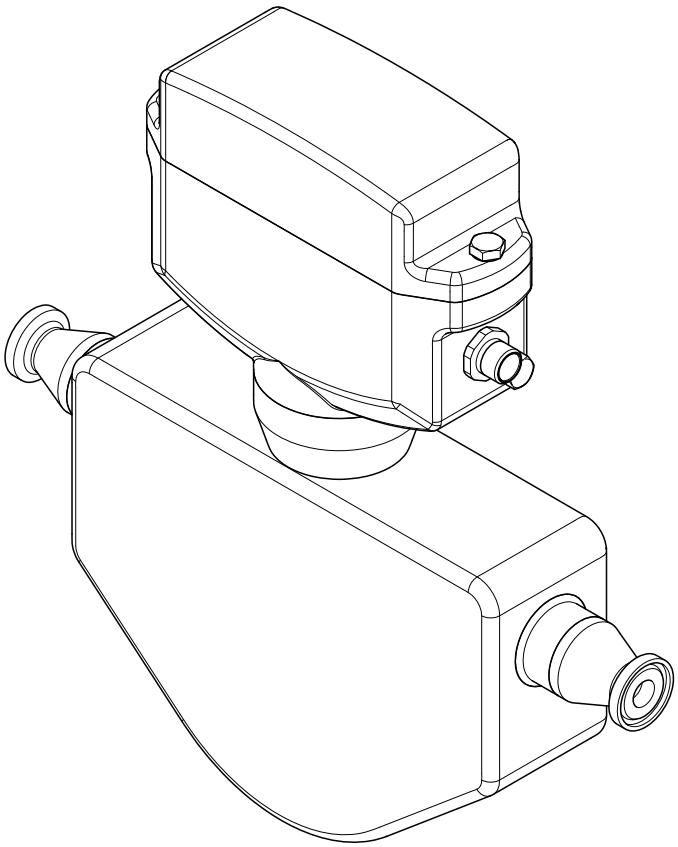
BA00097D/06/EN/15.14
71235479

Valid as of version
03.00.zz (Device firmware)

Operating Instructions
Dosimass

Coriolis flowmeter



Endress+Hauser
People for Process Automation

- Make sure the document is stored in a safe place such that it is always available when working on or with the device.
- To avoid danger to individuals or the facility, read the "Basic safety instructions" section carefully, as well as all other safety instructions in the document that are specific to working procedures.
- The manufacturer reserves the right to modify technical data without prior notice. Your Endress+Hauser Sales Center will supply you with current information and updates to these Instructions.

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1 Document information

1.1 Document function

These Operating Instructions contain all the information that is required in 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.

1.2 Symbols used

1.2.1 Safety symbols

Symbol	Meaning
DANGER	**DANGER!** This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
WARNING	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
CAUTION	**CAUTION!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
NOTICE	**NOTE!** This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Electrical symbols

Symbol	Meaning
⎓	**Direct current** A terminal to which DC voltage is applied or through which direct current flows.
~	**Alternating current** A terminal to which alternating voltage is applied or through which alternating current flows.
⎓ ~	**Direct current and alternating current** ▪ A terminal to which alternating voltage or DC voltage is applied. ▪ A terminal through which alternating current or direct current flows.
⏚	**Ground connection** A grounded terminal which, as far as the operator is concerned, is grounded via a grounding system.
⊜	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.
⏚	**Equipotential connection** A connection that has to be connected to the plant grounding system: This may be a potential equalization line or a star grounding system depending on national or company codes of practice.

1.2.3 Symbols for certain types of information

Symbol	Meaning
	**Permitted** Indicates procedures, processes or actions that are permitted.
	**Preferred** Indicates procedures, processes or actions that are preferred.
	**Forbidden** Indicates procedures, processes or actions that are forbidden.
	**Tip** Indicates additional information.
	**Reference to documentation** Refers to the corresponding device documentation.
	**Reference to page** Refers to the corresponding page number.
	**Reference to graphic** Refers to the corresponding graphic number and page number.
1. , 2. , 3. ...	**Series of steps**
	Result of a sequence of actions
	**Help in the event of a problem**
	**Visual inspection**

1.2.4 Symbols in graphics

Symbol	Meaning
1, 2, 3,...	Item numbers
1. , 2. , 3. ...	Series of steps
A, B, C, ...	Views
A-A, B-B, C-C, ...	Sections
 A0013441	Flow direction
 A0011187	**Hazardous area** Indicates a hazardous area.
 A0011188	**Safe area (non-hazardous area)** Indicates the non-hazardous area.

1.3 Documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:

- The CD-ROM provided for the device (depending on the device version, the CD-ROM might not be part of the delivery!)
- The *W@M Device Viewer* : Enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2-D matrix code (QR code) on the nameplate.

For a detailed list of the individual documents along with the documentation code

1.3.1 Standard documentation

Document type	Purpose and content of the document
Technical Information	**Planning aid for your device** The document contains all the technical data on the device and provides an overview of the accessories and other products that can be ordered for the device.
Brief Operating Instructions	**Guide that takes you quickly to the 1st measured value** The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

1.3.2 Supplementary device-dependent documentation

Additional documents are supplied depending on the device version ordered: Always comply strictly with the instructions in the supplementary documentation. The supplementary documentation is an integral part of the device documentation.

1.4 Registered trademarks

Modbus®
Registered trademark of SCHNEIDER AUTOMATION, INC.

Microsoft®
Registered trademark of the Microsoft Corporation, Redmond, Washington, USA

VITON ®
Registered trademark of DuPont Performance Elastomers L.L.C., Wilmington, USA

TRI-CLAMP ®
Registered trademark of Ladish & Co., Inc., Kenosha, USA

Applicator®, DeviceCare®, FieldCare®
Registered or registration-pending trademarks of the Endress+Hauser Group

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:
- Trained, qualified specialists must have a relevant qualification for this specific function and task
- Are authorized by the plant owner/operator
- Are familiar with federal/national regulations
- Before beginning work, the specialist staff must have read and understood the instructions in the Operating Instructions and supplementary documentation as well as in the certificates (depending on the application)
- Following instructions and basic conditions

The operating personnel must fulfill the following requirements:
- Being instructed and authorized according to the requirements of the task by the facility's owner-operator
- Following the instructions in these Operating Instructions

2.2 Designated use

Application and media
The measuring device described in these Instructions is intended only for flow measurement of liquids and gases.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

Measuring devices for use in hazardous areas, in hygienic applications or in applications where there is an increased risk due to process pressure, are labeled accordingly on the nameplate.

To ensure that the measuring device remains in proper condition for the operation time:
- Only use the measuring device in full compliance with the data on the nameplate and the general conditions listed in the Operating Instructions and supplementary documentation.
- Based on the nameplate, check whether the ordered device is permitted for the intended use in the hazardous area (e.g. explosion protection, pressure vessel safety).
- Use the measuring device only for media against which the process-wetted materials are adequately resistant.
- If the measuring device is not operated at atmospheric temperature, compliance with the relevant basic conditions specified in the associated device documentation is absolutely essential: "Documentation" section (→ 🖹 6).

Incorrect use
Non-designated use can compromise safety. The manufacturer is not liable for damage caused by improper or non-designated use.

⚠ WARNING
Danger of breakage of the measuring tube due to corrosive or abrasive fluids.
Housing breakage due to mechanical overload possible!
- Verify the compatibility of the process fluid with the measuring tube material.
- Ensure the resistance of all fluid-wetted materials in the process.
- Observe the specified pressure and temperature range.

Verification for borderline cases:
- For special fluids and fluids for cleaning, Endress+Hauser is glad to provide assistance in verifying the corrosion resistance of fluid-wetted materials, but does not accept any

warranty or liability as minute changes in the temperature, concentration or level of contamination in the process can alter the corrosion resistance properties.

Residual risks
The external surface temperature of the housing can increase by max. 20 K due to the power consumption of the electronic components. Hot process fluids passing through the measuring device will further increase the surface temperature of the housing. The surface of the sensor, in particular, can reach temperatures which are close to the fluid temperature.

Possible burn hazard due to fluid temperatures!
- ▶ For elevated fluid temperature, ensure protection against contact to prevent burns.

2.3 Workplace safety

For work on and with the device:
- ▶ Wear the required personal protective equipment according to federal/national regulations.

For welding work on the piping:
- ▶ Do not ground the welding unit via the measuring device.

If working on and with the device with wet hands:
- ▶ It is recommended to wear gloves on account of the higher risk of electric shock.

2.4 Operational safety

Risk of injury.
- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.
- ▶ If, despite this, modifications are required, consult with Endress+Hauser.

Repair

To ensure continued operational safety and reliability,
- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to repair of an electrical device.
- ▶ Use original spare parts and accessories from Endress+Hauser only.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EC directives listed in the device-specific EC Declaration of Conformity. Endress+Hauser confirms this by affixing the CE mark to the device.

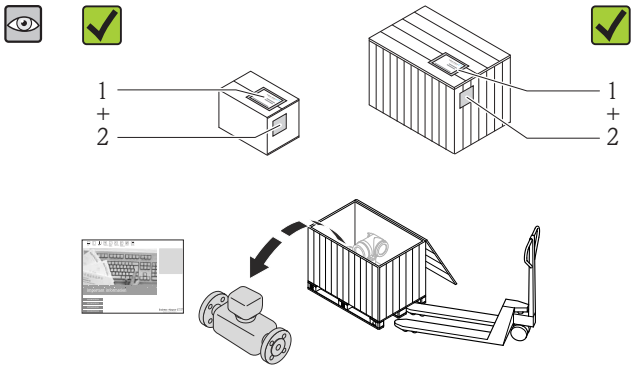
2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3 Incoming acceptance and product identification

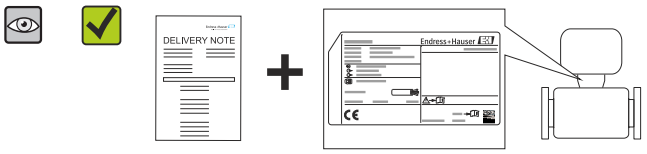
3.1 Incoming acceptance



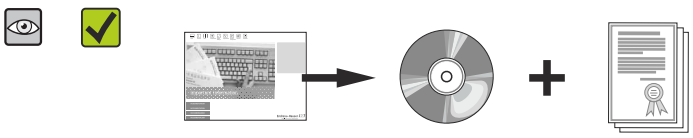
Are the order codes on the delivery note (1) and the product sticker (2) identical?



Are the goods undamaged?



Do the nameplate data match the ordering information on the delivery note?



Is the CD-ROM with the Technical Documentation (depends on device version) and documents present?

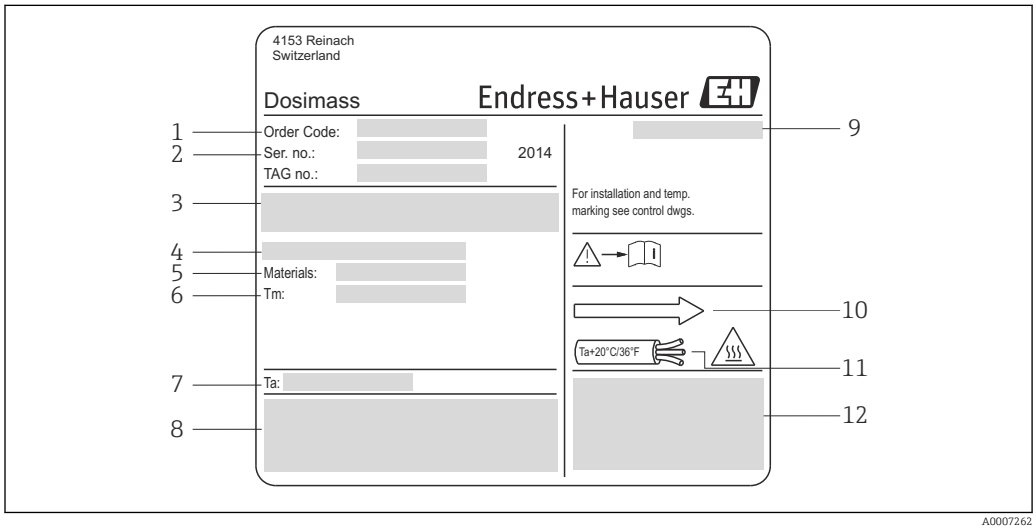
- If one of the conditions is not satisfied, contact your Endress+Hauser Sales Center.
- Depending on the device version, the CD-ROM might not be part of the delivery! In such cases, the technical documentation is available via the Internet or via the *Endress+Hauser Operations App*, see the "Product identification" section (→ 12).

3.2 Product identification

The following options are available for identification of the measuring device:
- Nameplate specifications
- Order code with breakdown of the device features on the delivery note
- Enter serial numbers from nameplates in *W@M Device Viewer* (www.endress.com/deviceviewer): All information about the measuring device is displayed.
- Enter the serial number from the nameplates into the *Endress+Hauser Operations App* or scan the 2-D matrix code (QR code) on the nameplate with the *Endress+Hauser Operations App*: all the information for the measuring device is displayed.

For an overview of the scope of the associated Technical Documentation, refer to the following:
- The chapters "Additional standard documentation on the device" (→ 7) and "Supplementary device-dependent documentation" (→ 7)
- The *W@M Device Viewer*: Enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2-D matrix code (QR code) on the nameplate.

3.2.1 Sensor nameplate



1 *Example of a sensor nameplate*

1 *Order code: see the specifications on the order confirmation for the meanings of the individual letters and digits*
2 *Serial number*
3 *Supply voltage and power consumption*
4 *Process connection*
5 *Wetted materials*
6 *Maximum process temperature*
7 *Permitted ambient temperature range*
8 *Space reserved for additional information on the device version (approvals, certificates, etc.)*
9 *Degree of protection*
10 *Flow direction*
11 *Cable temperature*
12 *Space reserved for additional information on the device version (approvals, certificates, etc.)*

Order code

The measuring device is reordered using the order code.

Extended order code
- The device type (product root) and basic specifications (mandatory features) are always listed.
- Of the optional specifications (optional features), only the safety and approval-related specifications are listed (e.g. LA). If other optional specifications are also ordered, these are indicated collectively using the # placeholder symbol (e.g. #LA#).
- If the ordered optional specifications do not include any safety and approval-related specifications, they are indicated by the + placeholder symbol (e.g. XXXXXX-ABCDE +).

3.2.2 Symbols on measuring device

Symbol	Meaning
⚠	**WARNING!** This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
 A0011194	**Reference to documentation** Refers to the corresponding device documentation.
 A0011199	**Protective ground connection** A terminal which must be connected to ground prior to establishing any other connections.

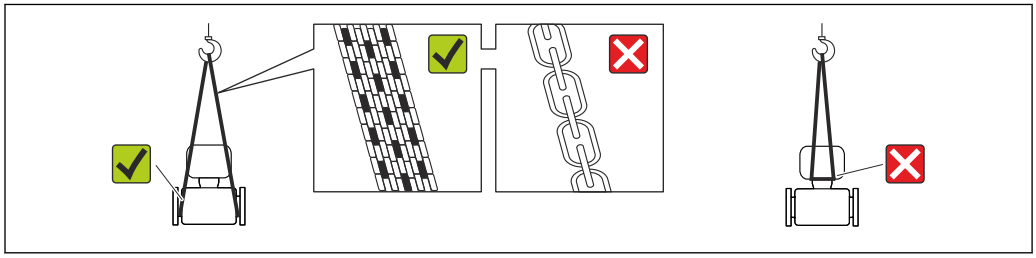
4 Storage and transport

4.1 Storage conditions

Observe the following notes for storage:
- Store in the original packaging to ensure protection from shock.
- Do not remove protective covers or protective caps installed on process connections. They prevent mechanical damage to the sealing surfaces and fouling in the measuring tube.
- Protect from direct sunlight to avoid unacceptably high surface temperatures.
- Storage temperature: –40 to +80 °C (–40 to +176 °F), preferable for +20 °C (+68 °F)
- Store in a dry and dust-free place.
- Do not store outdoors.

4.2 Transporting the product

Transport the measuring device to the measuring point in the original packaging.



A0015604

Do not remove protective covers or caps installed on process connections. They prevent mechanical damage to the sealing surfaces and contamination in the measuring tube.

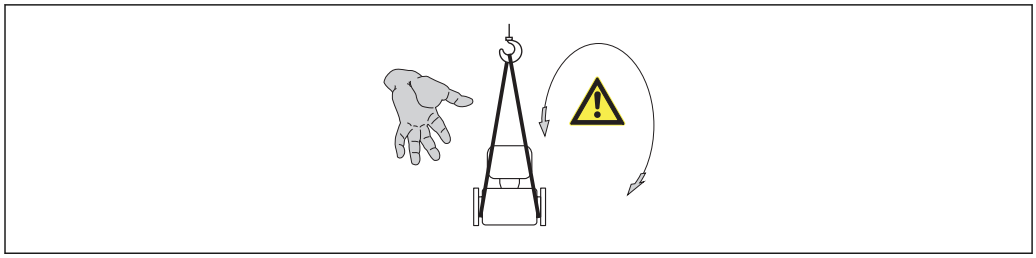
4.2.1 Measuring devices without lifting lugs

WARNING

Center of gravity of the measuring device is higher than the suspension points of the webbing slings.

Risk of injury if the measuring device slips.

- ▶ Secure the measuring device against slipping or turning.
- ▶ Observe the weight specified on the packaging (stick-on label).



A0015606

4.2.2 Measuring devices with lifting lugs

⚠ CAUTION

Special transportation instructions for devices with lifting lugs

- ▶ Only use the lifting lugs fitted on the device or flanges to transport the device.
- ▶ The device must always be secured at two lifting lugs at least.

4.2.3 Transporting with a fork lift

If transporting in wood crates, the floor structure enables the crates to be lifted lengthwise or at both sides using a forklift.

4.3 Packaging disposal

All packaging materials are environmentally friendly and 100% recyclable:

- Measuring device secondary packaging: polymer stretch film that conforms to EC Directive 2002/95/EC (RoHS).
- Packaging:
  - Wood crate, treated in accordance with ISPM 15 standard, which is confirmed by the affixed IPPC logo.
    or
  - Carton in accordance with European Packaging Directive 94/62EC; recyclability is confirmed by the affixed RESY symbol.
- Seaworthy packaging (optional): Wood crate, treated in accordance with ISPM 15 standard, which is confirmed by the affixed IPPC logo.
- Carrying and mounting hardware:
  - Disposable plastic pallet
  - Plastic straps
  - Plastic adhesive strips
- Dunnage: Paper cushion

5 Installation

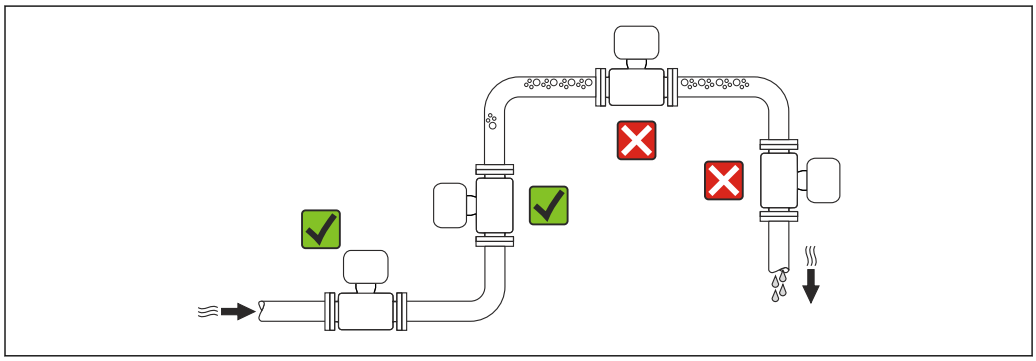
5.1 Installation conditions

No special measures such as supports are necessary. External forces are absorbed by the construction of the device.

5.1.1 Mounting position

Mounting location

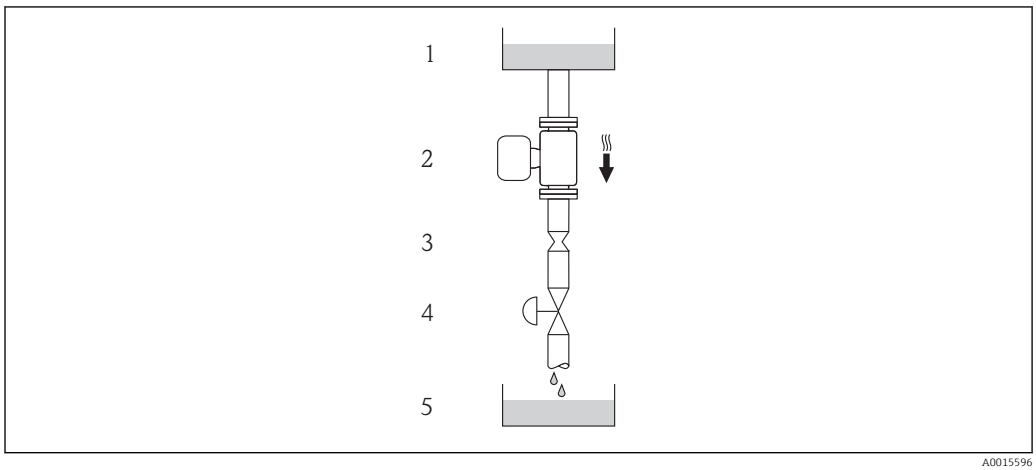
To prevent measuring errors arising from accumulation of gas bubbles in the measuring tube, avoid the following mounting locations in the pipe:
- Highest point of a pipeline.
- Directly upstream of a free pipe outlet in a down pipe.



A0023344

Installation in down pipes

However, the following installation suggestion allows for installation in an open vertical pipeline. Pipe restrictions or the use of an orifice with a smaller cross-section than the nominal diameter prevent the sensor running empty while measurement is in progress.



A0015596

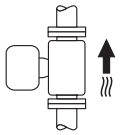
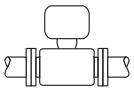
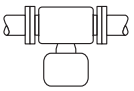
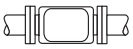
2 *Installation in a down pipe (e.g. for batching applications)*

1 *Supply tank*
2 *Sensor*
3 *Orifice plate, pipe restriction*
4 *Valve*
5 *Batching tank*

DN		Ø orifice plate, pipe restriction	
[mm]	[in]	[mm]	[in]
8	3/8	6	0.24
15	1/2	10	0.40
25	1	14	0.55

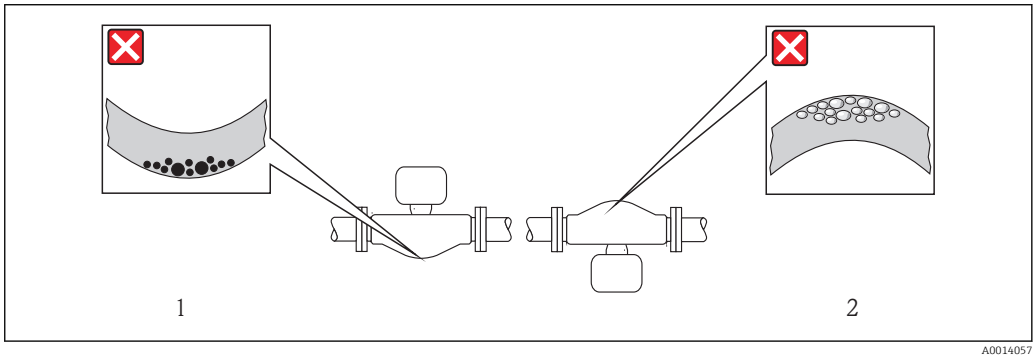
Orientation

The direction of the arrow on the sensor nameplate helps you to install the sensor according to the flow direction (direction of medium flow through the piping).

Orientation			Recommendation
A	Vertical orientation	 A0015591	✓✓
B	Horizontal orientation, transmitter head up	 A0015589	✓✓ [1] Exception: (→ 3, 17)
C	Horizontal orientation, transmitter head down	 A0015590	✓✓ [2] Exception: (→ 3, 17)
D	Horizontal orientation, transmitter head at side	 A0015592	✗

1) Applications with low process temperatures may reduce the ambient temperature. To maintain the minimum ambient temperature for the transmitter, this orientation is recommended.
2) Applications with high process temperatures may increase the ambient temperature. To maintain the maximum ambient temperature for the transmitter, this orientation is recommended.

If a sensor is installed horizontally with a curved measuring tube, match the position of the sensor to the fluid properties.

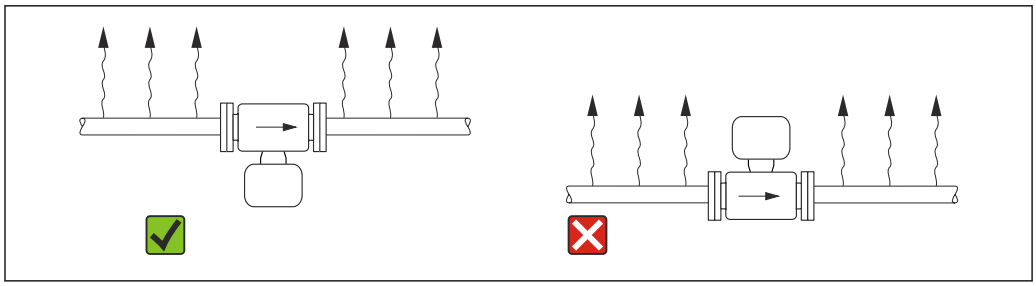


A0014057

3 Orientation of sensor with curved measuring tube

1 Avoid this orientation for fluids with entrained solids: Risk of solids accumulating.
2 Avoid this orientation for outgassing fluids: Risk of gas accumulating.

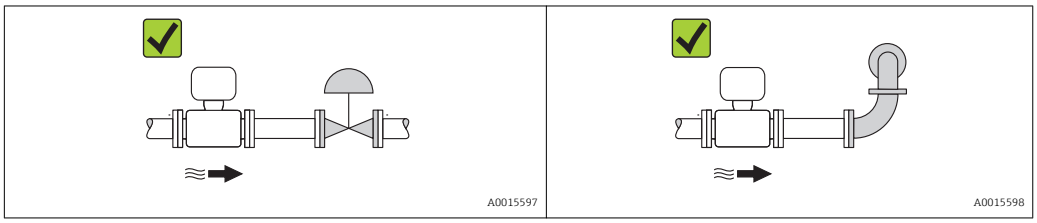
In the event of extreme heating (e.g. for CIP or SIP cleaning processes), we recommend you install the measuring device in such a way that the transmitter part is pointing downwards. This reduces the risk of the electronic components overheating.



4 *Recommended orientation in the event of extreme heating*

Inlet and outlet runs

No special precautions need to be taken for fittings which create turbulence, such as valves, elbows or T-pieces, as long as no cavitation occurs (→ 18).



Installation dimensions

For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section

5.1.2 Requirements from environment and process

Ambient temperature range

Measuring device	−40 to +60 °C (−40 to +140 °F) (Sensor, transmitter) Install the measuring device in a shady location. Avoid direct sunlight, particularly in warm climatic regions.

▶ If operating outdoors:
Avoid direct sunlight, particularly in warm climatic regions.

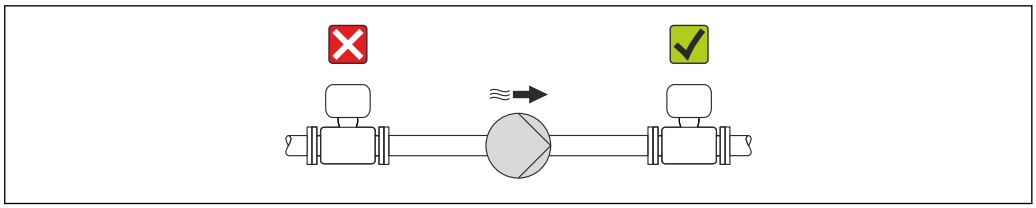
System pressure

It is important that cavitation does not occur, or that gases entrained in the liquids do not outgas.

Cavitation is caused if the pressure drops below the vapor pressure:
- In liquids that have a low boiling point (e.g. hydrocarbons, solvents, liquefied gases)
- In suction lines

▶ Ensure the system pressure is sufficiently high to prevent cavitation and outgassing.

For this reason, the following mounting locations are recommended:
- At the lowest point in a vertical pipe
- Downstream from pumps (no danger of vacuum)



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Thermal insulation

In the case of some fluids, it is important that the heat radiated from the sensor to the transmitter is kept to a minimum. A wide range of materials can be used for the required insulation.

The connection adapter between the sensor and transmitter must always be kept free. Note that a certain orientation might be required, depending on the fluid temperature (→ 17)

Information on the permitted operating temperature range (→ 18)

NOTICE

Electronics overheating on account of thermal insulation!

- ▶ Observe maximum permitted insulation height of the transmitter neck so that the transmitter head is completely free.

Heating

NOTICE

Electronics can overheat due to elevated ambient temperature!

- ▶ Observe maximum permitted ambient temperature for the transmitter (→ 18).
- ▶ Depending on the fluid temperature, take the device orientation requirements into account .

Heating options

If a fluid requires that no heat loss should occur at the sensor, users can avail of the following heating options:

- Electrical heating, e.g. with electric band heaters
- Via pipes carrying hot water or steam
- Via heating jackets

Using an electrical trace heating system

If heating is regulated via phase angle control or pulse packages, magnetic fields can affect the measured values (= for values that are greater than the values approved by the EN standard (sine 30 A/m)).

For this reason, the sensor must be magnetically shielded: the housing can be shielded with tin plates or electric sheets without a privileged direction (e.g. V330-35A).

The sheet must have the following properties:

- Relative magnetic permeability μr ≥ 300
- Plate thickness d ≥ 0.35 mm (d ≥ 0.014 in)

Vibrations

The high oscillation frequency of the measuring tubes ensures that the correct operation of the measuring system is not influenced by plant vibrations.

5.1.3 Special mounting instructions

Zero point adjustment

All measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions (→ 57). Therefore, a zero point adjustment in the field is generally not required.

Experience shows that zero point adjustment is advisable only in special cases:
- To achieve maximum measuring accuracy even with low flow rates
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Zero point adjustment is performed via the **Zero point adjustment control** parameter (→ 35).

5.2 Mounting the measuring device

5.2.1 Required tools

For sensor

For flanges and other process connections: Corresponding mounting tools

5.2.2 Preparing the measuring device

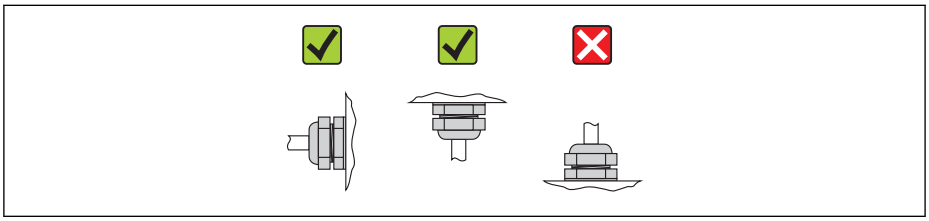
1. Remove all remaining transport packaging.
2. Remove any protective covers or protective caps present from the sensor.
3. Remove stick-on label on the electronics compartment cover.

5.2.3 Mounting the measuring device

WARNING

Danger due to improper process sealing!
- ▶ Ensure that the inside diameters of the gaskets are greater than or equal to that of the process connections and piping.
- ▶ Ensure that the gaskets are clean and undamaged.
- ▶ Install the gaskets correctly.

1. Ensure that the direction of the arrow on the nameplate of the sensor matches the flow direction of the fluid.
2. Install the measuring device or turn the transmitter housing so that the cable entries do not point upwards.



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5.3 Post-installation check

Is the device undamaged (visual inspection)?	❑
Does the measuring device conform to the measuring point specifications? For example: ▪ Process temperature (→ 🖹 59) ▪ Process pressure (refer to the chapter on "Pressure-temperature ratings" of the "Technical Information" document) ▪ Ambient temperature (→ 🖹 18) ▪ Measuring range	❑
Has the correct orientation for the sensor been selected ? ▪ According to sensor type ▪ According to medium temperature ▪ According to medium properties (outgassing, with entrained solids)	❑
Does the arrow on the sensor nameplate match the direction of flow of the fluid through the piping (→ 🖹 17)?	❑
Are the measuring point identification and labeling correct (visual inspection)?	❑
Is the device adequately protected from precipitation and direct sunlight?	❑
Are the securing screw and securing clamp tightened securely?	❑

6 Electrical connection

6.1 Connection conditions

⚠ WARNING

Risk of electric shock.

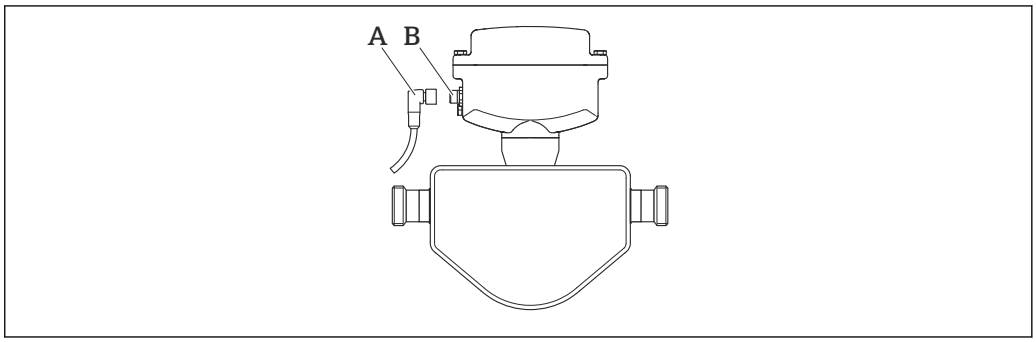
- ▶ Have electrical connection work carried out by correspondingly trained specialists only.
- ▶ Observe applicable federal/national installation codes and regulations.
- ▶ Comply with local workplace safety regulations.
- ▶ Observe grounding concept of the plant.
- ▶ Never mount or wire the measuring device while it is connected to the supply voltage.
- ▶ Before the supply voltage is applied, connect the protective ground to the measuring device.

The circuits of the pulse/frequency/status output are galvanically isolated on the device side from the communication and power supply.

6.2 Connecting the measuring device

6.2.1 Pin and socket assignment

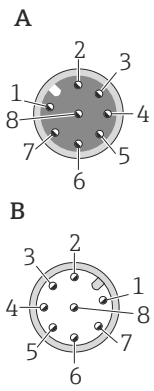
Pulse/frequency/status output (option 3)



5 *Connection (option 3)*

Option 3: Pulse/frequency/status output

RSE8 M12 × 1



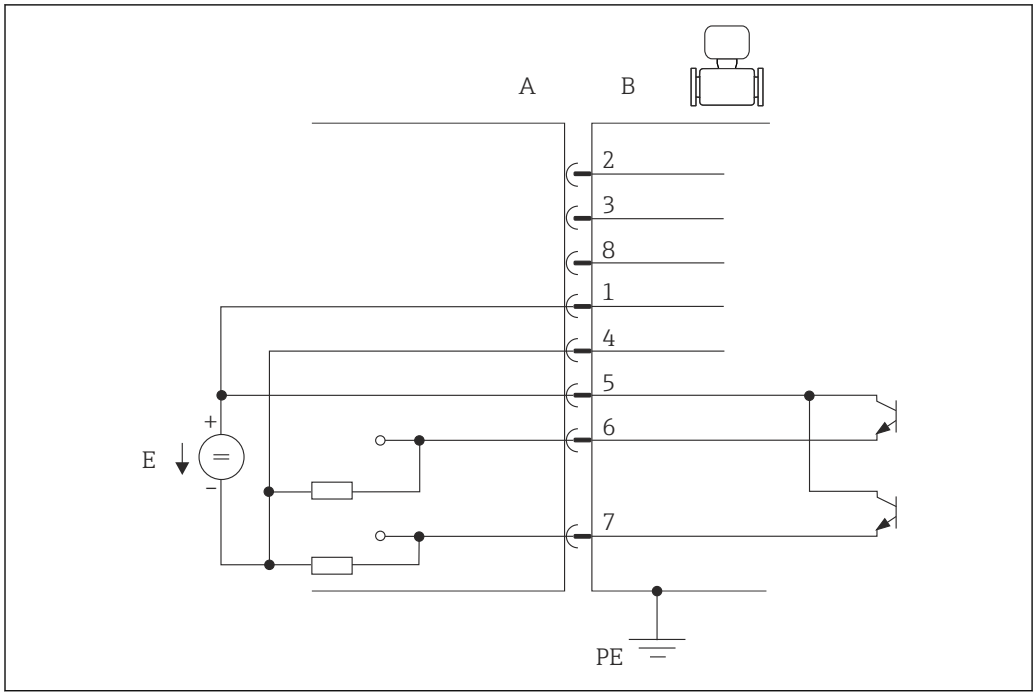
Pin	Assignment	
1	L+	Supply voltage: 24 V_{DC} nominal voltage (20 to 30 V_{DC}), 3.5 W
2	+	RX service interface (may not be connected during normal operation)
3	+	TX service interface (may not be connected during normal operation)
4	L-	Supply voltage: 24 V_{DC} nominal voltage (20 to 30 V_{DC}), 3.5 W
5	+	Pulse/frequency/status output (max. 30 V)
6	–	Pulse/frequency/status output 1 (max. 25 mA)
7	–	Pulse/frequency/status output 2 (max. 25 mA)
8	–	GND service interface (may not be connected during normal operation)
Coding	**Plug/socket**	
A	A: Socket B: Plug	

The measuring device may only be connected to SELV, PELV or CLASS 2 circuits. This applies to both the power supply and the outputs.

6.2.2 Electrical connection

M12 socket × 1 for supply voltage and signal outputs.

Connection option 3

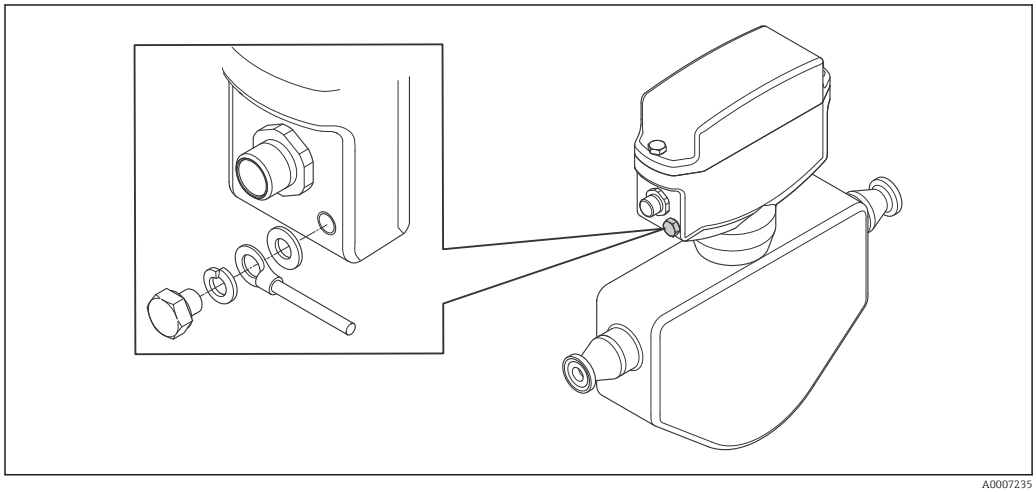


6 *8-pin device connection*

A Socket, input
B Connector, input
1 Supply voltage +
2 Service interface
3 Service interface
4 Supply voltage –
5 (+) pulse/frequency/status output
6 (–) pulse/frequency/status output
7 (–) pulse/frequency/status output
8 Service interface
E PELV or SELV power supply

Ground connection

The ground connection is via a cable lug that must be mechanically connected to the ground connection of the measuring device.



7 *Ground connection*

6.2.3 Cable specifications

Use connecting cables with a cross-section of at least 0.25 mm^2 (0.0004 in^2) (e.g. AWG23). The temperature specification of the cable must be at least 20 °C (68 °F) higher than the maximum ambient temperature in the application.

6.2.4 Potential equalization

No special measures for potential equalization are required.

6.3 Ensuring the degree of protection

The measuring device fulfills all the requirements for IP67 degree of protection, Type 4X enclosure.

To guarantee IP67 degree of protection, Type 4X enclosure, carry out the following steps after the electrical connection:

1. Check that the housing seals are clean and fitted correctly. Dry, clean or replace the seals if necessary.
2. Tighten all housing screws and screw covers.
3. Firmly tighten the cable glands.

6.4 Post-connection check

Is the device undamaged (visual inspection)?	❑
Does the supply voltage in the system match the data on the nameplate of the device?	❑
Do the cables used meet the necessary specifications?	❑
Are the maximum values for voltage and current observed at the pulse and status output? (→ 🖹 55)	❑
Do the cables have adequate strain relief?	❑
Is the cable type route completely isolated? Without loops and cross-overs?	❑
Are the power supply and signal cables correctly connected?	❑

7 Operation options

7.1 Overview of operation options

7.1.1 Configuration

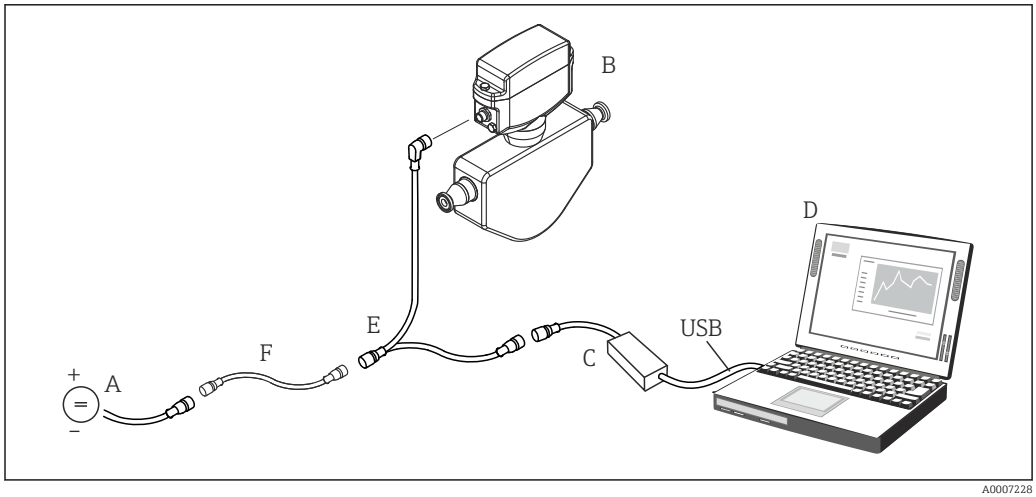
Customer-specific configuration with DeviceCare and FieldCare

The device is operated via the DeviceCare and FieldCare operating programs. DeviceCare and FieldCare are universal service and configuration programs from Endress+Hauser. Connection is by means of the service adapter with an FXA291 service interface.

More information on DeviceCare and FieldCare and the operation of these programs is available in the online help.

DeviceCare and FieldCare can be used for the following:

- Configuration of device functions
- Data backup of device parameters
- Measuring-point documentation



8 *Connection to DeviceCare and/or FieldCare*

A Supply voltage 24 V DC
B Dosimass
C Service interface FXA291
D Computer with DeviceCare and/or FieldCare software
E Service adapter
F Adapter for pin reduction(→ 52)

DeviceCare and FieldCare

Operating tool	Sources for obtaining device descriptions
DeviceCare and FieldCare	▪ www.endress.com → Download Area ▪ CD-ROM (contact Endress+Hauser) ▪ DVD (contact Endress+Hauser)

To ensure the correct operation of the DeviceCare and FieldCare programs, the computer running the programs must meet certain minimum requirements with regard to hardware and software. The minimum requirements are listed on the Endress+Hauser website www.endress.com.

8 Commissioning

8.1 Function check

Before commissioning the device, make sure that the post-installation and post-connection checks have been performed.

- "Post-installation check" checklist
- "Post-connection check" checklist (→ 25)

8.2 Switching on the measuring device

If the post-installation checks have been performed successfully, switch on the supply voltage. The device is now operational.

The measuring device performs a number of post switch-on self-tests. Measuring mode commences as soon as startup completes.

If startup fails, an error message to this effect is displayed in the DeviceCare or FieldCare operating program, depending on the cause.

8.2.1 Zero point adjustment

All Dosimass measuring devices are calibrated in accordance with state-of-the-art technology. Calibration takes place under reference conditions (→ 57). Dosimass therefore does not require zero point adjustment!

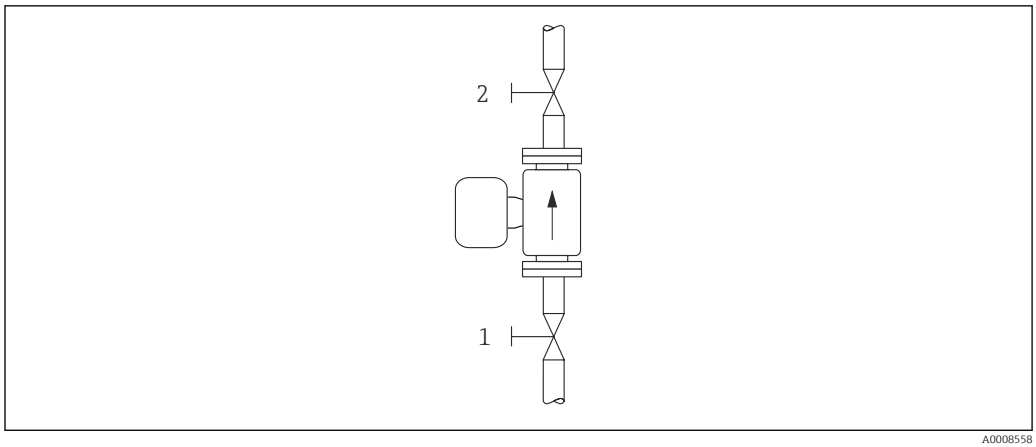
Experience shows that zero point adjustment is advisable only in special cases:

- To achieve maximum measuring accuracy even with very low flow rates
- Under extreme process or operating conditions (e.g. very high process temperatures or very high-viscosity fluids).

Prerequisites for zero point adjustment

Note the following points before performing the adjustment:

- A zero point adjustment can be performed only with fluids that contain no gas or solid contents.
- Zero point adjustment is performed with the measuring tubes completely filled and at zero flow (v = 0 m/s (0 ft/s)). This can be achieved, for example, with shutoff valves upstream and/or downstream of the sensor or by using existing valves and gates.
  - Normal operation → Valves 1 and 2 open
  - Zero point adjustment with pump pressure → Valve 1 open / valve 2 closed
  - Zero point adjustment without pump pressure → Valve 1 closed / valve 2 open



9

Performing the zero point adjustment

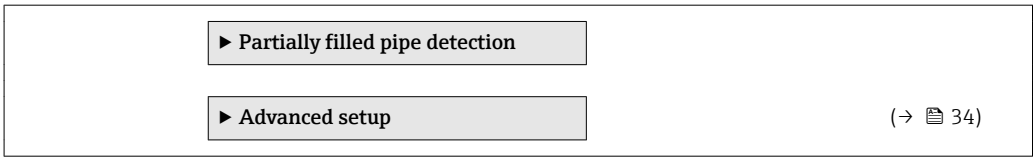
1. Let the system run until normal operating conditions are present.
2. Stop the flow (v = 0 m/s (0 ft/s)).
3. Check the shutoff valves for leaks.
4. Check the necessary process pressure.
5. Perform the adjustment via the ZERO ADJUSTMENT function.

8.3 Configuring the measuring device

The **Setup** menu with its submenus contains all the parameters needed for standard operation.

Navigation
"Setup" menu

Setup		
	Device tag	(→ 29)
	Device tag	(→ 47)
	▶ **System units**	(→ 29)
	▶ **Status input**	
	▶ **Batch output**	
	▶ **Pulse/frequency/switch output 1 to 2**	(→ 30)
	▶ **Communication**	(→ 80)
	▶ **Low flow cut off**	(→ 32)



8.3.1 Defining the tag name

To enable fast identification of the measuring point within the system, you can enter a unique designation using the **Device tag** parameter and thus change the factory setting.

The number of characters displayed depends on the characters used.

Navigation
"Setup" menu → Device tag

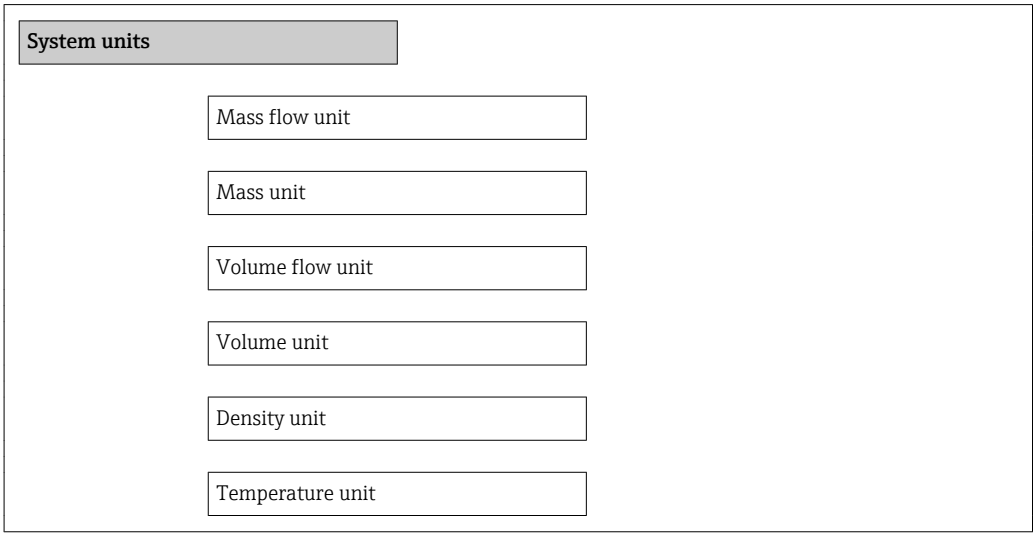
Parameter overview with brief description

Parameter	Description	User entry	Factory setting
Device tag	Enter the name for the measuring point.	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /).	Dosimass

8.3.2 Setting the system units

In the **System units** submenu the units of all the measured values can be set.

Navigation
"Setup" menu → System units



Parameter overview with brief description

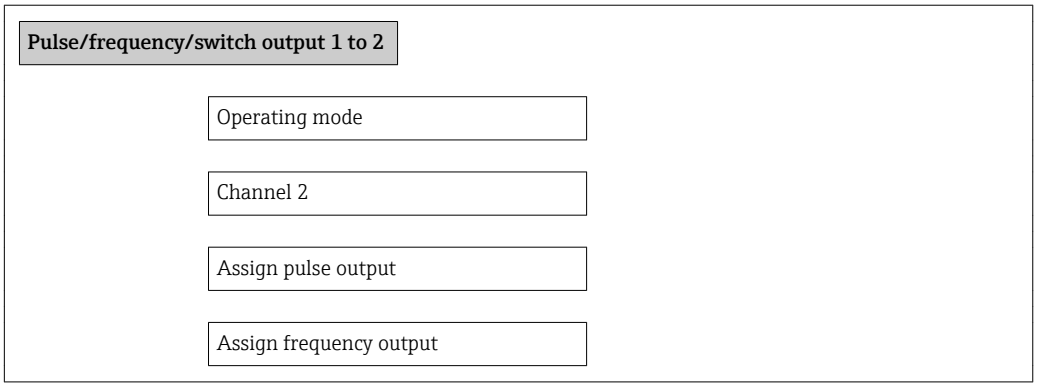
Parameter	Description	Selection	Factory setting
Mass flow unit	Select mass flow unit. *Result* The selected unit applies for: ▪ Output ▪ Low flow cut off ▪ Simulation process variable	Unit choose list	Country-specific: ▪ 75 = kg/h ▪ 81 = lb/min
Mass unit	Select mass unit. *Result* The selected unit is taken from: **Mass flow unit** parameter	Unit choose list	Country-specific: ▪ 61 = kg ▪ 63 = lb
Volume flow unit	Select volume flow unit. *Result* The selected unit applies for: ▪ Output ▪ Low flow cut off ▪ Simulation process variable	Unit choose list	Country-specific: ▪ 138 = l/h ▪ 16 = gal/min (us)
Volume unit	Select volume unit. **Result** The selected unit is taken from: **Volume flow unit** parameter	Unit choose list	Country-specific: ▪ 41 = l ▪ 40 = gal (us)
Density unit	Select density unit. *Result* The selected unit applies for: ▪ Output ▪ Simulation process variable ▪ Density adjustment (in **Expert** menu)	Unit choose list	Country-specific: ▪ 96 = kg/l ▪ 94 = lb/ft³
Temperature unit	Select temperature unit. *Result* The selected unit applies for: ▪ Output ▪ Reference temperature ▪ Simulation process variable	Unit choose list	Country-specific: ▪ 32 = °C (Celsius) ▪ 33 = °F (Fahrenheit)

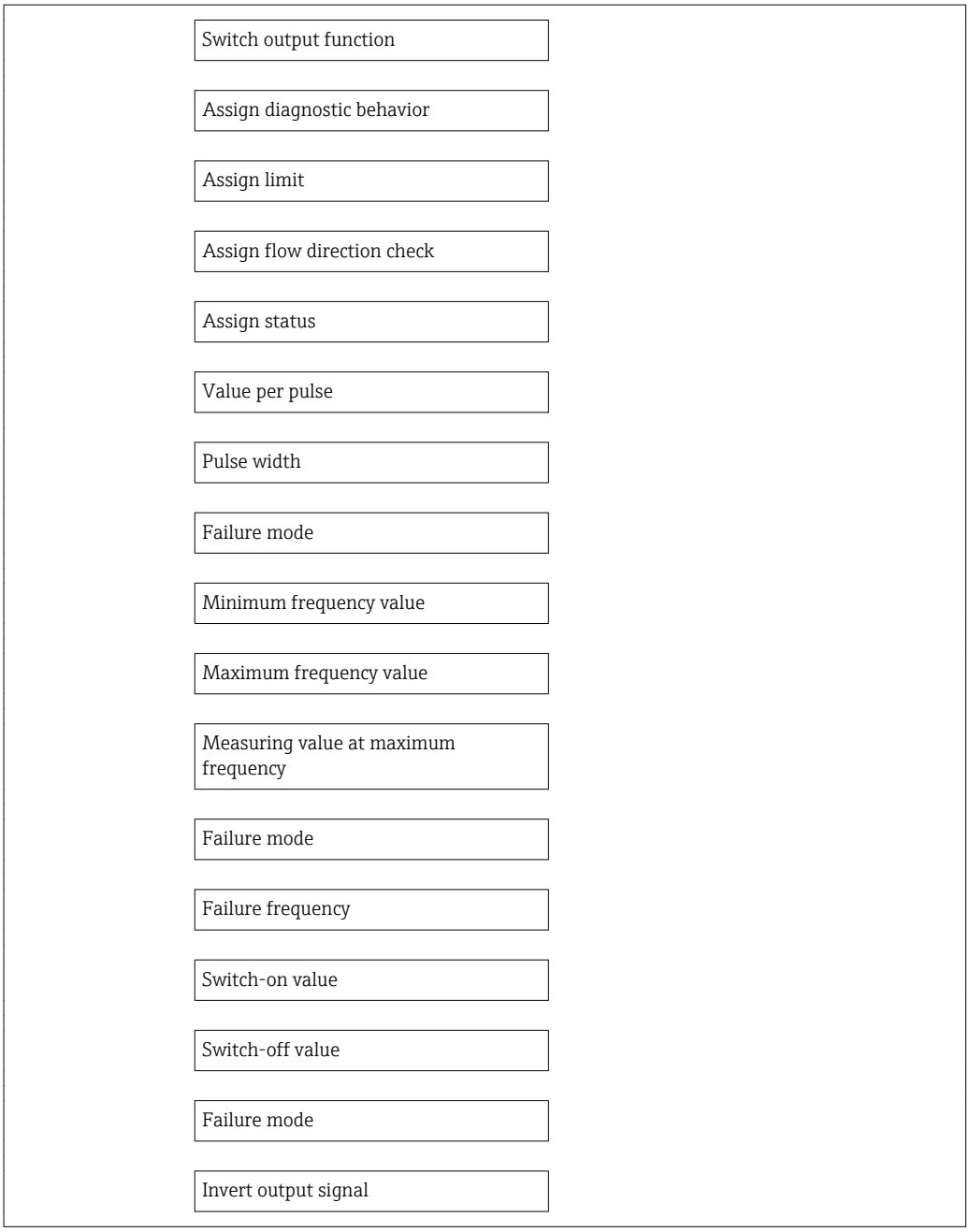
8.3.3 Configuring the pulse/frequency/switch output (option 3)

The **Pulse/frequency/switch output 1** submenu contains all the parameters that must be configured for the configuration of the selected output type.

Navigation

"Setup" menu → Pulse/frequency/switch output 1 to 2





Parameter overview with brief description

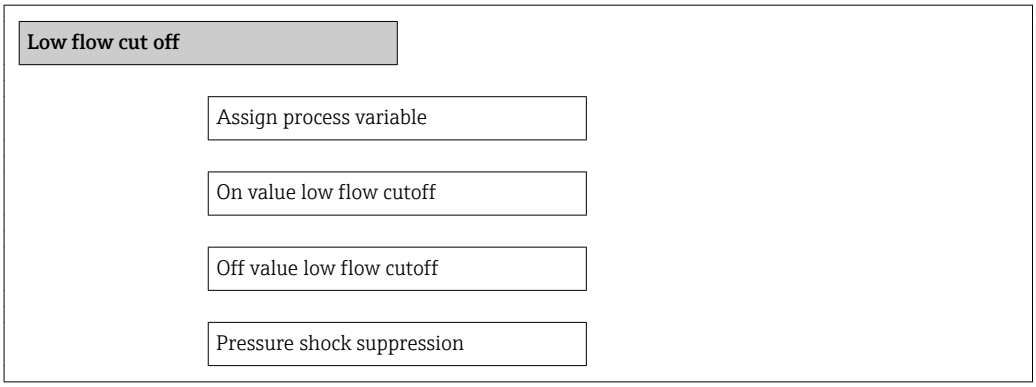
Parameter	Description	Selection / User entry	Factory setting
Operating mode	Define the output as a pulse, frequency or switch output.	▪ 0 = Off ▪ 2 = Pulse ▪ 3 = Automatic pulse ▪ 12 = Frequency ▪ 1 = Switch	2 = Pulse
Channel 2	Select impulse with or without time offset.	▪ 0 = Off ▪ 1 = Redundant 0° ▪ 2 = Redundant 90° ▪ 3 = Redundant 180°	0 = Off
Assign pulse output	Select process variable for pulse output.	▪ 0 = Off ▪ 1 = Mass flow ▪ 2 = Volume flow	0 = Off

Parameter	Description	Selection / User entry	Factory setting
Assign frequency output	Select process variable for frequency output.	▪ 0 = Off ▪ 1 = Mass flow ▪ 2 = Volume flow ▪ 4 = Density ▪ 7 = Temperature	0 = Off
Switch output function	Select function for switch output.	▪ 0 = Off ▪ 1 = On ▪ 2 = Diagnostic behavior ▪ 4 = Limit ▪ 3 = Flow direction check ▪ 5 = Status	0 = Off
Assign diagnostic behavior	Select diagnostic behavior for switch output.	▪ 0 = Alarm ▪ 2 = Alarm or warning ▪ 1 = Warning	0 = Alarm
Assign limit	Select process variable for limit function.	▪ 1 = Mass flow ▪ 2 = Volume flow ▪ 4 = Density ▪ 7 = Temperature	2 = Volume flow
Assign flow direction check	Select process variable for flow direction monitoring.	▪ 0 = Off ▪ 2 = Volume flow ▪ 1 = Mass flow	2 = Volume flow
Assign status	Select device status for switch output.	▪ 1 = Partially filled pipe detection ▪ 0 = Low flow cut off	0 = Low flow cut off
Value per pulse	Enter measured value at which a pulse is output.	Signed floating-point number	0
Pulse width	Define time width of the output pulse.	0.05 to 3.75 ms	0.05 ms
Failure mode	Define output behavior in alarm condition.	▪ 0 = Actual value ▪ 1 = No pulses	0 = Actual value
Minimum frequency value	Enter minimum frequency.	0.0 to 10 000.0 Hz	0.0 Hz
Maximum frequency value	Enter maximum frequency.	0.0 to 10 000.0 Hz	10 000.0 Hz
Measuring value at maximum frequency	Enter measured value for maximum frequency.	Signed floating-point number	0
Failure mode	Define output behavior in alarm condition.	▪ 0 = Actual value ▪ 2 = Defined value ▪ 1 = 0 Hz	1 = 0 Hz
Failure frequency	Enter frequency output value in alarm condition.	0.0 to 10 000.0 Hz	0.0 Hz
Switch-on value	Enter measured value for the switch-on point.	Signed floating-point number	0 l/h
Switch-off value	Enter measured value for the switch-off point.	Signed floating-point number	0 l/h
Failure mode	Define output behavior in alarm condition.	▪ 0 = Actual status ▪ 1 = Open ▪ 2 = Closed	1 = Open
Invert output signal	Invert the output signal.	▪ 1 = No ▪ 0 = Yes	0 = Yes

8.3.4 Low flow cut off

The **Low flow cut off** submenu contains parameters that must be configured for the configuration of low flow cut off.

Navigation
"Setup" menu → Low flow cut off



Parameter overview with brief description

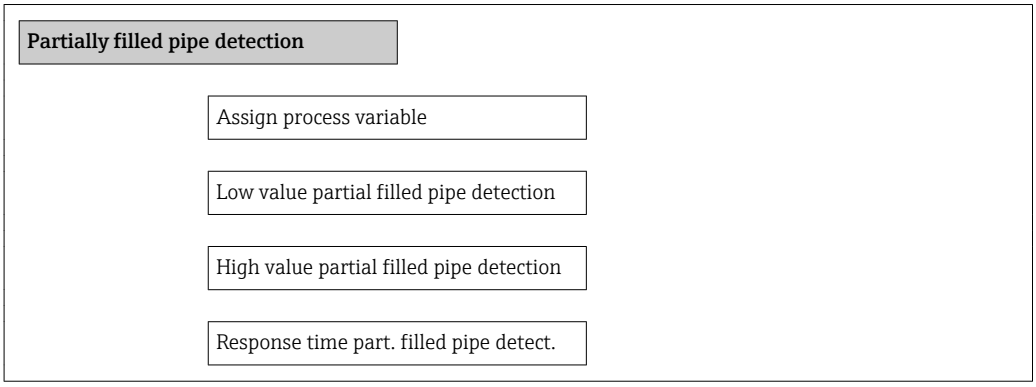
Parameter	Description	Selection / User entry	Factory setting
Assign process variable	Select process variable for low flow cut off.	▪ 0 = Off ▪ 1 = Mass flow ▪ 2 = Volume flow	1 = Mass flow
On value low flow cutoff	Enter on value for low flow cut off.	Positive floating-point number	0 kg/h
Off value low flow cutoff	Enter off value for low flow cut off.	0 to 100.0 %	50 %
Pressure shock suppression	Enter time frame for signal suppression (= active pressure shock suppression).	0 to 100 s	0 s

8.3.5 Partially filled pipe detection

The **Low flow cut off** submenu contains parameters that must be configured for monitoring partially filled pipes.

Navigation

"Setup" menu → Low flow cut off



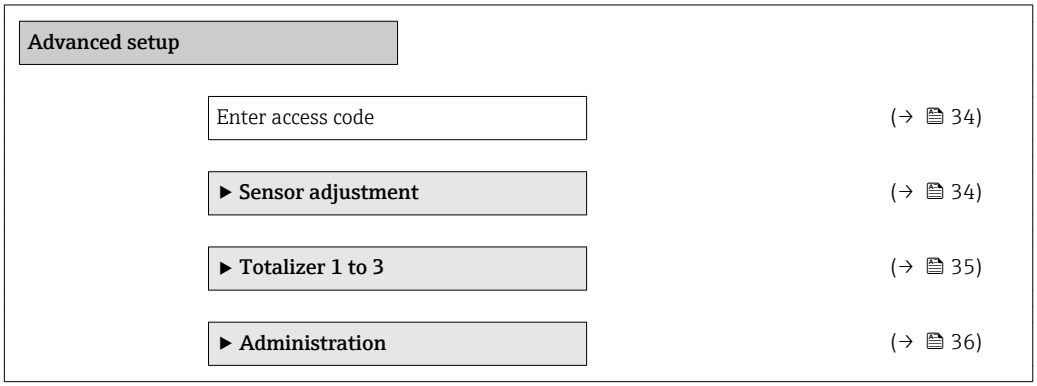
Parameter overview with brief description

Parameter	Description	Selection / User entry	Factory setting
Assign process variable	Select process variable for partially filled pipe detection.	▪ 0 = Off ▪ 4 = Density	0 = Off
Low value partial filled pipe detection	Enter lower limit value for deactivating partialy filled pipe detection.	Signed floating-point number	Country-dependent: ▪ 0.2 kg/l ▪ 12.5 lb/ft³
High value partial filled pipe detection	Enter upper limit value for deactivating partialy filled pipe detection.	Signed floating-point number	Country-dependent: ▪ 6 kg/l ▪ 374.6 lb/ft³

8.4 Advanced settings

The **Advanced setup** submenu with its submenus contains parameters for specific settings.

Navigation
"Setup" menu → Advanced setup



8.4.1 Enter access code

With the **Enter access code** parameter it is possible to disable parameter write protection by entering the user-specific access code.

Navigation
"Setup" menu → Advanced setup

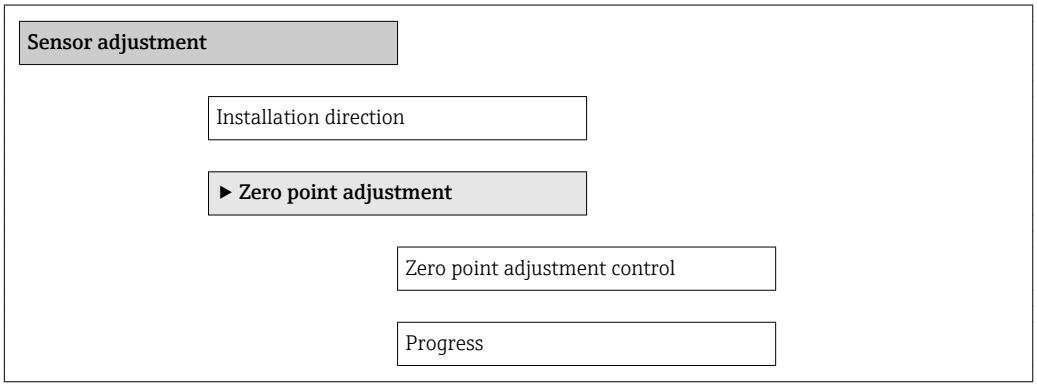
Parameter overview with brief description

Parameter	Description	User entry	Factory setting
Enter access code	Enter access code to disable write protection of parameters.	0 to 9 999	0

8.4.2 Sensor adjustment

The **Sensor adjustment** submenu contains parameters that pertain to the functionality of the sensor.

Navigation
"Setup" menu → Advanced setup → Sensor adjustment



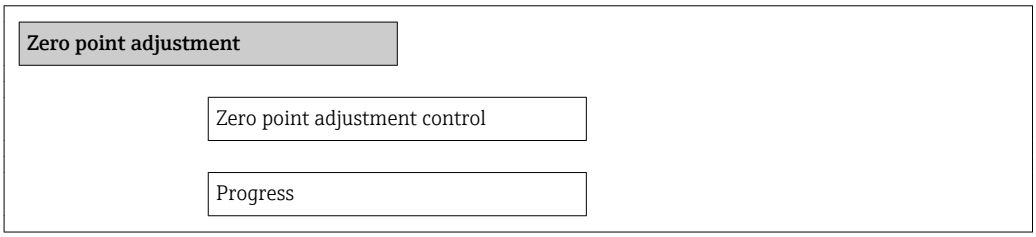
Parameter overview with brief description

Parameter	Description	Selection	Factory setting
Installation direction	Set sign of flow direction to match the direction of the arrow on the sensor.	▪ 0 = Flow in arrow direction ▪ 1 = Flow against arrow direction	0 = Flow in arrow direction

Zero point adjustment

The **Sensor adjustment** submenu contains parameters that are needed for zero point adjustment.

Navigation
"Zero point adjustment" submenu



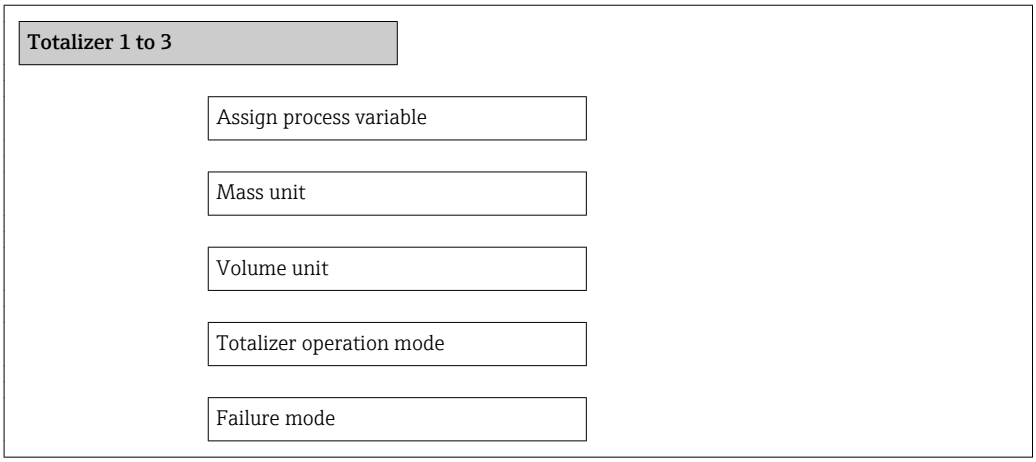
Parameter overview with brief description

Parameter	Description	Selection / User interface	Factory setting
Zero point adjustment control	Start zero point adjustment.	▪ 0 = Cancel ▪ 8 = Busy ▪ 2 = Zero point adjust failure ▪ 1 = Start	0 = Cancel
Progress	Shows the progress of the process.	0 to 100 %	0 %

8.4.3 Configuring the totalizer

In the **"Totalizer 1 to 3" submenu** the individual totalizers can be configured.

Navigation
"Setup" menu → Advanced setup → Totalizer 1 to 3



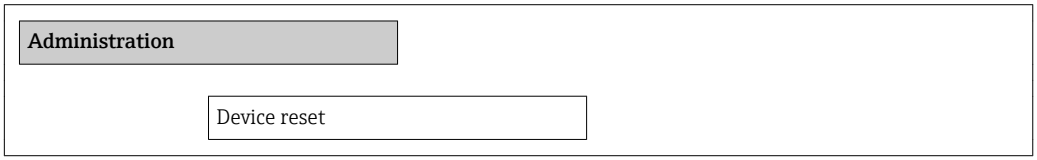
Parameter overview with brief description

Parameter	Description	Selection	Factory setting
Assign process variable	Select process variable for totalizer.	▪ 0 = Off ▪ 2 = Volume flow ▪ 1 = Mass flow	1 = Mass flow
Mass unit	Select mass unit.	Unit choose list	13 = kg
Volume unit	Select volume unit.	Unit choose list	2 = m^3
Totalizer operation mode	Select totalizer calculation mode.	▪ 0 = Net flow total ▪ 1 = Forward flow total ▪ 2 = Reverse flow total	0 = Net flow total
Failure mode	Define totalizer behavior in alarm condition.	▪ 0 = Stop ▪ 1 = Actual value ▪ 2 = Last valid value	0 = Stop

8.4.4 Resetting the measuring device

In the **"Administration" submenu** it is possible to reset the device.

Navigation
"Expert" menu → System → Administration



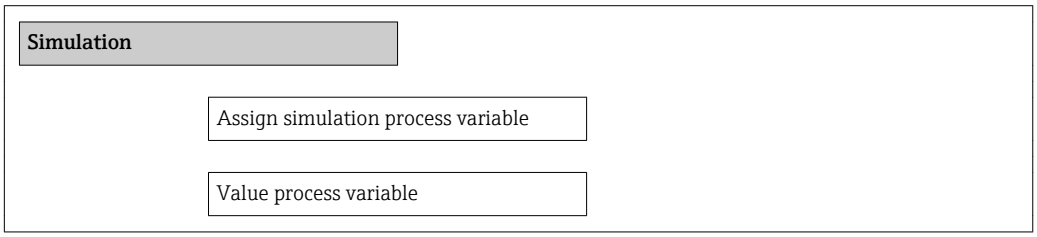
Parameter overview with brief description

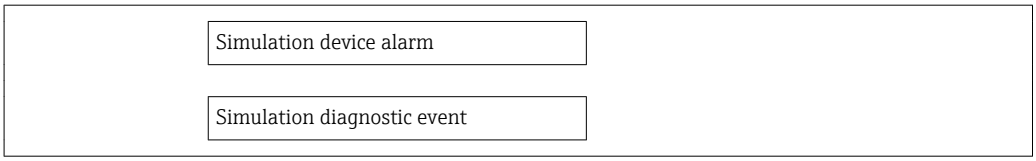
Parameter	Description	Selection	Factory setting
Device reset	Restart or reset device manually.	▪ 0 = Cancel ▪ 2 = To delivery settings ▪ 1 = Restart device	0 = Cancel

8.5 Simulation

The **"Simulation" submenu** enables you to simulate, without a real flow situation, various process variables in the process and the device alarm mode and to verify downstream signal chains (switching valves or closed-control loops).

Navigation
"Diagnostics" menu → Simulation





Parameter overview with brief description

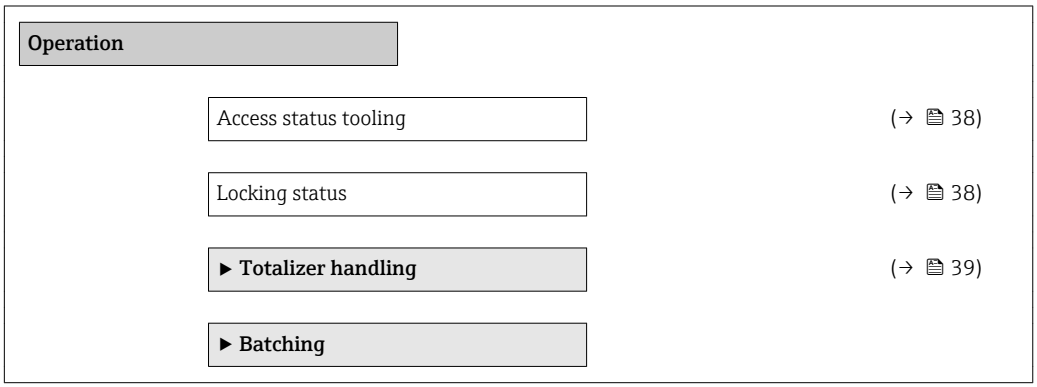
Parameter	Prerequsite	Description	Selection / User entry	Factory setting
Assign simulation process variable	–	Select a process variable for the simulation process that is activated.	▪ 0 = Off ▪ 1 = Mass flow ▪ 2 = Volume flow ▪ 4 = Density ▪ 7 = Temperature	0 = Off
Value process variable	A process variable is selected in the **Assign simulation process variable** parameter.	Enter the simulation value for the selected process variable.	Signed floating-point number	0
Simulation device alarm	–	Switch the device alarm on and off.	▪ 0 = Off ▪ 1 = On	0 = Off
Simulation diagnostic event	–	Enter service ID of diagnostic event to simulate this event.	Positive integer	65 533

9 Operation

9.1 Operation

The **Operation** menu with its submenus contains all the parameters needed for operation.

Navigation
"Operation" menu



9.1.1 Operating software access authorization

The following access authorization can be configured with the **Access status tooling** parameter.

Navigation
"Operation" menu

Parameter overview with brief description

Parameter	Description	User interface	Factory setting
Access status tooling	Shows the access authorization to the parameters via the operating tool.	▪ 0 = Operator ▪ 1 = Maintenance ▪ 2 = Service ▪ 3 = Production ▪ 4 = Development	1 = Maintenance

9.1.2 Reading the device locking status

The write protection types that are currently active can be determined using the **Locking status** parameter.

Navigation
"Operation" menu

Parameter overview with brief description

Parameter	Description	User interface
Locking status	Indicates the write protection with the highest priority that is currently active.	▪ 256 = Hardware locked ▪ 512 = Temporarily locked

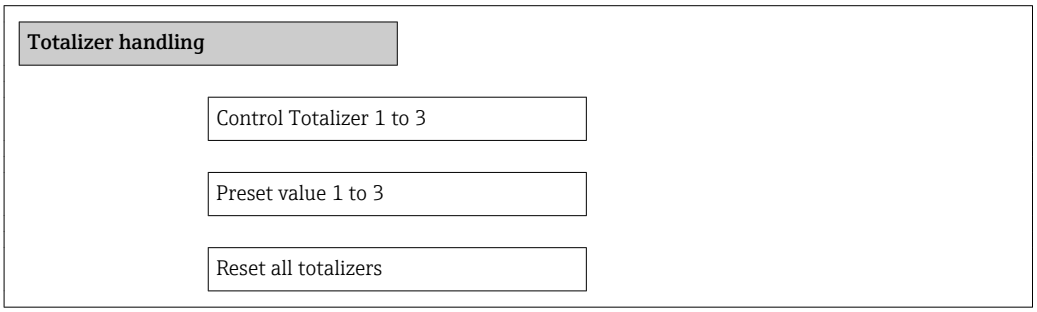
9.2 Totalizer operation

The **Totalizer handling** submenu contains all the parameters that are needed for the totalizer.

9.2.1 Control totalizer

The **Totalizer handling** submenu contains all the parameters that are needed for totalizer control.

Navigation
"Operation" menu → Totalizer handling



Parameter overview with brief description

Parameter	Description	Selection / User entry	Factory setting
Control Totalizer 1 to 3	Control totalizer value.	▪ 0 = Totalize ▪ 3 = Reset + hold ▪ 2 = Preset + hold ▪ 1 = Reset + totalize ▪ 4 = Preset + totalize	0 = Totalize
Preset value 1 to 3	Specify start value for totalizer.	Signed floating-point number	0 kg
Reset all totalizers	Reset all totalizers to 0 and start.	▪ 0 = Cancel ▪ 1 = Reset + totalize	0 = Cancel

10 Diagnostics and troubleshooting

10.1 General troubleshooting

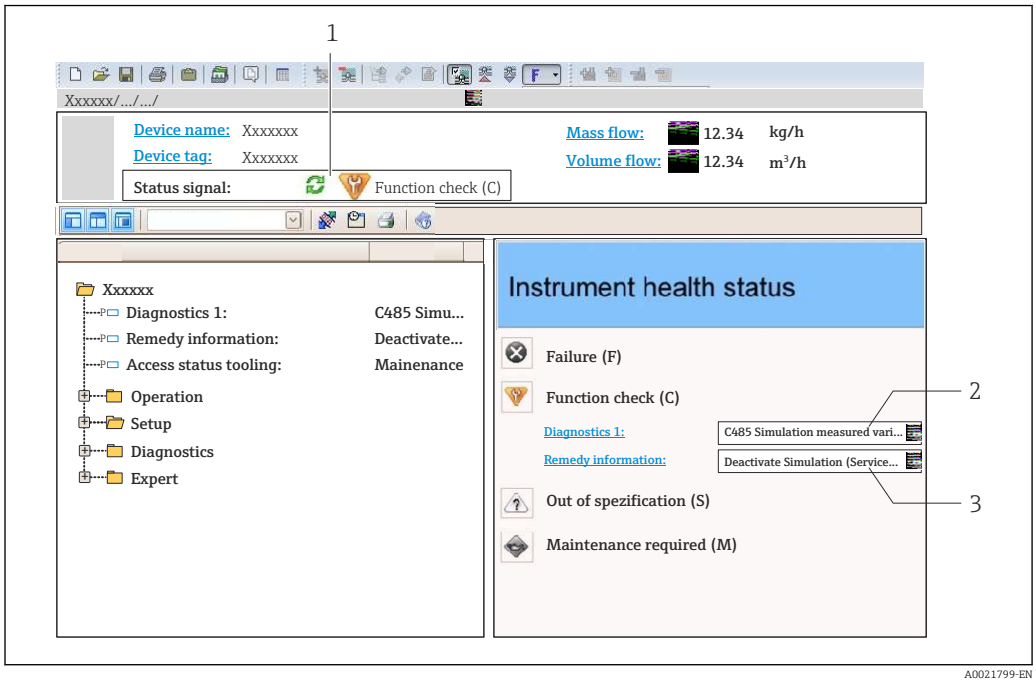
10.1.1 For access

Problem	Possible causes	Remedy
No write access to parameters	Write protection enabled	Check the locking status(→ 38).

10.2 Diagnostics information in DeviceCare and FieldCare

10.2.1 Diagnostic options

Any faults detected by the measuring device are displayed on the home page of the operating tool once the connection has been established.



1 *Status area with status signal*
2 *Diagnostic information*
3 *Remedial measures with Service ID*

Furthermore, diagnostic events that have occurred can be viewed in the **Diagnostics** menu:
- Via parameters
- Via submenu (→ 45)

10.2.2 Calling up remedy information

Remedy information is provided for every diagnostic event to ensure that problems can be rectified quickly:
- On the home page
  Remedy information is displayed in a separate field below the diagnostics information.
- In the **Diagnostics** menu
  Remedy information can be called up in the working area of the user interface.

The user is in the **Diagnostics** menu.

1. Call up the desired parameter.
2. On the right in the working area, mouse over the parameter.
   ↳ A tool tip with remedy information for the diagnostic event appears.

10.3 Adapting the diagnostic information

10.3.1 Adapting the diagnostic behavior

Each item of diagnostic information is assigned a specific diagnostic behavior at the factory. The user can change this assignment for certain diagnostic information in the **Diagnostic behavior** submenu .

"Expert" menu → System → Diagnostic handling → Diagnostic behavior

10.4 Overview of diagnostic information

In the case of some items of diagnostic information, the status signal and the diagnostic behavior can be changed. Adapt the diagnostic information (→ 41)

Diagnostic number	Short text	Remedy instructions	Status signal [from the factory]	Diagnostic behavior [from the factory]
Diagnostic of sensor				
022	Sensor temperature	1.Change main electronic module 2.Change sensor	F	Alarm
046	Sensor limit exceeded	1. Inspect sensor 2. Check process condition	S	Alarm [1)]
062	Sensor connection	1.Change main electronic module 2.Change sensor	F	Alarm
082	Data storage	1. Check module connections 2. Contact service	F	Alarm
083	Memory content	1. Restart device 2. Contact service	F	Alarm
140	Sensor signal	1.Check or change main electronics 2.Change sensor	S	Alarm [1)]
190	Special event 1	Contact service	F	Alarm
191	Special event 5	Contact service	F	Alarm
192	Special event 9	Contact service	F	Alarm [1)]

Diagnostic number	Short text	Remedy instructions	Status signal [from the factory]	Diagnostic behavior [from the factory]
Diagnostic of electronic				
242	Software incompatible	1. Check software 2. Flash or change main electronics module	F	Alarm
270	Main electronic failure	Change main electronic module	F	Alarm
271	Main electronic failure	1. Restart device 2. Change main electronic module	F	Alarm
272	Main electronic failure	1. Restart device 2. Contact service	F	Alarm
273	Main electronic failure	Change electronic	F	Alarm
274	Main electronic failure	Change electronic	S	Warning [1)]
311	Electronic failure	1. Reset device 2. Contact service	F	Alarm
390	Special event 2	Contact service	F	Alarm
391	Special event 6	Contact service	F	Alarm
392	Special event 10	Contact service	F	Alarm [1)]
Diagnostic of configuration				
410	Data transfer	1. Check connection 2. Retry data transfer	F	Alarm
411	Up-/download active	Up-/download active, please wait	C	Warning
438	Dataset	1. Check data set file 2. Check device configuration 3. Up- and download new configuration	M	Warning
442	Frequency output 1 to 2	1. Check process 2. Check frequency output settings	S	Warning [1)]
443	Pulse output 1 to 2	1. Check process 2. Check pulse output settings	S	Warning [1)]
453	Flow override	Deactivate flow override	C	Warning
484	Simulation failure mode	Deactivate simulation	C	Alarm
485	Simulation measured variable	Deactivate simulation	C	Warning
590	Special event 3	Contact service	F	Alarm
591	Special event 7	Contact service	F	Alarm
592	Special event 11	Contact service	F	Alarm [1)]
Diagnostic of process				
834	Process temperature too high	Reduce process temperature	S	Warning [1)]
835	Process temperature too low	Increase process temperature	S	Warning [1)]
862	Partly filled pipe	1.Check for gas in process 2. Adjust detection limits	S	Warning
910	Tubes not oscillating	1. Check electronic 2. Inspect sensor	F	Alarm

Diagnostic number	Short text	Remedy instructions	Status signal [from the factory]	Diagnostic behavior [from the factory]
912	Medium inhomogeneous	1. Check process cond. 2. Increase system pressure	S	Warning [1]
912	Inhomogeneous	1. Check process cond. 2. Increase system pressure	S	Warning [1]
913	Medium unsuitable	1. Check process conditions 2. Check electronic modules or sensor	S	Alarm [1]
948	Tube damping too high	Check process conditions	S	Warning
990	Special event 4	Contact service	F	Alarm
991	Batch time exceeded	Check process conditions	F	Warning [1]
991	Special event 8	Contact service	F	Alarm
991	Maximum flow rate exceeded	Check process conditions	F	Warning [1]
992	Special event 12	Contact service	F	Alarm [1]

1) Diagnostic status is changeable.

10.4.1 Process errors without message

Symptoms	Remedial measures
Measured-value reading shown on display, even though the fluid is at a standstill and the measuring tube is full.	▪ Check whether there are gas bubbles in the fluid. ▪ Activate the "LOW FLOW CUTOFF" function, i.e. enter or increase the value for the switching point.
The fault cannot be rectified or some other fault not described above has occurred. Contact the E+H service organization responsible.	The following options are available for tackling problems of this nature: ▪ Request the services of an Endress+Hauser service technician. Be ready with the following information when requesting the services of a service technician from customer service: – Brief description of the fault – Nameplate specifications (→ 1, 12): order code and serial number ▪ Returning devices to Endress+Hauser Make sure to comply with the procedures on how to return a measuring device. (→ 50)

10.4.2 Response of outputs to errors

The failsafe mode of the pulse, frequency and status output can be set differently via the DeviceCare or FieldCare operating program.

Error response mode of the pulse and status output	
Output	**Failsafe mode**
Pulse output	The failsafe mode of the pulse output can be set differently using the DeviceCare or FieldCare operating program: FALLBACK VALUE Signal output → No pulses ACTUAL VALUE Fault is ignored, i.e. normal measured value output on the basis of ongoing flow measurement Notice messages do not have any effect on the pulse output! See information on.
Frequency output	The failsafe mode of the frequency output can be set differently using the DeviceCare or FieldCare operating program.
Status output	The assignment of the status output can be defined via the DeviceCare or FieldCare operating program. In the event of a fault, notice message or power supply failure → the status output is not conductive

10.4.3 Software history

Date	Software version	Changes to software	Operating Instructions
08.2014	3.00.zz	▪ Original software ▪ Compatible with DeviceCare	15.14 Batch versions: 01.14
08.2012	1.01.XX	No software modifications	71.../14.12
01.2011			71128084/13.11
04.2007	1.01.00	**New functionality:** ▪ Selection of a measuring mode for the pulse output ▪ New limit value switch for the status output with the option of specifying the switch-on value and switch-off point individually ▪ Choice of operating mode for pressure shock suppression ▪ New option to clear the error memory	71039224/04.07
12.2003	1.00.00	▪ Original software ▪ Compatible with FieldCare	–

10.5 Pending diagnostic events

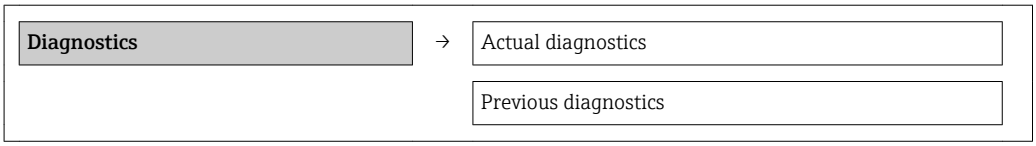
The **Diagnostics** menu allows the user to view the current diagnostic event and the previous diagnostic event separately.

To call up the measures to rectify a diagnostic event:
Via DeviceCare and FieldCare operating tool (→ 41)

Other pending diagnostic events can be displayed in the **Diagnostic list** submenu(→ 45)

Navigation
"Diagnostics" menu

Structure of the submenu



Parameter overview with brief description

Parameter	Prerequsite	Description	User interface	Factory setting
Actual diagnostics	1 diagnostic event has occurred.	Displays the current diagnostic event along with the diagnostic information. If two or more messages occur simultaneously, the message with the highest priority is shown on the display.	Symbol for diagnostic behavior, diagnostic code and short message.	–
Previous diagnostics	2 diagnostic events have already occurred.	Displays the diagnostic event that occurred prior to the current diagnostic event along with the diagnostic information.	Symbol for diagnostic behavior, diagnostic code and short message.	–

10.6 Diagnostic list

In the **Diagnostic list** submenu, up to 5 currently pending diagnostic events can be displayed along with the related diagnostic information. If more than 5 diagnostic events are pending, the events with the highest priority are shown on the display.

Navigation path
Diagnostics menu→**Diagnostic list** submenu

To call up the measures to rectify a diagnostic event:
Via "FieldCare" operating tool (→ 41)

10.7 Event logbook

10.7.1 Event history

To call up the measures to rectify a diagnostic event:
Via DeviceCare and FieldCare operating tool (→ 41)

For filtering the displayed event messages (→ 45)

10.7.2 Filtering the event logbook

Using the **Filter options** parameter, you can define which category of event messages is displayed in the **Events list** submenu.

Navigation path
"Diagnostics" menu → Event logbook → Filter options

Filter categories
- All
- Failure (F)
- Function check (C)

- Out of specification (S)
- Maintenance required (M)
- Information (I)

10.7.3 Overview of information events

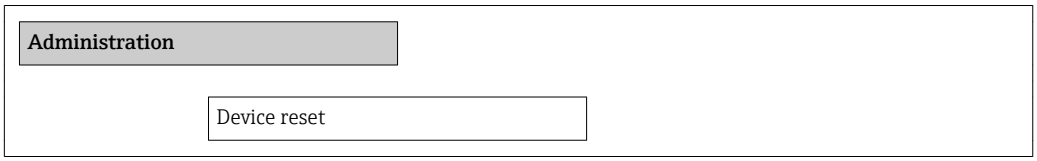
Unlike a diagnostic event, an information event is displayed in the event logbook only and not in the diagnostic list.

Info number	Info name
I1000	--------(Device ok)
I1089	Power on
I1090	Configuration reset
I1091	Configuration changed
I1110	Write protection switch changed
I1111	Density adjust failure
I1151	History reset
I1209	Density adjustment ok
I1221	Zero point adjust failure
I1222	Zero point adjustment ok

10.8 Resetting the measuring device

Using the **Device reset** parameter it is possible to reset the entire device configuration or some of the configuration to a defined state.

Navigation
"Setup" menu → Advanced setup → Administration → Device reset



Parameter overview with brief description

Parameter	Description	Selection	Factory setting
Device reset	Restart or reset device manually.	▪ 0 = Cancel ▪ 2 = To delivery settings ▪ 1 = Restart device	0 = Cancel

10.8.1 Function scope of "Device reset" parameter

Options	Description
Cancel	No action is executed and the user exits the parameter.
To delivery settings	Every parameter for which a customer-specific default setting was ordered is reset to this customer-specific value. All other parameters are reset to the factory setting. This option is not visible if no customer-specific settings have been ordered.

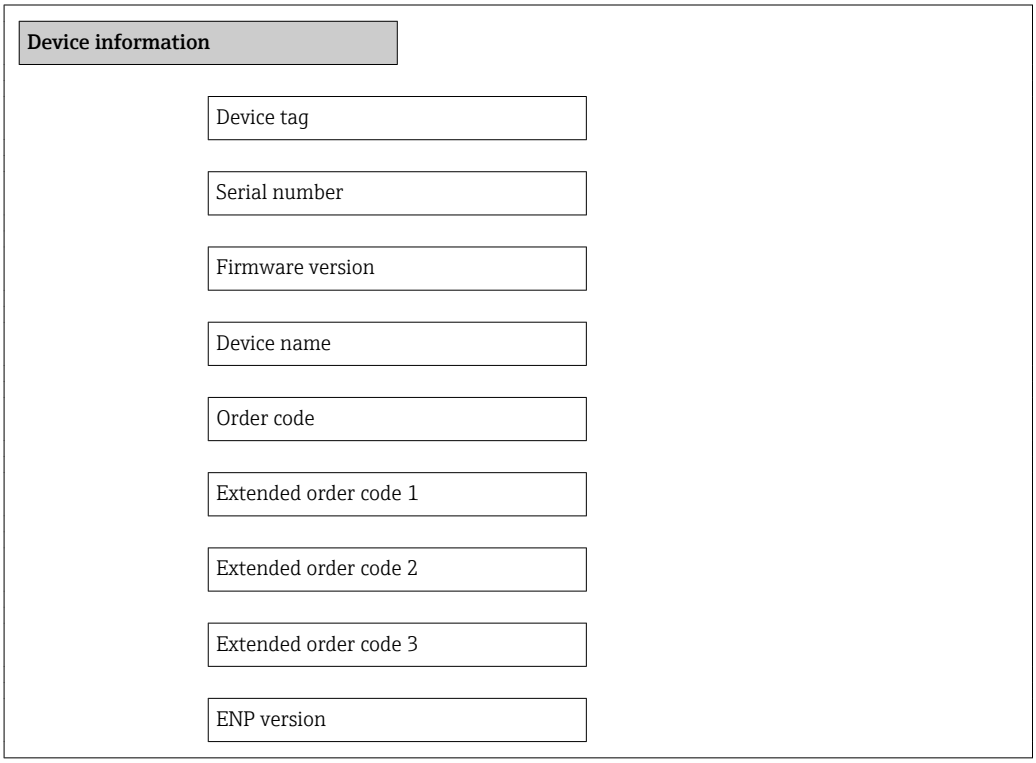
Options	Description
Restart device	The restart resets every parameter whose data are in the volatile memory (RAM) to the factory setting (e.g. measured value data). The device configuration remains unchanged.
History reset	Every parameter is reset to its factory setting.

10.9 Device information

The **Device information** submenu contains all the parameters that display different information for identifying the device.

Navigation

"Diagnostics" menu → Device information



Parameter overview with brief description

Parameter	Description	User entry / User interface	Factory setting
Device tag	Enter the name for the measuring point.	Max. 32 characters, such as letters, numbers or special characters (e.g. @, %, /)	Dosimass
Serial number	Displays the serial number of the measuring device.	Max. 11-digit character string comprising letters and numbers.	79AFFF16000
Firmware version	Displays the device firmware version installed.	Character string with the following format: xx.yy.zz	03.00
Device name	Displays the name of the transmitter.	Character string composed of letters, numbers and certain punctuation marks.	Dosimass

Parameter	Description	User entry / User interface	Factory setting
Order code	Displays the device order code.	Character string composed of letters, numbers and certain punctuation marks	–
Extended order code 1	Displays the 1st part of the extended order code.	Character string	–
Extended order code 2	Displays the 2nd part of the extended order code.	Character string	-
Extended order code 3	Displays the 3rd part of the extended order code.	Character string	-
ENP version	Displays the version of the electronic nameplate.	Character string in the format xx.yy.zz	2.02.00

10.10 Firmware history

Flashing the firmware to the current version or to the previous version is possible via the service interface (CDI) .

For the compatibility of the firmware version with the previous version, the installed device description files and operating tools, observe the information about the device in the "Manufacturer's information" document.

The manufacturer's information is available:
- In the Download Area of the Endress+Hauser Internet site: www.endress.com → Download
- Specify the following details:
  - Text search: Manufacturer's information
  - Search range: documentation

11 Maintenance

11.1 Maintenance tasks

No special maintenance work is required.

11.1.1 Exterior cleaning

When cleaning the exterior of measuring devices, always use cleaning agents that do not attack the surface of the housing or the seals.

11.1.2 Interior cleaning

Observe the following points for CIP and SIP cleaning:
- Use only cleaning agents to which the process-wetted materials are adequately resistant.
- Observe the maximum permitted medium temperature for the measuring device (→ 59).

11.1.3 Replacing seals

The sensor's seals (particularly aseptic molded seals) must be replaced periodically.

The interval between changes depends on the frequency of the cleaning cycles, the cleaning temperature and the medium temperature.

Replacement seals (accessory) (→ 52)

11.2 Measuring and test equipment

Endress+Hauser offers a wide variety of measuring and test equipment, such as W@M or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

For a list of some of the measuring and test equipment, refer to the "Accessories" chapter of the "Technical Information" document for the device.

11.3 Endress+Hauser services

Endress+Hauser offers a wide variety of services for maintenance such as recalibration, maintenance service or device tests.

Your Endress+Hauser Sales Center can provide detailed information on the services.

12 Repair

12.1 General notes

Repair and conversion concept
The Endress+Hauser repair and conversion concept provides for the following:
- The measuring devices have a modular design.
- Spare parts are grouped into logical kits with the associated Installation Instructions.
- Repairs are carried out by Endress+Hauser Service or by correspondingly trained customers.
- Certified devices can be converted into other certified devices by Endress+Hauser Service or at the factory only.

Notes for repair and conversion
For repair and modification of a measuring device, observe the following notes:
- Use only original Endress+Hauser spare parts.
- Carry out the repair according to the Installation Instructions.
- Observe the applicable standards, federal/national regulations, Ex documentation (XA) and certificates.
- Document every repair and each conversion and enter them into the *W@M* life cycle management database.

12.2 Spare parts

Measuring device serial number:
Can be read out via the **Serial number** parameter in the **Device information** submenu .

12.3 Endress+Hauser services

Contact your Endress+Hauser Sales Center for information on services and spare parts.

12.4 Return

The measuring device must be returned if repairs or a factory calibration are required, or if the wrong measuring device has been ordered or delivered. According to legal regulations, Endress+Hauser, as an ISO-certified company, is required to follow certain procedures when handling returned products that are in contact with medium.

To ensure swift, safe and professional device returns, please read the return procedures and conditions on the Endress+Hauser website at
www.services.endress.com/return-material

12.5 Disposal

12.5.1 Removing the measuring device

1. Switch off the device.
2. **WARNING!** Danger to persons from process conditions. Beware of hazardous process conditions such as pressure in the measuring device, high temperatures or aggressive fluids.

Carry out the mounting and connection steps from the chapters "Mounting the measuring device" and "Connecting the measuring device" in the logically reverse sequence. Observe the safety instructions.

12.5.2 Disposing of the measuring device

⚠ WARNING

Danger to personnel and environment from fluids that are hazardous to health.

- ▶ Ensure that the measuring device and all cavities are free of fluid residues that are hazardous to health or the environment, e.g. substances that have permeated into crevices or diffused through plastic.

Observe the following notes during disposal:

- Observe valid federal/national regulations.
- Ensure proper separation and reuse of the device components.

13 Accessories

Various accessories, which can be ordered with the device or subsequently from Endress +Hauser, are available for the device. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

13.1 Device-specific accessories

13.1.1 For the sensor

Accessories	Description
Seal set	For regular replacement of the seals on the process connections.
Housing seal	To seal the transmitter

13.2 Communication-specific accessories

Accessories	Description
Adapter connection	Adapter connections for installing on other electrical connections
RSE8 adapter	RSE8 connection jack, 8-pin adapter (RSE8), 24 V DC, pulse, status
RSE5 adapter	RSE8 connection jack, 5-pin adapter (RSE5), 24 V DC, pulse, status
RSE4 adapter	RSE8 connection jack, 4-pin adapter (RSE4), 24 V DC, pulse
FXA 291	Service interface connecting cable from the device to the PC for using the “DeviceCare” operating software
RSE8 supply cable	RKWTN8-56/5 P92 cable

13.3 Service-specific accessories

Accessories	Description
Applicator	Software for selecting and sizing Endress+Hauser measuring devices: ▪ Calculation of all the necessary data for identifying the optimum flowmeter: e.g. nominal diameter, pressure loss, accuracy or process connections. ▪ Graphic illustration of the calculation results Administration, documentation and access to all project-related data and parameters over the entire life cycle of a project. Applicator is available: ▪ Via the Internet: https://wapps.endress.com/applicator ▪ On CD-ROM for local PC installation.

W@M	Life cycle management for your plant W@M supports you with a wide range of software applications over the entire process: from planning and procurement, to the installation, commissioning and operation of the measuring devices. All the relevant device information, such as the device status, spare parts and device-specific documentation, is available for every device over the entire life cycle. The application already contains the data of your Endress+Hauser device. Endress +Hauser also takes care of maintaining and updating the data records. W@M is available: ▪ Via the Internet: www.endress.com/lifecyclemanagement ▪ On CD-ROM for local PC installation.
DeviceCare and FieldCare	FDT-based plant asset management tool from Endress+Hauser. It can configure all smart field units in your system and helps you manage them. By using the status information, it is also a simple but effective way of checking their status and condition. For details, see Operating Instructions BA00027S and BA00059S

14 Technical data

14.1 Application

The measuring device is suitable for flow measurement of liquids and gases only.

Depending on the version ordered, the measuring device can also measure potentially explosive, flammable, poisonous and oxidizing media.

To ensure that the device remains in proper operating condition for its service life, use the measuring device only for media against which the process-wetted materials are adequately resistant.

14.2 Function and system design

Measuring principle

Mass flow measurement based on the Coriolis measuring principle

Measuring system

For information on the structure of the device, see the Technical Information

14.3 Input

Measured variable

Direct measured variables

- Mass flow
- Density
- Temperature

Calculated measured variables

Volume flow

Measuring range

Measuring ranges for liquids

Flow values in SI units

DN [mm]	Measuring range full scale values $\dot{m}_{min(F)}$ to $\dot{m}_{max(F)}$ [kg/h]
8	0 to 2 000
15	0 to 6 500
25	0 to 18 000

Flow values in US units

DN [in]	Measuring range full scale values $\dot{m}_{min(F)}$ to $\dot{m}_{max(F)}$ [lb/min]
3/8	0 to 73.50
1/2	0 to 238.9
1	0 to 661.5

To calculate the measuring range, use the *Applicator* sizing tool

Recommended measuring range

"Flow limit" section (→ 60)

Operable flow range

Over 1000 : 1.

Flow rates above the preset full scale value are not overridden by the electronics unit, with the result that the totalizer values are registered correctly.

14.4 Output

Output signal

Pulse/frequency/switch output (option 3)

Version	Passive
Maximum input values	▪ DC 30 V ▪ 25 mA
Voltage drop	For 25 mA: ≤ DC 2 V
Operating mode	
Assignable functions	▪ Off ▪ Pulse ▪ Automatic pulse ▪ Frequency ▪ Switch
Channel 2	▪ Off ▪ Redundant 0° ▪ Redundant 90° ▪ Redundant 180°
Pulse output	
Pulse width	Adjustable: 0.05 to 3.75 ms
Maximum pulse rate	10 000 Impulse/s
Value per pulse	Adjustable
Assignable measured variables	▪ Off ▪ Mass flow ▪ Volume flow
Frequency output	
Output frequency	Adjustable: 0 to 10 000 Hz
Damping	Adjustable: 0 to 999.9 s
Pulse/pause ratio	1:1
Assignable measured variables	▪ Off ▪ Mass flow ▪ Volume flow ▪ Density ▪ Temperature
Switch output	
Switching behavior	Binary, conductive or non-conductive

Number of switching cycles	Unlimited
Assignable functions	▪ Off ▪ On ▪ Diagnostic behavior – Alarm – Alarm and warning – Warning ▪ Limit value – Mass flow – Volume flow – Density – Temperature ▪ Flow direction monitoring – Off – Volume flow – Mass flow ▪ Status – Partially filled pipe detection – Low flow cut off

Signal on alarm

Depending on the interface, failure information is displayed as follows:

Pulse/frequency/switch output (option 3)

Pulse output	
Failure mode	Choose from: ▪ Actual value ▪ No pulses
Frequency output	
Failure mode	Choose from: ▪ Actual value ▪ 0 Hz ▪ Defined value0 to 10 000 Hz
Switch output	
Failure mode	Choose from: ▪ Current status ▪ Open ▪ Closed

Low flow cut off

The switch points for low flow cut off are user-selectable.

Galvanic isolation

Option 3 (PFS output): all outputs are galvanically isolated from one another.

Switch output

Status output:

Passive, max. 30 V_{DC}, 25 mA

Protocol-specific data

14.5 Power supply

Pin assignment

(→ 22)

Supply voltage

Transmitter and sensor

24 V_{DC} Nominal voltage (20 to 30 V_{DC})

- The power supply may not exceed a maximum short-circuit current of 50 A.
- The measuring device may only be connected to SELV, PELV or CLASS 2 circuits.

Power consumption

Transmitter and sensor

DC: max. 3.5 W + 500 mA per batch output

Switch-on current: max. 1 A (< 6 ms)

Electrical connection

(→ 22)

Potential equalization

(→ 25)

In the case of devices for hazardous areas, pay attention to the information in the Ex-specific supplementary documentation.

Cable specification

(→ 25)

14.6 Performance characteristics

Reference operating conditions

- Error limits based on ISO 11631
- Water with +15 to +45 °C (+59 to +113 °F) at2 to 6 bar (29 to 87 psi)
- Specifications as per calibration protocol
- Accuracy based on accredited calibration rigs that are traced to ISO 17025.

To obtain measured errors, use the *Applicator* sizing tool

Maximum measured error

o.r. = of reading; 1 g/cm³ = 1 kg/l; T = medium temperature

Base accuracy

Mass flow and volume flow (liquids)

- ±0.15 % o.r.
- ±0.30 % ± [(zero point stability : measured value) · 100]% o.r.
- ±5 % ± [(zero point stability : measured value) · 100]% o.r.

Density (liquids)

- Reference conditions:±0.0005 g/cm³
- Field density calibration: ±0.0005 g/cm³
  (after field density calibration under process conditions)
- Standard density calibration:±0.02 g/cm³
  (valid over the entire temperature range and density range)

Temperature

±0.5 °C ± 0.005 · T °C (±0.9 °F ± 0.003 · (T − 32) °F)

Zero point stability

DN		Zero point stability	
[mm]	[in]	[kg/h]	[lb/min]
8	3/8	0.20	0.007
15	½	0.65	0.024
25	1	1.80	0.066

Flow values

Flow values as turndown parameter depending on nominal diameter.

SI units

DN	1:1	1:10	1:20	1:50	1:100	1:500
[mm]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]	[kg/h]
8	2000	200	100	40	20	4
15	6500	650	325	130	65	13
25	18000	1800	900	360	180	36

US units

DN	1:1	1:10	1:20	1:50	1:100	1:500
[inch]	[lb/min]	[lb/min]	[lb/min]	[lb/min]	[lb/min]	[lb/min]
3/8	73.50	7.350	3.675	1.470	0.735	0.147
½	238.9	23.89	11.95	4.778	2.389	0.478
1	661.5	66.15	33.08	13.23	6.615	1.323

Accuracy of outputs

o.r. = of reading; o.f.s. = of full scale value

Repeatability

Base repeatability

Dosing time [s]	Standard deviation [%]
≥ 0.75	0.2
≥ 1.5	0.1
≥ 3.0	0.05

Density (liquids)
±0.00025 g/cm³

Temperature
±0.25 °C ± 0.0025 · T °C (±0.45 °F ± 0.0015 · (T−32) °F)

Response time

The response time depends on the configuration (damping).

Influence of medium temperature	**Mass flow** When there is a difference between the temperature for zero point adjustment and the process temperature, the typical measured error of the sensor is ±0.0003 % of the full scale value/°C (±0.00015 % of the full scale value/°F). **Temperature** ±0.005 · T °C (±0.005 · (T – 32) °F)
Influence of medium pressure	A difference between the calibration pressure and process pressure does not affect accuracy.

14.7 Installation

"Mounting requirements" (→ 16)

14.8 Environment

Ambient temperature range	(→ 18) **Temperature tables** Observe the interdependencies between the permitted ambient and fluid temperatures when operating the device in hazardous areas. For detailed information on the temperature tables, see the separate document entitled "Safety Instructions" (XA) for the device.
Storage temperature	–40 to +80 °C (–40 to +176 °F) (preferably at +20 °C (+68 °F)
Climate class	DIN EN 60068-2-38 (test Z/AD)
Degree of protection	**Transmitter and sensor** As standard: IP67, type 4X enclosure
Shock resistance	As per IEC/EN 60068-2-31
Vibration resistance	Acceleration up to 1 g, 10 to 150 Hz, based on IEC/EN 60068-2-6
Interior cleaning	▪ Sterilization in place (SIP) ▪ Cleaning in place (CIP)
Electromagnetic compatibility (EMC)	As per IEC/EN 61326 and NAMUR Recommendation 21 (NE 21) For details refer to the Declaration of Conformity.

14.9 Process

Medium temperature range	**Sensor** –40 to +125 °C (–40 to +257 °F)

	Seals No internal seals
Medium pressure range (nominal pressure)	max. 100 bar (1 450 psi), depending on the process connection
Density	0 to 5 000 kg/m³ (0 to 312 lb/cf)
Pressure-temperature ratings	An overview of the pressure-temperature ratings for the process connections is provided in the "Technical Information" document
Secondary containment pressure rating	The housing does not have pressure vessel classification. For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section
Flow limit	Select the nominal diameter by optimizing between the required flow range and permissible pressure loss. For an overview of the measuring range full scale values, see the "Measuring range" section ▪ The minimum recommended full scale value is approx. 1/20 of the maximum full scale value ▪ In most applications, 20 to 50 % of the maximum full scale value can be considered ideal ▪ A low full scale value must be selected for abrasive media (such as liquids with entrained solids): flow velocity < 1 m/s (< 3 ft/s).
Pressure loss	To calculate the pressure loss, use the *Applicator* sizing tool

14.10 Mechanical construction

Design, dimensions

For the dimensions and installation lengths of the device, see the "Technical Information" document, "Mechanical construction" section

Weight

Compact version

Weight in SI units

DN [mm]	Weight [kg]
8	3.5
15	4.0
25	4.5

Weight in US units

DN [in]	Weight [lbs]
3/8	7.7
½	8.8
1	9.9

Materials

Transmitter housing

- Acid and alkali-resistant outer surface
- Stainless steel, 1.4308 (304)

Sensor housing

- Acid and alkali-resistant outer surface
- Stainless steel 1.4301 (304)

Measuring tubes

- Stainless steel, 1.4539 (904L)
- Surface quality:
  - Ra_{max} = 0.4 µm (16 µin)
  - Ra_{max} = 0.8 µm (32 µin)

Process connections

- Flanges according to EN (DIN):
  Stainless steel, 1.4404 (316/316L)
- Flanges according to DIN 32676:
  Stainless steel, 1.4435 (316L)
- All other process connections:
  Stainless steel, 1.4404 (316L)

List of all available process connections (→ 62)

Seals

Welded process connections without internal seals

Process connections

- Flanges:
  EN 1092-1 (DIN 2512N)
- Tri-Clamp (OD tubes)
- Clamp with compression fitting
  DIN 32676
- Threaded hygienic connection:
  – DIN 11851
  – SMS 1145
  – ISO 2853
  – DIN 11864-1 Form A

For information on the materials of the process connections (→ 61)

14.11 Operability

Local display

The measuring device does not have a display or display elements.

Remote operation

Operation takes place via Endress+Hauser's DeviceCare and FieldCare configuration and service programs. This can be used to configure functions and read off measured values.

In the case of measuring devices with the batching option it is also possible to configure and read measured values via Modbus.

14.12 Certificates and approvals

CE mark

The measuring system is in conformity with the statutory requirements of the applicable EC Directives. These are listed in the corresponding EC Declaration of Conformity along with the standards applied.

Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

C-Tick symbol

The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".

Ex approval

The measuring device is certified for use in hazardous areas and the relevant safety instructions are provided in the separate "Safety Instructions" (XA) document. Reference is made to this document on the nameplate.

The separate Ex documentation (XA) containing all the relevant explosion protection data is available from your Endress+Hauser sales center.

ATEX

Currently, the following versions for use in hazardous areas are available:

Ex nA

Category (ATEX)	Type of protection
II3G	Ex nA IIC T5 to T1 Gc

cCSAus

Currently, the following versions for use in hazardous areas are available:

NI

Category	Type of protection
Class I Division 2 Groups ABCD	NI (non-incendive version)

Hygienic compatibility

3A approval

Pressure Equipment Directive

- With the PED/G1/x (x = category) marking on the sensor nameplate, Endress+Hauser confirms compliance with the "Essential Safety Requirements" specified in Annex I of the Pressure Equipment Directive 97/23/EC.
- Devices not bearing this marking (PED) are designed and manufactured according to good engineering practice. They meet the requirements of Art.3 Section 3 of the Pressure Equipment Directive 97/23/EC. The range of application is indicated in tables 6 to 9 in Annex II of the Pressure Equipment Directive.

Other standards and guidelines

- EN 60529
  Degrees of protection provided by enclosures (IP code)
- EN 61010-1
  Safety requirements for electrical equipment for measurement, control and laboratory use
- IEC/EN 61326
  Emission in accordance with Class A requirements. Electromagnetic compatibility (EMC requirements).
- EN 61000-4-3 (IEC 1000-4-3)
  Operating behavior A with shielded connecting cable possible (shielding connected as short as possible on both sides), otherwise operating behavior B
- NAMUR NE 21
  Electromagnetic compatibility of industrial process and laboratory control equipment

14.13 Accessories

Overview of accessories available for order (→ 52)

14.14 Supplementary documentation

For an overview of the scope of the associated Technical Documentation, refer to the following:

- The CD-ROM provided for the device (depending on the device version, the CD-ROM might not be part of the delivery!)
- The *W@M Device Viewer* : Enter the serial number from the nameplate (www.endress.com/deviceviewer)
- The *Endress+Hauser Operations App*: Enter the serial number from the nameplate or scan the 2-D matrix code (QR code) on the nameplate.

Standard documentation

Brief Operating Instructions

Measuring device	Documentation code
Dosimass	KA00043D

Technical Information

Measuring device	Documentation code
Dosimass	TI00065D

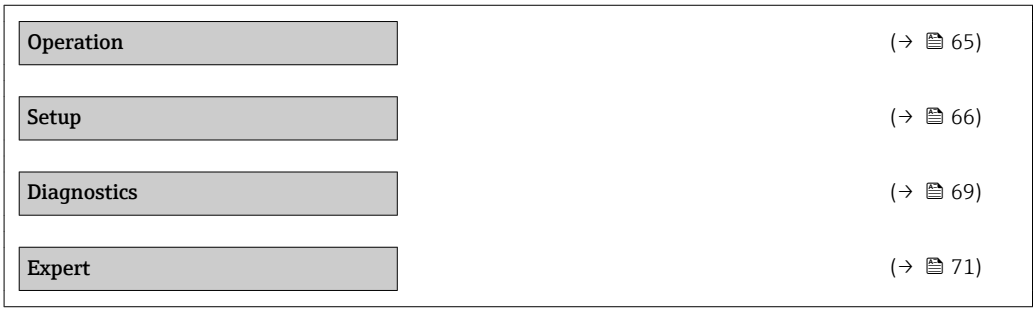
Supplementary device-dependent documentation

Safety Instructions

Contents	Documentation code
ATEX Ex nA	XA00079D
cCSAus NI	FES0232

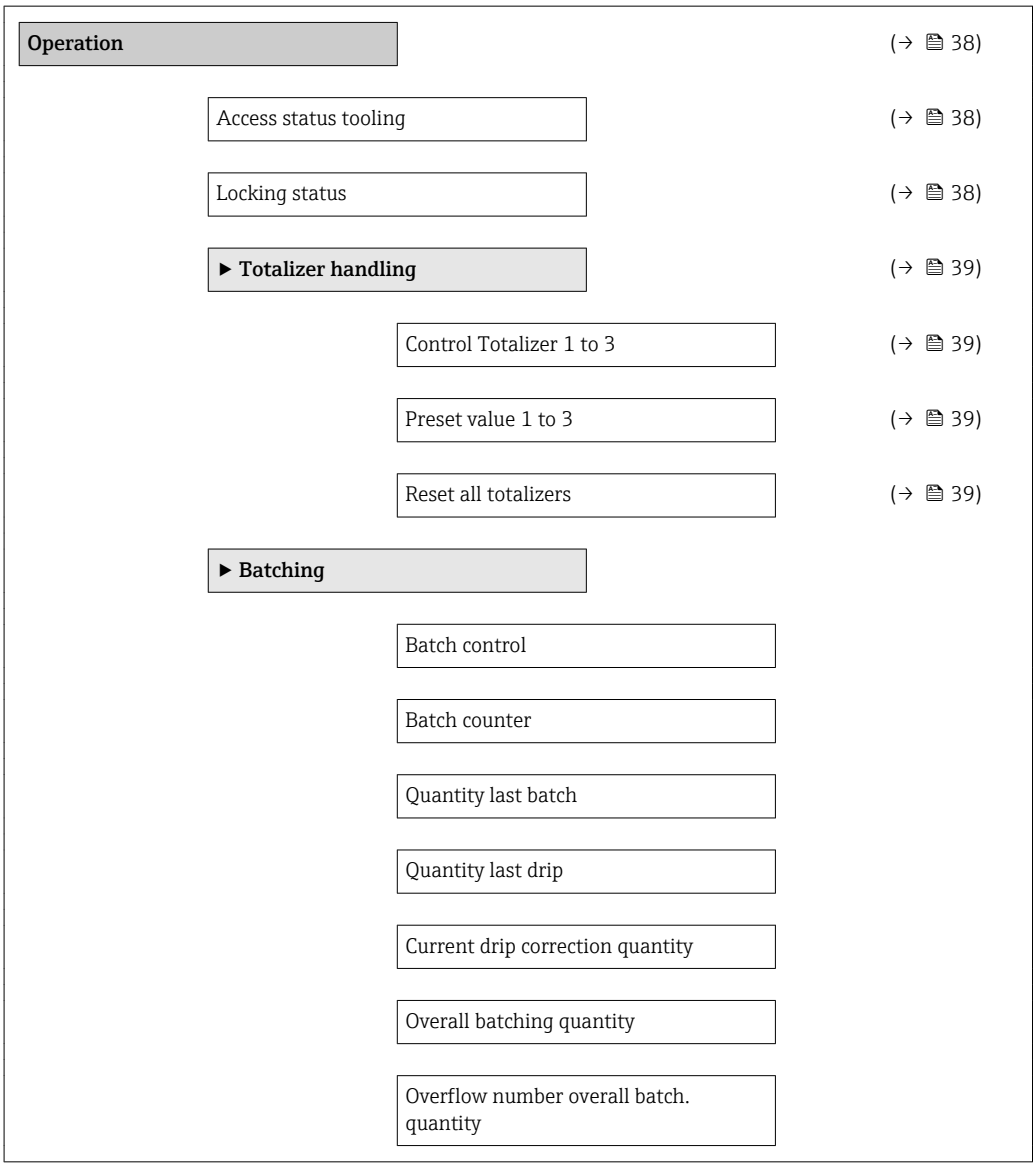
15 Appendix

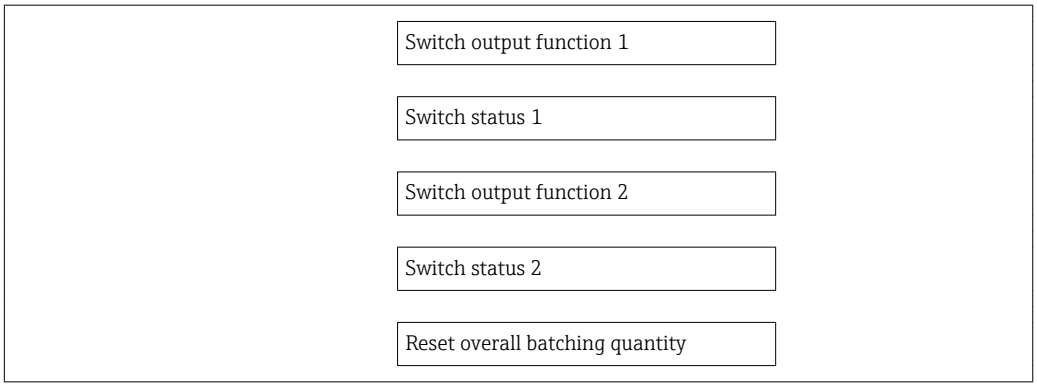
15.1 Overview of the operating menu



15.1.1 "Operation" menu

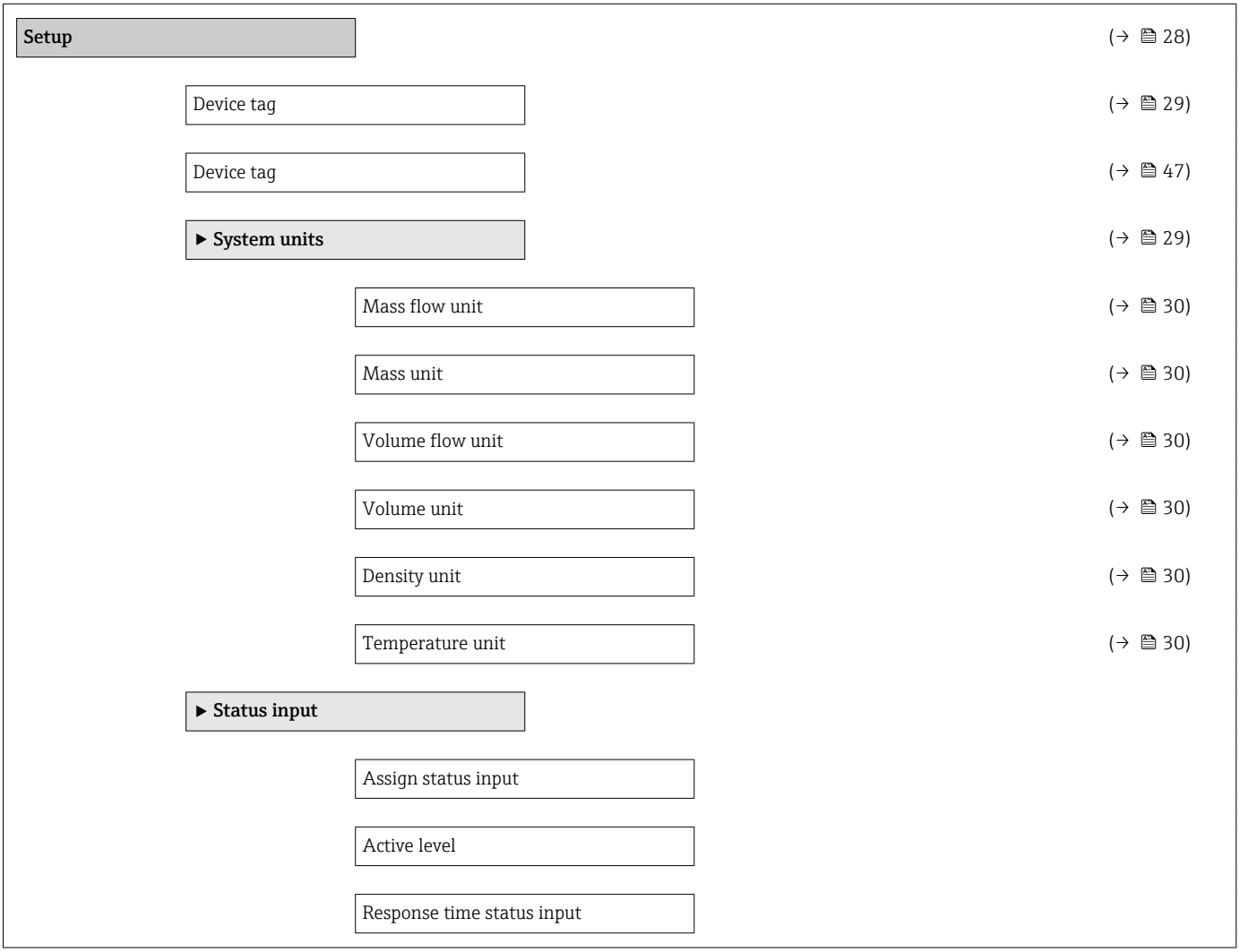
Navigation Operation





15.1.2 "Setup" menu

Navigation Setup



- ▶ **Batch output**
  - Batch profile
  - ▶ **Settings batch profile 1 to 6**
    - Input selector
    - Batch unit
    - Batch quantity
    - Drip correction mode
- ▶ **Pulse/frequency/switch output 1 to 2** (→ 30)
  - Operating mode (→ 31)
  - Channel 2 (→ 31)
  - Assign pulse output (→ 31)
  - Assign frequency output (→ 32)
  - Switch output function (→ 32)
  - Assign diagnostic behavior (→ 32)
  - Assign limit (→ 32)
  - Assign flow direction check (→ 32)
  - Assign status (→ 32)
  - Value per pulse (→ 32)
  - Pulse width (→ 32)
  - Failure mode (→ 32)
  - Minimum frequency value (→ 32)
  - Maximum frequency value (→ 32)
  - Measuring value at maximum frequency (→ 32)
  - Failure mode (→ 32)

- Failure frequency (→ 32)
- Switch-on value (→ 32)
- Switch-off value (→ 32)
- Failure mode (→ 32)
- Invert output signal (→ 32)

▶ Communication

- Bus address
- Baudrate
- Data transfer mode
- Parity
- Byte order
- Assign diagnostic behavior
- Failure mode

▶ Low flow cut off (→ 32)

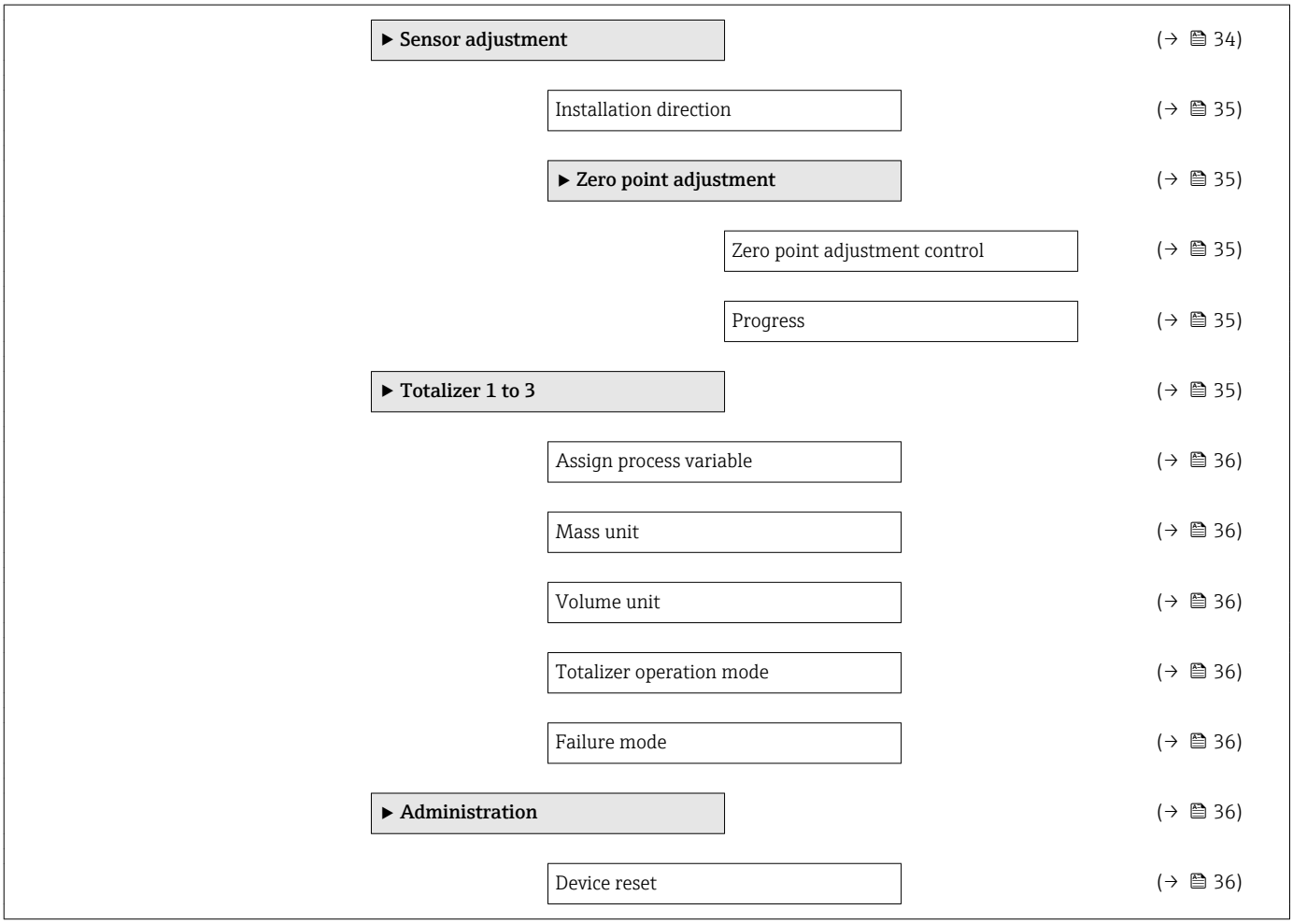
- Assign process variable (→ 33)
- On value low flow cutoff (→ 33)
- Off value low flow cutoff (→ 33)
- Pressure shock suppression (→ 33)

▶ Partially filled pipe detection

- Assign process variable (→ 33)
- Low value partial filled pipe detection (→ 33)
- High value partial filled pipe detection (→ 33)
- Response time part. filled pipe detect.

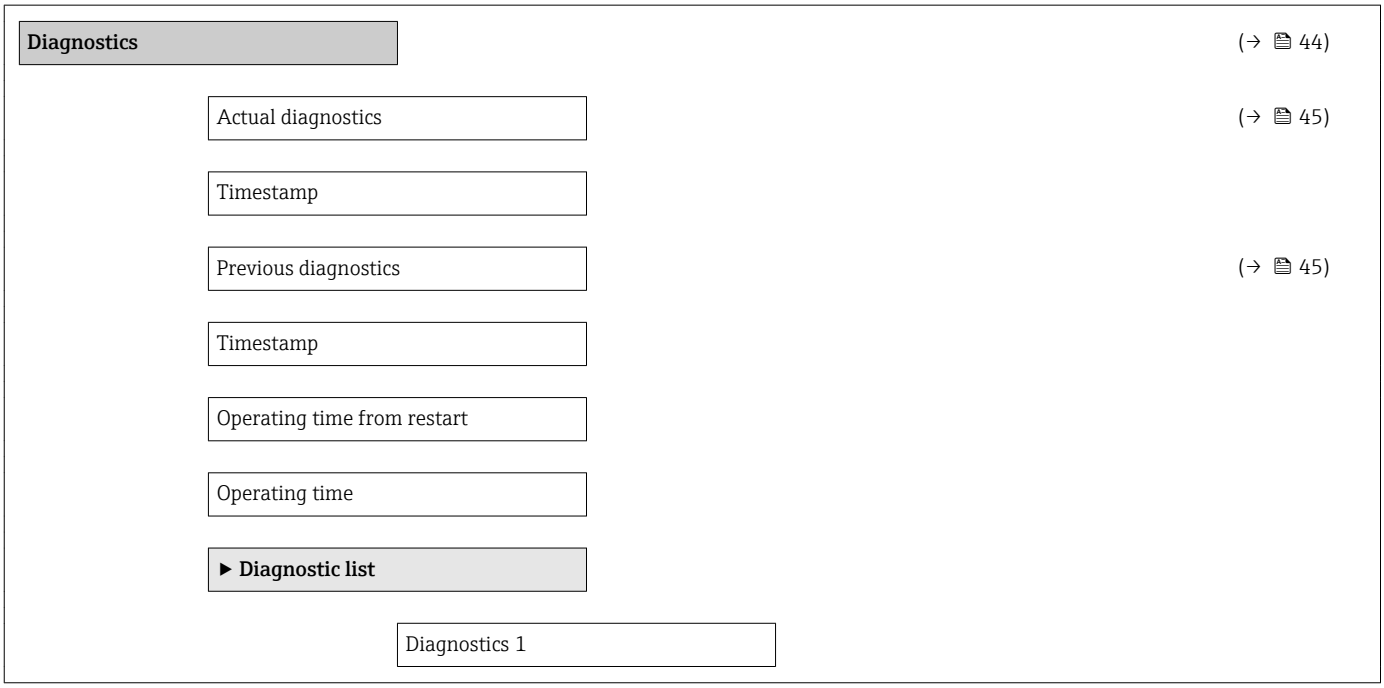
▶ Advanced setup (→ 34)

- Enter access code (→ 34)



15.1.3 "Diagnostics" menu

Navigation Diagnostics



- Timestamp
- Diagnostics 2
- Timestamp
- Diagnostics 3
- Timestamp
- Diagnostics 4
- Timestamp
- Diagnostics 5
- Timestamp

▶ Event logbook

- Filter options
- Clear event list

▶ Device information (→ 47)

- Device tag (→ 47)
- Serial number (→ 47)
- Firmware version (→ 47)
- Device name (→ 47)
- Order code (→ 48)
- Extended order code 1 (→ 48)
- Extended order code 2 (→ 48)
- Extended order code 3 (→ 48)
- ENP version (→ 48)

▶ Measured values

▶ Process variables

- Mass flow



15.1.4 "Expert" menu

The following tables provide an overview of the **Expert** menu with its submenus and parameters. The direct access code to the parameter is given in brackets. The page reference indicates where a description of the parameter can be found in the manual.

Navigation Expert



"System" submenu

Navigation Expert → System

- **System**
  - ▶ **Diagnostic handling**
    - Alarm delay
    - ▶ **Diagnostic behavior**
      - Assign behavior of diagnostic no. 140
      - Assign behavior of diagnostic no. 046
      - Assign behavior of diagnostic no. 834
      - Assign behavior of diagnostic no. 835
      - Assign behavior of diagnostic no. 912
      - Assign behavior of diagnostic no. 913
      - Assign behavior of diagnostic no. 192
      - Assign behavior of diagnostic no. 274
      - Assign behavior of diagnostic no. 392
      - Assign behavior of diagnostic no. 442
      - Assign behavior of diagnostic no. 443
      - Assign behavior of diagnostic no. 592
      - Assign behavior of diagnostic no. 992
      - Assign behavior of diagnostic no. 991
  - ▶ **Administration** (→ 36)
    - Device reset (→ 36)
    - Confirm defaulted parameter
    - Defaulted parameter
    - DATVersion

Permanent storage

Device tag (→ 29)

"Sensor" submenu

Navigation Expert → Sensor

Sensor

- ▶ **Measured values**
  - ▶ **Process variables**
    - Mass flow
    - Volume flow
    - Density
    - Temperature
  - ▶ **Totalizer** (→ 35)
    - Totalizer value 1 to 3
    - Totalizer overflow 1 to 3
  - ▶ **Input values**
    - Value status input
  - ▶ **Output values**
    - Pulse output
    - Output frequency
    - Switch status
    - Output frequency
    - Pulse output
    - Switch status

- ▶ **System units** (→ 29)
  - Mass flow unit (→ 30)
  - Mass unit (→ 30)
  - Volume flow unit (→ 30)
  - Volume unit (→ 30)
  - Density unit (→ 30)
  - Temperature unit (→ 30)
  - Date/time format
  - ▶ **User-specific units**
    - User mass text
    - User mass factor
    - User volume text
    - User volume factor
    - User density text
    - User density offset
    - User density factor
- ▶ **Process parameters**
  - Flow damping
  - Density damping
  - Temperature damping
  - Flow override
  - ▶ **Low flow cut off** (→ 32)
    - Assign process variable (→ 33)
    - On value low flow cutoff (→ 33)

- Off value low flow cutoff (→ 33)
- Pressure shock suppression (→ 33)
- **▶ Partially filled pipe detection**
  - Assign process variable (→ 33)
  - Low value partial filled pipe detection (→ 33)
  - High value partial filled pipe detection (→ 33)
  - Response time part. filled pipe detect.
  - Maximum damping partial filled pipe det.
- **▶ Sensor adjustment** (→ 34)
  - Installation direction (→ 35)
  - **▶ Zero point adjustment** (→ 35)
    - Zero point adjustment control (→ 35)
    - Progress (→ 35)
  - **▶ Density adjustment**
    - Density adjustment mode
    - Density setpoint 1
    - Density setpoint 2
    - Execute density adjustment
    - Progress (→ 35)
    - Density adjustment factor
    - Density adjustment offset
  - **▶ Process variable adjustment**
    - Mass flow offset
    - Mass flow factor

Volume flow offset

Volume flow factor

Density offset

Density factor

Temperature offset

Temperature factor

▶ **Calibration**

Calibration factor

Zero point

Nominal diameter

C

C

C

C

C

C

Calibration date/time

Calibration factor

▶ **Logbook**

Calibration counter

Calibration date/time

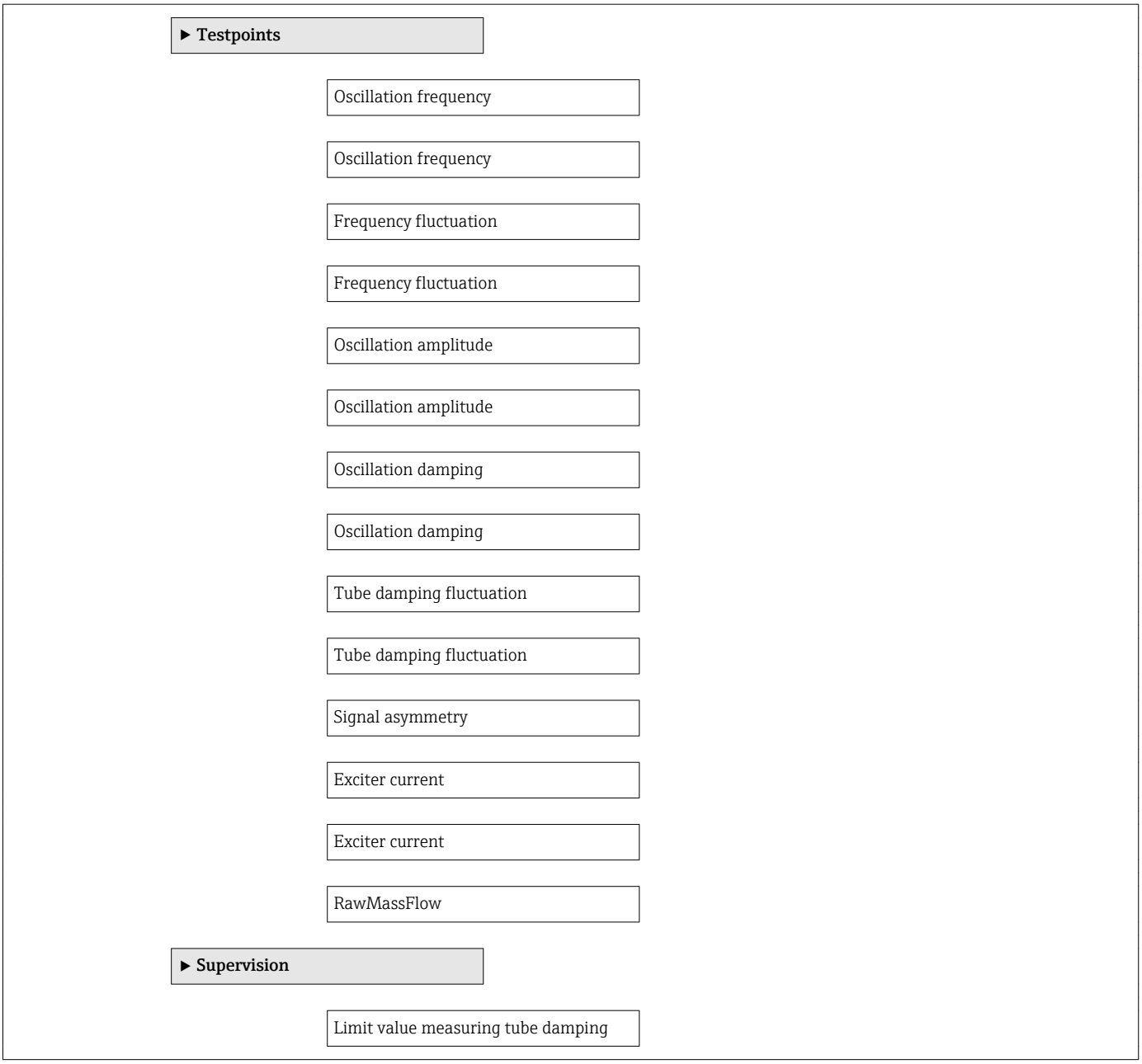
Calibration date/time

Calibration date/time

Calibration date/time

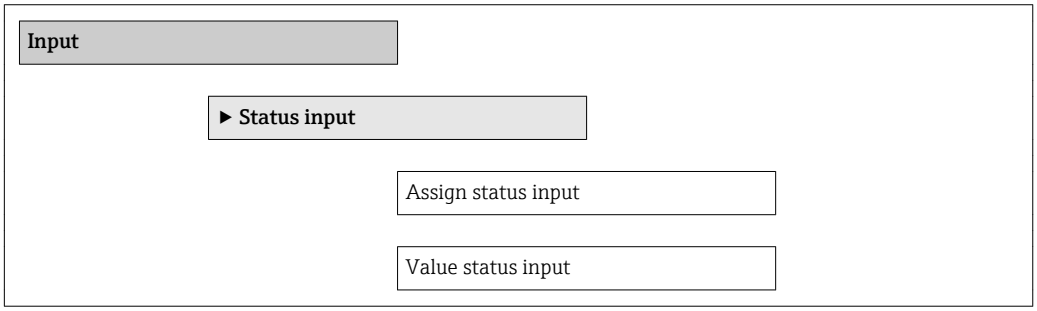
Calibration date/time

Calibration date/time
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Calibration factor
Calibration factor
Calibration factor
Calibration factor



"Current input" submenu

Navigation Expert → Input → Current input



Active level

Response time status input

Output

▶ **Pulse/frequency/switch output 1 to 2** (→ 30)

Operating mode (→ 31)

Channel 2 (→ 31)

Assign pulse output (→ 31)

Value per pulse (→ 32)

Pulse width (→ 32)

Measuring mode

Failure mode (→ 32)

Pulse output

Assign frequency output (→ 32)

Minimum frequency value (→ 32)

Maximum frequency value (→ 32)

Measuring value at maximum frequency (→ 32)

Measuring mode

Damping output

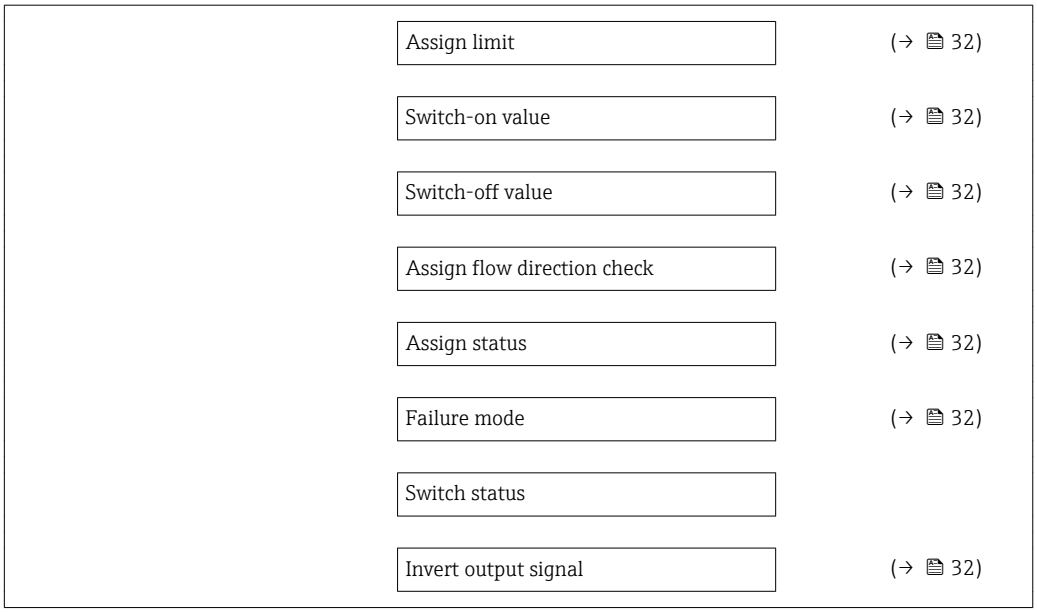
Failure mode (→ 32)

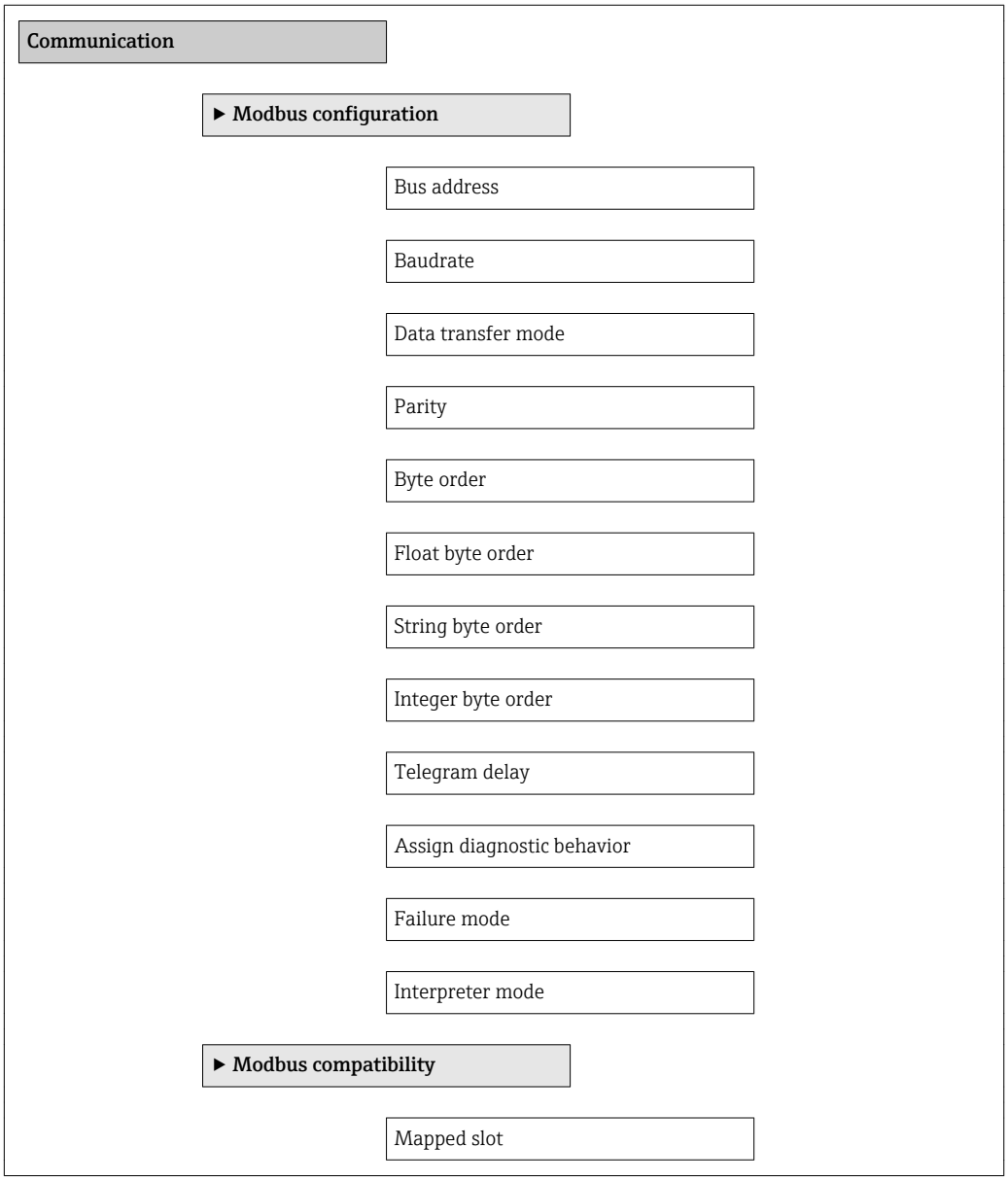
Failure frequency (→ 32)

Output frequency

Switch output function (→ 32)

Assign diagnostic behavior (→ 32)


Assign limit
(→ 32)
Switch-on value
(→ 32)
Switch-off value
(→ 32)
Assign flow direction check
(→ 32)
Assign status
(→ 32)
Failure mode
(→ 32)
Switch status
Invert output signal
(→ 32)


Communication
▶ Modbus configuration
Bus address
Baudrate
Data transfer mode
Parity
Byte order
Float byte order
String byte order
Integer byte order
Telegram delay
Assign diagnostic behavior
Failure mode
Interpreter mode
▶ Modbus compatibility
Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

Mapped slot

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Mapped slot

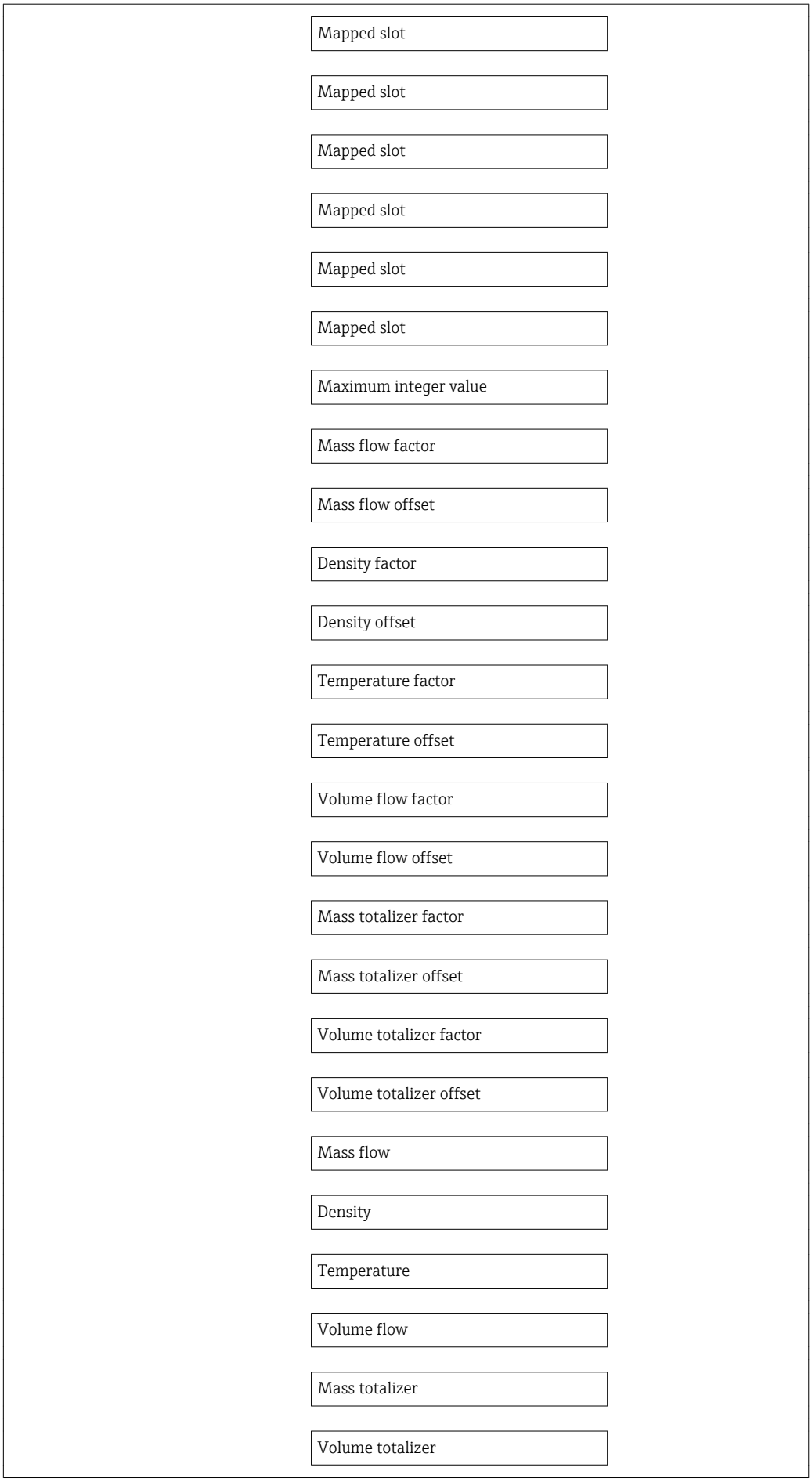
Mapped slot

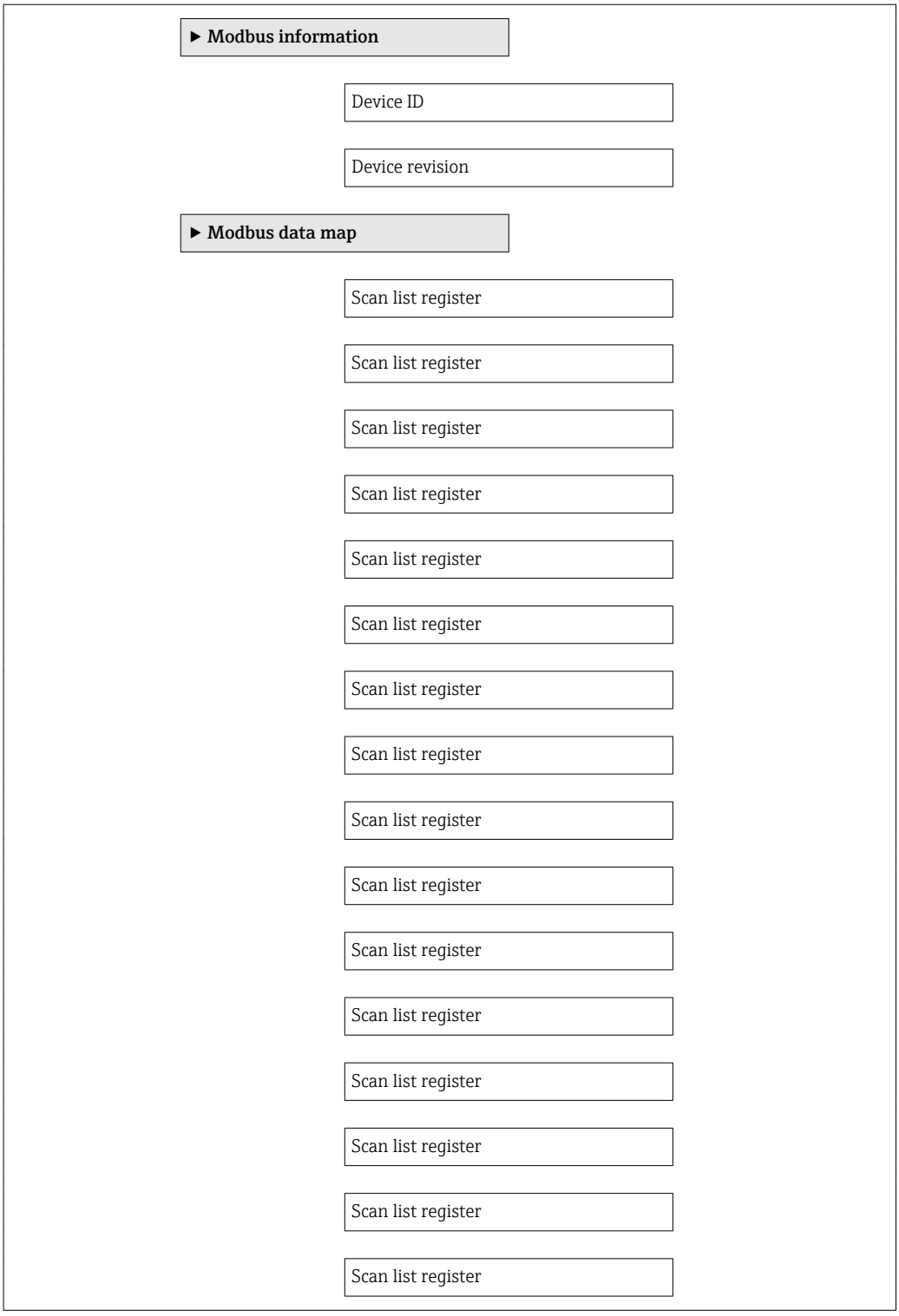
Mapped slot

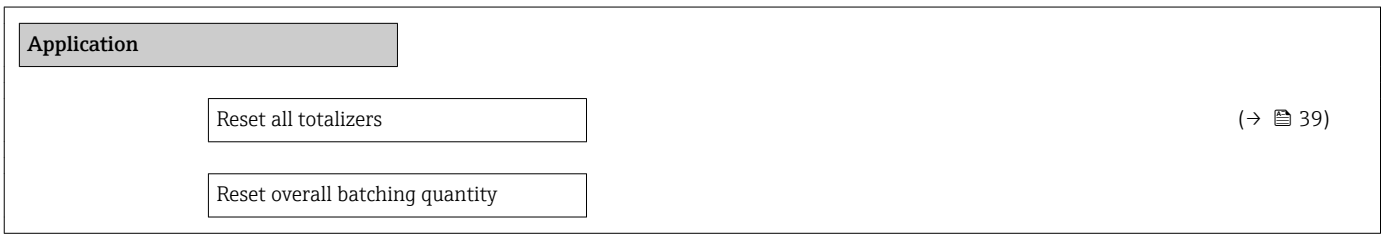
Mapped slot

Mapped slot

Mapped slot

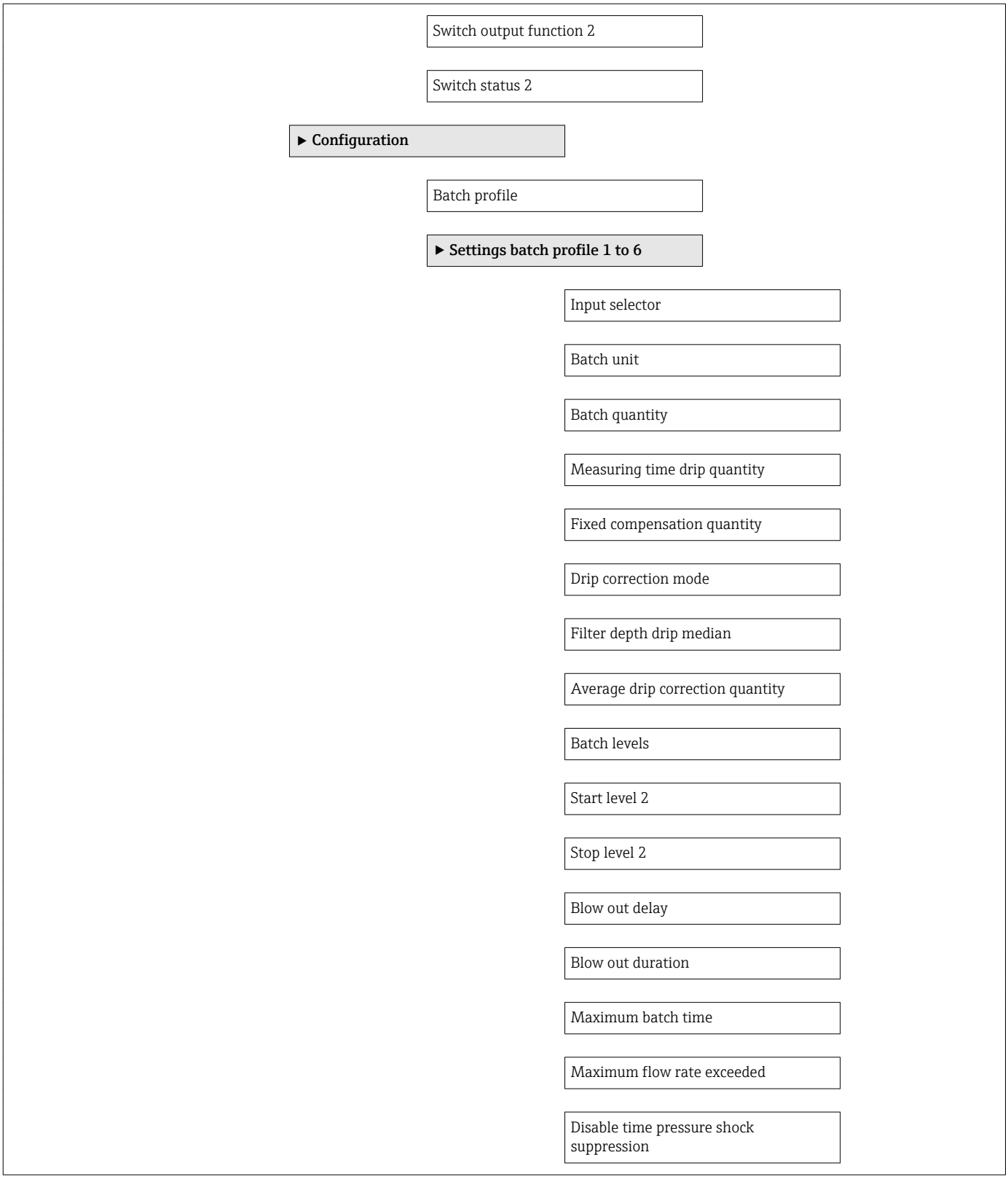

Mapped slot
Mapped slot
Mapped slot
Mapped slot
Mapped slot
Mapped slot
Maximum integer value
Mass flow factor
Mass flow offset
Density factor
Density offset
Temperature factor
Temperature offset
Volume flow factor
Volume flow offset
Mass totalizer factor
Mass totalizer offset
Volume totalizer factor
Volume totalizer offset
Mass flow
Density
Temperature
Volume flow
Mass totalizer
Volume totalizer


▶ Modbus information
Device ID
Device revision
▶ Modbus data map
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register
Scan list register


Application
Reset all totalizers
Reset overall batching quantity

(→ 39)

- ▶ **Totalizer 1 to 3** (→ 35)
  - Assign process variable (→ 36)
  - Mass unit (→ 36)
  - Volume unit (→ 36)
  - Totalizer operation mode (→ 36)
  - Control Totalizer 1 to 3 (→ 39)
  - Preset value 1 to 3 (→ 39)
  - Failure mode (→ 36)
- ▶ **Batching**
  - ▶ **Operation** (→ 38)
    - Batch control
    - Batch counter
    - Quantity last batch
    - Quantity last drip
    - Time last batch
    - Close time last batch
    - Current drip correction quantity
    - Overall batching quantity
    - Overflow number overall batch. quantity
    - Batch unit
    - Switch output function 1
    - Switch status 1



Diagnostics (→ 44)

Actual diagnostics (→ 45)

Timestamp

Actual diagnostics

Previous diagnostics (→ 45)

Timestamp

Previous diagnostics

Operating time from restart

Operating time

▶ Diagnostic list

Diagnostics 1

Diagnostics 1

Timestamp

Diagnostics 2

Diagnostics 2

Timestamp

Diagnostics 3

Diagnostics 3

Timestamp

Diagnostics 4

Diagnostics 4

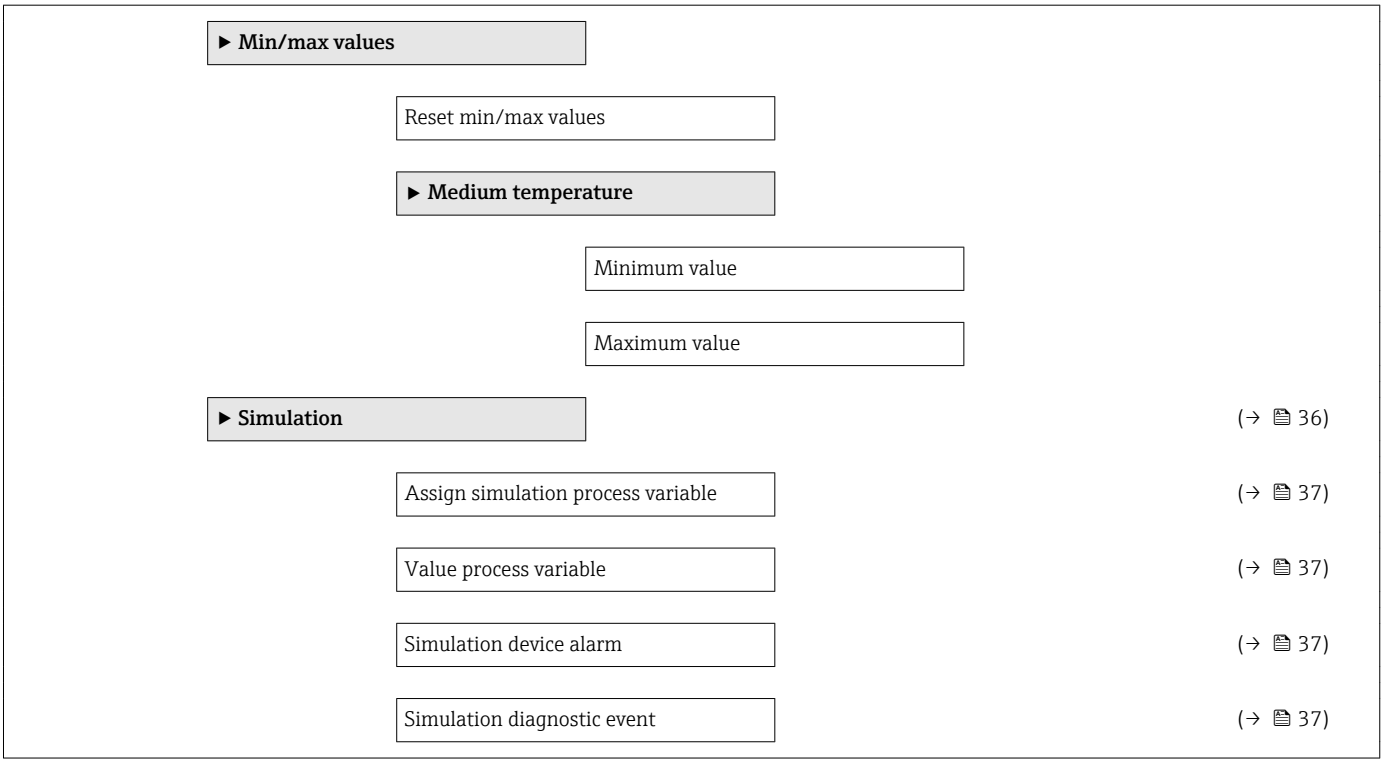
Timestamp

Diagnostics 5

Diagnostics 5

Timestamp

- ▶ **Event logbook**
  - Filter options
  - Clear event list
- ▶ **Device information** (→ 47)
  - Device tag (→ 47)
  - Serial number (→ 47)
  - Firmware version (→ 47)
  - Device name (→ 47)
  - Order code (→ 48)
  - Extended order code 1 (→ 48)
  - Extended order code 2 (→ 48)
  - Extended order code 3 (→ 48)
  - ENP version (→ 48)
  - Configuration counter
- ▶ **Sensor module**
  - Hardware revision
  - Module name
  - Serial number
- ▶ **Mainboard module**
  - Software revision
  - Build no. software
  - Hardware revision
  - Module name
  - Serial number
  - Bootloader revision


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Reset min/max values
▶ Medium temperature
Minimum value
Maximum value
▶ Simulation
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