



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services

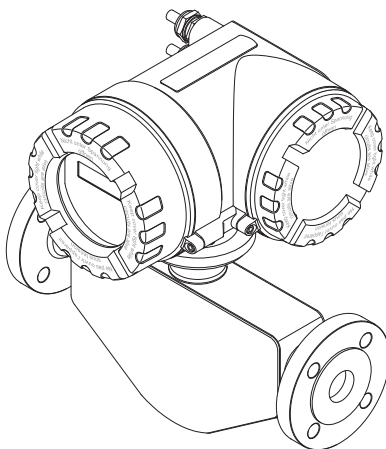


Solutions

## Brief Operating Instructions

# Proline Promass 40

## Coriolis mass flow measuring system



These Brief Operating Instructions are not intended to replace the Operating Instructions provided in the scope of supply. Detailed information is provided in the Operating Instructions and the additional documentation on the CD-ROM supplied.

The complete device documentation consists of:

- These Brief Operating Instructions
- Depending on the device version:
  - Operating Instructions and the Description of Device Functions
  - Approvals and safety certificates
  - Special safety instructions in accordance with the approvals for the device (e.g. explosion protection, Pressure Equipment Directive, etc.)
  - Additional device-specific information

---

## Table of contents

<b>1 Safety instructions</b> .....	<b>3</b>
1.1 Designated use .....	3
1.2 Installation, commissioning and operation .....	3
1.3 Operational safety .....	3
1.4 Safety conventions .....	4
<b>2 Installation</b> .....	<b>5</b>
2.1 Transporting to the measuring point .....	5
2.2 Installation conditions .....	5
2.3 Post-installation .....	7
2.4 Post-installation check .....	8
<b>3 Wiring</b> .....	<b>9</b>
3.1 Connection .....	10
3.2 Degree of protection .....	10
3.3 Post-connection check .....	11
<b>4 Commissioning</b> .....	<b>12</b>
4.1 Switching on the measuring device .....	12
4.2 Operation .....	13
4.3 Troubleshooting .....	15

# 1 Safety instructions

## 1.1 Designated use

- The measuring device described in these Operating Instructions must only be used for measuring the mass flow or the volume flow of liquids and gases. Fluids with the most diverse properties can be measured, such as additives, oils, grease, acids, alkalis, lacquers, paints, dyes, suspensions and gases.
- 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 measuring device 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 measuring device.
- The measuring device may only be installed in the piping when in a de-energized state and free from external influences.
- Changes may only be made to the measuring device if this 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 measuring device.

## 1.3 Operational safety

- The measuring device 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.
- Information provided on nameplates and connection plates which are affixed to the measuring device must be observed and warnings must also be heeded. They contain important information about the permitted operating conditions, the application of the measuring device, material specifications etc.  
If the measuring device is not used at atmospheric temperatures, the relevant conditions, in accordance with the device documentation supplied (on CD-ROM), must be strictly adhered to.
- The measuring device must be wired as per the wiring diagrams and connection plates. Interconnection must be permitted.

- All parts of the measuring device must be included in the potential matching of the system.
- Cables, tested cable glands and tested dummy plugs must be suitable for the prevailing operating conditions, e.g. temperature range of the process. Housing openings which have not been used must be sealed with dummy plugs.
- The measuring device must only be used with fluids, against which all wetted parts of the measuring device are sufficiently 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. A sensor version which allows the sensor housing be monitored should be used for critical fluids.

- Hazardous areas: Measuring devices for use in hazardous areas are labeled accordingly on the nameplate. Relevant national regulations must be observed when operating the device in hazardous areas.
- Hygienic applications: Measuring devices for hygienic applications have their own special labeling. Relevant national regulations must be observed when using these devices.
- Pressure instruments: Measuring devices for use in systems that need to be monitored are labeled accordingly on the nameplate. Relevant national regulations must be observed when using these devices. The documentation on the CD-ROM for pressure instruments in systems that need to be monitored is an integral part of the entire device documentation. The installation regulations, connection data and safety instructions provided in the Ex documentation must be observed.
- 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.



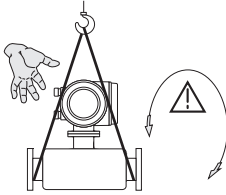
### Note!

"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

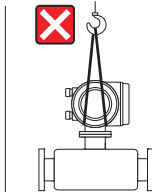
- Transport the measuring device to the measuring point in the original packaging.
- The covers or caps fitted on the process connections prevent mechanical damage to the sensors during transport and storage. For this reason, do not remove the covers or caps until immediately before installation.



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 measuring device may be higher than the holding points of the slings. Always ensure that the device cannot slip or turn around its axis.

A0007408



Do not lift measuring devices by the transmitter housing. Do not use chains as they could damage the housing.

A0007409

### 2.2 Installation conditions

#### 2.2.1 Dimensions

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

#### 2.2.2 Mounting location

The following mounting locations are recommended:

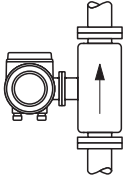
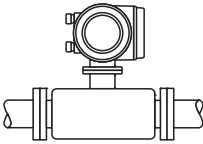
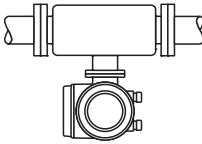
- Upstream from assemblies such as valves, T-pieces, elbows, etc.
- On the pressure side of pumps (for high system pressure)
- At the lowest point in an ascending pipe (for high system pressure)

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 measuring device 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 measuring device must match the flow direction of the fluid.
- The following table lists the possible orientations of the measuring devices:

	Vertical	Horizontal	Horizontal
	 <p style="text-align: center;">A0004572</p> <p style="text-align: center;">Transmitter at the side</p>	 <p style="text-align: center;">A0004576</p> <p style="text-align: center;">Transmitter at the top</p>	 <p style="text-align: center;">A0004576</p> <p style="text-align: center;">Transmitter at the bottom</p>
Promass E	Recommended	Recommended  This orientation is, however, <b>not suitable</b> for fluids with entrained solids.	Recommended  This orientation is, however, <b>not suitable</b> : <ul style="list-style-type: none"> <li>■ for outgassing fluids</li> <li>■ for low fluid temperatures.</li> </ul>

### 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

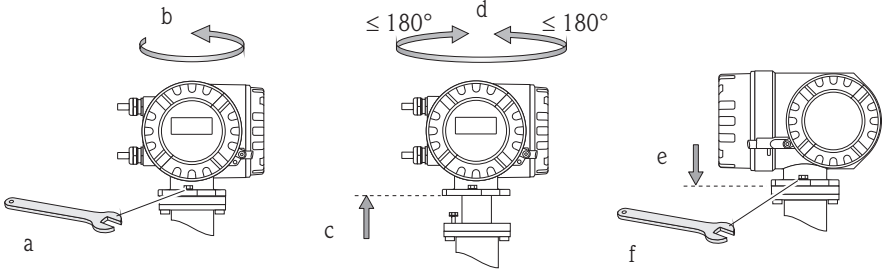
No measures are necessary.

### 2.3 Post-installation

#### 2.3.1 Turning the transmitter housing

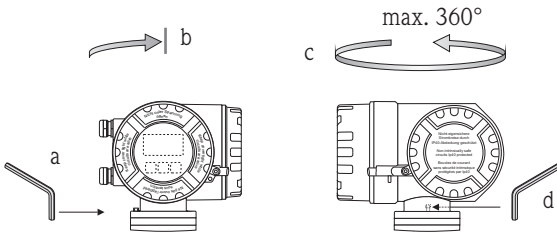
##### Turning the aluminum field housing

Aluminum field housing for non-Ex area



A0007540

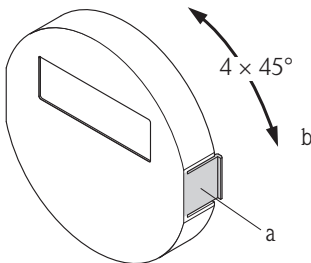
Aluminum field housing for Zone 1 or Class I Div. 1



A0008036

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

#### 2.3.2 Turning the onsite display



- 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 x 45° in both directions) and reset it onto the cover plate of the electronics compartment.

A0007541

## 2.4 Post-installation check

- Is the measuring device damaged (visual inspection)?
- Does the measuring device correspond to the specifications at the measuring point?
- 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 measuring device protected against moisture and sunlight?
- Is the measuring device protected against overheating?



### 3 Wiring



#### Warning!

Risk of electric shock! Components carry dangerous voltages.

- Never mount or wire the measuring device 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 Ex-certified measuring devices:**



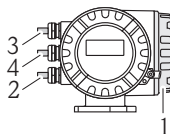
#### Warning!

When wiring Ex-certified measuring devices, 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 Connection

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   |

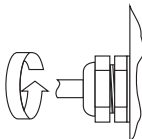
## 3.2 Degree of protection

The devices meet all the requirements for IP 67.

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

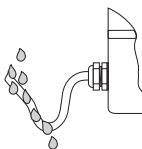
- Install the measuring device in such a way that the cable entries do not point upwards.
- Do not remove the seal from the cable entry.
- Remove all unused cable entries and plug them with suitable drain plugs.

Tighten the cable entries correctly.



A0007549

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



A0007550

### 3.3 Post-connection check

- Are cables or the device damaged (visual inspection)?
- Does the supply voltage match the specifications on the nameplate?
- Are the power supply and signal cables correctly connected?
- 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 correctly tightened?
- Are all the cable entries installed, correctly tightened and properly sealed?
- Cable routed as a “water trap” in loops?
- Are all housing covers installed and correctly tightened?

## 4 Commissioning

### 4.1 Switching on the measuring device

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 measuring device.

When the power supply is switched on, the measuring device 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:

**PROMASS 40**  
**STARTING...**

Start-up message

 (i)

**DEVICE SOFTWARE**  
**V XX.XX.XX**

Displays the current software

 (i)

**SYSTEM OK**  
**→ OPERATION**

Beginning of operation

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



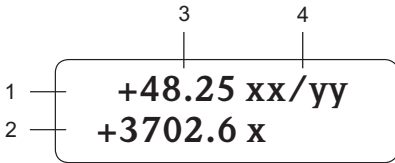
Note!

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

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

## 4.2 Operation

### 4.2.1 Display elements

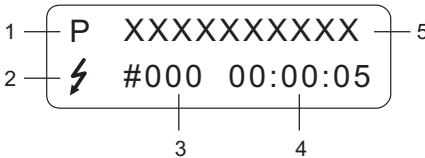


A0007557

Display lines/fields

1. Main line for primary measured values
2. Additional line for additional measured variables/status variables
3. Current measured values
4. Engineering units/time units

### 4.2.2 Displaying error messages



A0007561

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, see Seite 15
  - List of all error messages, see associated Operating Instructions on the CD-ROM

### 4.2.3 Operation using the HART protocol

The measuring device can be configured using the HART protocol and measured values can be queried.

Digital communication takes place here by means of the 4–20 mA HART current output.

For configuration and diagnosis purposes, the HART protocol enables the transmission of measured data and device data between the HART master and the related field device. HART masters, such as the handheld terminal or PC-based operating programs (e.g. FieldCare), require device description files (DD). Using device description files, it is possible to access all the information in a HART device.

Such information is solely transmitted using "commands". There are three different types of commands:

- **Universal commands**  
Supported and used by all HART devices.  
This includes the following functions for example:
  - Recognizing HART devices
  - Reading digital measured values (mass flow, totalizer, etc.)
- **Common practice commands**  
Provide functions which can be supported or executed by many, but not all, field devices.
- **Device-specific commands**  
These commands permit access to device-specific functions which are not standard for HART. Such commands access individual field device information such as calibration values, settings for low flow cut off etc.



Note!

The measuring device has all three command categories. A list of all the "universal commands" and "common practice commands" supported can be found in the related Operating Instructions on the CD-ROM.

### 4.2.4 Operating options

#### **HART Communicator DXR 375**

In the case of the HART Communicator, the device functions can be selected using different menus and also with help of a special HART function matrix. More detailed information on the HART handheld terminal can be found in the related Operating Instructions, which are located in the carrying case of the device.

#### **FieldCare operating program**

FieldCare is Endress+Hauser's FDT-based plant asset management tool that facilitates the configuration and diagnosis of intelligent field devices. By using the status information, you also have a simple yet effective tool for monitoring devices. The Proline flow measuring devices can be accessed via a service interface or the FXA193 service interface.

**SIMATIC PDM (Siemens) operating program**

SIMATIC PDM is a standard manufacturer-independent tool for the operation, configuration, maintenance and diagnosis of intelligent field devices.

**AMS (Emerson Process Management) operating program**

AMS (Asset Management Solutions) operating program: program for the operation and configuration of devices.

**4.3 Troubleshooting**

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



Note!

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

[www.endress.com/worldwide](http://www.endress.com/worldwide)

---

**Endress+Hauser**   
People for Process Automation

---