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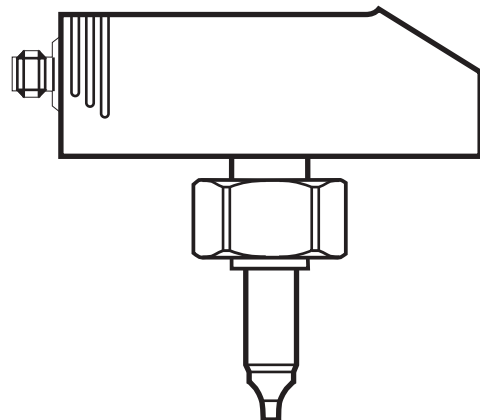
Operating instructions
Compressed air meter

efector300[®]

SD0523

UK

11406627 / 00 06 / 2015



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1 Preliminary note

1.1 Symbols used

- ▶ Instructions
- > Reaction, result
- [...] Designation of pushbuttons, buttons or indications
- Cross-reference
-  Important note
Non-compliance can result in malfunction or interference.
-  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.
- Ensure before mounting the components into or removing them from the compressed air system that the installation is at a standstill and no pressure is applied.
- Improper or non-intended use may lead to malfunctions of the unit or to unwanted effects in your application. That is why installation, electrical connection, set-up, operation and maintenance of the unit must only be carried out by qualified personnel authorised by the machine operator.
- In order to guarantee the correct condition of the device for the operating time the device must only be used in media to which the wetted parts are sufficiently resistant (→ Technical data).
- The responsibility whether the measurement devices are 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 result in a loss of the warranty claims.

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3 Functions and features

The unit monitors the standard volume flow of compressed air in industrial use.

It detects the 4 process variables flow velocity, volumetric flow quantity, consumed quantity, medium temperature.

- Application: compressed air systems in industrial use.
- All indications apply for standard volume flow to DIN ISO 2533, i.e. volume flow at 1013 hPa, 15 °C and 0 % relative air humidity.
The unit can be set to different standard conditions (→ 9.6.8 and → 9.6.9).
- The general operating conditions of compressed air equipment apply.

4 Function

4.1 Process measured signals

- The unit displays the current process values.
- It generates 2 output signals according to the parameter setting.

OUT1: 4 selection options	Parameter setting
- Switching signal for volumetric flow quantity limit value	(→ 9.3.2)
- or switching signal for flow velocity	(→ 9.3.2)
- or pulse signal for quantity meter	(→ 9.4.1)
- or switching signal for preset counter	(→ 9.4.2)

OUT2: 6 selection options	Parameter setting
- Switching signal for volumetric flow quantity limit value	(→ 9.3.3)
- or switching signal for flow velocity limit value	(→ 9.3.3)
- or switching signal for temperature limit value	(→ 9.5.1)
- or analogue signal for volumetric flow quantity	(→ 9.3.4)
- or analogue signal for flow velocity	(→ 9.3.4)
- or analogue signal for temperature	(→ 9.5.2)

If not used as an output, OUT2 (pin 2) can instead be used as an input for an external reset signal. (→ 9.4.6)

4.2 Volumetric flow monitoring

The volumetric flow is monitored by a calorimetric measuring system, the measured signals are evaluated by the electronics.

- 2 switching signals for volumetric flow limit values can be provided (output 1 and output 2). On the switching functions → 4.5.
- An analogue signal which is proportional to the volumetric flow (4...20 mA) can be provided on output 2. On the analogue functions → 4.6.

4.3 Consumed quantity monitoring

The unit has an internal quantity meter which continuously totals the volumetric flow quantity. The sum corresponds to the current consumed quantity since the last reset.

- The current meter reading can be displayed.

- In addition the value before the last reset is saved. This value can also be displayed.

The meter saves the totalled consumed quantity every 10 minutes. After a power failure this value is available as the current meter reading. If a time-controlled reset is set, the elapsed time of the set reset interval is also saved. So the possible data loss can be maximum 10 minutes.

- Overflow: After the maximum value (9 999 999 Nm³) the meter is reset to 0.

The meter can be reset as follows:

- Manual reset (→ 9.4.4).
- Time-controlled automatic reset (→ 9.4.4).
- External input signal on pin 2 (→ 9.4.6).

4.3.1 Consumed quantity monitoring with pulse output

Output 1 provides a counting pulse each time the value set in [ImPS] is reached (→ 9.4.1).

4.3.2 Consumed quantity monitoring with preset counter

2 types of monitoring are possible:

- Time-dependent quantity monitoring.
 - Settings: [ImPS] = quantity x, [ImPR] = [no], [rTo] = time t.
 - If the quantity x is reached during t, output 1 switches and remains switched until the counter is reset.
 - If the quantity x is not reached after the time t has elapsed, the meter is automatically reset and counting starts again; output 1 does not switch.
- Non time-dependent quantity monitoring.
 - Settings: [ImPS] = quantity x, [ImPR] = [no], [rTo] = [OFF].
 - If the quantity x is reached, output 1 switches and remains switched until the counter is reset.

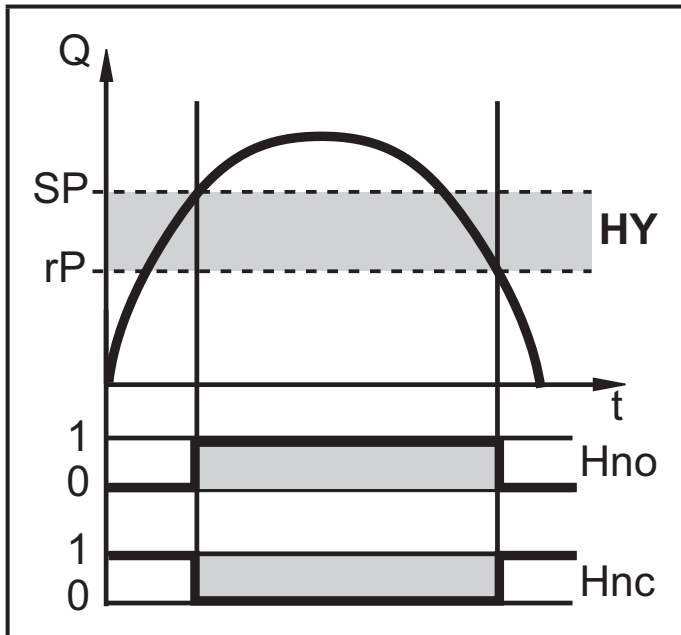
4.4 Temperature monitoring

- A switching signal for temperature limit values can be provided on output 2. On the switching functions → 4.5.
- An analogue signal which is proportional to the temperature (4...20 mA) can be provided on output 2. On the analogue functions → 4.6.

4.5 Volumetric flow or temperature monitoring / 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:

4.5.1 Hysteresis function



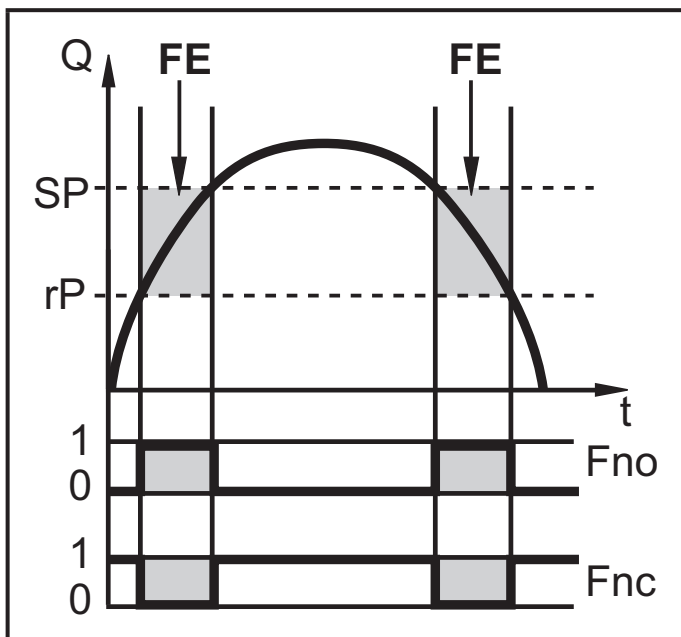
HY = hysteresis

Normally open: [OUx] = [Hno]

Normally closed: [OUx] = [Hnc]

First the set point (SPx) is set, then the reset point (rPx) with the requested difference.

4.5.2 Window function



FE = window

Normally open: [OUx] = [Fno]

Normally closed: [OUx] = [Fnc]

The width of the window can be set by means of the difference between SPx and rPx.

SPx = upper value

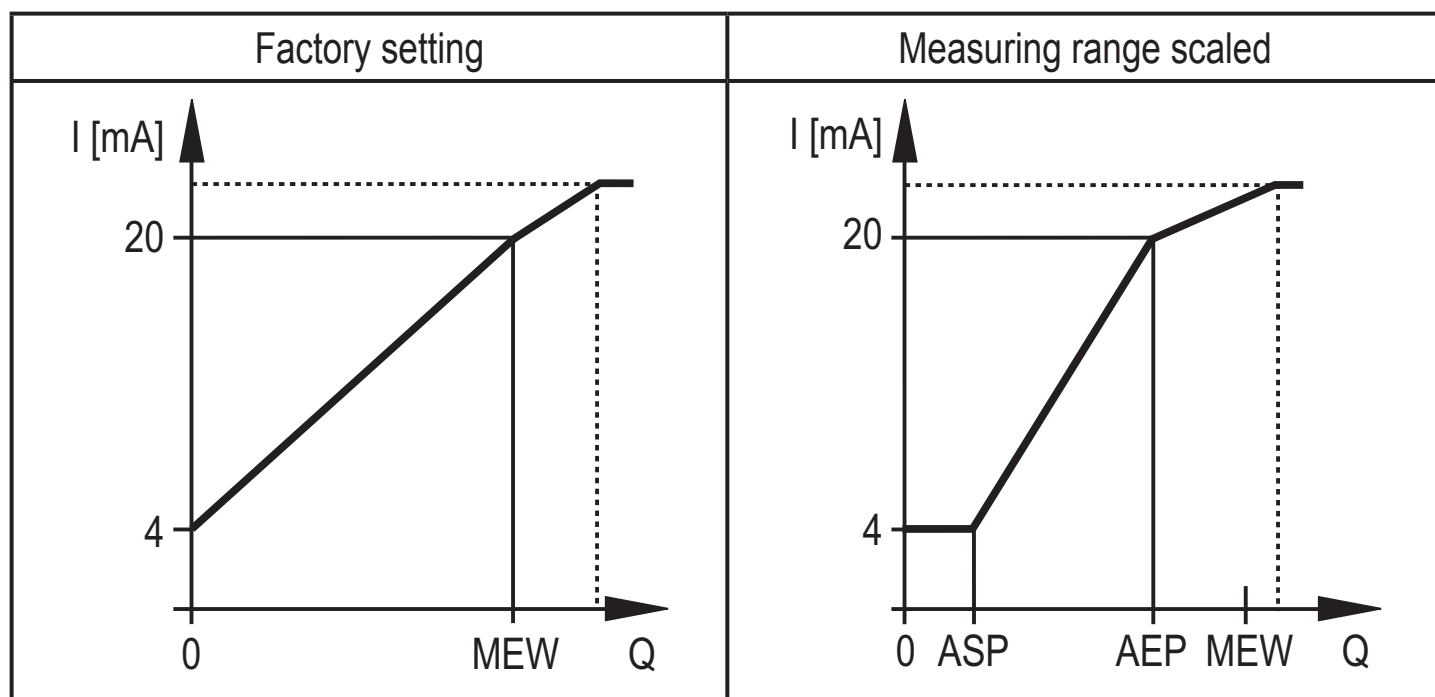
rPx = lower value.

4.6 Volumetric flow or temperature monitoring / analogue function

- Analogue start point [ASP] determines at which measured value the output signal is 4 mA.
- Analogue end point [AEP] determines at which measured value the output signal is 20 mA.

Minimum distance between [ASP] and [AEP] = 25 % of the final value of the measuring range.

Example of volumetric flow monitoring:



MEW = final value of the measuring range

In the set measuring range the output signal is between 4 mA and 20 mA.

It is also indicated:

Volumetric flow above the measuring range: output signal > 20 mA.

4.7 Adjustment to the internal pipe width

The unit can be used for different internal pipe widths. The selected internal pipe width must be set via the menu (→ 9.3.1 Adjustment to the internal pipe width).



Set the internal pipe widths before defining values for switching limits (SPx, rPx) and analogue limit values (ASP, AEP).

4.8 Set standard conditions of the volume flow

The unit is adjusted to a standard volume flow to DIN ISO 2533, i.e. volume flow at 1013 hPa, 15 °C and 0 % relative air humidity.

The unit can be set to different standard conditions:

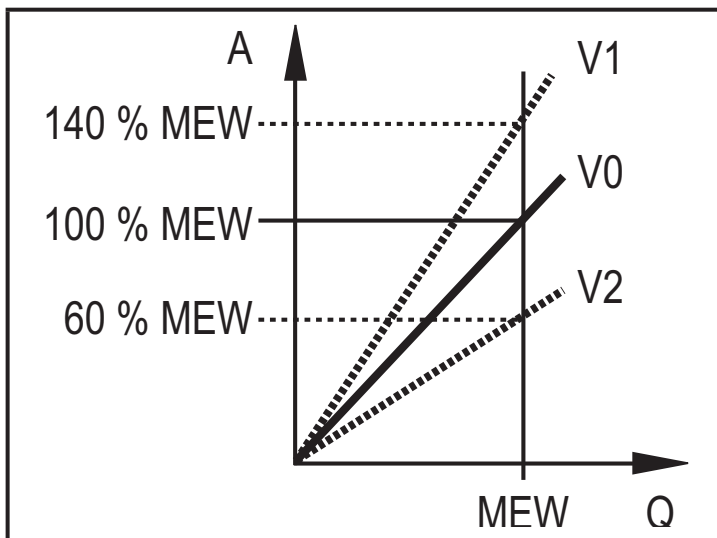
- Via the menu item [rEF.P] the standard pressure is set, which serves as a reference for the measured and display values for volumetric flow (→ 9.6.8).
- Via the menu item [rEF.T] the standard temperature is set, which serves as a reference for the measured and display values for volumetric flow (→ 9.6.9).

4.9 Low flow cut-off (LFC)

With this function small volumetric flow quantities can be ignored (→ 9.6.5). Flows below the LFC value have no effect on the display and output signals.

4.10 Customer-specific calibration (CGA)

The customer-specific calibration allows changing the gradient of the curve of measured values. It influences the display and the outputs.



A	Operating value for display and output signals
Q	Volumetric flow
MEW	Final value of the measuring range
V0	Curve of measured values with factory setting
V1, V2	Curve of measured values after calibration

The change in the gradient is indicated in per cent. Factory setting = 100 %. After a change the calibration can be reset to factory setting (→ 9.6.7).

5 Installation



The rules and regulations for the installation and operation of compressed air equipment must be observed.

Installation in pipes:

- ▶ Insert the unit into a G1 process adapter and tighten the nut. Tightening torque max. 50 Nm. Ensure that the unit is correctly oriented.

5.1 Installation location

- Downstream of the cold dryer / near the load.
- If compressed air is fed into the main pipe through parallel pipes, the unit should be mounted in the main pipe.

- Installation downstream of the maintenance unit is also possible (if oil is used for the loads, the units must be mounted upstream of the oiler).

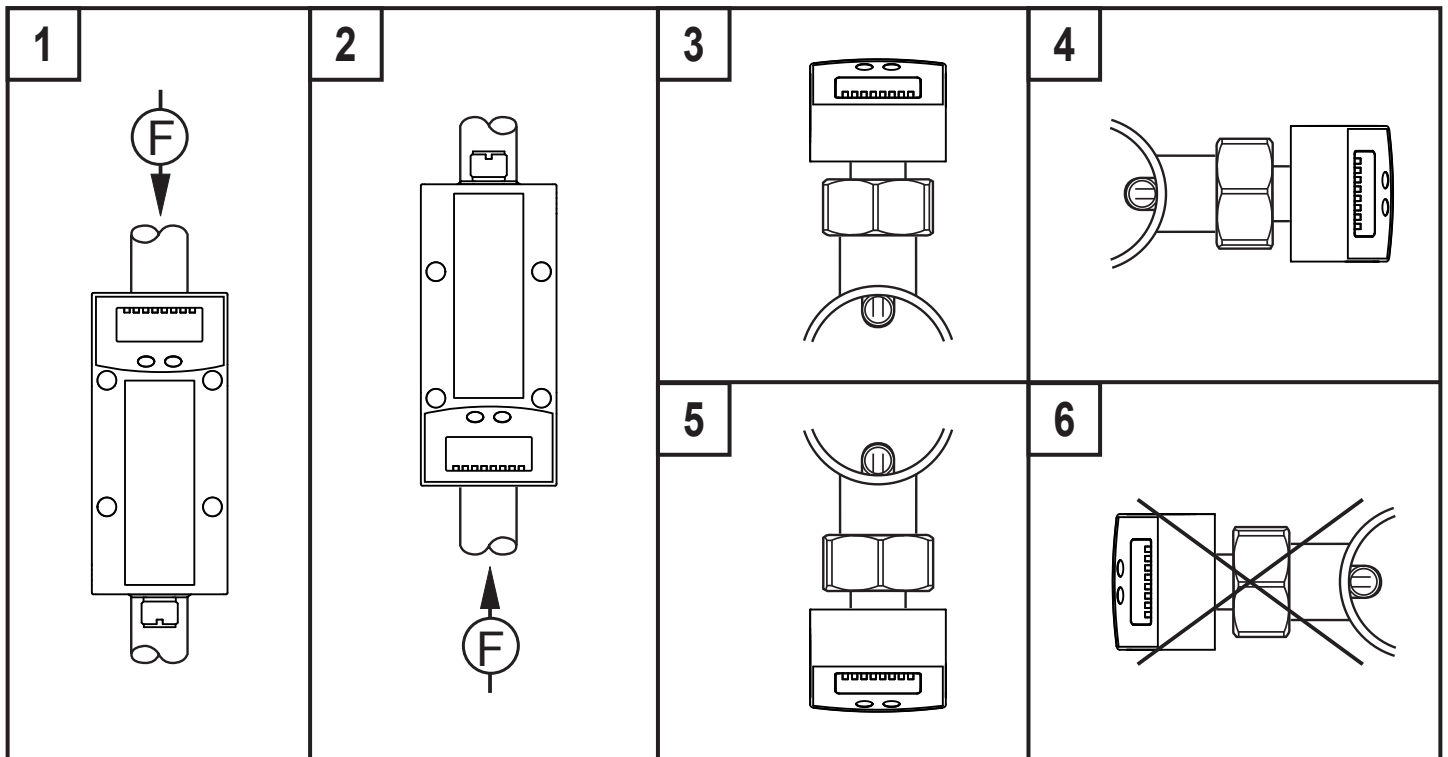
5.2 Installation conditions

Recommendation:

- ▶ Use a straight inlet pipe with a length of 20 x pipe diameter.
- ▶ In case of disturbances on the inlet side caused by elbows, valves, slides etc. use an inlet pipe with a length of 50 x pipe diameter.
- ▶ Use a straight outlet pipe with a length of 5 x pipe diameter.

5.3 Installation position

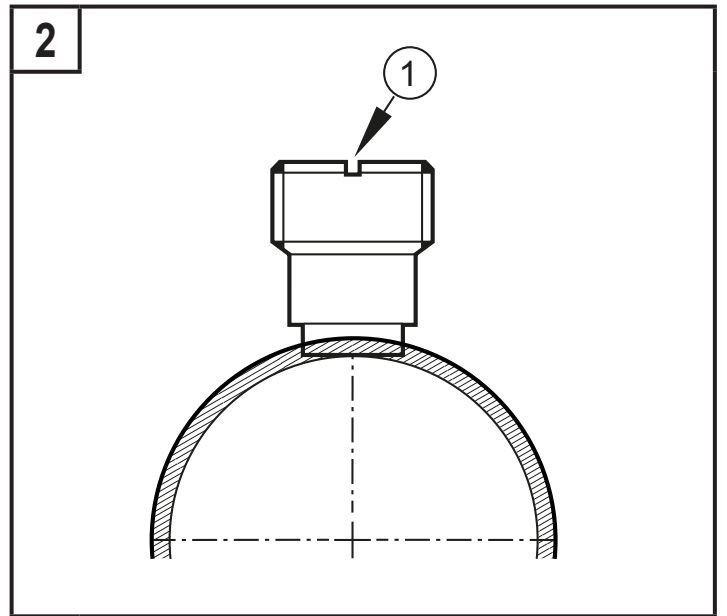
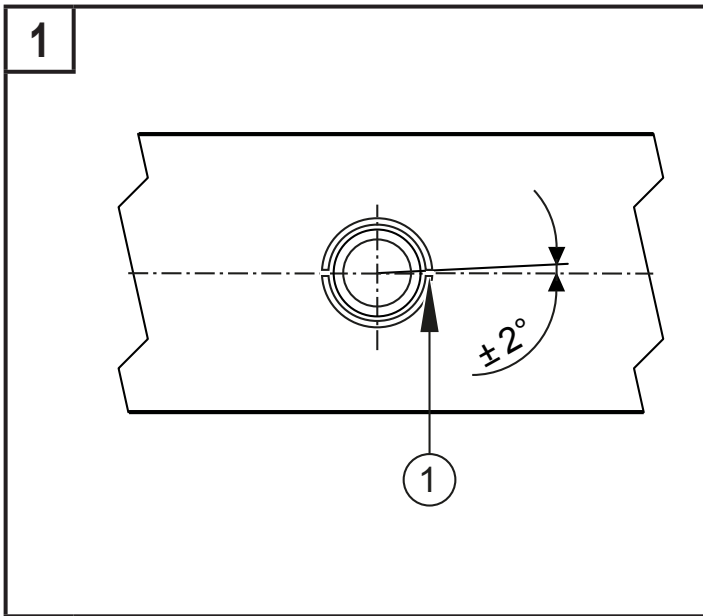
- Permitted installation positions: pipe length vertical, any position (fig. 1, 2); pipe length horizontal, unit vertical (fig. 3, 5); unit on side, pipe length left (fig. 4).
- Avoid the installation position in fig. 6 (unit on side, pipe length right). If the flow rate is low, the specified measurement accuracy cannot be adhered to.



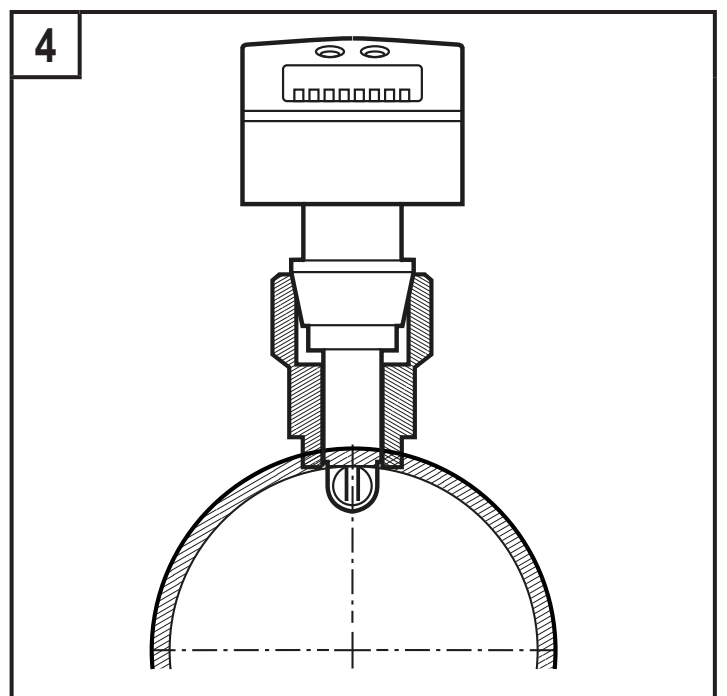
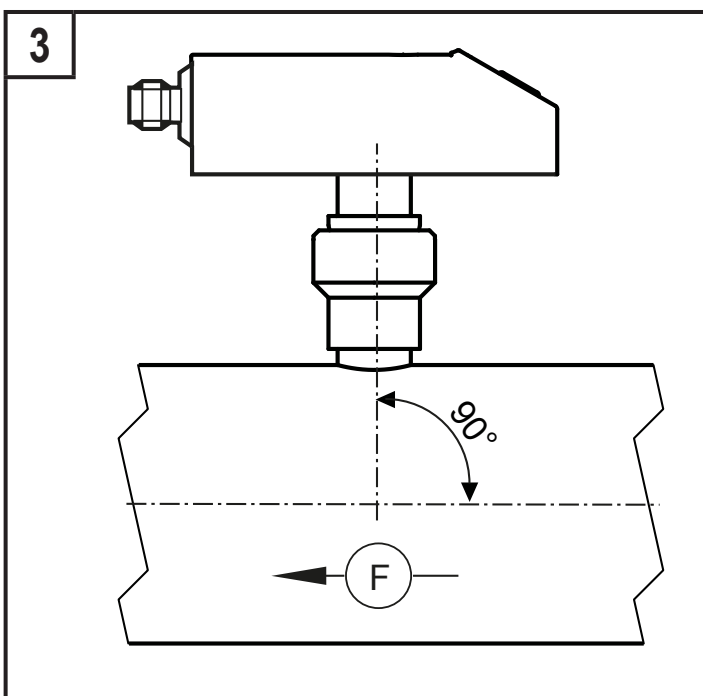
5.4 Installation example using the process adapter E40195

For an ideal alignment of the sensor's measuring probe to the direction of flow of the medium (fig. 4), observe the following notes on welding of the E40195 process adapter into the pipe:

- ▶ Drill a hole for the process adapter into the pipe and remove all burrs.
- ▶ Align the adapter with the alignment mark at a max. offset of $\pm 2^\circ$ to the pipe axis (fig. 1 and 2).
- ▶ Ensure that the adapter does not extend into the pipe (fig. 2).
- ▶ Install the adapter precisely vertically in the pipe (fig. 3).



1: Alignment mark



6 Electrical connection



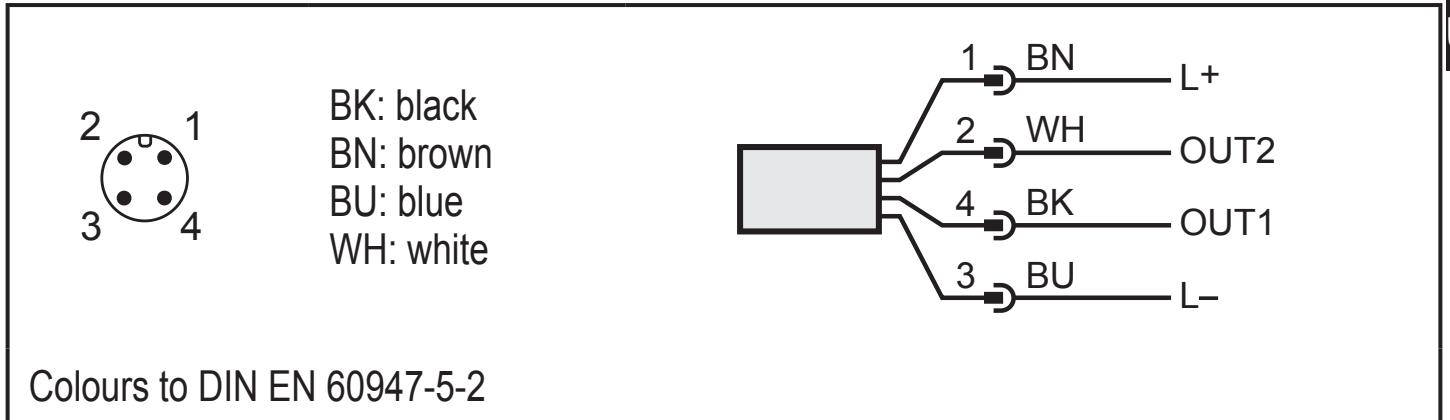
The unit must be connected by a qualified electrician.

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

Voltage supply according to EN 50178, SELV, PELV.

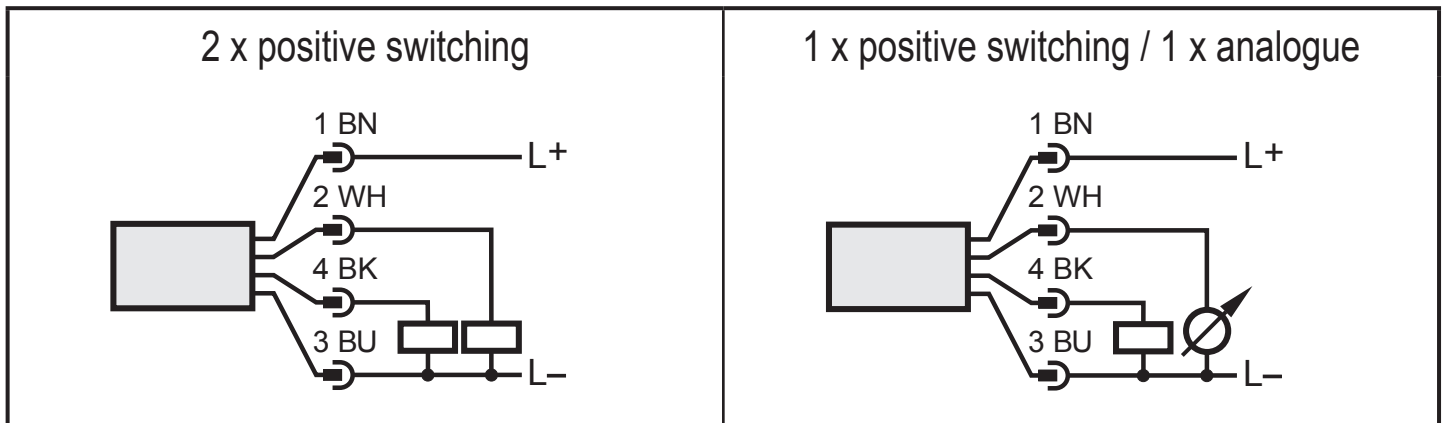
► Disconnect power.

► Connect the unit as follows:



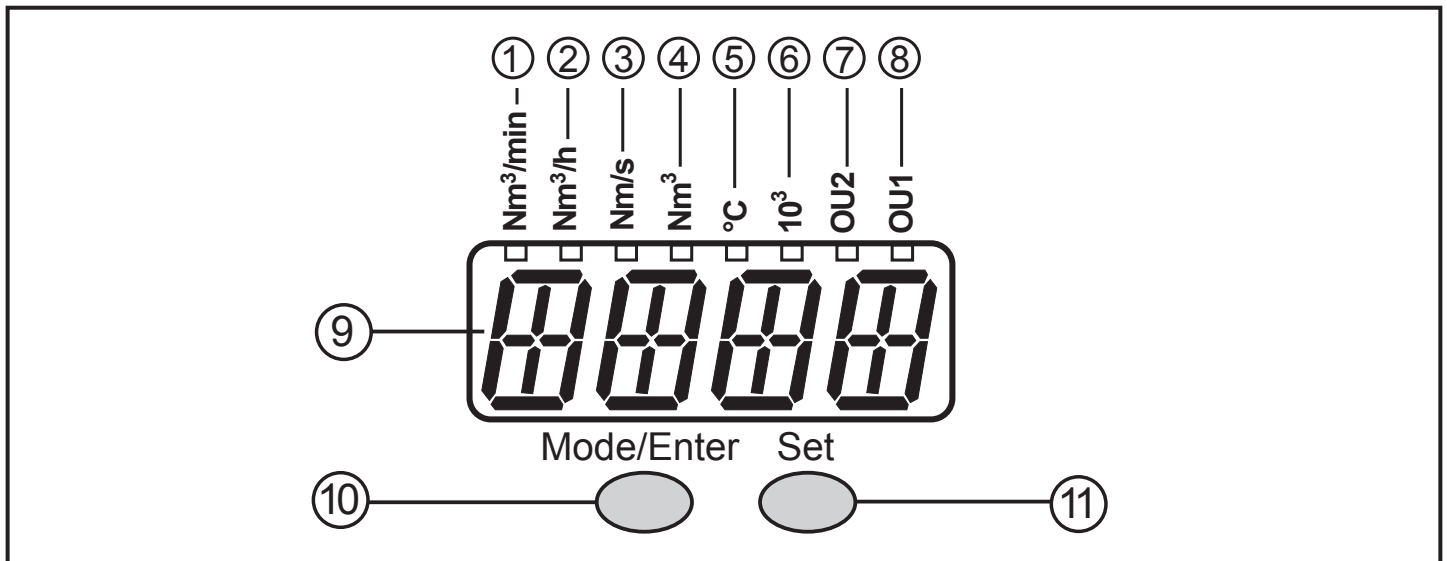
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Sample circuits:



Pin 1	L+
Pin 3	L-
Pin 4 (OUT1)	<ul style="list-style-type: none"> • Switching signal: limit values for volumetric flow. • Switching signal: quantity meter reached preset value. • Pulses: 1 pulse every time the defined volumetric flow quantity is reached. • IO-Link
Pin 2 (OUT2/InD)	<ul style="list-style-type: none"> • Switching signal: limit values for volumetric flow. • Switching signal: limit values for temperature. • Analogue signal for volumetric flow. • Analogue signal for temperature. • Input for signal "meter reset".

7 Operating and display elements



1 to 8: indicator LEDs

- LED 1 = current volumetric flow in standard cubic metres/minute(Nm³/min).
- LED 2 = current volumetric flow in standard cubic metres/hour (Nm³/h).
- LED 3 = current flow velocity in standard metres/second (Nm/s).
- LED 4 = current consumed quantity since the last reset in standard cubic metres (Nm³).
- LED 4 flashing = consumed quantity before the last reset in standard cubic metres (Nm³).
- LED 4 and 6 = current consumed quantity since the last reset in 10³ standard cubic metres.
- LED 4 and 6 flashing = consumed quantity before the last reset in 10³ cubic metres.
- LED 5 = current medium temperature in °C.
- LED 7, LED 8 = switching state of the corresponding output.

9: Alphanumeric display, 4 digits

- Indication of the current volumetric flow quantity (if [SELd] = [FLOW] is set).
- Indication of the meter reading (if [SELd] = [TOTL] is set).
- Indication of the current medium temperature (→ 10.2).
- Indication of the parameters and parameter values.

10: Mode/Enter button

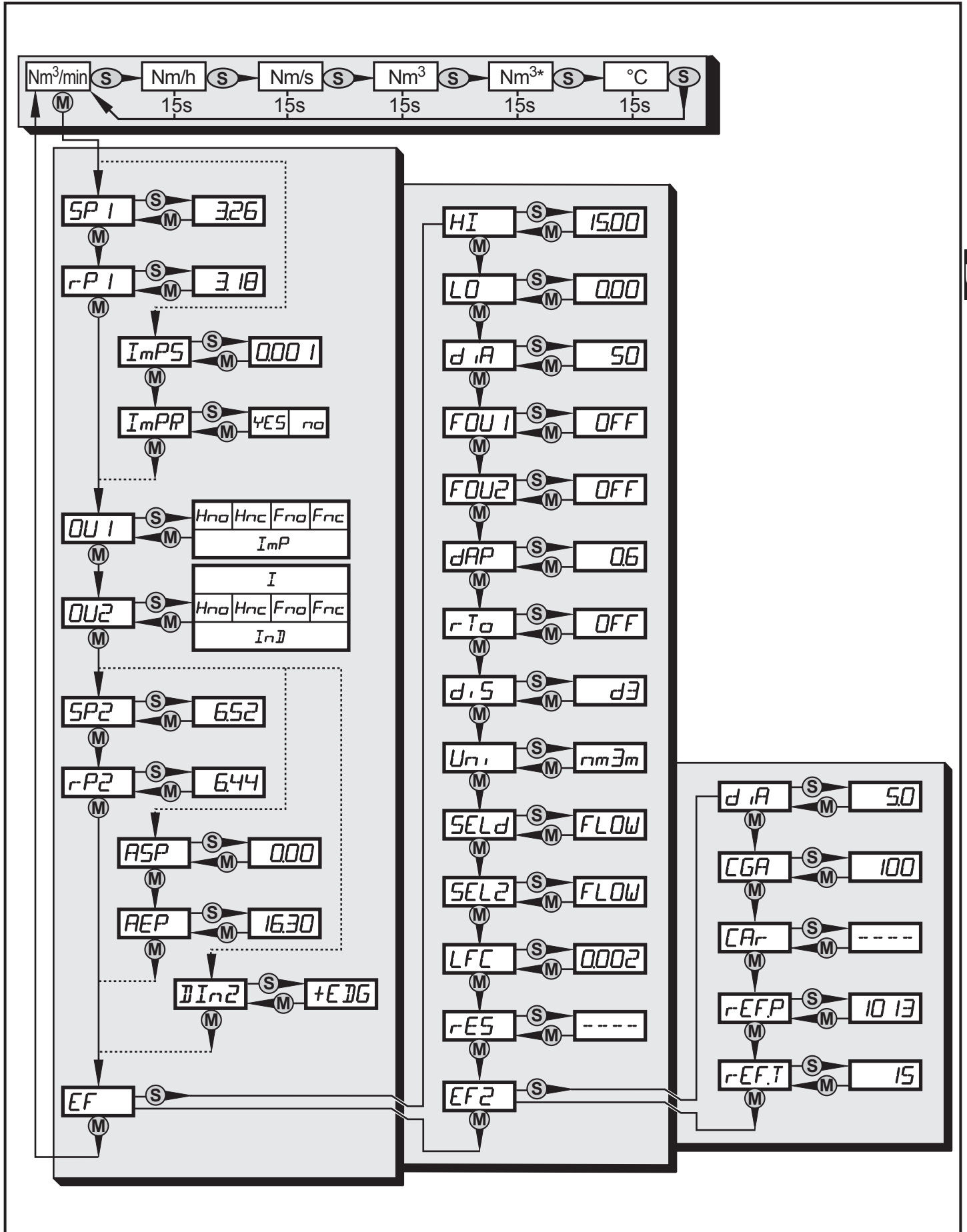
- Selection of the parameters and acknowledgement of the parameter values.

11: Set button

- Setting of the parameter values (scrolling by holding pressed; incrementally by pressing once).
- Change of the display unit in the normal operating mode (Run mode).

8 Menu

8.1 Menu structure



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Ⓜ = [Mode/Enter] / Ⓢ = [Set]

Nm³ = current meter reading in Nm³ / Nm³* = saved meter reading in Nm³

8.2 Explanation of the menu

SP1/rP1	Upper / lower limit value for volumetric flow.
ImPS	Pulse value.
ImPR	Pulse repetition active (= pulse output) or not active (= preset counter function).
OU1	Output function for OUT1 (volumetric flow or consumed quantity): - Switching signal for the limit values: hysteresis function or window function, either normally open or normally closed. - Pulse or switching signal for quantity meter.
OU2	Output function for OUT2 (volumetric flow or temperature): - Switching signal for the limit values: hysteresis function or window function, either normally open or normally closed. - Analogue signal: 4-20 mA [I].
	As an alternative: configure OUT2 (pin 2) as input for external reset signal: Setting: [OU2] = [InD].
SP2/rP2	Upper / lower limit value for volumetric flow or temperature.
ASP / AEP	Analogue start value / analogue end value for volumetric flow or temperature.
DIn2	Configure the input (pin 2) for meter reset.

8.2.1 Extended functions (1)

EF	Extended menu
HI / LO	Maximum / minimum value memory for volumetric flow.
diA	Indication of the internal pipe diameter in mm.
FOU1	Status of output 1 in case of an internal fault.
FOU2	Status of output 2 in case of an internal fault.
dAP	Measured value damping / damping constant in seconds.
rTo	Meter reset: manual reset / time-controlled reset.
diS	Update rate and orientation of the display.
Uni	Standard unit of measurement for volumetric flow: Nm ³ /min or Nm/s.
SELd	Standard measured variable of the display: volumetric flow value, meter reading or medium temperature.
SEL2	Standard measured variable for evaluation by OUT2: - Limit value signal or analogue signal for volumetric flow. - Limit value signal or analogue signal for temperature.
LFC	Low flow cut-off.
rES	Restore factory setting.

8.2.2 Extended functions (2)

EF2	Extended menu 2.
diA	Setting of the inner pipe diameter in mm.
CGA	Calibration of the curve of measured values: define gradient.
CAR	Reset the calibration data.
rEF.P	Standard pressure which serves as a reference for measured and display values for volumetric flow.
rEF.T	Standard temperature which serves as a reference for measured and display values for volumetric flow.

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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 IO-Link

9.1.1 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.

You will find more detailed information about IO-Link at www.ifm.com/gb/io-link.

9.1.2 Device-specific information

You will 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 www.ifm.com/gb/io-link.

9.1.3 Parameter setting tools

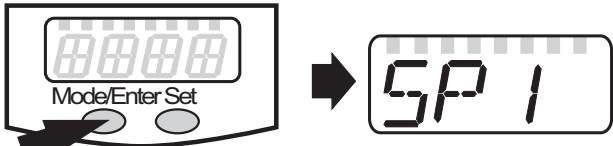
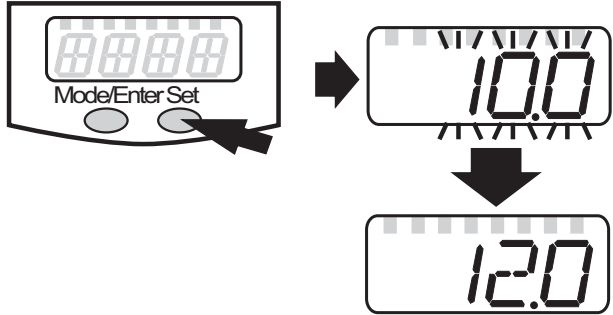
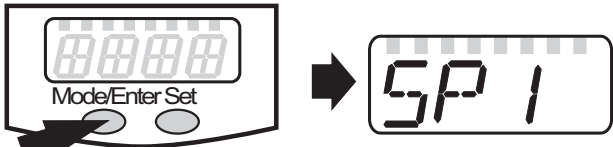
You will find all necessary information about the required IO-Link hardware and software at www.ifm.com/gb/io-link.

9.1.4 Adjustable parameters via IO-Link

- Inner pipe diameter [diA]
- Meter reset [rTo]

9.2 Parameter setting in general

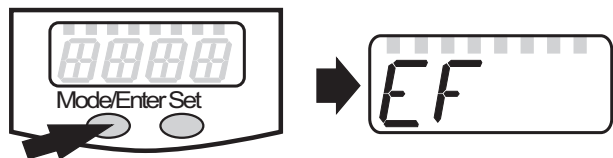
3 steps must be taken for each parameter setting:

<p>1 Select the parameter</p> <ul style="list-style-type: none"> ▶ Press [Mode/Enter] until the requested parameter is displayed. 	
<p>2 Set the parameter value</p> <ul style="list-style-type: none"> ▶ Press and hold [Set]. > Current setting value of the parameter flashes for 5 s. > After 5 s: setting value is changed: incrementally by pressing once or scrolling by holding pressed. <p>Numerical values are incremented continuously. To reduce the value: let the display move to the maximum setting value. Then the cycle starts again at the minimum setting value.</p>	
<p>3 Confirm the parameter value</p> <ul style="list-style-type: none"> ▶ Briefly press [Mode/Enter]. > The parameter is displayed again. The new setting value is saved. 	
<p>Set other parameters</p> <ul style="list-style-type: none"> ▶ Start again with step 1. 	
<p>Finish parameter setting</p> <ul style="list-style-type: none"> ▶ Press [Mode/Enter] several times until the current measured value is displayed or wait for 15 s. > The unit returns to the operating mode. 	

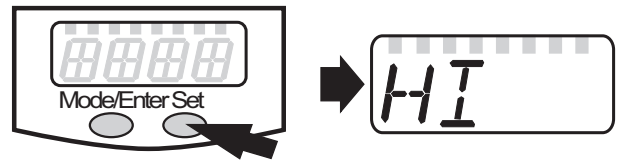


If [S.Loc] is displayed when an attempt is made to modify a parameter value, either an IO-Link communication is active (temporary locking) or the sensor is permanently locked via software. This locking can only be removed with a parameter setting software.

9.2.1 Extended menu 1

<ul style="list-style-type: none"> ▶ Press [Mode/Enter] until [EF] is displayed. 	
---	--

- ▶ Press [Set] briefly.
- > The first parameter of the submenu is displayed (here: [HI]).



9.2.2 Extended menu 2

- ▶ Press [Mode/Enter] until [EF] is displayed.
- ▶ Press [Set] briefly.
- > [EF2] is displayed.
- ▶ Press [Set] briefly.
- > The first parameter of the extended menu [diA] is displayed.



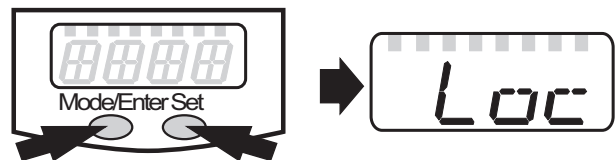
If the extended menu is protected by an access code, [Cod] flashes in the display.

- ▶ Press and hold [Set] until the valid code no. is displayed.
- ▶ Briefly press [Mode/Enter].

9.2.3 Locking / unlocking

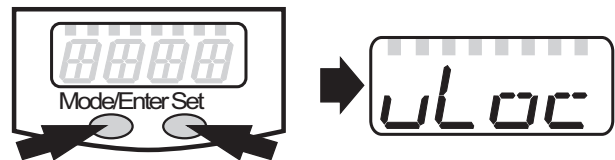
The unit can be locked electronically to prevent unintentional settings.

- ▶ Make sure that the unit is in the normal operating mode.
- ▶ Press [Mode/Enter] + [Set] for 10 s.
- > [Loc] is displayed.



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

- For unlocking:
- ▶ Press [Mode/Enter] + [Set] for 10 s.
 - > [uLoc] is displayed.




Factory setting: not locked.

9.2.4 Timeout

If no button is pressed for 15 s during parameter setting, the unit returns to the operating mode with unchanged values.

9.3 Settings for volumetric flow monitoring

9.3.1 Adjustment to the internal pipe width

<ul style="list-style-type: none">▶ Select [diA] and set a numerical value in mm.  Set the internal pipe widths before defining values for switching limits (SPx, rPx) and analogue limit values (ASP, AEP).	<i>di A</i>
--	-------------

9.3.2 Configure limit value monitoring with OUT1

<ul style="list-style-type: none">▶ Select [Uni] and set the unit of measurement (→ 9.6.1).▶ Select [OU1] and set the switching function.<ul style="list-style-type: none">- [Hno] = hysteresis function/normally open.- [Hnc] = hysteresis function/normally closed.- [Fno] = window function/normally open.- [Fnc] = window function/normally closed.▶ Select [SP1] and set the value at which the output switches.▶ Select [rP1] and set the value at which the output resets.	<i>Uni OU 1 SP 1 r-P 1</i>
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9.3.3 Configure limit value monitoring with OUT2


<ul style="list-style-type: none">▶ Select [Uni] and set the unit of measurement (→ 9.6.1).▶ Select [SEL2] and set [FLOW].▶ Select [OU2] and set the switching function.<ul style="list-style-type: none">- [Hno] = hysteresis function/normally open.- [Hnc] = hysteresis function/normally closed.- [Fno] = window function/normally open.- [Fnc] = window function/normally closed.▶ Select [SP2] and set the value at which the output switches.▶ Select [rP2] and set the value at which the output resets.	<i>Uni SEL2 OU2 SP2 r-P2</i>
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9.3.4 Configure analogue value for volumetric flow


<ul style="list-style-type: none">▶ Select [Uni] and set the unit of measurement (→ 9.6.1).▶ Select [SEL2] and set [FLOW].▶ Select [OU2] and set the function.<ul style="list-style-type: none">- [I] = current signal proportional to volumetric flow (4...20 mA).▶ Select [ASP] and set the value at which the minimum value is provided.▶ Select [AEP] and set the value at which the maximum value is provided.	<i>Uni SEL2 OU2 ASP AEP</i>
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9.4 Settings for consumed quantity monitoring

9.4.1 Configure quantity monitoring via pulse output


<ul style="list-style-type: none">▶ Select [OU1] and set [ImP].▶ Select [ImPS] and set the volumetric flow quantity at which 1 pulse is provided (→ 9.4.3).▶ Select [ImPR] and set [YES]> Pulse repetition is active. Output 1 provides a counting pulse each time the value set in [ImPS] is reached.	 <p>OU 1 ImPS ImPR</p>
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9.4.2 Configure quantity monitoring via the preset counter

<ul style="list-style-type: none">▶ Select [OU1] and set [ImP].▶ Select [ImPS] and set the volumetric flow quantity at which output 1 switches (→ 9.4.3).▶ Select [ImPR] and set [no]> Pulse repetition is not active. The output switches ON if the value set in [ImPS] is reached. It remains switched until the counter is reset.	 <p>OU 1 ImPS ImPR</p>
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9.4.3 Setting the pulse value

- ▶ Select [ImPS].
- ▶ Press and hold [Set].
- > The current numerical value flashes for 5 s, then one of the 4 digits becomes active and can be changed as below:
 1. Briefly press [Set]
 - > Active figure is changed.
 2. Keep [Set] pressed
 - > The next figure on the left becomes active.
-  - After the cycle of the figures on the left on the display the display changes to the next higher setting range (decimal point shifts or LED changes).
 - Change to the lower setting range: Keep [Set] pressed until the display moves through all ranges and jumps back to the start value.
- 3. Wait without pressing a button
 - > The next figure on the right becomes active.
- ▶ Briefly press [Mode/Enter] when all 4 digits are set.

ImPS

Setting ranges:

LED	Display	Value	Step increment
4	0 0 0 1 ... 9 9 9 9	1...9999 Nm ³	1 Nm ³
4 + 6	1 0 .0 0 ... 9 9 .9 9	10 000...99 990 Nm ³	10 Nm ³
4 + 6	1 0 0 .0 ... 9 9 9 .9	100 000...999 900 Nm ³	100 Nm ³
4 + 6	1 0 0 0 ... 1 0 0 0	1 000 000 Nm ³	

9.4.4 Configure program-controlled meter reset

- ▶ Select [rTO] and continue with a) or b).
- a) Reset the meter manually:
 - ▶ Press [SET] until [rES.T] is displayed, then briefly press [Mode/Enter].
- b) Enter the value for time-controlled reset
 - ▶ Press [Set] until the requested value is displayed (intervals from 1 hour to 8 weeks), then briefly press [Mode/Enter].

rTO

9.4.5 Deactivate meter reset

<ul style="list-style-type: none"> ▶ Select [rTo] and set [OFF] <p>The meter is only reset after overflow (= factory setting).</p> <p>Overflow: After the maximum value (9 999 999 Nm³) the meter is reset to 0.</p>	
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9.4.6 Configure meter reset using an external signal

<ul style="list-style-type: none"> ▶ Select [OU2] and set [InD] ▶ Select [Din2] and set the reset signal <ul style="list-style-type: none"> - [HIGH] = reset for high signal - [LOW] = reset for low signal - [+EDG] = reset for rising edge - [-EDG] = reset for falling edge 	
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9.5 Settings for temperature monitoring

9.5.1 Configure limit value monitoring with OUT2


<ul style="list-style-type: none"> ▶ Select [SEL2] and set [TEMP]. ▶ Select [OU2] and set the switching function. <ul style="list-style-type: none"> - [Hno] = hysteresis function/normally open. - [Hnc] = hysteresis function/normally closed. - [Fno] = window function/normally open. - [Fnc] = window function/normally closed. ▶ Select [SP2] and set the value at which the output switches. ▶ Select [rP2] and set the value at which the output resets. 	
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9.5.2 Configure analogue value for temperature


<ul style="list-style-type: none"> ▶ Select [SEL2] and set [TEMP]. ▶ Select [OU2] and set the function. <ul style="list-style-type: none"> - [I] = temperature-proportional current signal (4...20 mA). ▶ Select [ASP] and set the value at which the minimum value is provided. ▶ Select [AEP] and set the value at which the maximum value is provided. 	
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9.6 User settings (optional)


9.6.1 Set standard unit of measurement for volumetric flow

<ul style="list-style-type: none">▶ Select [Uni] and set the unit of measurement<ul style="list-style-type: none">- [nm3m] = volumetric flow quantity in standard cubic metres/minute- [nm3h] = volumetric flow quantity in standard cubic metres/hour- [nmS] = flow velocity in standard metres / second <p>The setting only has an effect on the volumetric flow value. The meter reading (consumed quantity) is automatically displayed in the unit of measurement providing the highest accuracy.</p>	
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9.6.2 Configure standard display

<ul style="list-style-type: none">▶ Select [SELD] and set the standard unit of measurement:<ul style="list-style-type: none">- [FLOW] = the current volumetric flow value in the standard unit of measurement is displayed.- [TOTL] = the current meter reading in Nm³ or Nm³ x 10³ is displayed.- [TEMP] = the current medium temperature in °C is displayed.▶ Select [diS] and set the update rate and orientation of the display:<ul style="list-style-type: none">- [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 display is switched off in the operating mode.	
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9.6.3 Set output status in fault condition

<ul style="list-style-type: none">▶ Select [FOU1] and set the value:<ul style="list-style-type: none">- [On] = output 1 switches ON in case of a fault.- [OFF] = output 1 switches OFF in case of a fault.- [OU] = output 1 switches irrespective of the fault as defined with the parameters.▶ Select [FOU2] and set the value:<ul style="list-style-type: none">- [On] = output 2 switches ON in case of a fault, the analogue signal goes to the upper final value.- [OFF] = output 2 switches OFF in case of a fault, the analogue signal goes to the lower final value.- [OU] = output 2 switches irrespective of the fault as defined with the parameters. The analogue signal corresponds to the measured value.	
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9.6.4 Set measured value damping

<ul style="list-style-type: none">▶ Select [dAP] and set the damping constant in seconds (t value 63 %).	
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9.6.5 Set low flow cut-off

<ul style="list-style-type: none">▶ Select [LFC] and set the limit value Flows below the LFC value have no effect on the display and output signals.	LFC
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9.6.6 Calibrate curve of measured values

<ul style="list-style-type: none">▶ Select [CGA] and set a percentage between 60 and 140 (100 = factory setting).	CGA
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9.6.7 Reset calibration data

<ul style="list-style-type: none">▶ Select [CAr].▶ Press and hold [SET] until [----] is displayed.▶ Briefly press [Mode/Enter].> The values are reset to the factory setting (CGA = 100).	CAr-
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9.6.8 Set standard pressure which serves as a reference for measured and display values for volumetric flow

<ul style="list-style-type: none">▶ Select [rEF.P] and set the requested standard pressure Setting range: 950...1050 hPa in steps of 1 hPa	r-EFP
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9.6.9 Set standard temperature which serves as a reference for measured and display values for volumetric flow



<ul style="list-style-type: none">▶ Select [rEF.T] and set the requested standard temperature Setting range: 0...25 °C in steps of 1 °C	r-EF.T
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9.7 Service functions

9.7.1 Read min/max values for volumetric flow

<ul style="list-style-type: none">▶ Select [HI] or [LO], briefly press [Set]. [HI] = maximum value, [LO] = minimum value. Delete memory: <ul style="list-style-type: none">▶ Select [HI] or [LO].▶ Press and hold [Set] until [----] is displayed.▶ Briefly press [Mode/Enter]. It makes sense to delete the memories as soon as the unit operates under normal operating conditions for the first time.	HI LO
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9.7.2 Reset all parameters to factory setting

<ul style="list-style-type: none">▶ Select [rES].▶ Press and hold [Set] until [----] is displayed.▶ Briefly press [Mode/Enter]. <p> Recommendation:</p> <ul style="list-style-type: none">▶ Before the reset note down your factory settings. → 12 Factory setting.	
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10 Operation

Correct operation and compliance with the measurement accuracy can only be ensured if the environmental conditions specified in the technical data ((→ www.ifm.com → Data sheet search → Enter article number) are adhered to. Ensure that the maximum pressure range, measuring range and permitted ambient temperature are not exceeded.

After power-on and expiry of the power-on delay time (approx. 0.5 s) the unit is in the Run mode (= normal operating mode). It carries out its measurement and evaluation functions and generates output signals according to the set parameters.

- Operating indicators → 7 Operating and display elements.
- During the power-on delay time the outputs are switched as programmed: ON for normally open function (Hno, Fno), OFF for normally closed function (Hnc, Fnc).
- If output 2 is configured as analogue output, the output signal is at the final value of the measuring range during the power-on delay time.

10.1 Read set parameters

- ▶ Press [Mode/Enter] until the requested parameter is displayed.
- ▶ Press [Set] briefly.
- > The unit displays the corresponding parameter value. After about 15 s it again displays the parameter, then it returns to the Run mode.

10.2 Change display unit in the Run mode

- ▶ Press [Set] briefly in the Run mode. Press the button to move to the next display unit.
- > The unit displays the current measured value in the selected display unit for approx. 15 s, the corresponding LED is lit.

10.3 Fault indications

[SC1]	Short circuit in OUT1.*
[SC2]	Short circuit in OUT2.*
[SC]	Short circuit in both outputs.*
[OL]	Measured value > 120 % of the final value of the measuring range.
[UL]	Measured value < initial value of the measuring range.
[Err]	Flashing: fault in the measuring probe.

*The output concerned is switched off as long as the short circuit exists.
These messages are displayed even if the display is switched off.

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10.4 General operating conditions

The unit is maintenance-free for media which do not stick to the measuring probes.

- From time to time check the measuring probes visually for build-up.
- If necessary, clean them at regular intervals. To do so, use a suitable cleaning liquid (e.g. alcoholic solution).
- Avoid mechanical damage to the measuring probes.

11 Technical data and scale drawing

Technical data and scale drawing at www.ifm.com.

12 Factory setting

	Factory setting	User setting
SP1	422	
rP1	412	
ImPS	1	
ImPR	YES	
OU1	Hno	
OU2	I	
SP2 (FLOW)	844	

rP2 (FLOW)	834	
SP2 (TEMP)	24.0	
rP2 (TEMP)	23.8	
ASP (FLOW)	0.00	
AEP (FLOW)	2110	
ASP (TEMP)	0.0	
AEP (TEMP)	60.0	
DIn2	+EDG	
FOU1	OFF	
FOU2	OFF	
dAP	0.6	
rTo	OFF	
diS	d3	
Uni	nm3h	
SELd	FLOW	
SEL2	FLOW	
LFC	0.04	
diA	72	
CGA	100	
rEF.P	1013	
rEF.T	15	

More information at www.ifm.com