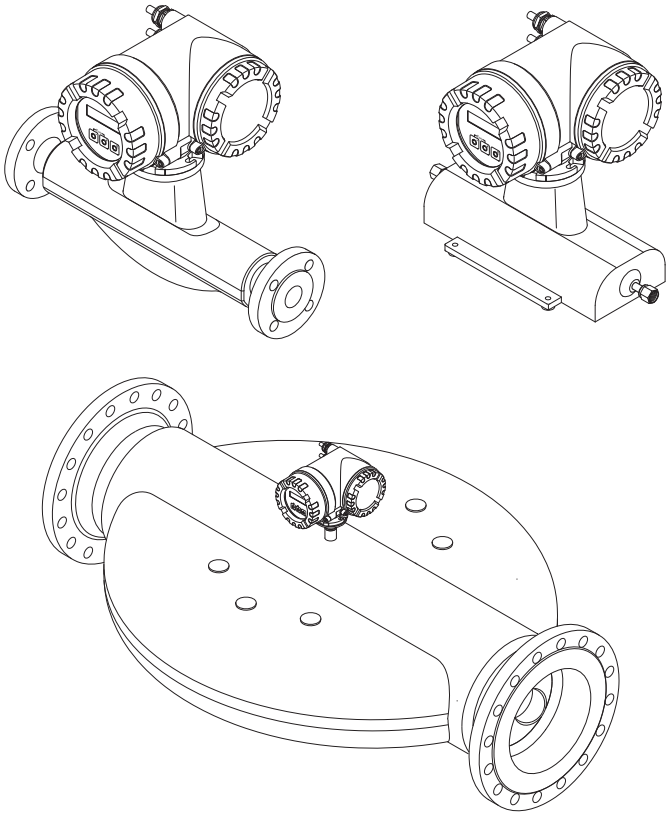
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Commissioning Instructions for PTB gas approval

DE-08-MI002-PTB007

Proline Promass 84

Coriolis gas meter for applications subject to legal metrological control



SD00128D/06/EN/13.11
71144260

Valid as of version
HART: V 3.01.XX (device software)
Modbus: V 3.06.XX (device software)

Endress+Hauser

People for Process Automation

Table of contents

1 General information

1.1 How to use this document

1.1.1 Intended use

This document is designed to help you with the preparations needed to place the Promass 84 Coriolis gas meter on the market and to put it into use.

1.1.2 Target audience

This document is aimed solely at those who are authorized to place this gas meter on the market and to carry out a re-verification. The gas meter has been approved in accordance with the Measuring Instruments Directive.

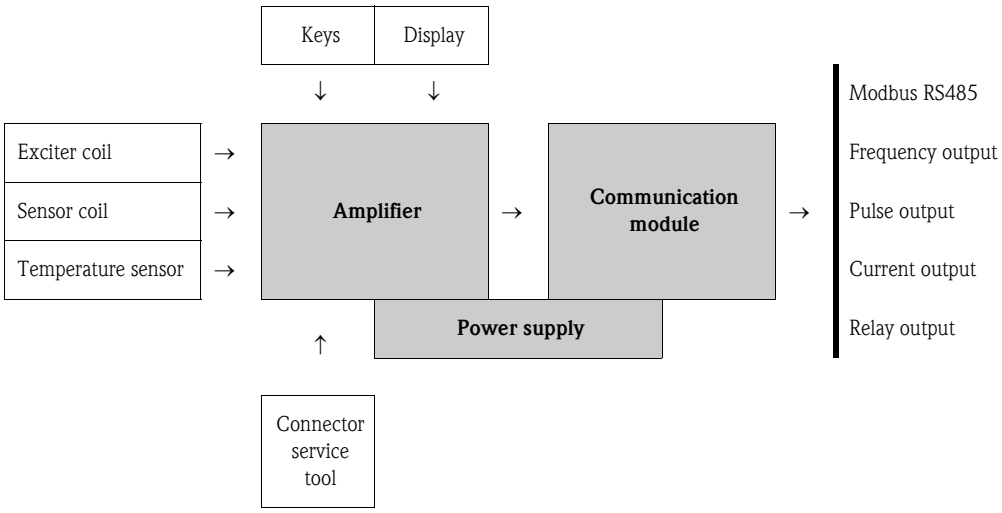
1.1.3 Additional documentation

This document supplements the following documentation:

- for the Proline Promass 84 HART measuring device:
  – BA00109D Operating Instructions
  – BA00110D Description of Device Functions
- for the Proline Promass 84 Modbus RS485 measuring device:
  – BA00129D Operating Instructions
  – BA00130D Description of Device Functions

1.2 Components of the measuring system

1.2.1 System design



The electronics basically consist of a bus printed circuit board, which connects the power unit to the amplifier and the communication module. The sensor/exciting circuits, HistoROM/S-DAT, HistoROM/T-DAT as well as the user interface/operating module are plugged into the amplifier.

2 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.

For an overview of the scope of the Technical Documentation provided, refer to the following:
- The chapters "Additional documentation" → 4
- Der *W@M Device Viewer*: Enter the serial number from the nameplate (www.endress.com/deviceviewer)

Reorder
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. 8E2B50-ABCDE+).

2.1 Device designation and versions

The "Promass 84" Coriolis gas meter consists of the following parts:

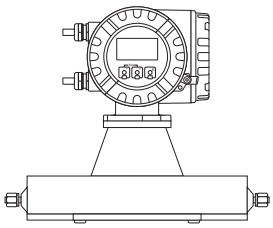
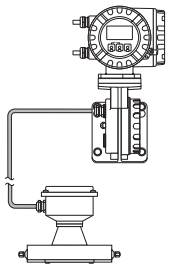
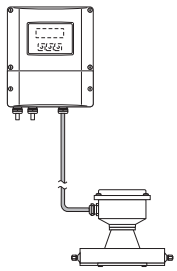
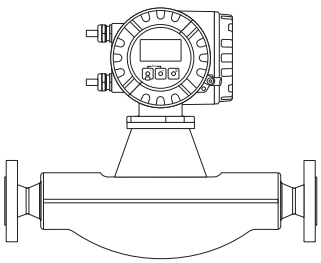
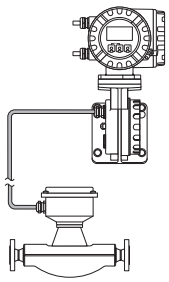
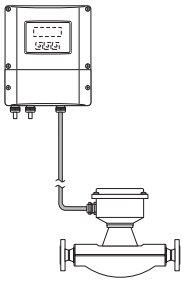
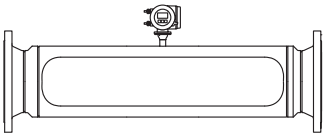
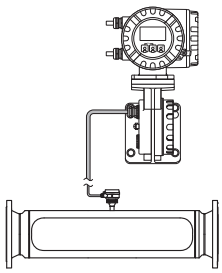
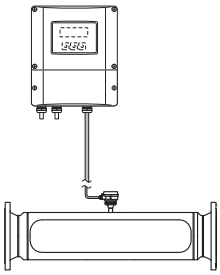
- Transmitter: Promass 84
- Sensor: Promass A, Promass F, Promass X and Promass O

The "Promass 84" gas meter has been approved in accordance with the Measuring Instruments Directive 2004/22/EC, including Appendix I Essential Requirements and Appendix MI-002 Gas Meters and Volume Conversion Devices, and also has an EC type-examination certificate DE-08-MI002-PTB007.

Two versions are available:

- Compact version:
  Transmitter and sensor form a single mechanical unit.
- Remote version:
  Transmitter and sensor are installed separately.

In addition, versions for use in hazardous areas are also available.

	Compact version* Aluminum field housing	Remote version Aluminum field housing	Remote version Wall-mount housing
Promass A DN 2 to 4 (1/12" to 1/8")			
Promass F DN 8 to 250 (3/8" to 3") Promass O DN 80 to 150 (3" to 6")			
Promass X DN 350 (14")			

* In the compact version, a stainless steel field housing is also available.

2.2 Nameplates

The nameplates are attached to the transmitter and sensor and describe the most important technical information pertaining to the measuring device in question. The following sections describe the structure of the various nameplates using examples:

2.2.1 Transmitter nameplates

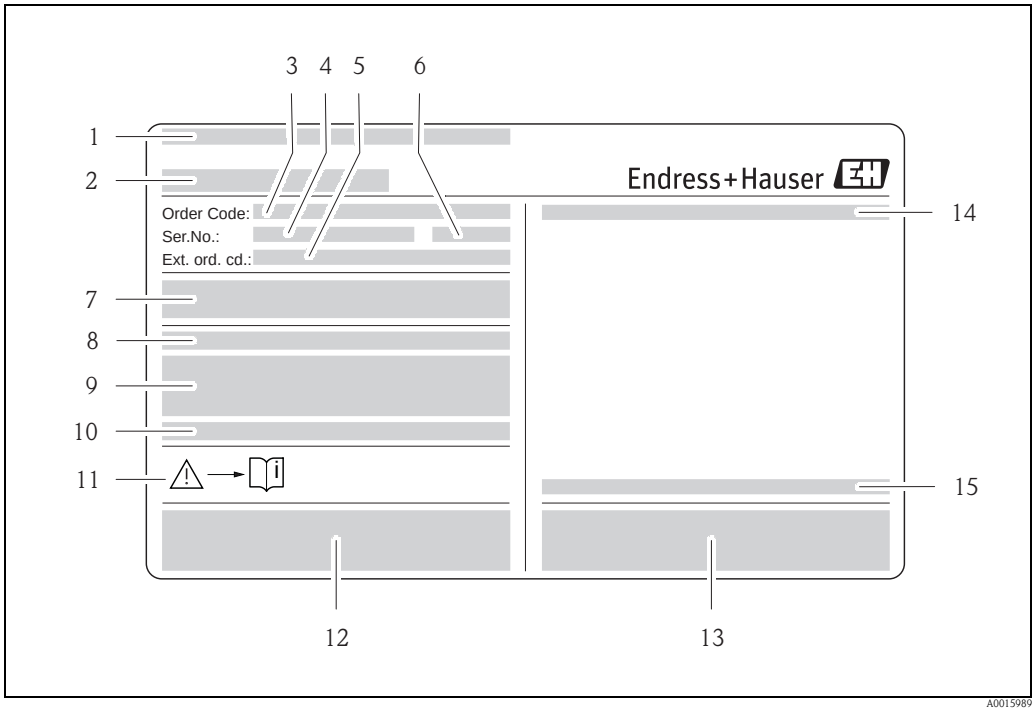


Fig. 1: Example of a transmitter nameplate

1 Certificate recipient
2 Name of the transmitter
3 Order code, meaning of individual letters and digits → 11
4 Serial number (Ser. no.)
5 Extended order code (Ext. ord. cd.)
6 Year of manufacture
7 Power supply, frequency and power consumption
8 Additional function and software
9 Available inputs / outputs
10 Reserved for information on special products
11 Please refer to operating instructions / documentation
12 Reserved for certificates, approvals and for additional information on device version
13 Patents
14 Degree of protection
15 Ambient temperature range

2.2.2 Additional nameplate for gas meters subject to legal metrological control

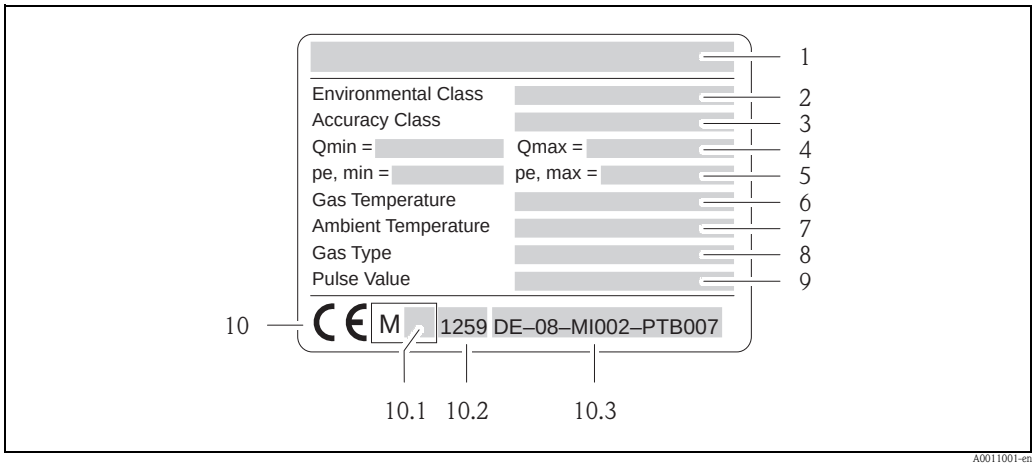


Fig. 2: Example of an additional nameplate

1 Name of the sensor
2 Electromagnetic / mechanical ambient class
3 Accuracy class
4 Permitted range of gas flow
5 Permitted pressure range
6 Permitted gas temperature range
7 Permitted operating temperature range
8 Information on medium
9 Information on pulse value
10 Conformity identification with CE-M mark
10.1 Number of years
10.2 Nominated authority
10.3 Number of EC type-examination certificate

2.2.3 Sensor nameplate (remote version)

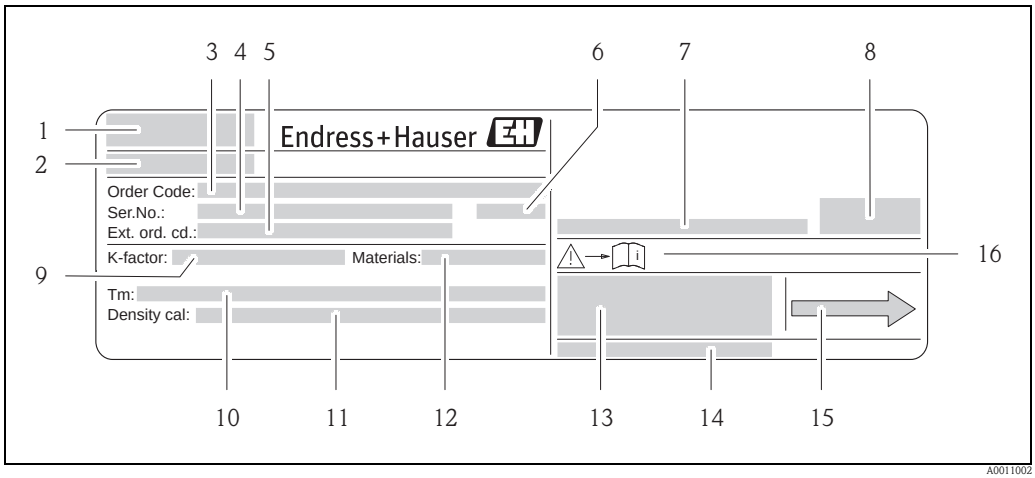


Fig. 3: Example of a sensor nameplate

1 Certificate recipient
2 Name of the transmitter
3 Order code, meaning of individual letters and digits → 11
4 Serial number (Ser. no.)
5 Extended order code (Ext. ord. cd.)
6 Year of manufacture
7 Ambient temperature range
8 Degree of protection
9 Calibration factor with zero point (K-factor)
10 Max. fluid temperature (Tm)
11 Accuracy of density measurement (Density cal.)
12 Material of measuring tubes (Materials)
13 Reserved for additional information on device version e.g. approvals, certificates
14 Patents
15 Flow direction
16 Please refer to operating instructions / documentation

2.2.4 Nameplate for connections

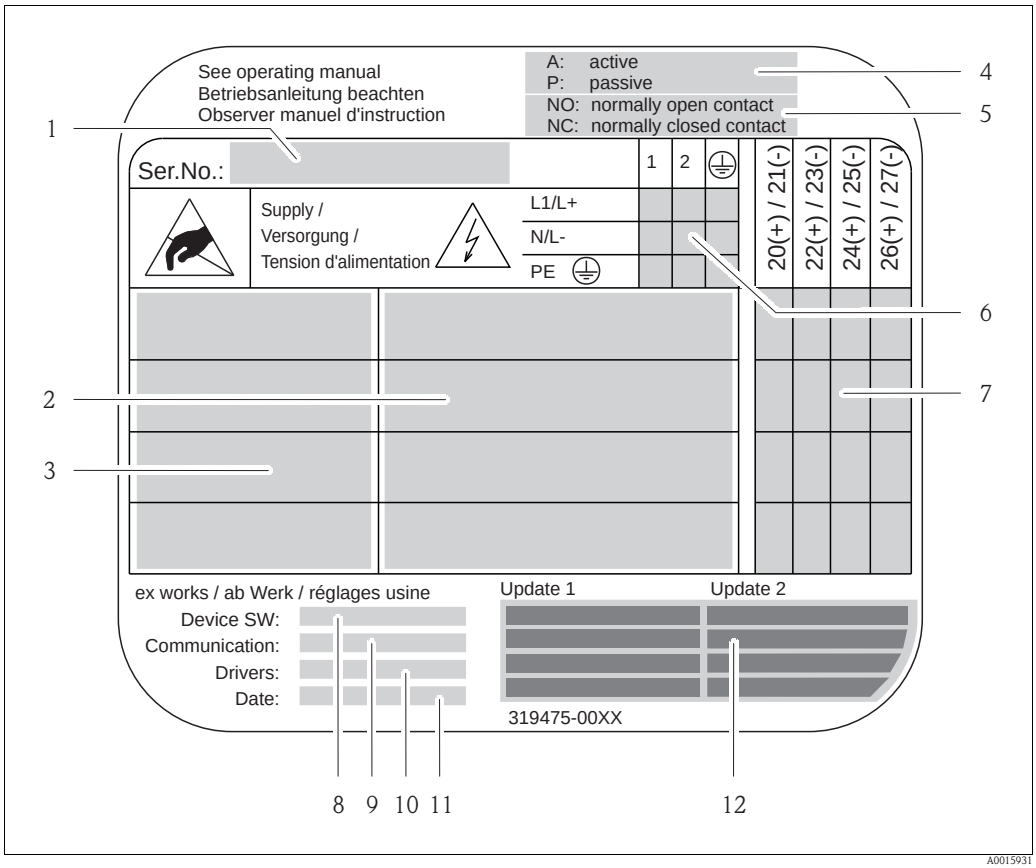
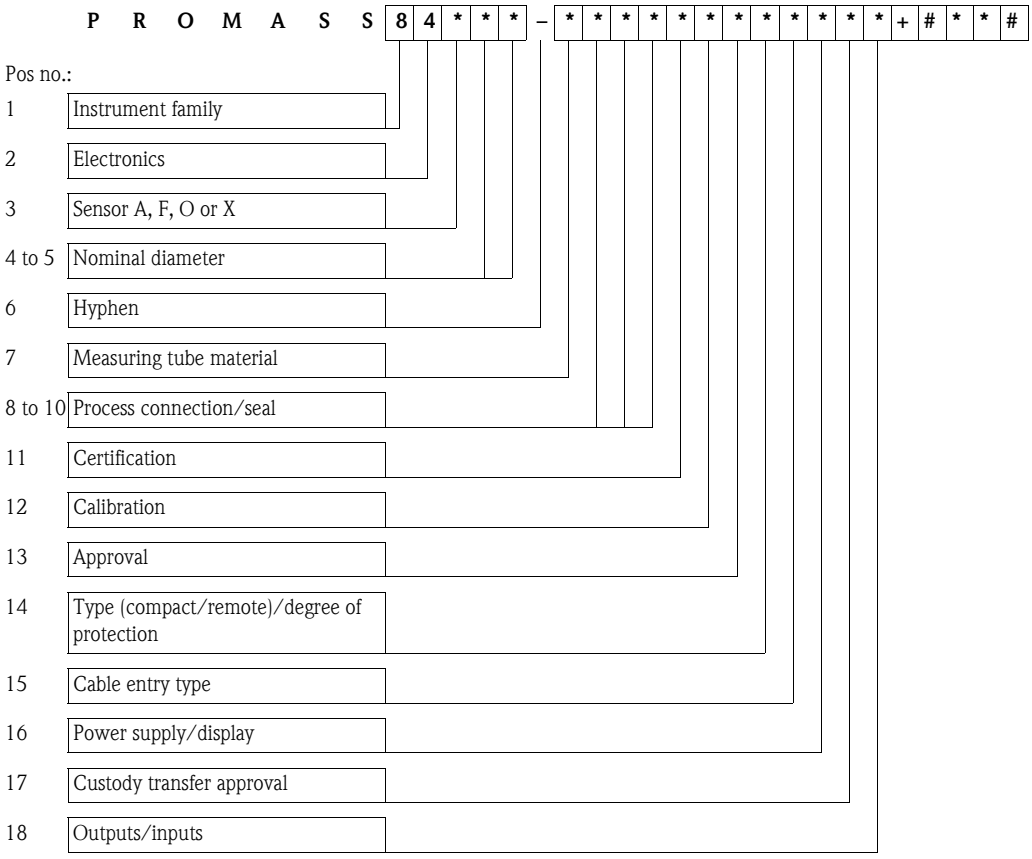


Fig. 4: Example of a connection nameplate

1 Serial number (Ser.No.)
2 Possible inputs and outputs
3 Signals present at inputs and outputs
4 Possible configuration of current output
5 Possible configuration of relay contacts
6 Terminal assignment, cable for power supply
7 Terminal assignment and configuration (see point 4 and 5) of inputs and outputs
8 Version of device software currently installed (Device SW)
9 Installed communication type (Communication)
10 Information on current communication software (Drivers: Device Revision and Device Description),
11 Date of installation (Date)
12 Current updates to data specified in points 8 to 11 (Update1, Update 2)

2.2.5 Structure of order code/serial number

The order code/serial number (type code) describes the exact structure and equipment level of the measuring system. It can be found on the nameplate of the transmitter and sensor and is structured as follows:



Approval for applications subject to legal metrological control (pos. no. 17)	
L	MID Type Examination Certificate Gas MI-002 (Europe)

3 Wiring

Warning!
When connecting Ex-certified devices, see the notes and diagrams in the Ex-specific supplement to these operating instructions. Please do not hesitate to contact your Endress+Hauser sales office if you have any questions.

3.1 Terminal assignment

The values for the individual inputs and outputs can be found in the Technical Data → 22

Order characteristic for "inputs/outputs"	Terminal no. (inputs/outputs)			
	20 (+) / 21 (-)	22 (+) / 23 (-)	24 (+) / 25 (-)	26 (+) / 27 (-)
Fixed communication boards (permanent assignment)				
S	–	–	Frequency output Ex i, passive	Current output HART, Ex i, active
T	–	–	Frequency output Ex i, passive	Current output HART, Ex i, passive
Flexible communication boards				
D	Status input	Relay output	Frequency output	Current output HART
M	Status input	Frequency output 2	Frequency output 1	Current output HART
N	Current output	Frequency output	Status input	Modbus RS485
1	Relay output	Frequency output 2	Frequency output 1	Modbus RS485
Q	–	–	Status input	Modbus RS485
2	Relay output	Current output 2	Frequency output	Current output 1 HART
7	Relay output 1	Relay output 2	Status input	Modbus RS485

3.2 Electrical connection of measuring unit

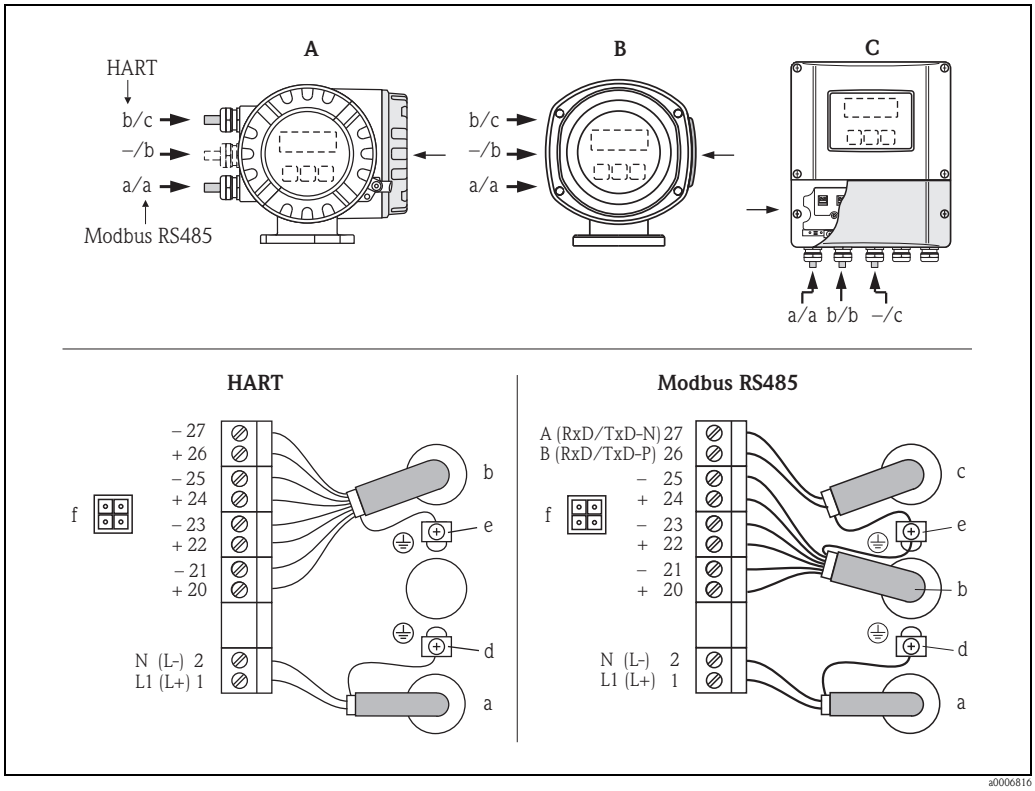


Fig. 5: Connecting the transmitter, conductor cross-section max. 2.5 mm²

A View A (aluminum field housing)
B View B (stainless steel field housing)
C View C (wall-mount housing)

a Cable for power supply: 85 to 260 V AC, 20 to 55 V AC, 16 to 62 V DC
– Terminal no. 1: L1 for AC, L+ for DC
– Terminal no. 2: N for AC, L- for DC
b Signal cable: Terminal assignment → 12
c Fieldbus cable: Terminal assignment → 12
d Ground terminal for protective ground
e Ground terminal for signal/fieldbus cable shield
f Service connector for connection to FXA193 service interface with Proline adapter cable (Fieldcheck, FieldCare)

3.3 Electrical connection of remote version

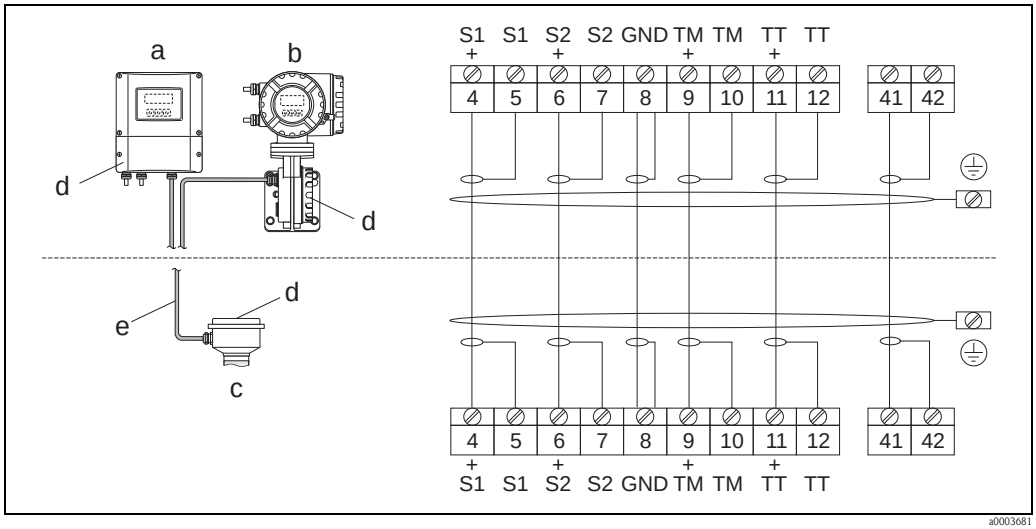


Fig. 6: Connecting the remote version

a Wall-mount housing: Non-hazardous area and ATEX II3G / Zone 2
b Wall-mount housing: ATEX II2G / Zone 1 /FM/CSA
c Remote version, flange version

Terminal no.:
4/5 = gray
6/7 = green
8 = yellow
9/10 = pink
11/12 = white
41/42 = brown

3.3.1 Cable specification, connecting cable

In the remote version, the specifications of the cable connecting the transmitter to the sensor are as follows:

- 6 × 0.38 mm² PVC cable with common shield and individually shielded cores
- Conductor resistance: ≤ 50 Ω/km
- Capacitance core/shield: ≤ 420 pF/m
- Cable length: max. 20 m
- Operating temperature: max. +105 °C

Note!
The cable must be installed securely, to prevent movement.

4 Operation and commissioning

4.1 Operating options

Different options are available for the configuration, commissioning and operation of the measuring device:

- Onsite operation (optional)
- Configuration programs (e.g. FieldCare)
- HART protocol or Modbus RS485 communication (depending on measuring device version)

Exact information on these topics can be found in the accompanying operating instructions (BA00109D, Proline Promass 84 HART or BA00129D, Proline Promass 84 Modbus RS485).

4.2 Hardware configurations

Using hardware switches, different configurations can be set up depending on the measuring device version:

- Hardware write protection → on/off
- Device address
- Terminating resistors
- Configuration of current output → active/passive
- Configuration of relay output → NC contact/NO contact
- Configuration of pulse/frequency output → Line monitoring

Exact information on this topic can be found in the accompanying operating instructions (BA00109D, Proline Promass 84 HART or BA00129D, Proline Promass 84 Modbus RS485).

4.3 Quick setups

Using quick setups, the measuring device can be commissioned quickly, and different configurations (depending on the measuring device version) can be set up:

- Commissioning
- Pulsating flow
- Gas measurement
- Communication (only Proline Promass 84 Modbus RS485)

Exact information on this topic can be found in the accompanying operating instructions (BA00109D, Proline Promass 84 HART or BA00129D, Proline Promass 84 Modbus RS485).

5 Operation subject to legal metrological control ("Custody transfer")

5.1 Placing on market of measuring devices subject to legal metrological control, inspection of operational devices

All Promass 84 Coriolis gas meters are tested at Endress+Hauser Flowtec AG or on an approved reference test rig (e.g. PIGSAR) using reference measurements.
The devices are placed on the market and put into use by either Endress+Hauser Flowtec AG in accordance with Measuring Instruments Directive, Module D or by an notified body in accordance with Module F.
The gas meter may then be used in applications subject to legal metrological control. The associated seal on the measuring device ensures this status.

Regular inspections of operational devices must be carried out in accordance with national regulations.

5.2 Requirements for commissioning at point of installation

5.2.1 Installation

As far as possible, the Promass 84 Coriolis gas meter must be mounted strainlessly. The metering system must, in appropriate way, be equipped with a gate valve so that, if necessary, a zero flow can be achieved for checking and adjusting the zero point. The valve needs not to be protected.

The types, serial numbers and software versions of all the meter modules used at the point of installation must be compared with the specifications in the accompanying documentation. Likewise, the electrical characteristics of additional devices which are connected to the outputs of the Promass 84 gas meter, must be tested.

When securing the gas meter at the point of installation, the parameters relating to measurement technology → 28 ff. must be checked using the parameter list which accompanies the device (see also CD-ROM: Product Documentation).

The data on the sheet accompanying the device are verified for accuracy, a change in the zero point and the configuration of device-specific functions. Changes in the parameters relating to measurement technology at the point of installation must be documented in the acceptance report. This also applies to a possible necessary zero point corrections (old zero point, new zero point), e.g. if significant changes in the tensions on the installed meter can not be excluded. The acceptance report for the device must be kept on file.

If the device is to be subject to legal metrological control, the connecting cables must be secured as well.

5.2.2 Operating pressure ranges

The Promass 84 gas meter must be used in accordance with the pe,min and pe,max values indicated on the additional nameplate → 2. The values must be selected in such a way that the gases or gas mixtures to be measured occur only in a gaseous state in the designated temperature range.

5.3 Requirements for usage

The meter must be operated with an uninterruptible voltage supply (emergency current supply in according to EN 60654-2), which can bridge a power failure and secure operation for at least 3 days or until maintenance operations are is carried out.

An automatic maintenance request must be technically ensured by the operator of the meters. The functioning of the uninterruptible voltage supply and the triggering of the automatic maintenance request must be checked and recorded in writing by the operator of the device.

When the device is in use, it must be ensured that the operating pressure does not drop below the minimum operating pressure.

Missing seals must be set on the meter by the operator of the facility (the party selling the energy), to ensure that the purchasing party cannot make any intentional or accidental changes.

5.4 Security measures

The main verification mark and the protective marks are taken from → 7 → 20.

5.5 Zero point adjustment

All Promass measuring devices are calibrated under reference operating conditions with state-of-the-art technology. The zero point calculated in this way is printed on the nameplate → 1. However, it can also be shown at any time on the display using the key sequence BASIC FUNCTION → SENSOR DATA → CONFIGURATION → ZERO POINT (6803).
See also the manual entitled "Description of Device Functions" BA00110D Promass 84 HART or BA00130D Promass 84 Modbus RS485.

In the case of the Promass 84, it is recommended that a zero point adjustment be carried out using a (test) gas during calibration and testing of the measurement technology. The resulting value must be documented in the report accompanying the device or in the acceptance report.

Performing the zero point adjustment

1. Operate the system until operating conditions have settled.
   This usually takes approx. 5 minutes at maximum flow rates.
2. Stop the flow (v = 0 m/s).
3. Check the shutoff valves for leaks.
4. Check that the operating pressure is correct.
5. Using the local display, select the ZEROPOINT ADJUSTMENT function in the function matrix:
   BASIC FUNCTIONS → PROCESS PARAMETER → ADJUSTMENT → ZERO POINT ADJUSTMENT
6. When you press + or − you are automatically prompted to enter the access code if the function matrix is still disabled. Enter the code (factory setting = 84).
7. Use + or − to select START and confirm with E.
   Select YES at the prompt and press E again to confirm.
   Zero point adjustment now starts.
   – The message "ZEROPOINT ADJUST RUNNING" appears on the display for 30 to 60 seconds while adjustment is in progress.
   – If the flow in the pipe exceeds 0.1 m/s, the following error message appears on the display: "ZERO ADJUST NOT POSSIBLE".
   – When the zero point adjustment completes, the "ZERO ADJUST." function reappears on the display.
8. Back to the HOME position:
   – Press and hold down the Esc keys (−+) for longer than three seconds, or repeatedly press and release these keys.

5.6 Configuring the measuring device for operation subject to legal metrological control

Precondition: The device is operational and **not** in custody transfer mode.

Configuration of those functions which are important for custody transfer measurement, such as output configuration, custody transfer variable and measuring mode.

Note!
A detailed description of the functions can be found in the manual entitled "Description of Device Functions" BA00110D Promass 84 HART or BA00130D Promass 84 Modbus RS485.

- In the CUSTODY TRANSFER (Z) block:
  In the functions Z001 to Z008, the outputs relevant to custody transfer measurement can be set to custody transfer and the current custody transfer displayed.
- In the OUTPUTS (E) block:
  The custody transfer variables can be assigned to the existing outputs.
- In the "INPUTS" (F) block:
  A switching behavior is assigned to the input.

5.7 Sealing of the measuring device

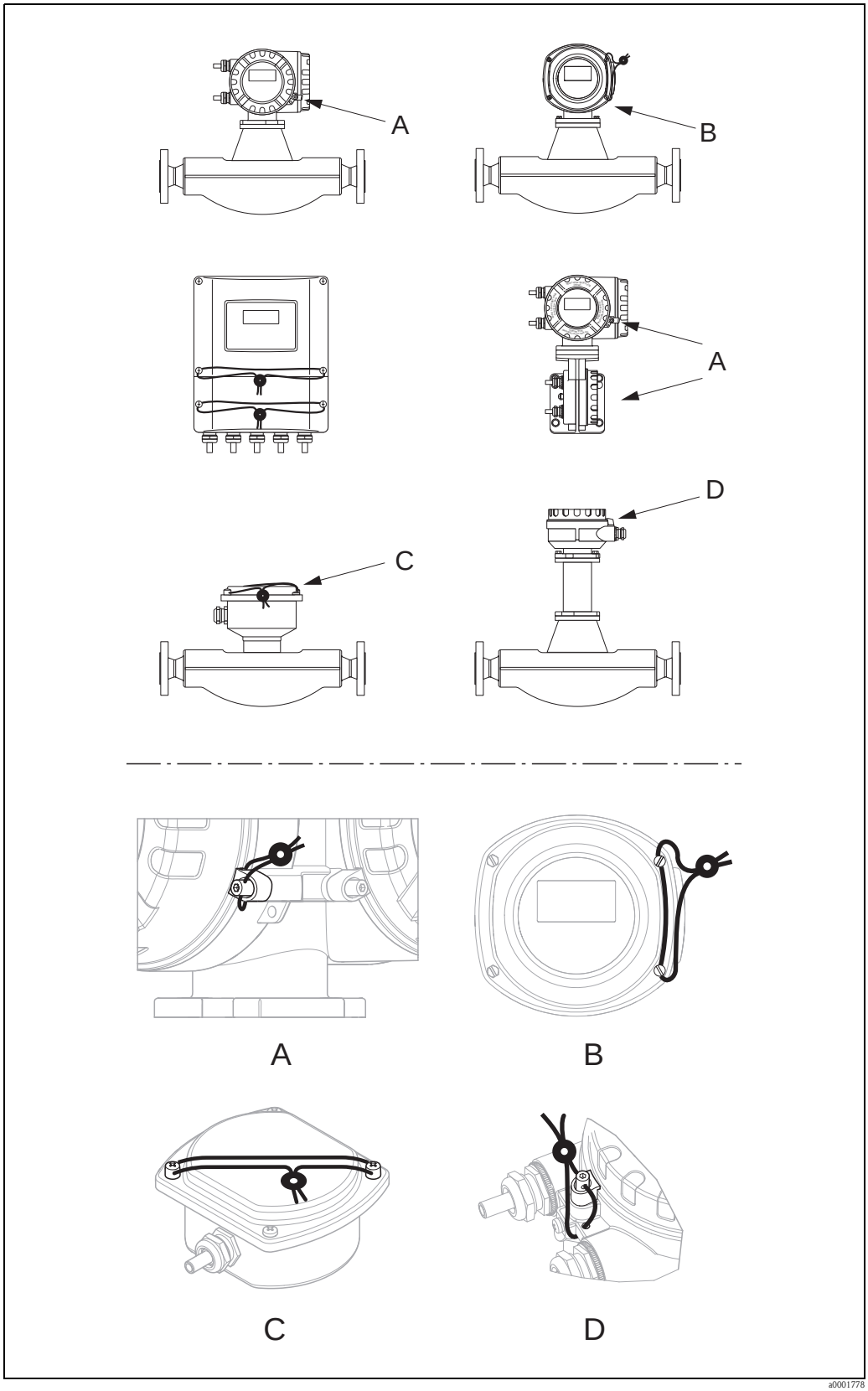


Fig. 7: Examples of how to seal the various device versions.

5.8 Unlocking the measuring device

Precondition: The device is operational and is already set to custody transfer mode.

1. Disconnect the device from the operating voltage.
2. Remove the custody transfer seals.

Warning!
In the case of explosion-protected equipment, observe a cooling or discharge time of 10 minutes before opening the device.

3. Open the cover of the transmitter housing electronics compartment.
   Detailed procedure for the compact/wall-mount version can be found in the Operating Instructions BA00109D Promass 84 HART or BA00129D Promass 84 Modbus RS485.
4. Remove the S-DAT
5. Reconnect the device to the power supply.
6. The device runs through the startup cycle.
   After startup, the error message "#031 SENSOR HW-DAT" is displayed.

   Note!
   This error message appears because the S-DAT has been removed.
   This does not have any effect on the subsequent steps.
7. Disconnect the device from the power supply again.
8. Reinsert the S-DAT.
9. Screw the covers of the electronics compartment and the display module back on.
10. Reconnect the device to the power supply.
11. The device runs through the startup cycle.
    During startup, the message "CUSTODY TRANSFER NO" appears on the display.
12. The device is now operational and is not in custody transfer mode.

6 Technical data

6.1 Overview of technical data relevant to custody transfer

6.1.1 Device software

See type-examination certificate DE-08-MI002-PTB007:
www.endress.com → Download-Area

6.1.2 Interfaces

Service interface	For connecting service tools used to configure and analyze the measuring device. Connection via the Commubox FXA195 (HART) or FXA 193(Modbus) service interface.

6.1.3 Operating programs

FieldCare	FieldCare is Endress+Hauser's FDT-based plant asset management tool and allows the configuration and diagnosis of intelligent field devices. The use of status information means that you also have a simple but effective tool for monitoring devices. Proline flowmeters are accessed via a service interface or the FXA195 or FXA 193.
SIMATIC PDM (HART only)	SIMATIC PDM (Siemens) is a standardized, nonproprietary tool for the operation, configuration, maintenance and diagnosis of intelligent field devices.
AMS (HART only)	AMS (Asset Management Solutions by Emerson Process Management): Program for operating and configuring the devices.

6.1.4 Operating tools

HART handheld terminal DXR 375	Selecting device functions with a HART Communicator is a process involving a number of menu levels and a special HART function matrix. The HART manual in the carrying case of the HART Communicator contains more detailed information on the device.

6.1.5 Input

Measured variable

- Mass flow
  (proportional to the phase difference between two sensors mounted on the measuring tube which register a phase shift in the oscillation)
- Fluid density
  (proportional to the resonance frequency of the measuring tube)
- Fluid temperature
  (via temperature sensors)/(not suitable for custody transfer measurement)

Measuring range

Promass A

DN [mm]	DN [inch]	Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Lowest permitted density at $p_{e,min}$ [kg/m³]
1	1/24	0.072	$0.6 \cdot \rho_{pe, min}$	2.4
2	1/12	0.360	$2.3 \cdot \rho_{pe, min}$	3.1
4	1/8	1.700	$11 \cdot \rho_{pe, min}$	3.1

$\rho_{pe, min}$ = density [kg/m³] at meter input at minimum operating overpressure $P_{e, min}$

Promass F

DN [mm]	DN [inch]	Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Lowest permitted density at $p_{e,min}$ [kg/m³]
8	3/8	3.6	$20 \cdot \rho_{pe, min}$	3.6
15	½	12.0	$60 \cdot \rho_{pe, min}$	4.0
25	1	30.0	$200 \cdot \rho_{pe, min}$	3.0
40	1½	135.0	$400 \cdot \rho_{pe, min}$	6.8
50	2	210.0	$600 \cdot \rho_{pe, min}$	7.0
80	3	550.0	$1200 \cdot \rho_{pe, min}$	9.2
100	4	1260.0	$2000 \cdot \rho_{pe, min}$	12.6
150	6	1860.0	$3000 \cdot \rho_{pe, min}$	12.4
250	10	5100.0	$8000 \cdot \rho_{pe, min}$	12.8

$\rho_{pe, min}$ = density [kg/m³] at meter input at minimum operating overpressure $P_{e, min}$

Promass O

DN [mm]	DN [inch]	Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Lowest permitted density at $p_{e,min}$ [kg/m³]
80	3	550.0	$1200 \cdot \rho_{pe, min}$	9.2
100	4	1260.0	$2000 \cdot \rho_{pe, min}$	12.6
150	6	1860.0	$3000 \cdot \rho_{pe, min}$	12.4
250	10	5100.0	$8000 \cdot \rho_{pe, min}$	12.8

$\rho_{pe, min}$ = density [kg/m³] at meter input at minimum operating overpressure $P_{e, min}$

Promass X

DN [mm]	DN [inch]	Minimum flow Q_{min} [kg/h]	Maximum flow Q_{max} [kg/h]	Lowest permitted density at $p_{e,min}$ [kg/m³]
350	14	10200.0	$16000 \cdot \rho_{pe, min}$	12.8

$\rho_{pe, min}$ = density [kg/m³] at meter input at minimum operating overpressure $P_{e, min}$

Input signal

Status input (auxiliary input), Promass 84 HART

U = 3 to 30 V DC, R_i = 5 kΩ, galvanically isolated.
Configurable for: totalizer reset, positive zero return, error message reset, start zero point adjustment

Status input (auxiliary input), Promass 84 Modbus RS485

U = 3 to 30 V DC, R_i = 3 kΩ, galvanically isolated.
Switching level: 3 to 30 V DC, polarity-independent.
Configurable for: totalizer reset, positive zero return, error message reset, start zero point adjustment

6.1.6 Output

Output signal

Current output, Promass 84 HART

Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.r./°C, resolution: 0.5 µA
- Active: 0/4 to 20 mA, $R_L \geq 250\ \Omega$
- Passive: 4 to 20 mA; supply voltage V_S 18 to 30 V DC; $R_i \geq 150\ \Omega$

Current output, Promass 84 Modbus RS485

Active/passive selectable, galvanically isolated, time constant selectable (0.05 to 100 s), full scale value selectable, temperature coefficient: typically 0.005% o.r./°C, resolution: 0.5 µA
- Active: 0/4 to 20 mA, $R_L < 700\ \Omega$
- Passive: 4 to 20 mA; supply voltage V_S 18 to 30 V DC; $R_i \geq 150\ \Omega$

Pulse/frequency output, Promass 84 HART

For custody transfer measurement, two pulse outputs can be operated, phase-shifted.
Passive, galvanically isolated, open collector, 30 V DC, 250 mA

- Frequency output:
  End value frequency 2 to 10000 Hz (f_{max} = 12500 Hz), on/off ratio 1:1, pulse width max. 2 s.
  In "Phase-shifted pulse outputs" operating mode, the end value frequency is limited to a maximum of 5000 Hz.
- Pulse output:
  Pulse value and pulse polarity selectable, pulse width configurable (0.05 to 2000 ms)

Pulse/frequency output, Promass 84 Modbus RS485

Active/passive selectable, galvanically isolated
- Active: 24 V DC, 25 mA (max. 250 mA for 20 ms), $R_L > 100\ \Omega$
- Passive: Open collector, 30 V DC, 250 mA

- Frequency output: End value frequency 2 to 10000 Hz (f_{max} = 12500 Hz), on/off ratio 1:1, pulse width max. 2 s
- Pulse output: Pulse value and pulse polarity selectable, pulse width configurable (0.05 to 2000 ms)

Modbus RS485

- Modbus device type: slave
- Address range: 1 to 247
- Supported function codes: 03, 04, 06, 08, 16, 23
- Broadcast: supported by the function codes 06, 16, 23
- Physical interface RS485 in accordance with EIA/TIA-485 standard
- Supported baud rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud
- Transmission mode: RTU or ASCII
- Response times: Direct data access = typically 25 to 50 ms
  Auto-scan buffer (data range) = typically 3 to 5 ms
- Possible output combinations → 📄 12

Signal on alarm

Current output
Failsafe mode selectable (for example, according to NAMUR Recommendation NE 43)

Pulse/frequency output
Failsafe mode selectable

Relay output
De-energized in the event of a fault or power supply failure

Modbus RS485
If a fault occurs, the value NaN (not a number) is output for the process variables.

Switch output

Relay output
Normally closed (NC or break) or normally open (NO or make) contacts available (factory setting: normally open),
max. 30 V / 0.5 A AC; 60 V / 0.1 A DC, galvanically isolated.

Load

See "Output signal"

Galvanic isolation

All circuits for inputs, outputs, and power supply are galvanically isolated from each other.

6.1.7 Power supply

Electrical connections

→ 📄 13

Supply voltage

85 to 260 V AC, 45 to 65 Hz
20 to 55 V AC, 45 to 65 Hz
16 to 62 V DC

Cable specifications

Remote version→ 📄 14

Power consumption

AC: <15 VA (including sensor)
DC: <15 W (including sensor)

Switch-on current
- max. 13.5 A (< 50 ms) at 24 V DC
- max. 3 A (< 5 ms) at 260 V AC

Power supply failure

Lasting min. 1 power cycle:
- EEPROM or T-DAT saves measuring system data if power supply fails.
- S-DAT: exchangeable data storage chip which stores the data of the sensor (nominal diameter, serial number, calibration factor, zero point, etc.)

Potential equalization

No measures necessary.
For explosion-protected equipment → see separate Ex-documentation supplied

6.1.8 Normal operating conditions

- Measured variable: mass of gas flowing through in kg, volume of gas flowing through in m^3 (possible with clean gases)
- Gas types, covered by MI-002 : fuel gases, technically pure flammable gases and mixtures of these gases in a gaseous state
- Additional allowed gas types: Nonflammable technical gases, mixtures of these and mixtures containing fuel gases
- Gas temperature range: –25°C to +55°C
- Operating overpressure range:
  – 5 to 100 bar (standard)
  – to 280 bar (Promass O)
  – to 350 bar (high-pressure version Promass A)
- Climatic ambient conditions: –40°C to +55°C; condensation possible
- Degree of protection: IP67
- Mechanical ambient conditions: M3 (for transporting on vehicles), M2 (in operation)
- Electromagnetic ambient conditions: E3

6.1.9 Human interface

Display elements

- Liquid crystal display: illuminated, four lines with 16 characters per line
- Selectable display of different measured values and status variables
- 3 totalizers
- At ambient temperatures below –20 °C, the readability of the display may be impaired.

Operating elements

- Local operation with three optical sensors (−/+/E)
- Application-specific quick setup menus for straightforward commissioning

Remote operation

Depending on device version:
- Operation by means of HART protocol
- Operation by means of Modbus RS485

6.1.10 Certificates and approvals

CE mark	The measuring system is in conformity with the statutory requirements of the EC directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.
C-tick mark	The measuring system meets the EMC requirements of the Australian Communications and Media Authority (ACMA).
Ex approval	Information about currently available Ex versions (ATEX, FM, CSA etc.) can be supplied by your Endress+Hauser representative on request. All explosion protection data are given in separate documentation which is also available upon request.
Legal metrological control	The gas meter is approved in accordance with Measuring Instruments Directive 2004/22/EC for applications subject to legal metrological control which use fuel gases, technically pure flammable gases and mixtures of these gases in a gaseous state, with a pressure of 100 bar, or 280 bar (Promass O),or 350 bar (Promass A, high-pressure version). The device has an EC type-examination certificate in accordance with Measuring Instruments Directive, PTB approval number: DE-08-MI002-PTB007
Sanitary compatibility	■ 3A approval ■ EHEDG-inspected (only Promass A)
Pressure measuring device approval	Measuring devices with a nominal diameter smaller than or equal to DN 25 correspond to Article 3 (3) of the EC Directive 97/23/EC (Pressure Equipment Directive) and have been designed and manufactured according to good engineering practice. For larger nominal diameters, optional approvals according to Cat. II/III are available when required (depends on fluid and process pressure).
Functional safety	SIL 2: In accordance with IEC 61508/IEC 61511-1 (FDIS)
Modbus RS485	The measuring device meets all the requirements of the Modbus/TCP conformity and integration test and has the "Modbus/TCP Conformance Test Policy, version 2.0". The measuring device has successfully passed all of the test procedures carried out and is certified by the "Modbus/TCP Conformance Test Laboratory" of the University of Michigan.
Other standards and guidelines	EN 60529: Degrees of protection by housing (IP code) EN 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use IEC/EN 61326 "Emission in accordance with requirements for Class A". Electromagnetic compatibility (EMC requirements) NAMUR NE 21: Electromagnetic compatibility (EMC) of industrial process and laboratory control equipment NAMUR NE 43: Standardization of the signal level for the breakdown information of digital transmitters with analog output signal. NAMUR NE 53: Software of field devices and signal-processing devices with digital electronics

7 Functions relevant to custody transfer

Information on all available functions can be found in the separate manual entitled "Description of Device Functions", BA00110D Promass 84 HART or BA00130D Promass 84 Modbus RS485.
In addition to the names of all functions and their place in the function matrix, this manual gives a precise explanation of their functionality, of selection and configuration options and of cross-connections within the function matrix, from the perspective of onsite operation.
The following is a list of functions relevant to custody transfer only, accompanied by a brief explanation:

7.1 Custody transfer

Function name	No.	Description	Configuration
CUSTODY TRANSFER	Z000	Use this function to display whether the measuring point is set to custody transfer mode.	Display: C.T. YES
PULSE OUTPUT 1 CUSTODY TRANSFER	Z001	Use this function to select pulse output 1 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
PULSE OUTPUT 2 CUSTODY TRANSFER *	Z002	Use this function to select pulse output 2 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
CURRENT OUTPUT 1 CUSTODY TRANSFER	Z003	Use this function to select current output 1 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
TOTALIZER 1 CUSTODY TRANSFER	Z006	Use this function to select totalizer 1 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
TOTALIZER 2 CUSTODY TRANSFER	Z007	Use this function to select totalizer 2 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
TOTALIZER 3 CUSTODY TRANSFER	Z008	Use this function to select totalizer 3 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
MODBUS CFG C.T. **	Z009	Use this function to select totalizer 3 for transferring the CT signal.	Options: YES (if relevant to custody transfer)
* available only for Proline Promass 84 HART measuring device ** available only for Proline Promass 84 Modbus RS485 measuring device			

7.2 Meas. variables → System units → Configuration

Function name	No.	Description	Configuration
UNIT MASS FLOW	0400	Use this function to select the desired unit.	Options: e.g. kg/h
UNIT MASS	0401	Use this function to select the desired unit.	Options: e.g. kg
UNIT VOLUME FLOW	0402	Use this function to select the desired unit.	Options: e.g. l/h
UNIT VOLUME	0403	Use this function to select the desired unit.	Options: e.g. l
UNIT CORRECTED VOLUME FLOW	0404	Use this function to select the desired unit.	Options: e.g. Nl/h
UNIT CORRECTED VOLUME	0405	Use this function to select the desired unit.	Options: e.g. Nl

7.3 Meas. variables → System units → Add. configuration

Function name	No.	Description	Configuration
UNIT DENSITY	0420	Use this function to select the desired unit.	Options: e.g. kg/l
UNIT REFERENCE DENSITY	0421	Use this function to select the desired unit.	Options: e.g. kg/Nl
UNIT TEMPERATURE	0422	Use this function to select the desired unit.	Options: e.g. °C
UNIT LENGTH	0424	Use this function to select the desired unit.	Options: e.g. MILLIMETER
UNIT PRESSURE	0426	Use this function to select the desired unit.	Options: e.g. bara

7.4 Meas. variables → Special units → Arbitrary unit

Function name	No.	Description	Configuration
TEXT ARBITRARY MASS *	0600	Use this function to enter text for arbitrary mass/mass flow.	User input: e.g. CENT
FACTOR ARBITRARY MASS *	0601	Use this function to enter quantity factor (without time) for arbitrary mass/mass flow.	User input: e.g. 1
TEXT ARBITRARY VOLUME *	0602	Use this function to enter text for arbitrary volume/ volume flow.	User input: e.g. GLAS
FACTOR ARBITRARY VOLUME *	0603	Use this function to enter quantity factor (without time) for arbitrary volume/volume flow.	User input: e.g. 1
TEXT ARBITRARY DENSITY*	0604	Use this function to enter text for arbitrary density.	User input: e.g. GLAS
FACTOR ARBITRARY DENSITY*	0605	Use this function to enter quantity factor (without time) for arbitrary density.	User input: e.g. 1

* available only for the Proline Promass 84 HART measuring device

7.5 Quick setup

Function name	No.	Description	Configuration
QUICK SETUP COMMISSIONING	1002	Start setup.	–
QUICK SETUP PULSATING FLOW	1003	Start setup.	–
QUICK SETUP GAS MEASUREMENT	1004	Start setup.	–
QUICK SETUP COMMUNICATION **	1006	Start setup.	–
T-DAT SAVE/LOAD	1006	Saving from EEPROM to T-DAT. Loading from T-DAT to EEPROM.	–

** available only for the Proline Promass 84 Modbus RS485 measuring device

7.6 Display → Control → Basic config.

Function name	No.	Description	Configuration
DISPLAY DAMPING	2002	Time constant which determines how the display reacts to severely fluctuating flow variables. ✎ Note! Function not blocked in custody transfer mode.	User input: e.g. 1 s

7.7 Display → Control → Unlocking/locking

Function name	No.	Description	Configuration
ACCESS CODE	2020	Use this function to enter the code number to enable programming / change the device settings. Blocking of functions relevant to custody transfer ✎ Note! Function not blocked in custody transfer mode.	User input: 84 User input: 8400

7.8 User interface → Main line → Configuration

Function name	No.	Description	Configuration
ASSIGN	2200	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2201	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2202	Use this function to select the number of decimal places.	Options: e.g. XX.XXX

7.9 User interface → Main line → Multiplex

Function name	No.	Description	Configuration
ASSIGN	2220	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2221	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2222	Use this function to select the number of decimal places.	Options: e.g. XX.XXX

7.10 User interface → Additional line → Configuration

Function name	No.	Description	Configuration
ASSIGN	2400	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2401	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2402	Use this function to select the number of decimal places.	Options: e.g. XX.XXX
DISPLAY MODE	2403	Use this function to select the format of the bar graph.	Options: e.g. STANDARD

7.11 User interface → Additional line → Multiplex

Function name	No.	Description	Configuration
ASSIGN	2420	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2421	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2422	Use this function to select the number of decimal places.	Options: e.g. XX.XXX
DISPLAY MODE	2423	Use this function to select the format of the bar graph.	Options: e.g. STANDARD

7.12 User interface → Information line → Configuration

Function name	No.	Description	Configuration
ASSIGN	2600	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2601	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2602	Use this function to select the number of decimal places.	Options: e.g. XX.XXX
DISPLAY MODE	2603	Use this function to select the format of the bar graph.	Options: e.g. STANDARD

7.13 User interface → Information line → Multiplex

Function name	No.	Description	Configuration
ASSIGN	2620	Use this function to assign a display value to the main line.	Options: e.g. MASS FLOW
100% VALUE	2621	Use this function to specify the value to be displayed as 100%.	User input: 5-digit floating-point number
FORMAT	2622	Use this function to select the number of decimal places.	Options: e.g. XX.XXX
DISPLAY MODE	2623	Use this function to select the format of the bar graph.	Options: e.g. STANDARD

7.14 Totalizer → Totalizer 1 to 3 → Configuration

Function name	No.	Description	Configuration
ASSIGN	3000	Use this function to assign a measured variable to the relevant totalizer.	Options: e.g. MASS FLOW
UNIT TOTALIZER	3001	Use this function to select the desired unit.	Options: e.g. kg
TOTALIZER MODE	3002	Use this function to select how the totalizer should operate.	Options: e.g. FORWARD
RESET TOTALIZER	3003	Use this function to reset the total and the overflow of the totalizer to zero.	Options: e.g. NO

7.15 Totalizer → Handling totalizer

Function name	No.	Description	Configuration
RESET ALL TOTALIZERS	3800	Use this function to reset the total and the overflow of all totalizers to zero.	Options: e.g. NO
FAILSAFE MODE	3801	Use this function to select failsafe mode in the event of a fault.	Options: e.g. STOP

7.16 Outputs → Current output → Configuration

Function name	No.	Description	Configuration
ASSIGN	4000	Use this function assign a measured variable to the relevant current output.	Options: e.g. MASS FLOW
CURRENT SPAN	4001	Use this function to select the current span.	Options: e.g. 4-20 mA
VALUE 0_4 mA	4002	Use this function to specify the value at which a current value of 0 or 4 mA is output.	Options: e.g. 0 kg/h
VALUE 20 mA	4003	Use this function to specify the value at which a current value of 20 mA is output.	Options: e.g. 200 kg/h
MEASURING MODE	4004	Use this function to select the measuring mode.	Options: e.g. STANDARD
TIME CONSTANT	4005	Time constant which determines how the current output reacts to severely fluctuating flow variables.	Options: e.g. 1.00 s
FAILSAFE MODE	4006	Use this function to select failsafe mode in the event of a fault.	Options: e.g. MIN. CURRENT

7.17 Outputs → Current output → Operation

Function name	No.	Description	Configuration
SIMULATION CURRENT	4041	Use this function to activate the simulation of the current output.	Options: e.g. OFF
VALUE SIMULATION CURRENT	4041	Default value for the simulation of the current output.	User input: e.g. 0.00 mA

7.18 Outputs → Pulse/freq. output → Configuration

Function name	No.	Description	Configuration
MODE OF OPERATION	4200	Configuration of output as: Frequency output, → 🖹 33 Pulse output, → 🖹 33 Status output, → 🖹 34	Options: e.g. PULSE

7.18.1 Frequency output

Function name	No.	Description	Configuration
ASSIGN FREQUENCY	4201	Use this function to assign a measured variable to the frequency output.	Options: e.g. MASS FLOW
START VALUE FREQUENCY	4202	Use this function to enter the start value frequency.	User input: e.g. 0 Hz
END VALUE FREQUENCY	4203	Use this function to enter the end value frequency.	User input: e.g. 10000 Hz
VALUE f MIN	4204	Use this function to enter a value for the start value frequency.	User input: e.g. 0 kg/l
VALUE f HIGH	4205	Use this function to enter a value for the end value frequency.	User input: e.g. 2 kg/l
MEASURING MODE	4206	Use this function to select the measuring mode.	Options: e.g. STANDARD
OUTPUT SIGNAL	4207	Use this function to select the output configuration.	Options: e.g. PASSIVE - POSITIVE
TIME CONSTANT	4208	Time constant which determines how the frequency output reacts to severely fluctuating flow variables.	User input: e.g. 0.00 s
FAILSAFE MODE	4209	Use this function to select failsafe mode in the event of a fault.	Options: e.g. FALLBACK VALUE
FAILSAFE VALUE	4211	Use this function to specify the frequency issued by the output in the event of a fault.	User input: e.g. 12500 Hz

7.18.2 Pulse output

Function name	No.	Description	Configuration
ASSIGN PULSE	4221	Use this function to assign a measured variable to the pulse output.	Options: e.g. MASS FLOW
PULSE VALUE	4222	Use this function to enter the flow rate at which a pulse is to be output.	User input: e.g. 1 kg
PULSE WIDTH	4223	Use this function to enter the pulse width.	User input: e.g. 100 ms
MEASURING MODE	4225	Use this function to select the measuring mode.	Options: e.g. STANDARD
OUTPUT SIGNAL	4226	Use this function to select the output configuration.	Options: e.g. PASSIVE-POSITIVE
FAILSAFE MODE	4227	Use this function to select failsafe mode in the event of a fault.	Options: e.g. FALLBACK VALUE

7.18.3 Status output

Function name	No.	Description	Configuration
ASSIGN STATUS	4241	Use this function to assign a switching function to the status output.	Options: e.g. FAULT MESSAGE
ON-VALUE	4242	Use this function to enter the value for the switch-on point.	User input: e.g. 0 kg
SWITCH-ON DELAY	4243	Time period which must elapse after the switch-on point has been reached and before the output switches.	User input: e.g. 0.0 s
OFF-VALUE	4244	Use this function to enter the value for the switch-off point.	User input: e.g. 2 kg
SWITCH-OFF DELAY	4245	Time period which must elapse after the switch-off point has been reached and before the output switches.	User input: e.g. 0.0 s
MEASURING MODE	4246	Use this function to select the measuring mode.	Options: e.g. STANDARD
TIME CONSTANT	4247	Time constant which determines how the frequency output reacts to severely fluctuating flow variables.	User input: e.g. 0.00 s

7.19 Outputs → Pulse/freq. output → Operation

7.19.1 Frequency output

Function name	No.	Description	Configuration
ACTUAL FREQUENCY	4301	Use this function to display the frequency currently output.	Display: e.g. 0 Hz
SIMULATION FREQUENCY	4302	Use this function to activate the simulation of the frequency output.	Options: e.g. OFF
VALUE SIMULATION FREQUENCY	4303	Default value for the simulation of the frequency output.	User input: e.g. 0 Hz

7.19.2 Pulse output

Function name	No.	Description	Configuration
SIMULATION PULSE	4322	Use this function to activate the simulation of the pulse output.	Options: e.g. OFF
VALUE SIMULATION PULSE	4323	Default value for the simulation of the pulse output.	User input: e.g. 0

7.19.3 Status output

Function name	No.	Description	Configuration
ACTUAL STATUS	4341	Use this function to display the status currently output.	Display: e.g. CONDUCTIVE
SIMULATION SWITCH POINT	4342	Use this function to activate the simulation of the status output.	Options: e.g. OFF
VALUE SIMULATION SWITCH POINT	4343	Default value for the simulation of the status output.	User input: e.g. CONDUCTIVE

7.20 Outputs → Relay output → Configuration

Function name	No.	Description	Configuration
ASSIGN RELAY	4700	Use this function to assign a switching function to the relay output.	Options: e.g. FAULT MESSAGE
ON-VALUE	4701	Use this function to enter the value for the switch-on point.	User input: e.g. 0 kg
SWITCH-ON DELAY	4702	Time period which must elapse after the switch-on point has been reached and before the output switches.	User input: e.g. 0.0 s
OFF-VALUE	4703	Use this function to enter the value for the switch-off point.	User input: e.g. 2 kg
SWITCH-OFF DELAY	4704	Time period which must elapse after the switch-off point has been reached and before the output switches.	User input: e.g. 0.0 s
MEASURING MODE	4705	Use this function to select the measuring mode.	Options: e.g. STANDARD
TIME CONSTANT	4706	Time constant which determines how the relay output reacts to severely fluctuating flow variables.	User input: e.g. 0.00 s

7.21 Outputs → Relay output → Operation

Function name	No.	Description	Configuration
ACTUAL STATUS RELAY	4740	Use this function display the status currently output.	Display: e.g. MAKE CONTACT OPEN
SIMULATION SWITCH POINT	4741	Use this function to activate the simulation of the relay output.	Options: e.g. OFF
VALUE SIMULATION SWITCH POINT	4742	Default value for the simulation of the relay output.	User input: e.g. MAKE CONTACT OPEN

7.22 Inputs → Status input → Configuration

Function name	No.	Description	Configuration
ASSIGN STATUS INPUT	5000	Use this function to assign a switching function to the status input.	Options: e.g. RESET FAULT MESSAGE
ACTIVE LEVEL	5001	Use this function to select the level at which the switching function is to be activated.	User input: e.g. HIGH
MINIMUM PULSE WIDTH	5002	Use this function to specify the minimum pulse width which must be present for the switching function to be activated.	User input: e.g. 50 ms

7.23 Inputs → Status input → Operation

Function name	No.	Description	Configuration
SIMULATION STATUS INPUT	5041	Use this function to activate the simulation of the status input.	Options: e.g. OFF
VALUE SIMULATION STATUS INPUT	5042	Default value for the simulation of the status input.	User input: e.g. LOW

7.24 Basic function → Process parameter → Configuration

Function name	No.	Description	Configuration
ASSIGN LOW FLOW CUT OFF	6400	Use this function to assign a switching function to the low flow cut off.	Options: e.g. MASS FLOW
ON-VALUE LOW FLOW CUT OFF	6402	Use this function to enter the value for the switch-on point.	User input: e.g. 0 kg
OFF-VALUE LOW FLOW CUTOFF	6403	Use this function to enter the value for the switch-off point.	User input: e.g. 2 kg
PRESSURE SHOCK SUPPRESSION	6404	Use this function to specify the duration of pressure shock suppression.	User input: e.g. 0.0 s

7.25 Basic function → Process para. → EPD parameter

Function name	No.	Description	Configuration
EMPTY PIPE DETECTION	6420	Use this function to activate empty pipe detection.	Options: e.g. OFF
EPD VALUE LOW	6423	Use this function to enter the lower density value for fluid monitoring.	User input: e.g. 0.2000 kg/l
EPD VALUE HIGH	6424	Use this function to enter the upper density value for fluid monitoring.	User input: e.g. 6.0000 kg/l
EPD RESPONSE TIME	6425	Use this function to specify the time period which must elapse before a notice or fault message is generated.	User input: e.g. 1.0 s
EPD EXC.CURR.	6426	Use this function to specify the excitation current which generates a notice or fault message.	User input: e.g. 100 mA

7.26 Basic function → Process para. → Ref. parameter

Function name	No.	Description	Configuration
CORRECTED VOLUME CALCULATION	6460	Use this function to select how the standard volume flow is to be calculated.	Options: e.g. FIXED REFERENCE DENSITY
FIXED REFERENCE DENSITY	6461	Use this function to enter the density value for calculating the standard volume flow.	User input: e.g. 1 kg/Nl
EXPANSION COEFFICIENT	6462	Use this function to enter the expansion coefficient used to calculate the temperature-compensated density functions.	User input: e.g. 0.5000 e^{-3} [1/K]
EXPANSION COEFFICIENT SQUARE	6463	Use this function to enter the squared expansion coefficient in case temperature compensation is not linear.	User input: e.g. 0 e^{-6} [$1/K^2$]
REFERENCE TEMPERATURE	6464	Use this function to enter the reference temperature for calculating: corrected vol. flow, corrected vol. and reference density.	User input: e.g. 20.000 °C

7.27 Basic function → Process parameter → Adjustment

Function name	No.	Description	Configuration
ZERO POINT ADJUST	6480	Use this function to activate zero point adjustment.	Options: e.g. CANCEL
DENSITY ADJUST MODE	6482	Use this function to select whether a 1-point or 2-point density adjustment is to be carried out.	Options: e.g. CANCEL
DENSITY SETPOINT 1	6483	Use this function to enter the density setpoint value for the 1st fluid for which a density adjustment is to be carried out.	User input: e.g. 1.0000 kg/l
MEASURE FLUID 1	6484	Use this function to measure the current density of the first fluid for density adjustment.	User input: e.g. CANCEL
DENSITY SETPOINT 2	6485	Use this function to enter the density setpoint value for the 2nd fluid for which a density adjustment is to be carried out.	User input: e.g. 1.0000 kg/l
MEASURE FLUID 2	6486	Use this function to enter the current density of the second fluid for density adjustment.	User input: e.g. CANCEL
DENSITY ADJUST	6487	Use this function to activate the density adjustment or measurement of the first or second fluid.	User input: e.g. CANCEL
RESTORE ORIGINAL	6488	Use this function to restore the original density coefficients determined at the factory.	User input: e.g. NO

7.28 Basic function → Process para. → Pressure correct.

Function name	No.	Description	Configuration
PRESSURE MODE	6500	Use this function to configure the automatic pressure correction.	Options: e.g. OFF
PRESSURE	6501	Use this function to enter the pressure value for pressure correction.	User input: e.g. 0 barg

7.29 Basic function → System parameter → Configuration

Function name	No.	Description	Configuration
INSTALLATION DIRECTION SENSOR	6600	Use this function to change the sign for the flow variable.	Options: e.g. NORMAL
DENSITY DAMPING	6602	Use this function to configure the sensitivity of the density measuring signal to fluctuations in fluid density.	User input: e.g. 0.00 s
FLOW DAMPING	6603	Use this function to configure the sensitivity of the measuring signal to interference peaks.	User input: e.g. 0 s
POSITIVE ZERO RETURN	6605	Use this function to interrupt the evaluation of the measured variables.	Options: e.g. OFF

7.30 Basic function → Sensor data → Configuration

Function name	No.	Description	Configuration
K-FACTOR	6800	Use this function to display the current calibration factor for the sensor.	Display: depending on DN and calibration
ZERO POINT	6803	Use this function to display the current zero point correction value for the sensor.	Display: depending on calibration
NOMINAL DIAMETER	6804	Use this function to display the nominal diameter of the sensor.	Display: depending on DN
POSITIVE ZERO RETURN	6605	Use this function to interrupt the evaluation of the measured variables.	Options: e.g. OFF

7.31 Basic function → Sensor data → Flow coeff.

Function name	No.	Description	Configuration
TEMPERATURE COEFFICIENT KM	6840	Use this function to display the temperature coefficient KM.	display only
TEMP. COEFFICIENT KM 2	6841	Use this function to display the temperature coefficient KM 2.	display only
TEMP. COEFFICIENT KT	6842	Use this function to display the temperature coefficient KT.	display only
CALIBRATION COEFF. KD 1	6843	Use this function to display the calibration coefficient KD 1.	display only
CALIBRATION COEFF. KD 2	6844	Use this function to display the calibration coefficient KD 2.	display only

7.32 Basic function → Sensor data → Density coeff.

Function name	No.	Description	Configuration
DENSITY COEFFICIENT C 0	6850	Use this function to display the density coefficient C 0.	display only
DENSITY COEFFICIENT C 1	6851	Use this function to display the density coefficient C 1.	display only
DENSITY COEFFICIENT C 2	6852	Use this function to display the density coefficient C 2.	display only
DENSITY COEFFICIENT C 3	6853	Use this function to display the density coefficient C 3.	display only
DENSITY COEFFICIENT C 4	6854	Use this function to display the density coefficient C 4.	display only
DENSITY COEFFICIENT C 5	6855	Use this function to display the density coefficient C 5.	display only

7.33 Supervision → System → Configuration

Function name	No.	Description	Configuration
ASSIGN SYSTEM ERROR	8000	Use this function to display system errors.	Options: e.g. system error list
ERROR CATEGORY	8001	Use this function to determine whether the system error generates a notice or fault message.	Options: e.g. NOTICE MESSAGE
ASSIGN PROCESS ERROR	8002	Use this function to display process errors.	Options: e.g. process error list
ERROR CATEGORY	8003	Use this function to determine whether the process error generates a notice or fault message.	Options: e.g. NOTICE MESSAGE
ACKNOWLEDGE FAULTS	8004	Use this function to determine whether a fault message must be acknowledged.	Options: e.g. ON
ALARM DELAY	8005	Use this function to specify the time period which must elapse before a notice or fault message is generated.	User input: e.g. 0 s
STORE PERMANENTLY	8007	Use this function to display the status of the automatic, permanent storage of parameter changes in the EEPROM.	Display: e.g. ON

7.34 Supervision → System → Operation

Function name	No.	Description	Configuration
SIMULATION FAILSAFE MODE	8042	Use this function to switch all inputs, outputs and totalizers to their respective failsafe mode.	Options: OFF
SIMULATION MEASURAND	8043	Use this function to switch all inputs, outputs and totalizers to their respective flow-response mode.	Options: OFF
VALUE SIMULATION MEASURAND	8044	Default value for the simulation of the flow-response mode.	Options: OFF
SYSTEM RESET	8046	Use this function to reset the measuring system.	Options: NO

7.35 Monitoring → Version-info → Device

Function name	No.	Description	Configuration
DEVICE SOFTWARE	8100	Use this function to display the current version of the device software.	display only

7.36 Supervision → Version-info → Sensor

Function name	No.	Description	Configuration
SERIAL NUMBER	8200	Use this function to display the serial number of the sensor.	display only
SENSOR TYPE	8201	Use this function to display the sensor type (e.g. Promass F).	display only
SOFTWARE REVISION NUMBER S-DAT	8205	Use this function to display the revision number of the software used to program the S-DAT.	display only

7.37 Supervision → Version-info → Amplifier

Function name	No.	Description	Configuration
SOFTWARE REVISION NUMBER AMPLIFIER	8222	Use this function to display the software revision number of the amplifier.	display only
SOFTWARE REVISION NUMBER T-DAT	8225	Use this function to display the revision number of the software used to program the T-DAT.	display only
LANGUAGE GROUP	8226	Use this function to display the language group.	display only

7.38 Supervision → Version-info → I/O module

Function name	No.	Description	Configuration
I/O MODULE TYPE	8300	Use this function to display the configuration of the I/O module complete with terminal number.	display only
SOFTWARE REV. NUMBER I/O MODULE	9303	Use this function to display the software revision number of the I/O module.	display only

7.39 Service & Analysis → Application → Test points

Function name	No.	Description	Configuration
OSCILLATION FREQUENCY	9000	Use this function to display the current operating frequency (resonance frequency) of the measuring tubes in Hz. This depends on the sensor type and fluid density.	display only
EXCITATION CURRENT	9001	Use this function to display the effective value of the excitation current in mA.	display only
CARRIER TUBE TEMPERATURE	9002	Use this function to display the current temperature of the carrier tube.	display only

7.40 Service & Analysis → Application → Monitoring

Function name	No.	Description	Configuration
MONITORING MODE	9100	Use this function to suppress / output the following error messages: ■ #701 EXC. CURR. LIM. ■ #701 FLUID INHOM. ■ #701 NOISE LIM. CH0 ■ #701 NOISE LIM. CH0 ■ #701 FLOW LIMIT	Options: OFF = Error messages are suppressed. ON = Error messages are output.
OSCILLATION AMPLITUDE	9101	Use this function to increase or decrease the oscillating amplitude of the measuring tubes relative to the standard value of 100%.	User input: 50 to 150% of standard value
GAIN AMPLIFIER	9102	Use this function to enter the relative signal amplification	User input: 25 to 150% of standard value
MONITOR INTERVAL	9102	Use this function to specify the time from when a fault occurs to when it is signaled by means of an error message on the onsite display or at the outputs. This interval also applies to the time from when the fault is eliminated to when the error message is removed from the onsite display or the outputs.	User input: 1.0 to 100 s

7.41 Service & Analysis → Application → Gas measurement

Function name	No.	Description	Configuration
GAS MODE	9200	Use this function to select the gas mode for gas measurement: ■ OFF ■ MODE 1 (for methane or natural gas) ■ MODE 2 (for gas in GAS TYPE function) ■ ETHYLENE	Options: MODE 1 (factory setting)
GAS TYPE	9201	Use this function to select the gas type for gas mode 2: AIR, NITROGEN, ARGON, HELIUM, CO2, OXYGEN, METHANE, AMMONIA, OTHER, HYDROGEN, C2H6, C3H8, C4H10, CL2, HCL, CO, N2O, NO, H2S, SF6, C3H6, O3.	Options: METHANE (factory setting)
SOUND VELOCITY	9202	Use this function to select the sound velocity of the gas selected in the GAS TYPE function at 0 °C. Caution! The value for the sound velocity must be calculated at 0 °C and input in m/s.	User input: 5-digit floating point number, incl. sign Factory setting: depending on the option selected in the gas type function.
TEMPERATURE COEFFICIENT OF SOUND VELOCITY	9203	Use this function to enter the temperature coefficient for the sound velocity of the gas selected in the GAS TYPE function. Caution! The value for the temperature coefficient of the sound velocity must be input in 1/K.	User input: 5-digit floating point number, incl. sign Factory setting: depending on the option selected in the gas type function.
PRESSURE MODE	9204	Use this function to select the setting for pressure measuring mode within ethylene gas measurement. Note! ■ This function is not available unless the "ETHYLENE" setting was selected in the GAS MODE function . ■ The option selected is also applied to the PRESSURE MODE function (6500) and vice versa. This means that there is no need to switch to another block within the function matrix when configuring ethylene gas measurement. ■ The "MEASURED" option is available only if the measuring device has a current input.	Options: OFF No correction FIX The pressure is known and is constant within narrow limits. It is input in the PRESSURE FUNCTION. MEASURED The pressure is measured externally and read in via the current input.
PRESSURE	9204	Use this function to enter the actual process pressure during measurement. Note! ■ This function is not available unless "ETHYLENE" was selected in the GAS MODE function and "FIX" was selected in the PRESSURE MODE function. ■ The value entered here is also applied to the PRESSURE function (6501) and vice versa. This means that there is no need to switch to another block within the function matrix when configuring ethylene gas measurement. ■ The appropriate unit is taken from the function group SYSTEM UNITS (see the relevant operating instructions).	User input: –1,0133 to +99999 barg 5-digit floating point number, incl. sign

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