

No.	Device status message (local display)	PROFIBUS measured value status				Extended diagnostic message in the PROFIBUS master	Cause/remedy (Spare parts →  135ff)
		Quality code (HEX) Measured value status	Quality status	Quality substatus	Limits		
502	S: UP-/DOWNLO. ACT. !: # 502	0x48 0x49 0x4A	UNCERTAIN UNCERTAIN	Substitute set (substitute set of failsafe status)	O.K. Low High	Upload/download of device data active	<i>Cause:</i> Uploading or downloading the device data via configuration program. Currently no other functions are possible. <i>Remedy:</i> Wait until the procedure is finished.
No. # 6xx → Simulation mode active							
601	S: POS. ZERO RETURN !: # 601	0x53	UNCERTAIN UNCERTAIN	Sensor conversion not accurate (measured value from sensor not accurate)	Constant	Positive zero return active	<i>Cause:</i> Positive zero return is active.  Note! This message has the highest display priority! <i>Remedy:</i> Switch off positive zero return. <i>Access:</i> BASIC FUNCTIONS → SYSTEM PARAMETER → CONFIGURATION → POS. ZERO RETURN (→ OFF)
611 ... 614	S: SIM. CURR. OUT. n !: # 611...614	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation current output is active. <i>Remedy:</i> Switch off simulation.
621 ... 624	S: SIM. FREQ. OUT. n !: # 621...624	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation frequency output is active. <i>Remedy:</i> Switch off simulation.
631 ... 634	S: SIM. PULSE n !: # 631...634	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation pulse output is active. <i>Remedy:</i> Switch off simulation.
641 ... 644	S: SIM. STAT. OUT n !: # 641...644	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation status output is active. <i>Remedy:</i> Switch off simulation.
651 ... 654	S: SIM. RELAY n !: # 651...654	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation relay output is active. <i>Remedy:</i> Switch off simulation.
671 ... 674	S: SIM. STATUS IN n !: # 671...674	0x80	GOOD .	O.K.	O.K.	Simulation IO active	<i>Cause:</i> Simulation status output is active. <i>Remedy:</i> Switch off simulation.
691	S: SIM. FAILSAFE !: # 691	0x48 0x49 0x4A	UNCERTAIN UNCERTAIN	Substitute set (substitute set of failsafe status)	O.K. Low High	Simulation failsafe active	<i>Cause:</i> Simulation of failsafe mode (outputs) is active. <i>Remedy:</i> Switch off simulation. <i>Access:</i> SUPERVISION → SYSTEM → OPERATION → SIM. FAILSAFE MODE (→ OFF)

No.	Device status message (local display)	PROFIBUS measured value status				Extended diagnostic message in the PROFIBUS master	Cause/remedy (Spare parts →  135ff)
		Quality code (HEX) Measured value status	Quality status	Quality substatus	Limits		
692	S: SIM. MEASURAND !: # 692	0x60 0x61 0x62	UNCERTAIN UNCERTAIN	Simulated Value (manually specified value)	O.K. Low High	Simulation measured value active	<i>Cause:</i> Simulation of the measured value is active. <i>Remedy:</i> Switch off simulation. <i>Access:</i> SUPERVISION → SYSTEM → OPERATION → SIM. MEASURAND (→ OFF)
698	S: DEV. TEST ACT. !: # 698	0x60 0x61 0x62	UNCERTAIN UNCERTAIN	Simulated Value (manually specified value)	O.K. Low High	Device test via Fieldcheck active	<i>Cause:</i> The measuring device is being checked on site via the test and simulation device.
No. # 8xx → Software option errors							
840	S: COAT.E1DEVLIM !: # 840	0x40 0x41 0x42	UNCERTAIN UNCERTAIN	Non specific (uncertain status)	O.K. Low High	Delay time outside the limit	<i>Cause:</i> The measured error of the decay time constant is outside the range defined in the WARNING (7546) function. <i>Remedy:</i> Remove the sensor from the pipe and check whether the inside wall of the measuring tube has to be cleaned.
841	S: COAT.E2DEVLIM !: # 841	0x40 0x41 0x42	UNCERTAIN UNCERTAIN	Non specific (uncertain status)	O.K. Low High	Delay time outside the limit	<i>Cause:</i> The measured error of the decay time constant is outside the range defined in the WARNING (7546) function. <i>Remedy:</i> Remove the sensor from the pipe and check whether the inside wall of the measuring tube has to be cleaned.
845	S: COATING FAILURE !: # 845	0x40 0x41 0x42	UNCERTAIN UNCERTAIN	Non specific (uncertain status)	O.K. Low High	Coating detection not possible	<i>Cause:</i> Coating detection not possible: 1. The recovery time entered for this is too small. 2. The measuring tube is empty or not filled completely. <i>Remedy:</i> 1. Increase the value for the recovery time (→ RECOVERY TIME function, 7523). 2. Fill the measuring tube (if necessary, check the process conditions of the facility).
846	S: NOI.VAL.DEVLIM !: # 846	0x40 0x41 0x42	UNCERTAIN UNCERTAIN	Non specific (uncertain status)	O.K. Low High	Noise valve outside the limit	<i>Cause:</i> The measured error of the decay time constant is outside the range defined in the WARNING (7546) function. <i>Remedy:</i> Check the application for process change (pressure, air bubbles, inhomogeneity etc.).

9.3 Process error messages



Note!

Also observe the information on → 62 and → 133.

9.3.1 Displaying the device status on PROFIBUS DP/PA

For more information, refer to → 124

9.3.2 List of process error messages

No.	Device status message (local display)	PROFIBUS measured value status				Extended diagnostic message in the PROFIBUS master	Cause/remedy
		Quality code (HEX) Measured value status	Quality status	Quality substatus	Limits		
P = Process error ⚡ = Fault message (<i>with</i> and effect on operation) ! = Notice message (<i>without</i> an effect on operation)							
401	P: EMPTY PIPE ⚡: # 401	0x03	BAD BAD	Non specific (uncertain status)	Constant	Empty Pipe detected	<i>Cause:</i> Measuring tube partially filled or empty. <i>Remedy:</i> 1. Check the process conditions of the plant. 2. Fill the measuring tube.
461	P: ADJ. NOT OK !: # 461	0x40 0x41 0x42	UNCERT AIN UNCERT AIN	Non specific (uncertain status)	O.K. Low High	EPD adjustment not possible	<i>Cause:</i> EPD adjustment not possible because the fluid's conductivity is either too low or too high. <i>Remedy:</i> The EPD function cannot be used with fluids of this nature.
463	P: FULL = EMPTY ⚡: # 463	0x40 0x41 0x42	UNCERT AIN UNCERT AIN	Non specific (uncertain status)	O.K. Low High	EPD adjustment wrong	<i>Cause:</i> The EPD calibration values for empty pipe and full pipe are identical and therefore incorrect. <i>Remedy:</i> Repeat adjustment, making sure procedure is correct. → 📖 117
467	S: AO-Block Error ⚡: # 467	0x0F	BAD BAD	Device Failure Device Failure	Constant	AO-Block Error	<i>Cause:</i> The value imported cyclically using the AO block is invalid (status = BAD). <i>Remedy:</i> Ensure that the status of the imported value = GOOD. Process variables affected – calculated mass flow – target mass flow – % target mass flow – carrier mass flow – % carrier mass flow – totalizer (mass)

9.4 Process errors without messages

Symptoms	Rectification
 Note! You may have to change or correct certain settings in functions in the function matrix in order to rectify the fault. The functions outlined below, such as DISPLAY DAMPING, are described in detail in the "Description of Device Functions" manual (BA125D).	
Flow values are negative, even though the fluid is flowing forwards through the pipe.	- Remote version: - Switch off the power supply and check the wiring → 40 - If necessary, reverse the connections at terminals 41 and 42 - Change the setting in the INSTALLATION DIRECTION SENSOR function accordingly
Measured value reading fluctuates even though flow is steady.	- Check grounding and potential matching → 52 - The medium is too inhomogeneous. Check the following medium characteristics: - Gas bubble percentage too high? - Solids percentage too high? - Conductivity fluctuations too high? - Increase the following values: - Analog Input function block 1 to 2 → RISING TIME (PV_FTIME) - BASIC FUNCTIONS → SYSTEM PARAMETER → CONFIGURATION → FLOW DAMPING - Increase the value for display damping: - HOME → USER INTERFACE → CONTROL → BASIC CONFIGURATION → DISPLAY DAMPING
Measured value reading shown on display, even though the fluid is at a standstill and the measuring tube is full.	- Check grounding and potential equalization → 52 - Check the fluid for presence of gas bubbles. - Activate ON-VALUE LOW FLOW function, i.e. enter or increase on value (→ BASIC FUNCTION/PROCESSPARAMETER/CONFIGURATION).
Measured-value reading on display, even though measuring tube is empty.	- Perform empty-pipe/full-pipe adjustment and then switch on empty pipe detection → 117 - Remote version: Check the terminals of the EPD cable → 40 - Fill the measuring tube.
The fault cannot be rectified or some other fault not described above has arisen. In these instances, please contact your Endress+Hauser service organization.	The following options are available for tackling problems of this nature: ■ Request the services of an Endress+Hauser service technician If you contact our service organization to have a service technician sent out, please be ready to quote the following information: – Brief description of the fault – Nameplate specifications: order code and serial number → 7 ■ Returning devices to Endress+Hauser The required procedures must be carried out before you return a flowmeter requiring repair or calibration to Endress+Hauser. → 140 Always enclose a duly completed "Declaration of contamination" form with the flowmeter. You will find a preprinted blank of this form at the back of this manual. ■ Replace transmitter electronics Components in the measuring electronics defective → Order spare parts → 135

9.5 Failsafe mode of outputs



Note!

The failsafe mode of the current, pulse and frequency outputs can be customized by means of various functions in the function matrix. You will find detailed information on these procedures in the "Description of Device Functions" manual.

You can use positive zero return to reset the signals of the current, pulse and frequency outputs to their fallback value, or reset measured value transmission via fieldbus to "0", for example when measuring has to be interrupted while a pipe is being cleaned. This function takes priority over all other device functions. Simulations, for example, are suppressed.

Failsafe mode of outputs		
	System/process error is present	Positive zero return is activated
 Caution! System or process errors defined as "Notice messages" have no effect whatsoever on the inputs and outputs. See the information on →  62		
Current output	MINIMUM VALUE 0–20 mA → 0 mA 4–20 mA → 2 mA 4–20 mA NAMUR → 3.5 mA 4–20 mA US → 3.75 mA 0–20 mA (25 mA) → 0 mA 4–20 mA (25 mA) → 2 mA MAXIMUM VALUE 0–20 mA → 22 mA 4–20 mA → 22 mA 4–20 mA NAMUR → 22.6 mA 4–20 mA US → 22.6 mA 0–20 mA (25 mA) → 25 mA 4–20 mA (25 mA) → 25 mA HOLD VALUE Last valid value (preceding occurrence of the fault) is output. ACTUAL VALUE Fault is ignored, i.e. normal measured-value output on the basis of ongoing flow measurement.	Output signal corresponds to "zero flow"
Pulse output	FALLBACK VALUE Signal output → no pulses HOLD VALUE Last valid value (preceding occurrence of the fault) is output. ACTUAL VALUE Fault is ignored, i.e. normal measured-value output on the basis of ongoing flow measurement.	Output signal corresponds to "zero flow"
Frequency output	FALLBACK VALUE Signal output → 0 Hz FAILSAFE LEVEL Output of the frequency specified in the FAILSAFE VALUE function. HOLD VALUE Last valid value (preceding occurrence of the fault) is output. ACTUAL VALUE Fault is ignored, i.e. normal measured-value output on the basis of ongoing flow measurement.	Output signal corresponds to "zero flow"
Relay output	In the event of a fault or power supply failure: Relay → deenergized The "Description of Device Functions" manual contains detailed information on relay switching response for various configurations such as error message, flow direction, EPD, limit value, etc.	No effect on relay output
PROFIBUS	→  124	–

9.6 Spare parts

The previous sections contain a detailed troubleshooting guide. → [122](#)

The measuring device, moreover, provides additional support in the form of continuous self-diagnosis and error messages.

Fault rectification can entail replacing defective components with tested spare parts. The illustration below shows the available scope of spare parts.



Note!

You can order spare parts directly from your Endress+Hauser service organization by providing the serial number printed on the transmitter nameplate. → [7](#)

Spare parts are shipped as sets comprising the following parts:

- Spare part
- Additional parts, small items (screws etc.)
- Mounting instructions
- Packaging

9.6.1 PROFIBUS DP

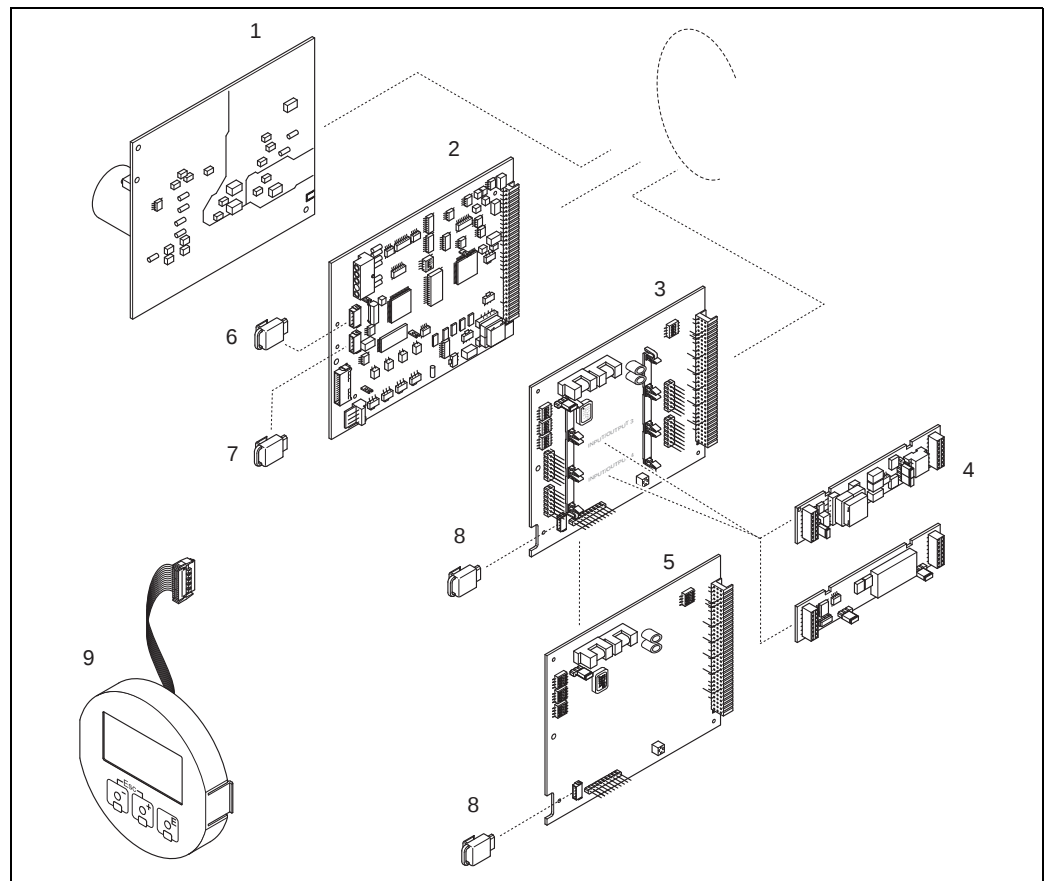
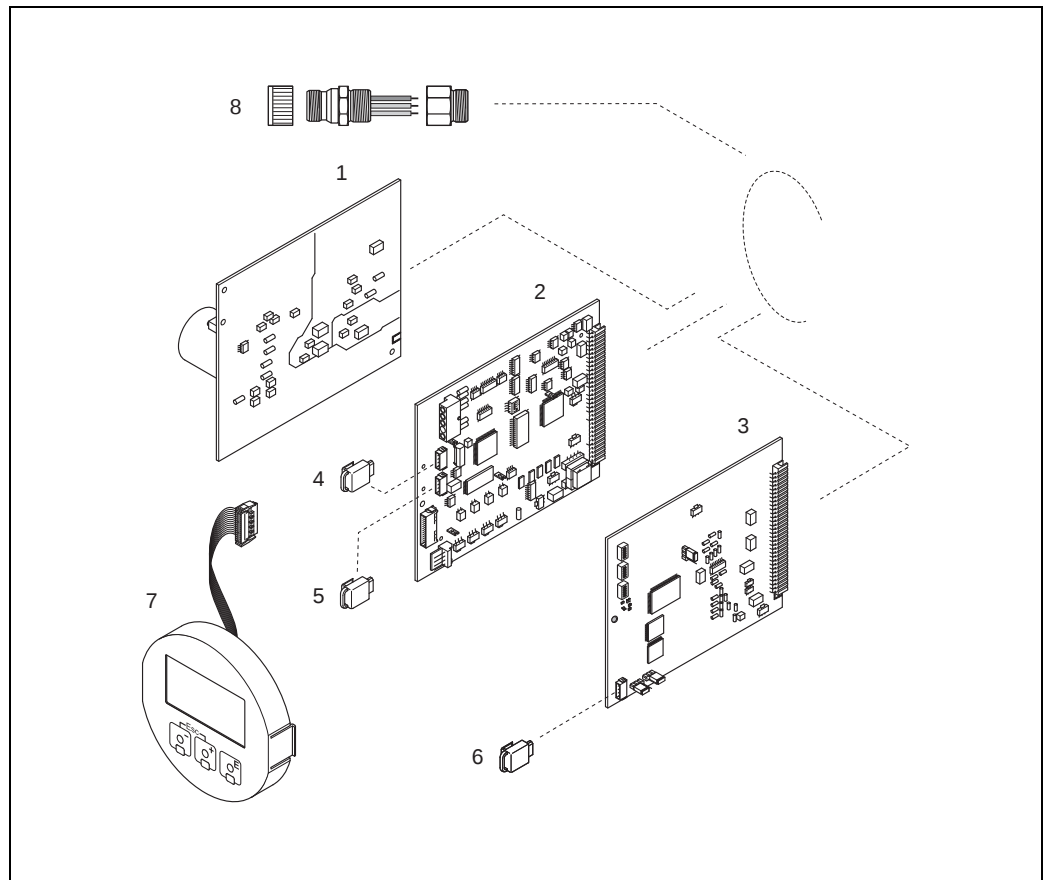


Fig. 66: Spare parts for PROFIBUS DP transmitters (field and wall-mount housing)

- 1 Power unit board (20 to 260 V AC, 20 to 64 V DC)
- 2 Amplifier board
- 3 I/O board (COM module), flexible
- 4 Pluggable input/output submodules; ordering structure → [120](#)
- 5 I/O board (COM module), permanent assignment
- 6 S-DAT (sensor data storage device)
- 7 T-DAT (transmitter data storage device)
- 8 F-CHIP (function chip for optional software)
- 9 Display module

9.6.2 PROFIBUS PA



a0004780

Fig. 67: Spare parts for PROFIBUS PA transmitters (field and wall-mount housing)

- 1 Power unit board (20 to 260 V AC, 20 to 64 V DC)
- 2 Amplifier board
- 3 I/O board (COM module), permanent assignment
- 4 S-DAT (sensor data storage device)
- 5 T-DAT (transmitter data storage device)
- 6 F-CHIP (function chip for optional software)
- 7 Display module
- 8 Fieldbus connector consisting of protection cap, connector, adapter PG 13.5/M20.5 (only for PROFIBUS-PA, order No. 50098037)

9.6.3 Removing and installing printed circuit boards

Field housing



Warning!

- Risk of electric shock. Exposed components carry dangerous voltages. Make sure that the power supply is switched off before you remove the cover of the electronics compartment.
- Risk of damaging electronic components (ESD protection). Static electricity can damage electronic components or impair their operability. Use a workplace with a grounded working surface purpose-built for electrostatically sensitive devices!
- If you cannot guarantee that the dielectric strength of the device is maintained in the following steps, then an appropriate inspection must be carried out in accordance with the manufacturer's specifications.
- When connecting Ex-certified devices, see the notes and diagrams in the Ex-specific supplement to these Operating Instructions.



Caution!

Use only original Endress+Hauser parts.

Removing and installing the boards →  68:

1. Unscrew cover of the electronics compartment from the transmitter housing.
2. Remove the local display (1) as follows:
 - Press in the latches (1.1) at the side and remove the display module.
 - Disconnect the ribbon cable (1.2) of the display module from the amplifier board.
3. Remove the screws and remove the cover (2) from the electronics compartment.
4. Remove power unit board (4) and I/O board (6):
Insert a thin pin into the hole provided (3) and pull the board clear of its holder.
5. Removing sub-modules (6.2, only for measuring devices with convertible I/O board):
No tools are required for removing the submodules (inputs/outputs) from the I/O board.
Installation is also a no-tools operation.

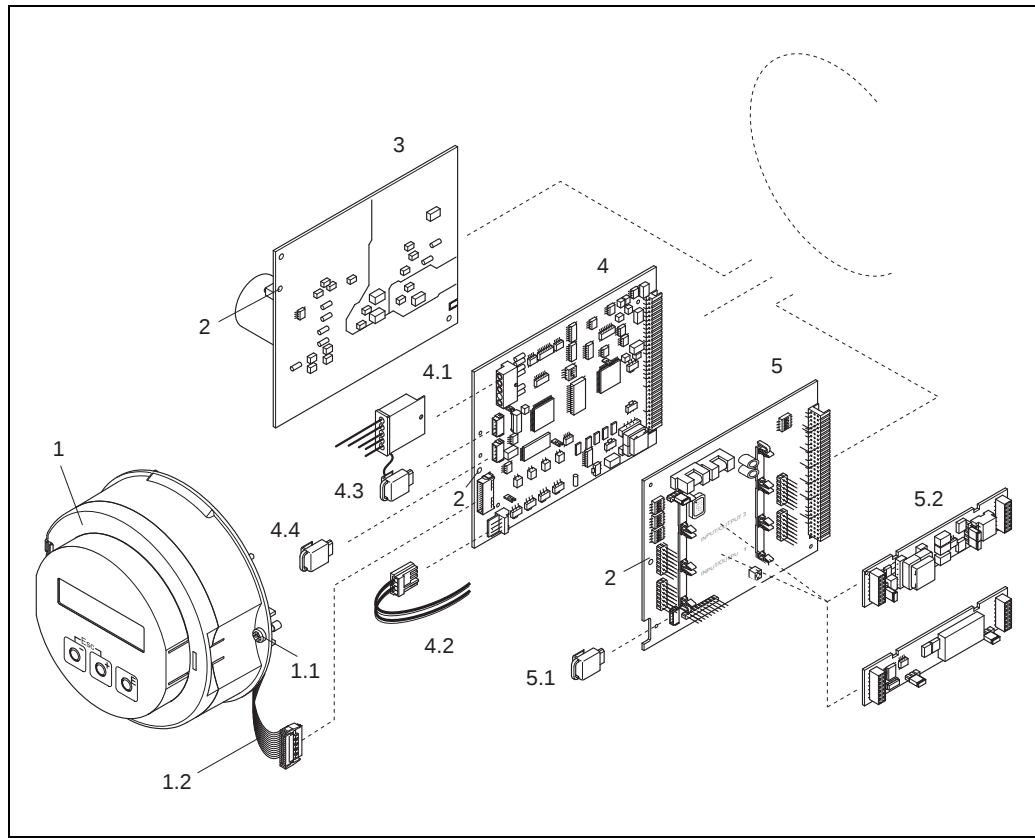


Caution!

Only certain combinations of submodules on the I/O board are permissible →  45.
The individual slots are marked and correspond to certain terminals in the connection compartment of the transmitter:

- "INPUT / OUTPUT 3" slot = terminals 22/23
- "INPUT / OUTPUT 4" slot = terminals 20/21

6. Remove amplifier board (5):
 - Disconnect the plug of the electrode signal cable (5.1) including S-DAT (5.3) from the board.
 - Loosen the plug locking of the coil current cable (5.2) and gently disconnect the plug from the board, i.e. without moving it back and forward.
 - Insert a thin pin into the hole provided (3) and pull the board clear of its holder.
7. Installation is the reverse of the removal procedure.



#0008241

Fig. 68: Field housing: removing and installing printed circuit boards

- 1 Local display
- 1.1 Screws for electronics compartment cover
- 1.2 Ribbon cable (display module)
- 2 Aperture for installing / removing boards
- 3 Power unit board
- 4 Amplifier board
- 4.1 Electrode signal cable (sensor)
- 4.2 Coil current cable (sensor)
- 4.3 S-DAT (sensor data storage device)
- 4.4 T-DAT (transmitter data storage device)
- 5 I/O board (flexible assignment)
- 5.1 F-CHIP (function chip for optional software)
- 5.2 Pluggable sub-modules (current, pulse/frequency and relay output)

9.6.4 Replacing the device fuse



Warning!

Risk of electric shock. Exposed components carry dangerous voltages. Make sure that the power supply is switched off before you remove the cover of the electronics compartment.

The main fuse is on the power supply board →  69.

The procedure for replacing the fuse is as follows:

1. Switch off power supply.
2. Remove power unit board →  137
3. Remove the protection cap (1) and replace the device fuse (2).
Use only fuses of the following type:
 - 20 to 260 V AC / 20 to 64 V DC → 2.0 A slow-blow /250 V; 5.2 × 20 mm
 - Ex-rated devices → See the Ex documentation
4. Installation is the reverse of the removal procedure.



Caution!

Use only original Endress+Hauser parts.

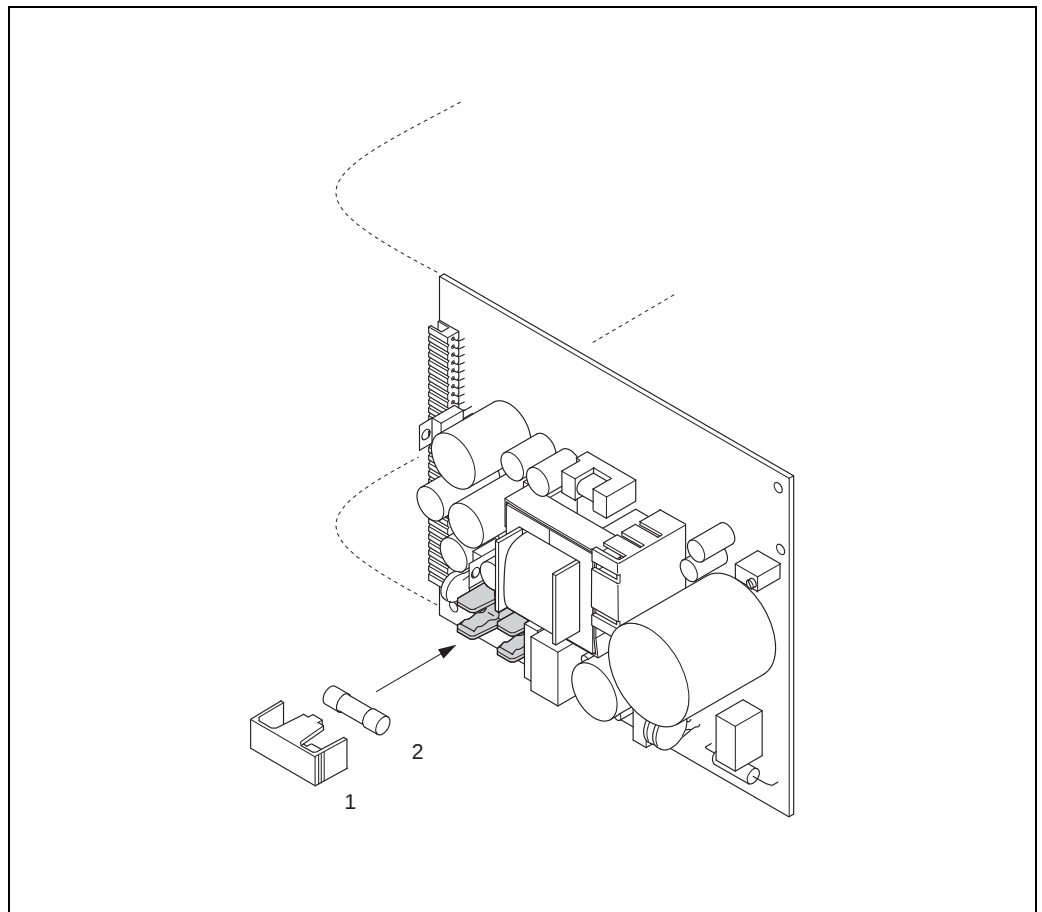


Fig. 69: Replacing the device fuse on the power unit board

- 1 Protection cap
2 Device fuse

9.7 Return



Caution!

Do not return a measuring device if you are not absolutely certain that all traces of hazardous substances have been removed, e.g. substances which have penetrated crevices or diffused through plastic.

Costs incurred for waste disposal and injury (burns, etc.) due to inadequate cleaning will be charged to the owner-operator.

The following steps must be taken before returning a flow measuring device to Endress+Hauser, e.g. for repair or calibration:

- Always enclose a duly completed "Declaration of contamination" form. Only then can Endress+Hauser transport, examine and repair a returned device.
- Enclose special handling instructions if necessary, for example a safety data sheet as per EC REACH Regulation No. 1907/2006.
- Remove all residues. Pay special attention to the grooves for seals and crevices which could contain residues. This is particularly important if the substance is hazardous to health, e.g. flammable, toxic, caustic, carcinogenic, etc.



Note!

You will find a preprinted "Declaration of contamination" form at the back of this Operating Manual.

9.8 Disposal

Please observe the regulations applicable in your country or region.

9.9 Software history

Date	Software version	Changes to software	Documentation
06.2010	PROFIBUS DP/PA 3.06.XX	Introduction of a new PROFIBUS DP I/O board	71116509/06.10
12.2007	PROFIBUS PA 3.05.XX	Introduction of a new PROFIBUS PA I/O board	71065431/12.07
09.2006	PROFIBUS PA 2.03.XX	Original software	71028542/09.06

10 Technical data

10.1 Technical data at a glance

10.1.1 Applications

Liner specific applications:

- Promag S (DN 15 to 600 / ½ to 24"):
 - Polyurethane lining for applications using cold water and for abrasive fluids, e.g. for sludge with particles smaller than 0.5 mm (<0.02 inch)
 - Hard rubber lining for all applications with water (especially for drinking water)
 - Natural rubber lining for all water applications and for highly abrasive fluids, e.g. for sludge with particles larger than 0.5 mm (>0.02 inch)
 - PTFE lining for standard applications in the paper and food industries
 - PFA lining for all applications in the paper and food industries; especially for high process temperatures and applications with temperature shocks.
- Promag H (DN 2 to 100) / 1/12 to 4"):
 - PFA lining for all applications in chemical, process and food industries; especially for high process temperatures, for applications with temperature shocks and for applications with CIP or SIP cleaning processes.

10.1.2 Function and system design

Measuring principle	Electromagnetic flow measurement on the basis of Faraday's Law.
Measuring system	The flow measuring system consists of the following components: ■ Promag 55 transmitter ■ Promag S sensor (DN 15 to 600 / ½ to 24") ■ Promag H Sensor (DN 2 to 100 / 1/12 to 4") Two versions are available: ■ Compact version: Transmitter and sensor form a single mechanical unit. ■ Remote version: Transmitter and sensor are installed separately.
Measured variable	■ Flow rate (proportional to induced voltage) ■ Conductivity (without temperature compensation)
Measuring range	■ Flow rate: Typical $v = 0.01$ to 10 m/s (0.03 to 33 ft/s) with the specified measuring accuracy ■ Conductivity $s = 5$ to 2000 $\mu\text{S}/\text{cm}$ not for sensors without reference electrode (Promag H, Promag S with brush electrodes)
Operable flow range	Over 1000 : 1

10.1.4 Output

Output signal

Current output

Active/passive selectable, galvanically isolated, time constant selectable (0.01 to 100 s), Full scale value adjustable, temperature coefficient: typically 0.005% o.r./°C, resolution: 0.5 µA

- Active: 0/4 to 20 mA, R_L max. 700 Ω
- Passive: 4 to 20 mA; supply voltage V_S 18 to 30 V DC; $R_i \geq 150 \Omega$

Pulse/frequency output:

Active/passive selectable, galvanically isolated

- Active: 24 V DC, 25 mA (max. 250 mA during 20 ms), $R_L > 100 \Omega$
- Passive: open collector, 30 V DC, 250 mA
- Frequency output: full scale 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 configur. (0.05 to 2000 ms)

PROFIBUS DP interface:

- PROFIBUS DP in accordance with IEC 61158, galvanically isolated
- Profile Version 3.0
- Data transmission rate: 9.6 kBaud to 12 MBaud
- Automatic identification of data transmission rate
- Signal coding: NRZ code
- Bus address can be configured via miniature switches or via the local display (optional)

PROFIBUS PA interface:

- PROFIBUS PA in accordance with IEC 61158 (MBP), galvanically isolated
- Profile Version 3.0
- Data transmission rate: 31.25 kBaud
- Current consumption: 11 mA
- Permitted supply voltage: 9 to 32 V
- Bus connection with integrated reverse polarity protection
- Error current FDE (Fault Disconnection Electronic): 0 mA
- Signal coding: Manchester II
- Bus address can be configured via miniature switches or via the local display (optional)

Low flow cut off

Switch points for low flow freely selectable.

Galvanic isolation

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

10.1.5 Power supply

Electrical connections	→  36
Supply voltage	20 to 260 V AC, 45 to 65 Hz 20 to 64 V DC
Cable entries	Power supply and signal cables (inputs/outputs): ■ Cable gland M20 × 1.5 (8 to 12 mm / 0.31 to 0.47 inch) ■ Sensor cable gland for armored cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63 inch) ■ Cable entries for thread ½" NPT, G ½" Connecting cable for remote version: ■ Cable gland M20 × 1.5 (8 to 12 mm / 0.31 to 0.47 inch) ■ Sensor cable gland for armored cables M20 × 1.5 (9.5 to 16 mm / 0.37 to 0.63 inch) ■ Cable entries for thread ½" NPT, G ½"
Cable specifications (remote version)	→  44
Power consumption	AC: <45 VA at 260 V AC; <30 VA at 110 V AC (incl. sensor) DC: <19 W (including sensor) Switch-on current: ■ max. 2.50 A (<200 ms) at 24 V DC ■ max. 2.50 A (<5 ms) at 110 V AC ■ max. 5.50 A (<5 ms) at 260 V AC
Power supply failure	Lasting min. 1 power cycle: ■ EEPROM or HistoROM/T-DAT saves measuring system data if power supply fails ■ HistoROM/S-DAT: exchangeable data storage device which stores sensor characteristic data (nominal diameter, serial number, calibration factor, zero point etc.)
Potential equalization	→  52

10.1.6 Measuring accuracy

Reference conditions	To DIN EN 29104 and VDI/VDE 2641: ■ Fluid temperature: $+28\text{ }^{\circ}\text{C} \pm 2\text{ K}$ ■ Ambient temperature: $+22\text{ }^{\circ}\text{C} \pm 2\text{ K}$ ■ Warm-up time: 30 minutes Installation: ■ Inlet run $>10 \times \text{DN}$ ■ Outlet run $> 5 \times \text{DN}$ ■ Sensor and transmitter grounded. ■ Sensor centered relative to the pipe.
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Maximum measured error	<i>Volume flow</i> Pulse output: ■ Standard: $\pm 0.2\%$ o.r. $\pm 2\text{ mm/s}$ (o.r. = of reading) ■ With option brush electrodes: $\pm 0.5\%$ o.r. $\pm 2\text{ mm/s}$ (o.r. = of reading) Current output: in addition typically $\pm 5\text{ }\mu\text{A}$  Note! Supply-voltage fluctuations have no effect within the specified range.
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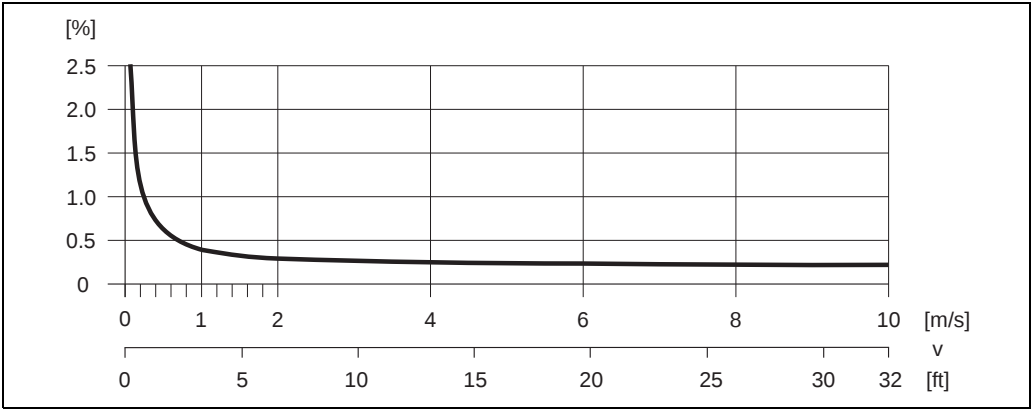


Fig. 70: Max. measured error in % of reading

- Conductivity*
- Max. measuring error not specified
 - Without temperature compensation

Repeatability	<i>Volume flow</i> ■ Standard: max. $\pm 0.1\%$ o.r. $\pm 0.5\text{ mm/s}$ (o.r. = of reading) ■ With brush electrodes (Option): max. $\pm 0.2\%$ o.r. $\pm 0.5\text{ mm/s}$ (o.r. = of reading) <i>Conductivity</i> ■ Max. $\pm 5\%$ o.r. (o.r. = of reading)
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10.1.7 Operating conditions: Installation

Installation instructions	→  13
Inlet and outlet runs	Inlet run: typically $\geq 5 \times \text{DN}$ Outlet run: typically $\geq 2 \times \text{DN}$
Length of connecting cable	The permissible cable length L_{max} for the remote version depends on the conductivity of the medium →  21

10.1.8 Operating conditions: Environment

Ambient temperature	Transmitter: ■ Standard: – Compact version: -20 to $+50$ °C (-4 to $+122$ °F) – Remote version: -20 to $+60$ °C (-4 to $+140$ °F) ■ Optional: – Compact version: -40 to $+50$ °C (-40 to $+122$ °F) – Remote version: -40 to $+60$ °C (-40 to $+140$ °F)  Note! At ambient temperatures below -20 °C (-4 °F), the readability of the display may be impaired. Sensor: ■ Flange material, carbon steel: -10 to $+60$ °C ($+14$ to $+140$ °F) ■ Flange material, stainless steel: -40 to $+60$ °C (-40 to $+140$ °F)  Caution! Do not exceed the min. and max. temperatures for the lining of the measuring tube (→ "Medium temperature range"). Note the following points: ■ Install the device at a shady location. Avoid direct sunlight, particularly in warm climatic regions. ■ If both fluid and ambient temperatures are high, install the transmitter at a remote location from the sensor (→ "Medium temperature range").
Storage temperature	The storage temperature corresponds to the operating temperature range of the transmitter and sensor.
Degree of protection	■ Standard: IP 67 (NEMA 4X) for transmitter and sensor ■ Optional: IP 68 (NEMA 6P) for remote version of Promag S sensor
Shock and vibration resistance	Acceleration up to 2 g by analogy with IEC 600 68-2-6 (High temperature version: no data available)
CIP / SIP cleaning	Promag S: possible with PFA (note max. temperature) not possible with PU, PTFE, hard rubber, natural rubber Promag H: possible (note max. temperature)
Electromagnetic compatibility (EMC)	According to IEC/EN 61326 and NAMUR recommendation NE 21

10.1.9 Operating conditions: Process

Medium temperature range

The permitted temperature depends on the lining of the measuring tube:

Promag S

- Hard rubber: 0 to +80 °C (+32 to +176 °F)
- Natural rubber: 0 to +60 °C (+32 to +140 °F)
- Polyurethane: -20 to +50 °C (-4 to +122 °F)
- PFA: -20 to +180 °C (-4 to +356 °F), restrictions → see diagrams
- PTFE: -40 to +130 °C (-40 to +266 °F), restrictions → see diagrams

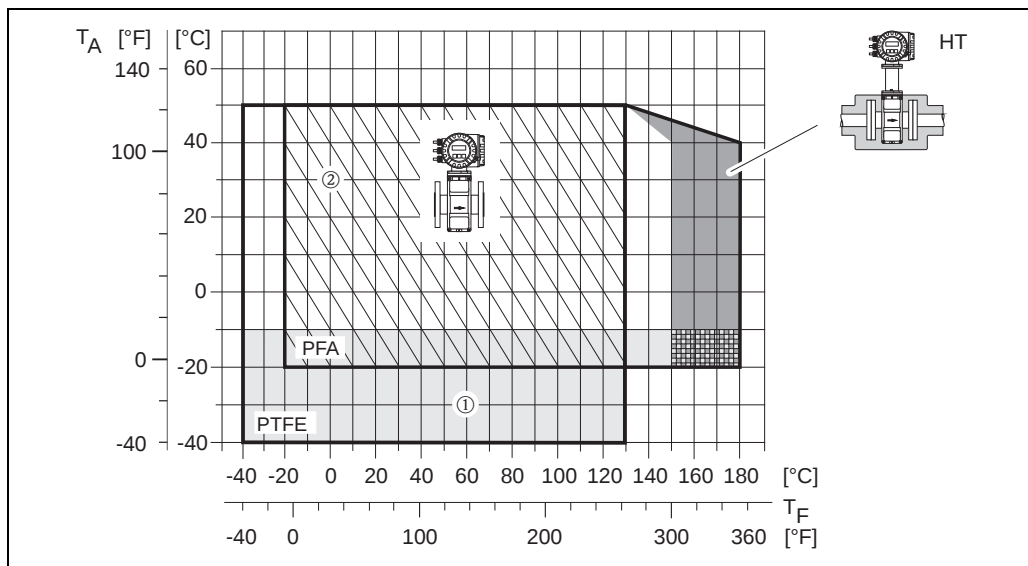


Fig. 71: Compact versions of Promag S (with PFA or PTFE lining)

T_A = ambient temperature; T_F = fluid temperature; HT = high-temperature version with insulation

- ① = Light gray area → Temperature range from -10 to 40 °C (-14 to -40 °F) applies only to stainless steel flanges
- ② = Diagonally hatched area → foam lining (HE) + degree of protection IP68 = fluid temperature max. 130°C

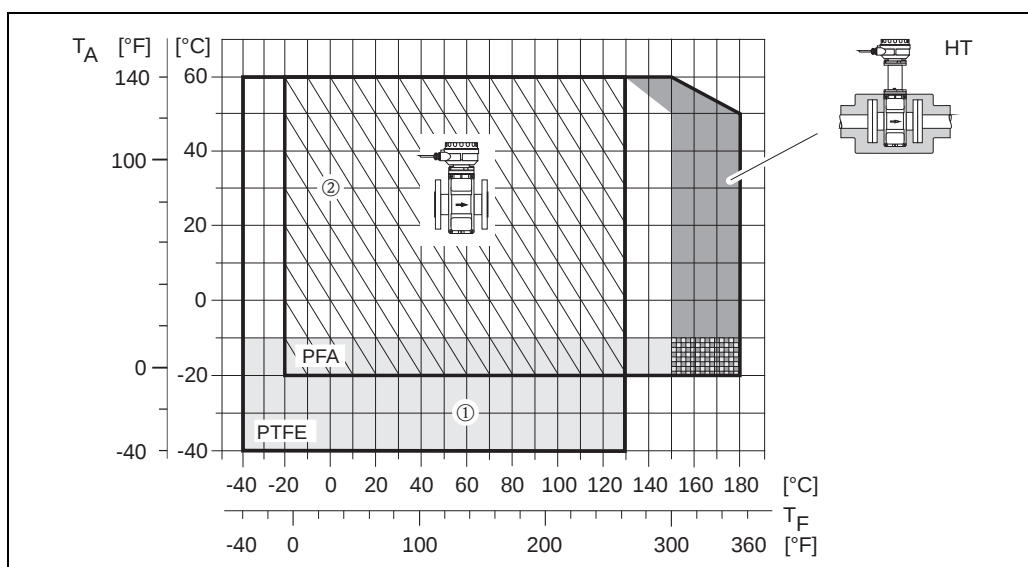


Fig. 72: Remote versions (with PFA or PTFE lining)

T_A = ambient temperature; T_F = fluid temperature; HT = high-temperature version with insulation

- ① = Light gray area → Temperature range from -10 to 40 °C (-14 to -40 °F) applies only to stainless steel flanges
- ② = Diagonally hatched area → foam lining (HE) + degree of protection IP68 = fluid temperature max. 130°C

Promag H

Sensor:

- DN 2 to 25: -20 to +150 °C (-4 to +302 °F)
- DN 40 to 100: -20 to +150 °C (-4 to +302 °F)

Seals:

- EPDM: -20 to +150 °C (-4 to +302 °F)
- Silicone: -20 to +150 °C (-4 to +302 °F)
- Viton: -20 to +150 °C (-4 to +302 °F)
- Kalrez: -20 to +150 °C (-4 to +302 °F)

Conductivity

Minimum conductivity:

- $\geq 5 \mu\text{S}/\text{cm}$ for all liquids (incl. demineralized water)



Note!

In the remote version, the required minimum conductivity is also influenced by the length of the cable →  21

Fluid pressure range (nominal pressure)

Promag S:

- EN 1092-1 (DIN 2501): PN 10 (DN 200 to 600/8 to 24"), PN 16 (DN 65 to 600/2½ to 24"), PN 25 (DN 200 to 600/8 to 24"), PN 40 (DN 15 to 150/½ to 6")
- ANSI B16.5: Class 150 (DN ½ to 24"), Class 300 (DN ½ to 6")
- JIS B2220: 10 K (DN 50 to 300/2 to 12"), 20 K (DN 15 to 300/½ to 12")
- AS 2129: Table E (DN 25/1", DN 50/2")
- AS 4087: Cl. 14 (DN 50/2")

Promag H:

The permissible nominal pressure depends on the process connection and seal:

- 40 bar: flange, weld nipple (with O-ring seal)
- 16 bar: all other process connections

Pressure tightness (liner)

Pressure tightness in SI units [mbar]

Promag S Nominal diameter [mm]	Measuring tube lining	Pressure tightness of measuring tube lining (SI units) Limit values for abs. pressure [mbar] at various fluid temperatures						
		25 °C	50 °C	80 °C	100 °C	130 °C	150 °C	180 °C
25...600	Polyurethane	0	0	–	–	–	–	–
65...600	Natural rubber	0	0	–	–	–	–	–
50...600	Hard rubber	0	0	0	–	–	–	–

Promag S Nominal diameter [mm]	Measuring tube lining	Pressure tightness of measuring tube lining (SI units) Limit values for abs. pressure [mbar] at various fluid temperatures					
		25 °C	80° C	100 °C	130 °C	150 °C	180 °C
15	PTFE	0	0	0	100	–	–
25	PTFE / PFA	0/0	0/0	0/0	100/0	–/0	–/0
32	PTFE / PFA	0/0	0/0	0/0	100/0	–/0	–/0
40	PTFE / PFA	0/0	0/0	0/0	100/0	–/0	–/0
50	PTFE / PFA	0/0	0/0	0/0	100/0	–/0	–/0
65	PTFE / PFA	0/0	*	40/0	130/0	–/0	–/0
80	PTFE / PFA	0/0	*	40/0	130/0	–/0	–/0
100	PTFE / PFA	0/0	*	135/0	170/0	–/0	–/0
125	PTFE / PFA	135/0	*	240/0	385/0	–/0	–/0
150	PTFE / PFA	135/0	*	240/0	385/0	–/0	–/0
200	PTFE / PFA	200/0	*	290/0	410/0	–/0	–/0
250	PTFE	330	*	400	530	–	–
300	PTFE	400	*	500	630	–	–
350	PTFE	470	*	600	730	–	–
400	PTFE	540	*	670	800	–	–
450	PTFE	Partial vacuum is impermissible					
500	PTFE						
600	PTFE						
* No value can be quoted.							

Promag H Nominal diameter [mm]	Measuring tube lining	Pressure tightness of measuring tube lining (SI units) Limit values for abs. pressure [mbar] at various fluid temperatures					
		25 °C	80 °C	100 °C	130 °C	150 °C	180 °C
2...100	PFA	0	0	0	0	0	0

Pressure tightness in US units [psi = pounds/inch²]

Promag S Nominal diameter [inch]	Measuring tube lining	Pressure tightness of measuring tube lining (US units) Limit values for abs. pressure [psi] at various fluid temperatures						
		77 °F	122 °F	176 °F	212 °F	266 °F	302 °F	356 °F
1...24"	Polyurethane	0	0	–	–	–	–	–
3...24"	Natural rubber	0	0	–	–	–	–	–
2...24"	Hard rubber	0	0	0	–	–	–	–

Promag S Nominal diameter [inch]	Measuring tube lining	Pressure tightness of measuring tube lining (US units) Limit values for abs. pressure [psi] at various fluid temperatures					
		77 °F	176 °F	212 °F	266 °F	302 °F	356 °F
½"	PTFE	0	0	0	1.5	–	–
1"	PTFE / PFA	0/0	0/0	0/0	1.5/0	–/0	–/0
–	PTFE / PFA	0/0	0/0	0/0	1.5/0	–/0	–/0
1 ½"	PTFE / PFA	0/0	0/0	0/0	1.5/0	–/0	–/0
2"	PTFE / PFA	0/0	0/0	0/0	1.5/0	–/0	–/0
–	PTFE / PFA	0/0	*	0.6/0	1.9/0	–/0	–/0
3"	PTFE / PFA	0/0	*	0.6/0	1.9/0	–/0	–/0
4"	PTFE / PFA	0/0	*	2.0/0	2.5/0	–/0	–/0
–	PTFE / PFA	2.0/0	*	3.5/0	5.6/0	–/0	–/0
6"	PTFE / PFA	2.0/0	*	3.5/0	5.6/0	–/0	–/0
8"	PTFE / PFA	2.9/0	*	4.2/0	5.9/0	–/0	–/0
10"	PTFE	4.8	*	5.8	7.7	–	–
12"	PTFE	5.8	*	7.3	9.1	–	–
14"	PTFE	6.8	*	8.7	10.6	–	–
16"	PTFE	7.8	*	9.7	11.6	–	–
18"	PTFE	Partial vacuum is impermissible					
20"	PTFE						
24"	PTFE						
* No value can be quoted.							

Promag H Nominal diameter [inch]	Measuring tube lining	Pressure tightness of measuring tube lining (US units) Limit values for abs. pressure [psi] at various fluid temperatures						
		77 °F	176 °F	212 °F	266 °F	302 °F	356 °F	
1/12...4"	PFA	0	0	0	0	0	0	

Limiting flow

Further information can be found in the section "Nominal diameter and flow rate" → 18

Pressure loss

- No pressure loss if the sensor is installed in a pipe of the same nominal diameter.
- Pressure losses for configurations incorporating adapters according to DIN EN 545 → 17

10.1.10 Mechanical construction

Design / dimensions

The dimensions and face-to-face length of the sensor and transmitter can be found in the separate "Technical Information" for each device which can be downloaded in PDF format from www.endress.com. A list of the available "Technical information" documents can be found in the "Supplementary documentation" section →  156.

Weight (SI units)



Promag S

Note!

The following weights apply to standard pressure ratings and without packaging material.

Nominal diameter	Weight in kilograms [kg]						
	Compact version				Remote version (without cable)		
				Sensor		Transmitter	
[mm]	EN (DIN) / AS*		JIS	EN (DIN) / AS*		JIS	(Wall-mount housing)
15	PN 40	6.5	6.5	PN 40	4.5	4.5	6.0
25		7.3			5.3		6.0
32		8.0			6.0		6.0
40		9.4			7.4		6.0
50		10.6			8.6		6.0
65	PN 16	12.0	10K	PN 16	10.0	10K	6.0
80		14.0			12.0		6.0
100		16.0			14.0		6.0
125		21.5			19.5		6.0
150		25.5			23.5		6.0
200	PN 10	45	10K	PN 10	43	10K	6.0
250		65			63		6.0
300		70			68		6.0
350		115			113		6.0
400		135			133		6.0
450		175			173		6.0
500		175			173		6.0
600		235			233		6.0
Transmitter (compact version): 3.4 kg High-temperature version: +1.5 kg * Only DN 25 and 50 are available for flanges according to AS							

Promag H

Note!

The following weights apply to standard pressure ratings and without packaging material.

Nominal diameter DIN [mm]	Weight in kilograms [kg]		
	Compact version	Remote version (without cable)	
		Sensor	Transmitter
2	5.2	2.0	6.0
4	5.2	2.0	6.0
8	5.3	2.0	6.0
15	5.4	1.9	6.0
25	5.5	2.3	6.0
40	6.5	4.5	6.0
50	9.0	7.0	6.0
65	9.5	7.5	6.0
80	19.0	17.0	6.0
100	18.5	16.5	6.0
Promag transmitter (compact version): 3.4 kg			

Weight (US units)

Promag S

Note!

The following weights apply to standard pressure ratings and without packaging material.

Nominal diameter	Weight in pounds [lbs]				
	Compact version		Remote version (without cable)		
			Sensor	Transmitter	
[inch]	ANSI		ANSI	(Wall-mount housing)	
½"	Class 150	14	Class 150	10	13
1"		16		12	13
1 ½"		21		16	13
2"		23		19	13
3"		31		26	13
4"		35		31	13
6"		56		52	13
8"		99		95	13
10"		165		161	13
12"		243		238	13
14"		386		381	13
16"		452		448	13
18"		562		558	13
20"		628		624	13
24"	893	889	13		
Transmitter (compact version): 7.5 lbs High-temperature version: +3.3 lbs					

Promag H

Note!

The following weights apply to standard pressure ratings and without packaging material.

Nominal diameter ANSI [inch]	Promag H weight in pounds (lbs)		
	Compact version	Remote version (without cable)	
		Sensor	Transmitter
1/12"	11.5	4.4	13.5
5/32"	11.5	4.4	13.5
5/16"	11.7	4.4	13.5
1/2"	11.9	4.2	13.5
1"	12.1	5.1	13.5
Promag transmitter (compact version): 7.5 kg			

Materials

Promag S

Transmitter housing:

- Compact and remote version: Powder-coated die-cast aluminum

Sensor housing:

- DN 15 to 300 (1/2 to 12"): powder-coated die-cast aluminum
- DN 350 to 600 (14 to 24"): painted steel

Measuring tube:

- DN < 350 (14"): stainless steel 1.4301 or 1.4306/304L
Non-stainless flange material with Al/Zn protective coating.
- DN > 300 (12"): stainless steel 1.4301/304
For flanges made of carbon steel with protective varnish.

Flanges:

- EN 1092-1 (DIN 2501): 316L / 1.4571 (SS 316Ti); RSt37-2 (S235JRG2) / C22 / FE 410W B
(DN < 350/14": with Al/Zn protective coating; DN > 300/12" with protective varnish)
- ANSI: A105; F316L
(DN < 350/14" with Al/Zn protective coating; DN > 300/12" with protective varnish)
- JIS: RSt37-2 (S235JRG2) / HII / 1.0425 / 316L
(DN < 350/14" with Al/Zn protective coating; DN > 300/12" with protective varnish)
- AS 2129:
 - DN 25 (1"): A105 or RSt37-2 (S235JRG2), with Al/Zn protective coating
 - DN 50 (2"): A105 or St44-2 (S275JR), with Al/Zn protective coating
- AS 4087:
 - DN 50 (2"): A105 or St44-2 (S275JR), with Al/Zn protective coating

Ground disks:

- 1.4435/316L
- Alloy C-22

Electrodes:

- 1.4435 (with tungsten carbide coating)
- Platinum
- Alloy C-22
- Tantalum
- Titanium Gr. 2
- Duplex 1.4462
- For brush electrodes:
 - 1.4310/302
 - Alloy X750

Seals:

- according to DIN EN 1514-1

Promag H

Transmitter housing:

- Compact housing: Powder-coated die-cast aluminum or stainless steel field housing (1.4301/316L)
- Wall-mount housing: Powder-coated die-cast aluminum
- Window material: glass or polycarbonate
- Sensor housing: stainless steel 1.4301
- Wall mounting kit (holder panel): stainless steel 1.4301
- Measuring tube: stainless steel 1.4301
- Liner material: PFA*

Flanges:

- Connection generally made of stainless steel 1.4404/316L
- Flanges (EN (DIN), ANSI, JIS) also in PVDF
- Adhesive fitting made of PVC

Electrodes:

- Standard: 1.4435
- Optional: Alloy C-22, tantalum, platinum (only up to DN 25 (1"))

Seals:

- DN 2 to 25: O-ring (EPDM, Viton, Kalrez) or molded seal (EPDM*, silicone*, Viton)
- DN 40 to 100: molded seal (EPDM*, silicone*)

Grounding rings:

- Standard: 1.4435/316L,
- Optional: Alloy C-22, tantalum

* According to approval: USP Class VI; FDA 21 CFR 177.2600; 3A

Material load diagrams

The material load diagrams (pressure-temperature diagrams) for the process connections can be found in the separate "Technical Information", which you can download in PDF format from www.endress.com.

A list of the available "Technical Information" documents can be found in the "Supplementary documentation" section →  156.

Fitted electrodes

Promag S

Available as standard:

- 2 measuring electrodes for signal detection
- 1 EPD electrode for empty pipe detection
- 1 Reference electrode for potential equalization

Optionally available for measuring electrodes made of platinum:

- 1 EPD electrode for empty pipe detection
- 1 Reference electrode for potential equalization

For measuring tube with natural rubber lining in combination with brush electrodes:

- 2 brush electrodes for signal detection

Promag H

- 2 measuring electrodes for signal detection
- 1 EPD electrode for empty pipe detection, not for DN 2 to 15 (1/12" to 1/2")

Process connections

Promag S

Flange connection:

- EN 1092-1 (DIN 2501)
 - DN < 300 (12"): form A
 - DN > 300 (12"): form B
 - DN 65 (2½") PN 16 and DN 600 (24") PN 16 exclusively according to EN 1092-1
- ANSI
- JIS
- AS

Promag H

With O-ring:

- Welding nozzle DIN (EN), ISO 1127, ODT/SMS
- Flange EN (DIN), ANSI, JIS
- Flange made of PVDF EN (DIN), ANSI, JIS
- External thread
- Internal thread
- Hose connection
- PVC adhesive fitting

With molded seal:

- Welding nozzle DIN 11850, ODT/SMS
- Clamp ISO 2852, DIN 32676, L14 AM7
- Coupling DIN 11851, DIN 11864-1, ISO 2853, SMS 1145
- Flange DIN 11864-2

Surface roughness

- Lining with PFA: ≤0.4 µm (16 µin)
- Electrodes: 0.3 to 0.5 µm (12 to 20 µin)
- Process connection made of stainless steel: ≤0.8 µm (31 µin)

All data relate to wetted parts.

10.1.11 Human interface

Display elements

- Liquid crystal display: illuminated, four lines with 16 characters per line
- Custom configurations for presenting different measured values and status variables
- 3 totalizers
- At ambient temperatures below –20 °C (–4 °F), the readability of the display may be impaired.

Operating elements

- Onsite operation with three optical sensor keys (□/+/E)
- Application-specific Quick Setup menus for straightforward commissioning

Language groups

Language groups available for operation in different countries:

- Western Europe and America (WEA):
English, German, Spanish, Italian, French, Dutch and Portuguese
- Eastern Europe/Scandinavia (EES):
English, Russian, Polish, Norwegian, Finnish, Swedish and Czech.
- South and East Asia (SEA):
English, Japanese, Indonesian
- China (CN):
English, Chinese



Note!

You can change the language group via the operating program "FieldCare".

10.1.12 Certificates and approvals

CE mark	The measuring system described in these Operating Instructions therefore complies with the legal requirements of the EU Directives. Endress+Hauser confirms this by affixing the CE mark to it and by issuing the CE declaration of conformity.
C-tick mark	The measuring system meets the EMC requirements of the "Australian Communications and Media Authority (ACMA)".
Ex approval	Information on the currently available Ex-rated versions (ATEX, FM, CSA, etc.) is available on request from your Endress+Hauser sales outlet. All explosion protection data are given in a separate documentation which is available upon request.
Sanitary compatibility	<i>Promag S</i> no applicable approvals or certification <i>Promag H</i> ■ 3A authorization and EHEDG-tested ■ Seals in conformity with FDA (except Kalrez seals)
Certification PROFIBUS	The flowmeter has successfully passed all the test procedures carried out and is certified and registered by the PNO (PROFIBUS User Organization). The device thus meets all the requirements of the following specifications: ■ Certified in accordance with PROFIBUS Profile Version 3.0 (device certification number: available on request) ■ The measuring device can also be operated with certified devices of other manufacturers (interoperability).
Pressure measuring device approval	The measuring devices can be ordered with or without PED (Pressure Equipment Directive). If a device with PED is required, this must be ordered explicitly. For devices with nominal diameters less than or equal to DN 25 (1"), this is neither possible nor necessary. ■ 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 with this identification (with PED) are suitable for the following types of fluid: – Fluids of Group 1 and 2 with a steam pressure of greater or less than 0.5 bar (7.3 psi) – Unstable gases ■ Devices without this identification (without PED) are designed and manufactured according to good engineering practice. They correspond to the requirements of Art. 3, Section 3 of the Pressure Equipment Directive 97/23/EC. Their application is illustrated in Diagrams 6 to 9 in Appendix II of the Pressure Equipment Directive 97/23/EC.

Other standards and guidelines

- EN 60529
Degrees of protection by housing (IP code)
- EN 61010-1
Protection Measures for Electrical Equipment for Measurement, Control, Regulation and Laboratory Procedures.
- IEC/EN 61326
"Emission in accordance with requirements for class A".
Electromagnetic compatibility (EMC requirements).
- ANSI/ISA-S82.01
Safety Standard for Electrical and Electronic Test, Measuring, Controlling and related Equipment - General Requirements. Pollution degree 2, Installation Category II.
- CAN/CSA-C22.2 (No. 1010.1-92)
Safety requirements for Electrical Equipment for Measurement and Control and Laboratory Use. Pollution degree 2, Installation Category I.
- 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.

10.1.13 Ordering information

The Endress+Hauser service organization can provide detailed ordering information and information on specific order codes on request.

10.1.14 Accessories

Various accessories are available for the transmitter and the sensor. These can be ordered separately from Endress+Hauser →  120



Note!

The Endress+Hauser service organization can provide detailed information on the order codes of your choice.

10.1.15 Documentation

- Flow Measurement (FA005D/06/en)
- Promag 55S Technical Information (TI071D/06/en)
- Promag 55H Technical Information (TI096D/06/en)
- Promag 55 Description of Device Functions (BA125D/06/en)
- Supplementary documentation on Ex-ratings: ATEX, FM, CSA

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Declaration of Hazardous Material and De-Contamination Erklärung zur Kontamination und Reinigung

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Type of instrument / sensor

Geräte-/Sensortyp

Serial number

Seriennummer

☐ Used as SIL device in a Safety Instrumented System / Einsatz als SIL Gerät in Schutzeinrichtungen

Process data / Prozessdaten

Temperature / Temperatur _____ [°F] _____ [°C]

Pressure / Druck _____ [psi] _____ [Pa]

Conductivity / Leitfähigkeit _____ [µS/cm]

Viscosity / Viskosität _____ [cp] _____ [mm²/s]

Medium and warnings

Warnhinweise zum Medium



	Medium /concentration Medium /Konzentration	Identification CAS No.	flammable entzündlich	toxic giftig	corrosive ätzend	harmful/ irritant gesundheits- schädlich/ reizend	other * sonstiges*	harmless unbedenklich
Process medium Medium im Prozess								
Medium for process cleaning Medium zur Prozessreinigung								
Returned part cleaned with Medium zur Endreinigung								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive

* explosiv; brandfördernd; umweltgefährlich; biogefährlich; radioaktiv

Please tick should one of the above be applicable, include safety data sheet and, if necessary, special handling instructions.

Zutreffendes ankreuzen; trifft einer der Warnhinweise zu, Sicherheitsdatenblatt und ggf. spezielle Handhabungsvorschriften beilegen.

Description of failure / Fehlerbeschreibung

Company data / Angaben zum Absender

Company / Firma	Phone number of contact person / Telefon-Nr. Ansprechpartner:
Address / Adresse	Fax / E-Mail
	Your order No. / Ihre Auftragsnr.

"We hereby certify that this declaration is filled out truthfully and completely to the best of our knowledge. We further certify that the returned parts have been carefully cleaned. To the best of our knowledge they are free of any residues in dangerous quantities."

"Wir bestätigen, die vorliegende Erklärung nach unserem besten Wissen wahrheitsgetreu und vollständig ausgefüllt zu haben. Wir bestätigen weiter, dass die zurückgesandten Teile sorgfältig gereinigt wurden und nach unserem besten Wissen frei von Rückständen in gefährlichen Mengen sind."

(place, date / Ort, Datum)

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