Industrial Automation

IMI Norgren

Electronic Pressure Sensor
34D-xxxxx-DA1-xx
1x PNP/ 1x analogue (1x IO-Link, configurable)

Breakthrough
engineering for
a better world

Operation Manual

Before starting work read these instructions.

Electronic Pressure Sensor
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Contents

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1. Preliminary note

1.1. Symbols used

›   Instructions

>   Reaction, result

[...]   Designation of keys, buttons or indications

»   Cross-reference

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

[i] Information
Supplementary note

2. Safety instructions

- Please read this document prior to set-up of the unit. Ensure that the product is suitable for your application without any restrictions.

- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property can occur.

- Check the compatibility of the product materials with the media to be measured in all applications.

- Correct condition of the device for the operating time can only be guaranteed if the device is only used for media to which the wetted materials are sufficiently resistant » 3.1 Applications.

- If the devices are used in gas applications with pressures > 25 bar the notes in chapter 3.1 for devices with the marking *), must be absolutely observed.

[!] The responsibility whether the measurement device is suitable for the respective application lies with the operator. The manufacturer assumes no liability for consequences of misuse by the operator. Improper installation and use of the devices results in a loss of the warranty claims.

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3. Functions and features

The device monitors the system pressure of machines and installations.

3.1. Applications

Type of pressure: relative pressure

Order number	Measuring range		Permissible overpressure		Bursting pressure	
	bar	PSI	bar	PSI	bar	PSI
Pressure sensors with internal thread G¼						
34D-P600...	0...600	0...8700	800	11580	2500	36250
34D-P400...	0...400	0...5800	800	11580	1700	24650
34D-P250...	0...250	0...3625	500	7250	1200	17400
34D-P160...	0...160	0...2320	350	5075	1000	14500
34D-P100...	0...100	0...1450	300	4350	650	9400
34D-P040...	0...40	0...580	200	2900	500	7250
34D-P016...	0...16	0...232	85	1225	500	2900
34D-V110...	-1...10	-14,5...145	75	1087	150	2175
34D-V101...	-1...1	-14,5...14,5	10	145	30	450
*) With static overload pressure or max. 100 million pressure cycles.						
MPa = (measured value in bar) ÷ 10 kPa = (measured value in bar) x 100						

! Media used must be compatible with the materials specified in the 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. ATTENTION: Risk of injury!

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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 laid out for fully bidirectional communication. So, the following options are possible:
  - Remote display: reading and display of the current system pressure.
  - Remote parameter setting: reading and changing the current parameter setting. - IO-Link parameter setting » 4.3

4.1. Communication, parameter setting, evaluation

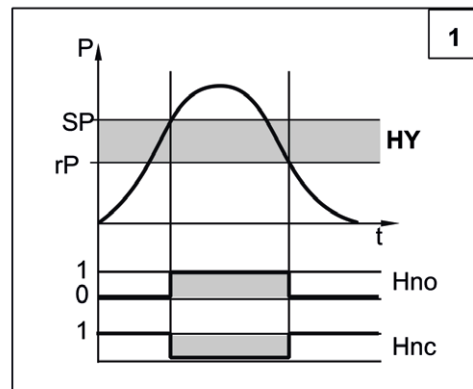| OUT1	• Switching signal for system pressure limit value • Communication via IO-Link
OUT2	• Analog signal 4 ... 20mA / 0 ... 10V

4.2. Switching function

OUTx changes its switching state 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

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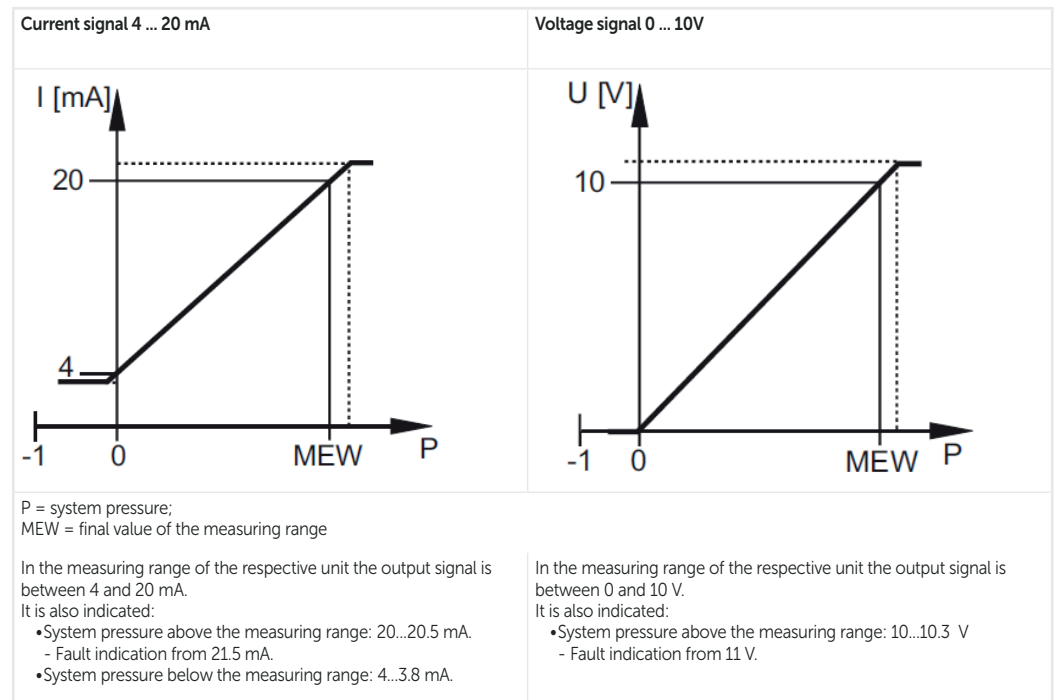1x PNP/ 1x analogue (1x IO-Link, configurable)

4.3 Analogue function

OUT2 is an analogue output:

- [ou2] defines whether the set measuring range is provided as
  4...20 mA ([ou2] = [I]) or as 0...10 V ([ou2] = [U])

[!] 34D-xxxxx-DA1-AA:

Analogue signal 4...20 mA / 0...10 V corresponds to the measuring range 0...10 bar. Negative pressure values cannot be represented via the analogue output for the indicated units.

Current signal 4 ... 20 mA	Voltage signal 0 ... 10V

P = system pressure;
MEW = final value of the measuring range

In the measuring range of the respective unit the output signal is between 4 and 20 mA. It is also indicated:
 • System pressure above the measuring range: 20...20.5 mA.
   - Fault indication from 21.5 mA.
 • System pressure below the measuring range: 4...3.8 mA.
	In the measuring range of the respective unit the output signal is between 0 and 10 V. It is also indicated:
	 • System pressure above the measuring range: 10...10.3 V
	   - Fault indication from 11 V.

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4.4 IO-Link General Information

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

The IO-Link interface enables direct access to the process and diagnostic data and provides the possibility to set the parameters of the unit during operation.

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

Device-specific Information
You can find the IODDs necessary for the configuration of the IO-Link unit and detailed information about process data structure,

Diagnostic information and parameter addresses at
https://www.norgren.com/uk/en/technical-support/software

Parameter setting tools
You will find all necessary information about the required IO-Link hardware and software at http://s.norgren.com/34d

5. Installation

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

› Insert the unit in a G¼ process connection.

› Tighten firmly.

Recommended tightening torque: 25 to 35 Nm

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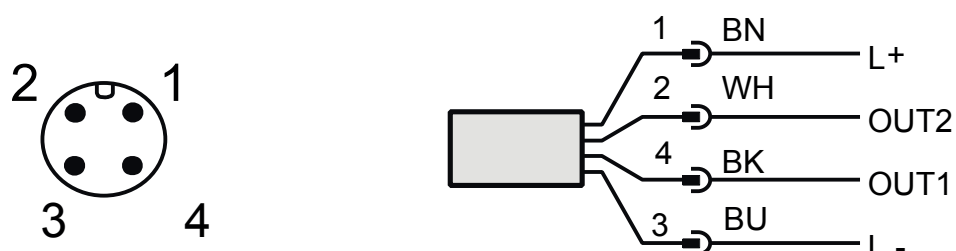
6. Electrical connection

[!] The unit must be connected by a qualified electrician.

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

Voltage supply according to EN 50178, SELV, PELV.

› Disconnect power.
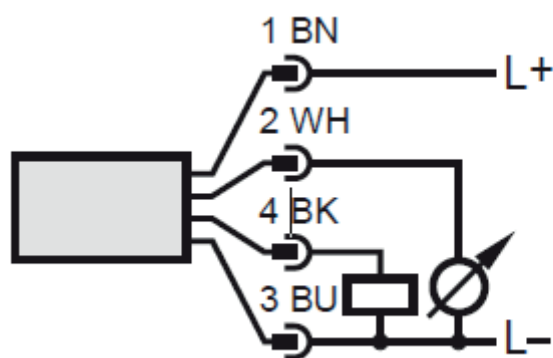
› Connect the unit as follows:

Core colours	
BK	black
BN	brown
BU	blue
WH	white

OUT 1	Binary switching output or IO-Link
OUT2	Binary switching output Colours to DIN EN 60947-5-6

Example circuits

1 x positive switching   1 x analogue

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7. Operating and display elements

1 to 8: Indicator LEDs	
LED 1	Switching status OUT1 (lights when output 1 is switched).
LED 8	No function
LED 2 - 7	System pressure in the indicated unit of measurement.

9: [Enter] button [•]

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

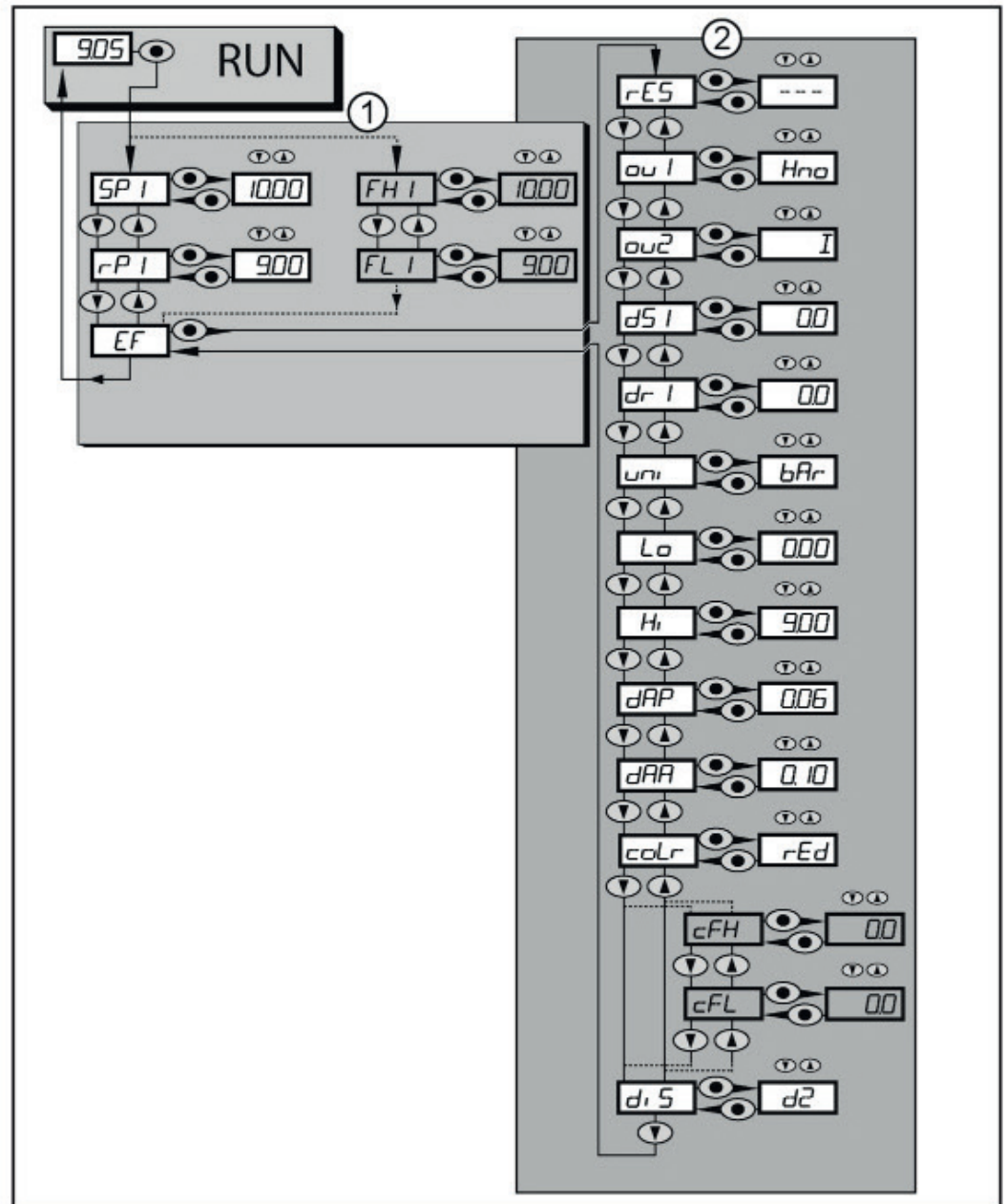**10 to 11: Arrow keys up [▲] and down [▼]**

- Setting of the parameter values (scrolling by holding pressed; incremental by pressing once).

12: Alphanumeric display, 4 digits

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

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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.

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8.2 Explanation of the menu

8.2.1 Explanation of the menu level 1

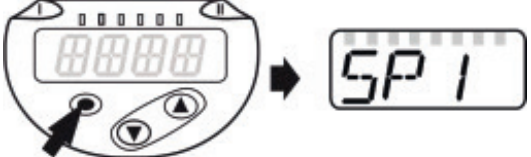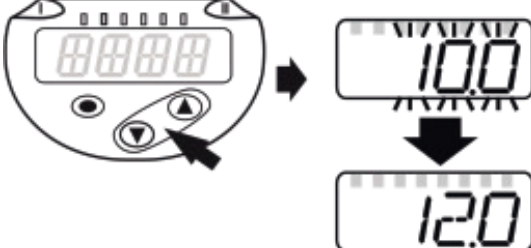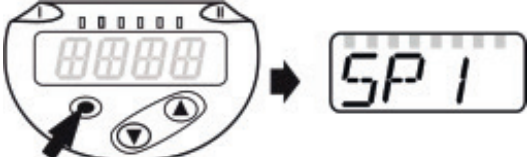|	
SPx/rPx	Upper / lower limit value for system pressure at which OUT1 switches with hysteresis setting. SP1/rP1 is displayed if the parameter [Hno] or [Hnc] for OUT1 was set in the extended functions "EF" menu.
FHx/FLx	Upper / lower limit value for system pressure at which OUT1 switches with window setting. FH1/FL1 appears when the parameter [Fno] or [Fnc] was set for OUT1 in the menu Extended Functions "EF".
EF	Extended functions / opening of menu level 2.

8.2.2 Explanation of the menu level 2

rES	Restore factory setting.
ou1	Output function for OUT1: • Switching signal for the pressure limit values: hysteresis function [H ..] or window function [F ..], either normally open [. no] or normally closed [. nc].
ou2	Output function for OUT2: Analogue signal for the current system pressure: 4...20 mA [I] or 0...10 V [U]
dS1 / dS2	Switch-on delay for OUT1.
dr1 / dr2	Switch-off delay for OUT1
uni	Standard unit of measurement for system pressure (display): [bAr] / [mbar] / [MPA] / [kPA] / [PSI] / [inHG] .
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.
cFL / cFH	Lower / upper 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.

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9. Parameter setting

During parameter setting the unit remains in the operating mode. It continues to monitor with the existing parameters until the parameter setting has been completed.

9.1 Parameter setting in general

1	Select parameter › Press [•] to get to the menu. › Press [▲] or [▼] until the requested parameter is displayed.	
2	Set parameter value › Press [•] to edit the selected para-meter. › Press [▲] or [▼] for min. 2 s. > After 2 s: setting value is changed: incrementally by pressing the button once or continuously by keeping the button pressed.	
	Numerical values are incremented continuously with [▲] or decremented with [▼].	
	Acknowledge parameter value › Briefly press [•]. > The parameter is displayed again. The new setting value is saved.	

Set other parameters:
› Press [▲] or [▼] until the requested 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.

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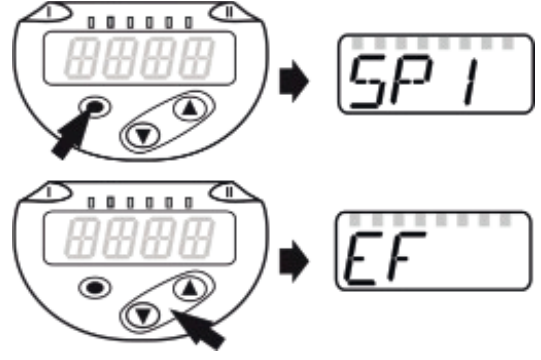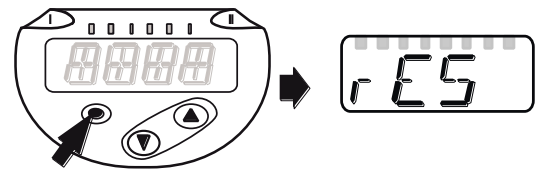
Each parameter setting requires 3 steps:

> 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 using a parameter setting software.
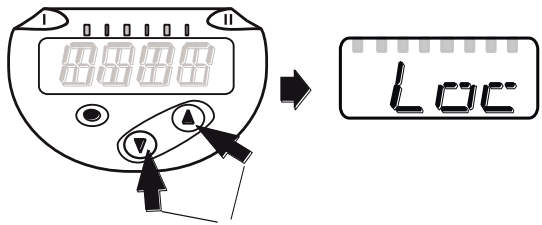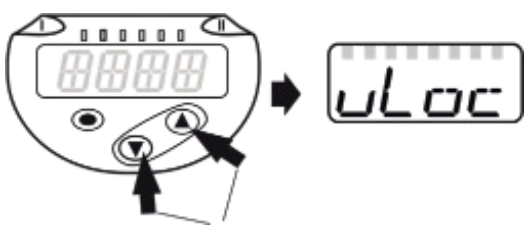
• Change from menu level 1 to menu level 2:

› Press [•] to get to the menu. › Press [▲] or [▼] until [EF] is dis-played.	
› Press [•]. > The first parameter of the submenu is displayed (here: [rES]).	

> Change from menu level 1 to menu level 2 when a parameter setting software is used:

› Activate the [EF] button.

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• Locking / unlocking
The unit can be locked electronically to prevent unintentional settings.
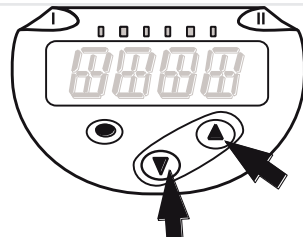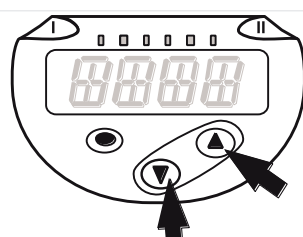
› Make sure that the unit is in the normal operating mode. › Press [▲] + [▼] simultaneously for 10 s. > [Loc] is displayed.	
During operation: [Loc] is briefly displayed if you try to change parameter values.	
For unlocking: › Press [▲] + [▼] simultaneously for 10 s. > [uLoc] is displayed.	

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 adopting the settings

To exit a parameter without adopting the settings: › Press [▲] + [▼] simultaneously. > Return to the menu level.	
Leaving the menu level	
To leave the menu level: › Press [▲] + [▼] simultaneously. > Menu level 2 changes to level 1 or Level 1 changes to the display	

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9.2 Configure display (optional)

› Select [Uni] and set the unit of measurement: [bAr], [mbAr], [MPA], [kPA], [PSI], [inHG] ⓘ The selectable units of measurement depend on the respective unit.	uni
› Select [diS] and set the update rate and orientation of the display: [d1]: update of the measured values every 50 ms. [d2]: update of the measured values every 200 ms. [d3]: update of the measured values every 600 ms. [rd1], [rd2], [rd3]: display as for d1, d2, d3; rotated by 180°. [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.	di5
ⓘ Even with unsteady pressure characteristics [d1] provides optimum readability; the corresponding algorithms are stored.	

9.3 Set output signals

9.3.1 Set output functions

› Select [ou1] and set the switching function: [Hno] = hysteresis function/NO, [Hnc] = hysteresis function/NC, [Fno] = window function/NO, [Fnc] = window function/NC.	ou1
› Select [OU2] and set the function: [I] = current signal 4...20 mA [U] = voltage signal 0...10 V	ou2

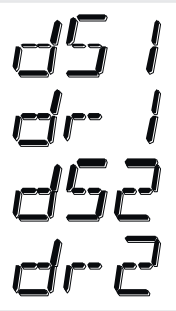### 9.3.2 Define switching limits for the hysteresis function

› [ou1] / [ou2] must be set as [Hno] or [Hnc]. › Select [SP1] / [SP2] and set the value at which the output is set.	SP1 SP2
› Select [rP1] / [rP2] and set the value at which the output is reset. rPx is always smaller than SPx. The unit only accepts values which are lower than the value for SPx.	rP1 rP2

9.3.3 Define switching limits for the window function

› [ou1] /[ou2] must be set as [Fno] or [Fnc]. › Select [FH1] / [FH2] and set the upper limit value.	FH1 FH2
› Select [FL1] / [FL2] and set the lower limit value. FLx is always lower than FHx. The unit only accepts values which are lower than the value for FHx.	FL1 FL2

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9.4 User settings (optional)

9.4.1 Set delay 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).

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

dS1
dr1
dS2
dr2

9.4.2 Set output logic for the switching outputs

› Select [P-n] and set [PnP] or [nPn].

P-n

9.4.3 Set damping for the switching signal

› Select [dAP], set the value in seconds; setting range 0.000...4.000 s (T value: 63 %). At 0.00 [dAP] is not active.

dAP

9.4.4 Read min-/max values for the system pressure

› Select [HI] or [Lo] and briefly press [•]. [HI] = maximum value, [LO] = minimum value. Delete memory:
› Select [HI] or [LO].
› Press and hold [▲] or [▼] until [----] is displayed.
› Briefly press [•].

HI
Lo

9.4.5 Reset all parameters to factory setting

› Select [rES].
› Press [•].
› Press and hold [▲] or [▼] until [----] is displayed.
› Briefly press [•].
We recommend noting down your own settings before carrying out a reset (» 12 Factory setting).

rES

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9.4.6 Set colour change of the display

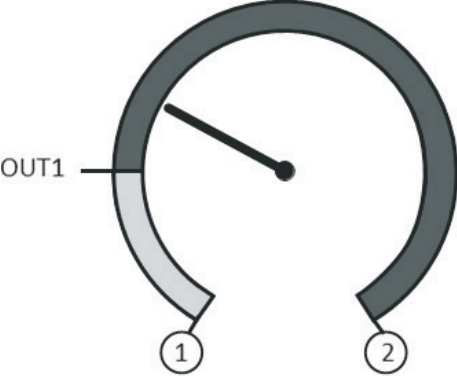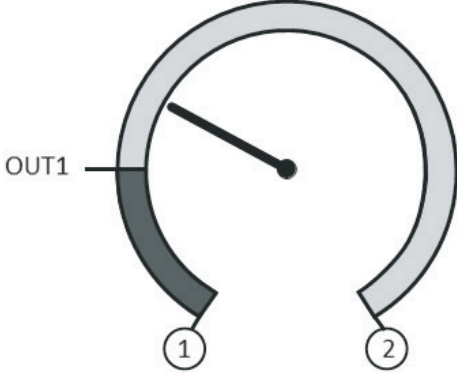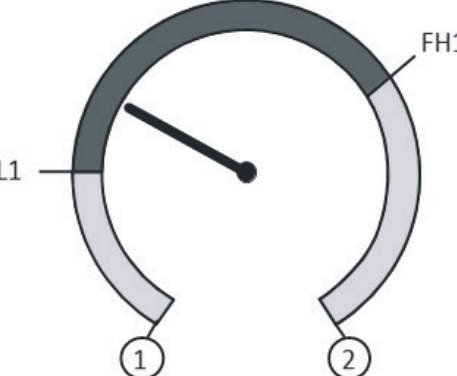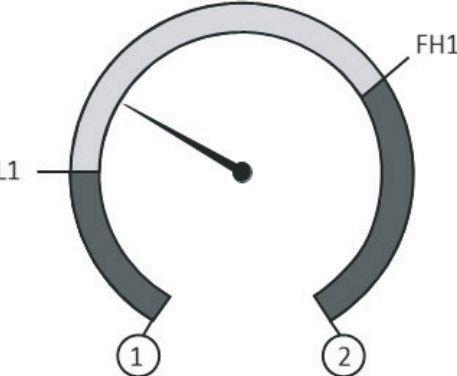|	

› Select [coLr] and set the function:
- [rEd] = display colour red (independent of the measured value).
- [GrEn] = display colour green (independent of the measured value).
- [r1ou] = display colour red when OUT1 switches
- [G1ou] = display colour green when OUT1 switches.
- [r2ou] = display colour red when OUT2 switches.
- [G2ou] = display colour green when OUT2 switches.
- [r-12] = Display colour red when the measured value is between
      the limit values of OUT1 and OUT2.
- [G-12] = Display colour green when the measured value is between
      the limit values of OUT1 and OUT2.
- [r-cF] = Display colour red when the measured value is between
      the freely definable limit) values
        [cFL]*) and [cFH])*).
- [G-cF] = Display colour green when the measured value is between
      the freely definable limit values
[cFL])*) and [cFH])]*).
*) *) The parameters [cFL] and [cFH] can only be selected in the menu tree when [r-cF] or [G-cF] were activated.
	colr

› Select [cFL] and set the lower limit value (only possible when [r-cF] or [G-cF] were activated). > The setting range corresponds to the measuring range and its maximum limit is [cFH].	cFL
› Select [cFH] and set the upper limit value. (only possible when [r-cF] or [G-cF] were activated). > The setting range corresponds to the measuring range and its minimum limit is [cFL].	cFH

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9.4.7 Graphical depiction of the colour change of the display

Display colour change for the parameters [r1ou], mode **hysteresis function**	Display colour change for the parameters [G1ou] / [G1ou], mode **hysteresis function**.
Measured value > switch point OUT1 Display = red	Measured value > switch point OUT1 Display = green
Display colour change for the parameters [r1ou], mode **window function**	Display colour change for the parameters [G1ou], mode **window function**.
Measured value between FL1 and FH1; Display = red	Measured value between FL1 and FH1; Display = green

▬ (grey)	Colour change display green
▬ (black)	Colour change display red
1	Initial value of the measuring range
2	Final value of the measuring range

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Display colour change with parameter [r-cF] independent of OUT1 / OUT2.	Display colour change with parameter [G-cF] independent of OUT1 / OUT2
Measured value between cFL and cFH; Display = red	Measured value between cFL and cFH; 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 value (independent of the output function)
cFH	Upper limit value (independent of the output function)

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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.
Operating indicators » 7 Operating and display elements.

10.1 Read set parameters

› Press [•].
› Press [▲] or [▼] until the requested 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-diagnosis / error 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	Fault / Warning	Corrective measures
none		(F**) Supply voltage too low	› Check / correct the supply voltage
SC1	flashes	(F**) Excessive current at swit-ching output OUT1 *)	› Check switching output OUT1 for short-circuit or excessive current; remove the fault.
Loc		(W **) Parameterization via pushbuttons locked.	› Unlock buttons » 9.1 Parameter setting in general Locking / unlocking
C.Loc		(W**) Parameter setting locked via pushbuttons, para-meter 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 / param-eter software.
OL		(W**) Process value too high. (measuring range exceeded)	› Check / reduce system pressure / select unit with corresponding measuring range.
UL		(W**) Process value too low (value below measuring range)	› Check / increase system pressure / select unit with corresponding measuring range. Measuring range
Err	flashes	(F**) Internal fault / malfunction.	› Contact the manufacturer.

*) The output remains deactivated as long as the excessive current / short circuit continues
**) F= Fault, W= Warning

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11. Technical data

11.1 Setting ranges

		SP1 / SP2		rP1 / rP2		ΔP
		min	max	min	max	
34D-P600...	bar	4	600	2	598	2
	PSI	40	8700	20	8680	20
	MPa	0,4	60	0,2	59,8	0,2
34D-P400...	bar	4	400	2	398	2
	PSI	40	5800	20	5780	20
	MPa	0,4	40	0,2	39,8	0,2
34D-P250...	bar	2	250	1	249	1
	PSI	40	3620	20	3600	20
	MPa	0,2	25	0,1	24,9	0,1
34D-P160...	bar	1	160	0,5	159,5	0,5
	PSI	14,5	2320	5	2313	7,25
	MPa	0,1	16	0,05	15,9	0,05
34D-P100...	bar	1	100	0,5	99,5	0,5
	PSI	14,5	1450	7,25	1442,75	5
	MPa	0,1	10	0,05	9,95	0,05
34D-P040...	bar	1	40	0,5	39,5	0,5
	PSI	14,5	580	7,25	572,75	7,25
	MPa	0,1	4	0,05	3,95	0,05
34D-P016...	bar	1	16	0,5	15,5	0,5
	PSI	14,5	232	7,25	224,75	7,25
	kPa	0,1	1,6	0,05	1,55	0,05
34D-V110...	bar	-0,9	10	-0,95	9,95	0,05
	PSI	-13,5	145	-14	144,5	0,5
	MPa	-0,09	1	0,095	0,995	0,005
34D-V101...	mbar	-980	1000	-990	990	10
	PSI	-14,3	14,5	-14,4	14,4	0,1
	kPa	-98	100	-99	99	1
	inHG	-29	29,6	-29,2	29,4	0,2

ΔP = step increment

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Electronic Pressure Sensor
34D-xxxxx-DA1-xx
1x PNP/ 1x analogue (1x IO-Link, configurable)

12. Factory setting

	Factory setting	User setting / Comments
SP1 / FH1	25% MEW*	
rP1 / FL1	23% MEW*	
ou1	Hno	
ou2	I	
dS1	0,0	
dr1	0,0	
dAP	0,06	
dAA	0,0	
uni	bAr / mbAr	
coLr	rEd	
cFH	MEW***	
cFL	MAW**	
diS	d2	
colr	rEd	
diS	d2	

* = 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.
** = measuring range initial value (MAW)
***= Final value of the measuring range (MEW)

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Electronic Pressure Sensor
34D-xxxxx-DA1-xx
1x PNP/ 1x analogue (1x IO-Link, configurable)

The data specified above only serve to describe the product.
No statements concerning a certain condition or suitability for a
certain application can be derived from our information.
The given information does not release the user from the
obligation of own judgement and verification.
It must be remembered that our products are subject to a natural process of wear and aging.
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