
- swarf
- coolants
- or the like

A protective housing is to be planned.

Special solutions are available on request!

7 Installation

WARNING

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Improper connection can lead to escapes of oil under high pressure at the connections.

- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil under high pressure.

- Before using them make a visual control.

Poisoning due to contact with hydraulic oil.

Wear, damage of the seals, aging and incorrect mounting of the seal kit by the operator can lead to escapes of oil.

Incorrect connection can lead to escapes of oil at the ports.

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

⚠ CAUTION

Operation with inductive loads

For operation with inductive load, a protective circuit is to be planned.

7.1 Design

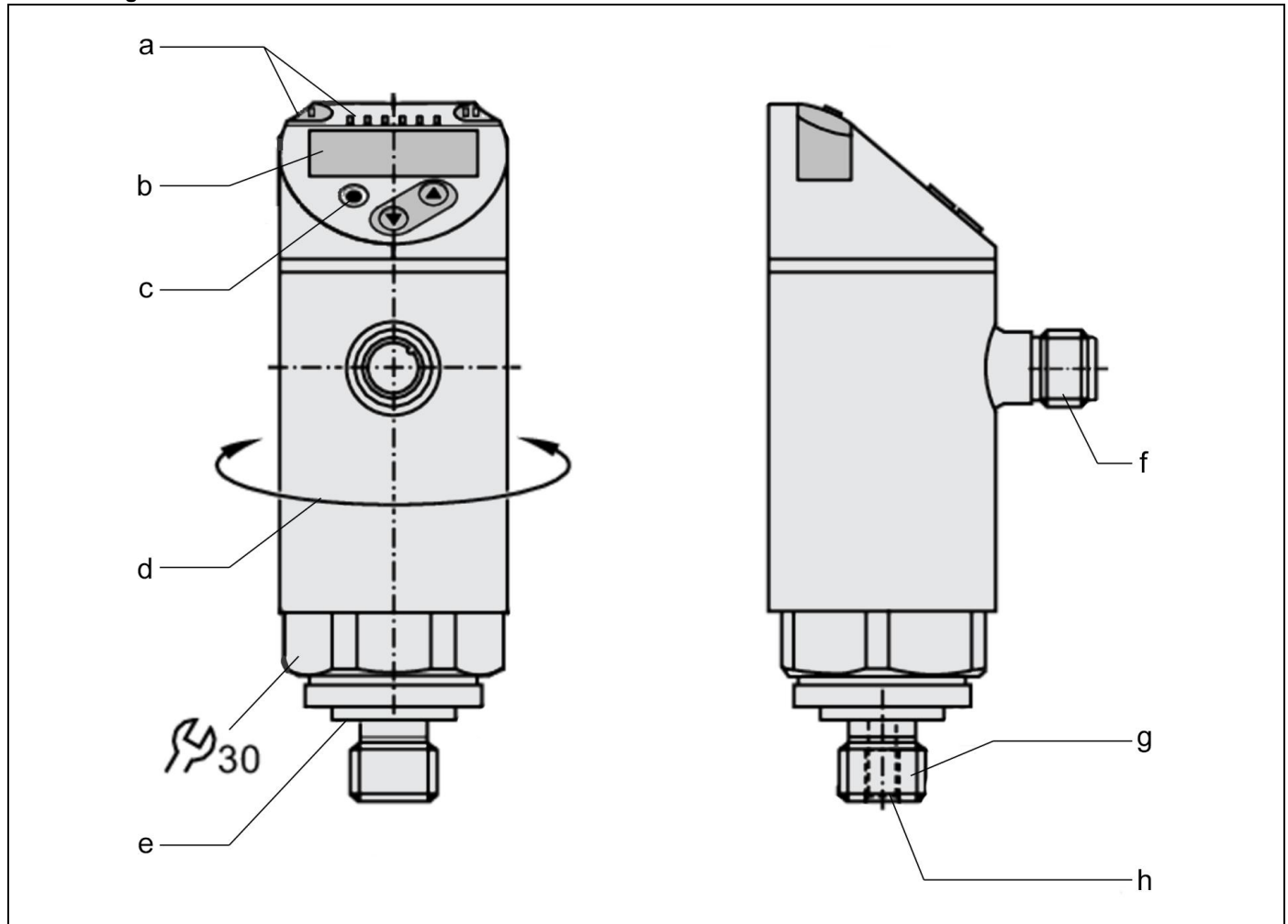


Fig. 1: Component

a LEDs optical display unit / switching status	e Seal
b Alphanumeric display 4-character/digit red / green	f Thread M12x1
c Program key	g Thread G1/4
d Upper part of housing, rotatable 345°	h Internal thread M5

NOTE

More details

- See ROEMHELD data sheets A 0.100, F 9.300, F 9.310 and F 9.360.

Screwed Plug

- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

Hydraulic connection

- Do not use sealing tape, copper rings or coned fittings.

Pressure fluids

- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

Before installing and dismantling the device: Make sure that the system is pressureless.

1. Insert the device into a G1/4 process connection
2. Tighten firmly.

Recommended tightening torque:

Pressure range in bar	Tightening torque in Nm
600	30 to 50
Depends on lubrication, sealing and pressure load!	

The sensor housing can be rotated by 345° relative to the process connection.
Do not exceed the stop!

NOTE
Accessories

Accessories, available on request.

7.1.1 Electric connection
⚠ CAUTION
Work by qualified personnel

- Works only to be effected by authorised personnel.

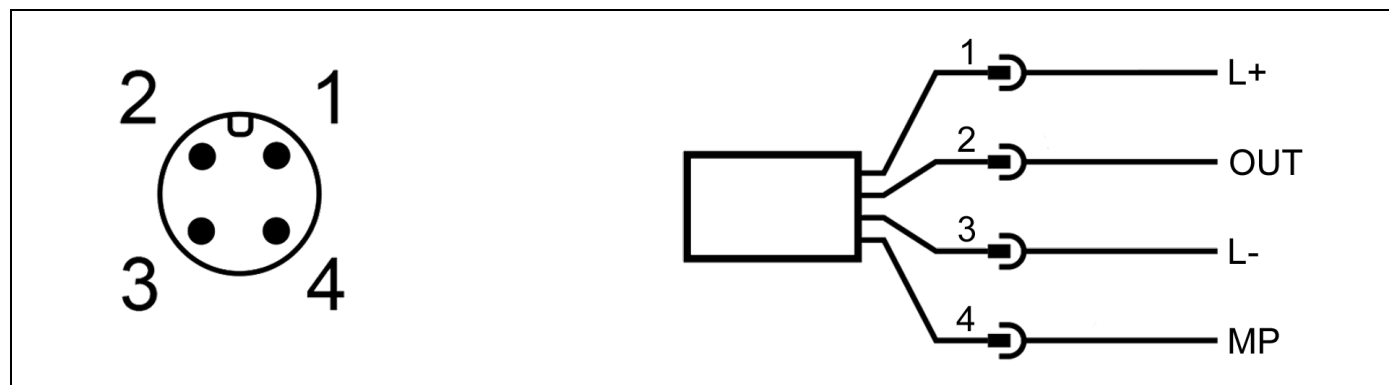
Mounting components of the customer!

- When mounting components of the customer no damages may occur at the product .

The device must only be installed by a qualified electrician.
Comply with national and international regulations for the installation of electrical systems.
Power supply in accordance with EN 50178, SELV, PELV

1. Disconnect the system from the mains
2. Connect the device as follows:

Plug-type connector: 1 x M12; coding A



1	L+
2	OUT DO (NO / NC), AO
3	L-
4	MP DO (NO / NC), IO-Link
AO: Analogue output; DO: Digital output; MP: Multi-function connection	

8 Operation
⚠ WARNING
Injuries due to non-compliance of the operating instructions!

- The product may only be operated, if the operating instructions - especially the chapter "Safety instructions" have been read and understood.

8.1 Operating and display panel

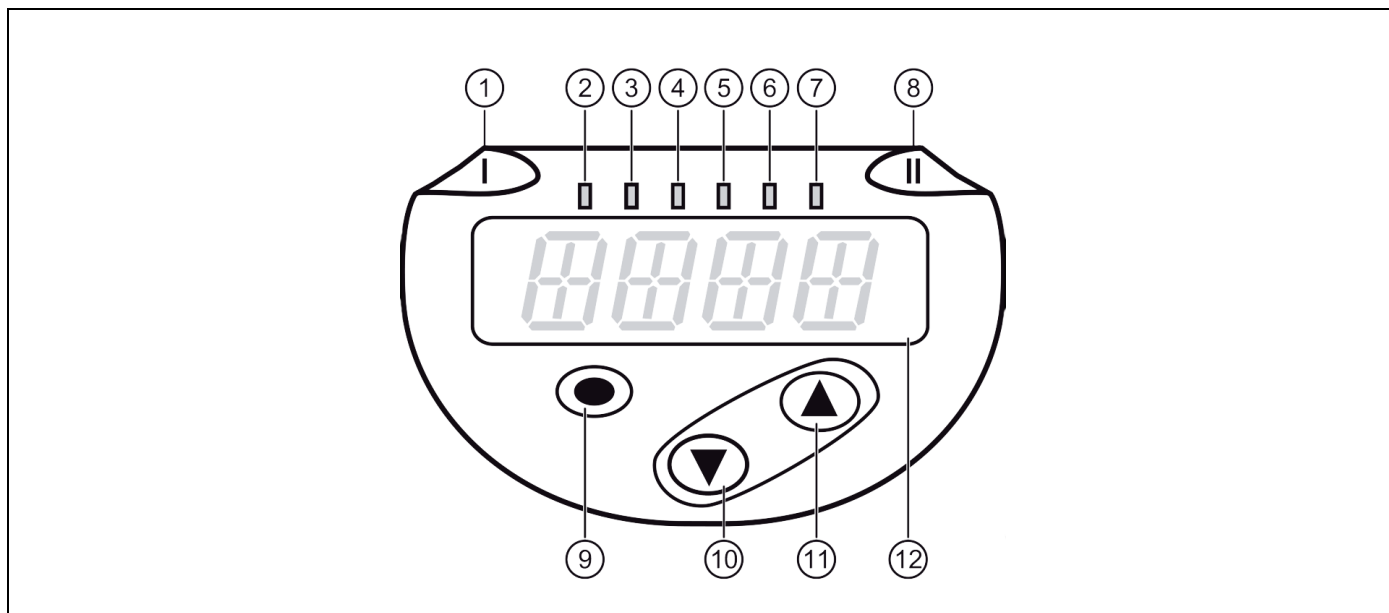


Fig. 2: Operating and display panel

1 to 8: Indicator LEDs	
LED 1	Switching status OUT1 (illuminates when output 1 is switched on)
LED 8	Switching status OUT2 (illuminates when output 2 is switched on).
LED 2-7	System pressure in the specified unit of measurement (assignment depends on the device)
9: Enter key [•]	
1.	Selecting parameters and confirming parameter values
10 to 11: Arrow keys up [▲] and down [▼]	
1.	Setting of the parameter values (continuously with continuous pressure, gradually with individual pressure)
12: Alphanumeric display, 4-character/digit	
1.	Current system pressure display
2.	Parameter and parameter value display

8.2 Menu for pressure switch 9740079

8.2.1 Menu structure: Main menu

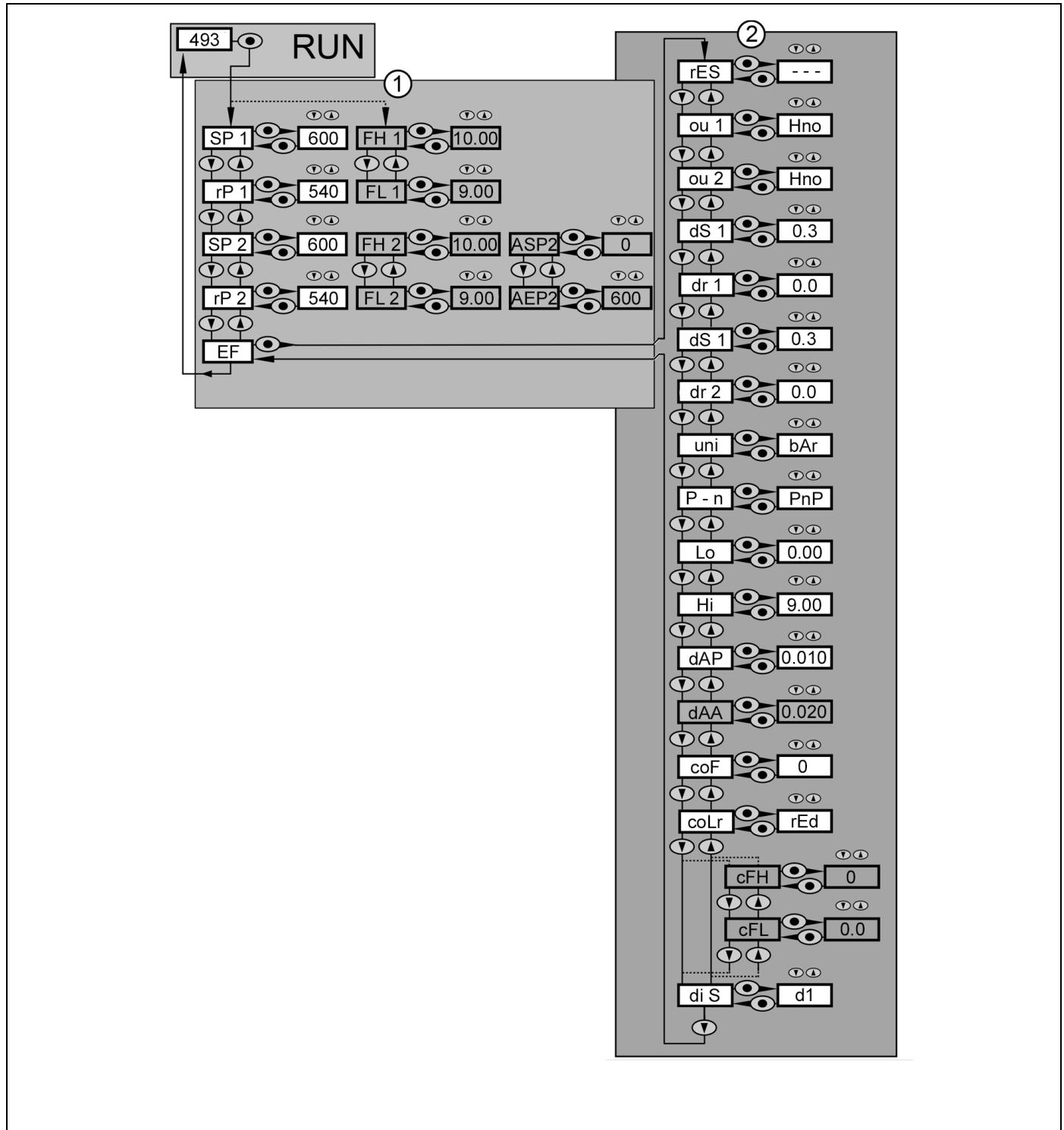


Fig. 3: Menu structure

NOTE

Menu items highlighted in grey, e.g. [FH1], are only active once the associated parameters have been selected.

8.2.2 Information about menu level 1

SPx/ rPx	Upper/lower limit for system pressure at which OUTx switches when hysteresis is set. Conditions: OUTx setting is [Hno] or [Hnc].
FHx/ FLx	Upper/lower limit for system pressure at which OUTx switches when window is set. Conditions: OUTx setting is [Fno] or [Fnc].
ASP2	Analogue start point for system pressure: The measured value at which 4 mA/0 V is output. Conditions: OUT2 setting is [I] or [U].

AEP2	Analogue end point for system pressure: The measured value at which 20 mA/10 V is output. Conditions: OUT2 setting is [I] or [U].
EF	Expanded functions / open menu level 2

8.2.3 Information about menu level 2

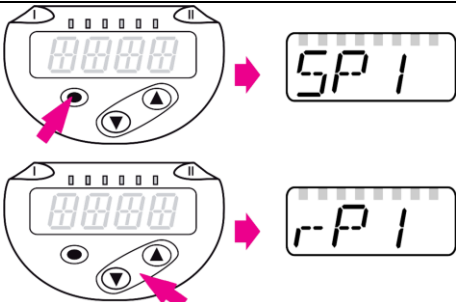
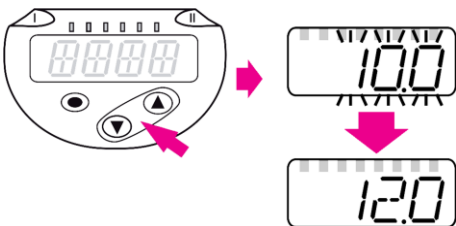
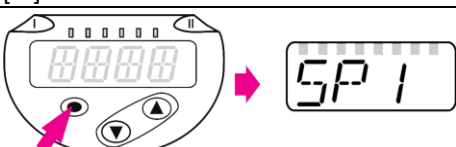
rES	Restore factory settings.
ou1	Output function for OUT1: - Switching signal for system pressure limits: Hysteresis function [H...] or window function [F...], either normally open [no] or normally closed [nc]. - Output off [OFF] (function only available in operating mode [3]).
ou2	Output function for OUT2: - Switching signal for system pressure limits: Hysteresis function [H...] or window function [F...], either normally open [no] or normally closed [nc]. - Analogue signal for current system pressure: 4 to 20 mA [I] or 0 to 10 V [U]. - Output off [OFF] (function only available in operating mode [3]).
dS1/ dS2	Switch delay for OUT1/ OUT2.
dr1/ dr2	Reset delay for OUT1/ OUT2.
uni	Standard unit of measurement for system pressure (display): [bAr] / [mbar] / [MPa] / [kPa] / [PSI] / [inHG] / [iH2O] / [mmWS].
P-n	Output switching logic: PNP/NPN
Lo	Minimum value memory for system pressure.
Hi	Maximum value memory for system pressure.
dAP	Damping of the switching point/process data stream (IO-Link communication) and the display.
dAA	Damping of the analogue output. Conditions: OUT2 setting is [I] or [U].
coF	Zero point calibration.
coLr	Assignment of the display colours red and green within the measuring range.
cFH / cFL	Upper / lower limit for colour change. This parameter is only active after selecting a freely definable colour window in the coLr parameter: [r-cF] or [G-cF].
diS	Refresh rate and display orientation.

8.2.4 Configuration

The device remains in operating mode during the configuration process. It continues to perform monitoring functions using the existing parameters until configuration is complete.

8.2.5 Configuration process 9740079

Each configuration setting requires 3 steps:

1	Choose the parameter - Press [●] to access the menu. - Press [▲] or [▼] until the desired parameter is displayed.	
2	Set the parameter value - Press [●] to change the selected parameter. - Press [▲] or [▼] for at least 1 s. > After 1 s: the set value changes. Interval by interval by pressing the button once, or continuously by holding the button down.	
Numerical values are increased continuously using [▲] or decreased using [▼].		
3	Confirm the parameter value - Press [●] briefly. > The parameter is displayed again. The new set value is saved.	

Set further parameters

- Press [▲] or [▼] until the desired parameter is displayed.

Finish configuration

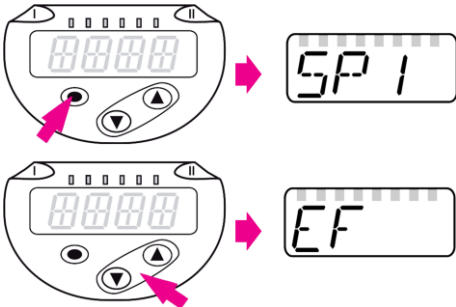
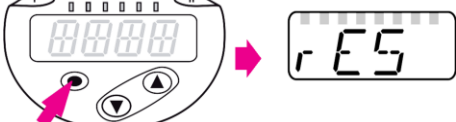
- Press [▲] or [▼] until the current measured value is displayed or wait 30 s.
- > The device returns to the process value display.

NOTE

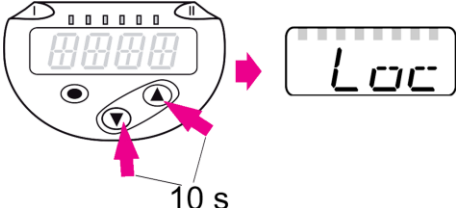
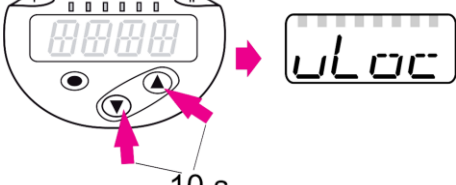
If [C.Loc] is displayed when attempting to change a parameter value, a configuration process via IO-Link communication is active (temporary lock).

If [S.Loc] is displayed, the sensor is permanently locked via software. This lock can only be released using configuration software.

- Switching from menu level 1 to menu level 2:

► Press [●] to access the menu. ► Press [▼] until [EF] is displayed.	
► Press [●]. > The first parameter in the submenu is displayed (here: [rES]).	

- Locking / unlocking. The device can be locked electronically to prevent accidental incorrect entries.

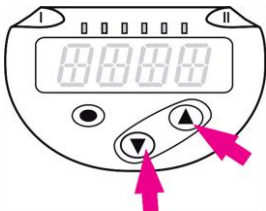
► Ensure that the device is in normal operating mode. ► Press [▲] and [▼] simultaneously for 10 s. > [Loc] is displayed.	
During operation: [Loc] is displayed briefly when an attempt is made to change parameter values.	
To unlock: ► Ensure that the device is in normal operating mode. ► Press [▲] and [▼] simultaneously for 10 s. > [uLoc] is displayed.	

Supplied as: unlocked.

- Timeout:

If no button is pressed for 30 s whilst a parameter is being set, the device returns to operating mode with the value unchanged.

- Exit the parameter without saving the settings

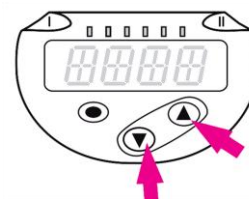
Exit the parameter without saving: ► Press [▲] and [▼] simultaneously. > Return to the menu level.	
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- Exit the menu level

Exit the menu level:

► Press [▲] and [▼] simultaneously.

> Menu level 2 switches to level 1 or level 1 switches to the display.



8.3 Menu for pressure switch 9740080

8.3.1 Menu structure: Main menu

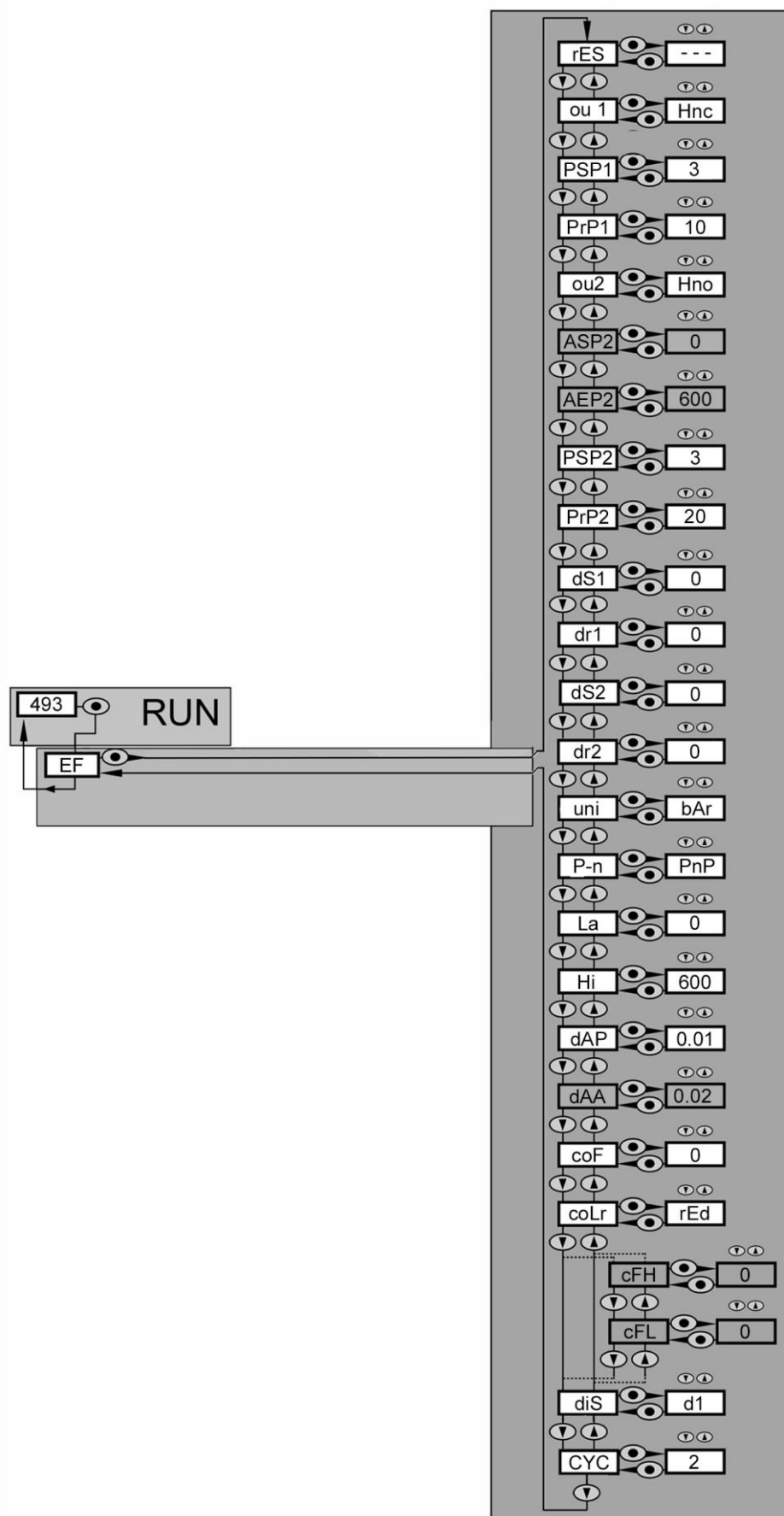


Fig. 4: Menu structure

NOTE

Menu items highlighted in grey, e.g. [ASP2], are only active once the associated parameters have been selected.

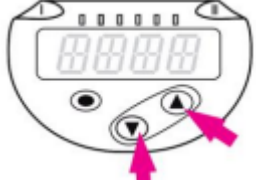
8.3.2 Teach-In function quick guide

For the Teach-In function (brief teaching), the switching as well as reverse switching points are calculated and saved by pressing the system's Enter/Set key.

This completes pressure switch adjustment and the pressure switch is ready for operation (RUN mode).

1. Connect operating voltage. The device is now automatically in RUN mode. The current pressure is displayed.

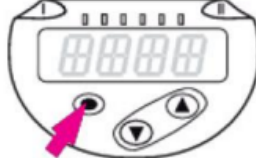
2. Activate TEACH mode

Press the up ▲ and down ▼ arrow buttons simultaneously for at least 3 seconds.	
---	--

The device is now in TEACH mode. The display goes out cyclically (flashes).

3. Now the pressure can be adjusted at the pressure generator and can be checked at the pressure switch display.

4. Complete the TEACH process

Press the Enter/Set button briefly.	
--	---

The device is once again automatically in RUN mode, the switching points are newly calculated and saved.

8.3.3 Information about menu level 1

The expanded functions can be accessed from the main menu. To open menu level 2, you must first select "EF" and then press and hold "Enter" for at least 5 s.

EF	Expanded functions / open menu level 2
----	--

NOTE

SPx and rPx can only be selected via the IO-Link and do not appear in the menu.

8.3.4 Information about menu level 2

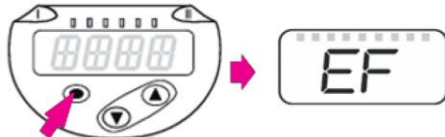
rES	Restore factory settings.
Ou1	Output function for OUT1: Switching signal for system pressure limits: Hysteresis function [H...], either normally open [no] or normally closed [nc].
PSP1	Percentage for SP1 teach calculation: Sets the percentage to be subtracted from the teach pressure in order to calculate SP1 in teach mode.
PrP1	Percentage for rP1 teach calculation: Sets the percentage to be subtracted from the teach pressure in order to calculate rP1 in teach mode.
ou2	Output function for OUT2: - Switching signal for system pressure limits: Hysteresis function [H...], either normally open [no] or normally closed [nc]. - Analogue signal for current system pressure: 4 to 20 mA [I] or 0 to 10 V [U].
PSP2	Percentage for SP2 teach calculation: Sets the percentage to be subtracted from the teach pressure in order to calculate SP2 in teach mode.
PrP2	Percentage for rP2 teach calculation: Sets the percentage to be subtracted from the teach pressure in order to calculate rP2 in teach mode.
ASP2	Analogue start point for system pressure: The measured value at which 4 mA/0 V is output. Conditions: OUT2 setting is [I] or [U].
AEP2	Analogue end point for system pressure: The measured value at which 20 mA/10 V is output. Conditions: OUT2 setting is [I] or [U].

dS1/ dS2	Switch delay for OUT1/ OUT2.
dr1/ dr2	Reset delay for OUT1/ OUT2.
uni	Standard unit of measurement for system pressure (display): [bAr] / [MPa] / [PSI].
P-n	Output switching logic: PNP/NPN
Lo	Minimum value memory for system pressure.
Hi	Maximum value memory for system pressure.
dAP	Damping of the switching point/process data stream (IO-Link communication) and the display.
dAA	Damping of the analogue output. Conditions: OUT2 setting is [I] or [U].
coF	Zero point calibration.
coLr	Assignment of the display colours red and green within the measuring range.
diS	Refresh rate and display orientation.
CYC	Switch transition counter SP1: counts the increasing switch transitions of switch point SP1

8.3.5 Configuration

8.3.5.1 Procedure for configuration process

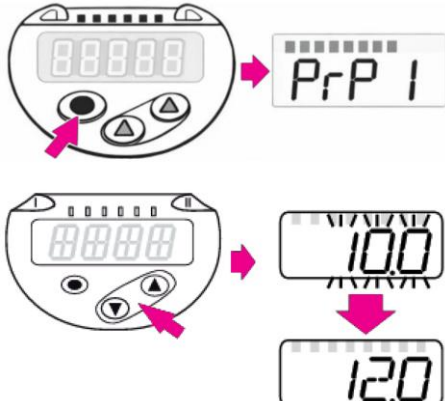
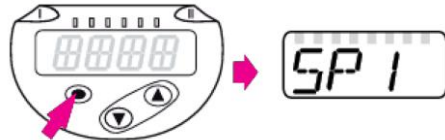
- Choose the parameter
- Select the value
- Confirm

Choose the parameter ► Press [●] to access menu level 2.	
--	---

To access the EF menu, press and hold the ENTER button for 5 s.

- To change parameters in the sub-menu, follow the instructions below: switching from menu level 1 to menu level 2:

Switching from menu level 1 to menu level 2:

1	Choose the parameter ► Press [▲] or [▼] until the desired parameter is displayed.	
2	Set the parameter value ► Press [●] to change the selected parameter. ► Press [▲] or [▼] for at least 1 s. > After 1 s: the set value changes. Interval by interval by pressing the button once, or continuously by holding the button down.	
Numerical values are increased continuously using [▲] or decreased using [▼].		
3	Confirm the parameter value ► Press [●] briefly. > The parameter is displayed again. The new set value is saved.	

Set further parameters

► Press [▲] or [▼] until the desired parameter is displayed.

Finish configuration

► Press [▲] or [▼] until the current measured value is displayed or wait 30 s.

> The device returns to the process value display.

8.3.6 Locking

If [C.Loc] is displayed when attempting to change a parameter value, a configuration process via IO-Link communication is active (temporary lock).

If [S.Loc] is displayed, the sensor is permanently locked via software. This lock can only be released using configuration software.

Locking/unlocking using the device buttons:

The device can be locked electronically to prevent accidental incorrect entries.

Activate [Loc]:

- Ensure that the device is in normal operating mode
- From the process value display, the set parameters can be locked in the advanced menu by pressing and holding the "Down" and "Enter" buttons simultaneously for ten seconds.
- During operation: [Loc] is displayed briefly when an attempt is made to change parameter values.

[uLOC] (deactivate Loc)

- Ensure that the device is in normal operating mode
- From the process value display, the previously set lock can be removed by pressing and holding the "Up" and "Enter" buttons simultaneously for ten seconds.

Teach mode can also be accessed even when [Loc] is active.

Delivered as: [Loc] is active.

8.3.7 Timeouts 9740079 and 9740080

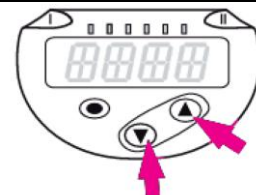
If no button is pressed for 30 s whilst a parameter is being set, the device returns to operating mode with the value unchanged.

Exit the parameter without saving the settings

Exit the parameter without saving:

► Press [▲] and [▼] simultaneously.

> Return to the menu level.

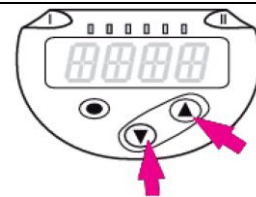


Exiting the menu level

Exit the menu level:

► Press [▲] and [▼] simultaneously.

> Menu level 2 switches to level 1 or level 1 switches to the display.



8.3.8 Configuring displays 9740079 and 9740080

► Choose [uni] and set the unit of measure:

- [bAr],
- [MPa],
- [PSI]

uni

► Choose [diS] set the refresh rate and display orientation: - [d1]: Measured value update every 50 ms. - [d2]: Measured value update every 200 ms. - [d3]: Measured value update every 600 ms. - [rd1], [rd2], [rd3]: Display such as d1, d2, d3; rotated 180°. - [OFF] = The measurement display is switched off in Run mode. The LEDs remain active even when the display is switched off. Error messages are displayed even when the display is switched off.	
--	---

8.3.9 Setting output signals

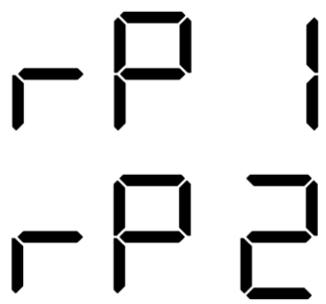
8.3.9.1 Setting output functions 9740079 and 9740080

► Choose [ou1] and set the switching function: - [Hno] = Hysteresis function/normally open contact, - [Hnc] = Hysteresis function/normally closed contact, - [Fno] = Window function/normally open contact **, - [Fnc] = Window function/normally closed contact **. - [OFF] = Output off.	
► Choose [ou2] and set the switching function: - [Hno] = Hysteresis function/normally open contact, - [Hnc] = Hysteresis function/normally closed contact, - [Fno] = Window function/normally open contact **, - [Fnc] = Window function/normally closed contact **. - [I] = Current signal 4 to 20 mA - [U] = Voltage signal 0 to 10 V - [OFF] = Output off.	

** Applies only to 9740079

8.3.9.2 Setting switching limits for hysteresis function 9740079

► [ou1]/ [ou2] must be set to [Hno] or [Hnc]. ► Choose [SPx] and set the value at which the output switches.	
--	---

► Choose [rPx] and set the value at which the output switches back. rPx is always less than SPx. Only values lower than the value for SPx can be entered.	
---	---

NOTE

Parameters SPx and rPx

For model 9740080, these parameters are only available via IO-Link.

8.3.9.3 Setting switching limits for the window function for pressure switch 9740079

► [ou1]/[ou2] must be set to [Fno] or [Fnc]. ► Choose [FHx] and set the upper limit.	
► Choose [FLx] and set the lower limit. FLx is always less than FHx. Only values lower than the value for FHx can be entered.	

8.3.9.4 Scaling analogue values 9740079 and 9740080

► Choose [ASP2] and set the value at which 4 mA/0 V is output.	
► Choose [AEP2] and set the value at which 20 mA/10 V is output. Minimum distance between ASP2 and AEP2 = 20 % of the measuring range (scaling factor of 5).	

8.3.10 User settings (optional)

8.3.10.1 Setting the delay time for switching outputs 9740079 and 9740080

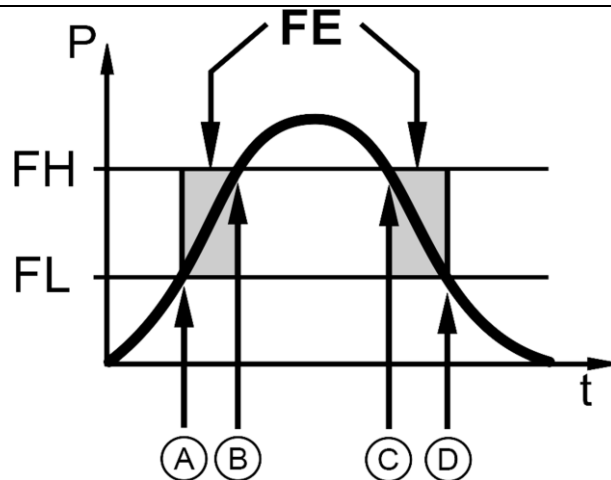
[dS1]/ [dS2] = Switching delay for OUT1/ OUT2.

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

► Choose [dS1], [dS2], [dr1] or [dr2] and set a value between 0 and 50 s (if set to 0, the delay time is not active).

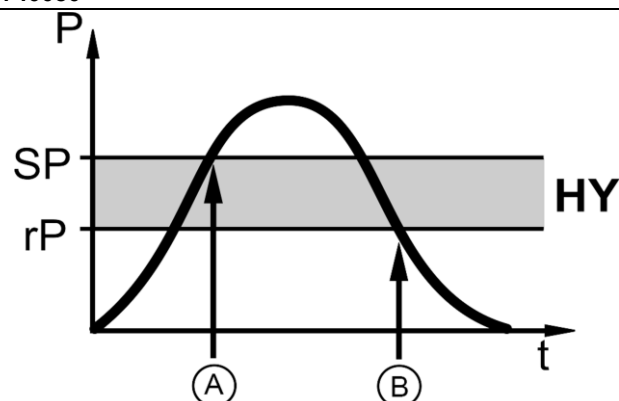
dS 1
dr 1
dS 2
dr 2

Pressure switch 9740079



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

Pressure switches 9740079 and 9740080



Output function	A:	B:
-----------------	----	----

[Hno] / [Hnc]	dS	dr
---------------	----	----

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

NOTE

Assignment of the parameters [dSx] and [drx] to the switching and reset points, respectively, is carried out strictly in accordance with the VDMA guideline on this device.

8.3.10.2 Defining switching logic for switching outputs 9740079 and 9740080

- Choose [P-n] and set [PnP] or [nPn].

P - - n

8.3.10.3 Set damping for switching signals 9740079 and 9740080

- Choose [dAP] and set the damping constant in seconds (T-value: 63 %); adjusting range of 0.000 to 4.000 s.

dAP

NOTE

Damping [dAP] affects the switching point / process data stream (IO-Link communication) and the display.

8.3.10.4 Setting damping for the analogue output switching signal 9740079 and 9740080

- Choose [dAA] and set the damping constant (10 to 90 % rise time) in seconds; adjusting range 0.000 to 4.000 s.

dAA

NOTE

Attenuation [dAA] only affects the analogue output/the analogue signal path.

8.3.10.5 Zero point calibration 9740079 and 9740080

► Choose [coF] and set a value between -5 % and 5 % of the measuring range end value (for PN2x69 and PN2x99, ± 5 % of the measurement range). The internal measurement value "0" is shifted by this amount.

coF

8.3.10.6 Reset all parameters to factory settings 9740079 and 9740080

► Choose [rES].
 ► Press [•].
 ► Press and hold [▲] or [▼] until [----] is displayed.
 ► Press [•] briefly.
 It is a good idea to note of your own settings before running the function (→ 12 factory settings).

rES

8.3.10.7 Set colour switching for the display

► Choose [coLr] and set the function:

- [rEd] = Display colour red (independent of measured value).
- [GrEn] = Display colour green (independent of measured value).
- [r1ou] = Display colour red when OUT1 switches.
- [G1ou] = Display colour green when OUT1 switches.
- [r2ou] = Display colour red when OUT2 switches ($[ou2] = [Hxx] / [Fxx]$).
- [G2ou] = Display colour green when OUT2 switches ($[ou2] = [Hxx] / [Fxx]$).
- [r-12] = Display colour red when measured value lies between the limits of OUT1 and OUT2 ($[ou2] = [Hxx] / [Fxx]$).
- [G-12] = Display colour green when measured value lies between the limits of OUT1 and OUT2 ($[ou2] = [Hxx] / [Fxx]$).
- [r-cF] = Display colour red if the measured value lies between the freely definable limit values [cFH]*) and [cFL]*).
- [G-cF] = Display colour green if the measured value lies between the freely definable limit values [cFH]*) and [cFL]*).

*) The parameters [cFH] and [cFL] can only be selected in the menu tree if [r-cF] or [G-cF] has been enabled.

coLr

► Choose [cFH] and set the upper limit (only possible if [r-cF] or [G-cF] has been enabled).
 > The setting range corresponds to the measuring range and is limited at the lower end by [cFL].

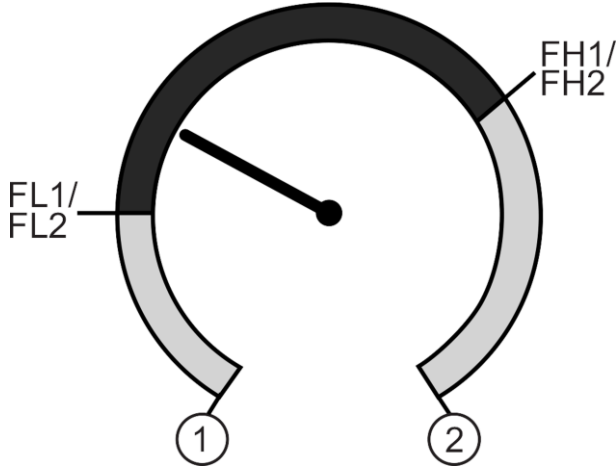
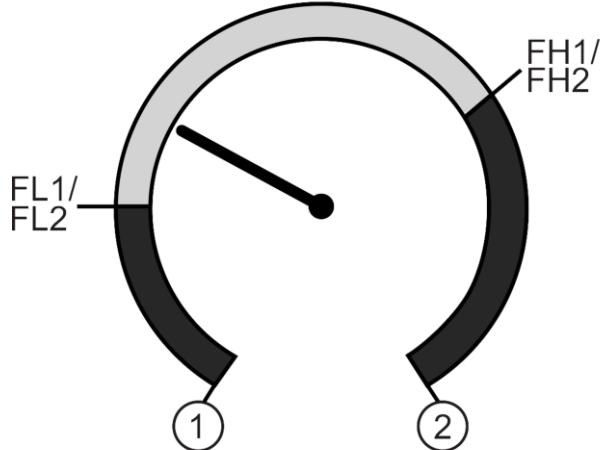
cFH

► Choose [cFL] and set the lower limit
(only possible if [r-cF] or [G-cF] has been enabled).
> The setting range corresponds to the measuring range and is limited at
the upper end by [cFH].

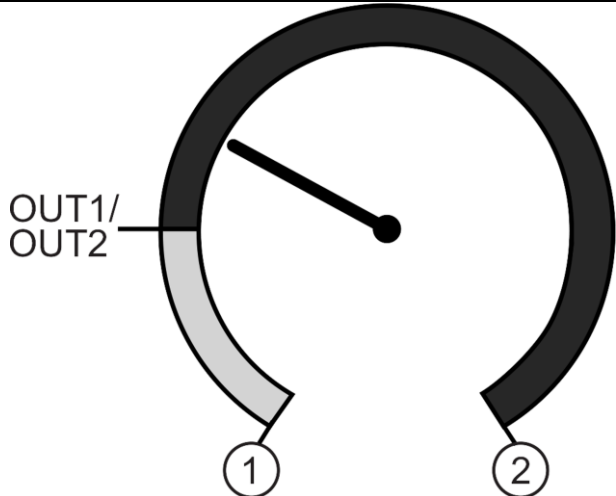
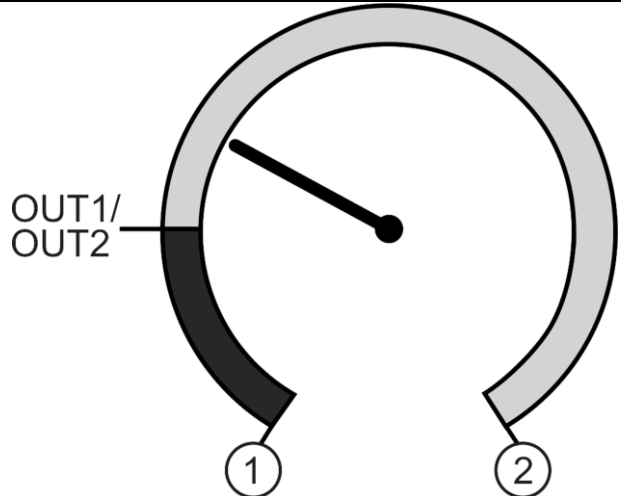
cFL

8.3.11 Graphical representation of display colour switching

8.3.11.1 Pressure switch 9740079

Display colour change for parameters [r1ou] / [r2ou], window function mode	Display colour change for parameters [G1ou] / [G2ou], window function mode
	
Measured value between FL1/FL2 and FH1/FH2; Display = red	Measured value between FL1/FL2 and FH1/FH2; Display = green

8.3.11.2 Pressure switches 9740079 and 9740080

Display colour change for parameters [r1ou] / [r2ou], hysteresis function mode	Display colour change for parameters [G1ou] / [G2ou], hysteresis function mode
	
Measured value > switching point OUT1 / OUT2; Display = red	Measured value > switching point OUT1 / OUT2; Display = green

	Colour switching for display, green
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		Set colour switching for display, red
1		Lower value of measuring range
2		Upper value of measuring range

8.3.12 Description of TEACH function for pressure switch 9740080

Teach mode is entered by pressing the "Up" and "Down" buttons continuously and simultaneously for three seconds, starting from the process value display. Once Teach mode is entered, the outputs are set to low for parameter selection Hno and to high for Hnc.

This mode can be exited either through inactivity (timeout after 2 minutes) or by pressing "Up" and "Down" simultaneously. The sensor then returns to the process value display without any parameter changes.

The parameters PSPx and PrPx from the menu are used to calculate the switching points SPx and rPx. These can be set in advance in the menu to a value between 0 and 100 %, in 1 % increments.

If the "Enter" key is pressed whilst in teach mode (indicated by the process value display flashing off and on cyclically), the current pressure, minus the percentage values previously set via parameters PSPx and PrPx for the respective switching and reset points SPx and rPx, is set immediately. Both outputs are always taught. If the teach operation is successful, the teach mode is exited immediately after the switching points have been set, and the outputs respond according to the process value. "OK" appears on the display for one second.

If any of the following conditions for an output – as determined by the user-defined configuration or by the current pressure – are not met, the sensor automatically corrects SPx and rPx accordingly so that the conditions are satisfied. The correction is made with priority given to SPx. If the sensor is unable to carry out a correction, "Fail" will appear on the display for one second and the teach mode will be exited automatically.

Conditions:

1. The minimum difference between the teach pressure and the switching point must be at least 2 bar.
2. The minimum difference between SPx and rPx must be at least 1 bar.
3. SPx and rPx must lie within a valid setting range, including 1 bar of switching hysteresis.

Example 1:

Parameter settings:

PSP1 = 3 %
 PrP1 = 10 %
 PSP2 = 3 %
 PrP2 = 20 %

Teaching a current pressure value of 500 bar in teach mode results in the following switch point settings:

$SP1 = 500 \text{ bar} * (100\% - PSP1) / 100 \% = 485 \text{ bar}$
 $rP1 = 500 \text{ bar} * (100\% - PrP1) / 100\% = 450 \text{ bar}$
 $SP2 = 500 \text{ bar} * (100\% - PSP2) / 100\% = 485 \text{ bar}$
 $rP2 = 500 \text{ bar} * (100\% - PrP2) / 100\% = 400 \text{ bar}$

Example 2:

Parameter settings:

PSP1 = 3 %
 PrP1 = 10 %

Teaching a current pressure value of 20 bar in teach mode results in the following switch point settings:

$SP1 = 20 \text{ bar} * (100\% - pSP1) / 100 = 19.4 \text{ bar} \Rightarrow \text{violates condition 1} \Rightarrow \text{auto correct SP1 to 18 bar}$
 $rP1 = 20 \text{ bar} * (100\% - prP1) / 100 = 18 \text{ bar} \Rightarrow \text{violates condition 2} \Rightarrow \text{auto correct rP1 = 17 bar}$

IO-Link exclusion:

This function cannot be performed via the IO-Link software interface.

8.3.13 CYC cycle counter for pressure switch 9740080

The [CYC] parameter counts the increasing switch transitions of switching point SP1 (from LOW to HIGH).

Transitions of switching point SP2 are not counted.

Larger transition counts (> 9999) are displayed as scrolling text.

Please note:

- The memory is updated every 10 minutes if any switching transitions have occurred.

- In the event of a power cut, data relating to the most recent switching transitions may be lost.
- This parameter cannot be reset using the factory settings reset [rES].

8.3.14 Zero-point stabilisation for pressure switch 9740080

i NOTE

Due to permissible device tolerances and temperature variations, the sensor may show a deviation from the zero point when the system is depressurised. To counteract this, the device is equipped with functions that keep the measuring signal more stable at process value 0.

The display during zero-point stabilisation works as follows:

- When pressure is falling: up to 2.0 bar applied
- When pressure is rising: from 2.5 bar applied

The display resolution and accuracy of the sensor, as specified in the data sheet, continue to apply.

Please note:

- Due to signs of ageing, zero-point calibration [coF] may be required (→ long-term stability in the data sheet)

8.3.15 Diagnostic functions

8.3.15.1 Reading the min. / max. values for system pressure

► Press [Hi] or [Lo] and briefly press [•]. [Hi] = maximum value, [Lo] = minimum value. Delete memory: ► Choose [Hi] or [Lo]□ ► Press and hold [▲] or [▼] until [----] is displayed. ► Press [•] briefly.	
---	--

8.3.15.2 Reading overload occurrences

• HIPC: Number of overload occurrences HIPC counts the number of times the HIPS threshold has been exceeded. It must be exceeded for at least 0.5 ms. • HIPS: sets the threshold for the overload counter.	
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9 Operation

Once the supply voltage is switched on, the device starts Run mode (= normal operating mode). It carries out its measurement and evaluation functions and outputs signals in accordance with the set parameters.

Operating indicators (→ 7 Control and display elements).

9.1 Reading parameter setting

- Press [•].
- Press [▲] or [▼] until the desired parameter is displayed.
- Press [•] briefly.

> The device displays the corresponding parameter value for approx. 30 s and then switches to the process value display.

9.2 Self diagnostic functions / error messages

The device has extensive self-diagnostic capabilities.

- It monitors itself automatically whilst in operation.
- Warnings and error conditions are shown on the display (even when the display is switched off); these are also available via the IO-Link.

Display	LED status OUT1	LED status OUT2	Type of error *)	Error / warning	Remedy
PARA			F	Parameter settings outside the permitted range.	► Repeat the parameter setting process.
None			F	Supply voltage Too low.	► Check/correct the level of supply voltage.
SC flashing	Flashing	Flashing	F	Overcurrent at the switch output OUT1 and OUT2 **).	► Check the switching outputs for short circuits or overcurrent; rectify the error.
SC1 flashing	Flashing		F	Overcurrent at the switch output OUT1 **).	► Check switching output OUT2 for short circuit or overcurrent; rectify the fault.
SC2 flashing		Flashing	F	Overcurrent at the switch output OUT2 **).	► Check switching output OUT2 for short circuit or overcurrent; rectify the error.
Loc			W	Configuration using keys is locked.	► Remove key lock (→ see the section General configuration process) → "Locking/Unlocking".
C.Loc			W	Configuration using keys locked, configuration via IO-Link communication is active (→ see section Configuration process).	► Wait until configuration via IO-Link is complete.
S.Loc			W	Control keys are locked via the configuration software. Any attempt to change parameters is rejected (→ see section Configuration process).	► Unlocking only possible via IO-Link- interface / configuration software.
OL			W	Process value too high (measuring range exceeded).	► Check / reduce system pressure / select a device with the appropriate measuring range.
UL			W	Process value too low (value below the measuring range).	► Check / increase system pressure / choose device with corresponding measuring range.
Err flashing			W	Internal error / function error.	► Contact the manufacturer.

*) F= error; W= warning

**) Output remains deactivated for as long as the overcurrent or short circuit persists.

10 Maintenance

Check if the hydraulic ports are tight (visual control). The pressure switch itself is maintenance free.

10.1 Cleaning

CAUTION

Material damage, damage or functional failure

Aggressive cleaning agents can cause damage, especially to seals.

The product must not be cleaned with:

- corrosive or caustic substances or
- organic, solvents such as halogenated or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.).

The product must be cleaned from dirt, swarf and liquids at regular intervals.

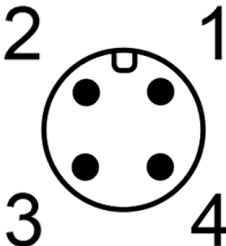
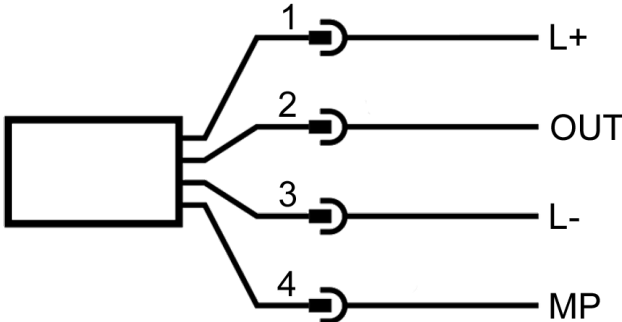
11 Technical characteristics

General characteristics 9740079 and 9740080

Product features			
Number of inputs and outputs	Number of digital outputs: 2; number of analogue outputs: 1		
Measuring range	0 to 600 bar	0 to 8700 psi	0 to 60 MPa
Process connection	Thread connection G 1/4 external thread (DIN EN ISO 1179-2); internal thread: M5		
Application			
Special characteristics	Gilded contacts		
Sensor	Metallic thin-film cell		
Application	For industrial use		
Media	Liquid and gaseous media		
Media temperature [°C]	-25 to 80		
Min. burst pressure	2,500 bar	36,250 PSI	250 MPa
Compressive strength	800 bar	11580 PSI	80 MPa
Vacuum resistance	-1,000 mbar		
Type of pressure	Relative pressure		
Electrical characteristics			
Operating voltage [V]	18 to 30 DC; (as per SELV/ PELV)		
Current consumption [mA]	< 35		
Minimum insulation resistance [MΩ]	100; (500 V DC)		
Protection class	III		
Protection against reverse battery	Yes		
Standby delay time [s]	0.3		
Watchdog integrated	Yes		
Inputs / outputs			
Number of inputs and outputs	Number of digital outputs: 2; number of analogue outputs: 1		
Outputs			
Total number of outputs	2		
Output signal	Switching signal; analogue signal; IO-Link; (configurable)		
Electrical configuration	PNP / NPN		
Number of digital outputs	2		
Output function	Normally open / normally closed (configurable)		
Max. pressure drop Switching output DC [V]	2		
Continuous current-carrying capacity of DC switching output [mA]	250		
Switching frequency DC [Hz]	< 500		
Number of analogue outputs	1		
Analogue output current [mA]	4 to 20; (scalable 1:5)		
Max. load [Ω]	500		

Analogue output voltage [V]	0 to 10; (scalable 1:5)		
Min. load resistance [Ω]	2,000		
Short circuit protection	Yes		
Version	Pulsed		
Short circuit protection			
Overload-proof	Yes		
Measuring range / setting range 9740079			
Measuring range	0 to 600 bar	0 to 8700 psi	0 to 60 MPa
Analogue starting point	0 to 480 bar	0 to 6960 psi	0 to 48 MPa
Analogue end point	120 to 600 bar	1740 to 87000 psi	12 to 60 MPa
Factory setting	SP1 = 600 bar		rP1 = 540 bar
	SP2 = 600 bar		rP2 = 540 bar
	ASP = 0 bar		AEP = 600 bar
	dAP = 0.01 s		dAA = 0.02 s
	Ou1 = HNO		Ou2 = HNO
	diS = d1		dS1/ dS2 = 0.3 s
Status_B High Resolution/ CMPT = 3			
Switching point SP	4 to 600 bar	55 to 8702 psi	0 to 60 MPa
Reset point rP	1 to 597 bar	19 to 8666 psi	0 to 60 MPa
Min. distance between SP and rP	3 bar	37 PSI	1 MPa
In intervals of	1 bar	1 PSI	1 MPa
Measuring range / setting range 9740080			
Measuring range	0 to 600 bar	0 to 8700 psi	0 to 60 MPa
Analogue starting point	0 to 480 bar	0 to 6960 psi	0 to 48 MPa
Analogue end point	120 to 600 bar	1740 to 87000 psi	12 to 60 MPa
Factory setting	SP1 = 600 bar		rP1 = 540 bar
	SP2 = 600 bar		rP2 = 540 bar
	ASP = 0 bar		AEP = 600 bar
	pSP1 = 3 %		prP1 = 10 %
	pSP2 = 3 %		prP2 = 20 %
	dAP = 0.01 s		dAA = 0.02 s
	Ou1 = HNC		Ou2 = HNO
	diS = d1		Loc = Key lock active
Status_B High Resolution/ CMPT = 3			
Teach switching point PSPx [% pressure]		0 to 100	
Teach switching prPx [% pressure]		0 to 100	
In intervals of % [pressure]		1	
Switching point SP	2 to 600 bar	34 to 8702 psi	0 to 60 MPa
Reset point rP	1 to 599 bar	19 to 8687 psi	0 to 60 MPa
Min. distance between SP and rP	1 bar	15 PSI	1 MPa
In intervals of	1 bar	1 PSI	1 MPa
Accuracy / deviations			
Switching point accuracy [% of range]	< ± 0.4 ; (decrease 1:1)		
Repetitive accuracy [% of range]	< ± 0.1 ; (for temperature fluctuations < 10 K; decrease 1:1)		
Curve deviation [% of range]	< ± 0.25 (BFSL)/ < ± 0.5 (LS); (decrease 1:1; BFSL = best fit straight line; LS = limit point setting)		
Hysteresis deviation [% of range]	< ± 0.1 ; (decrease 1:1)		
Long-term stability [% of range]	< ± 0.05 ; (decrease 1: 1 per 6 months)		
Temperature coefficient	0.2; (-25 to 80°C)		
Zero point [% of range / 10]			

K]		
Temperature coefficient range [% of range / 10 K]	0.2; (-25 to 80°C)	
Response times		
Response time [ms]	< 1.5	
Adjustable delay time dS, dr [s]	0 to 50	
Damping of process value dAP [s]	0 to 4	
Damping of analogue output dAA [s]	0 to 4	
Max. rise time of analogue output [ms]	3	
Software / programming		
Configuration options	Hysteresis / window; normally open / normally closed; switching delay / reset delay; damping; display unit; current output / voltage output	
Interfaces		
Communication interface	IO Link	
IO-Link revision	1.1	
SDCI standard	IEC 61131-9	
SIO mode	Yes	
Required masterport class	A; (if PIN 2 is not connected: B)	
Supported device IDs	Operating mode	Device ID
	Status_B High Resolution/ CMPT = 3	100000 (9740079) 100001 (9740080)
Note	For more information, see the IODD PDF file on the Römheld website.	
Status_B High Resolution/ CMPT = 3		
IO-Link resolution for pressure [bar]	0.2	
IO-Link process data (cyclical)	Function	Bit length
	Pressure	16
	Device status	4
	Binary switching information	2
IO-Link functions (acyclical)	Application-specific label	
Environmental conditions		
Ambient temperature [°C]	-25 to 80	
Storage temperature [°C]	-40 to 100	
Code class	IP 65; IP 67	
Certifications / inspections		
EMC	DIN EN 61000-6-2	
	DIN EN 61000-6-3	
Shock resistance	DIN EN 60068-2-27	50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6	20 g (10 to 2000 Hz)
Pressure equipment directive	Sound engineering practice; suitable for media in fluid group 2; media in fluid group 1 on request	
Mechanical characteristics		
Weight [g]	242.92	
Housing	Cylindrical	
Dimensions [mm]	Ø 34 / L = 92.7	
Materials	1.4542 (stainless steel / 17-4 PH / 630); 1,4404 (stainless steel / 316L); PBT+PC-GF30; PBT-GF20; PC	
Material in contact with the medium	1,4542 (stainless steel / 17-4 PH / 630)	
Min. pressure cycles	100 million	
Tightening torque [Nm]	30 to 50; (recommended torque; depends on	

	lubrication, sealing and pressure load)	
Process connection	Thread connection G 1/4 external thread (DIN EN ISO 1179-2); internal thread: M5	
Process connection seal	FKM (DIN EN ISO 1179-2)	
Throttle valve fitted	No (can be retrofitted)	
Displays / operating elements		
Display	Display unit	3 x LED, green (bar, psi, MPa)
	Switching status	2 x LED, yellow
	Measured values	Alphanumeric display, red / green 4-character/digit
Electrical connection – plug		
Plug-type connector: 1 x M12; coding: A; contacts: 4, gilded		
 		
Connection		
1	L+	
2	OUT DO (NO / NC), AO	
3	L-	
4	MP DO (NO / NC), IO-Link	
AO: Analogue output; DO: Digital output; MP: Multi-function connection		

11.1 Additional Installation Instructions for the United States and Canada (cULus/cRUus)

The device shall be supplied from an isolating transformer having a secondary Listed fuse rated either

a) max 5 amps for voltages 0~20 Vrms (0~28.3 Vp) or

b) 100/Vp for voltages of 20~30 Vrms (28.3~42.4 Vp).

Alternatively it can be supplied by a Class 2 power supply.

The device shall be connected only by using any Listed (CYJV/7) or R/C (CYJV2/8) cord in respect of Condition of Acceptability, having suitable ratings.

12 Accessory

NOTE

Accessories

Accessories, available on request.

13 Storage

CAUTION

Damage due to incorrect storage of components

In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion on/in the element can occur.

- Storage in the packaging and moderate environmental conditions.
- The product must not be exposed to direct sunlight, since UV light may cause serious damage to the seals.

ROEMHELD elements are tested with mineral oil. The exterior of the elements is protected against corrosion.

The residual oil film after the test procedure provides for a six-month interior protection against corrosion when stored in dry and tempered rooms.

14 Disposal



Hazardous to the environment

Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions. Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.

For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

15 Declaration of conformity



Manufacturer

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Responsible person for the documentation:

Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

This declaration of conformity applies to the following products:

Pressure switches of data sheet F9735. The following types or part numbers are concerned:

- 9740 079
- 9740 080

We herewith declare that the products described comply with the basic safety and health requirements of the aforementioned EU directives in their design and construction, as well as in the version marketed by us.

The following additional EU directives were applied:

2014/30/EU EMC - Electromagnetic compatibility [www.eur-lex.europa.eu]

- **2011/65/EU**, RoHS

The following harmonised standards have been applied:

DIN EN ICE 63000: 2018

DIN EN IEC 61000-6-2: 2019

DIN EN 61000-6-3: 2021



Ewgeni Schleining
Development Team Leader MH

**Römheld GmbH
Friedrichshütte**

Laubach, 04.09.2026

16 Declaration of conformity



Importer

Roemheld (UK) Limited
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SG4 0TY Hitchin

E-Mail: sales@roemheld.co.uk
www.roemheld.co.uk

Authorised person to compile the technical documentation:

Darren Rowell, 28 Knowl Piece, Wilbury Way, SG4 0TY Hitchin.

This declaration of conformity applies to the following products:

Pressure switches of data sheet F9735. The following types or part numbers are concerned:

- 9740 079
- 9740 080

We hereby declare that the machine described in its design and construction as well as in the version we have placed on the market complies with the essential health and safety requirements according to the following UKCA directives.

The following additional UKCA directives were applied:

- **Directive 2016 No. 1091**, Electromagnetic Compatibility
- **2012 No. 3032**, RoHS Regulations

The following harmonised standards have been applied:

DIN EN ICE 63000: 2018

DIN EN IEC 61000-6-2: 2019

DIN EN 61000-6-3: 2021

The technical documents according to the specified guidelines were created for the products.

The manufacturer obligates to provide the special documentation of the products to national authorities on demand.

If the product is modified and not approved by us, this declaration will become invalid.

SG4 0TY Hitchin, 04.09.2026



Darren Rowell
Managing Director,

Roemheld UK Ltd