

CoriolisMaster FCM2000 Mass Flowmeter

4-wire Compact Design
Digital Signal Processor
Transmitter Technology



Coriolis Mass Flowmeters are used for high precision measurement of mass flow and density. The fluid need not be electrically conductive

No moving parts, no wear, no maintenance

Ex design acc. to ATEX, IECEx / cFMus [USA]

Transmitter with DSP technology

- The latest digital filter technology assures detection of even the weakest sensor signals

Simultaneous measurement of mass flow, volume flow, density, temperature and concentration

Type-tested acc. to NAMUR




Options

- Expanded density calibration with temperature compensation
- Pressure-resistant housing
- EHEDG-certified
- Concentration measurement

Contents

1	Overview of flowmeter and transmitter designs	3
1.1	ATEX and IECEx device overview	4
1.2	FM device overview (PID: 3036514)	5
2	General information	6
2.1	Installation Requirements	6
3	Model FCM2000-MC2	11
3.1	Specifications	11
3.2	Dimensions	14
3.3	Ordering information	28
4	Model FCM2000-MS2	31
4.1	Specifications	31
4.2	Dimensions	33
4.3	Ordering information	36
5	Transmitter	38
5.1	Specifications	38
5.2	Concentration measurement DensiMass	39
5.3	Inputs/outputs	39
5.4	Digital Communication	41
5.5	Electrical connections	43
5.6	Dimensions	52
5.7	Ordering information	54
6	Ex relevant specifications in accordance with ATEX/IECEx	55
6.1	Safety-relevant information ATEX / IECEx	55
7	Ex relevant specifications in accordance with cFMus	62
7.1	Data relating to MC2x operation	62
7.2	Data relating to MS2x operation	63
7.3	Electrical data	64
8	Questionnaire	67

1 Overview of flowmeter and transmitter designs

	MC2		MS2
			
	Standard G00316	Hygienic (EHEDG) G00414	Standard G00315
Flowmeter sensor			
Model number	MC2	MC2_3	MS2
	DN PN	DN PN	DN PN
Flange DIN 2501/EN 1092-1	15 ... 150 40 ... 100	- -	10 / 15 40 / 100
Flange ASME B16.5	1/2" ... 6" CL 150 ... CL 600	- -	1/2" CL 150 ... CL 600
Threaded pipe connection conforming to DIN 11851	DN 15 ... DN 100 (1/2 ... 4")	DN 20 ... DN 80 (3/4 ... 3")	DN 10 (3/8")
Tri-Clamp	DIN 32676 (ISO 2852) DN 15 ... DN 100 (1/2 ... 4")	DIN 32676 (ISO 2852) DN 20 ... DN 80 (3/4 ... 3")	DIN 32676 (ISO 2852) DN 10 (3/8")
Aseptic flange DIN 11864-2	DN 15 ... DN 100 (1/2 ... 4")	DN 20 ... DN 80 (3/4 ... 3")	
"G" threaded pipe connection	-	-	1/4"
NPT threaded pipe connection	-	-	1/4"
Accuracy of mass flowrate	0.1 % / 0.15 % / 0.25 % / 0.4"	0.1 % / 0.15 % / 0.25 % / 0.4"	0.15 % / 0.25 % / 0.4"
Accuracy of density	0.005 kg/l, 0.001 kg/l	0.005 kg/l, 0.001 kg/l	0.01 kg/l
Accuracy of temperature	1 K	1 K	1 K
Materials in contact with fluid	Stainless steel Hastelloy C-4	Stainless steel 1.4435 (316L)	Stainless steel 1.4435 (316L), Hastelloy C-22
Ingress protection acc. to EN 60529	IP 67	IP 67	IP 67
Fluid temperature (see Section 3/4 of the data sheet, Section 10 of the operating instructions)	-50 ... 200 °C (-55 ... 392 °F)	-50 ... 200 °C (-55 ... 392 °F)	-50 ... 180 °C (-55 ... 356 °F)
Approvals			
Explosion protection conforming to ATEX, IECEx (KEM 08 ATEX 0150X/0151X), (IECEx KEM08 00.0034X)	Zone 0/1/2 Dust-ignition-proof	Zone 0/1/2 Dust-ignition-proof	Zone 1 (ATEX only)
Explosion protection conforming to cFMus (PID: 3036514)	Class I Div. 1 Class I Div. 2	Class I Div. 1 Class I Div. 2	-
Other approvals for potentially explosive areas	Please contact our sales organization	Please contact our sales organization	Please contact our sales organization
Hygienic and sterile requirements	FDA	FDA, EHEDG	FDA
Transmitter			
Model number	ME2 /MC23, MC27		ME2_
Housing	Separate, field-mount housing/compact housing		Separate, field-mount housing
Cable length	Up to 50 m (164 ft.); 300 m (984 ft.) on request		5, 10, 20, or 50 m (16, 32, 65, or 164 ft.)
Supply power	100 ... 230 V AC, 24 V AC/DC		
Current output 1	Active: 0/4 ... 20 mA or passive: 4 ... 20 mA		
Current output 2	Passive: 4 ... 20 mA		
Pulse output	Active (non-Ex) or passive		
Ext. output switch-off	Yes		
Ext. totalizer reset	Yes		
Forward/reverse flow metering	Yes		
Communication	HART protocol, PROFIBUS PA, FOUNDATION Fieldbus		
Empty pipe detection	Yes, based on preconfigured density alarm < 0.5 kg/l		
Self-monitoring, diagnostics	Yes		
On-site display/totalization	Yes		
Field optimized flow/density	Yes		
Ingress protection acc. to EN 60529	ME2: IP 65/67, NEMA 4X MC_ : IP 67, NEMA 4X		

1.1 ATEX and IECEx device overview

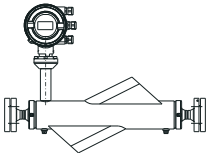
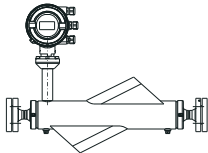
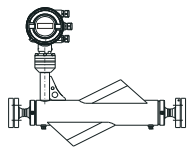
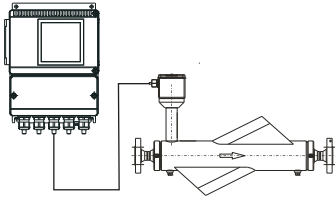
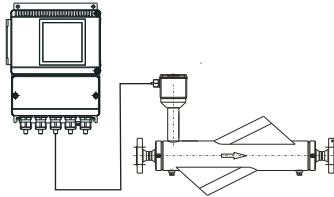
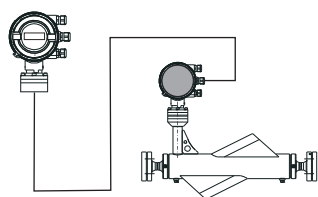
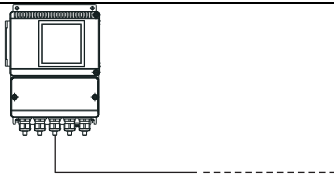
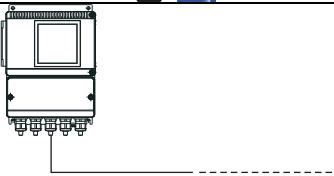
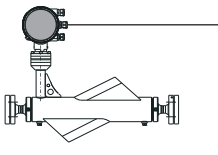
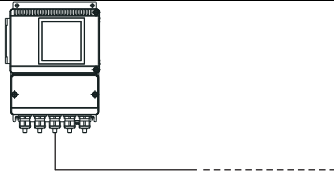
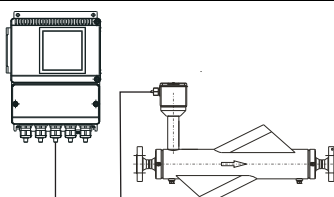
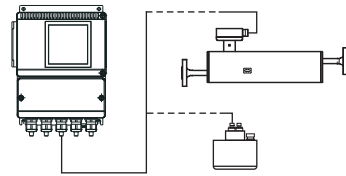
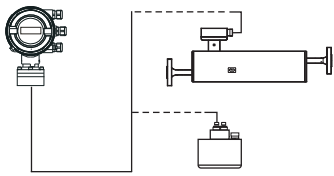
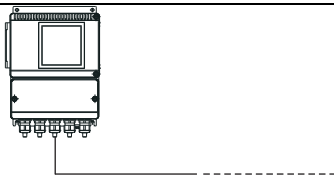
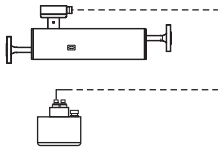


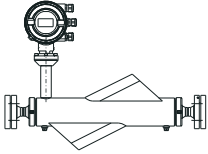
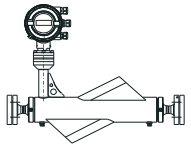
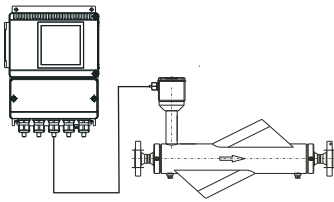
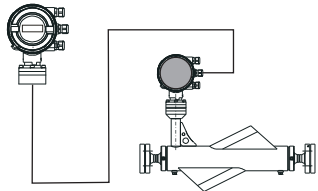
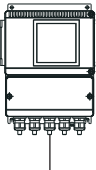
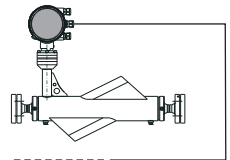
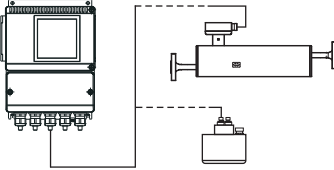
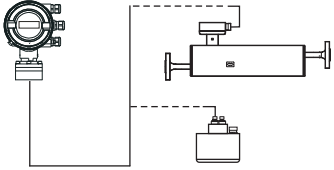
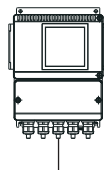
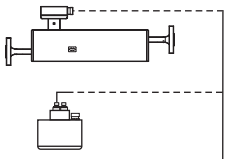
Type	Standard/non-Ex MC23 A, U		Zone 2/21, 22 MC23 M, N		Zone 1/21 MC27 B, E
1. Integral mount design - Standard/non-Ex - Ex Zone 2/21, 22 - Ex Zone 1/21					
Type	ME21 A, U	MC21 A, U	ME21 M, N	MC21 M, N	ME26 B, E MC26 B, E
2. Remote mount design Transmitter and flowmeter sensor - Standard/non-Ex - Ex Zone 1/21					
Type	ME21 A, U		ME21 M, N		MC26 B, E
3. Remote mount design Transmitter - Standard/non-Ex - Ex Zone 2/21, 22 Flowmeter sensor - Ex Zone 1/21					
Type	ME21 A, U		ME21 M, N	MC21 M, N	
4. Remote mount design (small nominal diameters) Transmitter - Standard/non-Ex - Ex Zone 2/21, 22 Flowmeter sensor - Ex Zone 2/21, 22					
Type	ME22 A, U ...	MS21 A, U			ME27/28 B, E MS26 B, E
5. Remote mount design (small nominal diameters) Transmitter and flowmeter sensor - Standard/non-Ex - Ex Zone 2/21, 22 - Ex Zone 1/21					
Type	ME24/25 A, U ...				MS26 B, E
6. Remote mount design (small nominal diameters) Transmitter - Standard/non-Ex - Ex Zone 2/21, 22 Flowmeter sensor - Ex Zone 1/21					

Fig. 1: FCM2000 overview

1.2 FM device overview (PID: 3036514)

	Standard/non-Ex	Class I Div. 2		Class I Div. 1	
					
MC2x	Type MC23 T, X	MC23 O, V, P, W		MC27 C, Y, D, Q	
	1. Integral mount design - Standard/non-Ex - Class I Div. 2 - Class I Div. 1			 Housing: XP	
	Type ME21 T, X MC21 T, X	ME21 O, V, P, W MC21 O, V, P, W		ME26 C, Y, D, Q MC26 C, Y, D, Q	
	2. Remote mount design Transmitter and flowmeter sensor - Standard/non-Ex - Class I Div. 2 - Class I Div. 1				
	Type ME21 T, X	ME21 O, V, P, W		MC26 C, Y, D, Q	
3. Remote mount design Transmitter - Standard/non-Ex - Class I Div. 2 Flowmeter sensor - Class I Div. 1					
MS2x	Type ME22/23 T, X... MS21 T, X	ME22/23 O, V, P, W MS21 O, V, P, W		ME27/28 C, Y, D, Q MS26 C, Y, D, Q	
	4. Remote mount design (small nominal diameters) Transmitter - Standard/non-Ex - Class I Div. 1 Flowmeter sensor - Class I Div. 2 - Class I Div. 1				
	Type ME24/25 T, X ...	ME24/25 O, V, P, W		MS26 C, Y, D, Q	
5. Remote mount design (small nominal diameters) Flowmeter sensor - Class I Div. 1					

G00899

Fig. 2: FCM2000 overview

2 General information

The FCM2000 is ABB's economical and uncomplicated mass flowmeter, featuring the new DSP transmitter, either integrated in the flowmeter or mounted separately from it. The compact unit reduces installation and cabling expenditure. Flowrate information can be viewed directly at the meter site and the meter can be installed in systems in an even more space-saving manner than is currently possible.

The FCM2000 operates according to the Coriolis principle. The design offers the following benefits:

- Space-saving, rugged design.
- Wide flow measuring range; meter size "S" (DN 1.5 [1/16"]) to meter size "L" (DN 150 [6"]).
- Variety of process connection options.
- Two separate current outputs for measuring mass or volume flowrate, density, or temperature, as well as one pulse output.
- Contact inputs and outputs.
- HART protocol, PROFIBUS PA, FOUNDATION Fieldbus.
- Ex approval: The user can select the "i" or "e" type of protection for the output circuits; the type chosen will depend on the circuits which are connected. The type of protection can be changed after installation has been completed. The contact outputs can be configured as NAMUR outputs by the user.
- Permissible fluid temperature up to 200 °C (392 °F), CIP-enabled
- Illuminated, 2-line display with data entered using a magnet stick and without opening the housing.
- Certified acc. to EHEDG.

Mass transmitter with digital signal processor (DSP)

The transmitter for the FCM2000 incorporates a digital signal processor (DSP) that enables high-precision mass flow and density measurements to be made. The Coriolis sensor signals are immediately converted into digital data without any intermediate analog steps.

Excellent long-term stability and reliability together with fast signal processing are achieved with the new DSP transmitter.

Self-diagnostic functions for the flowmeter sensor and the transmitter, in combination with absolute zero stability, are benefits you can count on to ensure accurate measurements are taken.

The FCM2000 transmitter is particularly well suited for use in the following cases:

- When mass flowrate is to be metered to the highest degree of accuracy.
- When the fluid density is to be determined.
- When the components of a recipe are to be mixed together.
- When metering non-conductive fluids or highly viscous, solid-loaded liquids, for example.
- In batch filling systems.

2.1 Installation Requirements

2.1.1 General information

Inspection

Before installing the flowmeter sensor, check for physical damage due to possible improper handling during shipment. All claims for damage are to be made promptly to the shipper.

Installation Requirements / System Sizing Information

The FCM2000 is suitable for both indoor and outdoor installations. The standard instrument meets the requirements of Protection Class IP 67. The primary is bidirectional and can be installed in any orientation. It is important to ensure that the meter pipes are always completely filled with fluid.

The corrosion resistance of the fluid wetted materials must be evaluated.

The following points are to be considered during installation:

The preferred flow direction is indicated by the arrow on the flowmeter sensor. Flow in this direction will be indicated as positive (a forward/reverse flow calibration is available as an option).

Installation position

The FCM2000 operates in any orientation. The optimal installation orientation is vertical with the flow upwards.

Supports

In order to support the weight of the flowmeter sensor and to ensure reliable measurements when adverse external effects exist (e. g., vibrations), the primary should be installed in rigid pipelines. Two supports or hangers should be installed symmetrically and stress free in close proximity to the in- and outlet process connections.

Shut Off Devices

To conduct a system zero adjustment, shut off devices are required in the pipeline:

- in horizontal installation at the outlet,
- in vertical installation at the inlet.

When possible, shut off devices should be installed both up- and downstream from the flowmeter sensor.

Inlet Straight Sections

The mass meter does not require any flow conditioning inlet straight sections. Care should be exercised to ensure that any valves, gates, sight glasses, etc., do not cavitate and are not set into vibration by the flowmeter sensor.

System Design Information

- The presence of gas bubbles in the fluid can result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter sensor should not be installed at the highest point in the system. Advantageous are installations in low pipeline sections, e. g., at the bottom of a U-section in the pipeline (invert).
- Long drop lines downstream from the flowmeter sensor should be avoided to prevent the meter tube from draining.
- Installation should be performed as stress free as possible.
- The flowmeter sensor should not come in contact with any other objects. Attachments to the housing are not permissible.
- When the cross-section of the connecting pipeline is larger than the flowmeter sensor size, suitable standard reducers should be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed beyond the supported flowmeter section and outside of the section between the shut off devices. The direct connection of flexible elements to the flowmeter sensor should be avoided.

- Care should be exercised to ensure that any dissolved gases, which may be present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (2.9 psi).
- Ensure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube.
- The flowmeter sensor should not be installed in the vicinity of strong electromagnetic fields, e. g., near motors, pumps, transformers etc.
- When operating more than one meter in one or multiple interconnected pipelines, the flowmeter primaries should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.
- Request information about special installation conditions for meter size "L".

Zero balance

In order to adjust the zero under operating conditions, it must be possible to reduce the flowrate "ZERO" while the meter tube remains completely filled. A bypass line is optimal when the process cannot be shut down. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter sensor. It is also important that the pressure and temperature in the meter tube be the same as those which exists during operation.

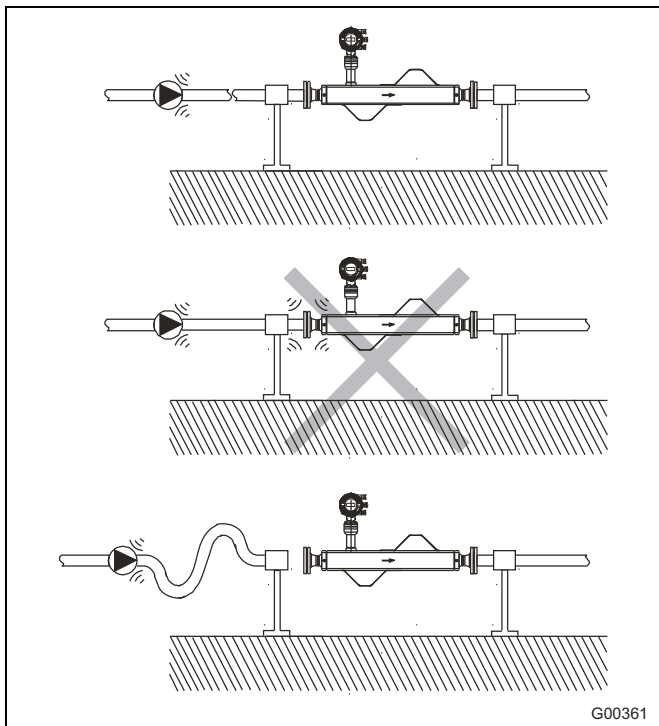


Fig. 3: Vibrations

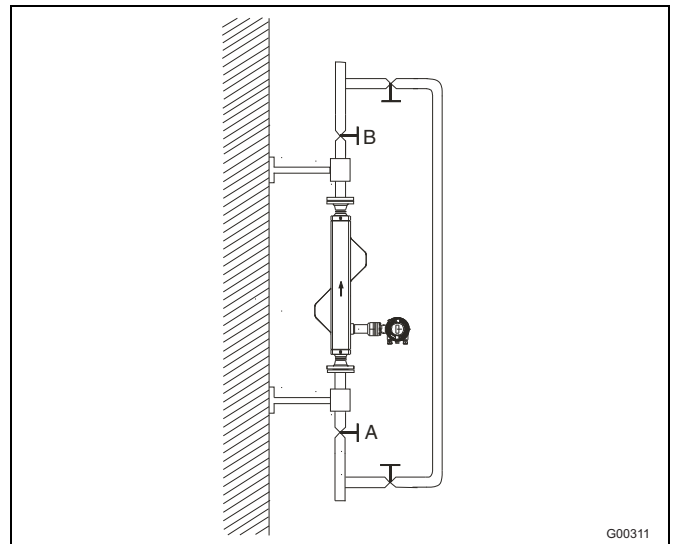


Fig. 4: Zero point adjustment with bypass line

2.1.2 Installation notes for FCM2000-MC2

Vertical installation position

The optimal installation orientation is a vertical installation with an upward flow as shown in Fig. 5. This has the advantage that any solids contained in the fluid will settle downward and any gas bubbles will move upward out of the meter tube when the flowrate is zero. Additionally, it is easy to drain the meter tube. Deposits can thereby be avoided.

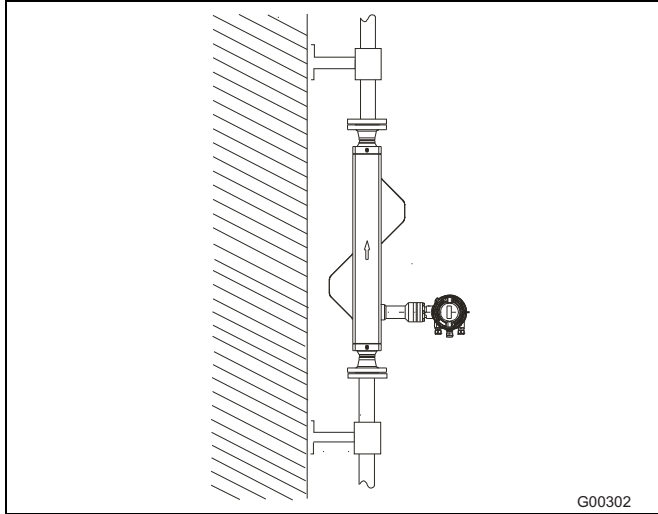


Fig. 5: Vertical installation position, self-draining (flow upwards)

Horizontal Installation Orientations

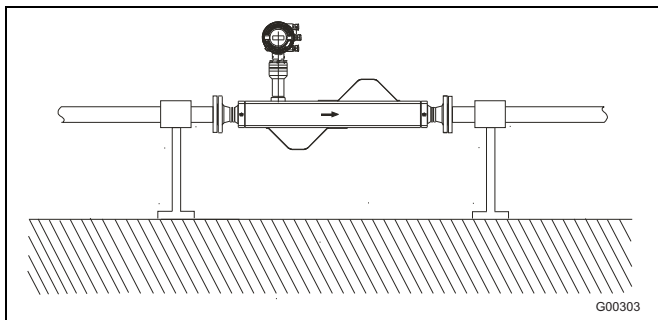


Fig. 6: Horizontal Installation Orientations

Horizontal Installations, Self Draining

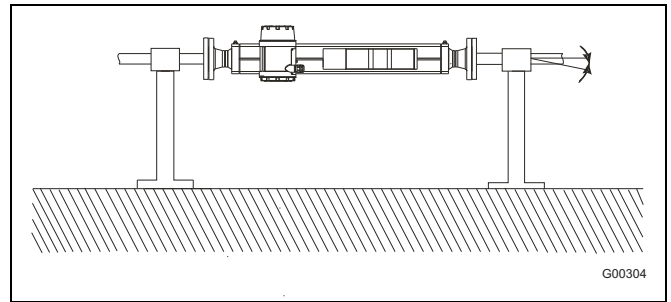


Fig. 7: Horizontal Installations, Self Draining, α 2 - 4°

Installation in a Drop Line

The installation recommendation shown in Fig. 8 is only permissible if a pipeline reduction or orifice with a smaller cross-section can be installed to prevent the flowmeter sensor from partially draining during the measurements.

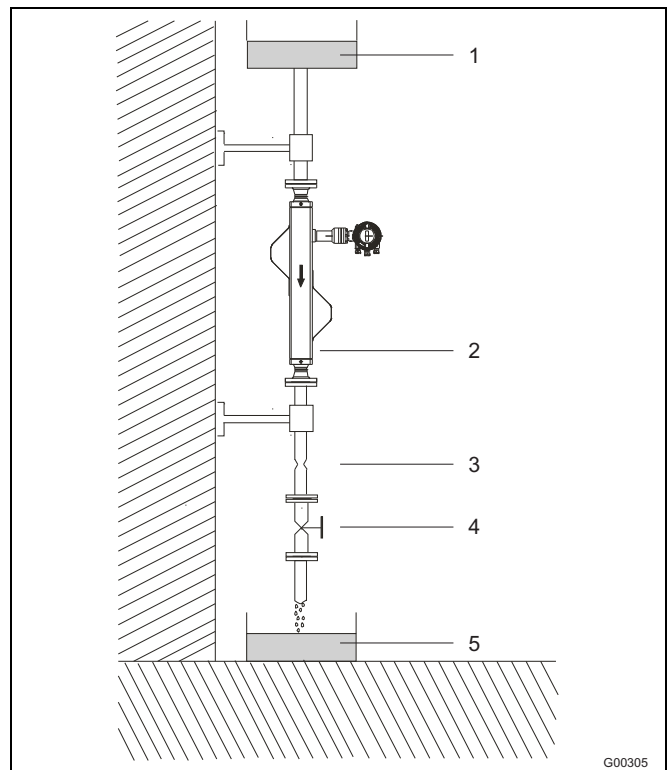


Fig. 8: Installation in a Drop Line

- 1 Supply reservoir
- 2 Flowmeter sensor
- 3 Orifice/pipe constriction
- 4 Valve
- 5 Product reservoir

Difficult Installation Conditions

The accumulation of air or gas bubbles in the meter pipe can lead to increased inaccuracies. Fig. Fig. 9 shows critical installation conditions.

Installations at the highest point in the pipeline (Figure A) can result in the formation of air pockets which can lead to appreciable inaccuracies.

Another difficult installation condition is immediately upstream of a free discharge (Figure B) in a drop line.

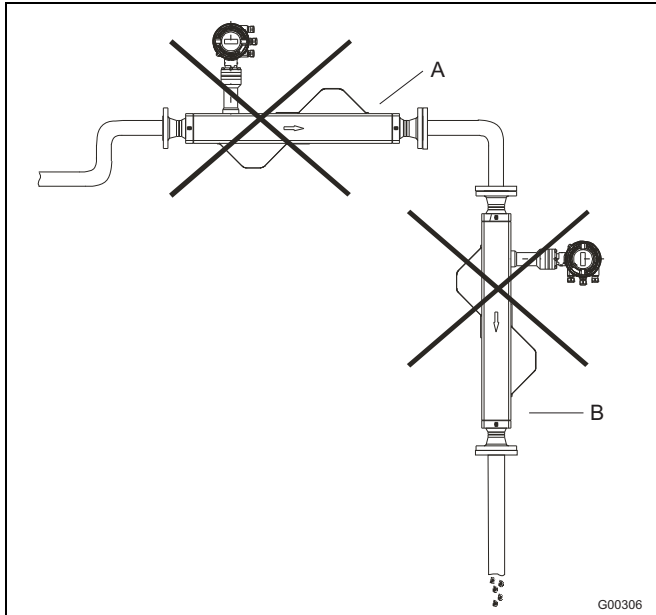


Fig. 9: Difficult Installation Conditions

Important:

Check whether the coordination flowmeter sensor and transmitter is correct. Compatible devices have the same end numbers, e. g., X001 and Y001 or X002 and Y002, on the type plate.

Pressure losses

The pressure losses, at the operating conditions, depends on the fluid and the actual flow. To calculate the pressure loss, the design program CD-CALC is provided.

2.1.3 Installation notes FCM2000-MS2

Installing the flowmeter sensor DN 1.5 (1/16")

Horizontal installation is recommended. If vertical installation is required, a flow direction from below to above is recommended for better elimination of air bubbles. In order for air to be removed from the flowmeter sensor, the flow speed in the flowmeter sensor must be at least 1 m/s. If the fluid contains solid particles, especially in conjunction with too little flow, a level installation location of the flowmeter sensor and positioning of the input flange completely on top is recommended so that the particles can be more easily flushed out. In order to avoid a partial emptying of the flowmeter sensor, a sufficient back pressure must be present at the unit (min. 0.1 ... 0.2 bar/(1.45...2.9 psi)).

- Install the flowmeter sensor in a vibration-free manner to a wall or a steel frame.
- Position the flowmeter sensor at a low location in the system in order to avoid a negative pressure in the flowmeter sensor, that could lead to air or gas separation in the fluid.
- Ensure that the flowmeter sensor is not run empty (in the normal operation) as this can lead to inaccurate measurements.

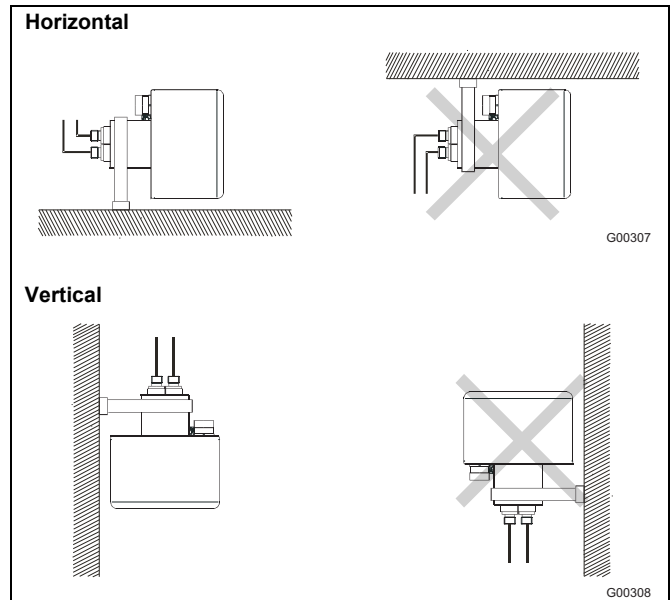


Fig. 10

High temperature version

In the high temperature design the multi-connection plug is separated from the sensor housing by a pipe. Thereby the plug can still be accessed even when the sensor is insulated.

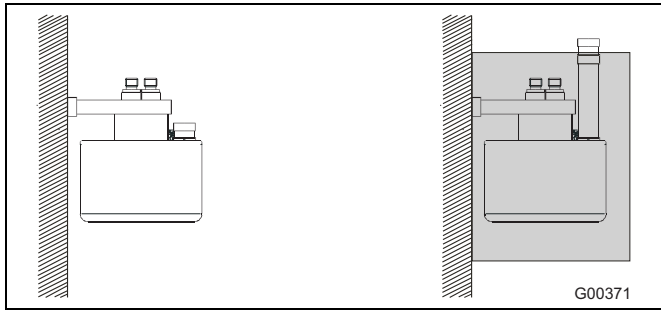


Fig. 11: Installation DN 1.5 (1/16") – vertical

i Important

If there are large differences between the fluid and ambient temperature the sensor must be insulated, to prevent two phase flow and accuracy effects. This is especially important for low flowrates.

The sensor must **always** be completely filled with homogeneous liquid or a single phase gas, otherwise the accuracy could be adversely affected.

For air/gas in volatile fluids horizontal installations are recommended.

The mounting bracket included with the shipment should always be used. The bracket should be secured to a wall or a steel framework (vibration free and mechanically stable).

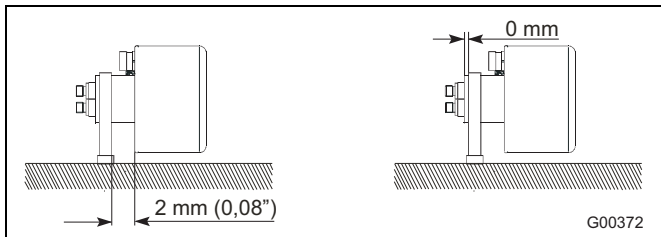


Fig. 12: Installation DN 1.5 (1/16") – horizontal

Angle multi-connection plug, horizontal

To achieve optimum performance, the multi-connection plug is to be installed as shown in the figure. The multi-connection plug can be rotated within the angle noted.

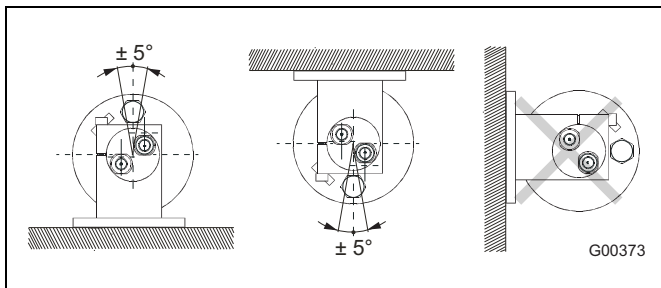


Fig. 13: Angle multi-connection plug – horizontal

Angle multi-connection plug, vertical

A specific orientation of the connection box is not prescribed for vertical installations, although the rotation of the sensor may not exceed the value shown.

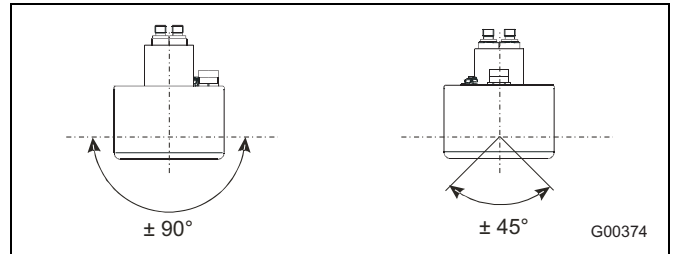


Fig. 14: Angle multi-connection plug – vertical

Installing flowmeter sensor DN3/DN6 (1/10 / 1/4")

A horizontal installation position is recommended for light flow, since air bubbles are easier to remove in this position. If the liquid is volatile or contains solid particles, vertical installation is not recommended.

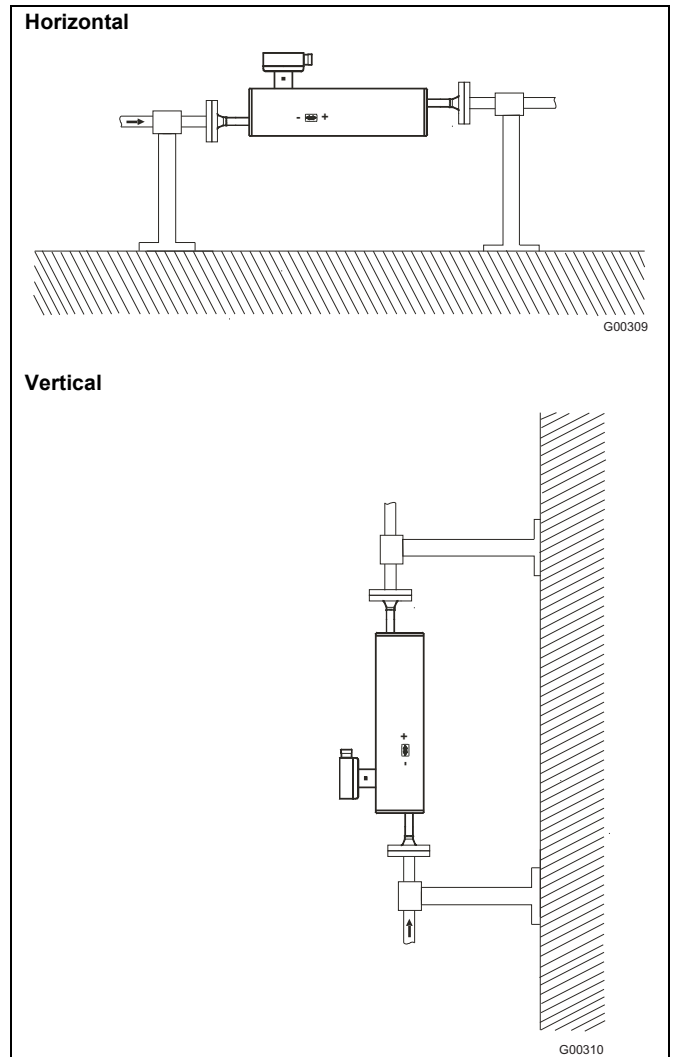


Fig. 15

3 Model FCM2000-MC2

3.1 Specifications



Fig. 16: FCM2000-MC2 flowmeter sensor

Nominal sizes

"E" (DN 20); "F" (DN 25); "G" (DN 40); "H" (DN 50);
 "I" (DN 65); "J" (DN 80); "K" (DN 100); "L" (DN 150)

Measuring ranges for flowrate

Nominal size	Max. measuring range [Q _{max}] in [kg/min]
"E" DN 20 (3/4")	0 ... 100
"F" DN 25 (1")	0 ... 160
"G" DN 40 (1 1/2")	0 ... 475
"H" DN 50 (2")	0 ... 920
"I" DN 65 (2 1/2")	0 ... 1,890
"J" DN 80 (3")	0 ... 2,460
"K" DN 100 (4")	0 ... 4,160
"L" DN 150 (6")	0 ... 11,000

Protection class: IP 65/IP 67, NEMA 4X

**Measured value deviation for flowrate DN 20 (3/4") to DN 65 (1.5")
 (sizes "E", "F", "G", "H", "I")**

± 0.4 % of flow rate + 0.02 % of Q_{max}
 ± 0.25 % of flow rate + 0.02 % of Q_{max}
 ± 0.15 % of flow rate + 0.01 % of Q_{max}
 ± 0.1 % of flow rate + 0.01 % of Q_{max} (not for size "E")
 (deviation from rate + zero error)

**Measured value deviation for flowrate DN 80 (3") and DN 100 (4")
 (sizes "J", "K")**

± 0.4 % of flow rate + 0.02 % of Q_{max}
 ± 0.25 % of flow rate + 0.02 % of Q_{max}
 ± 0.1 % of flow rate + 0.02 % of Q_{max}
 ± 0.15 % v. M. + 0.02 % v. Q_{max}
 (deviation from rate + zero error)

**Measured value deviation for flowrate DN 150 (6")
 (size "L")**

± 0.4 % of flow rate ± 0.05 % of Q_{max}
 ± 0.25 % of flow rate ± 0.05 % of Q_{max}
 ± 0.15 % of flow rate ± 0.05 % of Q_{max}
 ± 0.1 % of flow rate ± 0.05 % of Q_{max}

Operating temperature effect

Less than ± 0.006 % of Q_{max}/1 K

Reproducibility of flowrate at rates > 5 % of Q_{max}

0.10 % of flow rate for nom. deviation ± 0.1 %
 0.15 % of flow rate for nom. deviation ± 0.25 % and 0.4 %

Measuring range for density

0.5 ... 3.5 kg/dm³

Measured value deviation for density

Standard calibration ± 5 g/l
 Expanded density calibration ± 1 g/l

For separate designs, the signal cable is already calibrated and may not be either shortened or lengthened subsequently.

The transmitter is calibrated accordingly and may not be changed.

Reproducibility of density

± 0.1 g/l

Measured value deviation for temperature

-50 ... 200 °C (-58 ... 392 °F) < 1 °K (1.8 °F)

For the precise temperatures for units with Ex approval, refer to the "Ex relevant specifications" section.

If the ambient temperature is below -20 °C (-4 °F), additional flowrate, density, and temperature deviations are to be expected.

3.1.1 Reference conditions

Calibration fluid

Water 25 °C (77 °F) (+ 5 K/- 5 K)
Pressure 0.5 ... 6 bar (7.3 ... 87.0 psi)

Ambient temperature

25 °C (77 °F) (+ 10 K/- 5 K)

Supply power

Line voltage as per name plate $U_N \pm 1\%$

Warm-up phase

30 minutes

Installation according to this specification

No visible gas phase,
no external mechanical or hydraulic disturbances,
particularly cavitation

Output calibration

Pulse output

Effect of the analog output on the measurement accuracy

Similar to pulse output $\pm 0.1\%$ of measured value

3.1.2 Materials and additional specifications

Flowmeter sensor materials

Parts in contact with fluid

- Stainless steel 1.4571/1.4308 (316Ti/CF8)
- Stainless steel 1.4435/316L
- Hastelloy C-4/2.4610
- With flowmeter sensor material 1.4435 cert. acc. to EHEDG
- Option: Manufactured acc. to NACE MR0175 (ISO 15156)

Housing

- Stainless steel 1.4301/1.4308 (304/CF8)

Transmitter materials

Housing

- Alloy casting, varnished
- Mid-section: RAL 7012
- Cover: RAL 9002
- Paint coat: 80 ... 120 μm thickness

Fluid temperature

Standard: -50 ... 200 °C (-58 ... 392 °F)

The relevant ambient temperatures for use in a potentially explosive area can be found in the corresponding chapter.

Ambient temperature

-20 ... 60 °C (-4 ... 140 °F); opt. -40 ... 60 °C (-40 ... 140 °F)

The relevant ambient temperatures for use in a potentially explosive area can be found in the corresponding chapter.

Process connections

Flange DIN/ASME

Tri-clamp DIN 32676 (ISO 2852)

- DN 15 ... DN 50 (1/2 ... 2"): series 3
- DN 65 ... DN 100 (2 1/2 ... 4"): series 1

Threaded pipe connection conforming to DIN 11851

The max. permissible operating pressure is determined by the respective process connection, the fluid temperature, the screws, and the gasket material.

Pressure rating

PN 16, PN 40, PN 100 (up to DN 80 [3"])
CI 150, CI 300, CI 600 (up to DN 80 [3"])

Housing as protective device (optional)

Max. 40 bar (580 psi)

Pressure Equipment Directive 97/23/EC

Conformity assessment in accordance with Category III, fluid group 1, gas

Take into consideration the corrosion resistance of the meter tube materials as regards the measuring fluid.

EHEDG-approved unit versions

The appropriate installation conditions must be observed in order to achieve an installation that complies with hygiene requirements. The process connection/gasket combination created by the operator is particularly important too. Therefore, to ensure that the installation complies with hygiene requirements, only parts that conform to EHEDG stipulations (EHEDG Position Paper "Hygienic Process connections to use with hygienic components and equipment") may be used.

Material load for process connections

Process connection	Nominal size DN	PS _{max} [bar]	TS _{max} [°C]	TS _{min} [°C]
Threaded pipe connection conforming to DIN 11851	15 ... 40 (1/2 ... 1 1/2")	40	140	-40
Tri-Clamp conforming to DIN 32676	50 ... 100 (2 ... 4")	25	140	-40
	15 ... 50 (1/2 ... 2")	16	120	-40
	65 ... 100 (2 1/2 ... 4")	10	120	-40

3.1.3 Material load curves for flanged units

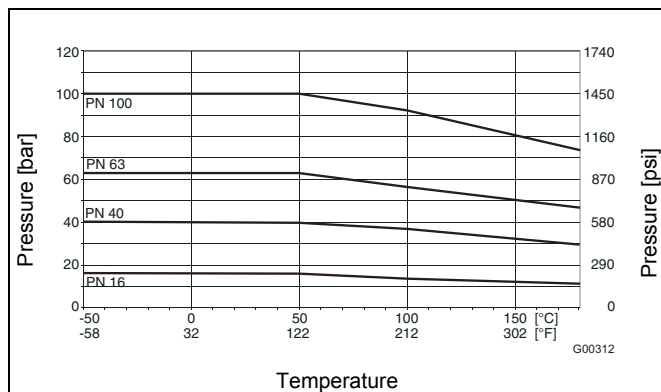


Fig. 17: DIN flange SS 1.4571 to DN 150 (6")

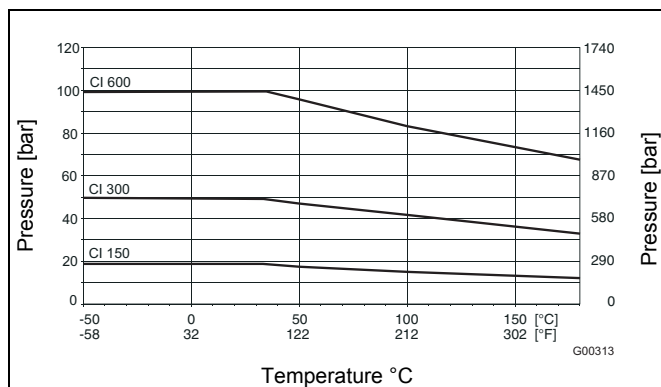


Fig. 18: ASME flange SS 1.4571 to DN 150 (6")

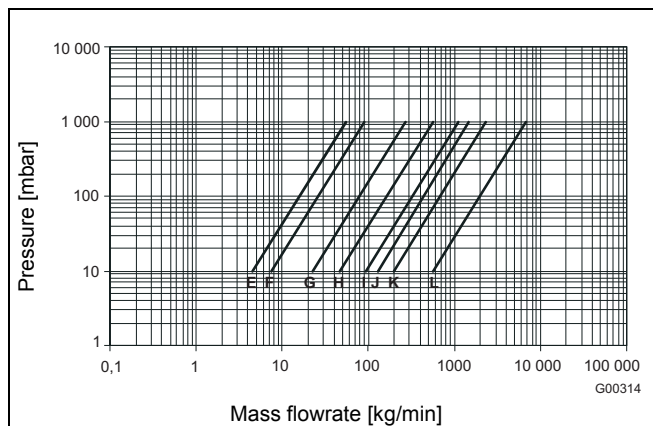


Fig. 19: Pressure loss curve FCM2000-MC2; measured with water, viscosity 1 mPa s

Viscosity range

Max. dyn. viscosity: ≤ 1 Pas (= 1,000 mPas = 1,000 cP)

At higher viscosities, please contact our ABB representatives.

3.2 Dimensions

3.2.1 Design MC21

Remote design, flanged construction "E" to "F", DIN/ASME

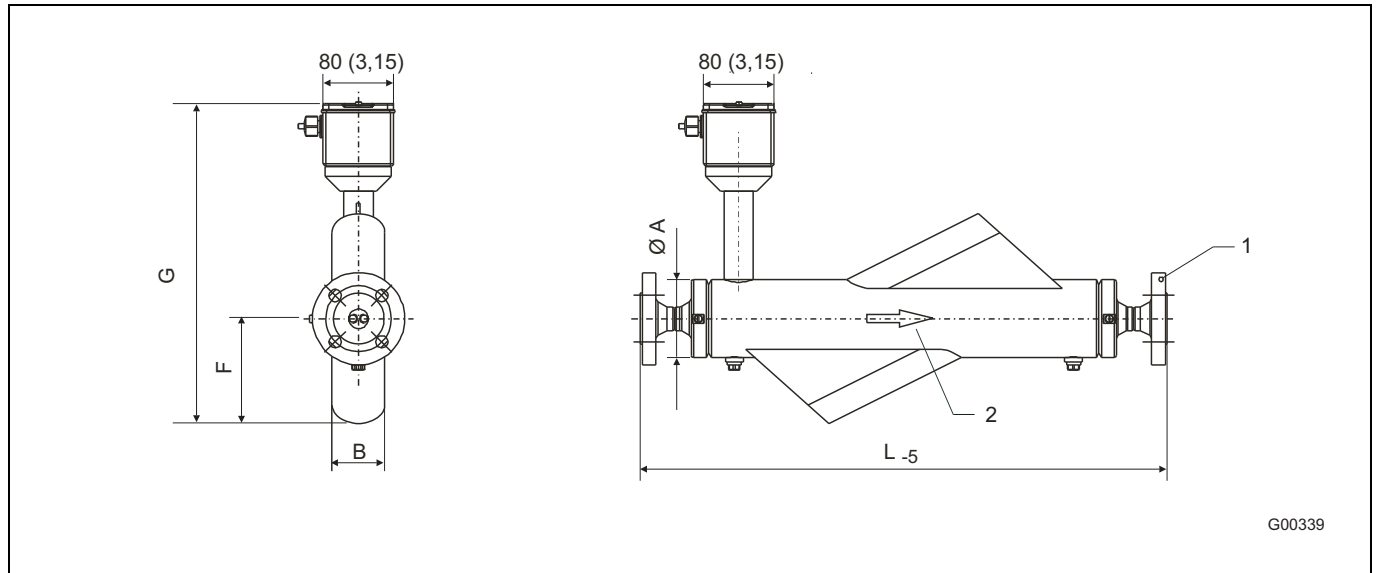


Fig. 20: Dimensions in mm (inch)

- 1 Flange DIN 2635 / ASME / ISO 7005 (connecting dimensions for ASME flanges acc. to ASME B16.5 (ANSI))
- 2 Flow direction

Meter size DN	Process connection	L ₅							G	F	B	Ø A	Weight kg (lb)
		DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	DIN 11864-2 form A ¹⁾					
„E“ (20)	DN 15 (1/2")	693 (27.28)	705 (27.76)	705 (27.76)	708 (27.87)	718 (28.27)	730 (28.74)	672 (26.46)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	15 (33.1)
	DN 20 (3/4")	598 (23.54)	-	-	618 (24.33)	628 (24.72)	645 (25.39)	583 (22.95)					15 (33.1)
	DN 25 (1")	698 (27.48)	735 (28.94)	735 (28.94)	728 (28.66)	738 (29.06)	753 (29.65)	683 (26.89)					16 (35.3)
„F“ (25)	DN 20 (3/4")	758 (29.84)	-	-	778 (30.63)	788 (31.02)	802 (31.57)	743 (29.25)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	16 (35.3)
	DN 25 (1")	658 (25.91)	693 (27.28)	693 (27.28)	688 (27.09)	698 (27.48)	710 (27.95)	643 (25.31)					16 (35.3)
	DN 40 (1 1/2")	808 (31.81)	840 (33.07)	840 (33.07)	838 (32.99)	855 (33.66)	868 (34.17)	786 (30.94)					19 (41.9)

All dimensions in mm (inch)

1) Antiseptic grooved flange DIN 11864-2, form A, for pipes acc. to DIN 11866

Remote design, flanged construction "G" to "L", DIN/ASME

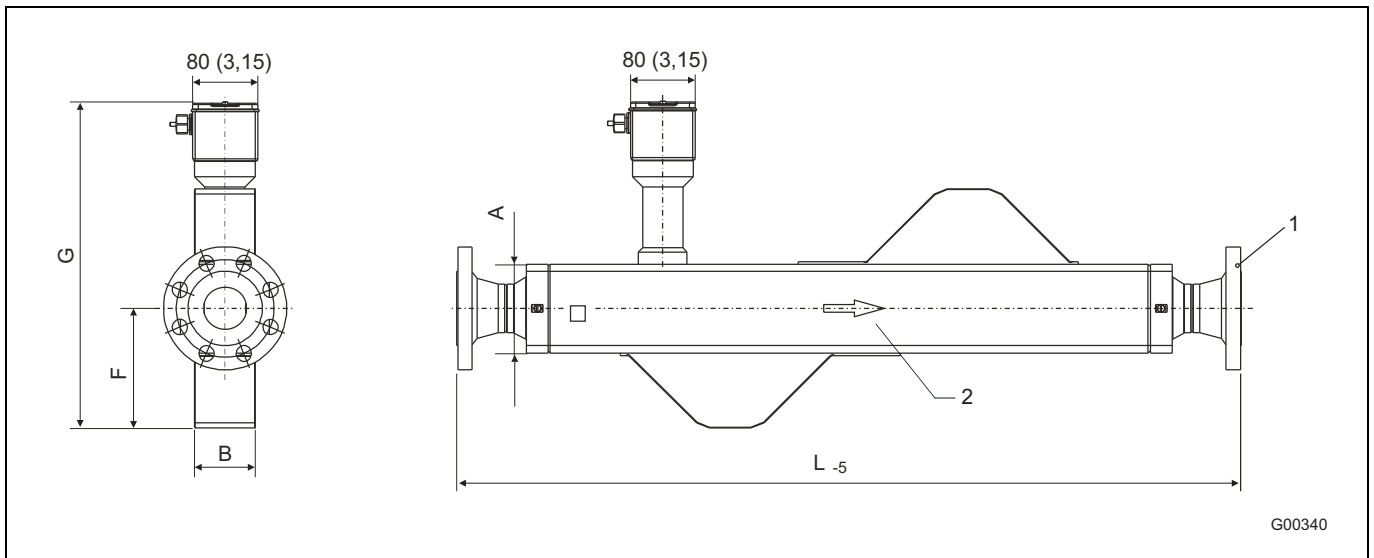


Fig. 21: Dimensions in mm (inch)

- 1 Flange DIN 2635 / ASME B16.5 / ISO 7005 (connecting dimensions for ASME flanges acc. to ASME B16.5 (ANSI))
- 2 Flow direction

Meter size DN	Process connection	L _s								G	F	B	A	Wt. kg (lb)
		DIN 2633 PN 16	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	DIN 11864-2 form A ¹⁾					
„G“ (40)	DN 25 (1“)		879 (34.61)	914 (35.98)	914 (35.98)	910 (35.83)	922 (36.30)	932 (36.69)	864 (34.02)	374 (14.72)	129 (5.08)	64 (2.52)	90 (3.54)	20 (44.1)
	DN 40 (1 1/2“)		780 (30.71)	813 (32.01)	813 (32.01)	810 (31.89)	825 (32.48)	843 (33.19)	761 (29.96)					22 (48.5)
	DN 50 (2“)		940 (37.01)	967 (38.07)	979 (38.54)	970 (38.19)	980 (38.58)	1001 (39.41)	918 (36.14)					23 (50.7)
„H“ (50)	DN 40 (1 1/2“)		1045 (41.14)	1078 (42.44)	1078 (42.44)	1075 (42.32)	1090 (42.91)	1108 (43.62)	1025 (40.35)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	32 (70.5)
	DN 50 (2“)		940 (37.01)	967 (38.07)	979 (38.54)	970 (38.19)	980 (38.58)	1001 (39.41)	918 (36.14)					34 (75.0)
	DN 65 (2 1/2“)		1100 (43.31)	1132 (44.57)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1248 (49.13)	1081 (42.56)					38 (83.8)
„I“ (65)	DN 50 (2“)		1220 (48.03)	1248 (49.13)	1259 (49.57)	1250 (49.21)	1260 (49.61)	1281 (50.43)	1197 (47.13)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	43 (94.8)
	DN 65 (2 1/2“)		1100 (43.31)	1132 (44.57)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1249 (49.17)	1081 (42.56)					48 (105.8)
	DN 80 (3“)		1220 (48.03)	1248 (49.13)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)	1200 (47.24)					50 (110.2)
„J“ (80)	DN 65 (2 1/2“)		1330 (52.36)	1362 (53.62)	1378 (54.25)	1365 (53.74)	1375 (54.13)	1396 (54.96)	1310 (51.57)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	56 (123.5)
	DN 80 (3“)		1220 (48.03)	1248 (49.13)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)	1200 (47.24)					58 (127.9)
	DN 100 (4“)	1450 (57.09)	1480 (58.27)	1494 (58.82)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)	1463 (57.60)					69 (152.1)
„K“ (100)	DN 80 (3“)		1640 (64.57)	1668 (65.67)	1680 (66.14)	1660 (65.35)	1680 (66.14)	1702 (67.01)	1618 (63.70)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	84 (185.2)
	DN 100 (4“)	1450 (57.09)	1480 (58.27)	1494 (58.82)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)	1463 (57.60)					91 (200.6)
	DN 150 (6“)	1736 (68.35)	1776 (69.92)	1816 (71.50)	–	1806 (71.10)	1826 (71.89)	–	–					120 (264.6)
„L“ (150)	DN 150 (6“)	2000 (78.74)	2040 (80.31)	2080 (81.89)	–	2070 (81.50)	2090 (82.28)	–	–	613 (24.13)	285 (11.22)	190 (7.48)	250 (9.84)	240 (529.1)

All dimensions in mm (inch)

1) Antiseptic grooved flange DIN 11864-2, form A, for pipes acc. to DIN 11866

Dimensions, remote design, food industry fitting "E" to "F", DIN 11851

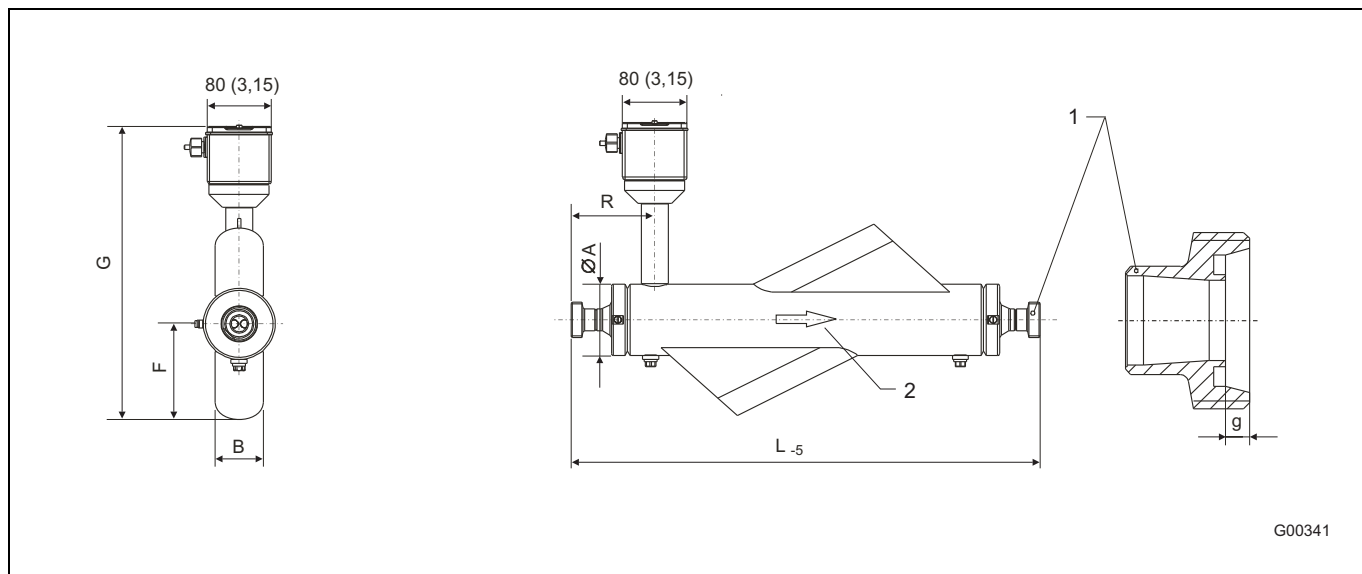


Fig. 22: Dimensions in mm (inch)

- 1 Food industry fitting acc. to DIN 11851 (threaded connector)
- 2 Flow direction

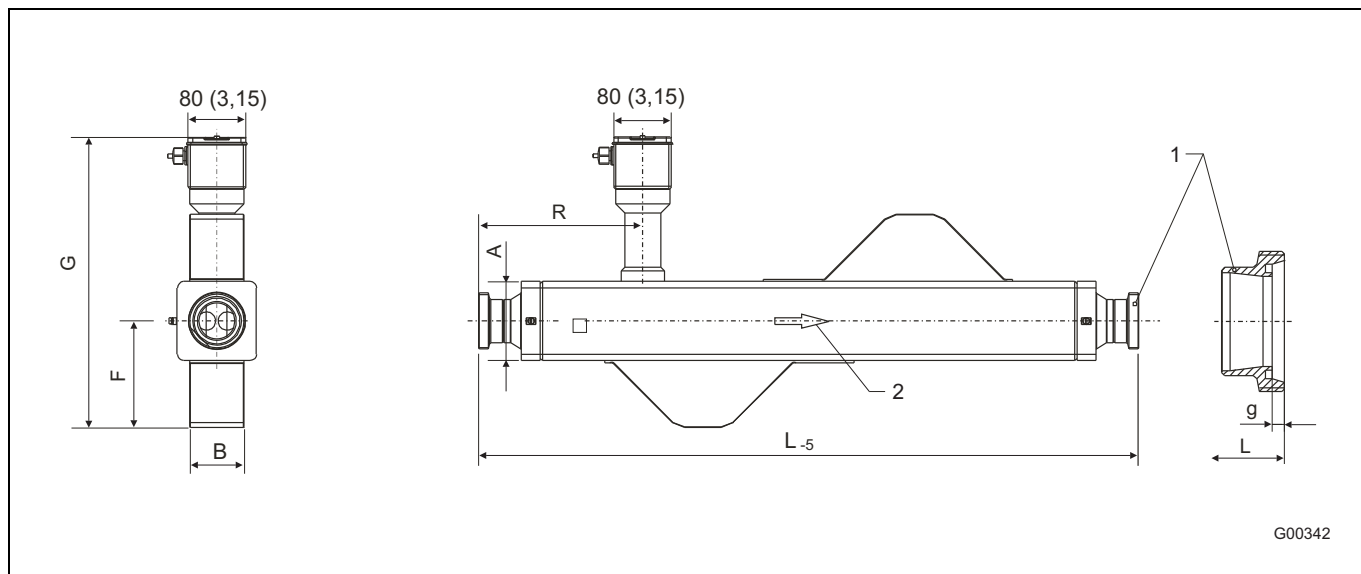
Meter Size DN	Process connection	L ₅	g	G	F	B	Ø A	R	Weight kg (lb)
"E" (20)	DN 15 / 1/2" Rd 34 x 1/8	672 (26.46)	4 (0.16)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	152 (5.98)	13 (28.7)
	DN 20 / 3/4" Rd 44 x 1/6	583 (22.95)	6 (0.24)					102 (4.02)	
	DN 25 / 1" Rd 52 x 1/6	683 (26.89)	7 (0.28)					152 (5.98)	
"F" (25)	DN 20 / 3/4" Rd 44 x 1/6	743 (29.25)	6 (0.24)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	162 (6.38)	14 (30.9)
	DN 25 / 1" Rd 52 x 1/6	643 (25.31)	7 (0.28)					112 (4.41)	
	DN 40 / 1/2" Rd 65 x 1/6	786 (30.94)	7 (0.28)					185 (7.28)	

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Remote design, food industry fitting "G" to "K", DIN 11851



G00342

Fig. 23: Dimensions in mm (inch)

- 1 Food industry fitting acc. to DIN 11851 (threaded connector)
- 2 Flow direction

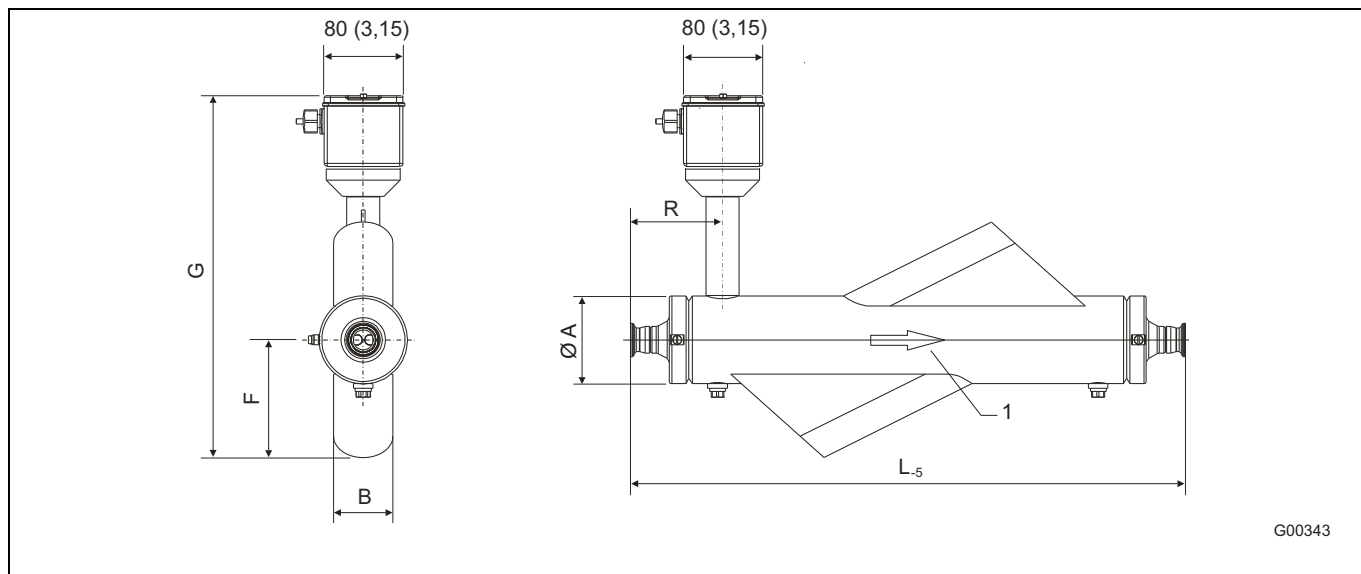
Meter Size DN	Process connection	L _s	g	G	F	B	A	R	Weight kg (lb)
„G“ (40)	DN 25 / (1") Rd 52 x 1/6	864 (34.02)	7 (0.28)	374 (14.72)	129 (5.08)	64 (2.52)	90 (3.54)	218 (8.58)	16 (35.3)
	DN 40 / (1 1/2") Rd 65 x 1/6	761 (29.96)	7 (0.28)					164 (6.46)	18 (39.7)
	DN 50 / (2") Rd 78 x 1/6	918 (36.14)	7 (0.28)					241 (9.49)	19 (41.9)
„H“ (50)	DN 40 / (1 1/2") Rd 65 x 1/6	1025 (40.35)	7 (0.28)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	233 (9.17)	28 (61.7)
	DN 50 / (2") Rd 78 x 1/6	918 (36.14)	7 (0.28)					177 (6.97)	30 (66.1)
	DN 65 / (2 1/2") Rd 95 x 1/6	1081 (42.56)	8 (0.31)					254 (10.00)	34 (75.0)
„I“ (65)	DN 50 / (2") Rd 78 x 1/6	1197 (47.13)	7 (0.28)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	291 (11.46)	40 (88.2)
	DN 65 / (2 1/2") Rd 95 x 1/6	1081 (42.56)	8 (0.31)					227 (8.94)	44 (97.0)
	DN 80 / (3") Rd 110 x 1/4	1200 (47.24)	8 (0.31)					281 (11.06)	47 (103.6)
„J“ (80)	DN 65 / (2 1/2") Rd 95 x 1/6	1310 (51.57)	8 (0.31)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	319 (12.56)	54 (119.0)
	DN 80 / (3") Rd 110 x 1/4	1205 (47.44)	8 (0.31)					258 (10.16)	56 (123.5)
	DN 100 / (4") Rd 130 x 1/4	1463 (57.60)	10 (0.39)					381 (15.00)	60 (132.3)
„K“ (100)	DN 80 / (3") Rd 110 x 1/4	1618 (63.70)	8 (0.31)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	401 (15.79)	82 (180.8)
	DN 100 / (4") Rd 130 x 1/4	1463 (57.60)	10 (0.39)					314 (12.36)	86 (189.6)

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device,
the device nominal sizes must correspond with the connection nominal sizes!

Remote design, tri-clamp "E" to "F", DIN 32676 (ISO 2852)



G00343

Fig. 24: Dimensions in mm (inch)

1 Flow direction

Meter Size DN	Process connection	L ₅	G	F	B	Ø A	R	Weight kg (lb)
„E“ (20)	DN 15 (1/2)	656 (25.83)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	140 (5.51)	12 (26.5)
	DN 20 (3/4")	561 (22.09)						
	DN 25 (1")	661 (26.02)						
„F“ (25)	DN 20 (3/4")	721 (28.39)	358 (14.09)	127 (5.00)	66 (2.60)	89 (3.50)	152 (5.98)	13 (28.7)
	DN 25 (1")	621 (24.45)						
	DN 40 (1 1/2")	773 (30.43)						

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Remote design, tri-clamp "G" to "K", DIN 32676 (ISO 2852)

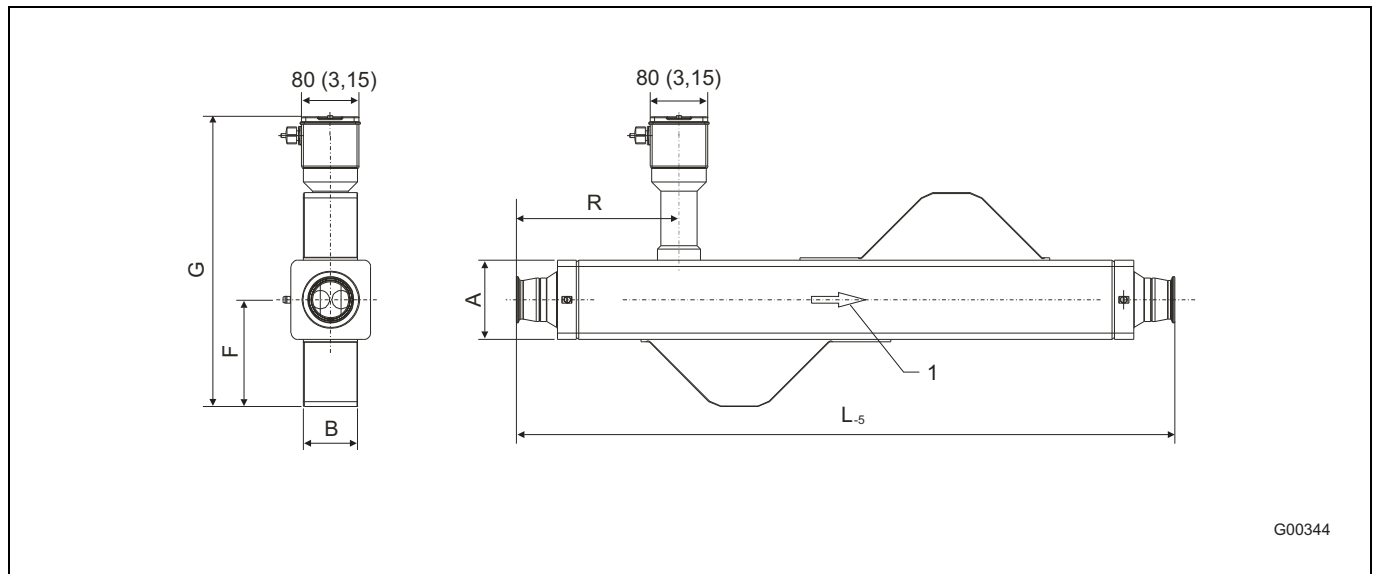


Fig. 25: Dimensions in mm (inch)

1 Flow direction

Meter Size DN	Process connection fitting	L ₅ ± 3	G	F	B	A	R	Weight kg (lb)
„G“ (40)	DN 25 (1")	842 (33.15)	374 (14.72)	129 (5.08)	64 (2.52)	90 (3.54)	242 (9.53)	17 (37.5)
	DN 40 (1 1/2")	748 (29.45)					195 (7.68)	17 (37.5)
	DN 50 (2")	913 (35.94)					278 (10.94)	18 (39.7)
„H“ (50)	DN 40 (1 1/2")	1012 (39.84)	403 (15.87)	148 (5.83)	80 (3.15)	110 (4.33)	275 (10.83)	27 (59.5)
	DN 50 (2")	913 (35.94)					225 (8.86)	26 (57.3)
	DN 65 (2 1/2")	1073 (42.24)					305 (12.01)	27 (59.5)
„I“ (65)	DN 50 (2")	1192 (46.93)	429 (16.89)	164 (6.46)	97 (3.82)	130 (5.12)	335 (13.19)	36 (79.4)
	DN 65 (2 1/2")	1073 (42.24)					275 (10.83)	37 (81.6)
	DN 80 (3")	1180 (46.46)					328 (12.91)	38 (83.8)
„J“ (80)	DN 65 (2 1/2")	1302 (51.26)	456 (17.95)	186 (7.32)	108 (4.25)	140 (5.51)	378 (14.88)	45 (99.2)
	DN 80 (3")	1180 (46.46)					296 (11.65)	44 (97.0)
	DN 100 (4")	1448 (57.01)					430 (16.93)	46 (101.4)
„K“ (100)	DN 80 (3")	1598 (62.91)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	440 (17.32)	71 (156.5)
	DN 100 (4")	1448 (57.01)					365 (14.37)	69 (152.1)

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

3.2.2 Design MC23 / MC26 / MC27 compact design or remote Ex design

Flanged construction "E" to "F", DIN/ASME

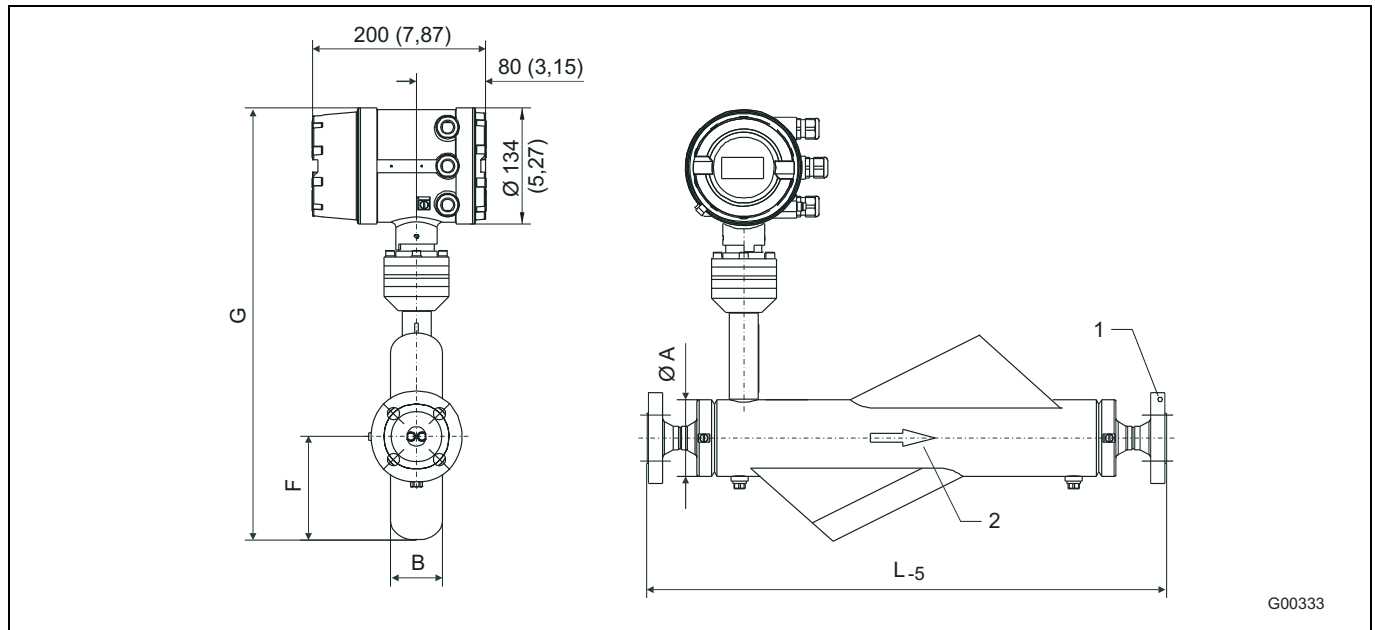


Fig. 26: Dimensions in mm (inch)

- 1 Flange DIN 2635 / ASME B16.5 / ISO 7005 (connecting dimensions for ASME flanges acc. to ASME B16.5 (ANSI))
- 2 Flow direction

Meter Size DN	A	F	B	G		Process connection DN	L _s							Weight kg (lb)
				MC23	MC26/ MC27		DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	DIN 11864-2 form A ¹⁾	
20 („E“)	89 (3.50)	127 (5)	66 (2.60)	470 (18.50)	494 (19.45)	15 (1/2")	693 (27.28)	705 (27.76)	705 (27.76)	708 (27.87)	718 (28.27)	730 (28.74)	672 (26.46)	16
						20 (3/4")	598 (23.54)	–	–	618 (24.33)	628 (24.72)	645 (25.39)	583 (22.95)	16
						25 (1")	698 (27.48)	735 (28.94)	735 (28.94)	728 (28.66)	738 (29.06)	753 (29.65)	683 (26.89)	17
25 („F“)	89 (3.50)	127 (5)	66 (2.60)	470 (18.50)	494 (19.45)	20 (3/4")	758 (29.84)	–	–	778 (30.63)	788 (31.02)	802 (31.57)	743 (29.25)	17
						25 (1")	658 (25.91)	693 (27.28)	693 (27.28)	688 (27.09)	698 (27.48)	710 (27.95)	643 (25.31)	17
						40 (1 1/2")	808 (31.81)	840 (33.07)	840 (33.07)	838 (32.99)	855 (33.66)	868 (34.17)	786 (30.94)	20

All dimensions in mm (inch)

1) Antiseptic grooved flange DIN 11864-2, form A, for pipes acc. to DIN 11866

Flanged construction "G" to "L", DIN/ASME

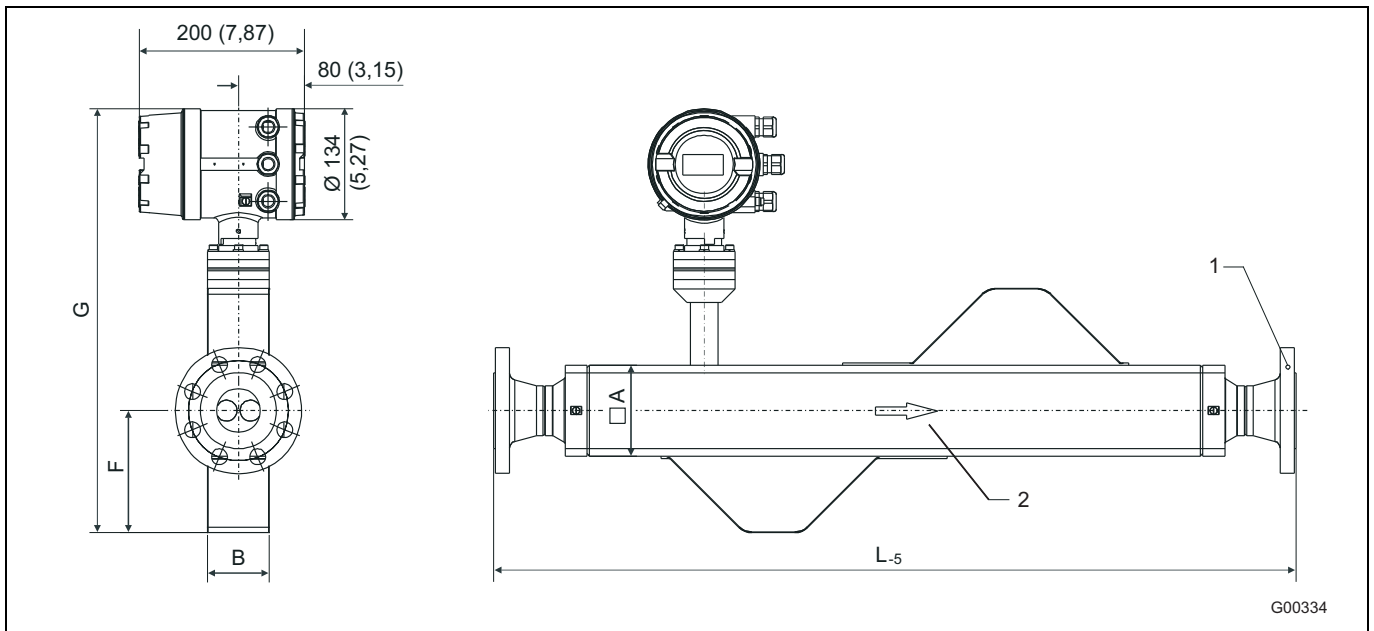


Fig. 27: Dimensions in mm (inch)

- 1 Flange DIN 2635 / ASME B16.5 / ISO 7005 (connecting dimensions for ASME flanges acc. to ASME B16.5 (ANSI))
- 2 Flow direction

Meter Size DN	A	F	B	G		Process conn. DN	L ₅								Weight kg (lb)	
				MC23	MC26/ MC27		DIN 2633 PN 16	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	DIN 11864-2 form A ¹⁾		
40 („G“)	90 (3.54)	129 (5.08)	64 (2.52)	486 (19.13)	511 (20.12)	25 (1“)		879 (34.61)	914 (35.98)	914 (35.98)	910 (35.83)	922 (36.30)	932 (36.69)	864 (34.02)	21 (46.3)	
						40 (1 1/2“)		780 (30.71)	813 (32.01)	813 (32.01)	810 (31.89)	825 (32.48)	843 (33.19)	761 (29.96)	23 (50.7)	
						50 (2“)		940 (37.01)	967 (38.07)	979 (38.54)	970 (38.19)	980 (38.58)	1001 (39.41)	918 (36.14)	24 (52.9)	
50 („H“)	110 (4.33)	148 (5.83)	80 (3.15)	515 (20.28)	540 (21.26)	40 (1 1/2“)		1045 (41.14)	1078 (42.44)	1078 (42.44)	1075 (42.32)	1090 (42.91)	1108 (43.62)	1025 (40.35)	33 (72.8)	
						50 (2“)		940 (37.01)	967 (38.07)	979 (38.54)	970 (38.19)	980 (38.58)	1001 (39.41)	918 (36.14)	35 (77.2)	
						65 (2 1/2“)		1100 (43.31)	1132 (44.57)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1248 (49.13)	1081 (42.56)	39 (86.0)	
65 („I“)	130 (5.12)	164 (6.46)	97 (3.82)	541 (21.30)	566 (22.28)	50 (2“)		1220 (48.03)	1248 (49.13)	1259 (49.57)	1250 (49.21)	1260 (49.61)	1281 (50.43)	1197 (47.13)	44 (97.0)	
						65 (2 1/2“)		1100 (43.31)	1132 (44.57)	1148 (45.20)	1218 (47.95)	1228 (48.35)	1249 (49.17)	1081 (42.56)	49 (108.0)	
						80 (3“)		1220 (48.03)	1248 (49.13)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)	1200 (47.24)	51 (112.4)	
80 („J“)	140 (5.51)	186 (7.32)	108 (4.25)	568 (22.36)	593 (23.35)	65 (2 1/2“)		1330 (52.36)	1362 (53.62)	1378 (54.25)	1365 (53.74)	1375 (54.13)	1396 (54.96)	1310 (51.57)	57 (125.7)	
						80 (3“)		1220 (48.03)	1248 (49.13)	1260 (49.61)	1240 (48.82)	1260 (49.61)	1282 (50.47)	1200 (47.24)	59 (130.1)	
						100 (4“)		1450 (57.09)	1480 (58.27)	1494 (58.82)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)	1463 (57.60)	70 (154.3)
100 („K“)	170 (6.69)	215 (8.46)	131 (5.16)	612 (24.09)	637 (25.08)	80 (3“)		1640 (64.57)	1668 (65.67)	1680 (66.14)	1660 (65.35)	1680 (66.14)	1702 (67.01)	1618 (63.70)	85 (187.4)	
						100 (4“)		1450 (57.09)	1480 (58.27)	1494 (58.82)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)	1463 (57.60)	92 (202.8)
						150 (6“)		1736 (68.35)	1776 (69.92)	1816 (71.50)	–	1806 (71.10)	1826 (71.89)	–	–	120 (264.6)
150 („L“)	250 (9.84)	285 (11.22)	190 (7.48)	725 (28.54)	750 (29.53)	150 (6“)	2000 (78.74)	2040 (80.31)	2080 (81.89)	–	2070 (81.50)	2090 (82.28)	–	–	240 (529.1)	

All dimensions in mm (inch)

1) Antiseptic grooved flange DIN 11864-2, form A, for pipes acc. to DIN 11866

Food industry fitting "E" to "F", DIN 11851

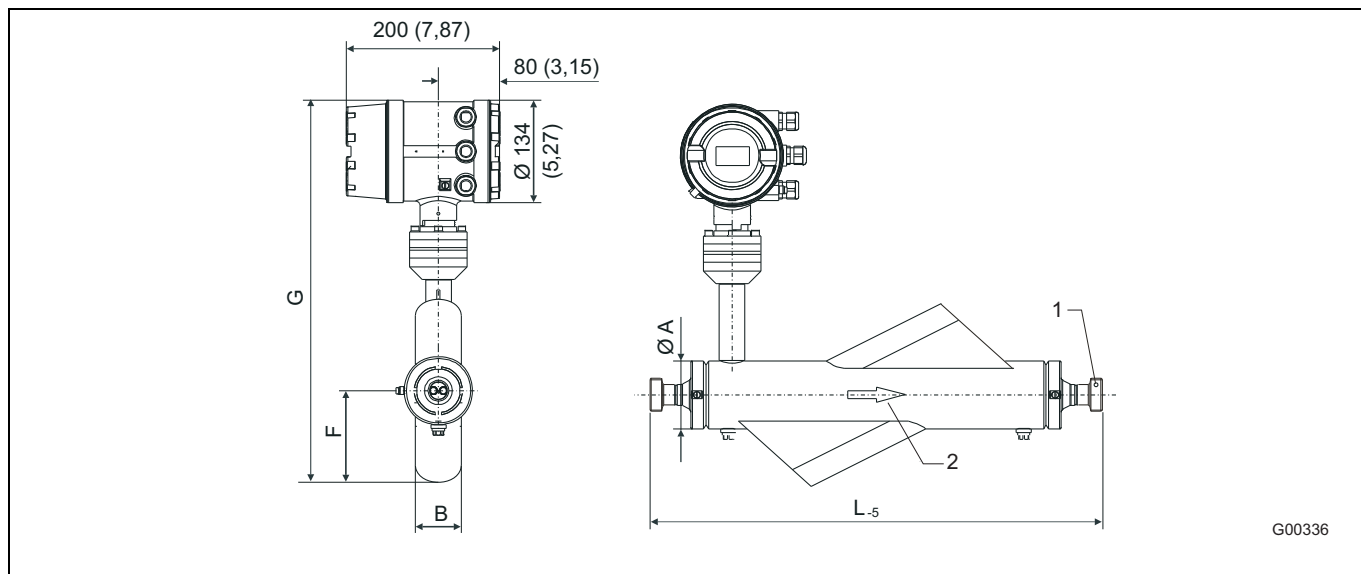


Fig. 28: Dimensions in mm (inch)

- 1 Food industry fitting acc. to DIN 11851 (threaded connector)
- 2 Flow direction

Meter Size DN	A	F	B	G		Process connection DN	L ₅	Weight appr. kg (lb)
				MC23	MC26 / MC27		DIN 11851	
20 („E“)	89 (3.50)	127 (5.00)	66 (2.60)	470 (18.50)	494 (19.45)	15 (1/2“)	672 (26.46)	14 (30.9)
						20 (3/4“)	583 (22.95)	
						25 (1“)	683 (26.89)	
25 („F“)	89 (3.50)	127 (5.00)	66 (2.60)	470 (18.50)	494 (19.45)	20 (3/4“)	743 (29.25)	15 (33.1)
						25 (1“)	643 (25.31)	
						40 (1 1/2“)	786 (30.94)	

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device,
the device nominal sizes must correspond with the connection nominal sizes!

Food industry fitting "G" to "K", DIN 11851

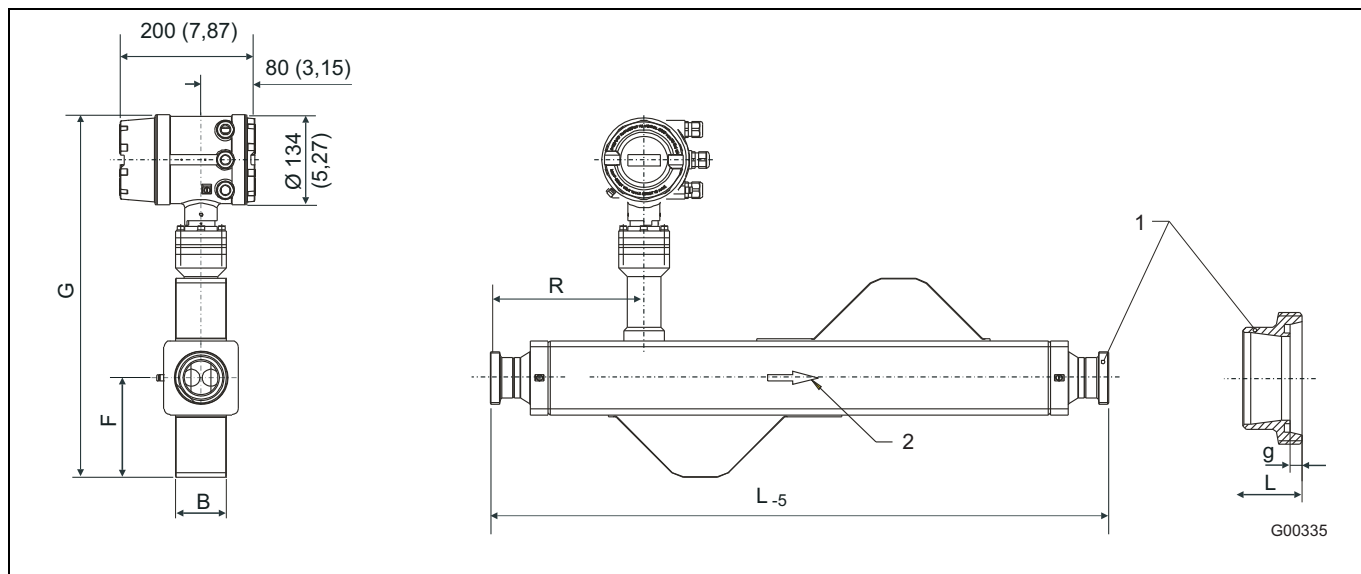


Fig. 29: Dimensions in mm (inch)

- 1 Food industry fitting acc. to DIN 11851 (threaded connector)
- 2 Flow Direction

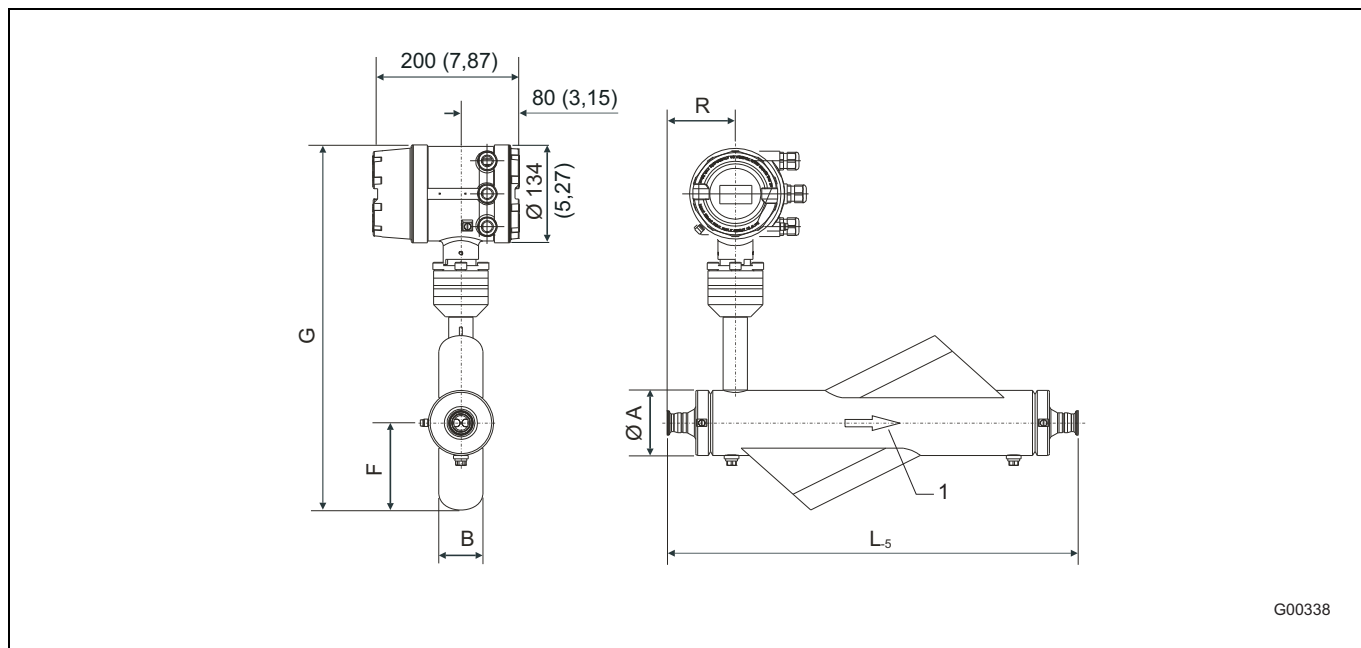
Meter Size DN	A	F	B	G		Process connection DN	L ₅	g	M	R	Weight appr kg (lb)
				MC23	MC26/ MC27						
40 („G“)	90 (3.54)	129 (5.08)	64 (2.52)	486 (19.13)	511 (20.12)	25 (1")	864 (34.02)	7 (0.28)	Rd 52 x 1/6	218 (8.58)	21 (46.3)
						40 (1 1/2")	61 (29.96)	7 (0.28)	Rd 65 x 1/6	164 (6.46)	23 (50.7)
						50 (2")	918 (36.14)	7 (0.28)	Rd 78 x 1/6	241 (9.49)	24 (52.9)
50 („H“)	110 (4.33)	148 (5.83)	80 (3.15)	515 (20.28)	540 (21.26)	40 (1 1/2")	1025 (40.35)	7 (0.28)	Rd 65 x 1/6	233 (9.17)	33 (72.8)
						50 (2")	918 (36.14)	7 (0.28)	Rd 78 x 1/6	177 (6.97)	35 (77.2)
						65 (2 1/2")	1081 (42.56)	8 (0.31)	Rd 95 x 1/6	254 (10.00)	39 (86.0)
65 („J“)	130 (5.12)	164 (6.46)	97 (3.82)	541 (21.30)	566 (22.28)	50 (2")	1197 (47.13)	7 (0.28)	Rd 78 x 1/6	291 (11.46)	44 (97.0)
						65 (2 1/2")	1081 (42.56)	8 (0.31)	Rd 95 x 1/6	227 (8.94)	48 (105.8)
						80 (3")	1200 (47.24)	8 (0.31)	Rd 110 x 1/4	281 (11.06)	51 (112.4)
80 („J“)	140 (5.51)	186 (7.32)	108 (4.25)	568 (22.36)	593 (23.35)	65 (2 1/2")	1310 (51.57)	8 (0.31)	Rd 95 x 1/6	319 (12.56)	57 (125.7)
						80 (3")	1200 (47.24)	8 (0.31)	Rd 110 x 1/4	258 (10.16)	59 (130.1)
						100 (4")	1463 (57.60)	10 (0.39)	Rd 130 x 1/4	381 (15.00)	70 (154.3)
100 („K“)	170 (6.69)	215 (8.46)	131 (5.16)	612 (24.09)	637 (25.08)	80 (3")	1618 (63.70)	8 (0.31)	Rd 110 x 1/4	401 (15.79)	85 (187.4)
						100 (4")	1463 (57.60)	10 (0.39)	Rd 130 x 1/4	314 (12.36)	92 (202.8)

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

Tri-clamp "E" to "F", DIN 32676 (ISO 2852)



G00338

Fig. 30: Dimensions in mm (inch)

1 Flow direction

Meter Size DN	A	F	B	G		Process connection DN	L ₅	R	Weight appr kg (lb)
				MC23	MC26/ MC27				
20 („E“)	89 (3.50)	127 (5.00)	66 (2.60)	470 (18.50)	494 (19.45)	15 (1/2“)	656 (25.83)	140 (5.51)	14 (30.9)
						20 (3/4“)	561 (22.09)	92 (3.62)	
						25 (1“)	661 (26.02)	142 (5.59)	
25 („F“)	89 (3.50)	127 (5.00)	66 (2.60)	470 (18.50)	494 (19.45)	20 (3/4“)	721 (28.39)	152 (5.98)	15 (33.1)
						25 (1“)	621 (24.45)	102 (4.02)	
						40 (1 1/2“)	773 (30.43)	180 (7.09)	

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device,
the device nominal sizes must correspond with the connection nominal sizes!

Tri-clamp "G" to "K", DIN 32676 (ISO 2852)

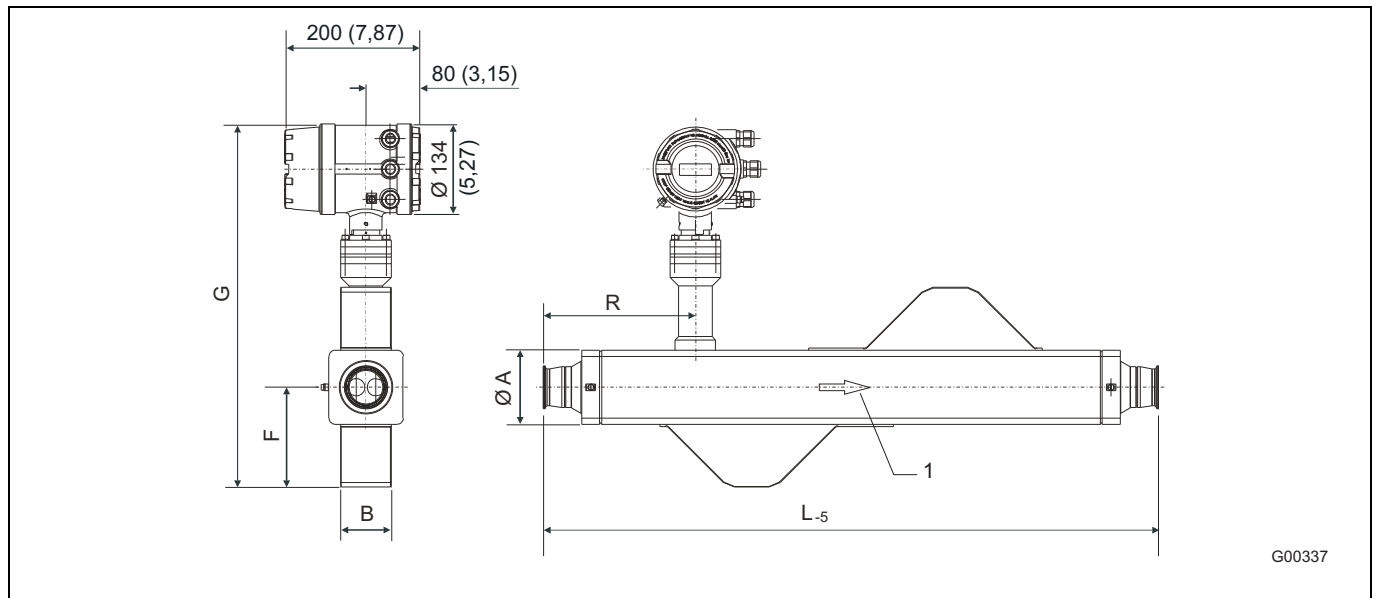


Fig. 31: Dimensions in mm (inch)

1 Flow direction

Meter Size DN	A	F	B	G		Process connection DN	L ₅	R	Weight appr kg (lb)
				MC23	MC26/ MC27				
40 („G“)	90 (3.54)	129 (5.08)	64 (2.52)	486 (19.13)	511 (20.12)	25 (1“)	842 (33.15)	242 (9.53)	17 (37.5)
						40 (1 1/2“)	748 (29.45)	195 (7.68)	17 (37.5)
						50 (2“)	913 (35.94)	278 (10.94)	18 (39.7)
50 („H“)	110 (4.33)	148 (5.83)	80 (3.15)	515 (20.28)	540 (21.26)	40 (1 1/2“)	1012 (39.84)	275 (10.83)	27 (59.5)
						50 (2“)	913 (35.94)	225 (8.86)	26 (57.3)
						65 (2 1/2“)	1073 (42.24)	305 (12.01)	27 (59.5)
65 („I“)	130 (5.12)	164 (6.46)	97 (3.82)	541 (21.30)	566 (22.28)	50 (2“)	1192 (46.93)	335 (13.19)	36 (79.4)
						65 (2 1/2“)	1073 (42.24)	275 (10.83)	37 (81.6)
						80 (3“)	1180 (46.46)	328 (12.91)	38 (83.8)
80 („J“)	140 (5.51)	186 (7.32)	108 (4.25)	568 (22.36)	593 (23.35)	65 (2 1/2“)	1302 (51.26)	378 (14.88)	45 (99.2)
						80 (3“)	1180 (46.46)	296 (11.65)	44 (97.0)
						100 (4“)	1448 (57.01)	430 (16.93)	46 (101.4)
100 („K“)	170 (6.69)	215 (8.46)	131 (5.16)	612 (24.09)	637 (25.08)	80 (3“)	1598 (62.91)	440 (17.32)	71 (156.5)
						100 (4“)	1448 (57.01)	365 (14.37)	69 (152.1)

All dimensions in mm (inch)



If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

3.3 Ordering information

Separate sensor and integral mount version, DN 15 ... DN 150 (1/2 ... 6")

		Main order number																		Additional order no.	
Version number		1-3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
CoriolisMaster mass flowmeter FCM2000 MC2			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XX	
Design																					
Remote mount, ATEX, IECEx Zone 2, FM Div. 2			1																		
Integral mount, ATEX, IECEx Zone 2, FM Div. 2			3																		
Remote mount, ATEX, IECEx Zone 1, FM Div. 1			6																		
Integral mount, ATEX, IECEx Zone 1, FM Div. 1			7																		
Explosion protection/Cable gland/Ambient temperature																					
None/cable gland M20 x 1.5/standard				A																	
None/cable gland NPT 1/2 in./standard				T																	
None/cable gland M20 x 1.5/extended -40 ... 60 °C (-40 ... 140 °F)			1)	U																	
None/cable gland NPT 1/2 in. /extended -40 ... 60 °C (-40 ... 140 °F)			1)	X																	
ATEX, IECEx Zone 1/cable gland M20 x 1.5/standard			2)	B																	
ATEX, IECEx Zone 2/cable gland M20 x 1.5/standard			3)	M																	
ATEX, IECEx Zone 1/M20 x 1.5/extended -40 ... 60 °C (-40 ... 140 °F)			4)	E																	
ATEX, IECEx Zone 2/M20 x 1.5/extended -40 ... 60 °C (-40 ... 140 °F)			2)	N																	
FMus Class I, Div. 1, Zone 1/cable gland NPT 1/2 in./standard			4)	C																	
FMus Class I, Div. 2, Zone 2/cable gland NPT 1/2 in./standard			3)	O																	
FMus Class I, Div. 1, Zone 1/NPT 1/2 in. /extended -40 ... 60 °C (-40 ... 140 °F)			4)	Y																	
FMus Class I, Div. 2, Zone 2/NPT 1/2 in. /extended -40 ... 60 °C (-40 ... 140 °F)			1)	V																	
cFM Class I, Div. 1, Zone 1/NPT 1/2 in./standard			2)	D																	
cFM Class I, Div. 2, Zone 2/NPT 1/2 in./standard			3)	P																	
cFM Class I, Div. 1, Zone 1/NPT 1/2 in. /extended -40 ... 60 °C (-40 ... 140 °F)			4)	Q																	
cFM Class I, Div. 2, Zone 2/NPT 1/2 in. /extended -40 ... 60 °C (-40 ... 140 °F)			1)	W																	
Certificates																					
Standard				1																	
Material certificate 3.1 to EN 10204				2																	
Material certificate 3.1 to EN 10204 and pressure test to AD-2000				3																	
Pressure test to AD-2000				4																	
NACE material certificate				5																	
NACE certificate + pressure test				6																	
Meter tube material																					
Stainless steel				1																	
1.4435 (AISI 316L SST) EHEDG version				5)	3																
Hastelloy C-4 (2.4610)				6)	4																
Measuring range/Max. measuring range/Size/DN nominal																					
0 ... 75 kg/min (0 ... 165 lbs/min)"/E"/DN 20 (3/4 in.)																					E
0 ... 125 kg/min (0 ... 275 lbs/min)"/F"/DN 25 (1 in.)																					F
0 ... 365 kg/min (0 ... 803 lbs/min)"/G"/DN 40 (1-1/2 in.)																					G
0 ... 710 kg/min (0 ... 1562 lbs/min)"/H"/DN 50 (2 in.)																					H
0 ... 1,450 kg/min (0 ... 3190 lbs/min)"/I"/DN 65 (2-1/2 in.)																					I
0 ... 1,890 kg/min (0 ... 4158 lbs/min)"/J"/DN 80 (3 in.)																					J
0 ... 3,200 kg/min (0 ... 7040 lbs/min)"/K"/DN 100 (4 in.)																					K
0 ... 8,500 kg/min (0 ... 18,700 lbs/min)"/L"/DN 150 (6 in.)																					L

Continued on next page

- 1) For MC23 only.
- 2) For MC26/MC27 only.
- 3) For MC21/MC23 only.
- 4) For MC2 only.
- 5) Only with process connection DIN 11851 or Tri-Clamp and size E ... J.
- 6) Only with DIN PN 40/ASME CL 150 and size E ... K.

Main order number																	Additional order no.		
Version number	1 - 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
CoriolisMaster mass flowmeter FCM2000 MC2		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XX
Process connection nominal diameter																			
DN 15 (1/2 in.)						7)	1	5											
DN 20 (3/4 in.)						7)	2	0											
DN 25 (1 in.)						7)	2	5											
DN 40 (1-1/2 in.)						7)	4	0											
DN 50 (2 in.)						7)	5	0											
DN 65 (2-1/2 in.)						7)	6	5											
DN 80 (3 in.)						7)	8	0											
DN 100 (4 in.)						7)	1	H											
DN 150 (6 in.)						7)	1	F											
Process connection type																			
Flange DIN PN 16																			D
Flange DIN PN 40																			F
Flange DIN PN 64																			G
Flange DIN PN 100									8)										H
Flange ASME 150																			P
Flange ASME 300																			Q
Flange ASME 600									8)										R
Aseptic flange conforming to DIN 11864-2 form A for pipes conforming																			N
Tri-Clamp conforming to DIN 32676										9)									U
Threaded pipe connection conforming to DIN 11851										9)									V
Housing (flowmeter sensor)																			
Standard																			1
Housing as protective device, 40 bar (565 psi)										9)									2
Heating/Cooling																			
None																			1
Calibration																			
Forward flow +/- 0.40 % of flow rate/density (+/- 5 g/l)																			A
Forward flow +/- 0.25 % of flow rate/density (+/- 5 g/l)																			B
Forward flow +/- 0.15 % of flow rate/density (+/- 5 g/l)																			C
Forward flow +/- 0.1 % of flow rate/density (+/- 5 g/l)										10)									M
Forward flow +/- 0.40 % of flow rate/density (+/- 1 g/l)										9)									D
Forward flow +/- 0.25 % of flow rate/density (+/- 1 g/l)										9)									E
Forward flow +/- 0.15 % of flow rate/density (+/- 1 g/l)										9)									F
Forward flow +/- 0.1 % of flow rate/density (+/- 1 g/l)										11)									N
Forward/reverse flow +/- 0.40 % of flow rate/density (+/- 5 g/l)																			G
Forward/reverse flow +/- 0.25 % of flow rate/density (+/- 5 g/l)																			H
Forward/reverse flow +/- 0.15 % of flow rate/density (+/- 5 g/l)																			I
Forward/reverse flow +/- 0.1 % of flow rate/density (+/- 5 g/l)										10)									O
Forward/reverse flow +/- 0.40 % of flow rate/density (+/- 1 g/l)										9)									J
Forward/reverse flow +/- 0.25 % of flow rate/density (+/- 1 g/l)										9)									K
Forward/reverse flow +/- 0.15 % of flow rate/density (+/- 1 g/l)										9)									L
Forward/reverse flow +/- 0.1 % of flow rate/density (+/- 1 g/l)										11)									P
Name plate																			
German																			12) G
English																			E
Design level (Specified by ABB)																			
																			X
Operating mode/Software version																			
Not selected (only for remote mount flowmeter sensors)																			X
Standard software (mass and density measurement)																			A
Standard software plus concentration measurement (DensiMass)																			C

Continued on next page

- 7) Possible combinations of measuring range and process connection nominal diameter: See data sheet.
- 8) Not for sizes "K" und "L".
- 9) Not for size "L" (DN 150 [6 in.]).
- 10) Not for size "E" (DN 20 [3/4 in.]).
- 11) Not for size "L" (DN 150 [6 in.]) or "E" (DN 20 [3/4 in.]).
- 12) Not for devices without Ex approval.

Main order number																			Additional order no.
Version number	1 - 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
CoriolisMaster mass flowmeter	FCM2000	MC2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XX
Outputs																			
Current output I (active), current output II (passive), pulse output (active) [Ex not possible]																13)	A		
Current output I (active), current output II (passive), pulse output (passive)																	B		
Current output I (passive, "ia"), current output II (passive, "ia"), pulse output (passive, "ia")																14)	D		
Not selected/fieldbus (only for remote mount flowmeter sensors)																	X		
Communication																			
Not selected (only for remote mount flowmeter)																	0		
None																	1		
HART protocol																	3		
PROFIBUS PA																	5		
FOUNDATION Fieldbus																15)	7		
PROFIBUS PA with M12 plug																			
Power supply																			
Not selected (only for remote mount flowmeter)																			
100 ... 230 V AC																			G
24 V AC/DC																			K
Signal cable length																			
Zero in the case of integral mount version																16)			C0
5 m (16 ft.) with ME21																16)			C1
10 m (33 ft.) with ME21																16)			C2
20 m (66 ft.) with ME21																16)			C3
25 m (82 ft.) with ME21																16)			C4
50 m (164 ft.) with ME21																16)			C5
10 m (33 ft.) with ME26																17)			C6
Language of documentation																			
German																			M1
English																			M5
Western Europe/Scandinavia language package (languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)																			MW
Eastern Europe language package (languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)																			ME
Other																			MZ
FCM2000-MC2 signal cable, price per meter																		D173D146U01	

- 13) Not for MC27.
- 14) Only for ATEX, IECEx Zone 1 or FM Div. 1 and with "ia" outputs.
- 15) Not with MC26/MC27.
- 16) With ME21 only.
- 17) With ME26 only.

4 Model FCM2000-MS2

4.1 Specifications

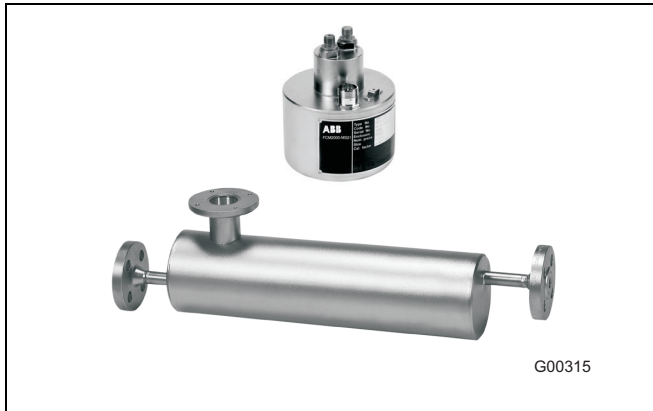


Fig. 32: FCM2000-MS2 flowmeter sensor

Nominal sizes

"S" (DN 1.5); "T" (DN 3); "U" (DN 6)

Measuring ranges for flowrate

Nominal size	Max. measuring range [Q _{max}] in [kg/h]
"S" DN 1.5 (1/16")	0 ... 65
"T" DN 3 (1/10")	0 ... 250
"U" DN 6 (1/4")	0 ... 1000

Protection class: IP 65

Measured value deviation for flowrate

± 0.4 % of flow rate ± 0.02 % of Q_{max}

± 0.25 % of flow rate ± 0.02 % of Q_{max}

± 0.15 % of flow rate ± 0.01 % of Q_{max}

(deviation from rate + zero error)

Reproducibility of flowrate

0.1 % of flow rate for nom. deviation ± 0.15 %

0.15 % of flow rate for nom. deviation ± 0.25 % and 0.4 %

Measuring range for density

0.5 ... 3.5 kg/dm³

Measured value deviation for density

Standard calibration ± 10 g/l

Temperature range 0 ... 100 °C (32 ... 212 °F)

Expanded density calibration available upon request

Measured value deviation for temperature

-50 ... 180 °C (-58 ... 356 °F) < 1 °K (1.8 °F)

Reference conditions

Calibration fluid

Water 25 °C (77 °F) (+ 5 K/- 5 K)

Pressure 0.5 ... 6 bar (7.3 ... 87.0 psi)

Ambient temperature

25 °C (77 °F) (+ 10 K/- 5 K)

Supply power

Line voltage as per name plate U_N ± 1 %

Warm-up phase

30 minutes

Installation according to this specification

No visible gas phase

No external mechanical or hydraulic disturbances, particularly cavitation

Output calibration

Pulse output

Effect of the analog output on the measurement accuracy

Similar to pulse output ± 0.1 % of measured value

Materials and additional specifications

Sensor materials

Parts in contact with fluid

1.4435/316L

Housing 1.4404

Fluid temperature

Standard:

-50 ... 180 °C (-58 ... 356 °F): DN 3 (1/10"), DN 6 (1/4")

-50 ... 125 °C (-58 ... 257 °F): DN 1.5 (1/16")

-50 ... 180 °C (-58 ... 356 °F): DN 1.5 (1/16") (optional)

For information about the design for operation in potentially explosive areas, refer to the corresponding chapter.

Ambient temperature

-20 ... 50 °C (-4 ... 122 °F)

For information about the design for operation in potentially explosive areas, refer to the corresponding chapter.

Process connections

G1/4" ISO 228-1

1/4" NPT ASME B1.201

Flange DIN/ASME for DN 6 (1/4")

Threaded pipe connection conforming to DIN 11851 for DN 6 (1/4")

Tri-Clamp conforming to DIN 32676 (ISO 2852) for DN 6 (1/4")

The max. permissible operating pressure is determined by the respective process connection, the fluid temperature, the screws, and the gasket material.

Pressure rating

Flange PN 40, PN 100, CI 150, CI 600

Thread G 1/4", 1/4" NPT, PN 100 ... PN 410 (for each option)

Installation

For more detailed instructions regarding installation, refer to the operating instructions.

Pressure loss curves

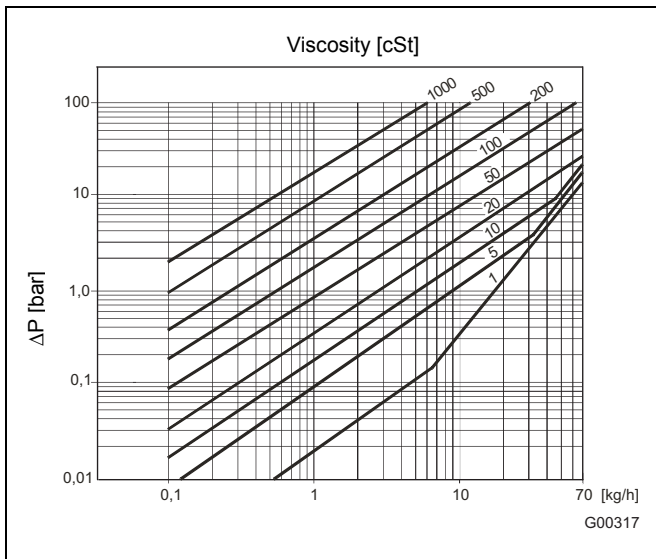


Fig. 33: Pressure losses MS21, DN 1.5 (1/16")

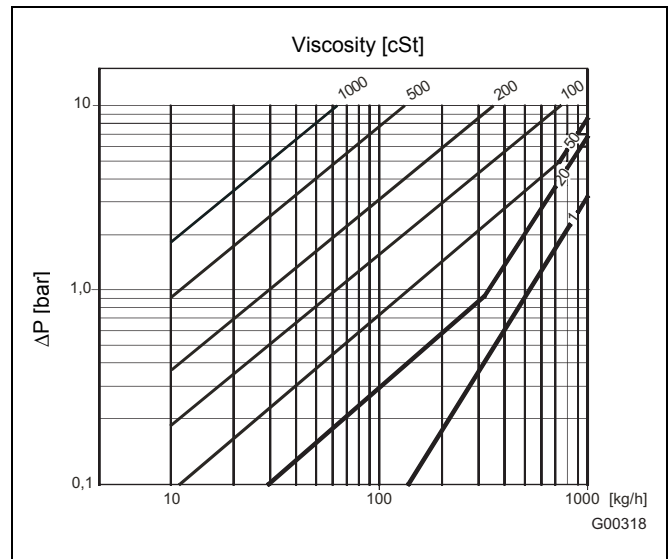


Fig. 35: Pressure losses MS21, DN 6 (1/4")

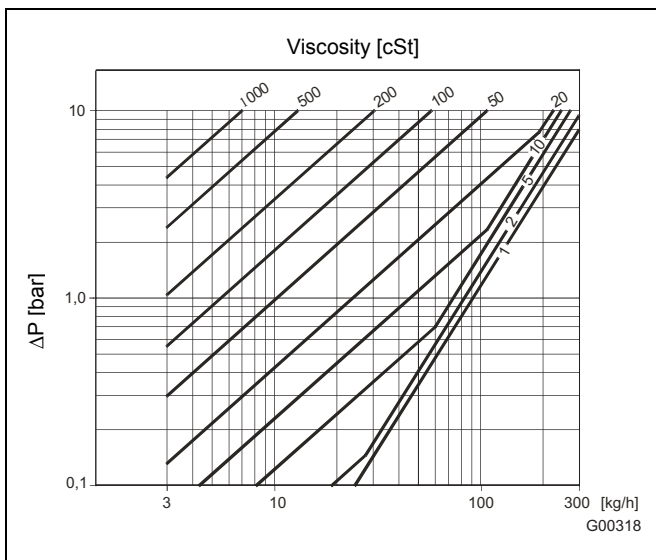


Fig. 34: Pressure losses MS21, DN 3 (1/10")

4.2 Dimensions

4.2.1 Design MS21

Remote design DN 3 ... DN 6 (1/10 ... 1/4")

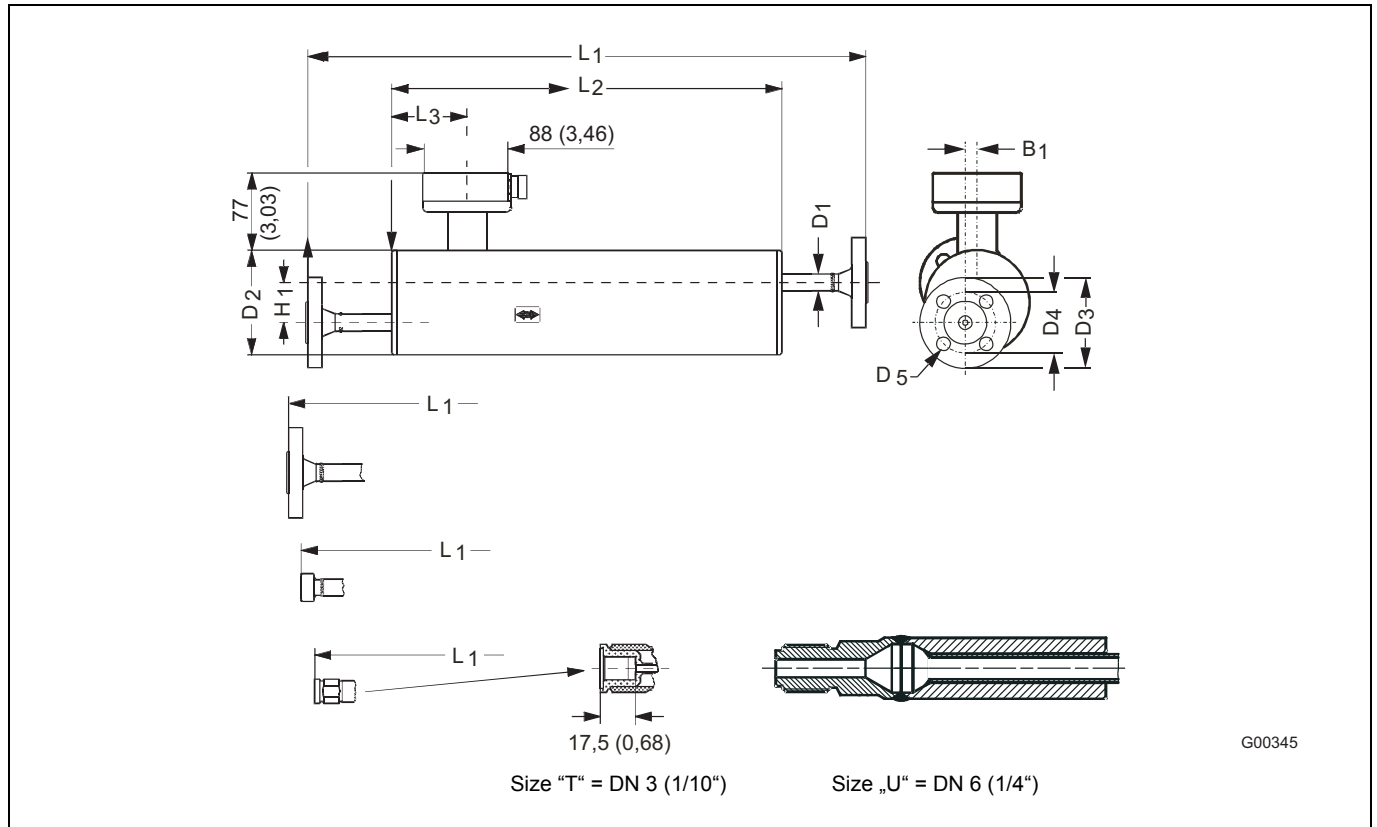
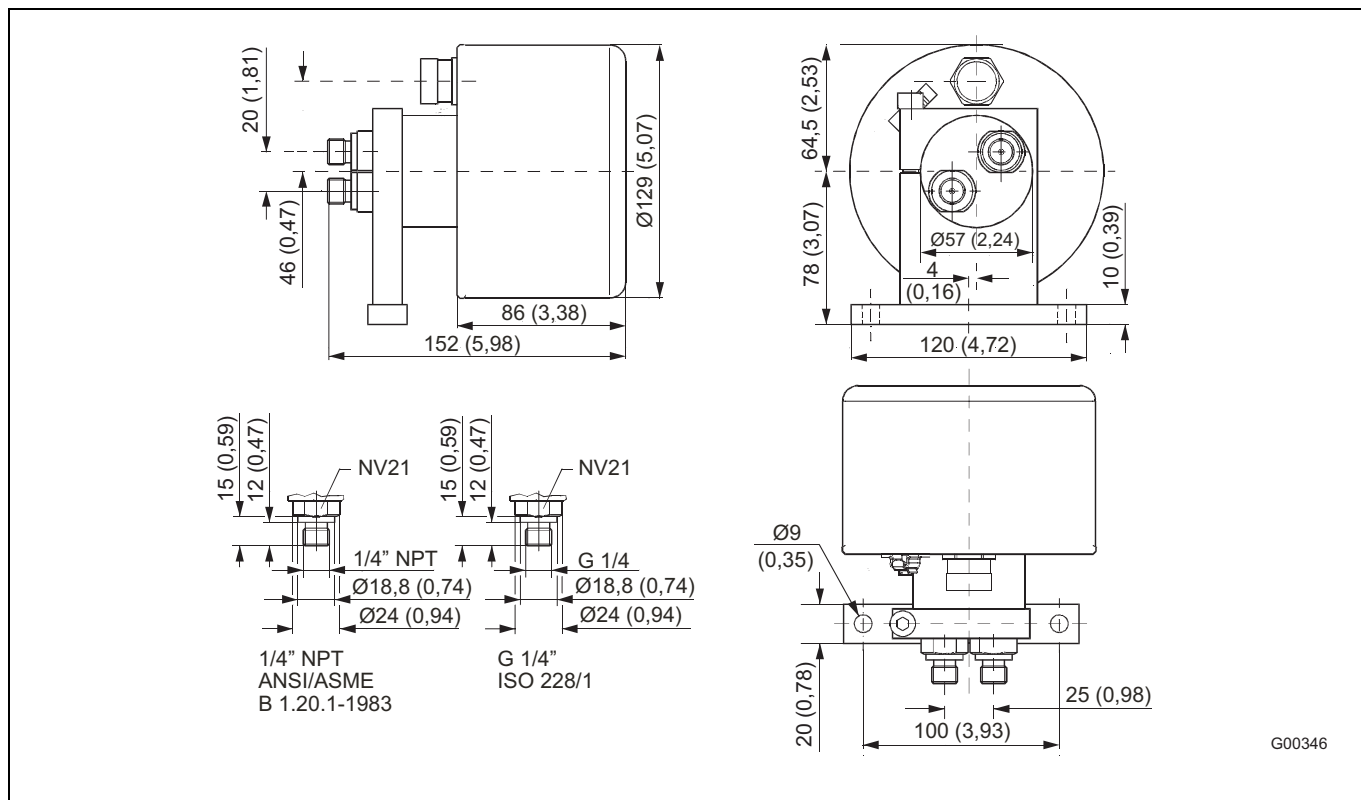


Fig. 36: Dimensions in mm (inch)

Nom. size DN	Connections			L1	L2	L3	H1	B1	D1	D2	D3	D4	D5	Weight appr. kg (lb)
	Type	Pressure PN	Size											
3 (1/10")	Threaded connector ISO 228/1-G 1/4	100	1/4"	400 (15.75)	280 (11.02)	75.0 (2.44)	60 (2.36)	0	21.3 (0.84)	104 (4.09)	-	-	-	4 (8.8)
	Threaded connection ANSI/ASME B1.20.1-1/4" NPT	100	1/4"	400 (15.75)	280 (11.02)	75.0 (2.44)	60 (2.36)	0	21.3 (0.84)	104 (4.09)				
6 (1/4")	Flange DIN 2635	40	DN 10	560 (22.05)	390 (11.02)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)	90.0 (3.54)	60.0 (2.36)	14.0 (0.55)	8 (17.6)
	Flange DIN 2637	100 (64)	DN 10	580 (22.83)	390 (11.02)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Flange DIN 2635	40	DN 15	638 (25.12)	390 (11.02)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Flange DIN 2637	100 (64)	DN 15	654 (25.75)	390 (11.02)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Flange ANSI / ASME B 16.5	Class 150	1/2"	624 (24.57)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)	88.9 (3.50)	60.5 (2.38)	15.7 (0.62)	
	Flange ANSI / ASME B 16.5	Class 600	1/2"	646 (25.43)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Flange ANSI / ASME B 16.5	Class 150	3/4"	670 (26.38)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Flange ANSI / ASME B 16.5	Class 600	3/4"	693 (27.28)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Screwed connection DIN 11851	40	DN 10	532 (20.94)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)	-	-	-	
	Screwed connection DIN 11851	40	DN 15	570 (22.44)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Tri-clamp, DIN 32676 (ISO 2852)	16	25 mm	570 (22.44)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Clamp, ISO 2853	16	25 mm	573 (22.56)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)				
	Threaded connector ISO 228/1-G 1/4	100	1/4"	562 (22.13)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)	-	-	-	
	Threaded connection ANSI/ASME B 1.20.1-1/4" NPT	100	1/4"	562 (22.13)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)	-	-	-	
Threaded connection ISO 228/1-G 1/4	EN1.4435 PN 265 EN2.4602 PN 410	1/4"	562 (22.13)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)					
Threaded connection ANSI/ASME B 1.20.1-1/4" NPT	EN1.4435 PN 265 EN2.4602 PN 410	1/4"	562 (22.13)	390 (15.35)	62.0 (2.44)	40 (1.57)	12 (0.47)	17.0 (0.67)	104 (4.09)					

Measurements in mm (inch)

Remote design, DN 1.5 (1/16")



G00346

Fig. 37: Dimensions in mm (inch)

4.3 Ordering information

Remote mount sensor, DN 1.5 ... DN 6 (1/10 ... 1/4")

		Main order number																Additional order no.
Version number		1-3	4	5	6	7	8	9	10	11	12	13	14	15	16			
CoriolisMaster mass flowmeter		FCM2000	MS2	X	X	X	X	X	X	X	X	X	X	X	X	X		
Design																		
Remote mount flowmeter sensor, non-Ex or FM Div. 2		1																
Remote mount flowmeter sensor, ATEX Zone 1, FM Div. 1		6																
Application																		
Standard/plug		1) A																
ATEX Zone 1/plug		2) B																
FMus Class I, Div. 1, Zone 1/plug		2) C																
FMus Class I, Div. 2, Zone 2/plug		1) O																
cFM Class I, Div. 1, Zone 1/NPT 1/2 in.		2) D																
cFM Class I, Div. 2, Zone 2/NPT 1/2 in.		1) P																
Certificates																		
Standard		1																
Material certificate 3.1 to EN 10204		2																
Material certificate 3.1 to EN 10204 and pressure test to AD-2000		3																
Meter tube material																		
Stainless steel AISI 316L (1.4435)		3																
Hastelloy C-22 (2.4602)		4																
Measuring range/Size/DN nominal																		
0 ... 65 kg/h (0 ... 140 lbs/h)"/S"/DN 1.5 (1/17 in.)		S																
0 ... 250 kg/h (0 ... 550 lbs/h)"/T"/DN 3 (1/10 in.)		T																
0 ... 1,000 kg/h (0 ... 2,200 lbs/h)"/U"/DN 6 (1/4 in.)		U																
Temperature version																		
Max. 125 °C (257 °F) (DN 1.5 [1/17 in.] only)		1																
Max. 180 °C (356 °F) (DN 3 [1/10 in.] and DN 6 [1/4 in.] only)		3) 2																
Process connection type																		
G 1/4 in. ISO 228-1/PN 100		A																
1/4 in. NPT, ANSI/ASME B 1.20.1/PN 100		B																
Flange EN 1092-1 DN 10/PN 40 (DN 6 [1/4 in.] only)		C																
Flange EN 1092-1 DN 15/PN 40		P																
Flange EN 1092-1 DN 10/PN 100		Q																
Flange EN 1092-1 DN 15/PN 100		R																
Flange 1/2 in. /ASME Class 150 (DN 6 [1/4 in.] only)		I																
Flange 3/4 in. /ASME Class 150		U																
Flange 1/2 in. /ASME Class 600		4) V																
Flange 3/4 in. /ASME Class 600		W																
DN 10 conforming to DIN 11851/PN 40 (DN 6 [1/4 in.] only)		M																
DN 15 conforming to DIN 11851/PN 40 (DN 6 [1/4 in.] only)		N																
Tri-Clamp 25 mm, ISO 2852/PN 16		J																
Housing design																		
Standard		5) 1																
PN 230 (316L)		6) 2																
PN 350 (HC22)		7) 3																
PN 365 (HC22)		8) 4																
PN 265		9) 5																
PN 410		9) 6																
Heating/Cooling																		
None		0																
Heating connection flange DN 15		10) 1																
Heating connection flange 1/2 in. ASME		10) 2																

Continued on next page

- | | |
|---|-------------------------------|
| 1) For MS21 only. | 6) With sizes "S", "T" only. |
| 2) For MS26 only. | 7) With size "T" only. |
| 3) For size "S" on request. | 8) With size "S" only. |
| 4) With plug at flowmeter sensor. | 9) With size "U" only. |
| 5) See "Process connection type" for details. | 10) With sizes "T", "U" only. |

Main order number																Additional order no.	
Version number	1 - 3	4	5	6	7	8	9	10	11	12	13	14	15	16			
CoriolisMaster mass flowmeter	FCM2000	MS2	X	X	X	X	X	X	X	X	X	X	X	X		XX	
Calibration																	
0.40 % / 10 g/l forward													A				
0.25 % / 10 g/l forward													B				
0.15 % / 10 g/l forward													C				
0.40 % / 10 g/l forward/reverse													G				
0.25 % / 10 g/l forward/reverse													H				
0.15 % / 10 g/l forward/reverse													I				
Name plate																	
German															11) G		
English															E		
Design level (Specified by ABB)																X	
Signal cable length																	
5 m (16 ft.)																4) 1	
10 m (33 ft.)																4) 2	
25 m (82 ft.)																4) 3	
50 m (164 ft.)																4) 4	
10 m (33 ft.) (with ME27/ME28 only)																4) 5	
Language of documentation																	
German																	M1
English																	M5
Western Europe/Scandinavia language package (languages: DE, EN, DA, ES, FR, IT, NL, PT, FI,																	MW
Eastern Europe language package (languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)																	ME
Other																	MZ

- 4) With plug at flowmeter sensor.
- 11) Only for non-Ex versions

5 Transmitter

5.1 Specifications

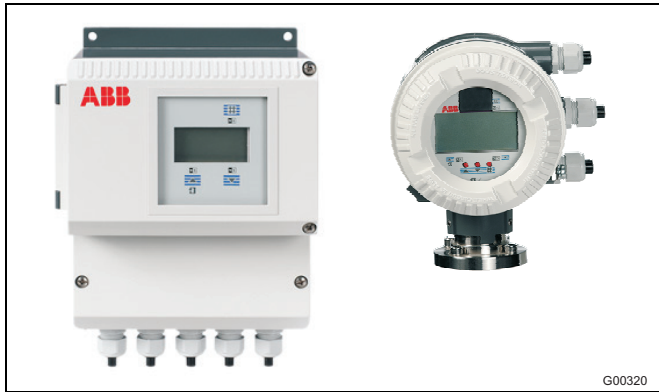


Fig. 38: FCM2000-ME2 transmitter, field-mount housing

Measuring range

Freely configurable between 0.01 Q_{max} and 1 Q_{max}

Ingress protection

IP 65/IP 67, NEMA 4X

Electrical connections

Cable gland M20 x 1.5 or 1/2" NPT

Max. signal cable length for remote mount design 50 m (longer lengths available upon request)

Supply power

Supply voltage

100 ... 230 V AC (tolerance -15 % and +10 %), 47 ... 63 Hz

20.4 ... 26.4 V AC, 47 ... 63 Hz

20.4 ... 31.2 V DC

Ripple: $\leq 5\%$

Power consumption

$S \leq 25\text{ VA}$

Response time

As jump function 0 ... 99 % (corr. to 5τ) $\geq 1\text{ s}$

Ambient temperature

-20 ... 60 °C (-4 ... 140 °F), optional -40 ... 60 °C (-40 ... 140 °F)

At operation below -20 °C (-4 °F), the display can no longer be read and the electronic unit should be operated with as few vibrations as possible. Complete operational reliability is achieved at temperatures above -20 °C (-4 °F).

Design

Field-mount housing and compact transmitter unit as alloy casting, varnished

Mid-section: RAL 7012, dark gray

Cover: RAL 9002, light gray

Paint coat: 80 ... 120 μm thick

Forward/reverse flow metering

Signals are shown on the display by direction arrows and by the optocoupler for ext. signaling.

Display

The graphic display has 2 lines and features an LED backlight. Both lines are freely configurable to display the mass flowrate, volume flowrate, density, or temperature. Flow count, 7-digit with overflow counter and physical unit for mass or volume.

When the four mounting screws are loosened, the display can be installed in 4 positions. This ensures optimal readability.



Fig. 39: Magnet stick operation

- 1 Magnet stick (The magnet stick can be used for parameterization in the compact unit or the field-mount housing when the housing cover is closed.)

Parameter adjustment

Data can also be entered in various languages using the three control buttons on the transmitter.

The transmitter housing can be rotated approx. 180° in each direction. The display can be installed in 4 positions to ensure optimal readability. As well as allowing you to select the 1st and 2nd display lines, multiplex mode can be used to display the following: flow indicators in %, physical unit, or bar graph; totalizer status; forward or reverse flow; and TAG no.

Data backup

Via FRAM, all data over 10 years old is stored without supply power in the event of shut-off or failure of the line voltage. Additional security is provided by another FRAM in the transmitter, through data exchange or data storage for process information.

Hardware and software identification acc. to NAMUR recommendation NE53.

i Important

The unit complies with NAMUR recommendations NE21 and NE43, "Electromagnetic compatibility of equipment for process and lab control technology", as well as EMC Directive 2004/108/EC (EN 61326) and Low-Voltage Directive 2006/95/EC (EN 61010-1).

5.2 Concentration measurement DensiMass

This software calculates on the basis of predefined density-temperature-concentration matrices the present concentration of a 2 phase liquid. In this software the following matrices are predefined:

- Concentration of sodium hydroxyde in water
- Concentration of alcohol in water
- Concentration of sugar (BRiX)
- Concentration of Corn Starch
- Concentration of Wheat starch

The user can additionally enter up to 2 variable matrices with up to 100 values for concentration computation.

Calculation of accuracy

The accuracy of the concentration computation depends foremost on the quality of the matrix data. As density and temperature measurement is the input for the calculation both accuracies define the accuracy of the concentration measurement.

Example:

Density 0 % alcohol in water (20 °C [68 °F])	998.23 g/l
Density 100 % alcohol in water (20 °C [68 °F])	789.30 g/l
100 % =	208.93 g/l
0.48 % =	1 g/l
2.40 % =	5 g/l

The chosen accuracy class of the density measurement effects the accuracy of the concentration measurement directly.

Please also see the manual D184B111Uxx attached to your meter and also available at www.abb.com/flow.

5.3 Inputs/outputs

Active current output (0/4 ... 20 mA)

Current output 1
 0/4 ... 20 mA, selectable
 Load: $0 \Omega \leq R_B \leq 560 \Omega$
 Terminals: 31/32
 Measurement uncertainty < 0.1 % of rate
 For output of mass flowrate, volume flowrate, density, and temperature.
 Freely configurable in the software.

Passive current output (4 ... 20 mA)

Current output 1 or 2
 Output current 4 ... 20 mA
 Load: $0 \Omega \leq R_B \leq 600 \Omega$
 Source voltage: $12 V \leq U_q \leq 30 V$
 Terminals: 33/34
 Measurement uncertainty < 0.1 % of rate
 For output of mass flowrate, volume flowrate, density, and temperature.

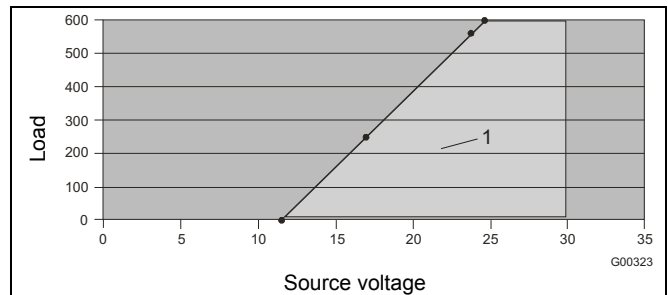


Fig. 40: Permissible source voltage as a function of the load resistance, where $I_{max} = 22 \text{ mA}$

1 Permissible range

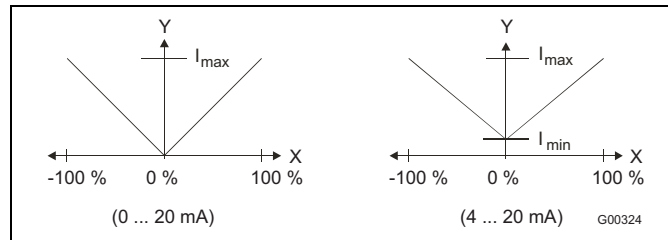


Fig. 41



Important

Failure information acc. to NAMUR recommendation NE43.

Scaled pulse output

Scaled pulse output (max. 5 kHz) with adjustable pulse factor between 0.001 ... 1,000 pulses per selected engineering unit. The pulse width is configurable from 0.1 ... 2,000 ms. The output is electrically isolated from current outputs 1 and 2.

Design	Passive	Active
Terminals	51, 52	51, 52
Operating voltage	$16\text{ V} \leq U_{\text{CEH}} \leq 30\text{ V DC}$ $0\text{ V} \leq U_{\text{CEL}} \leq 2\text{ V}$	$16\text{ V} \leq U \leq 30\text{ V DC}$ Load $\geq 150\text{ Ohm}$
Operating current	$0\text{ mA} \leq I_{\text{CEH}} \leq 0.2\text{ mA}$ $2\text{ mA} \leq I_{\text{CEL}} \leq 220\text{ mA}$	$f_{\text{max}} = 5\text{ kHz}$
	When using a mechanical totalizer, pulse widths $\geq 30\text{ ms}$ and $f_{\text{max}} \leq 3\text{ Hz}$ are recommended	
f_{max}	5 kHz	5 kHz
Pulse width	0.1 ms ... 2,000 ms	0.1 ms ... 2,000 ms

Contact output

The following functions can be assigned in the software:

System monitoring: normally open or normally closed contact

Forward/reverse flow indication: closed for forward flow

Max/min alarm: normally open or normally closed contact

Terminals: 41, 42

"Closed" $0\text{ V} \leq U_{\text{CEL}} \leq 2\text{ V}$

$2\text{ mA} \leq I_{\text{CEL}} \leq 220\text{ mA}$

"Open" $16\text{ V} \leq U_{\text{CEH}} \leq 30\text{ V}$

$0\text{ mA} \leq I_{\text{CEH}} \leq 0.2\text{ mA}$

Contact input

The following functions can be assigned in the software:

Ext. output switch-off. When the meter tube empties, all output signals can be turned off.

Ext. totalizer reset. The internal totalizers can be reset from an external contact.

Terminals: 81/82

"On" $16\text{ V} \leq U_{\text{KL}} \leq 30\text{ V}$

"Off" $0\text{ V} \leq U_{\text{KL}} \leq 2\text{ V}$

Internal resistance: $R_i = 2\text{ k}\Omega$

All inputs/outputs are electrically isolated from one another.

5.4 Digital Communication

The transmitter offers the following options for digital communication:

5.4.1 HART protocol

The unit is registered with the HART Communication Foundation.

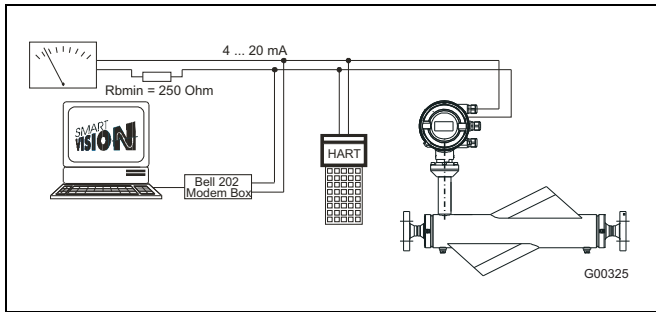


Fig. 42: Communication via HART protocol

HART protocol	
Configuration	Directly on the unit Software DSV401 (+ HART-DTM)
Transmission	FSK modulation on current output 4 ... 20 mA acc. to Bell 202 standard
Max. signal amplitude	1.2 mA _{SS}
Load of current output	Min. 250 Ω, max. = 560 Ω (ignition-proof: max. 300 Ω)
Cable	
Cable	AWG 24 twisted
Max. cable length	1,500 m (4,921 ft.)
Baud rate	1,200 baud
Display	Log. 1: 1,200 Hz Log. 0: 2,200 Hz

For additional information, see the separate interface description.

System integration

Communication (configuration, parameterization) can be performed with the DTM (Device Type Manager) available for the unit (software version B.10 and higher) and the corresponding framework applications as per FDT 0.98 or 1.2 (DSV401 R2). If you require integration into different tools/systems (e.g., AMS or Siemens S7), this is available upon request. DSV401 communication tool for HART, free 90-day test version also available upon request. DTMs are included in DSV401.

5.4.2 PROFIBUS PA protocol

The interface conforms to Profile 3.0 (PROFIBUS standard, EN 50170, DIN 19245 [PRO91]).

PROFIBUS PA ID no.:	0849 hex.
Alternative standard ID no.:	9700 or 9742 hex.
Configuration	Directly on the unit Software DSV401 (+ PROFIBUS PA DTM)
Transmission signal	Acc. to IEC 61158-2
Cable	Shielded, twisted cable (acc. to IEC 61158-2, types A or B are preferred)

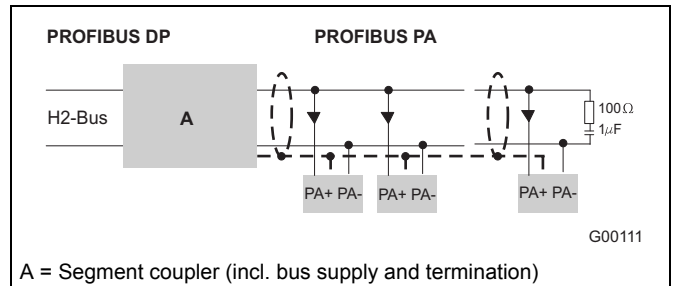


Fig. 43: Example for PROFIBUS PA interface connection

Bus topology

- Tree and/or line structure
- Bus termination: passive at both ends of the main bus line (RC element R = 100 Ω, C = 1 μF)

Voltage/Current consumption

- Average current consumption: 14 mA.
- In the event of an error, the FDE (= Fault Disconnection Electronic) function integrated in the unit ensures that the current consumption can rise to a maximum of 26 mA.
- The upper current limit is restricted electronically.
- The voltage on the bus line must lie in the range of 9 ... 32 V DC.

For additional information, see the separate interface description.

Important

For PROFIBUS PA / FOUNDATION Fieldbus, FISCO/FNICO, the maximum number of units which can be connected must be restricted.

5.4.3 FOUNDATION Fieldbus (FF)

FF interface	Compliant with FF standard 890/891 and FF-902
Interoperability test campaign no.	IT 027200
Manufacturer ID	0x000320
Device ID	0x0018
Configuration	<ul style="list-style-type: none"> • Directly on the unit • Via services integrated in the system • National configurator
Transmission signal	Acc. to IEC 61158-2

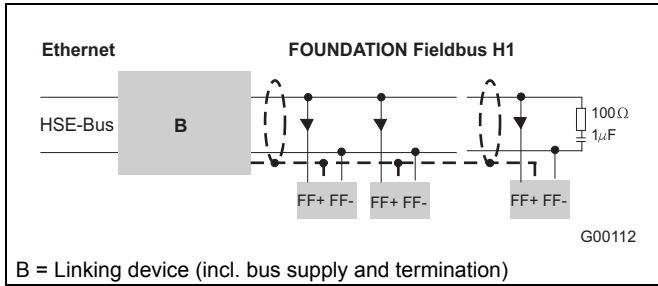


Fig. 44: Example for FOUNDATION Fieldbus interface connection

Bus topology

- Tree and/or line structure
- Bus termination: passive at both ends of the main bus line (RC element $R = 100 \Omega$, $C = 1 \mu F$)

Voltage/Current consumption

- Average current consumption: 14 mA.
- In the event of an error, the FDE (= Fault Disconnection Electronic) function integrated in the unit ensures that the current consumption can rise to a maximum of 26 mA.
- Upper current limit: electronically restricted.
- The voltage on the bus line must lie in the range of 9 ... 32 V DC.

Bus address

The bus address is automatically assigned or can be set in the system manually.

Addresses are detected using a unique combination of manufacturer ID, device ID, and device serial number.

System integration

The following are required:

- DD (Device Description) file, which includes the device description.
- The CFF (Common File Format) file is required for engineering the segment. Engineering can be performed online or offline.

You can find both files, as well as the interface description, on the supplied CD (part no.: D184B093U35). This can be re-ordered, if necessary, from ABB at no cost.

The files needed for operation can also be downloaded from www.abb.com/flow --> Coriolis Mass --> fieldbus.org.

i Important

For PROFIBUS PA / FOUNDATION Fieldbus, FISCO/FNICO, the maximum number of units which can be connected must be restricted.

5.5 Electrical connections

5.5.1 Interconnection Examples for Peripherals

DC outputs (incl. HART)

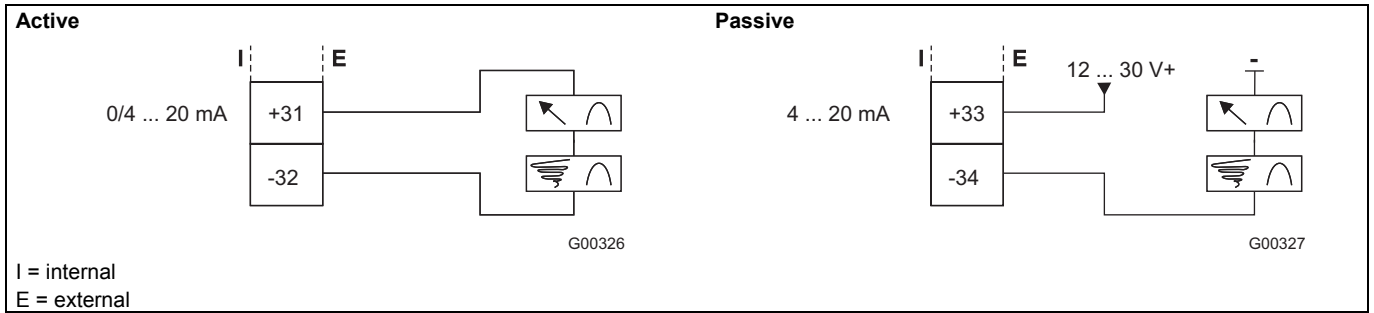


Fig. 45: Current output 1 active/passive

Switch output

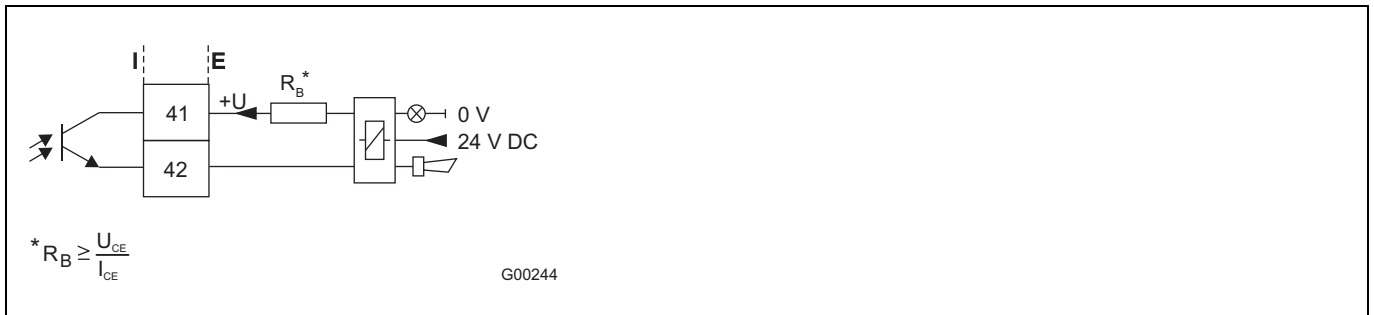


Fig. 46: Switch output for system monitoring, Max.-Min. alarm for empty tube or forward/reverse signal

Switch input

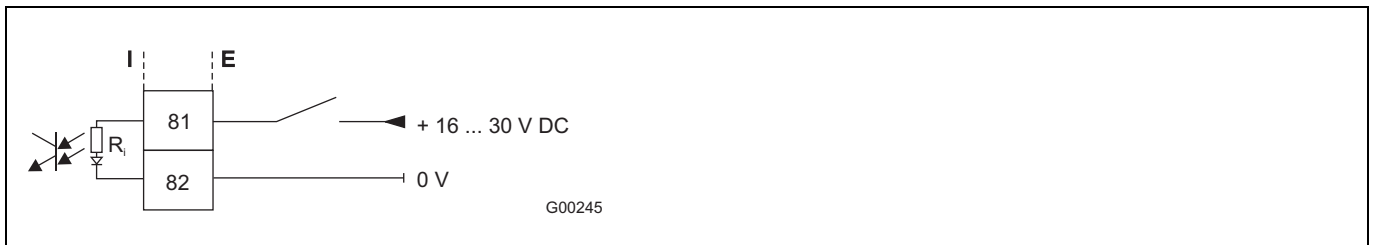


Fig. 47: Contact input for external totalizer reset and external zero return

Pulse Output

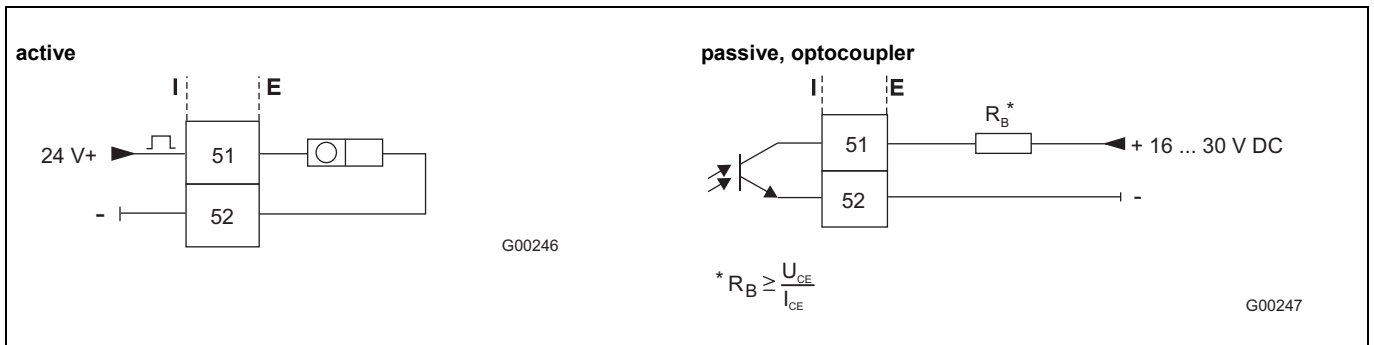


Fig. 48: Pulse output active and pulse output passive, optocoupler

PROFIBUS PA / FOUNDATION Fieldbus

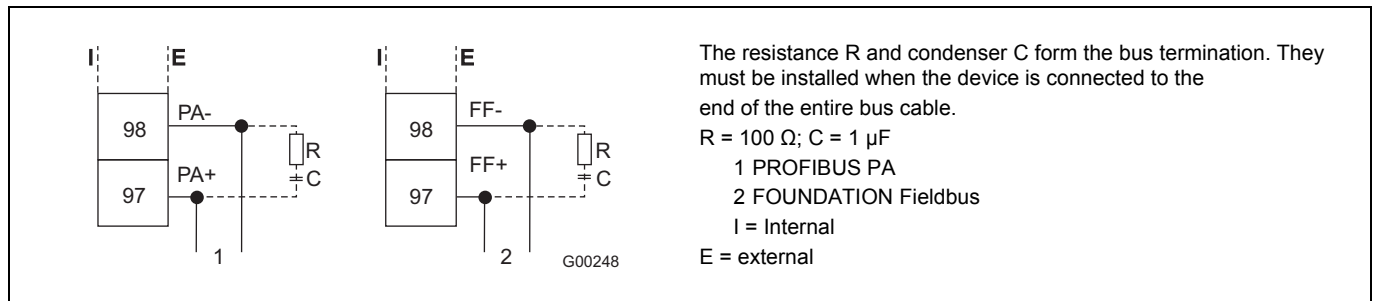


Fig. 49: Connection examples for peripherals with PROFIBUS PA or FOUNDATION Fieldbus

Connection via M12 plug (for PROFIBUS PA only)

As an option, the bus can also be connected via an M12 plug instead of the cable gland (see order information for device). The device can be shipped completely prewired. For information about suitable connectors (type EPG300) and other accessories, refer to the data sheet 10/63.6.44.

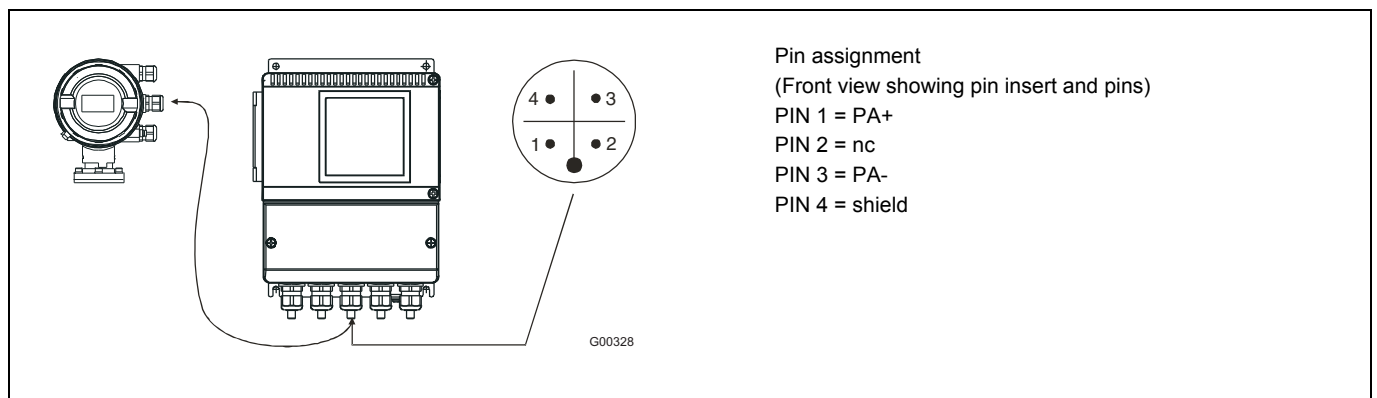


Fig. 50: Connection example via M12 plug

5.5.2 Electrical connections between the transmitter and the flowmeter sensor

Connecting transmitter ME21 to flowmeter sensor MC21

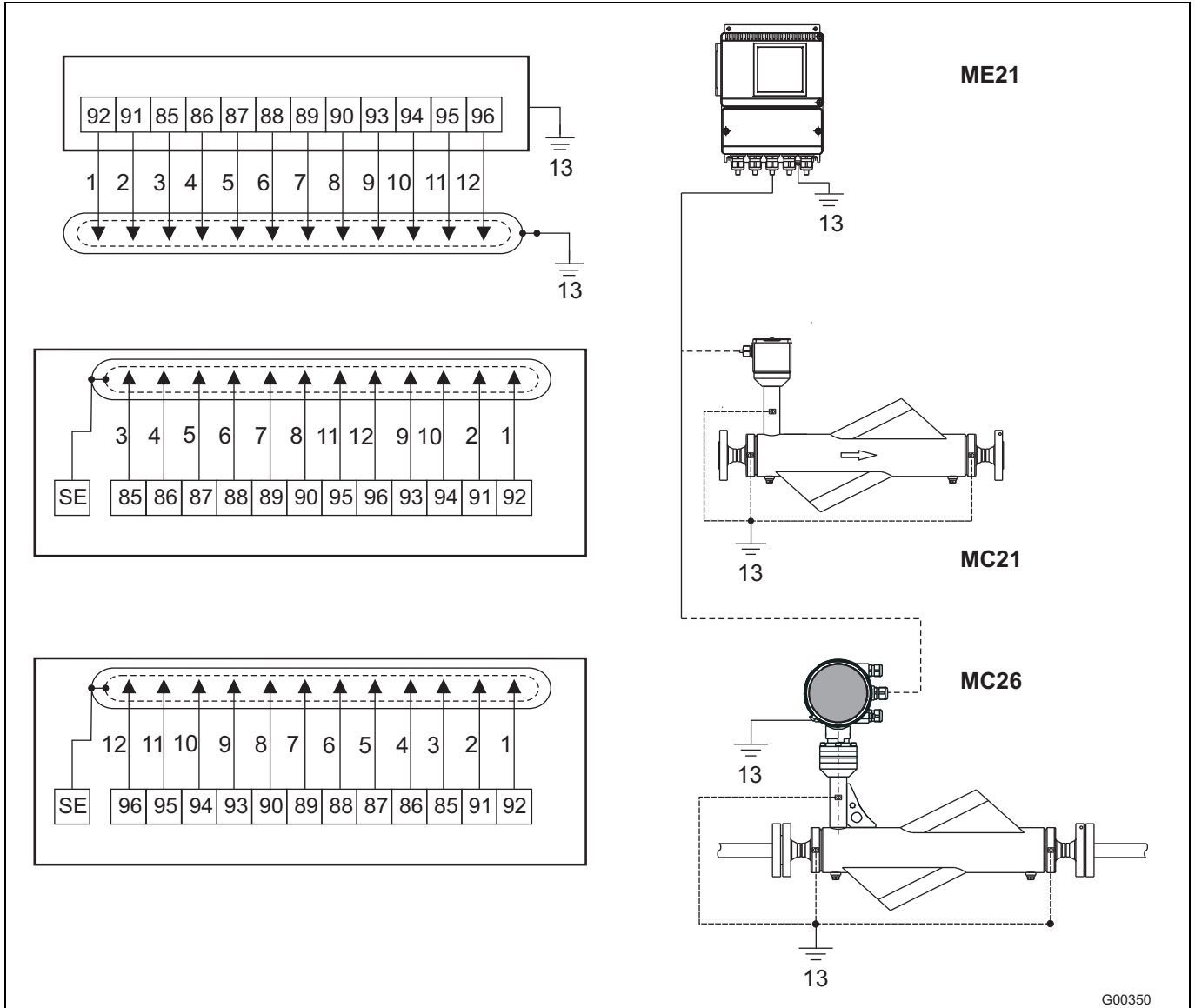
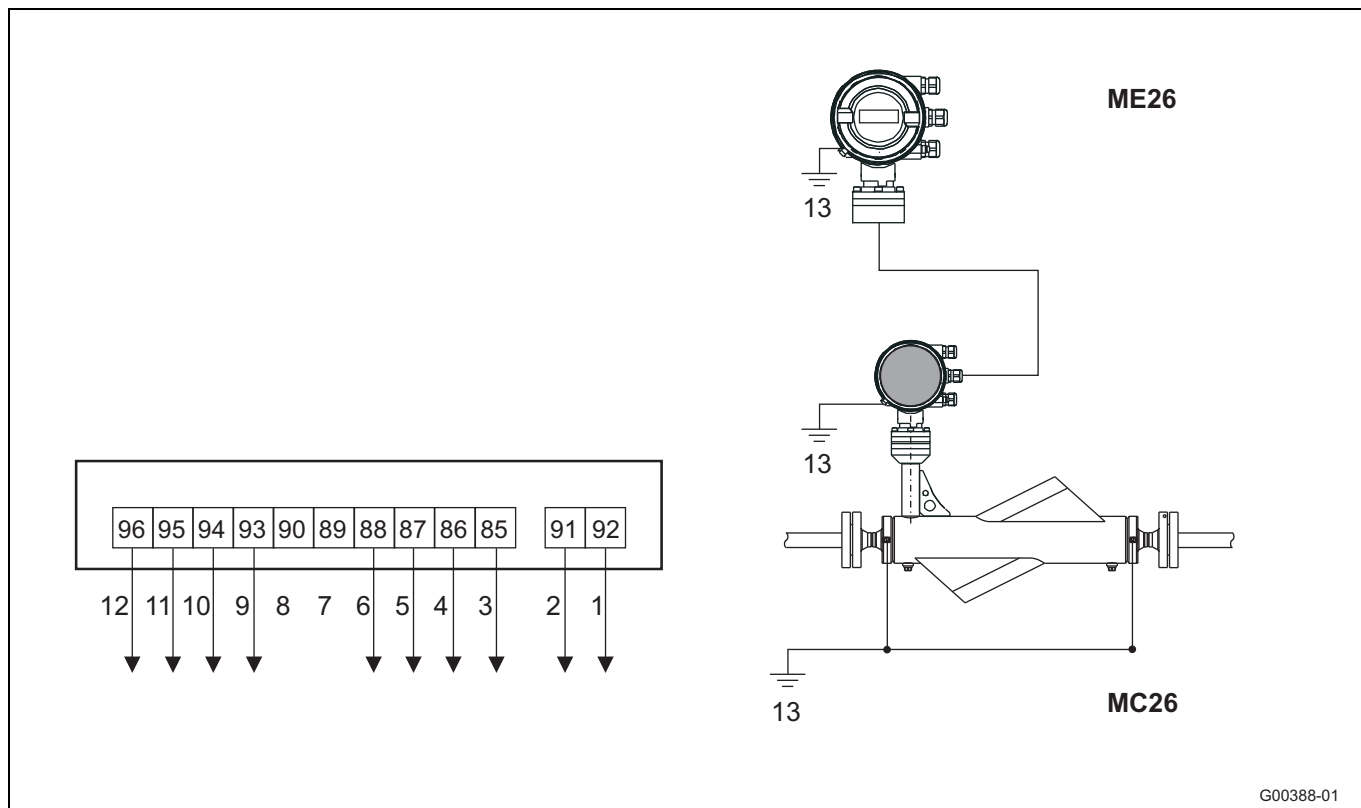


Fig. 51

- 91 / 92 Driver
- 93 / 94 / 95 / 96 Temperature
- 85 / 86 Sensor 1
- 87 / 88 Sensor 2

- 1 Red/blue
- 2 Gray/pink
- 3 White
- 4 Brown
- 5 Green
- 6 Yellow
- 7 Gray
- 8 Pink
- 9 Black
- 10 Violet
- 11 Blue
- 12 Red
- 13 "PA" equipotential bonding. The precise position of the ground terminals may vary according to the device type. However, the position is appropriately labeled in each case. When connecting transmitter ME21 to flowmeter sensor MC26, transmitter ME21 also has to be connected to "PA".

Connecting transmitter ME26 to flowmeter sensor MC26



G00388-01

Fig. 52

- 91 / 92 Driver
- 93 / 94 / 95 / 96 Temperature
- 85 / 86 Sensor 1
- 87 / 88 Sensor 2

- 1 Pink
- 2 Gray
- 3 White
- 4 Brown
- 5 Green
- 6 Yellow
- 7
- 8
- 9 Black
- 10 Violet
- 11 Blue
- 12 Red
- 13 "PA" equipotential bonding



Important

For reasons of EMC, the wires must be routed in pairs.

Connecting transmitter ME2 to flowmeter sensor MS2

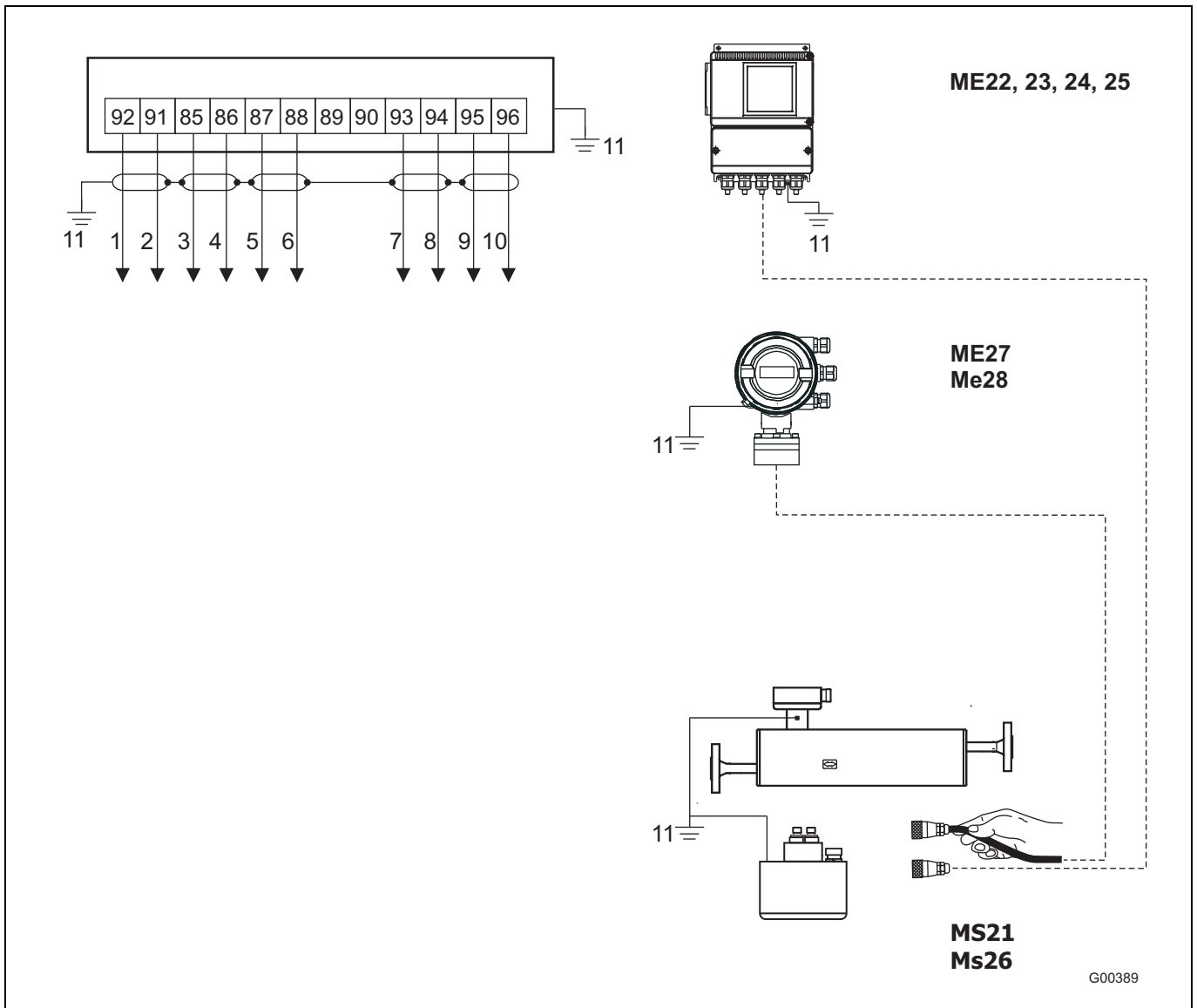


Fig. 53

- 91 / 92 Driver
- 93 / 94 / 95 / 96 Temperature
- 85 / 86 Sensor 1
- 87 / 88 Sensor 2

- 1 Red
- 2 Brown
- 3 Green
- 4 Blue
- 5 Gray
- 6 Violet
- 7 White
- 8 Black
- 9 Orange
- 10 Yellow
- 11 "PA" equipotential bonding. When connecting transmitter to flowmeter sensor MS26, transmitter also has to be connected to "PA".

5.5.3 Electrical connections between the transmitter and the peripherals

Input and output signals, supply power ME2/MC2

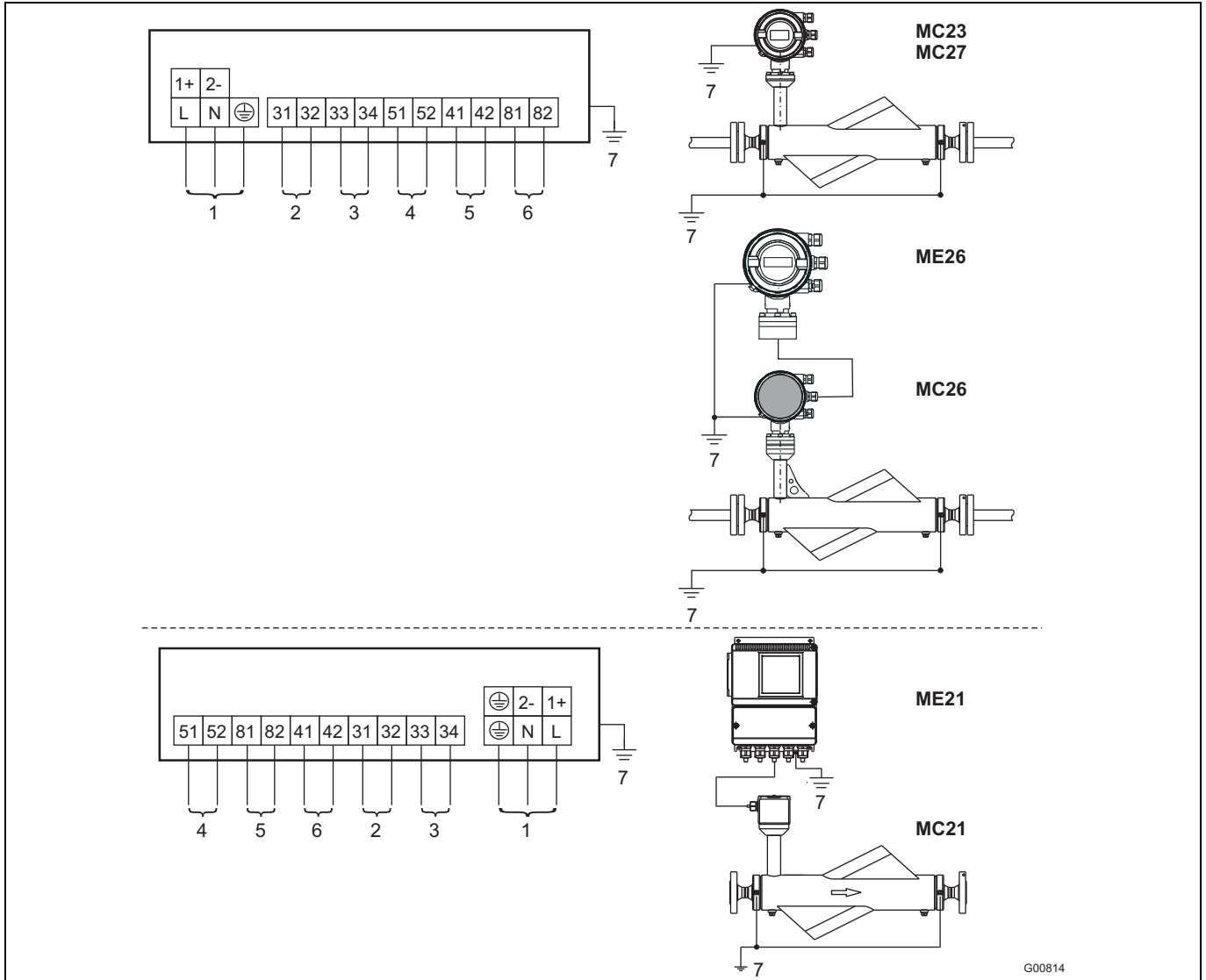


Fig. 54

- 1 Supply power
Line voltage: U_{AC} 100 ... 230 V AC, frequency 50/60 Hz, terminals L, N, \ominus
Low voltage: U_{AC} 24 V, frequency 50/60 Hz, terminals 1+, 2-, U_{DC} 24 V
- 2 Current output 1: can be selected via software
2a: function: active
Terminals: 31, 32; 0/4 ... 20 mA ($0 \Omega \leq R_B \leq 560 \Omega$, MC27/ME26: $0 \Omega \leq R_B \leq 300 \Omega$)
2b: alternate function: passive (option D, not FM)
Terminals: 31, 32; 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$)
Source voltage $12 \leq U_q \leq 30$ V
- 3 Current output 2: can be selected via software
Function: passive
Terminals: 33, 34; 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$)
Source voltage $12 \leq U_q \leq 30$ V
- 4a Passive pulse output, terminals: 51, 52
 $f_{max} = 5$ kHz, pulse width 0.1 ... 2,000 ms
Setting range: 0.001 ... 1,000 pulses/unit
"Closed": $0 V \leq U_{CEL} \leq 2 V$, $2 mA \leq I_{CEL} \leq 65 mA$
"Open": $16 V \leq U_{CEH} \leq 30 V$, $0 mA \leq I_{CEH} \leq 0.2 mA$
- 4b Active pulse output
 $U = 16 \dots 30 V$, load $\geq 150 \Omega$, $f_{max} = 5$ kHz,
- 5 Contact output, passive
Terminals: 41, 42
"Closed": $0 V \leq U_{CEL} \leq 2 V$, $2 mA \leq I_{CEL} \leq 65 mA$
"Open": $16 V \leq U_{CEH} \leq 30 V$, $0 mA \leq I_{CEH} \leq 0.2 mA$
- 6 Contact input, passive
Terminals: 81, 82
"On": $16 V \leq U_{KL} \leq 30 V$
"Off": $0 V \leq U_{KL} \leq 2 V$
- 7 Equipotential bonding "PA" (when connecting transmitter ME2 to flowmeter sensor MC26, transmitter ME2 also has to be connected to "PA").



Important

You can find the applicable Ex-relevant connection data in the section titled "Ex relevant specifications".

Input and output signals, supply power ME2/MS2

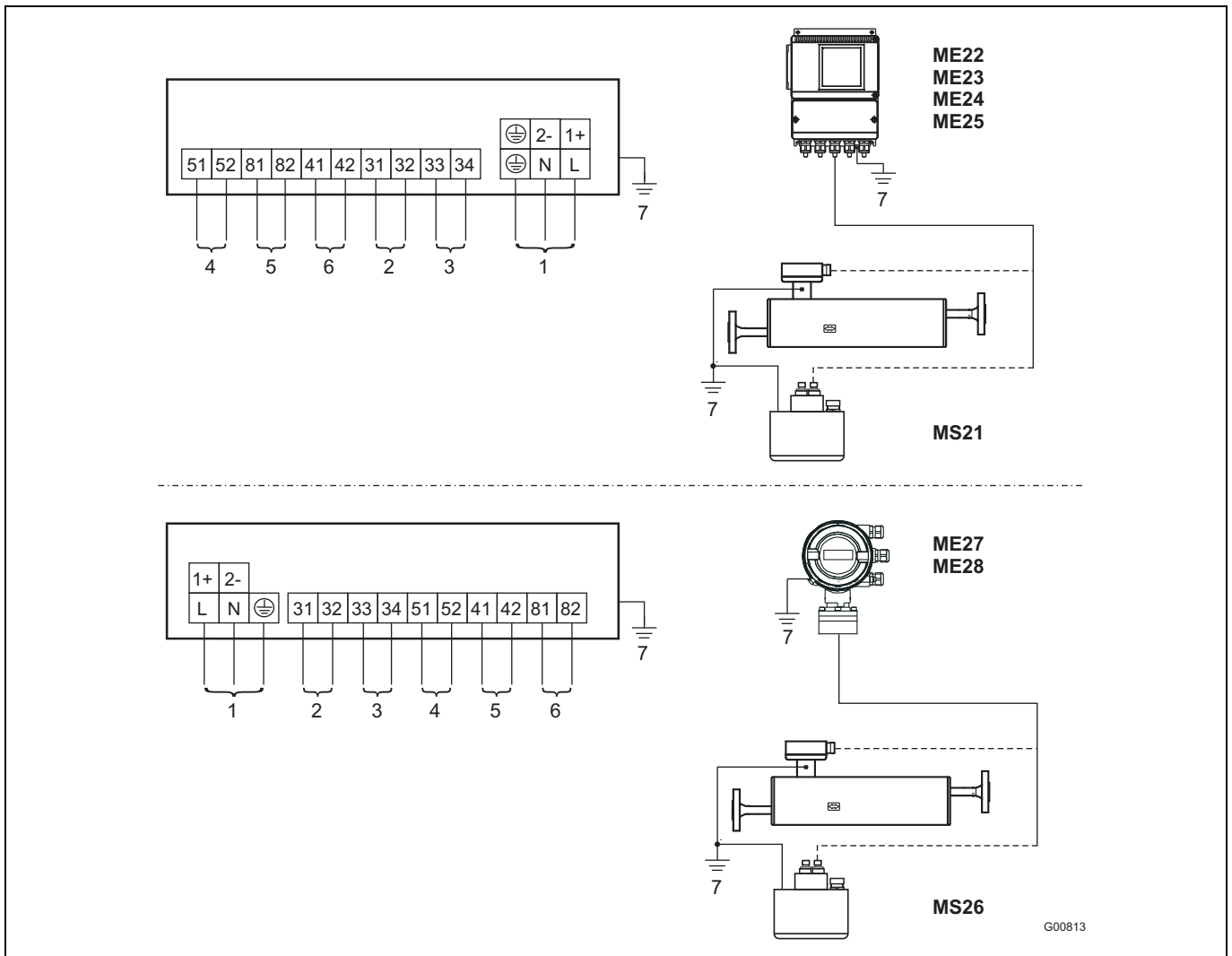


Fig. 55

- 1 Supply power
Line voltage: U_{AC} 100 ... 230 V AC, frequency 50/60 Hz, terminals L, N, \ominus
Low voltage: U_{AC} 24 V, frequency 50/60 Hz, terminals 1+, 2-, U_{DC} 24 V
- 2 Current output 1: can be selected via software
2a: function: active
Terminals: 31, 32; 0/4 ... 20 mA ($0 \Omega \leq R_B \leq 560 \Omega$, ME27/28: $0 \Omega \leq R_B \leq 300 \Omega$)
2b: alternate function: passive (option D)
Terminals: 31, 32; 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$)
Source voltage $12 \leq U_q \leq 30$ V
- 3 Current output 2: can be selected via software
Function: passive
Terminals: 33, 34; 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$)
Source voltage $12 \leq U_q \leq 30$ V
- 4a Passive pulse output, terminals: 51, 52
 $f_{max} = 5$ kHz, pulse width 0.1 ... 2,000 ms
Setting range: 0.001 ... 1,000 pulses/unit
"Closed": $0 V \leq U_{CEL} \leq 2 V$, $2 mA \leq I_{CEL} \leq 65 mA$
"Open": $16 V \leq U_{CEH} \leq 30 V$, $0 mA \leq I_{CEH} \leq 0.2 mA$
- 4b Active pulse output
 $U = 16 \dots 30$ V, load $\geq 150 \Omega$, $f_{max} = 5$ kHz,
- 5 Contact output, passive
Terminals: 41, 42
"Closed": $0 V \leq U_{CEL} \leq 2 V$, $2 mA \leq I_{CEL} \leq 65 mA$
"Open": $16 V \leq U_{CEH} \leq 30 V$, $0 mA \leq I_{CEH} \leq 0.2 mA$
- 6 Contact input, passive
Terminals: 81, 82
"On": $16 V \leq U_{KL} \leq 30 V$
"Off": $0 V \leq U_{KL} \leq 2 V$
- 7 "PA" equipotential bonding. When transmitter ME2 is connected to flowmeter sensor MS26, transmitter ME2 also has to be connected to "PA".

PROFIBUS PA/FOUNDATION Fieldbus, supply power for ME2/MC2

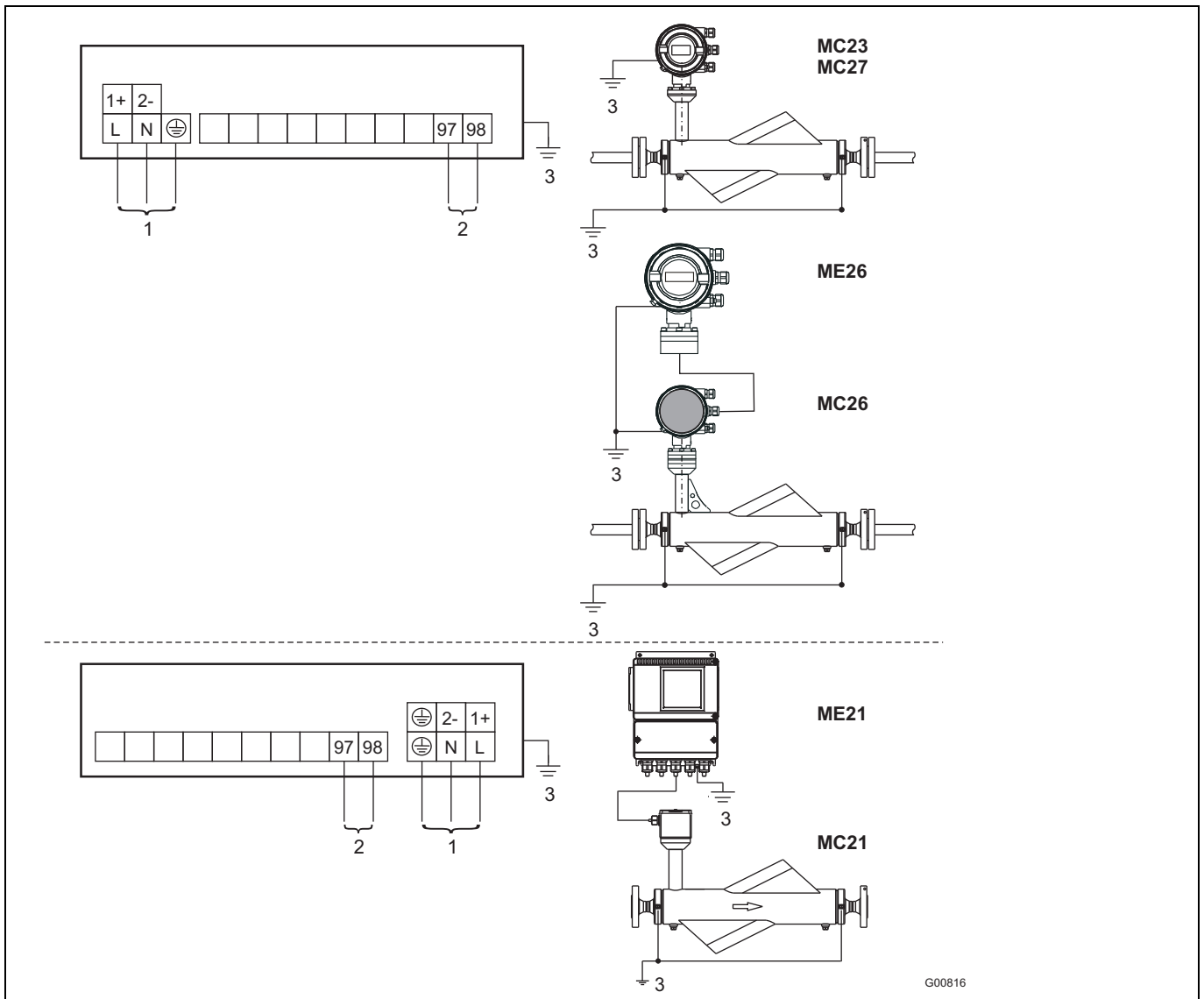


Fig. 56

- 1 Supply power
Line voltage: U_{AC} 100 ... 230 V AC, frequency 50/60 Hz, terminals L, N, \ominus
Low voltage: U_{AC} 24, frequency 50/60 Hz, terminals 1+, 2-
 U_{DC} 24 V
- 2a PROFIBUS PA design conforming to IEC 61158-2 (Profile 3.0)
 $U = 9 \dots 32$ V
 $I = 14$ mA (normal operation)
 $I = 26$ mA (in the event of an error / FDE)
Terminals: 97 / 98
Connection example via M12 plug, see Fig. 50
- 2b FOUNDATION Fieldbus design conforming to IEC 61158-2
 $U = 9 \dots 32$ V
 $I = 14$ mA (normal operation)
 $I = 26$ mA (in the event of an error / FDE)
Terminals: 97/98
Connection example via M12 plug, see Fig. 50
- 3 The precise position of the ground terminals may vary according to the device type. However, the position is appropriately labeled in each case. When transmitter ME2 is connected to flowmeter sensor MS26, transmitter ME2 also has to be connected to equipotential bonding "PA".

PROFIBUS PA/FOUNDATION Fieldbus, supply power for ME2/MS2

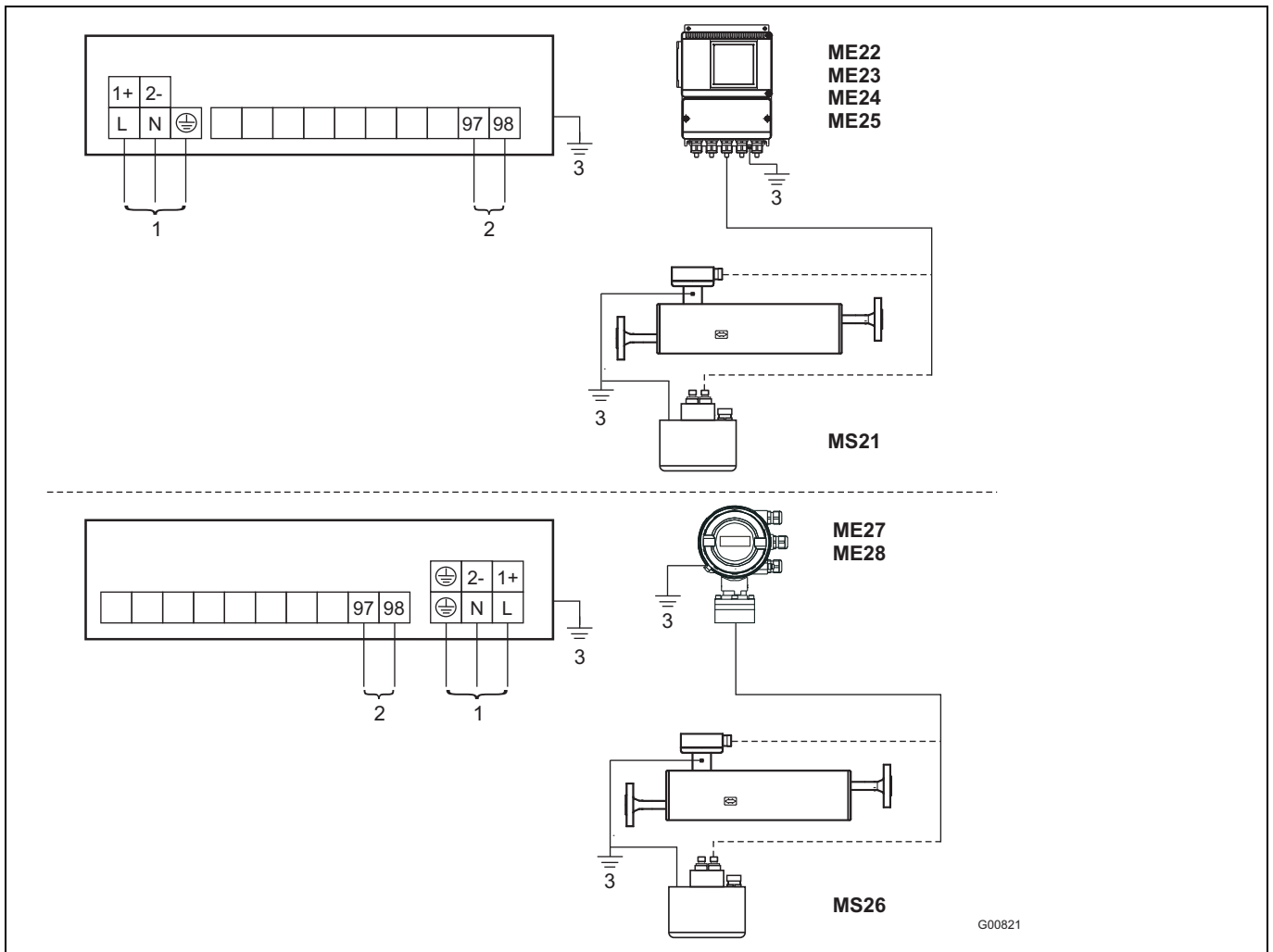


Fig. 57:

- 1 Supply power
Line voltage: U_{AC} 100 ... 230 V AC, frequency 50/60 Hz, terminals L, N, \oplus
Low voltage: U_{AC} 24, frequency 50/60 Hz, terminals 1+, 2-
 U_{DC} 24 V
- 2a PROFIBUS PA design conforming to IEC 61158-2 (Profile 3.0)
 $U = 9 \dots 32$ V
 $I = 14$ mA (normal operation)
 $I = 26$ mA (in the event of an error / FDE)
Terminals: 97 / 98
Connection example via M12 plug, see Fig. 50
- 2b FOUNDATION Fieldbus design conforming to IEC 61158-2
 $U = 9 \dots 32$ V
 $I = 14$ mA (normal operation)
 $I = 26$ mA (in the event of an error / FDE)
Terminals: 97/98
Connection example via M12 plug, see Fig. 50
- 3 The precise position of the ground terminals may vary according to the device type. However, the position is appropriately labeled in each case. When transmitter ME2 is connected to flowmeter sensor MS26, transmitter ME2 also has to be connected to equipotential bonding "PA".

5.6 Dimensions

5.6.1 Transmitter housing and suggested installation method

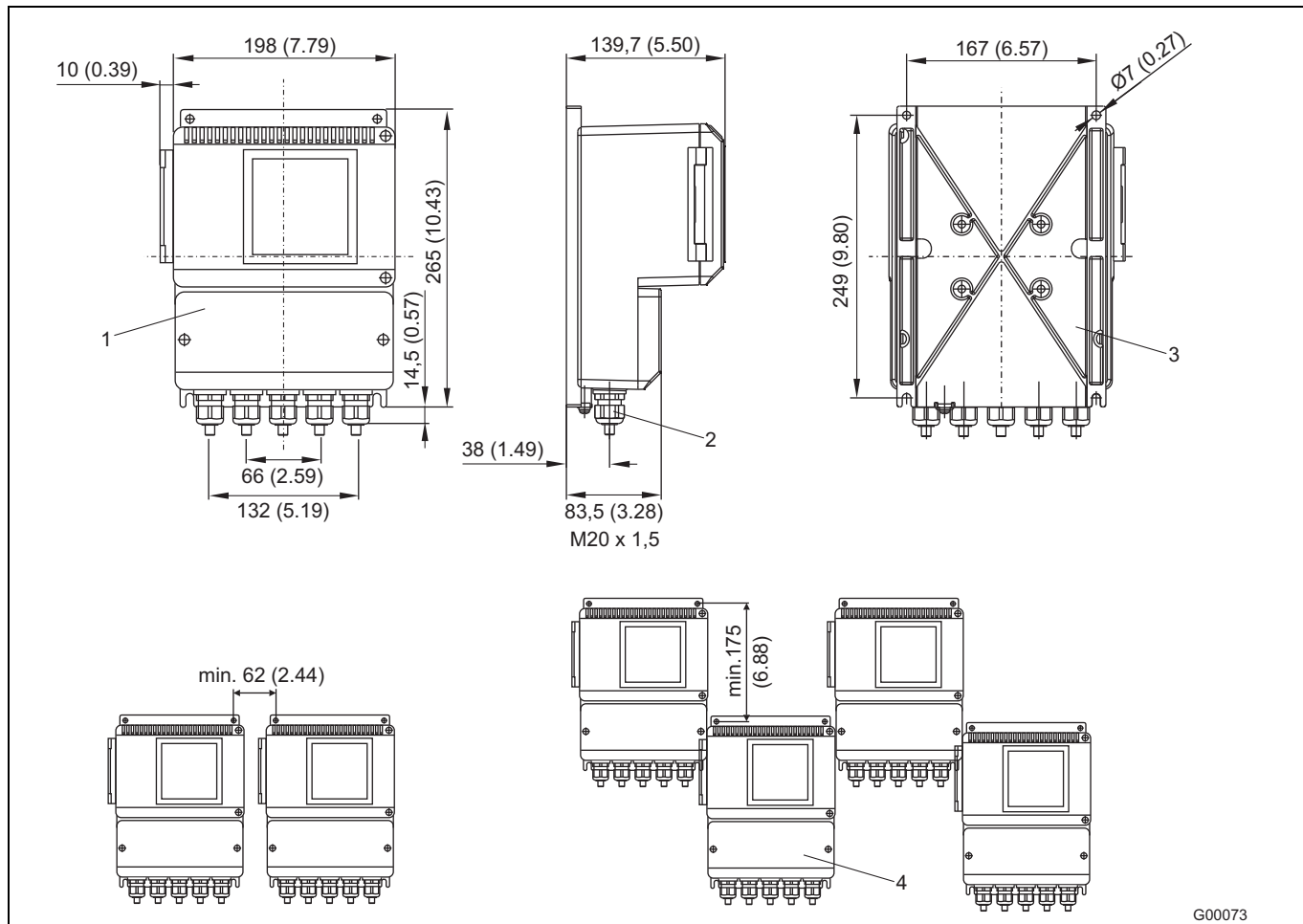


Fig. 58: Dimensions in mm (inch)

- 1 Field-mount housing with window
- 2 Cable gland M20 x 1.5
- 3 Installation holes for pipe mounting set, for 2" pipe installation; mounting set available on request (order no. 612B091U07)
- 4 Protection class IP 67

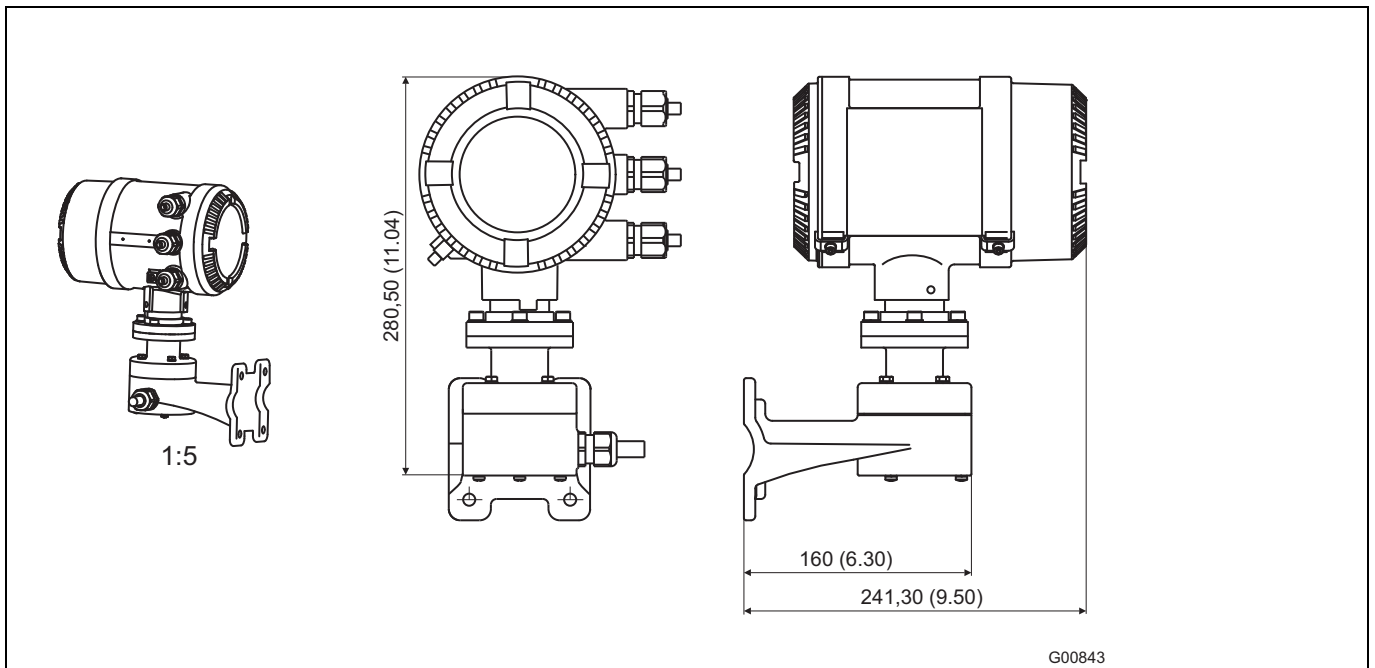


Fig. 59: Dimensions of ME26/27/28 transmitter housing

5.7 Ordering information

External transmitter, DSP technology, for remote mount sensor MC2, MS2

	Main order number											Additional order no.
	Version number	1 - 3	4	5	6	7	8	9	10	11		
CoriolisMaster mass flowmeter	FCM2000	ME2	X	X	X	X	X	X	X	X	X	XX
Design												
Remote mount design with flowmeter sensor MC21 or MC26			1									
Remote mount design with flowmeter sensor MS21 size "S"			2									
Remote mount design with flowmeter sensor MS21 size "T", "U"			3									
Remote mount design with flowmeter sensor MS26 size "S"			4									
Remote mount design with flowmeter sensor MS26 size "T", "U"			5									
Remote mount design ATEX, IECEx with flowmeter sensor MC26			6									
Remote mount design ATEX with flowmeter sensor MS26 size "S"			7									
Remote mount design ATEX with flowmeter sensor MS26 size "T", "U"			8									
Explosion protection/Cable gland/Ambient temperature												
None/cable gland M20 x 1.5/standard											A	
None/cable gland NPT 1/2 in./standard											T	
FMus Class I, Div. 2, Zone 2/cable gland NPT 1/2 in./standard											O	
ATEX, IECEx Zone 1/M20 x 1.5/standard			1)								B	
FMus Class I, Div. 1, Zone 1/NPT 1/2 in./standard											C	
cFM Class I, Div. 1, Zone 1/NPT 1/2 in./standard											D	
cFM Class I, Div. 2, Zone 2/NPT 1/2 in./standard											P	
Housing												
Field-mount housing, rectangular						2)	3					
Field-mount housing, round, with wall bracket, Ex, incl. 10 m cable						3)	8					
Operating mode/Software version												
Standard software (mass and density measurement)											A	
Standard software plus concentration measurement (DensiMass)											C	
Outputs												
Current output I (active), current output II (passive), pulse output (active) [Ex not possible]						2)					A	
Current output I (active), current output II (passive), pulse output (passive)											B	
Current output I (passive, "ia"), current output II (passive, "ia"), pulse output (passive, "ia")						4)					D	
Not selected/fieldbus											X	
Communication												
None											0	
HART protocol											1	
PROFIBUS PA											3	
FOUNDATION Fieldbus											5	
PROFIBUS PA with M12 plug											7	
Power supply												
100 ... 230 V AC											G	
24 V AC/DC											K	
Name plate												
German											5)	G
English												E
Language of documentation												
German												M1
English												M5
Western Europe/Scandinavia language package (languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)												MW
Eastern Europe language package (languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)												ME
Other												MZ

- 1) With ME26/ME27/ME28 only. IECEx with ME26 only.
- 2) Not with ME26/ME27/ME28.
- 3) With ME26/ME27/ME28 only.
- 4) Only for ATEX, IECEx Zone 1 or FM Div. 1 and with "ia" outputs.
- 5) Not with ATEX, IECEx, or FM

6 Ex relevant specifications in accordance with ATEX/IECEx

6.1 Safety-relevant information ATEX / IECEx

Overview of the different output options

	ATEX/IECEx Zone 2	ATEX/IECEx Zone 1
I Output option A/B in the order number	<ul style="list-style-type: none"> - Current output 1: active - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive 	<ul style="list-style-type: none"> - Current output 1: active - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive
II Output option D in the order number		<ul style="list-style-type: none"> - Current output 1: passive - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive
III Output option X and communication option 3, 5, or 7 in the order number	<ul style="list-style-type: none"> - Fieldbus communication (PROFIBUS PA/FOUNDATION Fieldbus) 	<ul style="list-style-type: none"> - Fieldbus communication (PROFIBUS PA/FOUNDATION Fieldbus)

Version I: Active/Passive current outputs

Types: ME21/ME22/ME23/ME24/ME25 and MC23				
	Protection type "nA" (Zone 2)		General operating values	
	U (V)	I (mA)	U _b (V)	I _b (mA)
Current output 1 Active Terminals 31/32	30	30	30	30
Current output 2 Passive Terminals 33/34	30	30	30	30
Pulse output Active or passive Terminals 51/52	30	65	30	65
Contact output Passive Terminals 41/42	30	65	30	65
Contact input Passive Terminals 81/82	30	10	30	10

All inputs and outputs are electrically isolated from each other and from the supply power.

Types: ME26/ME27/ME28 and MC27												
	Protection type "nA" (Zone 2)		General operating values		Protection type "e" (Zone 1)		Protection type "ib" (Zone 1)					
	U _i (V)	I _i (mA)	U _b (V)	I _b (mA)	U (V)	I (A)	U _o (V)	I _o (mA)	P _o (mW)	C _o (nF)	C _{o pa} (nF)	L _o (mH)
Current output 1 Active Terminals 31/32 Terminal 32 is connected to "PA"	30	30	30	30	60	35	20	100	500	217	0	3.8
							U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	C _{i pa} (nF)	L _i (mH)
							60	100	500	2.4	2.4	0.17
Current output 2 Passive Terminals 33/34 Terminal 34 is connected to "PA"	30	30	30	30	60	35	30	100	760	2.4	2.4	0.17
Pulse output Passive Terminals 51/52	30	65	30	65	60	35	15	30	115	2.4	2.4	0.17
Contact output Passive Terminals 41/42	30	65	30	65	60	35	15	30	115	2.4	2.4	0.17
Contact input Passive Terminals 81/82	30	10	30	10	60	35	30	60	500	2.4	2.4	0.17

All inputs and outputs are electrically isolated from each other and from the supply power. Only current outputs 1 and 2 are not electrically isolated from one another.

Version II: Passive/Passive current outputs

Types: ME26/ME27/ME28 and MC27												
	Protection type "nA" (Zone 2)		General operating values		Protection type "e" (Zone 1)		Protection type "ia" (Zone 1)					
	U _i (V)	I _i (mA)	U _b (V)	I _b (mA)	U (V)	I (A)	U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	C _{i pa} (nF)	L _i (mH)
Current output 1 Passive Terminals 31/32	30	30	30	30	60	35	60	300	2000	0,47	0,47	0,17
Current output 2 Passive Terminals 33/34	30	30	30	30	60	35	60	300	2000	0,47	0,47	0,17
Pulse output Passive Terminals 51/52	30	65	30	65	60	35	60	300	2000	0,47	0,47	0,17
Contact output Passive Terminals 41/42	30	65	30	65	60	35	60	300	2000	0,47	0,47	0,17
Contact input Passive Terminals 81/82	30	10	30	10	60	35	60	300	2000	0,47	0,47	0,17

All inputs and outputs are electrically isolated from each other and from the supply power.

Version III: Fieldbus communication

Types ME21/ME22/ME23/ME24/ME25/ME26/ME27/ME28 and MC23/MC27										
	Protection type "nL" (Zone 2)		General operating values		Protection type "n" FNICO (Zone 2)					
	U (V)	I (mA)	U _b (V)	I _b (mA)	U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	C _{i pa} (nF)	L _i (mH)
Fieldbus Passive Terminals 97/98	60	500	32	10	60	500	7,000	0	0	0.17

The output and supply power are electrically isolated.

Types ME26/ME27/ME28 and MC27																
	Type of protection "e" (Zone 1)		General operating values		Protection type "ia" FISCO (Zone 1)						Protection type "ia" (Zone 1)					
	U (V)	I (A)	U _b (V)	I _b (mA)	U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	C _{i pa} (nF)	L _i (mH)	U _i (V)	I _i (mA)	P _i (mW)	C _i (nF)	C _{i pa} (nF)	L _i (mH)
Fieldbus Passive Terminals 97/98	60	35	32	10	60	380	5320	0	0	0.17	60	380	5320	0	0	0.17

The output and supply power are electrically isolated.

Special conditions

The output circuits are designed in such a way that they can be connected to both intrinsically-safe and non-intrinsically-safe circuits. It is not permitted to combine intrinsically safe and non-intrinsically safe circuits. On intrinsically safe circuits, equipotential bonding must be in place along the entire length of the cable used for the current outputs. The rated voltage of the non-intrinsically safe circuits is U_M = 60 V.

The contact output and the pulse output (terminals 41 / 42 and 51 / 52) can be wired internally as a NAMUR contact for the purpose of connecting a NAMUR amplifier.

The cable glands are supplied in black by default. If the signal outputs are wired to intrinsically safe circuits, we recommend that you use the light blue caps supplied for the appropriate cable entries.



Important

If the protective conductor (PE) is connected in the flowmeter's terminal box, you must ensure that no dangerous potential difference can arise between the protective conductor (PE) and the equipotential bonding (PA) in the potentially explosive area.

6.1.1 ATEX/IECEX Ex approval

EC type-examination certificate in accordance with ATEX and IECEx

KEMA ATEX 08ATEX0150 X, KEMA 08 ATEX 0151X, or IECEx KEM 08.0034X

6.1.1.1 Flowmeter sensor MC2 in accordance with ATEX and IECEx

Model	MC26 and MC27 Zone 1		
	Ambient temperature	<=40 °C (104 °F)	<=50 °C (122 °F)
Temperature class			
T1	200 °C (392 °F)	200 °C (392 °F)	200 °C (392 °F)
T2	200 °C (392 °F)	200 °C (392 °F)	200 °C (392 °F)
T3	185 °C (365 °F)	180 °C (356 °F)	180 °C (356 °F)
T4	125 °C (257 °F)	120 °C (248 °F)	120 °C (248 °F)
T5	85 °C (185 °F)	85 °C (185 °F)	75 °C (167 °F)
T6	65 °C (149 °F)	65 °C (149 °F)	60 °C (140 °F)

Model	MC21 and MC23 Zone 2		
	Ambient temperature	<=40 °C (104 °F)	<=50 °C (122 °F)
Temperature class			
T1	200 °C (392 °F)	200 °C (392 °F)	180 °C (356 °F)
T2	200 °C (392 °F)	200 °C (392 °F)	180 °C (356 °F)
T3	180 °C (356 °F)	180 °C (356 °F)	180 °C (356 °F)
T4	115 °C (239 °F)	115 °C (239 °F)	115 °C (239 °F)
T5	80 °C(176 °F)	80 °C(176 °F)	75 °C (167 °F)
T6	60 °C (140 °F)	60 °C (140 °F)	60 °C (140 °F)

Ambient and process conditions:

T_{amb} -20 ... 60 °C (-4 ... 140 °F)

T_{amb, optional} -40 ... 60 °C (-40 ... 104 °F) (only for devices with a compact design)

T_{medium} -50 ... 200 °C (-58 ... 392 °F)

Protection class IP 65, IP 67, and NEMA 4X/type 4X

Specific coding in accordance with ATEX and IECEx applies depending on the design of the flowmeter sensor (compact or separate); see the overview on page 4).

Design MC21

Zone 2	Designation	
ATEX	II 3 G Ex nA II T6 ... T2	
	II 2 D Ex tD A21 IP6X T115 °C ... T _{medium}	
IECEX	Ex nA II T6 ... T2	
	Ex tD A21 IP6X T115 °C ... T _{medium}	

Design MC23

Zone 2	Designation	
ATEX	II 3 G Ex nA nR II T6 ... T2	No fieldbus, no M12 plug
	II 3 G Ex nA nR [nL] IIC T6 ... T2	FNICO fieldbus, no M12 plug
	II 2 D Ex tD A21 IP6X T115°C ... T _{medium}	FNICO fieldbus, no M12 plug
	FNICO field device	
IECEX	Ex nA nR II T6 ... T2	No fieldbus, no M12 plug
	Ex nA nR [nL] IIC T6 ... T2	FNICO fieldbus, no M12 plug
	Ex tD A21 IP6X T115 °C ... T _{medium}	No M12 plug
	FNICO field device	FNICO fieldbus

Design MC26

Zone 1	Designation	
ATEX	II 2 G Ex e mb [ia] IIC T6 ... T2	≤ DN 40 (1 1/2")
	II 1/2 G Ex e mb [ia] IIC T6 ... T2	≥ DN 50 (2")
	II 2 D Ex tD A21 IP6X T115 °C ... T _{medium}	
IECEX	Ex e mb [ia] IIC T6 ... T2	
	Ex tD A21 IP6X T115 °C ... T _{medium}	

Design MC27

Zone 1	Designation	
ATEX		
Version II/III	II 2 G Ex d e [ia] [ib] IIC T6 ... T2	≤ DN 40 (1 1/2") 2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 G Ex d e [ib] IIC T6 ... T2	≤ DN 40 (1 1/2") Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version II/III	II 1/2 G Ex d e [ia] [ib] IIC T6 ... T2	≥ DN 50 (2") 2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 1/2 G Ex d e [ib] IIC T6 ... T2	≥ DN 50 (2") Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version I/II/III	II 2 D Ex tD A21 IP6X T115 °C ... T _{medium}	Outputs "e"
Version II/III	II 2 D Ex tD [iaD] A21 IP6X T115 °C ... T _{medium}	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 D Ex tD [ibD] A21 IP6X T115 °C ... T _{medium}	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version III	FISCO field device	FISCO fieldbus
IECEX		
Version II/III	Ex d e [ia] [ib] IIC T6 ... T2	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	Ex d e [ib] IIC T6 ... T2	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version I/II/III	Ex tD A21 IP6X T115 °C ... T _{medium}	Outputs "e"
Version II/III	Ex tD [iaD] A21 IP6X T115 °C ... T _{medium}	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	Ex tD [ibD] A21 IP6X T115 °C ... T _{medium}	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version III	FISCO field device	FISCO fieldbus

6.1.1.2 Flowmeter sensor MS2 in accordance with ATEX

Model	MS2 Zone 1
Ambient temperature	-20 ... 50 °C (-4 ... 122 °F)
Temperature class	
T1	180 °C (356 °F)
T2	180 °C (356 °F)
T3	180 °C (356 °F)
T4	125 °C (257 °F)
T5	80 °C (176 °F)
T6	-

Ambient and process conditions:

T_{amb} -20 ... 50 °C (-4 ... 122 °F)

T_{medium} -50 ... 180 °C (-58 ... 356 °F)

Protection class IP 65, IP 67, and NEMA 4X/type 4X

Specific coding applies for ATEX and IECEx, depending on the design of the flowmeter sensor (compact or separate); see the overview on page 4).

Design MS26

Zone 1	Designation
ATEX	II 2 G Ex ib IIC T5 ... T3

6.1.1.3 Transmitter ME2, separate design, in accordance with ATEX and IECEx

Ambient and process conditions:

T_{amb} -20 ... 60 °C (-4 ... 140 °F)

Protection class IP 65, IP 67, and NEMA 4X/type 4X

Specific coding applies for ATEX and IECEx, depending on the design of the flowmeter sensor (compact or separate); see the overview on page 4).

Design ME21 / ME24 / ME25 M, N

	Designation	
ATEX	II 3 G Ex nR II T6 II 3 G Ex nR [nL] IIC T6 II 2 D Ex tD A21 IP6X T115 °C FNICO field device	No fieldbus, no M12 plug FNICO fieldbus, no M12 plug No M12 plug FNICO fieldbus
IECEx	Ex nR II T6 Ex nR [nL] IIC T6 Ex tD A21 IP6X T115 °C FNICO field device	No fieldbus, no M12 plug FNICO fieldbus, no M12 plug No M12 plug FNICO fieldbus

Design ME26 for flowmeter sensor MC2

Zone 1	Designation	
ATEX		
Version II/III	II 2 G Ex d e [ia] [ib] IIC T6	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 G Ex d e [ib] IIC T6	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version I/II/III	II 2 D Ex tD A21 IP6X T115 °C	Outputs "e"
Version II/III	II 2 D Ex tD [iaD] A21 IP6X T115 °C	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 D Ex tD [ibD] A21 IP6X T115 °C	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version III	FISCO field device	FISCO fieldbus
IECEx		
Version II/III	Ex d e [ia] [ib] IIC T6	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	Ex d e [ib] IIC T6	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version I/II/III	Ex tD A21 IP6X T115 °C	Outputs "e"
Version II/III	Ex tD [iaD] A21 IP6X T115 °C	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	Ex tD [ibD] A21 IP6X T115 °C	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version III	FISCO field device	FISCO fieldbus

Design ME27/ME28 for flowmeter sensor MS2

Zone 1	Designation	
ATEX		
Version II/III	II 2 G Ex d e [ia] [ib] IIC T6	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 G Ex d e [ib] IIC T6	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
Version II/III	II 2 D Ex tD [iaD] A21 IP6X T115 °C	2 passive analog outputs, outputs "ia"/"e", depending on user wiring, or FISCO fieldbus
Version I	II 2 D Ex tD [ibD] A21 IP6X T115 °C	Active/passive analog outputs, outputs "ib"/"e", depending on user wiring
	FISCO field device	FISCO fieldbus

7 Ex relevant specifications in accordance with cFMus

7.1 Data relating to MC2x operation

7.1.1 General information

Type of protection	Ex designation
Explosion-proof	XP-IS/I, II, III/1/BCD/T* TA=*; type NEMA 4x
Dust-ignition-proof	DIP/II, III/1 EFG/T* TA=*; type NEMA 4x
Intrinsically safe	IS/I, II, III/1/BCDEFG/T* TA = *; type NEMA 4x
Non-incendive	NI/I, II, III/2/ABCDFG/T* TA = *; type NEMA 4x

(T* = see FM temperature classes)

In the case of the remote mount design, the signal cable between the flowmeter sensor and the transmitter must measure at least 5 m (16.4 ft).

Ambient and process conditions	
T _{amb}	-20 ... 60 °C (-4 ... 140 °F)
T _{amb, optional}	-40 ... 60 °C (-40 ... 140 °F) (only with devices featuring integral mount design)
T _{Medium}	-50 ... 200 °C (-58 ... 392 °F)
Protection class	IP 65, IP 67 and NEMA 4x/type 4x

Specific FM coding applies, depending on the design of the flowmeter sensor (integral mount or remote mount design) For detailed information, please refer to the section titled 1.2 "FM device overview (PID: 3036514)".

7.1.2 Temperature data

Types: MC26, MC27 in Class I Div. 1

Temperature class	Ambient temperature		
	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °F)
	Maximum permissible fluid temperature		
T1	200 °C (392 °F)	200 °C (392 °F)	200 °C (392 °F)
T2	200 °C (392 °F)	200 °C (392 °F)	200 °C (392 °F)
T3	185 °C (365 °F)	180 °C (356 °F)	180 °C (356 °F)
T4	125 °C (257 °F)	120 °C (248 °F)	120 °C (248 °F)
T5	85 °C (185 °F)	85 °C (185 °F)	75 °C (167 °F)
T6	65 °C (149 °F)	65 °C (149 °F)	60 °C (140 °F)

Types: MC21, MC23 in Class I Div. 2

Temperature class	Ambient temperature		
	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °F)
	Maximum permissible fluid temperature		
T1	200 °C (392 °F)	200 °C (392 °F)	180 °C (356 °F)
T2	200 °C (392 °F)	200 °C (392 °F)	180 °C (356 °F)
T3	180 °C (356 °F)	180 °C (356 °F)	180 °C (356 °F)
T4	115 °C (239 °F)	115 °C (239 °F)	115 °C (239 °F)
T5	80 °C (176 °F)	80 °C (176 °F)	75 °C (167 °F)
T6	60 °C (140 °F)	60 °C (140 °F)	60 °C (140 °F)

7.2 Data relating to MS2x operation

7.2.1 General information

Type of protection	Ex designation
Explosion-proof	XP-IS/I, II, III/1/BCD/T* TA=*; type NEMA 4x
Dust-ignition-proof	DIP/II, III/1 EFG/T* TA=*; type NEMA 4x
Intrinsically safe	IS/I, II, III/1/BCDEFG/T* TA = *; type NEMA 4x
Non-incendive	NI/I, II, III/2/ABCDG/T* TA = *; type NEMA 4x

(T* = see FM temperature classes)

In the case of the remote mount design, the signal cable between the flowmeter sensor and the transmitter must measure at least 5 m (16.4 ft).

Ambient and process conditions	
T _{amb}	-20 ... 50 °C (-4 ... 122 °F)
T _{Medium}	-50 ... 180 °C (-58 ... 356 °F)
Protection class	IP 65, IP 67 and NEMA 4x/type 4x

Specific FM coding applies, depending on the design of the flowmeter sensor (integral mount or remote mount design) For detailed information, please refer to the section titled 1.2 "FM device overview (PID: 3036514)".

7.2.2 Temperature data

Type: MS2 in Class I Div. 1 or Class I Div. 2

Temperature class	Ambient temperature
	-20 ... 50 °C (-4 ... 122 °F)
Temperature class	Maximum permissible fluid temperature
T1	180 °C (356 °F)
T2	180 °C (356 °F)
T3	180 °C (356 °F)
T4	125 °C (257 °F)
T5	80 °C (176 °F)
T6	-

7.3 Electrical data

Overview of the different output options

	Class I Div. 2	Class I Div. 1
I Output option A/B in the order number	<ul style="list-style-type: none"> - Current output 1: active - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive 	<ul style="list-style-type: none"> - Current output 1: active - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive
II Output option D in the order number		<ul style="list-style-type: none"> - Current output 1: passive - Current output 2: passive - Pulse output: active/passive, switchable - Contact input and output: passive
III Output option X and communication option 3, 5, or 7 in the order number	<ul style="list-style-type: none"> - Fieldbus communication (PROFIBUS PA/FOUNDATION Fieldbus) 	<ul style="list-style-type: none"> - Fieldbus communication (PROFIBUS PA/FOUNDATION Fieldbus)

7.3.1 Electrical data relating to Div. 1

Version I: Active/Passive current outputs

Types: ME26/27/28, MC27 fieldbus: Active HART

Inputs and outputs	Type of protection IS					
	V_{max_o} [V]	I_{max_o} [mA]	P_o [mW]	C_o [nF]	$C_{o PA}$ [nF]	L_o [mH]
Current output 1 active Terminal 31/32	20	100	500	217	0	3,8
	V_{Max} [V]	I_{Max} [mA]	P_i [mW]	C_i [nF]	$C_{i PA}$ [nF]	L_i [mH]
	60	100	500	2,4	2,4	0,17
Current output 2 passive Terminal 33/34	30	100	760	2,4	2,4	0,17
Digital output Terminal 41/42	15	30	115	2,4	2,4	0,17
Digital input Terminal 81/82	30	60	500	2,4	2,4	0,17
Pulse output Terminal 51/52	15	30	115	2,4	2,4	0,17

All inputs and outputs are electrically isolated from each other and from the supply power. Only current outputs 1 and 2 are not electrically isolated from one another.

Version II: Passive/Passive current outputs

Types: ME26/27/28, MC27 fieldbus: Passive HART

Inputs and outputs	Type of protection IS					
	V _{max} [V]	I _{max} [mA]	P _i [mW]	C _i [nF]	C _{i PA} [nF]	L _i [mH]
Current output 1 passive Terminal 31/32	60	300	2000	0,47	0,47	0,17
Current output 2 passive Terminal 33/34	60	300	2000	0,47	0,47	0,17
Digital output Terminal 41/42	60	300	2000	0,47	0,47	0,17
Digital input Terminal 81/82	60	300	2000	0,47	0,47	0,17
Pulse output Terminal 51/52	60	300	2000	0,47	0,47	0,17

All inputs and outputs are electrically isolated from each other and from the supply power.

Version III: Fieldbus communication

Types: ME26/27/28, MC27 fieldbus: PA/FF

Inputs and outputs	Type of protection IS FISCO						Type of protection IS					
	V _{Max} [V]	I _{Max} [mA]	P _i [mW]	C _i [nF]	C _{i PA} [nF]	L _i [mH]	V _{Max} [V]	I _{Max} [mA]	P _i [mW]	C _i [nF]	C _{i PA} [nF]	L _i [mH]
Passive fieldbus Terminal 97/98	60	380	5320	0	0	0,17	60	380	5320	0	0	0,17

The output and supply power are electrically isolated.

Special connection conditions:

The output circuits are designed in such a way that they can be connected to both intrinsically-safe and non-intrinsically-safe circuits. It is not permitted to combine intrinsically safe and non-intrinsically safe circuits. On intrinsically safe circuits, equipotential bonding must be in place along the entire length of the cable used for the current outputs.

The rated voltage of the non-intrinsically safe circuits is $U_M = 60$ V.

Provided that rated voltage $U_M = 60$ V is not exceeded if connections are established to non-intrinsically safe external circuits, intrinsic safety is still guaranteed.

**Important (Notice)**

The housing for the transmitter and flowmeter sensor must be connected to the potential equalization PA. The operator must ensure that when connecting the protective conductor (PE) no potential differences can occur between protective conductor and potential equalization (PA).

7.3.2 Electrical data relating to Div. 2

Version I: Active/Passive current outputs

Types: ME21/24/25, MC23 fieldbus: HART

Inputs and outputs	Type of protection NI	
	Vmax _o [V]	I _{max} _o [mA]
Current output 1 Terminal 31/32	30	30
Current output 2 passive Terminal 33/34	30	30
Digital output Terminal 41/42	30	65
Digital input Terminal 81/82	30	10
Pulse output Terminal 51/52	30	65

All inputs and outputs are electrically isolated from each other and from the supply power.

Version III: Fieldbus communication

Types: ME21/24/25, MC23 fieldbus: PA/FF

Inputs and outputs	Type of protection NI FNICO						Type of protection NI					
	Vmax [V]	I _{max} [mA]	P _i [mW]	C _i [nF]	C _{i PA} [nF]	L _i [mH]	Vmax [V]	I _{max} [mA]	P _i [mW]	C _i [nF]	C _{i PA} [nF]	L _i [mH]
Passive fieldbus Terminal 97/98	60	500	7000	0	0	0,17	60	500	7000	0	0	0,17

The output and supply power are electrically isolated.



Important (Notice)

The housing for the transmitter and flowmeter sensor must be connected to the potential equalization PA. The operator must ensure that when connecting the protective conductor (PE) no potential differences can occur between protective conductor and potential equalization (PA).

8 Questionnaire

Customer:	Date:	
Ms./Mr.:	Department	
Phone:	Fax:	

Fluid:	Liquid content:	Gas content:
Flowrate: (min., max., operating point)	kg/h	
Density: (min., max., operating point)	kg/m ³	
Dyn. viscosity: (min., max., operating point)	mPas/cP	
Fluid temperature: (min., max., operating point)	°C	
Ambient temperature:	°C	
Pressure: (min., max., operating point)	bar	
Rate of flow:	<input type="checkbox"/> Steady	<input type="checkbox"/> Pulsating
Batch operation:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Concentration calculation:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Transmitter design:	<input type="checkbox"/> Compact	<input type="checkbox"/> Separate
Explosion protection:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Supply power:	<input type="checkbox"/> 100 ... 230 V, 50/60 Hz	<input type="checkbox"/> 24 V AC/DC, 50/60 Hz
Electrical outputs:	Communication:	
	<input type="checkbox"/> Current output I: 0/4 ... 20 mA	
	<input type="checkbox"/> Current output II: 0/4 ... 20 mA	
	<input type="checkbox"/> Pulse output, active	<input type="checkbox"/> HART
<input type="checkbox"/> Pulse output, passive		
Additional specifications:		
Pipeline diameter: mm	
Process connection:	

Contact us

ABB Ltd.

Process Automation

Oldends Lane, Stonehouse
Gloucestershire, GL10 3TA
UK

Tel: +44 (0)1453 826661

Fax: +44 (0)1453 829671

ABB Inc.

Process Automation

125 E. County Line Road
Warminster PA 18974
USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

ABB Automation Products GmbH

Process Automation

Dransfelder Str. 2
37079 Goettingen
Germany

Tel: +49 551 905-534

Fax: +49 551 905-555

www.abb.com

Note

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents - in whole or in parts - is forbidden without prior written consent of ABB.

Copyright© 2011 ABB

All rights reserved