01.00.zz (Device firmware)

Description of Device Parameters **Dosimass** 

Coriolis flowmeter IO-Link







## Table of contents

1	About this document 4	ł
1.1	Document function 4	ł
1.2	Target group   4	ł
1.3	Using this document 4	ł
	1.3.1 Symbols 4	ł
	1.3.2 Information on the document	
	structure	ł
	1.3.3 Operation concept 5	;
	1.3.4 Structure of a parameter description 6	)
1.4	Related documentation 6	)
2	"Guidance" menu 7	,
2.1	"Commissioning" wizard	7
212	2.1.1 Device identification	7
	2.1.2 System units	3
	2.1.3 Totalizer 1 to n	2
	2.1.4 Process 14	ł
	2.1.5 Pulse/frequency/switch output	
	1 to n	3
	2.1.6 Time format 28	3
3	"Diagnostics" menu 29	)
31	Active diagnostics 30	)
3.2	Diagnostic list	Ś
33	Simulation 35	
3.4	Diagnostic settings	)
	3.4.1 Properties	)
	3.4.2 Diagnostic configuration 39	)
4	"Application" menu	,
- / 1	Magazina di se luca	7
4.1	(1.1 Totalizar (C	, ,
4.7	4.1.1 IOIdIIZEI 49	י ו
4.2 /. 2	Totalizars 5/	,
4.5	/ 3.1 Totalizer handling 5/	t
	4.3.2 Totalizer 1 to n 54	t L
44	Sensor 50	)
1. 1	4 4 1 Process parameters 59	)
	4.4.2 Low flow cutoff	
	4.4.3 Partially filled pipe detection	ŧ
	4.4.4 Sensor adjustment	
	4.4.5 Calibration	)
	4.4.6 Supervision	L
4.5	Pulse/frequency/switch output 1 to n 74	ł
4.6	Pulse output	)
4.7	Frequency output 82	)
4.8	Switch output	ว
4.9	Limit Switch output 88	3
4.10	Diagnostic behavior Switch output 92	2
4.11	Flow direction check Switch output 93	3
4.12	Status Switch output	ł

<b>5</b> 5.1 5.2 5.3 5.4	"System" menu       95         Device management       96         User management       98         Date/time       99         Information       100         5.4.1       Device       100         5.4.2       Electronic module       103
6	Country-specific factory settings 104
6.1	SI units       104         6.1.1       System units       104         6.1.2       Pulse value       104         6.1.3       Switch-on point low flow cut off       104         6.1.3       Switch-on point low flow cut off       104         6.2.1       System units       105         6.2.2       Pulse value       105         6.2.3       Switch-on point low flow cut off       105
7	Explanation of abbreviated units 106
7.1 7.2 7.3	SI units106US units106Imperial units107
Index	к 109

## 1 About this document

## 1.1 Document function

The document is part of the Operating Instructions and serves as a reference for parameters, providing a detailed explanation of each individual parameter of the operating menus.

It is used to perform tasks that require detailed knowledge of the function of the device:

- Optimal adaptation of the measurement to difficult conditions
- Detailed configuration of the communication interface
- Error diagnostics in difficult cases

## 1.2 Target group

The document is aimed at specialists who work with the device over the entire life cycle and perform specific configurations.

## 1.3 Using this document

### 1.3.1 Symbols

#### Types of information

- ✓ ✓ Preferred procedures, processes or actions
- Permitted procedures, processes or actions
- Forbidden procedures, processes or actions
- Image: Additional information
- Reference to documentation
- Reference to page
- Reference to graphic

#### 1.3.2 Information on the document structure

The parameters of all the operating menus and the commissioning wizard are described in this document.

- Guidance menu with the Commissioning wizard (→ 
   <sup>(⇒)</sup> 7), which guides the user automatically through all the device parameters that are required for commissioning
- Application menu (→ 🗎 47)
- Diagnostics menu (→ 🗎 29)
- System menu (→ 🗎 95)

Operation method	Operation via: • SmartBlue app <sup>1)</sup> • Commubox FXA291
Reliable operation	<ul> <li>Operation in local language</li> <li>Standardized operating concept on the device and in the SmartBlue app</li> <li>Write protection</li> <li>When electronics modules are replaced: configurations are transferred using the T-DAT Backup device memory. The device memory contains process data, device data and the event logbook. No reconfiguration is necessary.</li> </ul>
Diagnostic behavior	<ul> <li>Efficient diagnostic behavior increases measurement availability:</li> <li>Open troubleshooting measures via local display and SmartBlue app.</li> <li>Diverse simulation options</li> <li>Logbook of events that have occurred.</li> </ul>

#### **1.3.3** Operation concept

1) Optional via order code "Display; operation", options H, J or K

#### IO-Link

The device-specific parameters are configured via IO-Link. There are specific configuration or operating programs from different manufacturers available to the user for this purpose. The device description file (IODD) is provided for the device

#### IO-Link operating concept

Operator-oriented menu structure for user-specific tasks. Efficient diagnostic behavior increases measurement availability:

- Diagnostic messages
- Remedial measures
- Simulation options

#### IODD download

- Two options for downloading the IODD:
- www.endress.com/download
- https://ioddfinder.io-link.com/

#### www.endress.com/download

- 1. Select "Device drivers".
- 2. Under "Type", select the "IO Device Description (IODD)" item.
- 3. Select "Product root".
- 4. Click "Search ".
  - ← A list of search results is displayed.

Select and download the appropriate version.

#### https://ioddfinder.io-link.com/

- 1. Enter and select "Endress" as the manufacturer.
- 2. Select product name.
  - └ A list of search results is displayed.

Select and download the appropriate version.

For detailed IO-Link information, see "IO-Link" Special Documentation on the device  $\rightarrow \ \boxdot \ 6$ 

### 1.3.4 Structure of a parameter description

The individual parts of a parameter description are described in the following section:

Complete parameter name		Write-protected parameter = 🖻
Navigation	Ø	Navigation path to the parameter via the operating tool The names of the menus, submenus and parameters are abbreviated to the form in which they appear on the display and in the operating tool.
Prerequisite	The pa	rameter is only available under these specific conditions
Description	Description of the parameter function	
Selection	List of • Opti • Opti	the individual options for the parameter ion 1 ion 2
User entry	Input r	ange for the parameter
User interface	Display	y value/data for the parameter
Additional information	Additio • On i • On c • On t	onal explanations (e.g. in examples): ndividual options display values/data the input range

• On the parameter function

### 1.4 Related documentation

Technical information	Overview of the device with the most important technical data.
Operating instructions	All the information that is required in the various phases of the life cycle of the device: from product identification, incoming acceptance and storage, to mounting, connection, operation and commissioning through to troubleshooting, maintenance and disposal as well as the technical data and dimensions.
Sensor Brief Operating Instructions	Incoming acceptance, transport, storage and mounting of the device.
Transmitter Brief Operating Instructions	Electrical connection and commissioning of the device.
Description of Parameters	Detailed explanation of the menus and parameters.
Safety Instructions	Documents for the use of the device in hazardous areas.
Special Documentation	Documents with more detailed information on specific topics.
Installation Instructions	Installation of spare parts and accessories.

#### The related documentation is available online:

Device Viewer	On the www.endress.com/deviceviewer website, enter the serial number of the device: nameplate
Endress+Hauser Operations App	<ul><li>Scan the Data Matrix code: nameplate</li><li>Enter the serial number of the device: nameplate</li></ul>

## 2 "Guidance" menu

Main functions for use – from fast and safe commissioning to guided support during operation.

Navigation	🗟 😑 Guidance	
Guidance		
	► Commissioning	→ 🗎 7

## 2.1 "Commissioning" wizard

Complete this wizard to commission the device.

For each parameter, enter the appropriate value or select the appropriate option.

#### NOTE

If you exit the wizard before completing all required parameters, the changes you have made will be saved. For this reason, the device may then be in an undefined state! In this case, a reset to the default settings is recommended.

*Navigation*  $\square \square$  Guidance  $\rightarrow$  Commissioning

► Commissioning	
► Device identification	→ 🗎 7
► System units	→ 🗎 8
► Totalizer 1 to n	→ 🗎 12
► Process	$\rightarrow  extstyle{14}$
► Pulse/frequency/switch output 1	→ ■ 18
► Date/time	→ 🗎 28

### 2.1.1 Device identification

*Navigation*  $\square$  Guidance  $\rightarrow$  Commissioning  $\rightarrow$  Device ident.

Device name		
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ Device ident. $\rightarrow$ Device name
Description	Displa namej	ys the name of the transmitter. The transmitter name is also provided on the plate of the transmitter.

User interface	Character string comprising numbers, letters and special characters			
Serial number				
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Device ident. $\rightarrow$ Serial number			
Description	Displays the serial number of the measuring device. The serial number is also provided on the nameplate of the sensor and of the transmitter.			
	The serial number can also be used to retrieve further device-related information and documentation via the Operations app or the Device Viewer on the Endress+Hauser website.			
User interface	Character string comprising numbers, letters and special characters			
Firmware version				
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Device ident. $\rightarrow$ Firmware version			
Description	Displays the device firmware version installed.			
User interface	Character string comprising numbers, letters and special characters			

## 2.1.2 System units

Navigation

 $\begin{tabular}{ll} \hline \blacksquare & \end{tabular} Guidance \rightarrow \end{tabular} Commissioning \rightarrow \end{tabular} System units \end{tabular}$ 

Mass flow unit			
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ System units $\rightarrow$ Mass flow unit	
Description	Selec	t the mass flow unit.	

#### Selection SI units US units ∎ q/s oz/s • q/min oz/min ∎ g/h ■ oz/h ∎ g/d ■ oz/d ■ kg/s ■ lb/s kg/min Ib/min ■ kg/h ■ lb/h ■ kg/d ■ lb/d ■ t/s STon/s • t/min STon/min ■ t/h STon/h ■ t/d STon/d The IO-Link interface only offers the ${\bf kg/s}$ option. Additional information F

Mass unit			
Navigation	$ \qquad \qquad$	ommissioning $ ightarrow$ System units $ ightarrow$ Mass unit	
Description	Select the mass unit		
Selection	SI units • g • kg • t	US units • oz • lb • STon	
Volume flow unit			
Navigation	$\Box \qquad \text{Guidance} \rightarrow \text{C}$	ommissioning $\rightarrow$ System units $\rightarrow$ Volume flow unit	

Description

Select the volume flow unit.

Imperial units

gal/s (imp)

gal/h (imp)

gal/d (imp)

Mgal/s (imp)

Mgal/h (imp)

Mgal/d (imp)

Mgal/min (imp)

bbl/s (imp;beer)

bbl/h (imp;beer)

bbl/d (imp;beer)

bbl/s (imp;oil)bbl/min (imp;oil)

bbl/h (imp;oil)

bbl/d (imp;oil)

bbl/min (imp;beer)

gal/min (imp)

Selection

SI units •  $cm^3/s$ • cm<sup>3</sup>/min •  $cm^3/h$  $\bullet$  cm<sup>3</sup>/d •  $dm^3/s$  dm<sup>3</sup>/min •  $dm^3/h$ •  $dm^3/d$ •  $m^3/s$ ■ m³/min  $\bullet$  m<sup>3</sup>/h •  $m^3/d$ ml/s ml/min ■ ml/h ml/d ■ 1/s I/min ■ 1/h ■ 1/d hl/s hl/min ■ hl/h ■ hl/d Ml/s Ml/min Ml/h Ml/d

US units • af/s

- af/min
- ∎ af/h
- af/d
- ft<sup>3</sup>/s
- ft³/min
- ft<sup>3</sup>/h
- ft<sup>3</sup>/d
- flor/a
- fl oz/s (us)
- fl oz/min (us)
- fl oz/h (us)
- fl oz/d (us)
- gal/s (us)
- gal/min (us)
- gal/h (us)
- gal/d (us)
- Mgal/s (us)
- Mgal/min (us)
- Mgal/h (us)
- Mgal/d (us)
- bbl/s (us;liq.)
- bbl/b (us;liq.)
   bbl/min (us;liq.)
- bbl/h (us;liq.)
- bbl/fi (us;liq.)
   bbl/d (us;liq.)
- bbl/s (us:beer)
- bbl/s (us;beer)
  bbl/min (us;beer)
- bbl/h (us;beer)
- bbl/d (us;beer)
- bbl/a (us;oil)
   bbl/s (us;oil)
- bbl/min (us;oil)
- bbl/h (us;oil)
- bbl/d (us;oil)
- bbl/s (us:tank)
- bbl/bl/min (us;tank)
- bbl/h (us;tank)
- bbl/d (us;tank)
- kgal/s (us)
- kgal/min (us)
- kgal/h (us)
- kgal/d (us)

#### Additional information

Options

For an explanation of the abbreviated units:  $\rightarrow \cong 106$ 



Volume unit			
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ System units $\rightarrow$ Volume unit	
Description	Seleo	t the volume unit.	



Temperature unit			
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ System units $\rightarrow$ Temperature unit	
Description	Select	the temperature unit.	

Selection

US units ■ °F

■ °R

Additional information

For an explanation of the abbreviated units:  $\rightarrow \cong 106$ 

#### 2.1.3 Totalizer 1 to n

Navigation

SI units

Selection

∎ °C

**•** K

□ Guidance → Commissioning → Totalizer 1 to n

Assign process variable			Ê
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ Totalizer 1 to n $\rightarrow$ AssignVariab. 1 to n	
Description	Selec If the	t a process variable to activate the totalizer. e process variable is changed or the totalizer deactivated, the totalizer is reset to "C	)".
Selection	■ Off ■ Vo ■ Ma	lume flow ass flow	
Additional information	i	Totalizer 1 is permanently set to and cannot be changed. Totalizers 2 and 3 can b changed.	е

Process variable unit		Â
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Totalizer 1 to n $\rightarrow$ VariableUnit 1 to n	
Description	Select the unit for the process variable of the totalizer.	
Selection	SI unitsUS unitsg*oz*kg*lb*t*STon*	

Visibility depends on order options or device settings

or

\*



*Other units* None<sup>\*</sup>

\*

Visibility depends on order options or device settings

Totalizer operation mode		
Navigation	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	
Description	Select the totalizer operation mode, e.g. only totalize forward flow or only totalize reflow.	everse
Selection	<ul><li>Net</li><li>Forward</li><li>Reverse</li></ul>	
Additional information	<ul> <li>Selection</li> <li>Net option The flow values in the forward and reverse flow directions are totalized and netter against each other. Net flow is recorded in the flow direction.</li> <li>Forward option Only the flow in the forward flow direction is totalized.</li> <li>Reverse option Only the flow in the reverse flow direction is totalized (= reverse flow quantity).</li> </ul>	d

Totalizer failure behavior			ß
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ Totalizer 1 to n $\rightarrow$ FailureBehav. 1 to n	
Description	Specif	y how the totalizer should behave in the event of a device alarm.	

Selection	

#### Hold

Continue

Selection

Last valid value + continue

#### Additional information

- Hold option
  - The totalizer is stopped in the event of a device alarm.
- Continue option The totalizer continues to totalize based on the current value measured; the device alarm is ignored.
- Last valid value + continue option
   The totalizer continues to totalize based on the last valid value measured before the device alarm occurred.

#### 2.1.4 Process

*Navigation*  $\square$  Guidance  $\rightarrow$  Commissioning  $\rightarrow$  Process

Flow damping		æ
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Process $\rightarrow$ Flow damping	
Description	Enter a time constant for flow damping. Value = 0: No damping Value > 0: Damping increases	
	Damping is implemented by means of a proportional transmission behavior with first order delay (PT1 element).	
User entry	0 to 99.9 s	
Low flow cutoff		æ
Navigation	$\Box \qquad Guidance \rightarrow Commissioning \rightarrow Process \rightarrow Low flow cutoff$	
Description	Select a process variable for low flow cutoff to activate low flow cutoff.	
Selection	<ul><li> Off</li><li> Mass flow</li><li> Volume flow</li></ul>	
Additional information	Description	



- Q Flow
- t Time
- H Hysteresis
- Α
- *Hysteresis* Low flow cut off active Low flow cut off is activated Low flow cut off is deactivated On-value entered Off-value entered 1
- 2 3 4

On value low flow cutoff		Â
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Process $\rightarrow$ On value	
Description	Enter on value to switch on low flow cutoff.	
	Value = 0: No low flow cutoff Value > 0: Low flow cutoff is activated	
User entry	Positive floating-point number	
Off value low flow cutoff		<u> </u>

Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ Process $\rightarrow$ Off value
Description	Enter hyster	off value to switch off low flow cutoff. The off value is entered as a positive resis with respect to the on value.
User entry	0 to 1	00.0 %

Pressure shock suppressi	on		
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Process $\rightarrow$ Pres. shock sup.		
Description	Enter a time span for signal suppression (= pressure shock suppression active), for example to prevent the device from registering flow movements in the pipe when a valve closed.		
	Pressure schock suppression is activated when the flow rate drops below the on value for low flow cutoff.		
	Values reported when pressure shock suppression is active:		
	Flow: 0 Totalizer: Last valid value		
	Pressure shock suppression is deactivated when the time span specified has elapsed and the flow rate exceeds the off value for low flow cutoff.		
User entry	0 to 100 s		
Additional information	Example		
	When a valve is closed, momentarily strong fluid movements may occur in the pipeline,		

which are registered by the device. These totalized flow values lead to a false totalizer status, particularly during batching processes. С Q D D



- Q Flow
- t Time
- After run Α
- В Pressure shock
- Pressure shock suppression active according to the time entered С
- D Pressure shock suppression inactive
- Valve closes 1
- 2 Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
- The time entered has elapsed: pressure shock suppression is deactivated 3
- The current flow value is processed and displayed again. On value for low flow cut off 4
- 5
- Off value for low flow cut off 6

Partially filled pipe	detection	Â
Navigation	$ \qquad \qquad$	
Description	Select a process variable to activate detection of an empty or partially filled pipe. Due to low density, deactivate partially filled pipe detection for a gas.	
Selection	<ul><li>Off</li><li>Density</li></ul>	

Low value partial filled pipe detection	
Navigation	$ \qquad \qquad$
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Empty pipe detection</b> submenu.
Description	Enter the lower limit value for the selected process variable. If the measured value drops below the limit value, diagnostic message "862 Partly filled pipe" is generated.
	The lower limit value must be lower than the upper limit value ("High value partial filled pipe detection" parameter).
User entry	Signed floating-point number

High value partial filled pipe detection	
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Process $\rightarrow$ High value
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Empty pipe detection</b> submenu.
Description	Enter the upper limit value for the selected process variable. If the measured value exceeds the limit value, diagnostic message "862 Partly filled pipe" is generated.
User entry	Signed floating-point number

## 2.1.5 Pulse/frequency/switch output 1 to n

*Navigation*  $\square$  Guidance  $\rightarrow$  Commissioning  $\rightarrow$  PFS output 1 to n

Operating mode	
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Operating mode
Description	Select the operating mode for the output.
Selection	<ul> <li>Off</li> <li>Pulse</li> <li>Automatic pulse</li> <li>Frequency</li> <li>Switch</li> </ul>
Additional information	Selection
	<ul> <li>Pulse option         Quantitatively proportional pulse with pulse width to be configured. Whenever the pulse         value for the specified process variable is reached, a pulse is emitted, the duration of         which is set within the "Pulse width" parameter.         The process variable for the pulse output is specified in the "Assign pulse output"         parameter.     </li> <li>Automatic pulse option         Quantitatively proportional pulse with a fixed 1:1 ratio of pulse-to-interval. Whenever         the pulse value for the specified process variable is reached, a pulse is emitted.         The process variable for the pulse output is specified in the "Assign pulse output"         parameter.     </li> <li>Frequency option         The output frequency is proportional to the value for the process variable assigned, with         a pulse-to-interval ratio of 1:1.         The process variable for the frequency output is specified in the "Assign frequency         output" parameter.     </li> <li>Switch option         Indicates when the state of the device changes, e.g. when a specified limit value is         reached or an alarm or warning is triggered.         The switch output can be in one of two states: either it is conductive or it is non-         conductive.         When the function assigned to the switch output is triggered, the switch output will         depending on the output configuration either be continuously conductive or continuously         non-conductive.      Pulse" option     </li> </ul>
	<ul> <li>Example</li> <li>Flow rate approx. 100 g/s</li> <li>Pulse value 0.1 g</li> <li>Pulse width 0.05 ms</li> <li>Pulse rate 1 000 pulse/s</li> </ul>



- 1 Quantity-proportional pulse (pulse value) with pulse width to be configured
- B Pulse width entered
- P Pauses between the individual pulses

#### "Frequency" option

#### Example

- Flow rate Q approx. 100 g/s
- Min. frequency (f<sub>min</sub>) 0 Hz
- Max. frequency (f<sub>max</sub>) 1000 Hz
- Flow rate at min. frequency  $(Q_{min}) \circ g/s$
- Flow rate at max. frequency (Q<sub>max</sub>) 1000 g/s
- Output frequency (f<sub>out</sub>) approx. 100 Hz
- $\mathbf{f_{out}} = f_{\min} + Q \times \left[ (f_{\max} f_{\min}) / (Q_{\max} Q_{\min}) \right] =$

0 Hz + 100 g/s × [(1000 Hz - 0 Hz)/(1000 g/s - 0 g/s )] = 100 Hz



E 2 Flow-proportional frequency output

#### "Switch" option

#### Example

Alarm response without alarm



🗟 3 No alarm, high level

#### Example

Alarm response in case of alarm



🖻 4 Alarm, low level

Assign frequency output			Ê
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Assign freq.	

Select a process variable for the frequency output.

Description

Selection

■ Off

- Mass flow
- Volume flow
- Density
- Temperature
- Exciter current 0
- Oscillation frequency 0
- Oscillation amplitude 0
- Frequency fluctuation 0
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry

#### Minimum frequency value

Navigation	Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Min. freq. value
Description	Enter the frequency to report for the lower range value of the measured value range. The lower range value for the measured value range that corresponds to the minimum frequency is specified in the "Measuring value at minimum frequency" parameter.
User entry	0.0 to 10 000.0 Hz

ß

Measuring value at	minimum frequency
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Val. at min.freq
Description	Enter the lower range value for the measured value range.
	Depending on the setting selected for the "Measuring mode" parameter, the value specified for this parameter and the "Measuring value at maximum frequency" parameter must have the same algebraic sign or not.
	As a rule, the lower range value is scaled to be lower than the upper range value. As a result, the behavior of the frequency output is proportional to the process variable assigned. If the lower range value is scaled to be higher than the upper range value, then the behavior of the frequency output will be inversely proportional to the process variable assigned.
User entry	Signed floating-point number

Maximum frequency value		Â	
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Max. freq. value	
Description	Enter	the frequency to report for the upper range value of the measured value range.	
	The u frequ	apper range value for the measured value range that corresponds to the maximum ency is specified in the "Measuring value at maximum frequency" parameter.	l
User entry	0.0 to	o 10 000.0 Hz	

Measuring value at maximum frequency		ß
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Val. at max.freq	
Description	Enter upper range value for the measured value range.	
User entry	Signed floating-point number	
Failure mode		
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Failure mode	
Description	Specify how the output should behave in the event of a device alarm.	
	For safety reasons, it is recommended that the behavior of the output in the event of device alarm be predefined.	а

Selection	<ul><li>Actual value</li><li>Defined value</li><li>0 Hz</li></ul>
Additional information	Selection
	<ul> <li>Actual value option The frequency output continues to report the actual flow rate measured. The fault condition is ignored. </li> <li>Defined value option The frequency output reports the value specified. The value is specified in the "Failure frequency" parameter. </li> <li>O Hz option The frequency output reports 0 Hz.</li></ul>

Failure frequency			
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Failure freq.	
Description	Ente	r the value for the "Defined value" option in the "Failure mode" parameter.	
User entry	0.0 t	o 10 000.0 Hz	

Assign pulse output		Â
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Assign pulse	
Description	Select the process variable for the pulse output.	
Selection	<ul><li>Off</li><li>Mass flow</li><li>Volume flow</li></ul>	

t

A0026882

Pulse width	
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Pulse width
Description	Specify the duration of a pulse.
	The maximum pulse rate is defined by $\text{fmax} = 1 / (2 \times \text{pulse width})$ . The interval between two pulses (P) is at least as long as the specified pulse width (B). The maximum flow is defined by $\text{Qmax} = \text{fmax} \times \text{pulse value}$ . If the flow exceeds these limit values, the measuring device displays the diagnostic message "443 Pulse output saturated".
	Example: Pulse value: 0.1 g Pulse width: 0.1 ms fmax: 1 / (2 × 0.1 ms) = 5 kHz Qmax: 5 kHz × 0.1 g = 0.5 kg/s
User entry	0.05 to 2 000 ms
Additional information	Description
	$U[V] \qquad B < P \qquad U[V] \qquad B = P$

*B* Pulse width entered

*P* Pauses between the individual pulses

Р

Value per pulse		Ê
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Value per pulse	
Description	Enter the measured value that corresponds to one pulse. The lower the value, the better the resolution and the higher the pulse frequency.	
User entry	Signed floating-point number	

► t

P

Switch output function			A
Navigation		Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Switch out funct	
Description	Assi	gn a function to the switch output.	

Selection	<ul> <li>Off</li> <li>On</li> <li>Diagnostic behavior</li> <li>Limit</li> <li>Flow direction check</li> <li>Status</li> </ul>
Additional information	Selection
	<ul> <li>Off option The switch output is permanently switched off (open, non-conductive).</li> <li>On option The switch output is permanently switched on (closed, conductive).</li> <li>Diagnostic behavior option The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category.</li> <li>Limit option The switch output is switched on (closed, conductive), if the limit value specified for the process variable is reached.</li> <li>Flow direction check option The switch output is switched on (closed, conductive), when the flow direction changes (forward or reverse flow).</li> <li>Status option The switch output is switched on (closed, conductive) to indicate the status for the selected device function ("Assign status" parameter).</li> </ul>

Assign diagnostic behavio	r	
Navigation	□ Guidance → Commissioning → PFS output $1 \rightarrow$ Assign diag. beh	
Description	The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category.	
Selection	<ul> <li>Alarm</li> <li>Alarm or warning</li> <li>Warning</li> </ul>	
Additional information	Selection	
	<ul> <li>Alarm option The switch output is only switched on for diagnostic events of the "Alarm" category.</li> <li>Alarm or warning option The switch output is switched on for diagnostic events of the "Alarm" or "Warning" category.</li> <li>Warning option The switch output is only switched on for diagnostic events of the "Warning" category.</li> </ul>	у.

Assign limit	8
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Assign limit
Description	Select the process variable to monitor in case the specified limit value is exceeded. If a limit value for the selected process variable is exceeded, the output is switched on.
Selection	<ul> <li>Off</li> <li>Mass flow</li> <li>Volume flow</li> <li>Density</li> <li>Temperature</li> <li>Oscillation damping</li> </ul>
Additional information	Switch-on point > switch-off point Behavior of the status output if switch-on point > switch-off point:

- Process variable > switch-on point: transistor is conductive
- Process variable < switch-off point: transistor is not conductive



- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

Switch-on point < switch-off point

Behavior of the status output if switch-on point < switch-off point:

- Process variable < switch-on point: transistor is conductive</li>
- Process variable > switch-off point: transistor is not conductive



- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variableB Status output
- D Status Output

#### *Switch-on point = switch-off point*

Behavior of the status output if switch-on point = switch-off point:

- Process variable > switch-on point: transistor is conductive
- Process variable < switch-off point: transistor is not conductive</p>



- 1 Switch-on point = switch-off point
- 2 Conductive
- 3 Non-conductive
- A Process variableB Status output

Switch-on value		ß
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Switch-on value	
Description	Enter the limit value for the switch-on point (process variable > switch-on value = clo conductive).	sed,
	To use a hysteresis: Switch-on point > Switch-off point.	
User entry	Signed floating-point number	

Switch-off value		
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Switch-off value	
Description	Enter the limit value for the switch-off point (process variable < switch-off value = open non-conductive).	,
	To use a hysteresis: Switch-on point > Switch-off point.	
User entry	Signed floating-point number	

Switch-on delay		
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Switch-on delay	
Description	Enter delay before the switch output is switched on.	
User entry	0.0 to 100.0 s	

Switch-off delay		
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Switch-off delay	
Description	Enter delay before the switch output is switched off.	
User entry	0.0 to 100.0 s	

Assign status		
Navigation	Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Assign status	

Description	Select the device function for which to report the status.
	If the switch-on point for the selected device function is reached, the output is switched on (closed and conductive). Otherwise, the output is non-conductive.
	The output behavior can be inverted in the "Invert output signal" parameter, i.e. in this case the output will be non-conductive when switched on and conductive when switched off. The "Invert output signal" parameter is not available for all devices.
Selection	<ul><li>Partially filled pipe detection</li><li>Low flow cutoff</li></ul>

Failure mode		Ê
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ PFS output 1 $\rightarrow$ Failure mode	
Description	Specify how the output should behave in the event of a device alarm.	
	For safety reasons, it is recommended that the behavior of the output in the event of a device alarm be predefined.	ι
Selection	<ul> <li>Actual status</li> <li>Open</li> <li>Closed</li> </ul>	
Additional information	Selection	
	<ul> <li>Actual status option The switch output continues to report the actual state of the switch output based on function assigned ("Switch output function" parameter). The fault condition is ignore </li> <li>Open option In the event of a device alarm, the switch output's transistor is set to "non-conductive"</li></ul>	the d. e".

### 2.1.6 Time format

*Navigation*  $\square$  Guidance  $\rightarrow$  Commissioning  $\rightarrow$  Time format

Time format		ß
Navigation	□ Guidance $\rightarrow$ Commissioning $\rightarrow$ Date/time $\rightarrow$ Time formation	at
Description	Select the time format.	
Selection	■ 24 h ■ 12 h AM/PM	
Additional information	Selection	
	For an explanation of the abbreviated units: $\rightarrow \cong 106$	

# 3 "Diagnostics" menu

Troubleshooting and preventive maintenance – settings for device behavior during process and device events as well as assistance and measures for diagnostic purposes.

Navigation	🗟 😑 Diagnostics	
Diagnostics		
	► Active diagnostics	→ 🗎 30
	► Diagnostic list	→ 🖺 33
	► Simulation	→ 🖺 35
	► Diagnostic settings	→ 🖺 39

## 3.1 Active diagnostics

Navigation

□ □ Diagnostics → Active diagnos.

► Active diagnostics			
Actual diagnostics	→ 🗎 30		
Active diagnostic IO-Link	→ 🗎 30		
Timestamp	→ 🗎 31		
Previous diagnostics	→ 🗎 31		
Last diagnostic IO-Link	→ 🗎 31		
Timestamp	→ 🗎 31		
Operating time from restart	→ 🗎 31		
Operating time	→ 🗎 32		

Actual diagnostics	
Navigation	□ Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Actual diagnos.
Prerequisite	A diagnostic event has occurred.
Description	Displays the currently active diagnostic message. If there is more than one pending diagnostic event, the message for the diagnostic event with the highest priority is displayed.
User interface	Positive integer

### Active diagnostic IO-Link

Navigation		Diagnostics → Active diagnos. → ActDiag IO-Link
Description	Displa more highes	ys the IO-Link event code for the currently active diagnostic message. If there is than one pending diagnostic event, the code for the diagnostic message with the st priority is displayed.
User interface	0 to 6	5 5 3 5

Timestamp	
Navigation	□ Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Timestamp
Description	Displays the timestamp for the currently active diagnostic message.
User interface	Days (d), hours (h), minutes (m), seconds (s)

Previous diagnostics	
Navigation	□ Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Prev.diagnostics
Prerequisite	At least two diagnostic events have already occurred.
Description	Displays the diagnostic message for the last diagnostic event that has ended.
User interface	Positive integer

Timestamp	
Navigation	□ Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Timestamp
Description	Displays the timestamp of the diagnostic message generated for the last diagnostic event that has ended.
User interface	Days (d), hours (h), minutes (m), seconds (s)

Last diagnostic IO-Link		
Navigation		Diagnostics → Active diagnos. → LastDiag IO-Link
Description	Displa	ys the IO-Link event code for the last diagnostic event that has ended.
User interface	0 to 6	5535

Operating time from restart			
Navigation		Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Time fr. restart	
Description	Indica restar	tes how long the device has been in operation since the last time the device was ted.	

#### User interface

Days (d), hours (h), minutes (m), seconds (s)

Operating time	
Navigation	□ Diagnostics $\rightarrow$ Active diagnos. $\rightarrow$ Operating time
Description	Indicates how long the device has been in operation.
User interface	Days (d), hours (h), minutes (m), seconds (s)

## 3.2 Diagnostic list

Navigation

□ □ Diagnostics → Diagnostic list

► Diagnostic list	
Diagnostic 2 IO-Link	) → 🗎 33
Diagnostic 3 IO-Link	) → 🗎 33
Diagnostic 4 IO-Link	) → 🗎 33
Diagnostic 5 IO-Link	] → 🗎 34

Diagnostic 2 IO-Link	
Navigation	□ Diagnostics $\rightarrow$ Diagnostic list $\rightarrow$ Diag. 2 IO-Link
Description	Displays the IO-Link event code for the currently active diagnostic message with the second highest priority.
User interface	0 to 65 535
Diagnostic 3 IO-Link	
Navigation	□ Diagnostics $\rightarrow$ Diagnostic list $\rightarrow$ Diag. 3 IO-Link
Description	Displays the IO-Link event code for the currently active diagnostic message with the third highest priority.
User interface	0 to 65 535
Diagnostic 4 IO-Link	
Navigation	□ Diagnostics $\rightarrow$ Diagnostic list $\rightarrow$ Diag. 4 IO-Link
Description	Displays the IO-Link event code for the currently active diagnostic message with the fourth highest priority.
User interface	0 to 65 535

Diagnostic 5 IO-Link	
Navigation	□ Diagnostics $\rightarrow$ Diagnostic list $\rightarrow$ Diag. 5 IO-Link
Description	Displays the IO-Link event code for the currently active diagnostic message with the fifth highest priority.
User interface	0 to 65 535

## 3.3 Simulation

Navigation □ □ Diagnostics → Simulation ► Simulation Assign simulation process variable → 🗎 35 Process value → 🗎 36 → 🗎 36 Frequency output 1 simulation Frequency output 1 value → 🗎 36 Pulse output simulation 1 → 🗎 36 Pulse value 1 → 🗎 37 Switch output simulation 1 → 🗎 37 Switch state 1 → 🗎 37 Device alarm simulation → 🗎 38 Diagnostic event simulation → 🗎 38

Assign simulation process variable		
Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Assign proc.var.	
Description	Select a process variable to activate the simulation.	
Selection	<ul> <li>Off</li> <li>Mass flow</li> <li>Volume flow</li> <li>Density</li> <li>Temperature</li> </ul>	
Additional information	<i>Description</i> The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.	<u>!</u>

A

Process value		1
Navigation	$\Box  \text{Diagnostics} \rightarrow \text{Simulation} \rightarrow \text{Process value}$	
Description	Enter the process value to simulate. The unit is set in the "System units" menu.	
User entry	Signed floating-point number	

### Frequency output simulation

Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Freq.outp 1 sim.
Description	Switch simulation of the frequency output on or off.
Selection	<ul><li>Off</li><li>On</li></ul>
Additional information	Description
	The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.

		ß
	Diagnostics $\rightarrow$ Simulation $\rightarrow$ Freq.outp 1 val.	
Enter	the frequency to simulate.	
0.0 to	10 000.0 Hz	
	Enter 0.0 to	<ul> <li>Diagnostics → Simulation → Freq.outp 1 val.</li> <li>Enter the frequency to simulate.</li> <li>0.0 to 10000.0 Hz</li> </ul>

Pulse output simulation	A

Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Puls.outp.sim. 1
Description	Switch simulation of the pulse output on or off.
Selection	<ul><li> Off</li><li> Fixed value</li></ul>

Down-counting value
Fixed value option

Pulses are emitted continuously with the pulse width specified in the "Pulse width" parameter.

• **Down-counting value** option The number of pulses specified in the "Pulse value " parameter are emitted.

#### Description

The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.

Pulse value		<u> </u>
Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Pulse value 1	
Description	Enter the number of pulses to simulate.	
User entry	0 to 65 535	

Switch output simulation		Ê
Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Switch sim. 1	
Description	Switch simulation of the switch output on or off.	
Selection	<ul><li>Off</li><li>On</li></ul>	
Additional information	Description	
	The display alternates between the measured value and a diagnostics message of the "function check" category (C) when simulation is active.	

Switch state		Â
Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Switch state 1	
Description	Select the switch state to simulate.	
Selection	<ul><li>Open</li><li>Closed</li></ul>	

• **Open** option The switch output is not conductive.

- **Closed** option The switch output is conductive.

Device alarm simulation		۵
Navigation		Diagnostics $\rightarrow$ Simulation $\rightarrow$ Dev. alarm sim.
Description	Swite Whil displ	ch the device alarm simulation on or off. e simulation is in progress, a diagnostic message of the Function Check (C) category is ayed.
Selection	■ Off ■ On	E

Diagnostic event si	ß	
Navigation	□ Diagnostics $\rightarrow$ Simulation $\rightarrow$ Diagnostic event	
Description	Select the diagnostic event to simulate.	
Selection	Off	

#### 3.4 Diagnostic settings

Navigation	Image: Barbon Barb	
► Diagnostic set	ttings	
	► Properties	→ 🗎 39
	► Diagnostic configuration	→ 🗎 39

#### 3.4.1 Properties

Navigation  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Properties

► Properties			
	Alarm delay		→ 🗎 39

Alarm delay	
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Properties $\rightarrow$ Alarm delay
Description	Enter a delay to suppress momentarily pending diagnostic messages. Only applies to diagnostic events that allow for a delay before the diagnostic message is generated.
User entry	0 to 60 s

#### 3.4.2 Diagnostic configuration

*Navigation*  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Diag. config.

► Diagnostic configuration				
► Sensor	) → 🗎 40			
► Electronics	) → 🗎 40			
► Configuration	] → 🗎 41			
► Process	] → 🗎 42			

A

#### Sensor

 Navigation
 Image: Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Diag. config.  $\rightarrow$  Sensor

 Image: Sensor
 Image: Assign behavior of diagnostic no. 046
  $\rightarrow$  Image: An and the sensor

#### Assign behavior of diagnostic no. 046

Navigation Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Diag. config.  $\rightarrow$  Sensor  $\rightarrow$  Diagnostic no. 046 Description Select behavior for diagnostic event "046 Sensor limit exceeded". Selection Off Alarm Warning Logbook entry only Additional information Selection • Off option The diagnostic event is ignored and no diagnostic message is generated or logged. • Alarm option The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated. • Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated. Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

#### Electronics

*Navigation*  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Diag. config.  $\rightarrow$  Electronics

► Electronics		
	Assign behavior of diagnostic no. 230	
	Assign behavior of diagnostic no. 231	

Assign behavior of diagnostic no. 230			æ
Navigation		Diagnostics → Diag. settings → Diag. config. → Electronics → Diagnostic no. 230	
Description	Selec	t behavior for diagnostic event "230 Date/time incorrect".	
Selection	■ Ala ■ Wa ■ Log	rm rning Jbook entry only	

# Assign behavior of diagnostic no. 231 Image: Construction of diagnostic no. 231 Navigation □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

Warning

Logbook entry only

#### Configuration

*Navigation*  $\square$  Diagnostics  $\rightarrow$  Diag. settings  $\rightarrow$  Diag. config.  $\rightarrow$  Configuration

► Configuration			
	Assign behavior of diagnostic no. 442		→ 🖺 41
	Assign behavior of diagnostic no. 443	]	→ 🗎 42

Assign behavior of dia	agnostic no. 442	Ê
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Configuration $\rightarrow$ Diagnostic r	10. 442
Description	Select behavior for diagnostic event "442 Frequency output faulty".	
Selection	<ul><li>Off</li><li>Alarm</li><li>Warning</li></ul>	

Logbook entry only

#### Off option

The diagnostic event is ignored and no diagnostic message is generated or logged.

Alarm option

The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.

- Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
  - Logbook entry only option

The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagn	ostic no. 443
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Configuration $\rightarrow$ Diagnostic no. 443
Description	Select behavior for diagnostic event "443 Pulse output faulty".
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>
Additional information	<ul> <li>Selection</li> <li>Off option The diagnostic event is ignored and no diagnostic message is generated or logged.</li> <li>Alarm option The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.</li> <li>Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.</li> <li>Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.</li> </ul>
	Process
	NavigationImage: Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process

► Process		 
	Assign behavior of diagnostic no. 834	→ 🖺 43
	Assign behavior of diagnostic no. 835	→ 🖺 43

A



#### Assign behavior of diagnostic no. 834

Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process $\rightarrow$ Diagnostic no. 834
Description	Select behavior for diagnostic event "834 Process temperature too high".
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>
Additional information	<ul> <li>Selection</li> <li>Off option The diagnostic event is ignored and no diagnostic message is generated or logged.</li> <li>Alarm option The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.</li> <li>Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.</li> <li>Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.</li> </ul>

Assign behavior of diagnostic no. 835		æ	
Navigation		Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 835	
Description	Seleo	t behavior for diagnostic event "835 Process temperature too low".	
Selection	<ul> <li>Of</li> <li>Ali</li> <li>Wi</li> <li>Lo</li> </ul>	f arm arning gbook entry only	

• Off option

The diagnostic event is ignored and no diagnostic message is generated or logged.

Alarm option

The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.

- Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- Logbook entry only option

The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagno	Assign behavior of diagnostic no. 842	
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process $\rightarrow$ Diagnostic no. 842	
Description	Select behavior for diagnostic event "842 Process value below limit".	
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>	
Additional information	<ul> <li>Selection</li> <li>Off option The diagnostic event is ignored and no diagnostic message is generated or logged.</li> <li>Alarm option The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.</li> <li>Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.</li> <li>Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Evelogbook" submenu and does not alternate with the standard operational information displayed.</li> </ul>	۹ ent

Assign behavior of diagnostic no. 862

æ

Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process $\rightarrow$ Diagnostic no. 862
Description	Select behavior for diagnostic event "862 Partly filled pipe".
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>

#### Off option

The diagnostic event is ignored and no diagnostic message is generated or logged. **• Alarm** option

The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.

• Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.

• Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagn	ostic no. 9	12	
Navigation		Diagnostics → Diag. settings → Diag. config. → Process → Diagnostic no. 912	
Description	Select l	oehavior for diagnostic event "912 Medium inhomogeneous".	
Selection	<ul><li>Off</li><li>Alarr</li><li>Warr</li><li>Logb</li></ul>	n ning ook entry only	
Additional information	Selectio	on	
	<ul> <li>Off on The on</li></ul>	ption diagnostic event is ignored and no diagnostic message is generated or logged. <b>m</b> option device stops measuring. The signal outputs and totalizers assume the specified n condition. A diagnostic message is generated. <b>ning</b> option device continues measuring. The signal outputs and totalizers are not affected. nostic message is generated. <b>ook entry only</b> option device continues measuring. The diagnostic message is only displayed in the "Ev pok" submenu and does not alternate with the standard operational information ayed.	A rent

Assign behavior of diagnostic no. 913		
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process $\rightarrow$ Diagnostic no. 913	
Description	Select behavior for diagnostic event "913 Medium unsuitable".	
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>	

Off option

The diagnostic event is ignored and no diagnostic message is generated or logged.

Alarm option

The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.

- Warning option The device continues measuring. The signal outputs and totalizers are not affected. A diagnostic message is generated.
- Logbook entry only option

The device continues measuring. The diagnostic message is only displayed in the "Event logbook" submenu and does not alternate with the standard operational information displayed.

Assign behavior of diagn	ostic no. 948	Ê
Navigation	□ Diagnostics $\rightarrow$ Diag. settings $\rightarrow$ Diag. config. $\rightarrow$ Process $\rightarrow$ Diagnostic no. 948	
Description	Select behavior for diagnostic event "948 Oscillation damping too high".	
Selection	<ul> <li>Off</li> <li>Alarm</li> <li>Warning</li> <li>Logbook entry only</li> </ul>	
Additional information	Selection	
	<ul> <li>Off option The diagnostic event is ignored and no diagnostic message is generated or logged.</li> <li>Alarm option The device stops measuring. The signal outputs and totalizers assume the specified alarm condition. A diagnostic message is generated.</li> <li>Warning option The device continues measuring. The signal outputs and totalizers are not affected. diagnostic message is generated.</li> <li>Logbook entry only option The device continues measuring. The diagnostic message is only displayed in the "Ev logbook" submenu and does not alternate with the standard operational information displayed.</li> </ul>	A vent n

#### 4 "Application" menu

Navigation

Targeted optimization to the application – comprehensive device settings from sensor technology to system integration for optimum application adaptation.

Application	
► Measured values	→ 🗎 47
► System units	→ 🗎 50
► Totalizers	→ 🗎 54
► Sensor	→ 🗎 59
► Pulse/frequency/switch output 1	→ 🗎 74
► Pulse output	→ 🗎 79
► Frequency output	→ 🗎 82
► Switch output	→ 🗎 86
► Limit	→ 🗎 88
► Diagnostic behavior	→ 🗎 92
► Flow direction check	→ 🗎 93
► Status	→ 🗎 94

🗟 🖴 Application

#### 4.1 Measured values

Navigation

 $\blacksquare \Box \quad \text{Application} \rightarrow \text{Measured values}$ 

► Measured values			
Mass flow		÷	₿ 48
Volume flo	N	÷	₿ 48
Density		÷	₿ 48
Temperatu	re	÷	₿ 48
► Totalize	r	÷	₿ 49

Mass flow		
Navigation	$\square \qquad \text{Application} \rightarrow \text{Measured values} \rightarrow \text{Mass flow}$	
Description	Displays the mass flow measured.	
	The unit is set in the "System units" menu.	
User interface	Signed floating-point number	
Additional information	The IO-Link interface only offers the <b>kg/s</b> option.	

Volume flow		
Navigation	$\square \qquad \text{Application} \rightarrow \text{Measured values} \rightarrow \text{Volume flow}$	
Description	Displays the volume flow measured. The unit is set in the "System units" menu.	
User interface	Signed floating-point number	
Additional information	The IO-Link interface only offers the <b>m³/h</b> option.	

Density	
Navigation	$\square \qquad \text{Application} \rightarrow \text{Measured values} \rightarrow \text{Density}$
Description	Displays the density measured. The unit is set in the "System units" menu.
User interface	Positive floating-point number

Temperature	
Navigation	$ \qquad \qquad$
Description	Displays the medium temperature measured. The unit is set in the "System units" menu.
User interface	Positive floating-point number

#### 4.1.1 Totalizer

Navigation

 $\blacksquare \Box \quad \text{Application} \rightarrow \text{Measured values} \rightarrow \text{Totalizer}$ 

► Totalizer			
	Totalizer 1 to n value	]	→ 🖺 49
	Totalizer 1 to n overflow		→ 🖺 49

Totalizer value			
Navigation	□ Application $\rightarrow$ Measured values $\rightarrow$ Totalizer $\rightarrow$ Tot. 1 to n value		
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Totalizer 1 to n</b> submenu.		
Description	Displays the totalizer counter since the last reset.		
	This parameter can only display figures up to 7 digits. If the counter exceeds this range, the overflow is displayed in the "Totalizer overflow " parameter.		
	Example:		
	Value of "Totalizer value" parameter: 1,968,457 m <sup>3</sup> Value of "Totalizer overflow " parameter: 1 × 10^7 (1 overflow) = 10,000,000 m <sup>3</sup> Counter (total): 11,968,457 m <sup>3</sup>		
	In the event of a fault condition, the totalizer behaves as specified in the "Totalizer failure behavior" parameter.		
User interface	Signed floating-point number		
Additional information	Totalizer 1 is permanently set to and cannot be changed. Totalizers 2 and 3 can be changed.		

Totalizer overflow		Ê
Navigation	□ Application $\rightarrow$ Measured values $\rightarrow$ Totalizer $\rightarrow$ Tot. 1 to n overflow	
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Totalizer 1 to n</b> submenu.	
Description	Displays the number of overflows for the totalizer counter ("Totalizer value" parameter)	).
User interface	-32 000.0 to 32 000.0	

#### 4.2 System units

Navigation

► System units	
Mass flow unit	) → 🗎 50
Mass unit	] → 🗎 50
Volume flow unit	) → 🗎 51
Volume unit	) → 🗎 52
Density unit	→ 🗎 52
Temperature unit	) → 🗎 53

Mass:	flow	unit
-------	------	------

ß

Navigation			
Description	Select the mass flow	unit.	
Selection	SI units g/s g/min g/h g/d kg/s kg/min kg/h kg/d t/s t/min t/h t/h	US units oz/s oz/min oz/h oz/d lb/s lb/min lb/h lb/h lb/d STon/s STon/min STon/h STon/d	
Additional information	The IO-Link interface only offers the <b>kg/s</b> option.		
Mass unit			
Navigation	$\Box  Application \rightarrow$	System units → Mass unit	

Ê

Volume flow unit			
Navigation	$\square  \text{Application} \rightarrow$	System units $\rightarrow$ Volume flow unit	
Description	Select the volume flo	ow unit.	
Selection	SI units $cm^{3}/s$ $cm^{3}/h$ $cm^{3}/h$ $dm^{3}/s$ $dm^{3}/min$ $dm^{3}/h$ $dm^{3}/d$ $m^{3}/d$ $m^{3}/d$ $m^{3}/h$ $m^{3}/h$ $m^{3}/h$ $m^{3}/h$ $m^{3}/h$ $m^{1}/s$ ml/min ml/h ml/h l/h l/h l/h l/h hl/h hl/h hl/h hl/h Ml/min Ml/h Ml/d	US units af/s af/s af/min af/h af/d ft <sup>3</sup> /s ft <sup>3</sup> /min ft <sup>3</sup> /h ft <sup>3</sup> /d fl oz/s (us) fl oz/s (us) afl oz/h (us) fl oz/h (us) gal/s (us) gal/s (us) gal/h (us) gal/h (us) gal/d (us) Mgal/h (us) Mgal/d (us) Mgal/d (us) bbl/s (us;liq.) bbl/k (us;liq.) bbl/d (us;liq.) bbl/d (us;liq.) bbl/d (us;liq.) bbl/d (us;liq.) bbl/h (us;beer) bbl/h (us;beer) bbl/h (us;beer) bbl/h (us;oil) bbl/h (us;oil) bbl/h (us;oil) bbl/h (us;cil) bbl/h (us	Imperial units 9 gal/s (imp) 9 gal/h (imp) 9 gal/d (imp) 9 Mgal/s (imp) 9 Mgal/h (imp) 9 Mgal/d (imp) 9 bbl/s (imp;beer) 9 bbl/h (imp;beer) 9 bbl/d (imp;beer) 9 bbl/s (imp;oil) 9 bbl/h (imp;oil) 9 bbl/h (imp;oil) 9 bbl/d (imp;oil) 9 bbl/d (imp;oil) 9 bbl/d (imp;oil)

US units

■ OZ

∎ lb STon

ß

#### Dosimass IO-Link

SI units

∎ g

■ kg

∎ t

Selection

#### Additional information

Options

For an explanation of the abbreviated units:  $\rightarrow \square 106$ 

The IO-Link interface only offers the  $m^3/h$  option.

Volume unit				Â
Navigation Description	Application $\rightarrow$ System units $\rightarrow$ Volume unit Select the volume unit			
Selection	SI units • cm <sup>3</sup> • dm <sup>3</sup> • m <sup>3</sup> • ml • l • hl • Ml Mega	US units • af • ft <sup>3</sup> • fl oz (us) • gal (us) • kgal (us) • Mgal (us) • bbl (us;oil) • bbl (us;liq.) • bbl (us;teer) • bbl (us;tank)	Imperial units • gal (imp) • Mgal (imp) • bbl (imp;beer) • bbl (imp;oil)	
Additional information	Selection For an explanation of the abbreviated units: $\rightarrow \square 106$			
Density unit				
Navigation	Application -	→ System units → Density unit		
Description	Select the density u	nit.		
Selection	SI units g/cm <sup>3</sup> g/m <sup>3</sup> g/ml kg/l kg/dm <sup>3</sup> kg/m <sup>3</sup> SD4°C SD15°C SD15°C SD20°C SG4°C SG15°C SG20°C	US units <ul> <li>lb/ft<sup>3</sup></li> <li>lb/gal (us)</li> <li>lb/bbl (us;liq.)</li> <li>lb/bbl (us;beer)</li> <li>lb/bbl (us;oil)</li> <li>lb/bbl (us;tank)</li> </ul>	Imperial units • lb/gal (imp) • lb/bbl (imp;beer) • lb/bbl (imp;oil)	

#### Additional information

Opt	ions
i	For

For an explanation of the abbreviated units:  $\rightarrow \square 106$ 

The IO-Link interface only offers the **kg/m<sup>3</sup>** option.

Temperature unit			Â
Navigation		application $\rightarrow$ System units $\rightarrow$ Temperature unit	
Description	Select th	Select the temperature unit.	
Selection	<i>SI units</i> ● ℃ ● K	US units ■ °F ■ °R	
Additional information	Selection For an explanation of the abbreviated units: $\rightarrow \square 106$		

#### 4.3 Totalizers

Navigation	$ \blacksquare \Box Application \rightarrow Totalizers $	
► Totalizers		
	► Totalizer handling	→ 🗎 54
	► Totalizer 1 to n	→ 🗎 54

#### 4.3.1 Totalizer handling

Navigation	8 8	Application $\rightarrow$ Totalizers $\rightarrow$ Totalizer
------------	-----	--------------------------------------------------------------

► Totalizer handling	
Reset all totalizers	→ 🖹 54

#### Reset all totalizers

 Navigation
 □ Application → Totalizers → Totalizer → Reset all tot.

 Description
 Reset all totalizers to "0" and restart the totalizers. The counter readings are not logged prior to the reset.

 Selection
 • Cancel

 Description
 • Cancel

Reset + totalize

#### 4.3.2 Totalizer 1 to n

Naviaation	Application $\rightarrow$ Totalizers $\rightarrow$ Totalizer 1 to n
Ivavigation	ripplication / localizers / localizer i to li

► Totalizer 1 to n	
Assign process variable 1 to n	→ 🗎 55
Process variable unit 1 to n	→ 🗎 55
Totalizer 1 to n operation mode	→ 🗎 56
Totalizer 1 to n control	→ 🗎 56

	Preset value 1 to n	]	→ 🖺 57
	Totalizer 1 to n failure behavior	]	→ 🗎 57

Assign process variable		A
Navigation	$ \qquad \qquad \text{Application} \rightarrow \text{Totalizers} \rightarrow \text{Totalizer 1 to } n \rightarrow \text{AssignVariab. 1 to } n $	
Description	Select a process variable to activate the totalizer. If the process variable is changed or the totalizer deactivated, the totalizer is reset to "0	
Selection	<ul><li> Off</li><li> Volume flow</li><li> Mass flow</li></ul>	
Additional information	Totalizer 1 is permanently set to and cannot be changed. Totalizers 2 and 3 car changed.	ı be

Process variable unit			٦
Navigation	Application -	Totalizers $\rightarrow$ Totalizer 1 to n $\rightarrow$ V	/ariableUnit 1 to n
Description	Select the unit for th	ne process variable of the totalizer	
Selection	SI units • g <sup>*</sup> • kg <sup>*</sup> • t <sup>*</sup> Visibility depends	US units • oz * • lb * • STon *	
	visionity depends	on order options of device settings	
	SI units • cm <sup>3*</sup> • dm <sup>3*</sup> • m <sup>3*</sup> • ml <sup>*</sup> • l <sup>*</sup> • hl <sup>*</sup> • Ml Mega <sup>*</sup>	US units • af • ft <sup>3</sup> • Mft <sup>3</sup> • Mft <sup>3</sup> • fl oz (us) • gal (us) • kgal (us) • Mgal (us) • bbl (us;liq.) • bbl (us;cer) • bbl (us;cank)	Imperial units • gal (imp) * • Mgal (imp) * • bbl (imp;beer) * • bbl (imp;oil) *
	* Visibility depends	on order options or device settings	

or

\*

*Other units* None <sup>\*</sup>

Visibility depends on order options or device settings

Totalizer operation mode	(	1
Navigation	□ Application $\rightarrow$ Totalizers $\rightarrow$ Totalizer 1 to n $\rightarrow$ Operat. mode 1 to n	
Description	Select the totalizer operation mode, e.g. only totalize forward flow or only totalize reverse flow.	е
Selection	<ul><li>Net</li><li>Forward</li><li>Reverse</li></ul>	
Additional information	Selection	
	<ul> <li>Net option The flow values in the forward and reverse flow directions are totalized and netted against each other. Net flow is recorded in the flow direction.</li> <li>Forward option Only the flow in the forward flow direction is totalized.</li> <li>Reverse option Only the flow in the reverse flow direction is totalized (= reverse flow quantity).</li> </ul>	

Totalizer control	
Nationalian	Application & Totalizana & Totalizan 1 to a & Tat 1 to a control
Navigation	$\blacksquare$ Application $\rightarrow$ rotalizers $\rightarrow$ rotalizer 1 to $n \rightarrow 10t$ . 1 to n control
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Totalizer 1 to n</b> submenu.
Description	Operate the totalizer.
Selection	<ul> <li>Totalize</li> <li>Reset + hold</li> <li>Preset + hold</li> <li>Reset + totalize</li> <li>Hold</li> </ul>

Additional information	Selection
	<ul> <li>Totalize option</li> <li>The totalizer is started or continues running</li> </ul>
	<ul> <li>Reset + hold option</li> </ul>
	The totalizer is reset to "0" and stopped.
	Preset + hold option
	The totalizer is stopped and set to the start value specified in the "Preset value " parameter.
	Reset + totalize option
	The totalizer is reset to "0" and restarted.
	Hold option
	The totalizer is stopped.

Preset value	
Navigation	□ Application $\rightarrow$ Totalizers $\rightarrow$ Totalizer 1 to n $\rightarrow$ Preset value 1 to n
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Totalizer 1 to n</b> submenu.
Description	Specify a start value for the totalizer.
User entry	Signed floating-point number
Additional information	DescriptionThe unit of the selected process variable is specified for the totalizer in the Unit totalizer parameter ( $\rightarrow \boxdot 12$ ).ExampleThis configuration is suitable for applications such as iterative filling processes with a fixed batch quantity.

Totalizer failure behavior			A
Navigation		Application $\rightarrow$ Totalizers $\rightarrow$ Totalizer 1 to n $\rightarrow$ FailureBehav. 1 to n	
Description	Spec	fy how the totalizer should behave in the event of a device alarm.	
Selection	<ul> <li>Ho</li> <li>Cor</li> <li>Las</li> </ul>	ld ntinue st valid value + continue	

#### Additional information

#### Selection

Hold option

The totalizer is stopped in the event of a device alarm.

Continue option

The totalizer continues to totalize based on the current value measured; the device alarm is ignored.

• Last valid value + continue option

The totalizer continues to totalize based on the last valid value measured before the device alarm occurred.

#### 4.4 Sensor



#### 4.4.1 Process parameters

Navigation

► Process parameters		
Flow damping	→ 🗎 59	
Flow override	→ ● 60	
Density damping	→ 🗎 60	
Temperature damping	→ 🗎 60	

Flow damping		
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Process param. $\rightarrow$ Flow damping	
Description	Enter a time constant for flow damping. Value = 0: No damping Value > 0: Damping increases	
	Damping is implemented by means of a proportional transmission behavior with first order delay (PT1 element).	
User entry	0 to 99.9 s	

Flow override	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Process param. $\rightarrow$ Flow override
Description	Reports the flow rate as zero until flow override is deactivated. Can be used for example when cleaning the pipeline.
Selection	<ul><li>Off</li><li>On</li></ul>
Additional information	Selection"On" optionActivates flow override and the diagnostic message "453 Flow override active" is generated.Values reported:Flow variables: ZeroOther process variables: As measuredTotalizers: Stop totalizingEffectImage: Stop affects all the functions of the measuring device.
	Positive zero return is not relevant for most applications.

Density damping		Ê
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Process param. $\rightarrow$ Density damping	
Description	Enter a time constant for the damping applied to the value measured for density. Value = 0: No damping Value > 0: Damping increases	
	Damping is implemented by means of a proportional transmission behavior with first order delay (PT1 element).	
User entry	0 to 999.9 s	

Temperature	damping
-------------	---------

Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Process param. $\rightarrow$ Temp. damping
Description	Enter Value Value	a time constant for the damping applied to the value measured for temperature. = 0: No damping > 0: Damping increases
	Damp order	ing is implemented by means of a proportional transmission behavior with first delay (PT1 element).

User entry

0 to 999.9 s

#### 4.4.2 Low flow cutoff

Low flow cut off is an important function for many applications to shut out inherent noise from the measuring device and the application in the lower measuring range. If the flow drops below a certain minimum value, the value is set to **0** so that the flow signal can be kept at the zero point between two batches.

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Low flow cutoff

► Low flow cutoff			
	Low flow cutoff		→ 🗎 61
	On value low flow cutoff	I	→ 🗎 62
	Off value low flow cutoff		→ 🗎 62
	Pressure shock suppression		→ 🖺 63
	Pressure shock suppression delay		→ 🗎 64

Low flow cutoff		Ê
Navigation	$\Box \qquad \text{Application} \rightarrow \text{Sensor} \rightarrow \text{Low flow cutoff} \rightarrow \text{Low flow cutoff}$	
Description	Select a process variable for low flow cutoff to activate low flow cutoff.	
Selection	<ul><li>Off</li><li>Mass flow</li><li>Volume flow</li></ul>	
Additional information	Description	



### On value low flow cutoff Image: Constant of the second second

Description	Enter on value to switch on low flow cutoff.
	Value = 0: No low flow cutoff Value > 0: Low flow cutoff is activated

User entry Positive floating-point number

#### Off value low flow cutoff

Navigation	
Description	Enter off value to switch off low flow cutoff. The off value is entered as a positive hysteresis with respect to the on value.
User entry	0 to 100.0 %

A

Pressure shock suppressi	on 🖻
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Low flow cutoff $\rightarrow$ Pres. shock sup.
Description	Enter a time span for signal suppression (= pressure shock suppression active), for example to prevent the device from registering flow movements in the pipe when a valve is closed.
	Pressure schock suppression is activated when the flow rate drops below the on value for low flow cutoff.
	Values reported when pressure shock suppression is active:
	Flow: 0 Totalizer: Last valid value
	Pressure shock suppression is deactivated when the time span specified has elapsed and the flow rate exceeds the off value for low flow cutoff.
User entry	0 to 100 s
Additional information	Example
	When a valve is closed, momentarily strong fluid movements may occur in the pipeline, which are registered by the device. These totalized flow values lead to a false totalizer status, particularly during batching processes.

С D Q D 1 3 6 5 В А

- Q Flow
- t Time
- Α After run
- В Pressure shock
- С Pressure shock suppression active according to the time entered
- D Pressure shock suppression inactive
- Valve closes 1
- 2 Flow falls below the on-value of the low flow cut off: pressure shock suppression is activated
- The time entered has elapsed: pressure shock suppression is deactivated 3
- The current flow value is processed and displayed again. On value for low flow cut off 4
- 5
- 6 Off value for low flow cut off

A001288

Pressure shock suppression	delay	ß
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Low flow cutoff $\rightarrow$ PresShockSpDelay	
Description	If required, enter a delay until pressure shock suppression is activated to suppress a response to momentary low flow.	
User entry	Positive floating-point number	

#### 4.4.3 Partially filled pipe detection

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Partial pipe det



Partially filled pipe	detection	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Partial pipe det $\rightarrow$ Partial pipe det	
Description	Select a process variable to activate detection of an empty or partially filled pipe. Due to low density, deactivate partially filled pipe detection for a gas.	
Selection	<ul><li>Off</li><li>Density</li></ul>	

Low value partial filled pipe detection			Ê
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Partial pipe det $\rightarrow$ Low value	
Prerequisite	A pro <b>Empt</b>	cess variable has been selected in the <b>Assign process variable</b> parameter in the <b>y pipe detection</b> submenu.	

ß

Description	Enter the lower limit value for the selected process variable. If the measured value drops below the limit value, diagnostic message "862 Partly filled pipe" is generated.
	The lower limit value must be lower than the upper limit value ("High value partial filled pipe detection" parameter).
User entry	Signed floating-point number

High value partial filled pipe detection
------------------------------------------

Navigation	
Prerequisite	A process variable has been selected in the <b>Assign process variable</b> parameter in the <b>Empty pipe detection</b> submenu.
Description	Enter the upper limit value for the selected process variable. If the measured value exceeds the limit value, diagnostic message "862 Partly filled pipe" is generated.
User entry	Signed floating-point number

Threshold	Â
Navigation	$ \qquad \qquad \text{Application} \rightarrow \text{Sensor} \rightarrow \text{Partial pipe det} \rightarrow \text{Threshold} $
Description	Enter the threshold for oscillation damping. When oscillation damping exceeds the threshold, the pipe is detected as partially filled, the flow rate is reported as 0, and the diagnostic message "862 Partly filled pipe" is generated.
	If the medium is inhomogeneous or contains air bubbles, oscillation damping of the measuring tubes increases. Oscillation damping also depends on application-specific variables, such as medium, nominal diameter, and sensor.
	For a full tube, oscillation damping will typically be around 500. For a partially filled pipe, oscillation damping rises to > 5000. Therefore, a threshold of 2000 is recommended. If set to 0, partially filled pipe detection via oscillation damping is deactivated.

User entry

Positive floating-point number

#### 4.4.4 Sensor adjustment

*Navigation*  $\blacksquare \square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Sensor adjustm.

► Sensor adjustment		
Installation direction		→ 🗎 66



Installation direction			
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Install. direct.	
Description	Select th	ne sign of the flow direction.	
Selection	<ul><li>Forwa</li><li>Reversion</li></ul>	ard flow se flow	

#### Zero adjustment

Navigation

 $\blacksquare$  □ Application → Sensor → Sensor adjustm. → Zero adjustment

► Zero adjustment				
Zero adjustment control	) → 🗎 66			
Progress	) → 🗎 67			
Status	) → 🗎 67			

### Zero adjustment control Navigation Application → Sensor → Sensor adjustm. → Zero adjustment → ZeroAdjustContr. Description Start or cancel a zero point adjustment. The following conditions must be met to perform a zero point adjustment successfully: The actual flow rate must be 0. The pressure must be at least 1.034 bar. Selection Cancel Start

Progress	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Zero adjustment $\rightarrow$ Progress
Description	Shows the progress of the process.
User interface	0 to 100 %
Status	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Zero adjustment $\rightarrow$ Status
Description	Displays the status of the zero point adjustment.
User interface	<ul><li>Busy</li><li>Failed</li><li>Done</li></ul>

#### Process variable adjustment

*Navigation*  $\square$  Application  $\rightarrow$  Sensor  $\rightarrow$  Sensor adjustm.  $\rightarrow$  Variable adjust

► Process variable adjustment				
Mass flow offset	→ 🗎 68			
Mass flow factor	→ 🗎 68			
Volume flow offset	→ 🗎 68			
Volume flow factor	→ 🗎 68			
Density offset	→ 🗎 69			
Density factor	→ 🗎 69			
Temperature offset	→ 🗎 69			
Temperature factor	→ 🗎 69			

Mass flow offset			Â
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Mass flow offset	
Description	Ente	r the offset by which to shift the zero point for mass flow in kg/s.	
User entry	Signe	ed floating-point number	
Additional information	Desci Corre	ription ected value = (factor × value) + offset	

Mass flow factor		Ê
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Mass flow factor	
Description	Enter the multiplication factor to apply to the mass flow value.	
User entry	Positive floating-point number	
Additional information	Description Corrected value = (factor × value) + offset	

Volume flow offset			
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Vol. flow offset	
Description	Enter	the offset by which to shift the zero point for volume flow in m3/s.	
User entry	Signed floating-point number		
Additional information	<i>Descr</i> Corre	iption cted value = (factor × value) + offset	

#### Volume flow factor

Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Vol. flow factor
Description	Enter the multiplication factor to apply to the volume flow.
User entry	Positive floating-point number
Additional information	Description Corrected value = (factor × value) + offset

£

Â

Density offset	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Density offset
Description	Enter the offset by which to shift the zero point for density in kg/m3.
User entry	Signed floating-point number
Additional information	Description Corrected value = (factor × value) + offset

Density factor		Ê
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Density factor	
Description	Enter the multiplication factor to apply to the density value.	
User entry	Positive floating-point number	
Additional information	Description	
	Corrected value = (factor × value) + offset	

Temperature offset			
Navigation		Application → Sensor → Sensor adjustm. → Variable adjust → Temp. offset	
Description	Enter	the offset by which to shift the zero point for temperature in K.	
User entry	Signe	Signed floating-point number	
Additional information	Descr	iption	
	Corre	cted value = (factor × value) + offset	

Temperature factor			
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Sensor adjustm. $\rightarrow$ Variable adjust $\rightarrow$ Temp. factor	
Description	Ente	r the multiplication factor to apply to the temperature value.	
User entry	Posi	tive floating-point number	

#### Additional information Description

Corrected value = (factor × value) + offset

#### 4.4.5 Calibration

*Navigation* B Application  $\rightarrow$  Sensor  $\rightarrow$  Calibration

► Calibration	
Nominal diameter	) → 🗎 70
Calibration factor	) → 🗎 70
Zero point	) → 🗎 70

#### Nominal diameter

Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Calibration $\rightarrow$ Nominal diameter
Description	Displa	ys the nominal diameter of the sensor.
User interface	Chara	cter string comprising numbers, letters and special characters

Calibration factor	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Calibration $\rightarrow$ Cal. factor
Description	Displays the current calibration factor for the sensor. The factory setting for the calibration factor can be found on the sensor's nameplate.
User interface	Signed floating-point number
Zero point	

Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Calibration $\rightarrow$ Zero point
Description	Displays the zero point correction value for the sensor.
	Users logged on in the Service role have write access.

#### User entry

Signed floating-point number

#### 4.4.6 Supervision

Navigation 🛛 🗐 🗏	Application $\rightarrow$ Sensor $\rightarrow$	Supervision
------------------	------------------------------------------------	-------------

► Supervision	
► Raw values	→ 🗎 71
► Sensor	) → 🗎 71

#### Raw values

Navigation

► Raw values				
[	Raw value mass flow	I		→ 🗎 71

Raw value mass flow	
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Raw values $\rightarrow$ Raw mass flow
Description	Displays the mass flow value before offset and factor correction, damping, low flow cut off and monitoring of a partially filled pipe. This value can be used to verify that the current zero point is within range.
User interface	Signed floating-point number
	Sensor
	Navigation $\textcircled{B} \square$ Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor

► Sensor			
Oscillation frequency 0	to 1	]	→ 🗎 72
Frequency fluctuation 0	to 1	]	→ 🗎 72

Oscillation amplitude 0 to 1	→ 🗎 72
Oscillation damping 0 to 1	→  ⇒ 72
Oscillation damping fluctuation 0 to 1	→ 🗎 73
Signal asymmetry 0	→ 🗎 73
Exciter current 0 to 1	→ 🗎 73

#### Oscillation frequency 0 to 1

Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Osc. freq. 0 to 1
Description	Displa	ays the current oscillation frequency.
User interface	Signe	d floating-point number

#### Frequency fluctuation 0 to 1

Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Freq. fluct. 0 to 1
Description	Displa	ays the current frequency fluctuation.
User interface	Signe	d floating-point number

#### Oscillation amplitude 0 to 1

Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Osc. ampl. 0 to 1
Description	Displays the oscillation amplitude of the sensor relative to the value under ideal conditions.
User interface	Signed floating-point number

# Oscillation damping 0 to 1 Navigation Application → Sensor → Supervision → Sensor → Osc. damping 0 to 1 Description Displays the current oscillation damping. Oscillation damping is an indicator for the sensor's current demand for excitation power.
### User interface

Positive floating-point number

Oscillation damping fluctuation 0 to 1		
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Osc.damp.fluct0 to 1	
Description	Displays the current fluctuation in oscillation damping.	
User interface	Signed floating-point number	
Signal asymmetry 0		
Navigation	□ Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Signal asymm. 0	
Description	Displays the relative difference between the signal amplitudes of the inlet sensor and the outlet sensor of the first oscillation mode.	
User interface	Signed floating-point number	

Exciter current 0 to 1		
Navigation		Application $\rightarrow$ Sensor $\rightarrow$ Supervision $\rightarrow$ Sensor $\rightarrow$ Exc. current 0 to 1
Description	Displ	lays the actual excitation current.
User interface	Signe	ed floating-point number

ß

# 4.5 Pulse/frequency/switch output 1 to n

*Navigation*  $\blacksquare \Box$  Application  $\rightarrow$  PFS output 1 to n

► Pulse/frequency/switch output 1	
Operating mode	] → 🗎 74
Invert output signal	) → 🗎 77

### Operating mode

Navigation

Select the operating mode for the output.

Description

Selection

Off

- Pulse
- Automatic pulse
- Frequency
- Switch

### Additional information

# Selection

• Pulse option

Quantitatively proportional pulse with pulse width to be configured. Whenever the pulse value for the specified process variable is reached, a pulse is emitted, the duration of which is set within the "Pulse width" parameter.

The process variable for the pulse output is specified in the "Assign pulse output " parameter.

Automatic pulse option

Quantitatively proportional pulse with a fixed 1:1 ratio of pulse-to-interval. Whenever the pulse value for the specified process variable is reached, a pulse is emitted. The process variable for the pulse output is specified in the "Assign pulse output " parameter.

Frequency option

The output frequency is proportional to the value for the process variable assigned, with a pulse-to-interval ratio of 1:1.

The process variable for the frequency output is specified in the "Assign frequency output" parameter.

Switch option

Indicates when the state of the device changes, e.g. when a specified limit value is reached or an alarm or warning is triggered.

The switch output can be in one of two states: either it is conductive or it is non-conductive.

When the function assigned to the switch output is triggered, the switch output will depending on the output configuration either be continuously conductive or continuously non-conductive.

### "Off" option

The pulse/frequency/switch output is not used.

### "Pulse" option

Quantity-dependent pulse with configurable pulse width

- Whenever a specific mass or volume is reached (pulse value), a pulse is output, the duration of which was set previously (pulse width).
- The pulses are never shorter than the set duration.
- This option is used for most batching applications.
- Depending on the setting, it is important when using this option that the recording device is capable of detecting pulses transmitted at a pulse rate of 10 kHz.

### Example

- Flow rate approx. 100 g/s
- Pulse value 0.1 g
- Pulse width 0.05 ms
- Pulse rate 1000 Impuls/s



☑ 5 Quantity-proportional pulse (pulse value) with pulse width to be configured

- B Pulse width entered
- P Pauses between the individual pulses

### "Automatic pulse" option

Quantity-proportional pulse with on/off ratio of 1:1

- This is used if the duration of the active pulse is not known.
- Whenever a specific mass or volume is reached (pulse value), a pulse with a on/off ratio of 1:1 is output.
- In this case, the pulse width is not relevant.
- When using this option, it is important that the recording device is capable of detecting pulses transmitted at a pulse rate of 10 kHz.

Example

- Flow rate approx. 100 g/s
- Pulse value 0.1 g
- Automatic pulse width
- Pulse rate approx. 1000 Impuls/s



Quantity-proportional pulse (pulse value) with automatic pulse width

- B Automatic pulse width
- P Pauses between the individual pulses

### "Frequency" option

Flow-proportional frequency output with 1:1 on/off ratio

- An output frequency is output that is proportional to the value of a process variable, such as mass flow, volume flow, density or temperature.
- Only this option can be used to output the density and temperature process variables.

### Example

- Flow rate approx. 100 g/s
- Max. frequency 10 kHz
- Flow rate at max. frequency 1000 g/s
- Output frequency approx. 1000 Hz



☑ 7 Flow-proportional frequency output

### "Switch" option

Contact for displaying a condition (e.g. alarm or warning if a limit value is reached)

### Example Alarm response without alarm



🗷 8 No alarm, high level

### Example

Alarm response in case of alarm



🖻 9 Alarm, low level

Invert output signal		Â
Navigation	Application $\rightarrow$ PFS output 1 $\rightarrow$ Invert outp sig	
in a station	Service and the service of the servi	
Description	Indicate whether to invert the output signal (Yes/No).	
	If the output signal is inverted, the output behavior is the reverse of its configuration. This setting does not apply to the frequency output.	
Selection	<ul><li>No</li><li>Yes</li></ul>	
Additional information	Selection	
	<b>No</b> option (passive - negative)	



# Yes option (passive - positive)



# 4.6 Pulse output

Navigation

 $\blacksquare \Box \quad \text{Application} \rightarrow \text{Pulse output}$ 

► Pulse output	
	_
Assign pulse output	→ 🗎 79
Measuring mode	] → 🗎 79
Value per pulse	] → 🗎 80
Pulse width	) → 🗎 80
Failure mode	) → 🖹 81
Pulse output	) → 🖹 81

Assign pulse output		ß
Navigation	Application $\rightarrow$ Pulse output $\rightarrow$ Assign pulse	

**Description** Select the process variable for the pulse output.

Selection

Off

- Mass flow
- Volume flow

Measuring mode		
Navigation	$\square \qquad \text{Application} \rightarrow \text{Pulse output} \rightarrow \text{Measuring mode}$	
Description	Select the measuring mode for the pulse output.	
Selection	<ul><li>Forward flow</li><li>Forward/Reverse flow</li><li>Reverse flow</li></ul>	

Reverse flow compensation

Additional information	Selection
Additional information	<ul> <li>Selection</li> <li>Forward flow option Positive flow is reported, negative flow is not reported.</li> <li>Forward/Reverse flow option Both positive and negative flow are reported (absolute value), whereby no distinction is made between positive and negative flow.</li> <li>Reverse flow option Negative flow is reported, positive flow is not reported.</li> <li>Reverse flow compensation option Positive flow is reported. Negative flow quantities are buffered, processed, and reported after a maximum delay of 60 s. This option is used e.g. to compensate intermittent negative flow, which may occur in connection with positive displacement pumps as a result of wear and tear or high viscosity.</li> </ul>

Value per pulse		
Navigation	$\square \qquad \text{Application} \rightarrow \text{Pulse output} \rightarrow \text{Value per pulse}$	
Description	Enter the measured value that corresponds to one pulse.	
	The lower the value, the better the resolution and the higher the pulse frequency.	
User entry	Signed floating-point number	
Navigation	$ \qquad \qquad \text{Application} \rightarrow \text{Pulse output} \rightarrow \text{Pulse width} $	
Description	Specify the duration of a pulse.	
	The maximum pulse rate is defined by fmax = $1 / (2 \times \text{pulse width})$ . The interval betwee two pulses (P) is at least as long as the specified pulse width (B). The maximum flow is defined by Qmax = fmax × pulse value. If the flow exceeds these limit values, the measuring device displays the diagnostic message "443 Pulse output saturated".	en
	Example: Pulse value: 0.1 g Pulse width: 0.1 ms fmax: 1 / (2 × 0.1 ms) = 5 kHz Qmax: 5 kHz × 0.1 g = 0.5 kg/s	
User entry	0.05 to 2 000 ms	

### Additional information

Description



B Pulse width entered

P Pauses between the individual pulses

Failure mode	
Navigation	
Description	Specify how the output should behave in the event of a device alarm.
	For safety reasons, it is recommended that the behavior of the output in the event of a device alarm be predefined.
Selection	<ul><li>Actual value</li><li>No pulses</li></ul>
Additional information	Selection
	<ul> <li>Actual value option         The pulse output continues to emit pulses based on the actual value measured. The fault condition is ignored.         A device alarm indicates a serious malfunction that may impact measurement quality to the point that accuracy can no longer be ensured. This option is only recommended if the necessary safeguards are in place to ensure that no alarm condition impacts measurement quality.     </li> <li>No pulses option         In the event of a device alarm, no pulses are emitted.     </li> </ul>

Pulse output	
Navigation	$\square \qquad \text{Application} \rightarrow \text{Pulse output} \rightarrow \text{Pulse output}$
Description	Displays the frequency at which pulses are currently emitted.
	The output behavior can be inverted in the "Invert output signal" parameter, i.e. in this case the transistor will be non-conductive for the duration of a pulse. The "Invert output signal" parameter is not available for all devices.
User interface	Positive floating-point number

# 4.7 Frequency output

Navigation

□ □ Application → Freq. output

► Frequency output	
Assign frequency output	→ 🗎 82
Measuring mode	) → 🗎 83
Minimum frequency value	→ 🗎 83
Maximum frequency value	) → 🗎 83
Measuring value at minimum frequency	→ 🗎 84
Measuring value at maximum frequency	→ 🖺 84
Damping output	] → 🖺 84
Failure mode	) → 🗎 84
Failure frequency	→ 🗎 85
Output frequency	→ 🗎 85

### Assign frequency output

A

Navigation

Application  $\rightarrow$  Freq. output  $\rightarrow$  Assign freq.

Description

Select a process variable for the frequency output.

Selection

OffMass flow

- Wass nowVolume flow
- Density
- DensityTemperature
- Temperature
  Exciter current 0
- Oscillation frequency 0
- Oscillation amplitude 0
- Frequency fluctuation 0
- Oscillation damping 0
- Oscillation damping fluctuation 0
- Signal asymmetry

Measuring mode		Â
Navigation	□ Application $\rightarrow$ Freq. output $\rightarrow$ Measuring mode	
Description	Select the measuring mode for the frequency output.	
Selection	<ul> <li>Forward flow</li> <li>Forward/Reverse flow</li> <li>Reverse flow</li> <li>Reverse flow compensation</li> </ul>	
Additional information	<ul> <li>Selection</li> <li>Forward flow option Positive flow is reported, negative flow is not reported.</li> <li>Forward/Reverse flow option Both positive and negative flow are reported (absolute value), whereby no distinction made between positive and negative flow.</li> <li>Reverse flow option Negative flow is reported, positive flow is not reported.</li> <li>Reverse flow compensation option Positive flow is reported. Negative flow quantities are buffered, processed, and report after a maximum delay of 60 s. This option is used e.g. to compensate intermittent negative flow, which may occur connection with positive displacement pumps as a result of wear and tear or high viscosity.</li> </ul>	on is orted in

Minimum frequency value		
Navigation	□ Application $\rightarrow$ Freq. output $\rightarrow$ Min. freq. value	
Description	Enter the frequency to report for the lower range value of the measured value range. The lower range value for the measured value range that corresponds to the minimum frequency is specified in the "Measuring value at minimum frequency" parameter.	
User entry	0.0 to 10 000.0 Hz	

Maximum frequency value			
Navigation		Application $\rightarrow$ Freq. output $\rightarrow$ Max. freq. value	
Description	Enter The u	the frequency to report for the upper range value of the measured value range.	I
	freque	ency is specified in the "Measuring value at maximum frequency" parameter.	
User entry	0.0 to	10 000.0 Hz	

Measuring value at	minimum frequency
Navigation	□ Application $\rightarrow$ Freq. output $\rightarrow$ Val. at min.freq
Description	Enter the lower range value for the measured value range.
	Depending on the setting selected for the "Measuring mode" parameter, the value specified for this parameter and the "Measuring value at maximum frequency" parameter must have the same algebraic sign or not.
	As a rule, the lower range value is scaled to be lower than the upper range value. As a result, the behavior of the frequency output is proportional to the process variable assigned. If the lower range value is scaled to be higher than the upper range value, then the behavior of the frequency output will be inversely proportional to the process variable assigned.
User entry	Signed floating-point number
Measuring value at	maximum frequency
Navigation	$ \qquad \qquad \text{Application} \rightarrow \text{Freq. output} \rightarrow \text{Val. at max.freq} $
Description	Enter upper range value for the measured value range.

User entry Signed floating-point number

Damping output	
Navigation	□ Application $\rightarrow$ Freq. output $\rightarrow$ Damping out.
Description	Enter a time constant to set the reaction time of the output signal to fluctuations in the measured value (PT1 element).
	The smaller the time constant, the faster the output reacts to fluctuations in the measured value
	If the time constant is 0, damping is deactivated.
User entry	0 to 999.9 s

Failure mode		£
Navigation	$\square \qquad \text{Application} \rightarrow \text{Freq. output} \rightarrow \text{Failure mode}$	
Description	Specify how the output should behave in the event of a device alarm.	
	For safety reasons, it is recommended that the behavior of the output in the event of a device alarm be predefined.	

Selection	<ul> <li>Actual value</li> <li>Defined value</li> <li>0 Hz</li> </ul>
Additional information	Selection
	<ul> <li>Actual value option The frequency output continues to report the actual flow rate measured. The fault condition is ignored.</li> <li>Defined value option The frequency output reports the value specified. The value is specified in the "Failure frequency" parameter.</li> <li>0 Hz option The frequency output reports 0 Hz.</li> </ul>

Failure frequency		â
Navigation	□ Application $\rightarrow$ Freq. output $\rightarrow$ Failure freq.	
Description	Enter the value for the "Defined value" option in the "Failure mode" parameter.	
User entry	0.0 to 10 000.0 Hz	

Output frequency	
Navigation	Application $\rightarrow$ Freq. output $\rightarrow$ Output freq.
Description	Displays the frequency reported for the process value measured.
User interface	0.0 to 10000.0 Hz

# 4.8 Switch output

Navigation



Switch output function	6
Navigation	$\Box \qquad \text{Application} \rightarrow \text{Switch output} \rightarrow \text{Switch out funct}$
Description	Assign a function to the switch output.
Selection	<ul> <li>Off</li> <li>On</li> <li>Diagnostic behavior</li> <li>Limit</li> <li>Flow direction check</li> <li>Status</li> </ul>
Additional information	<ul> <li>Selection</li> <li>Off option The switch output is permanently switched off (open, non-conductive).</li> <li>On option The switch output is permanently switched on (closed, conductive).</li> <li>Diagnostic behavior option The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category.</li> <li>Limit option The switch output is switched on (closed, conductive), if the limit value specified for the process variable is reached.</li> <li>Flow direction check option The switch output is switched on (closed, conductive), when the flow direction changes (forward or reverse flow).</li> <li>Status option The switch output is switched on (closed, conductive) to indicate the status for the selected device function ("Assign status" parameter).</li> </ul>

Failure mode		
Navigation	□ Application $\rightarrow$ Switch output $\rightarrow$ Failure mode	
Description	Specify how the output should behave in the event of a device alarm.	
	For safety reasons, it is recommended that the behavior of the output in the event of a device alarm be predefined.	
Selection	<ul><li>Actual status</li><li>Open</li><li>Closed</li></ul>	
Additional information	Selection	
	<ul> <li>Actual status option The switch output continues to report the actual state of the switch output based on function assigned ("Switch output function" parameter). The fault condition is ignored </li> <li>Open option In the event of a device alarm, the switch output's transistor is set to "non-conductive"</li></ul>	the d. ".

Switch state	
Navigation	$\Box \qquad \text{Application} \rightarrow \text{Switch output} \rightarrow \text{Switch state}$
Description	Indicates the current switch state of the switch output.
User interface	<ul><li>Open</li><li>Closed</li></ul>
Additional information	<ul> <li>User interface</li> <li>Open option The switch output is not conductive.</li> <li>Closed option The switch output is conductive.</li> </ul>

# 4.9 Limit Switch output



Assign limit	Â
Navigation	$\Box \qquad \text{Application} \rightarrow \text{Limit} \rightarrow \text{Assign limit}$
Description	Select the process variable to monitor in case the specified limit value is exceeded. If a limit value for the selected process variable is exceeded, the output is switched on.
Selection	<ul> <li>Off</li> <li>Mass flow</li> <li>Volume flow</li> <li>Density</li> <li>Temperature</li> <li>Oscillation damping</li> </ul>
Additional information	Switch-on point > switch-off point
	<ul> <li>Behavior of the status output if switch-on point &gt; switch-off point:</li> <li>Process variable &gt; switch-on point: transistor is conductive</li> <li>Process variable &lt; switch-off point: transistor is not conductive</li> </ul>

### Endress+Hauser



- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive A Process variable
- B Status output

Switch-on point < switch-off point

- Behavior of the status output if switch-on point < switch-off point:
- Process variable < switch-on point: transistor is conductive</li>
- Process variable > switch-off point: transistor is not conductive



- 1 Switch-on value
- 2 Switch-off value
- 3 Conductive
- 4 Non-conductive
- A Process variable
- B Status output

Switch-on point = switch-off point

Behavior of the status output if switch-on point = switch-off point:

- Process variable > switch-on point: transistor is conductive
- Process variable < switch-off point: transistor is not conductive



- Switch-on point = switch-off point Conductive 1
- 2 3
- Non-conductive Process variable
- Α В Status output

Switch-on value	
Navigation	$\square \qquad \text{Application} \rightarrow \text{Limit} \rightarrow \text{Switch-on value}$
Description	Enter the limit value for the switch-on point (process variable > switch-on value = closed conductive).
	To use a hysteresis: Switch-on point > Switch-off point.
User entry	Signed floating-point number
Switch-on delay	
Navigation	$\square \qquad \text{Application} \rightarrow \text{Limit} \rightarrow \text{Switch-on delay}$
Description	Enter delay before the switch output is switched on.
	0.0 to 100.0 c

Switch-off value	
Navigation	$\Box \qquad \text{Application} \rightarrow \text{Limit} \rightarrow \text{Switch-off value}$
Description	Enter the limit value for the switch-off point (process variable < switch-off value = open, non-conductive).
	To use a hysteresis: Switch-on point > Switch-off point.
User entry	Signed floating-point number

Switch-off delay			â
Navigation		Application $\rightarrow$ Limit $\rightarrow$ Switch-off delay	
Description	Enter	delay before the switch output is switched off.	
User entry	0.0 to	100.0 s	

# 4.10 Diagnostic behavior Switch output

Navigation		
► Diagnostic beh	havior	
	Assign diagnostic behavior	→ 🗎 92

Assign diagnostic behavior	Ê

Navigation	□ Application $\rightarrow$ Diag. behavior $\rightarrow$ Assign diag. beh
Description	The switch output is switched on (closed, conductive), if there is a pending diagnostic event of the assigned behavioral category.
Selection	<ul><li>Alarm</li><li>Alarm or warning</li><li>Warning</li></ul>
Additional information	Selection
	<ul> <li>Alarm option The switch output is only switched on for diagnostic events of the "Alarm" category.</li> <li>Alarm or warning option The switch output is switched on for diagnostic events of the "Alarm" or "Warning" category.</li> <li>Warning option The switch output is only switched on for diagnostic events of the "Warning" category.</li> </ul>

# 4.11 Flow direction check Switch output

 Navigation
 Image: Application → Fl. direct.check

 Image: Flow direction check
 Assign flow direction check

A

→ 🗎 93

### Assign flow direction check

Navigation	
Description	Select a process variable for flow direction monitoring.
Selection	<ul><li> Off</li><li> Volume flow</li><li> Mass flow</li></ul>

Endress+Hauser

Assign status

# 4.12 Status Switch output

Navigation		
► Status		
	Assign status	→ 🗎 9

Navigation	$\Box \qquad \text{Application} \rightarrow \text{Status} \rightarrow \text{Assign status}$
Description	Select the device function for which to report the status. If the switch-on point for the selected device function is reached, the output is switched on (closed and conductive). Otherwise, the output is non-conductive.
	The output behavior can be inverted in the "Invert output signal" parameter, i.e. in this case the output will be non-conductive when switched on and conductive when switched off. The "Invert output signal" parameter is not available for all devices.
Selection	<ul><li>Partially filled pipe detection</li><li>Low flow cutoff</li></ul>

Endress+Hauser

# 5 "System" menu

Overall device management and security settings – management of system settings and adaption to operational requirements.

Navigation	🗟 😑 System	
System		
	► Device management	→ 🗎 96
	► User management	→ 🗎 98
	► Date/time	→ 🗎 99
	► Information	→ 🗎 100

# 5.1 Device management

Navigation 🛛 🗐 🛛



Device tag		ß
Navigation	System $\rightarrow$ Device manag. $\rightarrow$ Device tag	
Description	Displays the name for the measuring point.	
User entry	Character string comprising numbers, letters and special characters (32)	

Locking status		
NT- 1		
Navigation	System $\rightarrow$ Device manag. $\rightarrow$ Locking status	
Description	Indicates the write protection with the highest priority that is currently active.	
User interface	Temporarily locked	
Additional information	User interface	
	<b>"Temporarily locked" option</b> Due to internal procedures that are currently in progress (e.g. data upload/download, reset, etc.), write access to the parameters is temporarily locked.The parameters can be modified again, once the internal procedures are complete.	

Configuration counter		
Navigation	System $\rightarrow$ Device manag. $\rightarrow$ Config. counter	
Description	Displays the counter for the number of times the device configuration has changed. If the value for a static parameter changes, the counter increments by 1. This is to enable tracking different parameter versions.	
	When multiple parameters are changed simultaneously, e.g. when loading a configuration file into the device from an external source such as FieldCare, the counter may increment.	
	The counter cannot be reset. Nor is it reset to a default value on performing a device reset. Once the counter has incremented to 65535, it restarts at 1.	
User interface	0 to 65 535	
Device reset	۵	
Navigation	System $\rightarrow$ Device manag. $\rightarrow$ Device reset	
Description	Reset the device configuration - either entirely or in part - to a defined state.	
Selection	<ul> <li>Cancel</li> <li>To delivery settings</li> <li>Restart device</li> <li>Restore S-DAT backup *</li> <li>Create T-DAT backup</li> <li>Restore T-DAT backup *</li> </ul>	
Additional information	<ul> <li>Selection</li> <li>To delivery settings option Every parameter for which a customer-specific default setting was ordered is reset to the customer-specific value. All other parameters are reset to the factory setting.</li> <li>Restart device option The restart resets every parameter with data stored in volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.</li> <li>Restore S-DAT backup option Restores the data that is saved on the S-DAT. This function can be used to resolve the memory issue "083 Memory content inconsistent" or to restore the S-DAT data when a new S-DAT has been installed.</li> <li>Create T-DAT backup option Creates T-DAT backup option Restores the data saved on the T-DAT. This function can be used to resolve the memory issue "283 Memory content inconsistent" or to restore the T-DAT data when a new T-DAT has been installed.</li> </ul>	

<sup>\*</sup> Visibility depends on order options or device settings

# 5.2 User management

Navigation	$\blacksquare$ System $\rightarrow$ User manag.	
► User manager	nent	
	User role	→ 🗎 98
	Enter access code	→ 🗎 98

User role	
Navigation	System $\rightarrow$ User manag. $\rightarrow$ User role
Description	Displays the role the user is currently logged on in. The role determines the user's access rights for the parameters. The access rights can be changed via the "Enter access code" parameter.
User interface	<ul> <li>Operator</li> <li>Maintenance</li> <li>Service</li> <li>Production</li> <li>Development</li> </ul>
Additional information	<ul> <li>User interface</li> <li>Operator option Provides only read access to parameters.</li> <li>Maintenance option Provides read and write access to parameters. For some parameters, the user must be logged on in the Service role to obtain write access.</li> <li>Service option Provides read and write access to Service parameters.</li> </ul>

Enter access code	
Navigation	□ System → User manag. → Ent. access code
Description	Use this function to enter the user-specific release code to remove parameter write protection.
User entry	Max. 16-digit character string comprising numbers, letters and special characters

# 5.3 Date/time

	Navigation $\textcircled{B} \boxminus$ System $\rightarrow$ Date/time	
	► Date/time	
	Time format	→ 🗎 99
Time format		Ê
Navigation	□ System $\rightarrow$ Date/time $\rightarrow$ Time format	
Description	Select the time format.	
Selection	<ul> <li>24 h</li> <li>12 h AM/PM</li> </ul>	
Additional information	Selection For an explanation of the abbreviated units: $\rightarrow \square 106$	

# 5.4 Information

Navigation		
► Information		
	► Device	→ 🗎 100
	► Electronic module	→ 🖺 103

### 5.4.1 Device

<b>Ν</b> Τ		- + :
INT	11111	171011
1100	vigu	πιυπ

 $\square$  System → Information → Device

► Device		
	Device name	→ 🗎 100
	Device tag	→ 🗎 101
	Serial number	→ 🗎 101
	Order code	→ 🗎 101
	Firmware version	→ 🖺 101
	Extended order code 1	→ 🗎 102
	Extended order code 2	→ 🗎 102
	Extended order code 3	→ 🗎 102
	ENP version	→ 🗎 102
	Manufacturer	→ 🗎 103

# Device name Navigation □ System → Information → Device → Device name Description Displays the name of the transmitter. The transmitter name is also provided on the nameplate of the transmitter.

**User interface** Character string comprising numbers, letters and special characters

Device tag				
Navigation	$ \qquad \qquad$			
Description	Displays the name for the measuring point.			
User entry	Character string comprising numbers, letters and special characters (32)			
Serial number				
Navigation	$ \qquad \qquad$			
Description	Displays the serial number of the measuring device. The serial number is also provided on the nameplate of the sensor and of the transmitter.			
	The serial number can also be used to retrieve further device-related information and documentation via the Operations app or the Device Viewer on the Endress+Hauser website.			
User interface	Character string comprising numbers, letters and special characters			
Order code	8			
Navigation	$ \qquad \qquad$			
Description	Displays the device order code.			
	The order code is used for instance to order a replacement or spare device or to verify that the device features specified on the order form match the shipping note.			
User interface	Character string comprising numbers, letters and special characters			

Firmware version		
Navigation		System $\rightarrow$ Information $\rightarrow$ Device $\rightarrow$ Firmware version
Description	Displa	ys the device firmware version installed.
User interface	Chara	cter string comprising numbers, letters and special characters

Extended order code	1	ß
Navigation	System $\rightarrow$ Information $\rightarrow$ Device $\rightarrow$ Ext. order cd. 1	
Description	Displays the first, second and/or third part of the extended order code.	
	Due to character length restrictions, the extended order code is split into a maximum of 2 parameters. The extended order code indicates for each feature in the product structure the selected option, thereby uniquely identifying the device model.	3
	The extended order code can also be found on the nameplate.	
User interface	Character string comprising numbers, letters and special characters	

Extended order code 2		
Navigation	□ System $\rightarrow$ Information $\rightarrow$ Device $\rightarrow$ Ext. order cd. 2	
Description	Displays the first, second and/or third part of the extended order code.	
	Due to character length restrictions, the extended order code is split into a maximum of parameters. The extended order code indicates for each feature in the product structure the selected option, thereby uniquely identifying the device model.	of 3 re
	The extended order code can also be found on the nameplate.	
User interface	Character string comprising numbers, letters and special characters	

Extended order code 3		6	9
Navigation		System $\rightarrow$ Information $\rightarrow$ Device $\rightarrow$ Ext. order cd. 3	
Description	Display	s the first, second and/or third part of the extended order code.	
	Due to o parame the sele	character length restrictions, the extended order code is split into a maximum of 3 ters. The extended order code indicates for each feature in the product structure ected option, thereby uniquely identifying the device model.	
	The ext	ended order code can also be found on the nameplate.	

User interface Character string comprising numbers, letters and special character	ers
-----------------------------------------------------------------------------------	-----

ENP version			
Navigation		$n \rightarrow Device \rightarrow ENP$ version	
Description	Displays the version of the e	electronic nameplate (ENP).	
User interface	Character string comprising	numbers, letters and special characters	

# Manufacturer Navigation □ System → Information → Device → Manufacturer Description Displays the manufacturer. User interface Character string comprising numbers, letters and special characters

### 5.4.2 Electronic module

*Navigation*  $\square$  System  $\rightarrow$  Information  $\rightarrow$  Electr. module

► Electronic module				
	[	Firmware version		→ 🗎 103

# Firmware version Navigation □ System → Information → Electr. module → Firmware version Description Displays the firmware version of the module. User interface Positive integer

# 6 Country-specific factory settings

# 6.1 SI units

Not valid for USA and Canada.

# 6.1.1 System units

Mass	g
Mass flow	g/s
Volume	ml
Volume flow	ml/s
Density	kg/l
Temperature	°C

# 6.1.2 Pulse value

Nominal diameter [mm]	[g/p]
1	0.003
2	0.005
4	0.01
8	0.02
15	0.1
25	0.2
40	0.4

## 6.1.3 Switch-on point low flow cut off

**F** The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [mm]	On-value low flow cut off for liquid [g/s]
1	0.25
2	0.5
4	1
8	2
15	7
25	20
40	50

# 6.2 US units

1 Only valid for USA and Canada.

# 6.2.1 System units

Mass	OZ
Mass flow	oz/s
Volume	fl oz (us)
Volume flow	fl oz/s (us)
Density	g/cm <sup>3</sup>
Temperature	°F

### 6.2.2 Pulse value

Nominal diameter [in]	[oz/p]
1/24	0.0001
<sup>1</sup> / <sub>12</sub>	0.0002
1/8	0.0004
<sup>3</sup> / <sub>8</sub>	0.001
1⁄2	0.004
1	0.007
1 1/2	0.014

### 6.2.3 Switch-on point low flow cut off

The switch-on point depends on the type of medium and the nominal diameter.

Nominal diameter [in]	On-value for liquid [oz/s]
1/24	0.01
1/12	0.02
1/8	0.04
<sup>3</sup> / <sub>8</sub>	0.08
1/2	0.25
1	0.7
1 1/2	1.7

# 7 Explanation of abbreviated units

# 7.1 SI units

Process variable	Units	Explanation
	g/cm³, g/m³	Gram/volume unit
	kg/dm³, kg/l, kg/m³	Kilogram/volume unit
	SD4°C, SD15°C, SD20°C	Specific density: The specific density is the ratio of the density of the fluid to the density of water at a water temperature of 4 $^{\circ}$ C (39 $^{\circ}$ F), 15 $^{\circ}$ C (59 $^{\circ}$ F), 20 $^{\circ}$ C (68 $^{\circ}$ F).
	SG4°C, SG15°C, SG20°C	Specific gravity: The specific gravity is the ratio of the density of the fluid to the density of water at a water temperature of 4 $^{\circ}$ C (39 $^{\circ}$ F), 15 $^{\circ}$ C (59 $^{\circ}$ F), 20 $^{\circ}$ C (68 $^{\circ}$ F).
Pressure	Pa a, kPa a, MPa a	Pascal, kilopascal, megapascal (absolute)
	bar	Bar
	Pa g, kPa g, MPa g	Pascal, kilopascal, megapascal (relative/gauge)
	bar g	Bar (relative/gauge)
Mass	g, kg, t	Gram, kilogram, metric ton
	g/s, g/min, g/h, g/d	Gram/time unit
	kg/s, kg/min, kg/h, kg/d	Kilogram/time unit
	t/s, t/min, t/h, t/d	Metric ton/time unit
	kg/Nm³, kg/Nl, g/Scm³, kg/Sm³	Kilogram, gram/standard volume unit
Corrected volume	Nl, Nm³, Sm³	Normal liter, normal cubic meter, standard cubic meter
	Nl/s, Nl/min, Nl/h, Nl/d	Normal liter/time unit
	Nm <sup>3</sup> /s, Nm <sup>3</sup> /min, Nm <sup>3</sup> /h, Nm <sup>3</sup> /d	Normal cubic meter/time unit
	Sm <sup>3</sup> /s, Sm <sup>3</sup> /min, Sm <sup>3</sup> /h, Sm <sup>3</sup> /d	Standard cubic meter/time unit
	°C , K	Celsius, Kelvin
Time	s, m, h, d, y	Second, minute, hour, day, year

# 7.2 US units

Process variable	Units	Explanation
	lb/ft³, lb/gal (us)	Pound/cubic foot, pound/gallon
	lb/bbl (us;liq.), lb/bbl (us;beer), lb/bbl (us;oil), lb/bbl (us;tank)	Pound/volume unit
Pressure	psi a	Pounds per square inch (absolute)
	psi g	Pounds per square inch (gauge)
Mass	oz, lb, STon	Ounce, pound, standard ton
	oz/s, oz/min, oz/h, oz/d	Ounce/time unit
	lb/s, lb/min, lb/h, lb/d	Pound/time unit
	STon/s, STon/min, STon/h, STon/d	Standard ton/time unit
	lb/Sft <sup>3</sup>	Weight unit/standard volume unit
Corrected volume	Sft <sup>3</sup> , Sgal (us), Sbbl (us;liq.)	Standard cubic foot, standard gallon, standard barrel
	Sft <sup>3</sup> /s, Sft <sup>3</sup> /min, Sft <sup>3</sup> /h, Sft <sup>3</sup> /d	Standard cubic foot/time unit

Process variable	Units	Explanation
	Sgal/s (us), Sgal/min (us), Sgal/h (us), Sgal/d (us)	Standard gallon/time unit
	Sbbl/s (us;liq.), Sbbl/min (us;liq.), Sbbl/h (us;liq.), Sbbl/d (us;liq.)	Barrel/time unit (normal liquids)
	°F, °R	Fahrenheit, Rankine
Volume	af	Acre foot
	ft <sup>3</sup>	Cubic foot
	fl oz (us), gal (us), kgal (us), Mgal (us)	Fluid ounce, gallon, kilogallon, million gallon
	bbl (us;liq.), bbl (us;beer), bbl (us;oil), bbl (us;tank)	Barrel (normal liquids), barrel (beer), barrel (petrochemicals), barrel (filling tanks)
	af/s, af/min, af/h, af/d	Acre foot/time unit
	ft <sup>3</sup> /s, ft <sup>3</sup> /min, ft <sup>3</sup> /h, ft <sup>3</sup> /d	Cubic foot/time unit
	fl oz/s (us), fl oz/min (us), fl oz/h (us), fl oz/d (us)	Fluid ounce/time unit
	gal/s (us), gal/min (us), gal/h (us), gal/d (us)	Gallon/time unit
	kgal/s (us), kgal/min (us), kgal/h (us), kgal/d (us)	Kilogallon/time unit
	Mgal/s (us), Mgal/min (us), Mgal/h (us), Mgal/d (us)	Million gallon/time unit
	bbl/s (us;liq.), bbl/min (us;liq.), bbl/h (us;liq.), bbl/d (us;liq.)	Barrel/time unit (normal liquids) Normal liquids: 31.5 gal/bbl
	bbl/s (us;beer), bbl/min (us;beer), bbl/h (us;beer), bbl/d (us;beer)	Barrel /time unit (beer) Beer: 31.0 gal/bbl
	bbl/s (us;oil), bbl/min (us;oil), bbl/h (us;oil), bbl/d (us;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 42.0 gal/bbl
	bbl/s (us;tank), bbl/min (us;tank), bbl/h (us;tank), bbl/d (us;tank)	Barrel/time unit (filling tank) Filling tanks: 55.0 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem ( before midday), post meridiem (after midday)

# 7.3 Imperial units

Process variable	Units	Explanation
	lb/gal (imp), lb/bbl (imp;beer), lb/bbl (imp;oil)	Pound/volume unit
Corrected volume	Sgal (imp)	Standard gallon
	Sgal/s (imp), Sgal/min (imp), Sgal/h (imp), Sgal/d (imp)	Standard gallon/time unit
Volume	gal (imp), Mgal (imp)	Gallon, mega gallon
	bbl (imp;beer), bbl (imp;oil)	Barrel (beer), barrel (petrochemicals)
	gal/s (imp), gal/min (imp), gal/h (imp), gal/d (imp)	Gallon/time unit
	Mgal/s (imp), Mgal/min (imp), Mgal/h (imp), Mgal/d (imp)	Mega gallon/time unit

Process variable	Units	Explanation
	bbl/s (imp;beer), bbl/min (imp;beer), bbl/h (imp;beer), bbl/d (imp;beer)	Barrel /time unit (beer) Beer: 36.0 gal/bbl
	bbl/s (imp;oil), bbl/min (imp;oil), bbl/h (imp;oil), bbl/d (imp;oil)	Barrel/time unit (petrochemicals) Petrochemicals: 34.97 gal/bbl
Time	s, m, h, d, y	Second, minute, hour, day, year
	am, pm	Ante meridiem ( before midday), post meridiem (after midday)
# Index

## A

А	
Active diagnostic IO-Link (Parameter) 30	)
Active diagnostics (Submenu) 30	)
Actual diagnostics (Parameter) 30	)
Alarm delay (Parameter) 39	9
Application (Menu)	7
Assign behavior of diagnostic no. 046 (Parameter) 40	)
Assign behavior of diagnostic no. 230 (Parameter) 41	1
Assign behavior of diagnostic no. 231 (Parameter) 41	1
Assign behavior of diagnostic no. 442 (Parameter) 41	1
Assign behavior of diagnostic no. 443 (Parameter) 42	2
Assign behavior of diagnostic no. 834 (Parameter) 43	3
Assign behavior of diagnostic no. 835 (Parameter) 43	3
Assign behavior of diagnostic no. 842 (Parameter) 44	í
Assign behavior of diagnostic no. 862 (Parameter) 44	í
Assign behavior of diagnostic no. 912 (Parameter) 45	5
Assign behavior of diagnostic no. 913 (Parameter) 45	5
Assign behavior of diagnostic no. 948 (Parameter) 46	5
Assign diagnostic behavior (Parameter) 24, 92	2
Assign flow direction check (Parameter) 93	3
Assign frequency output (Parameter) 20, 82	2
Assign limit (Parameter)	3
Assign process variable 1 to n (Parameter) 12, 55	5
Assign pulse output (Parameter)	Э
Assign simulation process variable (Parameter) 35	5
Assign status (Parameter)	ł

## С

Calibration (Submenu)	70
Calibration factor (Parameter)	70
Commissioning (Wizard)	. 7
Configuration (Submenu)	41
Configuration counter (Parameter)	97

## D

Damping output (Parameter)
Date/time (Submenu) 99
Density (Parameter) 48
Density damping (Parameter) 60
Density factor (Parameter) 69
Density offset (Parameter) 69
Density unit (Parameter) 11, 52
Device (Submenu)
Device alarm simulation (Parameter)
Device identification (Wizard) 7
Device management (Submenu)
Device name (Parameter)
Device reset (Parameter)
Device tag (Parameter) 96, 101
Diagnostic 2 IO-Link (Parameter)
Diagnostic 3 IO-Link (Parameter) 33
Diagnostic 4 IO-Link (Parameter) 33
Diagnostic 5 IO-Link (Parameter) 34
Diagnostic behavior (Submenu)
Diagnostic configuration (Submenu) 39
Diagnostic event simulation (Parameter)

Diagnostic list (Submenu)	33
Diagnostic settings (Submenu)	39
Diagnostics (Menu)	29
Document	
Target group	4

## E

Electronic module (Submenu) 103
Electronics (Submenu)
ENP version (Parameter) 102
Enter access code (Parameter) 98
Exciter current 0 to 1 (Parameter) 73
Extended order code 1 (Parameter) 102
Extended order code 2 (Parameter)
Extended order code 3 (Parameter)

## F

## G

Guidance (Menu)
-----------------

## Η

Hig	jh	Ţ	7a	lu	le	р	a	rt	ia	1 f	il	le	ed	F	pip	26	2	d	e	te	90	ti	io	n	(	F	'a	r	aı	n	le	te	er	•)					
			•						•						•		•	•			•							•							1	7	, (	55	5

## I

Information (Submenu)	100
Installation direction (Parameter)	66
Invert output signal (Parameter)	77

#### L

Last diagnostic IO-Link (Parameter)	31
Limit (Submenu)	88
Locking status (Parameter)	96
Low flow cutoff (Parameter) 14,	61
Low flow cutoff (Submenu)	61
Low value partial filled pipe detection (Parameter)	
	64

#### М

Manufacturer (Parameter)	103
Mass flow (Parameter)	48
Mass flow factor (Parameter)	68
Mass flow offset (Parameter)	68

Mass flow unit (Parameter)8, 50Mass unit (Parameter)9, 50Maximum frequency value (Parameter)21, 83Measured values (Submenu)47Measuring mode (Parameter)79, 83Measuring value at maximum frequency (Parameter)21, 84Measuring value at minimum frequency (Parameter)
Menu
Application
Diagnostics
Guidance
System
Minimum frequency value (Parameter) 20, 83
Ν

Nominal diameter	(Parameter)	 	70

#### 0

### Ρ

-
Partially filled pipe detection (Parameter) 17, 64
Partially filled pipe detection (Submenu) 64
Preset value 1 to n (Parameter)
Pressure shock suppression (Parameter) 16, 63
Pressure shock suppression delay (Parameter) 64
Previous diagnostics (Parameter) 32
Process (Submenu)
Process (Wizard) 14
Process parameters (Submenu) 59
Process value (Parameter) 36
Process variable adjustment (Submenu) 67
Process variable unit 1 to n (Parameter) 12, 55
Progress (Parameter) 67
Properties (Submenu) 39
Pulse output (Parameter)
Pulse output (Submenu) 79
Pulse output simulation 1 (Parameter)
Pulse value 1 (Parameter) 37
Pulse width (Parameter)
Pulse/frequency/switch output 1 to n (Submenu) 74
Pulse/frequency/switch output 1 to n (Wizard)
i also, frequency, switch output i to fr (wizard) it

## R

Raw value mass flow (Parameter)	71
Raw values (Submenu)	71
Reset all totalizers (Parameter)	54

## S

$\mathbf{J}$		71
Sensor (Submenu)	40, 59,	/1
Sensor adjustment (Submenu)		05
Serial number (Parameter)	8,1	
Signal asymmetry 0 (Parameter)		/3
Simulation (Submenu)		35
Status (Parameter)		67
Status (Submenu)		94
Submenu		
Active diagnostics		30
Calibration		70
Configuration		41
Date/time		99
Device	1	00
Device management		96
Diagnostic behavior		92
Diagnostic configuration		39
Diagnostic list		22
		20
Electropic module	1	ע רח
	1	05
Electronics	• • • • • •	40
Flow direction check		93
Frequency output	• • • • •	82
Information	1	00
Limit		88
Low flow cutoff		61
Measured values		47
Partially filled pipe detection		64
Process		42
Process parameters		59
Process parameters		59 67
Process parameters	· · · · · · · · · · · · · · · · · · ·	59 67 39
Process parameters	· · · · · · · · · · · · · · · · · · ·	59 67 39 79
Process parameters	· · · · · · · · · · · · · · · · · · ·	59 67 39 79
Process parameters	· · · · · · · · · · · · · · · · · · ·	59 67 39 79 74 71
Process parameters	· · · · · · · · · · · · · · · · · · ·	59 67 39 79 74 71
Process parameters	40, 59,	59 67 39 79 74 71 71
Process parameters	40, 59,	59 67 39 79 74 71 71 65
Process parameters	40, 59,	59 67 39 79 74 71 71 65 35
Process parameters	40, 59,	59 67 39 79 74 71 71 65 35 94
Process parameters	40, 59,	59 67 39 79 74 71 71 65 35 94 71
Process parameters	40, 59,	59 67 39 79 74 71 71 65 35 94 71 86
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSwitch outputSystem units	40, 59,	59 67 39 79 74 71 65 35 94 71 86 50
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSwitch outputSystem unitsTotalizer	40, 59,	59 67 39 74 71 71 65 35 94 71 86 50 49
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSystem unitsTotalizerTotalizer 1 to n	40, 59,	59 67 39 74 71 71 65 39 71 65 394 71 86 50 49 54
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSystem unitsTotalizerTotalizer 1 to nTotalizer handling	40, 59,	59 67 79 74 71 75 394 71 75 394 75 49 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSwitch outputSystem unitsTotalizerTotalizer 1 to nTotalizer sTotalizers	40, 59,	59 67 79 71 71 65 97 71 75 71 850 49 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74 74
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSwitch outputSystem unitsTotalizerTotalizer 1 to nTotalizersUser management	40, 59,	59 67 79 71 71 65 97 71 75 54 74 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54 54
Process parametersProcess variable adjustmentPropertiesPulse outputPulse/frequency/switch output 1 to nRaw valuesSensorSensor adjustmentSimulationStatusSupervisionSwitch outputSystem unitsTotalizerTotalizer 1 to nTotalizersUser managementZero adjustment	40, 59,	59 $67$ $74$ $71$ $639$ $74$ $71$ $635$ $45$ $45$ $54$ $54$ $54$ $66$
Process parameters	40, 59,	59 $79$ $71$ $755$ $771$ $755$ $74$ $71$ $755$ $74$ $54$ $54$ $54$ $54$ $671$
Process parameters	40, 59,	5977175547677716554767776576777765767777677677767776777
Process parameters	40, 59,	5977175541850967185096718607866786678667667667667667667667667667666766676667666766676666
Process parameters	40, 59,	597711554545486716887
Process parameters	40, 59,	597 777 776 3977 777 776 3977 777 776 3977 776 3977 776 3977 776 3977 776 39777 776 39777 776 397777 776 397777 776 3977777 776 397777777777
Process parameters	40, 59,	597941155416094455967883777655416094455967883777
Process parameters	40, 59,	57777763978549467883777776397859967883771
Process parameters	40, 59,	5639741554160944548618838390
Process parameters	40, 59,	577777639785455596788377102
Process parameters	40, 59, 	57777763978545458678883771002
Process parameters	40, 59, 	5777776397854559678883779005

System units (Submenu)	. 50
System units (Wizard)	8

## Т

-
Target group
Temperature (Parameter) 48
Temperature damping (Parameter) 60
Temperature factor (Parameter) 69
Temperature offset (Parameter) 69
Temperature unit (Parameter)
Threshold (Parameter) 65
Time format (Parameter)
Time format (Wizard) 28
Timestamp (Parameter) 31
Totalizer (Submenu) 49
Totalizer 1 to n (Submenu) 54
Totalizer 1 to n (Wizard) 12
Totalizer 1 to n control (Parameter)
Totalizer 1 to n failure behavior (Parameter) 13, 57
Totalizer 1 to n operation mode (Parameter) 13, 56
Totalizer 1 to n overflow (Parameter) 49
Totalizer 1 to n value (Parameter)
Totalizer handling (Submenu) 54
Totalizers (Submenu) 54

## U

User management (Submenu)	98
User role (Parameter)	98

## v

Value per pulse (Parameter)	23,80
Volume flow (Parameter)	48
Volume flow factor (Parameter)	68
Volume flow offset (Parameter)	68
Volume flow unit (Parameter)	9,51
Volume unit (Parameter)	10, 52

#### W Wiz

Vizard
Commissioning
Device identification
Process
Pulse/frequency/switch output 1 to n
System units
Time format
Totalizer 1 to n

## Ζ

Zero adjustment (Submenu)	66
Zero adjustment control (Parameter)	66
Zero point (Parameter)	70



www.addresses.endress.com

