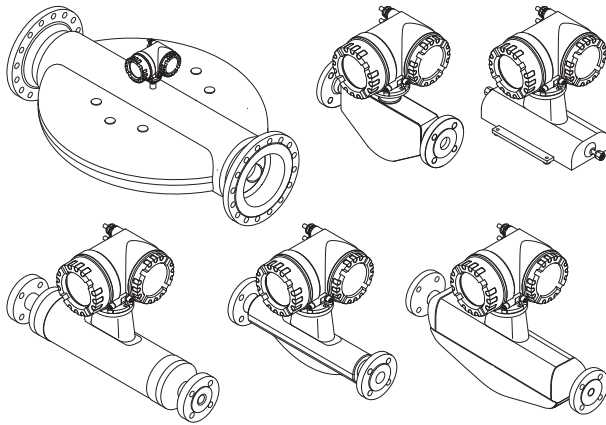


Brief Operating Instructions

Proline Promass 83

Coriolis flowmeter



These Brief Operating Instructions are not intended to replace the Operating Instructions provided in the scope of supply. Detailed information about the flowmeter is provided in the Operating Instructions and the additional documentation:

- On the CD-ROM supplied (is not included in the delivery for all device versions).
- Available for all flowmeter versions via:
 - Internet: www.endress.com/deviceviewer
 - Smartphone/tablet: Endress+Hauser Operations App

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1 Safety instructions

1.1 Designated use

The Promass 83 flowmeter consists of the following components:

- Promass 83 transmitter.
Promass A, Promass E, Promass F, Promass H, Promass I, Promass O, Promass P, Promass S or Promass X sensor.
- The flowmeter should only be used to measure the mass flow rate of liquids and gases. At the same time, the flowmeter also measures the density and fluid temperature. These parameters are then used to calculate other process variables such as volume flow.
- Any use other than that described here compromises the safety of persons and the entire measuring system and is, therefore, not permitted.
- The manufacturer is not liable for damage caused by improper or non-designated use.

1.2 Installation, commissioning and operation

- The flowmeter must only be installed, connected, commissioned and maintained by qualified and authorized specialists (e.g. electrical technicians) in full compliance with the instructions in these Brief Operating Instructions, the applicable norms, legal regulations and certificates (depending on the application).
- The specialists must have read and understood these Brief Operating Instructions and must follow the instructions they contain. If you are unclear on anything in these Brief Operating Instructions, you must read the Operating Instructions (on the CD-ROM). The Operating Instructions provide detailed information on the flowmeter.
- The flowmeter should only be installed in the pipe in a de-energized state free from outside loads or strain.
- The flowmeter may only be modified or repaired if such work is expressly permitted in the Operating Instructions (on the CD-ROM).
- Repairs may only be performed if a genuine spare parts kit is available and this repair work is expressly permitted.
- If performing welding work on the piping, the welding unit may not be grounded by means of the flowmeter.

1.3 Operational safety

- The flowmeter is designed 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. Relevant regulations and European standards have been observed.
- The manufacturer reserves the right to modify technical data without prior notice. Your Endress+Hauser distributor will supply you with current information and updates to these Operating Instructions.

- The information specified on the warning notices, nameplates and connection labels fitted on the flowmeter must be observed. These contain important data, including information on the permitted operating conditions, the application of the flowmeter and data on materials. If the flowmeter is not operated at atmospheric temperatures, compliance with the relevant basic conditions specified in the device documentation provided (on the CD-ROM) is absolutely essential.
- The flowmeter must be wired in accordance with the wiring diagrams and connection labels. Interconnecting must be permitted.
- All parts of the flowmeter must be integrated into the potential matching system of the plant.
- The cables, tested cable glands and tested dummy plugs must suit the prevailing operating conditions, e.g. the temperature range of the process. Housing openings that are not used need to be sealed with dummy plugs.
- The flowmeter can only be used in conjunction with fluids to which all the wetted parts of the flowmeter are adequately resistant. With regard to special fluids, including fluids used for cleaning, Endress+Hauser will be happy to assist in clarifying the corrosion-resistant properties of wetted materials. However, minor changes in temperature, concentration or in the degree of contamination in the process may result in variations in corrosion resistance. For this reason, Endress+Hauser does not accept any responsibility with regard to the corrosion resistance of wetted materials in a specific application. The user is responsible for the choice of suitable wetted materials in the process.
- When hot fluid passes through the measuring tube, the surface temperature of the housing increases. In the case of the sensor, in particular, users should expect temperatures that can be close to the fluid temperature. If the temperature of the fluid is high, implement sufficient measures to prevent burning or scalding.
- Hazardous areas
flowmeters for use in hazardous areas are labeled accordingly on the nameplate and accompanied by separate "Ex documentation", which is an integral part of these Operating Instructions. Relevant national regulations must be observed when operating the device in hazardous areas.
- Hygienic applications
flowmeters for hygienic applications have their own special labeling. Relevant national regulations must be observed when using these devices.
- Pressure instruments
With the identification PED/G1/III on the sensor nameplate, Endress+Hauser confirms conformity with the "Basic safety requirements" of Appendix I of the Pressure Equipment Directive 97/23/EC. Devices without this identification (without PED) are designed and manufactured according to good engineering practice.
- Endress+Hauser will be happy to assist in clarifying any questions on approvals, their application and implementation.

1.4 Safety conventions



Warning!

"Warning" indicates an action or procedure which, if not performed correctly, can result in injury or a safety hazard. Comply strictly with the instructions and proceed with care.



Caution!

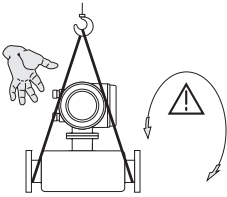
"Caution" indicates an action or procedure which, if not performed correctly, can result in incorrect operation or destruction of the device. Comply strictly with the instructions.

Note! "Note" indicates an action or procedure which, if not performed correctly, can have an indirect effect on operation or trigger an unexpected response on the part of the device.

2 Installation

2.1 Transporting to the measuring point

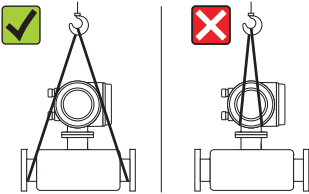
- Pack the flowmeter in such a way as to protect it reliably against impact for storage and transportation. The original packaging provides optimum protection.
- The permissible storage temperature is - 40 to + 80 °C (- 40 to + 176 °F), preferably + 20 °C (+ 68 °C).
- The flowmeter is to be protected against direct sunlight during storage in order to avoid unacceptably high surface temperatures.
- Transport the flowmeter to the measuring point in the original packaging.
- The covers or caps fitted on the process connections prevent mechanical damage to the sensors during transport and storage. For this reason, do not remove the covers or caps until immediately before installation.



A0007408

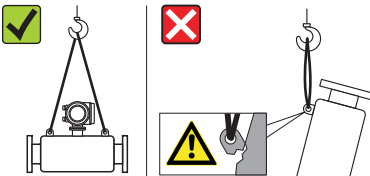
To transport the unit, use slings slung around the process connections or use lugs (if available).

Warning!
 Risk of injury! The device can slip.
 The center of gravity of the flowmeter may be higher than the holding points of the slings.
 Always ensure that the device cannot slip or turn around its axis.



A0007409

Do not lift flowmeters by the transmitter housing or the connection housing in the case of the remote version. Do not use chains as they could damage the housing.



A0007409

The assembly must always be attached to at least two lifting eyes.

2.2 Installation conditions

For mechanical reasons, and in order to protect the piping, it is advisable to support heavy sensors.

2.2.1 Dimensions

For the dimensions of the flowmeter → see associated Technical Information on the CD-ROM.

2.2.2 Mounting location

The following mounting locations are recommended:

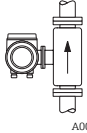
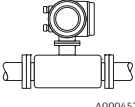
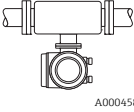

- Upstream from assemblies such as valves, T-pieces, elbows, etc.
- On the pressure side of pumps (for high system pressure)
- At the lowest point in an ascending pipe (for high system pressure)

The following mounting locations should be avoided:

- At the highest point in a pipe (risk of air accumulating)
- In an open down pipe directly upstream from a free pipe outlet. For ways of using the flowmeter in down pipes, see the related Operating Instructions on the CD-ROM.

2.2.3 Orientation

- The direction of the arrow on the nameplate of the flowmeter must match the flow direction of the fluid.
- The following table lists the possible orientations of the flowmeters:

Vertical	Horizontal	Horizontal	Horizontal
 <p>A0004572</p> <p>Transmitter at the side</p>	 <p>A0004576</p> <p>Transmitter at the top</p>	 <p>A0004580</p> <p>Transmitter at the bottom</p>	 <p>A0015445</p> <p>Transmitter at the side</p>

Promass A	Recommended	Possible (①)	Possible (①, ④)	Not suitable
Promass E	Recommended	Recommended (②)	Recommended (③, ④)	Not suitable
Promass F	Recommended	Recommended (②)	Recommended (③, ④)	Not suitable
Promass F HT* Compact version	Recommended	Not suitable	Recommended (③, ④)	Not suitable
Promass F HT* Remote version	Recommended	Possible (②)	Recommended (③, ④)	Not suitable
Promass H	Recommended	Recommended	Recommended (④)	Recommended
Promass I	Recommended	Recommended	Recommended (④)	Recommended
Promass P	Recommended	Recommended	Recommended (④)	Recommended
Promass S	Recommended	Recommended	Recommended (④)	Recommended
Promass O	Recommended	Recommended (②)	Recommended (③, ④)	Not suitable
Promass X	Recommended	Recommended	Recommended (④)	Possible

*HT = high temperature version for medium temperatures (TM) > 200 °C (392 °F)

- ① Do not install the flowmeter in such a way that is suspended without any support or securing unit.
- ② This orientation is not suitable for fluids with entrained solids.
- ③ This orientation is not suitable for outgassing fluids.
- ④ This orientation is not suitable for low fluid temperatures.

Special installation instructions for Promass A

⚠ Caution!

Risk of measuring pipe fracture if sensor installed incorrectly!

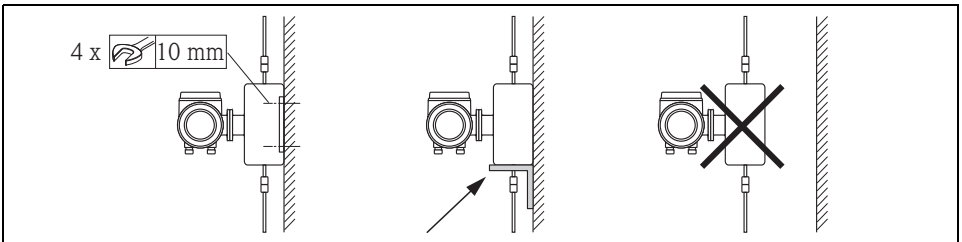
The sensor may not be installed in a pipe as a freely suspended sensor:

- Using the base plate, mount the sensor directly on the floor, the wall or the ceiling.
- Support the sensor on a firmly mounted support base (e.g. angle bracket).

Vertical

We recommend two installation versions when mounting vertically:

- Mounted directly on a wall using the base plate
- flowmeter supported on an angle bracket mounted on the wall

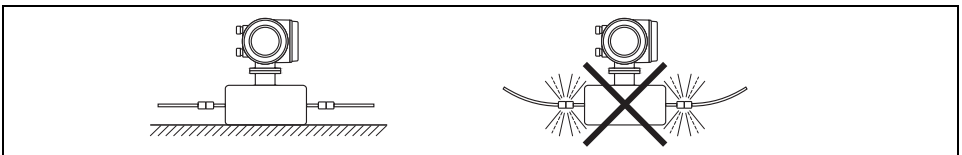


A0018980

Horizontal

We recommend the following installation version when mounting horizontally:

- flowmeter standing on a firm support base



A0018979

2.2.4 Heating

For information on the heating, please see the Operating Instructions on the CD-ROM.

2.2.5 Thermal insulation

For information on the thermal insulation, please see the Operating Instructions on the CD-ROM.

2.2.6 Inlet and outlet runs

No inlet and outlet runs are required.

2.2.7 Vibrations

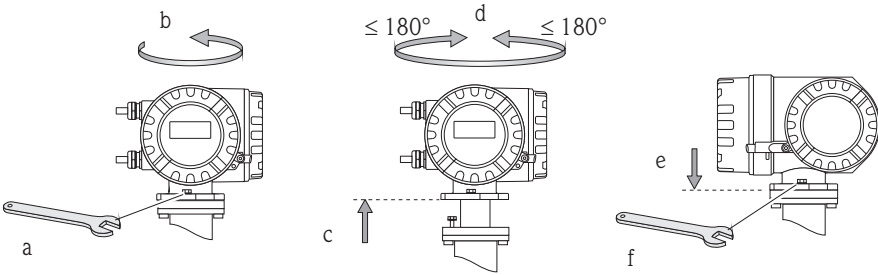
No measures are necessary.

2.3 Post-installation

2.3.1 Turning the transmitter housing

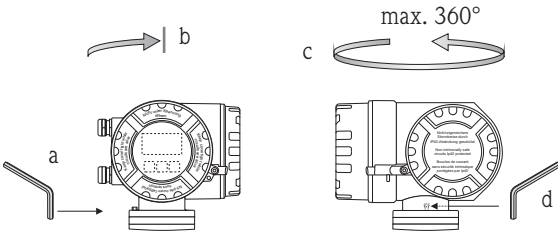
Turning the aluminum field housing

Aluminum field housing for non-Ex area



A0007540

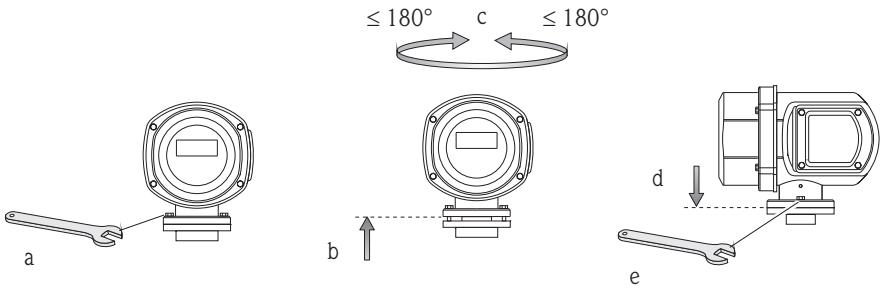
Aluminum field housing for Zone 0, Zone 1 or Class I Div. 1



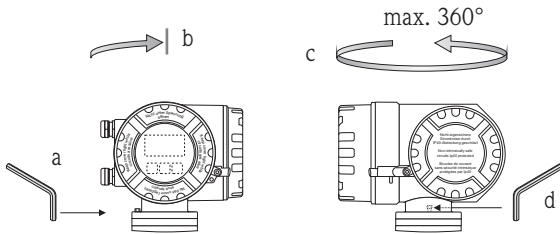
A0008036

- a. Release the setscrew.
- b. Turn the transmitter housing gently clockwise until the stop (end of the thread).
- c. Turn the transmitter counter-clockwise (max. 360°) to the desired position.
- d. Retighten the setscrew.

Turning the stainless steel field housing



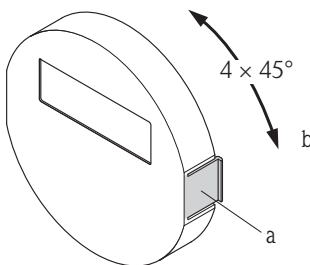
A0007661



A0008036

- a. Release the setscrew.
- b. Turn the transmitter housing gently clockwise until the stop (end of the thread).
- c. Turn the transmitter counterclockwise (max. 360°) to the desired position.
- d. Retighten the setscrew.

2.3.2 Turning the onsite display



A0007541

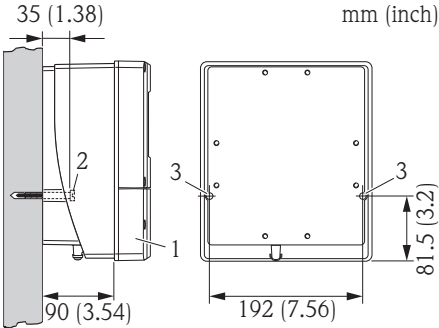
- a. Press in the side latches on the display module and remove the module from the cover plate of the electronics compartment.
- b. Turn the display to the desired position (max. 4 × 45° in both directions) and reset it onto the cover plate of the electronics compartment.

2.3.3 Installing the wall-mount housing

 Caution!

- Make sure that the ambient temperature does not exceed the permitted range.
- Always install the wall-mount housing in such a way that the cable entries point downwards.

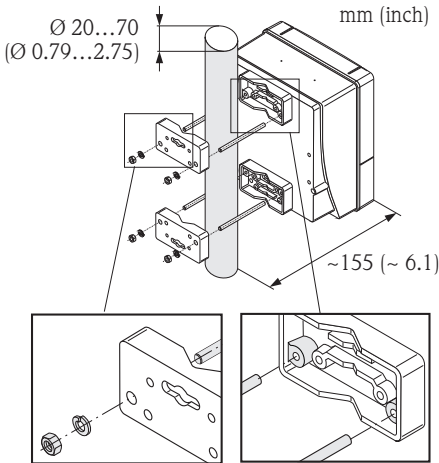
Mounted directly on the wall




1. Connection compartment
2. Securing screws M6 (max. \varnothing 6.5 mm (0.25")); screw head max. \varnothing 10.5 mm (0.4"))
3. Housing bores for securing screws

A0007542

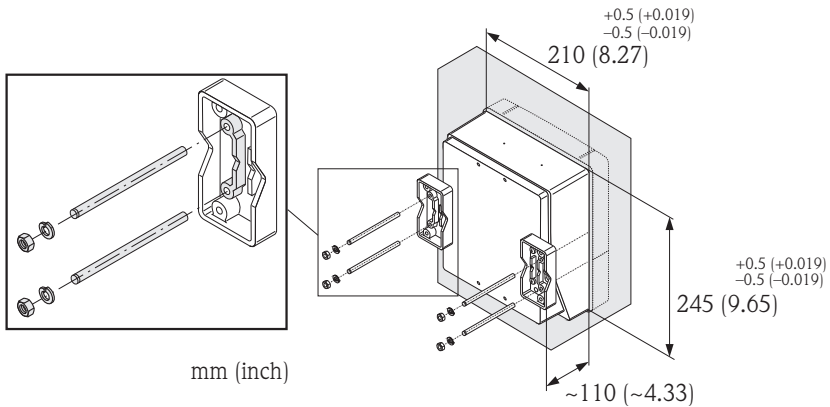
Pipe mounting



 Caution!
 Danger of overheating! If the device is mounted on a warm pipe, make sure that the housing temperature does not exceed +60 °C (+140 °F) which is the maximum temperature permitted.

A0007543

Panel mounting



A0007544

2.4 Post-installation check

- Is the flowmeter damaged (visual inspection)?
- Does the flowmeter correspond to the specifications at the measuring point?
- Is the serial number of sensor and the connected transmitter the same?
- Are the measuring point number and labeling correct (visual inspection)?
- Correct internal diameter and correct surface roughness/quality?
- Has the correct sensor orientation been selected in terms of type, fluid properties, fluid temperature?
- Does the arrow on the sensor point in the direction of the flow in the pipe?
- Is the flowmeter protected against moisture and sunlight?
- Is the flowmeter protected against overheating?

3 Wiring

Warning!

Risk of electric shock! Components carry dangerous voltages.

- Never mount or wire the flowmeter while it is connected to the power supply.
- Prior to connecting the power supply, connect the protective ground to the ground terminal on the housing.
- Route the power supply and signal cables so they are securely seated.
- Seal the cable entries and covers so they are airtight.

Caution!

Risk of damaging the electronic components!

- Connect the power supply in accordance with the connection data on the nameplate.
- Connect the signal cable in accordance with the connection data in the Operating Instructions or the Ex documentation on the CD-ROM.

In addition, for the remote version:

Caution!

Risk of damaging the electronic components!

- Only connect sensors and transmitters with the same serial number
- Observe the cable specifications of the connecting cable → Operating Instructions on the CD-ROM.

Note! Install the connecting cable securely to prevent movement.

In addition, for flowmeters with fieldbus communication:

Caution!

Risk of damaging the electronic components!

- Observe the cable specification of the fieldbus cable → Operating Instructions on the CD-ROM.
- Keep the stripped and twisted lengths of cable shield as short as possible.
- Screen and ground the signal lines → Operating Instructions on the CD-ROM.
- When using in systems without potential matching → Operating Instructions on the CD-ROM.

In addition, for Ex-certified flowmeters:

Warning!

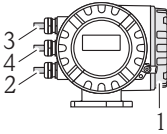
When wiring Ex-certified flowmeters, all the safety instructions, wiring diagrams, technical information, etc. of the related Ex documentation must be observed

→ Ex documentation on the CD-ROM.

3.1 Connecting the various housing types

Wire the unit using the terminal assignment diagram inside the cover.

3.1.1 Compact version

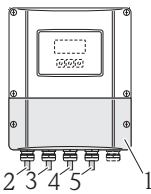


A0007545

Transmitter connection:

- 1 Connection diagram inside the connection compartment cover
- 2 Power supply cable
- 3 Signal cable or fieldbus cable
- 4 Optional

3.1.2 Remote version (transmitter): non-Ex Zone, Ex Zone 2, Class I Div. 2



A0007546

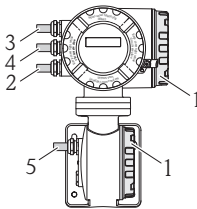
Transmitter connection:

- 1 Connection diagram inside the connection compartment cover
- 2 Power supply cable
- 3 Signal cable
- 4 Fieldbus cable

Connecting cable connection:

- 5 Sensor/transmitter connecting cable

3.1.3 Remote version (transmitter): Ex Zone 0, 1, Class I Div. 1



A0007547

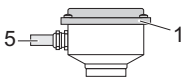
Transmitter connection:

- 1 Connection diagram inside the connection compartment cover
- 2 Power supply cable
- 3 Signal cable or fieldbus cable
- 4 Optional

Connecting cable connection:

- 5 Sensor/transmitter connecting cable

3.1.4 Remote version (sensor)



A0008037

Transmitter connection:

- 1 Connection diagram inside the connection compartment cover

Connecting cable connection:

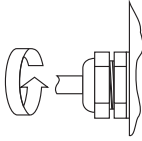
- 5 Sensor/transmitter connecting cable

3.2 Degree of protection

The devices meet all the requirements for IP 67 (NEMA 4X).

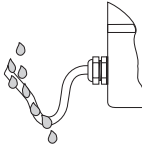
After mounting in the field or service work, the following points have to be observed to ensure that IP 67 (NEMA 4X) protection is retained:

- Install the flowmeter in such a way that the cable entries do not point upwards.
- Do not remove the seal from the cable entry.
- Remove all unused cable entries and insert blanking or certified plugs instead.
- Use cable entries and drain plugs with a long-term operating temperature range in accordance with the temperature specified on the nameplate.



A0007549

Tighten the cable entries correctly.



A0007550

The cables must loop down before they enter the cable entries ("water trap").

3.3 Post-connection check

- Are cables or the device damaged (visual inspection)?
- Does the supply voltage match the information on the nameplate?
- Do the cables used comply with the necessary specifications?
- Do the mounted cables have adequate strain relief and are they routed securely?
- Is the cable type route completely isolated? Without loops and crossovers?
- Are all screw terminals firmly tightened?
- Are all cable entries installed, firmly tightened and correctly sealed?
- Cable routed as a "water trap" in loops?
- Are all the housing covers installed and securely tightened?

In addition, for flowmeters with fieldbus communication:

- Are all the connecting components (T-boxes, junction boxes, connectors, etc.) connected with each other correctly?
- Has each fieldbus segment been terminated at both ends with a bus terminator?
- Has the max. length of the fieldbus cable been observed in accordance with the specifications?
- Has the max. length of the spurs been observed in accordance with the specifications?
- Is the fieldbus cable fully shielded and correctly grounded?

4 Hardware settings

This section only deals with the hardware settings needed for commissioning. All other settings (e.g. output configuration, write protection, etc.) are described in the associated Operating Instructions on the CD-ROM.

Note! No hardware settings are needed for flowmeters with HART or FOUNDATION Fieldbus-type communication.

4.1 Device address PROFIBUS DP/PA, Modbus RS485

Has to be set for flowmeters with the following communication methods:

- PROFIBUS DP/PA
- Modbus RS485

The device address can be configured via:


- Miniature switches → see description below
- Local operation → see section Software settings, "Device address PROFIBUS DP/PA, Modbus RS485" →  25

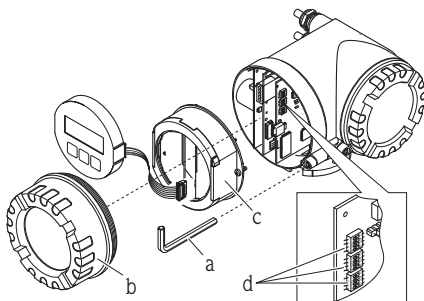
Addressing via miniature switches



Warning!

Risk of electric shock! Risk of damaging the electronic components!

- All the safety instructions for the flowmeter must be observed and all the warnings heeded →  14.
- Use a workspace, working environment and tools purposely designed for electrostatically sensitive devices.



A0007551



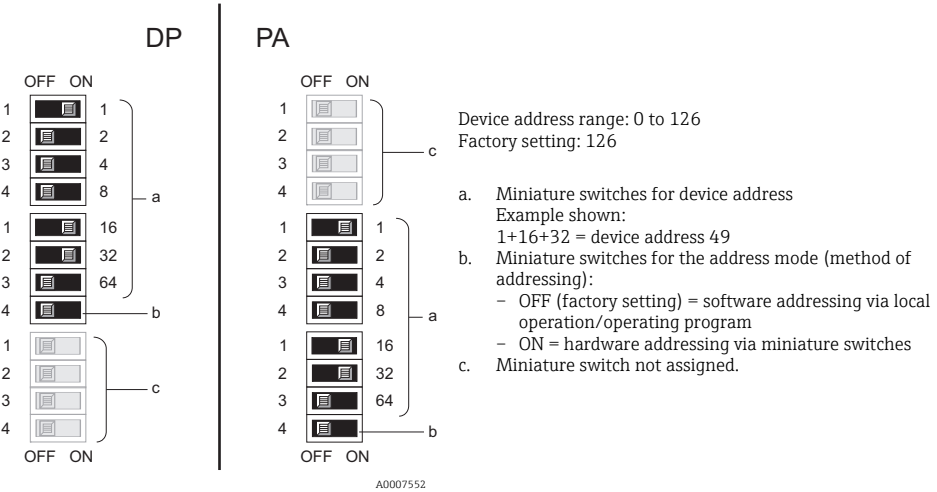
Warning!

Switch off the power supply before opening the device.

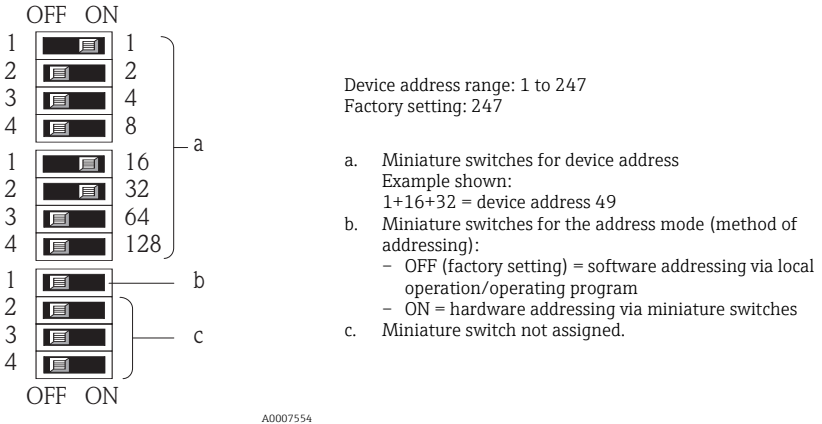
- a. Loosen the cheese head screw of the securing clamp with an Allen key (3 mm / 0.12 in)
- b. Unscrew cover of the electronics compartment from the transmitter housing.
- c. Loosen the securing screws of the display module and remove the onsite display (if present).
- d. Set the position of the miniature switches on the I/O board using a sharp pointed object.

Installation is the reverse of the removal procedure.

PROFIBUS DP/PA



Modbus RS485




4.2 Device address EtherNet/IP network


Has to be set for flowmeters with the communication method:

- EtherNet/IP


The IP address can be configured via:

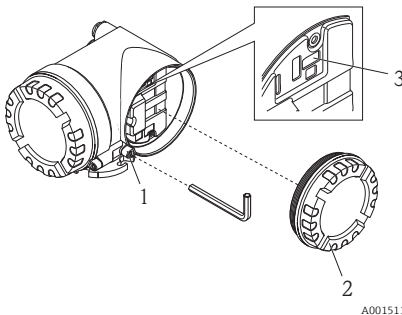
- Miniature switches → see description below
- Webserver → see section Software settings, "Device address EtherNet/IP network" →  26

Addressing via miniature switches

 **Warning!**

Risk of electric shock! Risk of damaging the electronic components!

- All the safety instructions for the flowmeter must be observed and all the warnings heeded →  14.
- Use a workspace, working environment and tools purposely designed for electrostatically sensitive devices.



- Loosen the cheese head screw of the securing clamp (1) with an Allen key (3 mm / 0.12 in).
- Unscrew cover of the electronics compartment (2) from the transmitter housing.
- Set the position of the miniature switches (3) on the I/O board using a sharp pointed object.

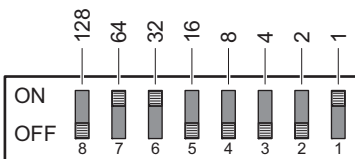
Installation is the reverse of the removal procedure.

IP address range: 0 to 254

Default setting: 192.168.212.212 (all miniature switches = OFF)


Example shown:

64+32+1 = IP address 192.168.212.97



Activation hardware addressing:

After 10 seconds the hardware addressing with the defined IP address is activated.

Note! Deactivation hardware addressing and activation software addressing (→  26): Switch all the DIP switches for hardware addressing to OFF.

4.3 Terminating resistors

Note! If the flowmeter is used at the end of a bus segment, termination is required.

This can be performed in the flowmeter by setting the terminating resistors on the I/O board. Generally, however, it is recommended to use an external bus terminator and not perform termination at the flowmeter itself.

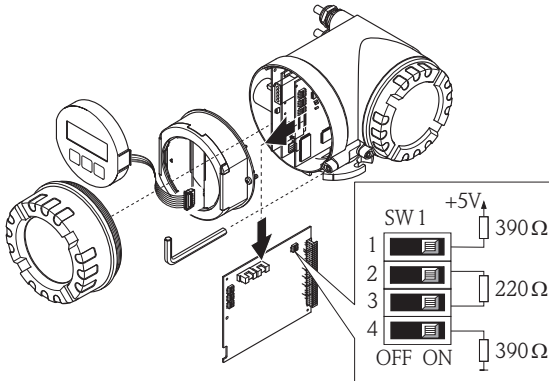
Has to be set for flowmeters with the following communication methods:

- PROFIBUS DP
 - Baudrate ≤ 1.5 MBaud \rightarrow Termination can be performed at the flowmeter, see graphic
 - Baudrate > 1.5 MBaud \rightarrow An external bus terminator must be used
- Modbus RS485 \rightarrow Termination can be performed at the flowmeter, see graphic

Warning!

Risk of electric shock! Risk of damaging the electronic components!

- All the safety instructions for the flowmeter must be observed and all the warnings heeded \rightarrow 14.
- Use a workspace, working environment and tools purposely designed for electrostatically sensitive devices.



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Setting the terminating switch SW1 on the I/O board:
ON - ON - ON - ON

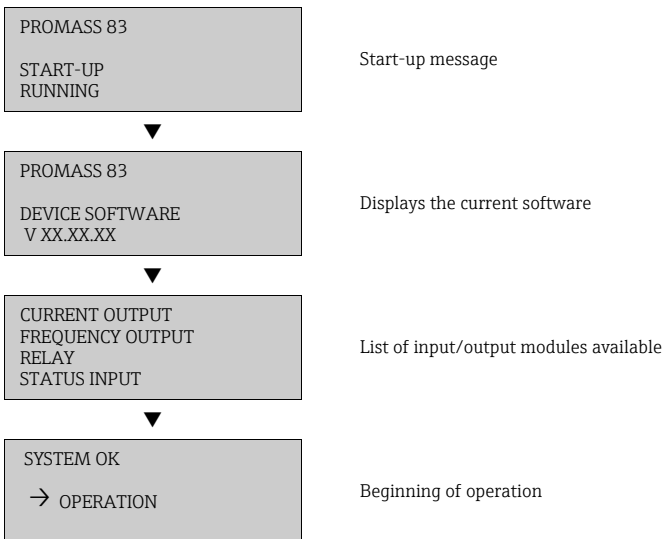
5 Commissioning

5.1 Switching on the flowmeter

On completion of the installation (successful post-installation check), wiring (successful post-connection check) and after making the necessary hardware settings, where applicable, the permitted power supply (see nameplate) can be switched on for the flowmeter.


When the power supply is switched on, the flowmeter performs a number of power-up checks and device self-checks. As this procedure progresses the following messages can appear on the onsite display:

Display examples:



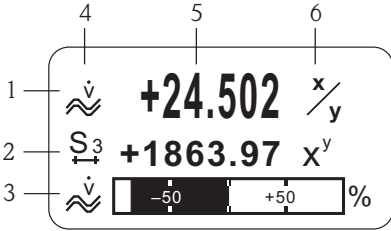
The flowmeter starts operating as soon as the startup procedure is complete. Various measured values and/or status variables appear on the display.

Note! If an error occurs during startup, this is indicated by an error message.

The error messages that occur most frequently when a flowmeter is commissioned are described in the Troubleshooting section →  28.

5.2 Operation

5.2.1 Display elements

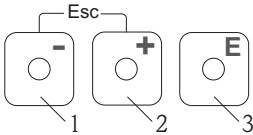


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Display lines/fields

1. Main line for primary measured values
2. Additional line for additional measured variables/status variables
3. Information line for bar graph display for example
4. Info icons, e.g. volume flow
5. Current measured values
6. Engineering units/time units

5.2.2 Operating elements



A0007559

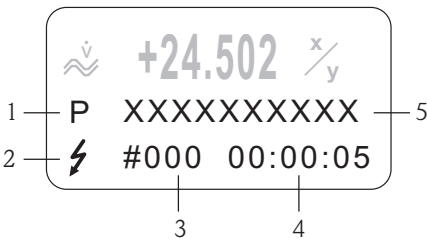
Operating keys

1. (-) Minus key for entering, selecting
2. (+) Plus key for entering, selecting
3. Enter key for calling the function matrix, saving

When the +/- keys are pressed simultaneously (Esc):

- Exit the function matrix step-by-step:
- > 3 sec. = cancel data input and return to the measured value display

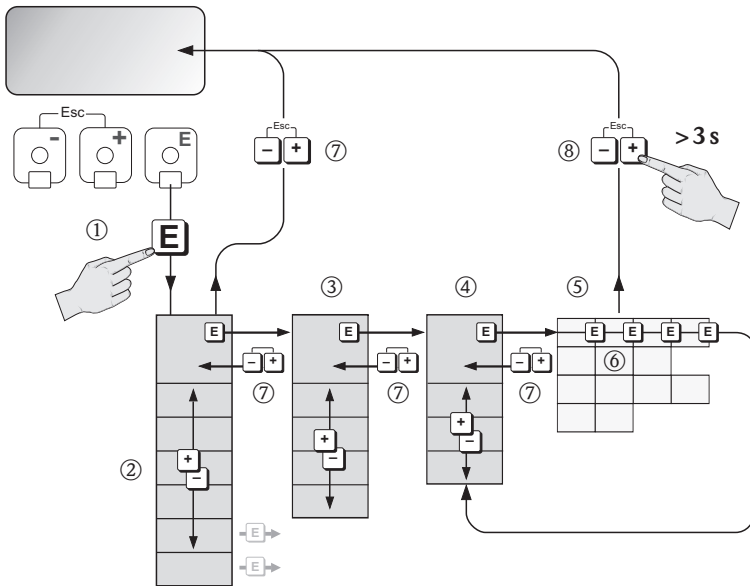
5.2.3 Displaying error messages



A0007664

1. Type of error:
P = Process error, S = System error
 2. Error message type:
⚡ = Fault message, ! = Notice message
 3. Error number
 4. Duration of the last error that occurred:
Hours: Minutes: Seconds
 5. Error designation
- List of the most common error messages during commissioning → 28
 - List of all error messages, see associated Operating Instructions on the CD-ROM

5.3 Navigating within the function matrix



A0007665

1. → Enter the function matrix (starting with measured value display)
2. → Select the Block (e.g. USER INTERFACE)
 → Confirm selection
3. → Select the group (e.g. CONTROL)
 → Confirm selection
4. → Select the function group (e.g. BASIC CONFIGURATION)
 → Confirm selection
5. → Select function (e.g. LANGUAGE)
6. → Enter code **83** (only for the first time you access the function matrix)
 → Confirm entry
7. → Change function/selection (e.g. ENGLISH)
 → Confirm selection
7. → Return to measured value display step by step
8. > 3 s → Return immediately to measured value display

5.4 Calling the Commissioning Quick Setup

All the functions needed for commissioning are called up automatically with the Quick Setup. The functions can be changed and adapted to the process in question.

1. → Enter the function matrix (starting with measured value display)
2. → Select the group QUICK SETUP
 - Confirm selection
3. QUICK SETUP COMMISSIONING function appears.
4. Intermediate step if configuration is blocked:
 - Enter the code **83** (confirm with) and thus enable configuration
5. → Go to Commissioning Quick Setup
6. → Select YES
 - Confirm selection
7. → Start Commissioning Quick Setup
8. Configure the individual functions/settings:
 - Via -key, select option or enter number
 - Via -key, confirm entry and go to next function
 - Via -key, return to Setup Commissioning function (settings already made are retained)

Note! Observe the following when performing the Quick Setup:

- Configuration selection: Select the ACTUAL SETTING option
- Unit selection: This is not offered again for selection after configuring a unit
- Output selection: This is not offered again for selection after configuring an output
- Automatic configuration of the display: select YES
 - Main line = Mass flow
 - Additional line = Totalizer 1
 - Information line = Operating/system conditions
- If asked whether additional Quick Setups should be executed: select NO

All the available functions of the flowmeter and their configuration options as well as additional Quick Setups, if available, are described in detail in the "Description of Device Functions" Operating Instructions. The related Operating Instructions can be found on the CD-ROM.

The flowmeter is ready for operation on completion of the Quick Setup.


5.5 Software settings

5.5.1 Device address PROFIBUS DP/PA, Modbus RS485

Has to be set for flowmeterflowmeters with the following communication methods:














- PROFIBUS DP
Device address range 0 to 126, factory setting 126
- Modbus RS485
Device address range 1 to 247, factory setting 247

The device address can be configured via:

- Miniature switches → see section Hardware settings, "Device address PROFIBUS DP/PA, Modbus RS485" →  17
- Local operation → see description below

Note! The COMMISSIONING SETUP must be executed before setting the device address.

Calling the Communication Quick Setup

1.  → Enter the function matrix (starting with measured value display)
2.  → Select the group QUICK SETUP
 → Confirm selection
3.  → Select the QUICK SETUP COMMUNICATION function
4. Intermediate step if configuration is blocked:
 → Enter the code **83** (confirm with ) and thus enable configuration
5.  → Go to Communication Quick Setup
6.  → Select YES
 → Confirm selection
7.  → Start Communication Quick Setup
8. Configure the individual functions/settings:
 - Via -key, select option or enter number
 - Via -key, confirm entry and go to next function
 - Via -key, return to Setup Commissioning function (settings already made are retained)

All the available functions of the flowmeter and their configuration options as well as additional Quick Setups, if available, are described in detail in the "Description of Device Functions" Operating Instructions. The related Operating Instructions can be found on the CD-ROM.


The flowmeter is ready for operation on completion of the Quick Setup.

5.5.2 Device address EtherNet/IP network

Has to be set for flowmeters with the communication method:

- EtherNet/IP


The device address can be configured via:

- Miniature switches → see section Hardware settings,
"Device address EtherNet/IP network" →  19
- Webserver → see description below

Software addressing is performed in the "Network Configuration" menu of the Webserver. Both the IP address for the EtherNet/IP network and the IP address for the Webserver can be configured. The flowmeter has the following default addresses when delivered:

	EtherNet/IP network	Webserver
IP address	192.168.212.212	192.168.212.213
Netmask	255.255.255.0	255.255.255.0
Gateway	192.168.212.212	192.168.212.213

Addresses in the range from 0 to 254 are permitted (the address 255 is reserved for the broadcast address).

Note! ■ Software addressing is disabled if hardware addressing is activated →  17.

- When changing from software addressing to hardware addressing, the first nine digits (first three octets) that were configured using software addressing, remain unchanged.
- A reset of the software addressing to the default setting is possible → see SD00138D.


DHCP client

If a DHCP server is used within the EtherNet/IP network, the IP address, gateway and subnet mask are set automatically when the DHCP client function of the Webserver is enabled. The MAC address of the flowmeter is used for identification purposes.

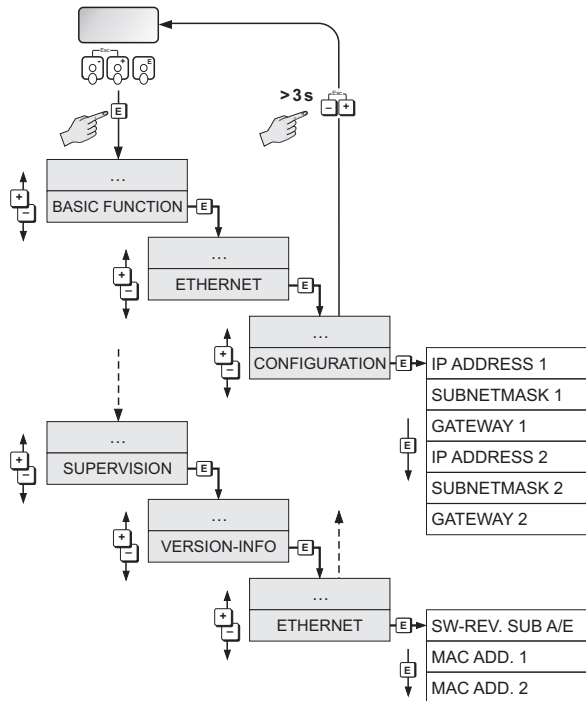
The DHCP client function is enabled in the "Network Configuration" menu.

The flowmeter has the following DHCP default settings when delivered:

	EtherNet/IP network	Webserver
DHCP	Yes (enabled)	No (disabled)

Note! The DHCP client function is disabled if hardware addressing is enabled →  19.

Displaying the address configurations via the local display



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The individual addressing parameters are assigned as follows:

Parameter	Assignment
IP ADDRESS 1	EtherNet/IP network
SUBNETMASK 1	
GATEWAY 1	
MAC ADD. 1	
IP ADDRESS 2	Webserver
SUBNETMASK 2	
GATEWAY 2	
MAC ADD. 2	

5.6 Troubleshooting

The error messages that can occur most frequently when a flowmeter is commissioned are described here.

A complete description of all the error messages → Operating Instructions on the CD-ROM.

General

Note! The output signals (e.g. pulse, frequency) of the flowmeter must correspond to the higher-order controller.

HART

No.	Error message / Type	Cause/remedy
351 to 354	System error message (S)/ Notice message (!) CURRENT SPAN n # 351 to 354	Current output The current flow is outside the set range. 1. Change the upper range or lower range values entered 2. Increase or reduce flow, as applicable
701	Process error message (P)/ Notice message (!) EXC. CURR. LIM # 701	The maximum current value for the measuring tube exciter coils has been reached since certain fluid characteristics, e.g. high gas or solid content, are in the limit range. The device continues to work correctly. In particular with outgassing fluids and/or increased gas content, the following measures are recommended to increase system pressure: 1. Install the flowmeter downstream of a pump 2. Mount the device at the lowest point in an ascending pipeline 3. Install a valve or an orifice plate downstream from the flowmeter

FOUNDATION Fieldbus

No.	Error messages: FOUNDATION Fieldbus (FF)* (onsite display)	Analog Input function block Error messages	Cause/remedy
701	Device status message (FF): Current of the measuring tube too high – Err. No. 701 Onsite display: P: EXC. CURR. LIM !: # 701	OUT. QUALITY = UNCERTAIN OUT. SUBSTATUS = Non-specific	See HART table

PROFIBUS

No.	Device status message (onsite display)	PROFIBUS measured value status	Extended diagnostic message in the PROFIBUS master	Cause/remedy
351 to 354	System error mess. (S)/ notice message (!) CURRENT SPAN n # 351 to 354	<ul style="list-style-type: none"> ▪ Quality Code (HEX), measured value status: 0x54; 0x55; 0x56 ▪ Quality status: UNCERTAIN ▪ Quality substatus: Engineering unit range violation ▪ Limits: O.K.; Low; High 	Flow is out of range	See HART table
701	Process error mess. (P)/ Notice message (!) EXC. CURR. LIM # 701	<ul style="list-style-type: none"> ▪ Quality Code (HEX), measured value status: 0x40; 0x41; 0x42 ▪ Quality status: UNCERTAIN ▪ Quality substatus: Non-specific ▪ Limits: O.K.; Low; High 	Excitation too high	See HART table

Modbus RS485

Register 6859 Data type: Integer	Register 6821 Data type: String (18 byte)	No.	Error message / Type	Cause/remedy
39 to 42	RANGE CUR. OUT n	351 to 354	System error message (S)/ Notice message (!) CURRENT SPAN n # 351 to 354	See HART table
112	EXC. CURR. LIM	701	Process error mess. (P)/ Notice message (!) EXC. CURR. LIM # 701	See HART table

Process errors without messages

Symptoms	Rectification
<p>Comment: You may have to change or correct certain settings of the function matrix in order to rectify faults. The functions outlined below, such as DISPLAY DAMPING, for example, are described in detail in the "Description of Device Functions" manual.</p>	

Symptoms	Rectification
Measured value reading fluctuates even though flow is steady.	<ol style="list-style-type: none"> 1. Check the fluid for presence of gas bubbles. 2. TIME CONSTANT function → increase value (→ OUTPUTS / CURRENT OUTPUT / CONFIGURATION) 3. DISPLAY DAMPING function → increase value (→ USER INTERFACE / CONTROL / BASIC CONFIGURATION)
Flow values are negative, even though the fluid is flowing forwards through the pipe.	Change the INSTALLATION DIR. SENSOR function accordingly
Measured-value reading or measured-value output pulsates or fluctuates, e.g. because of reciprocating pump, peristaltic pump, diaphragm pump or pump with similar delivery characteristic.	<p>Run the "Pulsating Flow" Quick Setup.</p> <p>If the problem persists despite these measures, a pulsation damper will have to be installed between pump and measuring device.</p>
There are differences between the flowmeter's internal totalizer and the external metering device.	<p>This symptom is due primarily to backflow in the piping, because the pulse output cannot subtract in the "STANDARD" or "SYMMETRY" measuring modes.</p> <p>The problem can be solved as follows: Allow for flow in both directions. Set the MEASURING MODE function to "Pulsating Flow" for the pulse output in question.</p>
Measured value reading shown on display, even though the fluid is at a standstill and the measuring tube is full.	<ol style="list-style-type: none"> 1. Check the fluid for presence of gas bubbles. 2. Activate the ON-VAL. LF-CUTOFF function, i.e. enter or increase the value for the low flow cut off (→ BASIC FUNCTION / PROCESS PARAMETER / CONFIGURATION).
<p>The error cannot be eliminated or another error pattern is present.</p> <p>In instances of this nature, contact your E+H service organization.</p>	<p>The following solutions are possible:</p> <p>Request the services of an Endress+Hauser service technician If you request the services of a service technician, please be ready with the following information:</p> <ul style="list-style-type: none"> – Brief error description – Nameplate specifications: order code and serial number. <p>Return the devices to Endress+Hauser Procedures must be carried out before you return a flowmeter to Endress+Hauser for repair or calibration. Always enclose a duly completed "Declaration of contamination" form with the flowmeter. You will find a master copy of the Dangerous Goods Sheet at the back of these Operating Instructions.</p> <p>Replace the transmitter electronics Parts of the measuring electronics defective → order spare part</p>

6 Maintenance

No special maintenance work is required.

6.1 Exterior cleaning

When cleaning the exterior of the flowmeter, always use non-aggressive cleaning agents that do not damage surface of the housing and the seals.

6.2 Cleaning with pigs (Promass H, I, S, P)

If pigs are used for cleaning, it is essential to take the inside diameters of the measuring tube and process connection into account, see Technical Information.

6.3 Replacing seals

Under normal circumstances, fluid wetted seals of the Promass A sensors do not require replacement. Replacement is necessary only in special circumstances, for example if aggressive or corrosive fluids are incompatible with the seal material.

Note!

- The period between changes depends on the fluid properties and on the frequency of the cleaning cycles in the case of CIP/SIP cleaning.
- Replacement seals (accessories)

www.addresses.endress.com
