Data Sheet
D184S068U02

Coriolis Mass Flowmeter FCM2000

- **Coriolis Mass Flowmeters are used for the measurement of the mass flow and density to the highest accuracy. The fluid need not be electrically conductive.**
- **No moving parts, no wear, no maintenance**
- **Ex-Design TÜV 99 ATEX 1443X [Europe]**
  - II 2G EEx emd [ib] IIC T6: (≤ DN 40 [1-1/2"])
  - II 1/2G EEx emd [ib] IIC T6: (DN 50 [2"] – DN150 [4"])
  - II 2 D T115 °C ... T_{Medium} IP67
- **Ex-Design FM [USA]**
  - Class I, Div. 1
  - Class I, Zone 1
  - Class I, Div. 2
  - Class I, Zone 2
- **Converter with DSP-Technology**
  - the latest digital filter technology assures detection of even the weakest sensor signals
- **Operate using a Magnet Stick without opening the housing**
- **Simultaneous measurement of the mass flowrate, density and temperature**
- **Type-tested according NAMUR**
- **Option**
  - Expanded density calibration with temperature compensation
  - Housing as secondary containment
  - EHEDG-Certified

HART® FIELD COMMUNICATIONS PROTOCOL
PROFIBUS
Fieldbus Foundation

4-Wire Compact Design
Digital-Signal-Processor
Converter Technology

ABB

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General

The FCM2000 is the economical and uncomplicated ABB Mass Flowmeter with the new DSP-converter mounted integral or remote from the flowmeter primary. The compact design reduces the installation and cabling expenses. The flowrate information can be viewed directly at the meter site and the meter can be installed in your system in a more space efficient manner.

The FCM2000 operates according to the Coriolis Principle.
The design offers the following features:

- Space saving, rugged design.
- Wide flow range; meter size „S“ (DN 1,5 [1/16”]) to meter size „L“ (DN 150 [6”]).
- Variety process connection options.
- Two separate current outputs for flowrate and density as well as a pulse output.
- Contact in- and outputs.
- HART-Protokoll, PROFIBUS PA, FOUNDATION Fieldbus.
- Ex-Approval: The Ignition Protection Type of the output circuits can be user selected as „i“ or „e“ and is determined by the Ignition Protection Type of the circuits connected. The Ignition Protection Type can be changed after the installation has been completed. The contact outputs can be configured as NAMUR-Outputs by the user.
- Allowable fluid temperatures up to 180 °C, CIP-capable
- Lighted, 2-line display with data entry using a Magnet Stick without opening the housing.
- Certified per EHEDG

Mass Converter with Digital Signal Processor (DSP)

The converter for the FCM2000 incorporates a digital signal processor (DSP) with which it is possible to measure the mass flow and density values to the highest precision. The Coriolis sensor signals are immediately converted into digital information without any intermediate analog steps.

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

Self diagnostic functions for the flowmeter primary and the converter coupled with absolute zero stability are the essential advantages, which are necessary, if reliance on the measurements is to be assured.

The FCM2000 converter provides advantages to the user, especially

- when mass flowrate is to be metered to the highest accuracy.
- when the fluid density must be determined.
- when the components of a recipe are to be mixed together.
- when metering non-conductive or highly viscous fluids or solids loaded liquids.
- in batch filling systems.

Operating Principle

When a mass flows through a vibrating pipe, Coriolis forces are generated which bend and twist the pipe. These very small pipe deformations are measured by optimally mounted sensors and electronically evaluated. Because the measured phase shift of the sensor signals is proportional to the mass flowrate, the Coriolis Mass Flowmeter measures the mass flowrate in the flowmeter directly. The metering principle is independent of the density, temperature, viscosity, pressure and conductivity of the fluid.

The meter tubes always vibrate at resonance. This resonant frequency, at the operating conditions, is a function of the meter tube geometry, the characteristics of the flowmeter materials and the mass of the fluid in the meter tube, which is also vibrating. It provides an accurate measure of the density of the fluid being metered. Summarizing, it is possible to simultaneously measure the mass flowrate, fluid density and temperature with the Coriolis Mass Flowmeter.

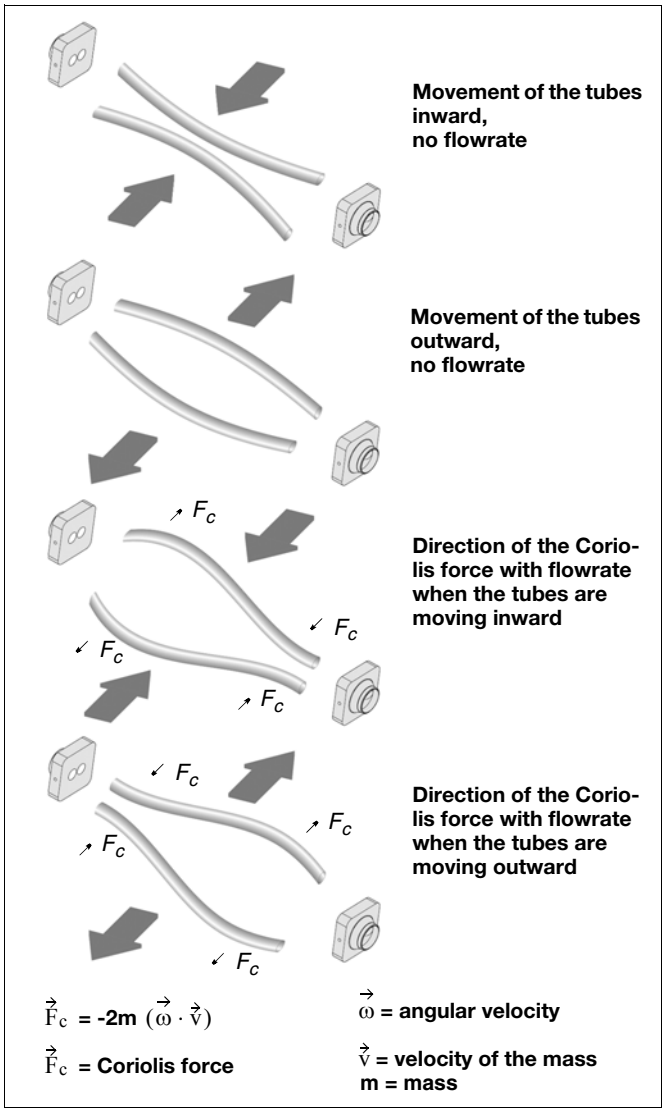


Fig. 1: Simplified Representation of the Coriolis Forces

System Design

The flowmeter primary consists of two one piece, formed meter tubes arranged in parallel through which the fluid flows. A twist and bend resistant mounting structure, which connects the in- and outlet of the flowmeter, is especially designed to isolate the meter tube from external forces and moments.

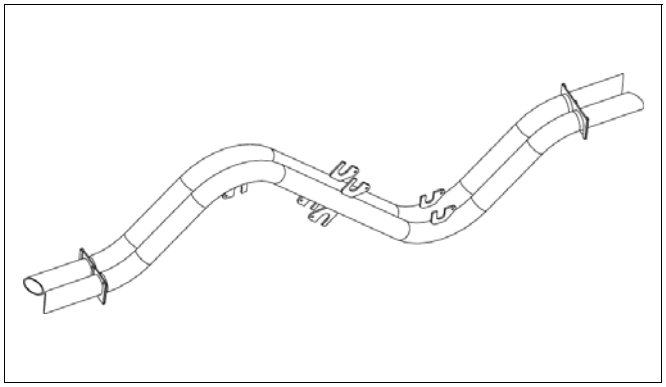


Fig. 2: FCM2000 Parallel Meter Tube Design

The meter tubes are welded at their in- and outlet ends to flow splitters. Therefore there is no direct coupling to the process connections. This approach appreciably minimizes the effects of external vibrations on the measurements.

Long life is assured by elimination of weld seams in the highly stressed areas and by hard silver soldering, under vacuum, the mounts for the meter tube, drivers and sensors. Exceptional long term stability is assured by vacuum stress relieving the meter tubes.

Easy installation, wide flow ranges and a variety of process connections and last, but not least, the quick amortization of the costs make the FCM2000 an instrument which can be optimally applied in production processes.

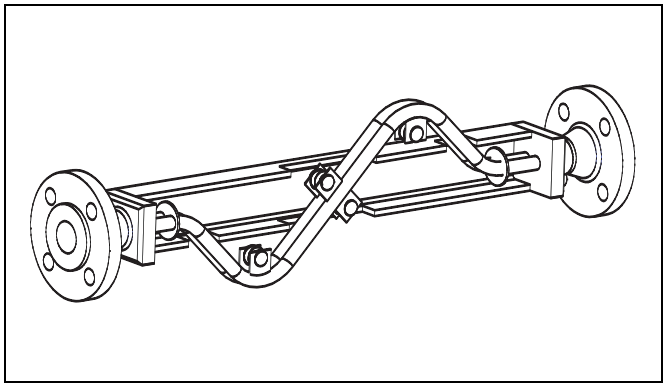


Fig. 3: Double Tube Flowmeter Primary FCM2000

Assembly and Installation Flowmeter Primary

Inspection

Before installing the flowmeter primary, 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 Design Information
The FCM2000 is suitable for both in- 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 assure that the meter tubes 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 primary. Flow in this direction will be indicated as positive (a forward/reverse flow calibration is available as on option).

Installation Orientation
- The FCM2000 operates in all orientations. The optimal installation orientation is vertical with the flow upwards.

Supports
- In order to support the weight of the flowmeter primary and to assure 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 installations at the outlet
  – in vertical installations at the inlet
- When possible, shut off devices should be installed both up- and downstream of the flowmeter primary.

Inlet Straight Sections
- The mass flowmeter does not require any flow conditioning inlet straight sections. Care should be exercised to assure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter primary.

System Design Information
- The presence of gas bubbles in the fluid can result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter primary 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 primary should be avoided to prevent the meter tube from draining.
- The pipelines should be connected in a stress free manner.
- The flowmeter primary 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 primary size, suitable standard reducers can 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 primary should be avoided.
- Care should be exercised to assure 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.
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube.
- The flowmeter primary 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 meter primaries should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.
- Request special installation requirements for meter size „L“.

Zero Adjustment

- 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 primary. It is also important that the pressure and temperature in the meter tube be the same as those which exists during operation.

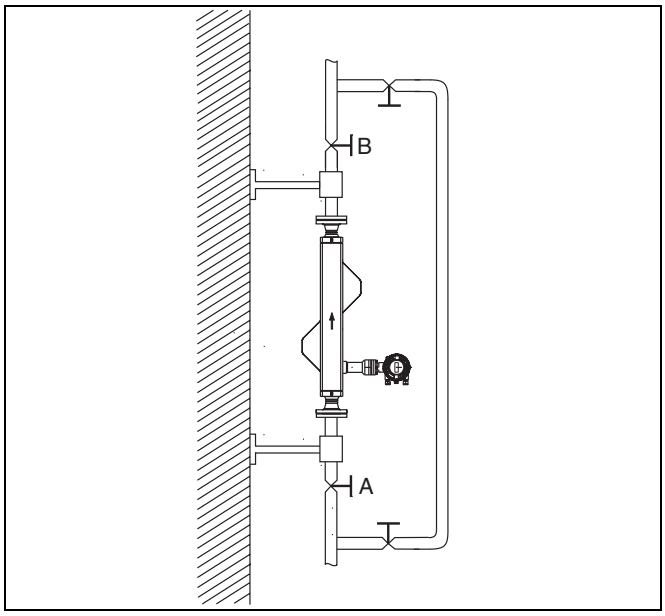


Fig. 4: Zero Adjustment with a By-Pass Line

Installation Instructions MC2 Flowmeter primary

Vertical Installations

The optimal installation orientation is a vertical installation with an upward flow as shown in the following figure. 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.

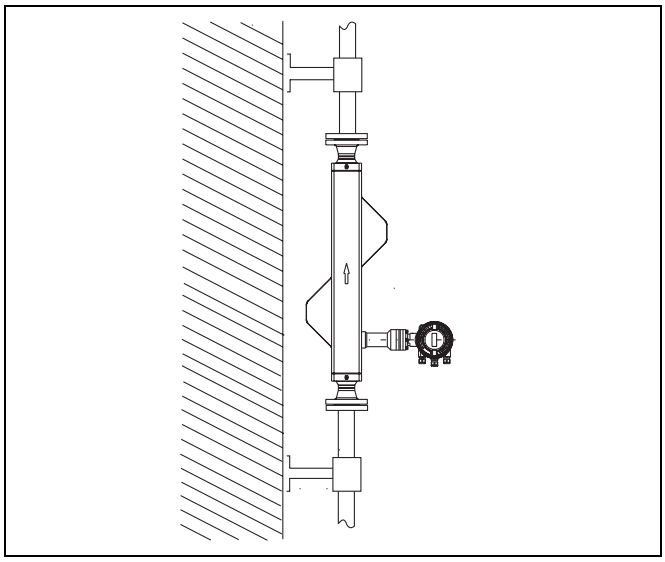


Fig. 5: Vertical Installation, Self-Draining (upward flow)

Horizontal Installations

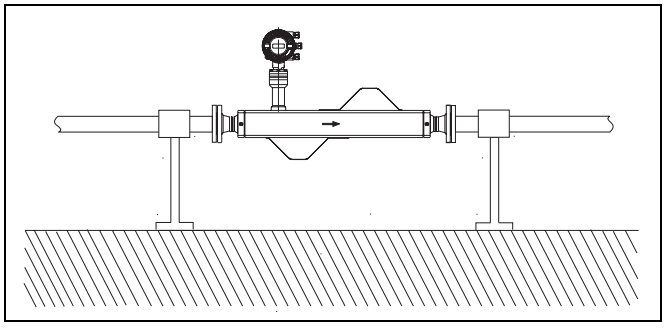


Fig. 6: Horizontal Installation

Horizontal Installation, Self Draining

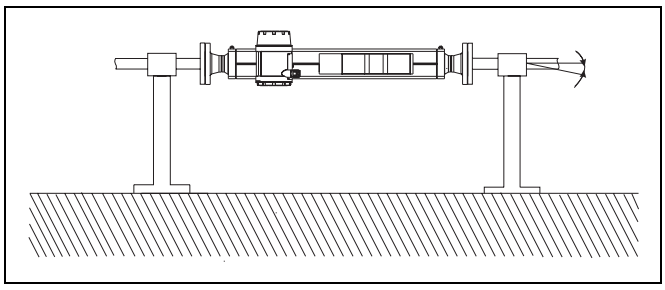


Fig. 7: Horizontal Installation, Self Draining, α 2 – 4°

Installation in a Drop Line

The installation recommendation shown in the following figure is only possible if a pipeline reduction or orifice with a smaller cross-section can be installed to prevent the flowmeter primary from partially draining during the measurements.

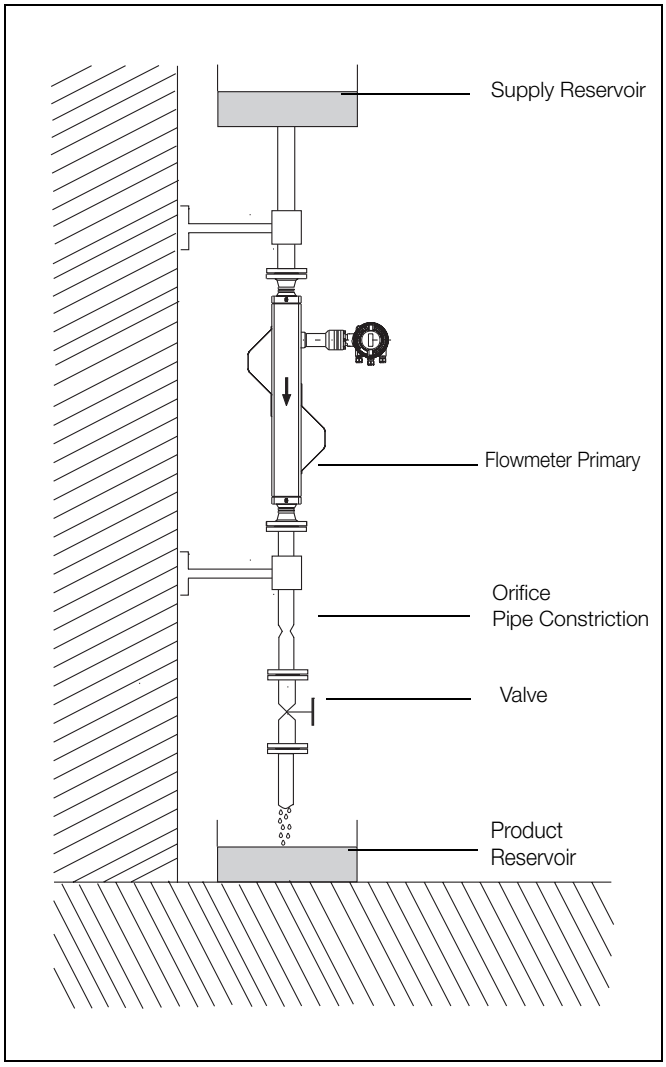


Fig. 8: Installation in a Drop LIne

Difficult Installation Locations

The accumulation of air or gas bubbles in the meter tube can lead to increased inaccuracies. Some difficult installations are shown in the following figure.

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.

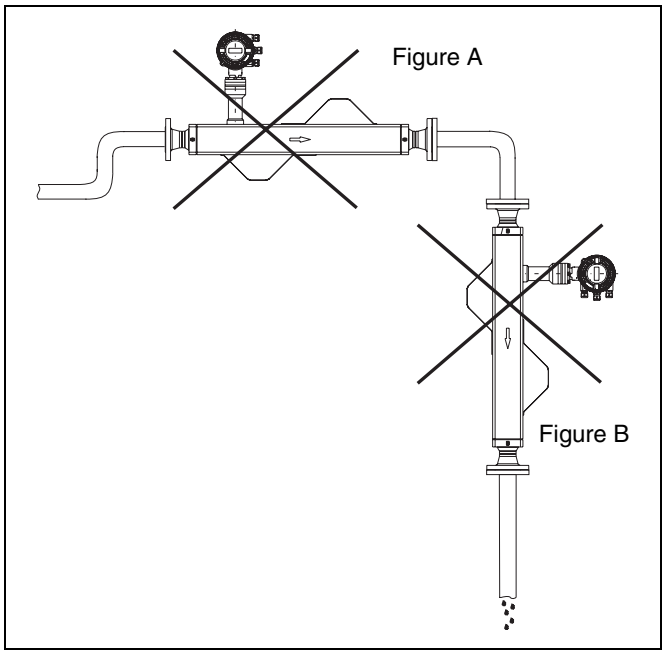


Fig. 9: Difficult Installation Conditions

Information:

Check that the coordination between the flowmeter primary and the converter is correct. The instruments which belong together have the same end characters on the Instrument Tag, e.g., X001 with Y001 or X002 with Y002.

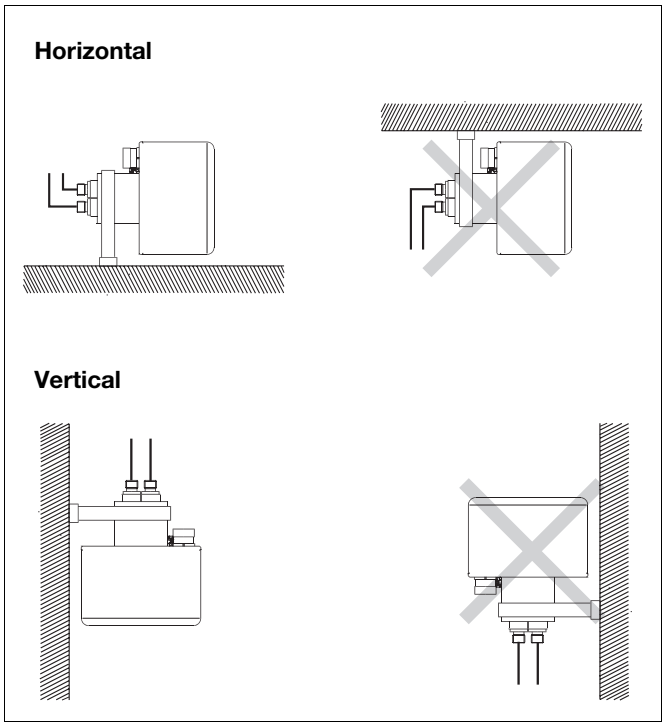
Pressure Drop

The pressure drop through the instrument is a function of the properties of the fluid and the flowrate. The Selection Program CD-CALC can be used to calculate the pressure drop.

MS2 Flowmeter primary

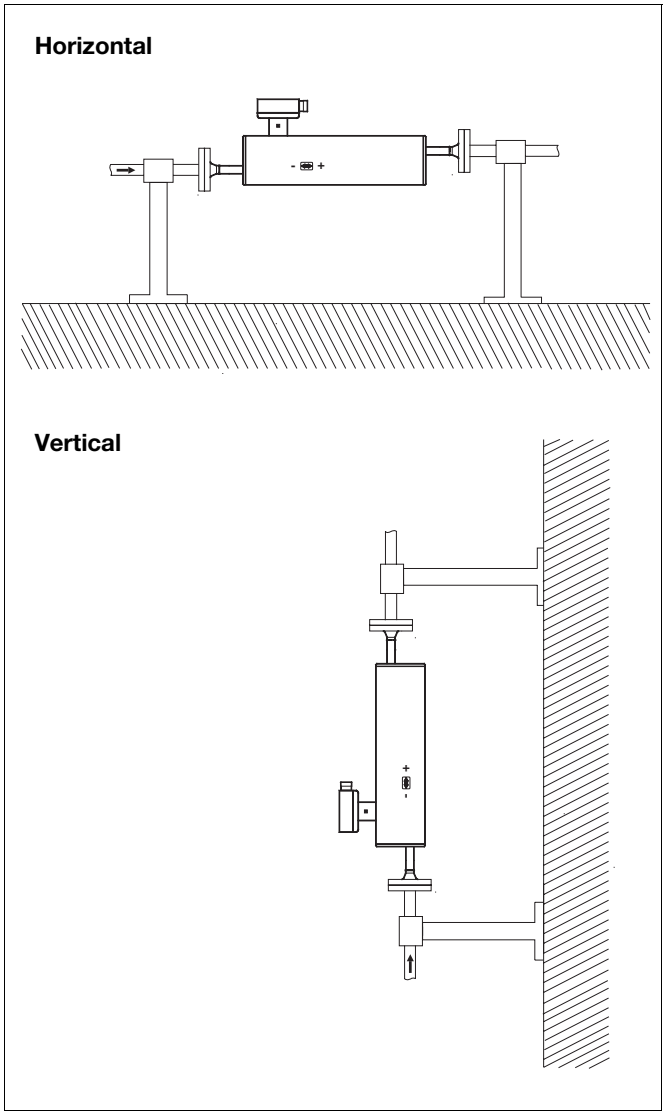
Flowmeter primary MS2 DN1.5 installation

- 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 primary, the flow speed in the flowmeter primary 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 primary 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 primary, a sufficient back pressure must be present at the unit (min. 0.1… 0.2 bar / 1.45 ... 2.9 psi).
- Install the flowmeter primary in a vibration-free way to a wall or a steel frame.
- Position the flowmeter primary at a low location in the system in order to avoid a negative pressure in the flowmeter primary, that could lead to air or gas separation in the fluid.
- Ensure that the flowmeter primary is not run empty (in the normal operation) as this can lead to inaccurate measurements.



Flowmeter primary MS2 DN3/DN6 installation

For light flow, a horizontal installation location is recommended since air bubbles are easier to remove in this position. If the fluid is non-permanent or contains solid particles, a vertical installation is not recommended.



Specifications: Flowmeter primary FCM2000-MC2

Fig. 10: Flowmeter Primary FCM2000-MC2

Meter Sizes

„E“ (DN 20 [3/4”]); „F“ (DN 25 [1”]); „G“ (DN 40 [1-1/2”]); „H“ (DN 50 [2”]);„I“ (DN 65 [2-1/2”]\); „J“ (DN 80 [3”]); „K“ (DN 100 [4”]); „L“ (DN 150 [6”])

Flow Ranges

Meter Size			Max. Flow Range [Q_{max}]			
	DN	Inch	[kg/min]		[lbs./min]	
„E“	**20**	**3/4**	0 to	100	0 to	220
„F“	**25**	**1**	0 to	160	0 to	352
„G“	**40**	**1-1/2**	0 to	475	0 to	1045
„H“	**50**	**2**	0 to	920	0 to	2024
„I“	**65**	**2-1/2**	0 to	1890	0 to	4158
„J“	**80**	**3**	0 to	2460	0 to	5412
„K“	**100**	**4**	0 to	4160	0 to	9152
„L“	**150**	**6**	0 to	11000	0 to	24200

Enclosure classification: IP65/IP67, NEMA 4X

Accuracy, Flowrate > DN 20 (sizes „F“, „G“, „H“, „I“, „J“, „K“)

± 0.4 % of rate ± 0.02 % of Q_{max}
± 0.25 % of rate ± 0.02 % of Q_{max}
± 0.15 % of rate ± 0.01 % of Q_{max}
(Accuracy of measured value + zero deviation)

Accuracy, Flowrate DN 20 (size „E“)

± 0.4 % of rate ± 0.01 % of Q_{max}
± 0.25 % of rate ± 0.01 % of Q_{max}
± 0.15 % of rate ± 0.005 % of Q_{max}
(Accuracy of measured value + zero deviation)

Accuracy, Flowrate DN 150 (size „L“)

± 0,4% of rate ± 0,05% v. Q_{max}
± 0,25% of rate ± 0,05% v. Q_{max}
± 0,15% of rate ± 0,05% v. Q_{max}

Influence of medium temperature

± 0,004 % of Q_{max} /1K

Reproducibility, Flowrate

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

Measurement Range, Density

0.5 kg/dm^3 to 3.5 kg/dm^3

Accuracy, Density

Standard calibration ± 5 g/l
Expanded density calibration ± 1 g/l
With separated technique tosignal cable is included in calibration and may neither be shortened nor extended after-wards!

Reproducibility, Density

± 0.1 g/l

Accuracy, Temperature

-50 °C to +180 °C < 1.0 °C

Reference Conditions

Calibration medium

Water 20 °C, (+ 10 K/- 5 K)
Pressure 0.5 ... 6 bar

Ambient Temperature

20 °C, (+ 10 K/- 5 K)

Power Supply

Nominal voltage per name plate U_N ± 1 %

Warm-up Time

30 Min.

Installation according to this specifications

no visible gas phase
no external mechanic or hydraulic interferences, specifically cavitation

Output at calibration

Pulse output

Analog output effects

Same as pulse output ± 0.1 % of rate

Materials

Flowmeter Primary

Fluid wetted parts
Stainless steel 1.4571 / 316 Ti
1.4435 / 316L
Hastelloy C4/2.4610
EHEDG Certified for flowmeter primary made of 1.4435 / 316L
Option: fluid wetted parts acc. to NACE MR0175 (ISO15156)
Housing
Stainless steel 1.4301

Converter

Housing
light metall casting, painted
central part: RAL 7012
top cover: RAL 9002
thickness of painting: 80-120 µm

Fluid Temperature

Standard: -50 °C to 180 °C;
Ex: -20 °C to +150 °C/180 °C for ATEX and FM
Ex: opt. -40 °C to +150 °C/180 °C for ATEX and FM

Ambient Temperature

-25 °C to +60 °C;
Ex: -20 °C to +60 °C for ATEX and FM
Ex: opt. -40 °C o + 60 °C for ATEX and FM

Process Connections

Flanges DIN/ASME
Tri-Clamp DIN 32676
- DN 15 - DN 50: Series 3
- DN 65 - DN 100: Series 1

Food Industry fittings DIN 11851
The max. allowable operating pressure is a function of the process connection type, the fluid temperature, the bolts and the gaskets.

Pressure Rating

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

Housing as secondary containment

max. 40 bar

Pressure Equipment Directive 97/23/EG

Conformity evaluation category III, fluid group 1, gas, diagramme 6

Corrosion resistance of measuring pipe material to measuring medium has to be considered.

Material strength for process connections

Process connection	Size		$PS_{max.}$ [bar]	$TS_{max.}$ [°C]	$TS_{min.}$ [°C]
	DN	Inch			
Thread acc. DIN 11851	15 - 40 50 - 100	1/2" - 1 1/2" 2" - 4"	40 25	140 140	-40 -40
Tri-Clamp acc. DIN 32676	15 - 50 65 - 100	1/2" - 2" 2 1/2" - 4"	16 10	120 120	-40 -40

Material Loads Curves for Flanged Flowmeters

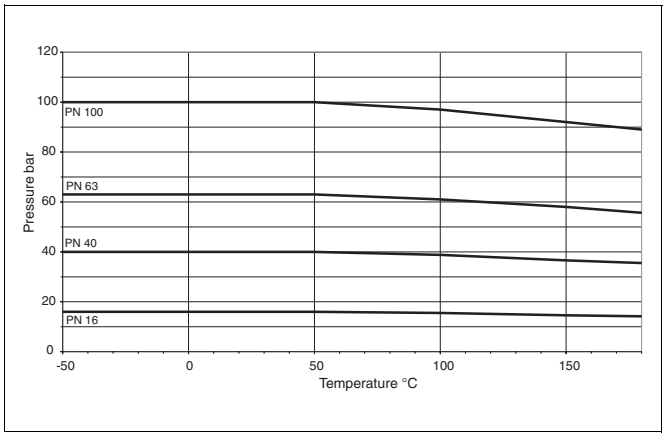


Fig. 11: DIN-Flanges SS 1.4571 [316Ti] to DN 100 [4"]

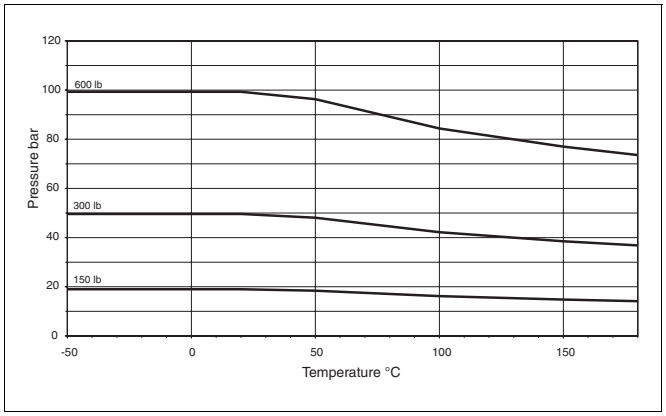


Fig. 12: ASME-Flanges SS 1.4571 [316Ti] to DN 100 [4"]

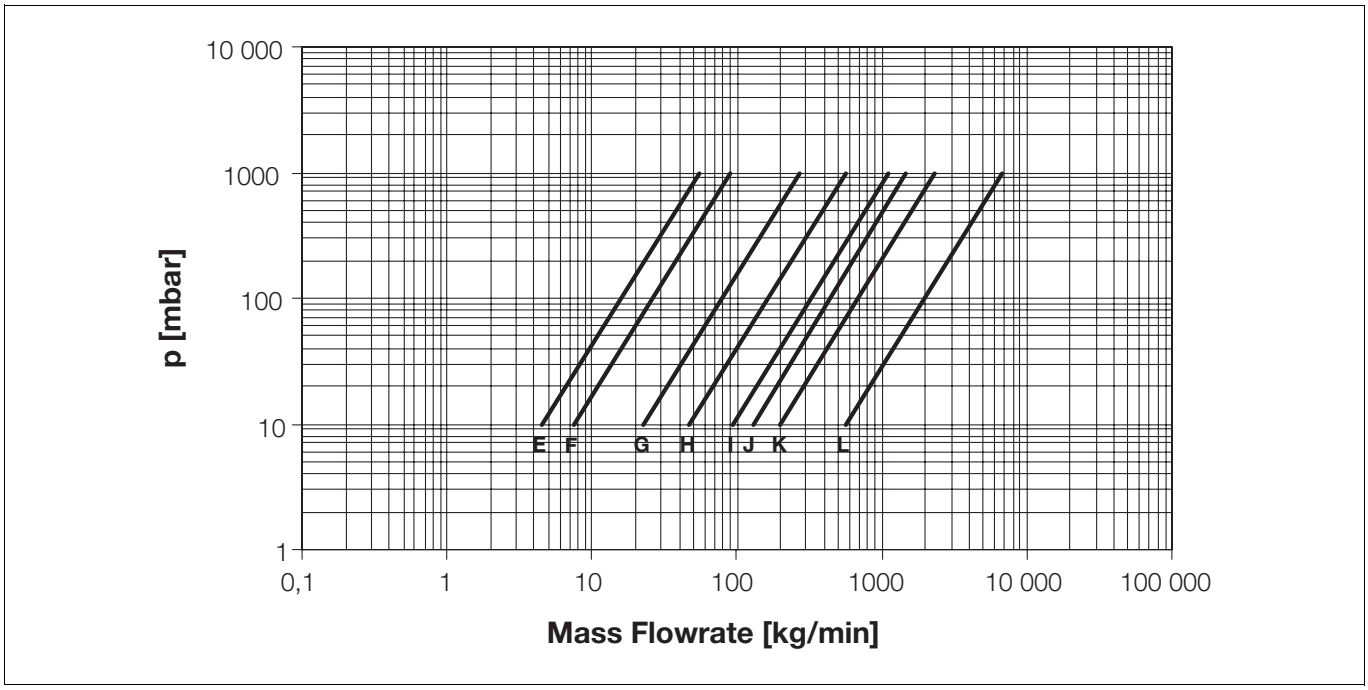


Fig. 13: Pressure Drop Curves FCM2000

Viscosity Range

Max. dyn. viscosity: ≤ 1 Pas (= 1000 mPas = 1000 cP)
for higher viscosities, please contact ABB-Sales offices.

Ex-Approval ATEX, MC26B, MC27B

EU-Type Examination Certificate:

TÜV 99 ATEX 1443 X
II 2G EEx emd [ib] IIC T6: (≤ DN 40 [1-1/2"])
II 1/2G EEx emd [ib] IIC T6: DN 50 [2"]–DN 150 [6"])
The internal volume for meter sizes „H" DN 50 [2"] to „L" DN 150 [6"] corresponds to Category 1 (Zone 0).
II 2D T115°C ... T_{Medium} IP67 ($T_{Ambient}$ -20 °C ... +60 °C)

Maximum Allowable Fluid Temperatures as a Function of the Ambient Temperature, Temperature Class and the Flowmeter Size

Meter Size	DN 20 [3/4"]–DN 150 [6"]		
Ambient Temperature	40 °C	50 °C	60 °C
Temperature Class			
T2	180 °C	–	–
T3	165 °C	140 °C	–
T4	100 °C	100 °C	80 °C
T5	65 °C	65 °C	65 °C
T6	50 °C	50 °C	50 °C

These values also apply to insulated Mass Flowmeters.

Ex-Zulassung FM, MC26C, MC27C

Explosion Proof	XP-IS/I, II, III/1/BCDT/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 Class

In case of a remote installation the length of the provided cable between sensor and transmitter must be at least 5 m.

FM Temperature Class and Ambient temperature

Meter Size	DN 20 [3/4"]–DN 150[6"]		
Ambient Temperature	-40 °C to +40 °C	-40 °C to +50 °C	-40 °C to +60 °C
Temperature Class			
T2	180 °C	–	–
T3	165 °C	140 °C	–
T4	100 °C	100 °C	80 °C
T5	65 °C	65 °C	65 °C
T6	50 °C	50 °C	50 °C

Ex-Approval FM, MC21O, MC23O

Nonincendive Class I,II, III, Division 2, Groups A, B, C, D, F, G/T6
Ta = 60 °C, NEMA 4X.

Specifications: Flowmeter Primary MS21

Fig. 14: Flowmeter Primary MS2000

Meter Sizes

„S“ (DN 1,5 [1/16“]); „T“ (DN 3 [1/8“]); „U“ (DN 6 [1/4“])

Flow Ranges

Meter Sizes	Max. Flow Range [Q_{max}]			
	[kg/h]		[lbs./min]	
„S“ DN 1,5 [1/16“]	0 to	65	0 to	143
„T“ DN 3 [1/8“]	0 to	250	0 to	550
„U“ DN 6 [1/4“]	0 to	1000	0 to	2200

Enclosure classification: IP65

Accuracy, Flowrate

± 0.4 % of rate ± 0.02 % of Q_{max}
± 0.25 % of rate ± 0.02 % of Q_{max}
± 0.15 % of rate ± 0.01 % of Q_{max}
(Accuracy of measured value + zero deviation))

Reproducibility, Flowrate

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

Measurement Range, Density

0.5 kg/dm^3 to 3.5 kg/dm^3

Accuracy, Density

Standard calibration ± 10 g/l
Temperature range 0 to 100 °C
Expanded density calibration upon request
With separated technique to signal cable is included in calibration and may neither be shortened nor extended after-wards!

Accuracy, Temperature

-50 °C to +180 °C < 1.0 °C

Reference Conditions

Calibration medium

Water 20 °C, (+ 10 K/- 5 K)
Pressure 0,5 ... 6 bar

Ambient Temperature

20 °C, (+ 10 K/- 5 K)

Power Supply

Nominal voltage per name plate U_N ± 1 %

Warm-up Time

30 Min.

Installation according to this specifications

no visible gas phase
no external mechanic or hydraulic interferences, specifically cavitation

Output at calibration

Pulse output

Analog output effects

Same as pulse output ± 0.1 % of rate

Materials

Flowmeter Primary

Fluid wetted parts
1.4435 / 316L
Housing Stainless steel 1.4404

Fluid Temperature

Standard: -50 °C to 180 °C: DN 3, DN 6
-50 °C to +125 °C: DN 1.5

Ambient temperature

-25 °C to +60 °C

Process Connections

G1/4“ ISO 228-1
1/4“ NPT ASME B1.201
Flanges DIN/ASME for DN 6 [1/4“]
Food Industry fittings DIN 11851 for DN 6 [1/4“]
The max. allowable operating pressure is a function of the process connection type, the fluid temperature, the bolts and the gaskets.

Pressure Rating

Flanges PN 40, CL 150,
Thread G 1/4“, 1/4“ NPT, PN 100

Installation

For detailed installation instructions please refer to the operating instructions.

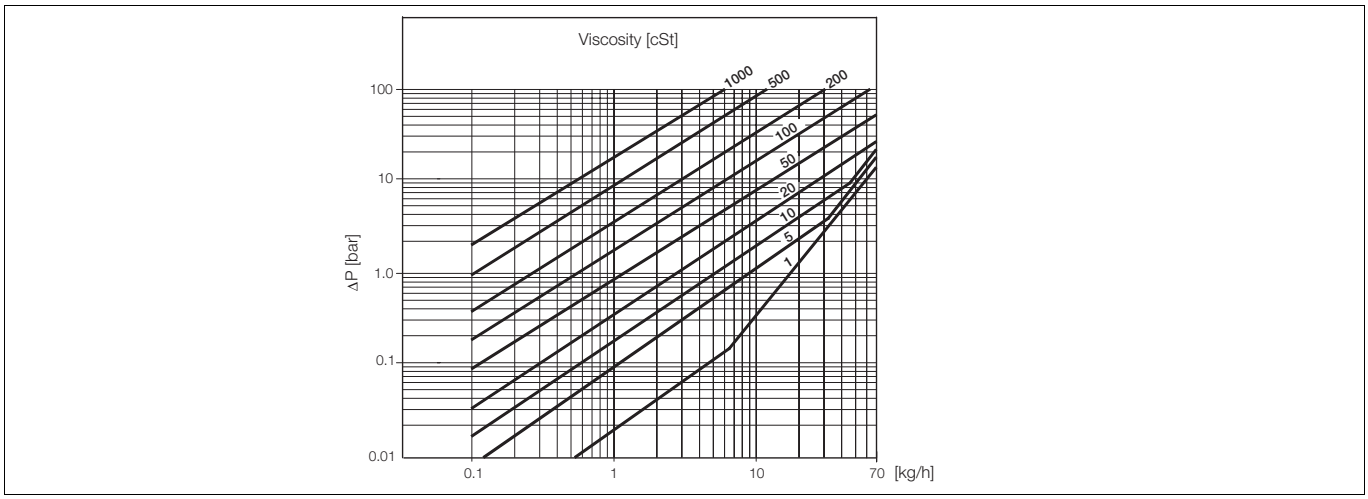


Fig. 15: Pressure Drop MS21, DN 1,5 [1/16“]

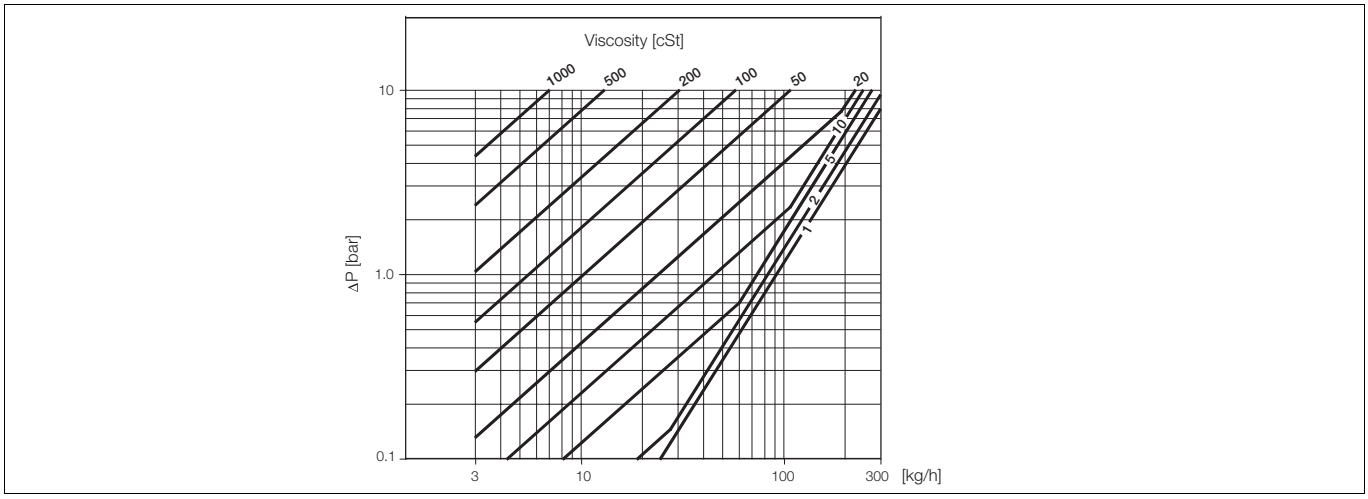


Fig. 16: Pressure Drop MS21, DN 3 [1/8“]

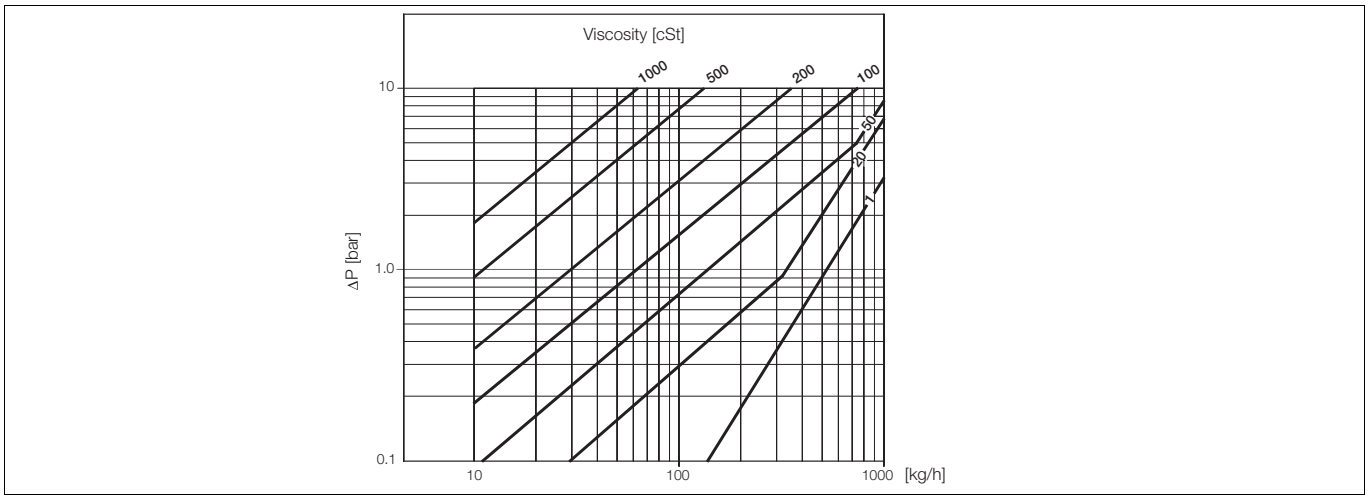


Fig. 17: Pressure Drop MS21, DN 6 [1/4“]

Specifications: Converter FCM2000-ME2

Fig. 18: Converter FCM2000 Field Mount Housing, rectangular

Flow Range

User selectable between 0.01 Q_{max} and 1 Q_{max}

Protection Class

IP65 / IP67, NEMA 4X

Electrical Connections

Cable connectors M20 x 1.5 or 1/2“ NPT
Max. signal cable length for remote mounted design 50 m (for longer length upon request)

Supply Power

Power Supply Voltage	85–253 V AC, 47–63 Hz 20,4–26,4 V AC, 47–63 Hz 20,4–31,2 V DC Ripple: 5 %

Power

S ≤ 25 VA

Response Time

For a 0–99 % step change (corresponds 5 τ) ≥ 1 s

Ambient Temperature

-20 °C to 60 °C

Construction

Cast light metal field mount housing, painted
Center section: RAL 7012, dark gray
Cover: RAL 9002, light gray
Farbanstrich: 80 – 120 µm thick

Forward/Reverse Flow Metering

The flow direction is indicated in the display by a direction arrow and is signaled by an optocoupler for an external alarm.

Display

2x16-character LCD-Dot-Matrix display with LED background lighting. Both lines can be user configured for the indication of mass flowrate, volume flowrate, density or temperature. Flow totalization, 7-digit with overflow counter in mass or volume units.

Ex Approval FM, ME21O

Nonincendive Class I, II, III Division 2, Groups A, B, C, D, F, G/T6
Ta = 60 °C, NEMA 4X

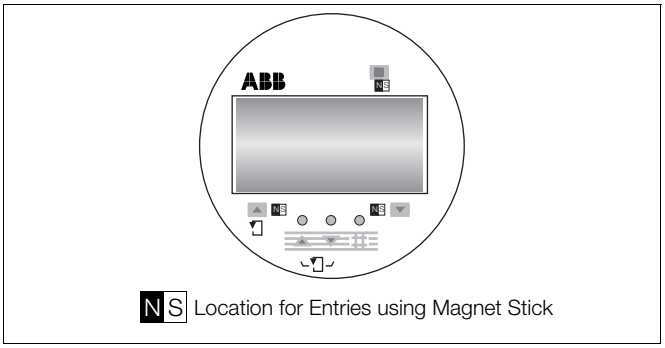


Fig. 19: Converter Keypad and Display

After the four mounting screws (1-4) have been loosened the converter can be repositioned in 4 orientations to assure optimum readability.

Fig. 20: Magnet Stick Operation

Magnetic stick operation makes it possible to configure the converter and enter data without removing the housing cover.

Setting Parameters

Data can be entered in a number of different languages using the 3 buttons on the converter.
The converter housing can be rotated in each direction by approx. 180°. There are four positions into which the display can be plugged to assure optimum readability. In the multiplex mode the flowrate in %, direct reading engineering units or as a bargraph, the totalizer values forward or reverse and the TAG-No. can be alternately displayed in addition to the display selections for the 1st and 2nd lines.

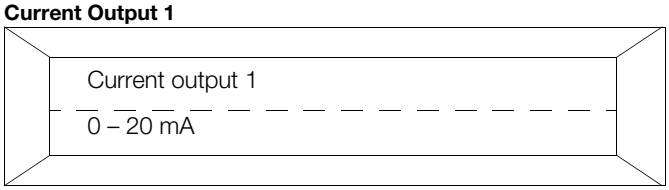
Data Protection

All data values are stored in an NV-RAM for 10 years without supplementary power when the instrument is turned off or during a power outage. Additional process information safeguards are provided by a serial EEPROM in the converter which incorporates data up- and download features.
Hard- and Software coding according to NAMUR-recommendation NE53.

Information:

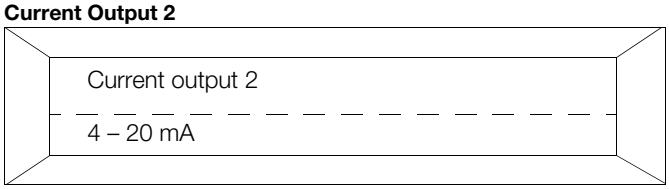
The instrument meets the NAMUR-recommendations NE21. electromagnetic compatibility of equipment of process- and laboratory technique and EMV guideline 89/336/EG (EN 50081-1,
EN 50082-2) as well as low voltage guideline 73/23/EG (EN 61010-1).

Current Output 1



Function: active
0/4–20 mA, selectable
Load: 0 Ω ≤ R_B ≤ 560 Ω
Terminals: 31/32
Measurement uncertainty < 0.1 % of rate
For output of mass flowrate, volume flowrate, density and temperature.
Function user selectable in the software.

Current Output 2



Function: Passive
Current Output 4–20 mA
Load: 0 Ω ≤ R_B ≤ 600 Ω
Source voltage: 12 V ≤ Us ≤ 30 V
Terminals: 33/34
Measurement uncertainty < 0.1 % of rate
For output of mass flowrate, volume flowrate, density and temperature.
Function user selectable in the software.

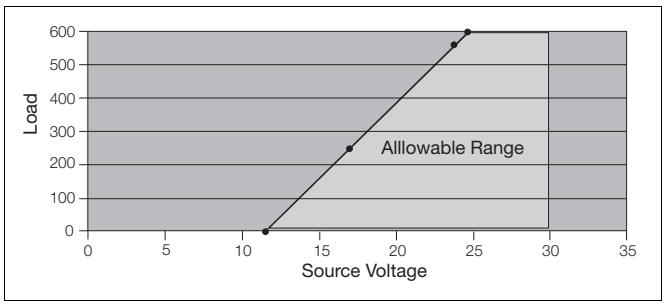
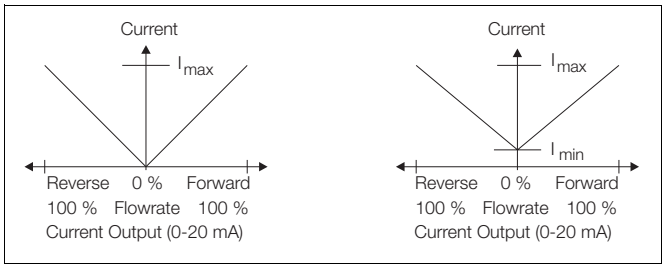
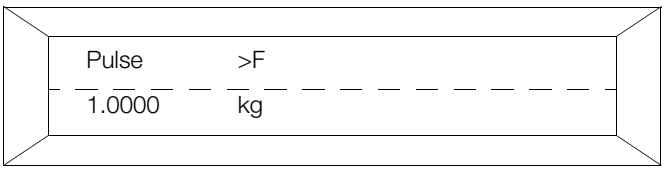


Fig. 21: Allowable Source Voltage as a Function of the Load Resistance at I_{max} = 22 mA



Information:

Measurement uncertainty according to NAMUR-recommendation NE43.



Scaled Pulse Output

Scaled pulse output (max. 5 kHz) with a selectable pulse factor between 0.001 – 1000 pulses per selected engineering unit. The pulse width can be set from 0.1 to 2000 ms. The output is galvanically isolated from Current Output 1 and from Current Output 2.

Design	**Passive**	**Active**
Terminals	51, 52	51, 52
Operating voltage Operating current	16 V ≤ U_{CEH} ≤ 30 V DC 0 V ≤ U_{CEL} ≤ 2 V 0 mA ≤ I_{CEH} ≤ 0.2 mA 2 mA ≤ I_{CEL} ≤ 220 mA	16 V ≤ U ≤ 30 V DC Load ≥ 150 Ohm fmax = 5 kHz
	When using a mechanical counter pulse widths ≥ 30 ms and fmax ≤ 3 Hz are recommended	
fmax	5 kHz	5 kHz
Pulse width	0.1 ms–2000 ms	0.1 ms–2000 ms

Contact Output

The following functions can be assigned to the contact output in the software:
System monitor: Normally open or normally closed contact
Forward/reverse direction indication: closed for forward direction
Max-Min alarm: Normally open or normally closed contact
Terminals: 41, 42

"closed"	0 V ≤ UCE_L ≤ 2 V
	2 mA ≤ ICE_L ≤ 220 mA
"open"	16 V ≤ UCE_H ≤ 30 V
	0 mA ≤ ICE_H ≤ 0.2 mA

Contact Input

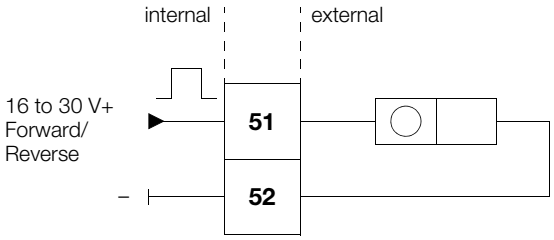
The following functions can be assigned to the contact input in the software:
Ext. Zero Return. When the meter tube empties the output signals can be turned off.
Ext. Totalizer Reset. The internal totalizers can be reset from an external contact.
Terminals: 81, 82

"ON"	16 V ≤ U_{KL} ≤ 30 V
"OFF"	0 V ≤ U_{KL} ≤ 2 V
Internal resistance:	R_i = 2kΩ

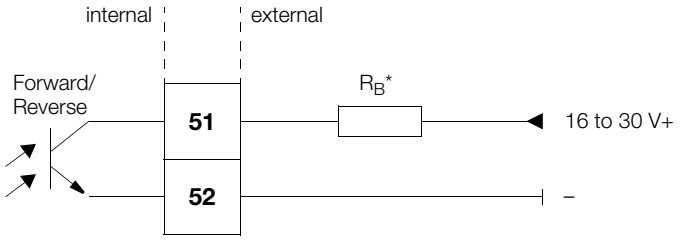
All signal In-/Outputs are galvanically isolated from the input circuit and each other.
For MC27 please refere to page 21.

Interconnection Examples for Peripherals, Standard

Scaled Pulse Output active

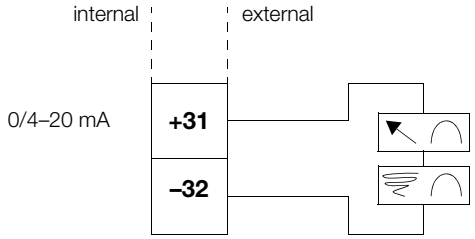


Scaled Pulse Output passive, Optocoupler (standard for EEx)

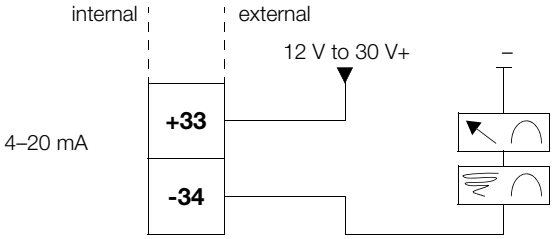


$$*R_B \geq \frac{U_{CE}}{I_{CE}}$$

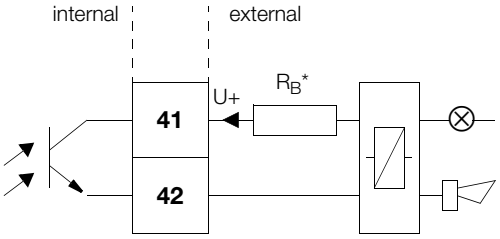
Current Output 1 active



Current Output 2 passive



Contact output for System Monitor, Max.-Min.-Alarm, Empty Pipe or Forward/Reverse direction signal Function software selectable



$$*R_B \geq \frac{U_{CE}}{I_{CE}}$$

Contact Input for External Totalizer Reset and External Zero Return Function software selectable

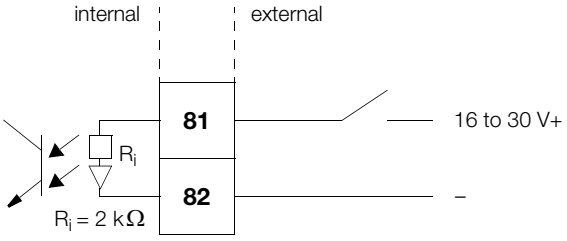


Fig. 22: Interconnections Examples for Peripherals

Technical Specifications: Converter

The converter has three alternatives for digital communication:

The HART® protocol

The HART® protocol is used for communication between a process control system, handheld terminal and the field device. The digital communication uses an ac voltage superimposed on the current output which does not affect the connected instrumentation. This design is only available with the 4-20 mA current output option. The device configuration is performed via the three buttons directly on the device or alternatively via the configuration and operation software SMART VISION® and the associated HART DTM for SMART VISION®. (Further information see below) or separate interface description part no. D184B108U07. The system is registered with the HART Communication Foundation.

HART® protocol

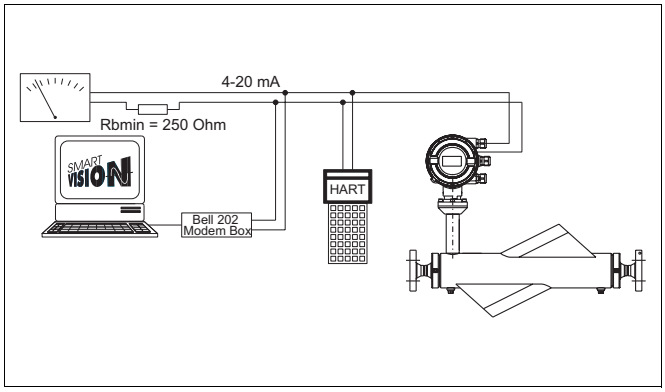


Fig. 23: Communication via HART protocol

Transmission method

FSK modulation on voltage output 4-20 mA according to Bell 202 standard.

Max. signal amplitude	1.2 mA_{SS}
Resistance voltage output	min. 250 Ω, max. = 560 Ω
	(Ex: max. 300 Ω)
Cable	AWG 24 twisted
Max. cable length	1500 m
Baud rate	1200 Baud
Display	Log. 1: 1200 Hz
	Log. 0: 2200 Hz

The PROFIBUS PA protocol

The digital communication occurs according to IEC 61158-2. The device configuration is performed via the three buttons directly on the device or alternatively via the configuration and operation SMART VISION® software and the associated PROFIBUS PA DTM. Further information see separate PROFIBUS PA interface description part no. D184B093U35.

FOUNDATION Fieldbus FF

The digital communication occurs according to IEC 61158-2. The device configuration is performed via the three buttons directly on the device or via the system-integrated services or via the national configurator. Further information see separate interface description part no. D184B093U31.

System integration

In conjunction with the DTM (Device Type Manager) to the device, the communication (configuration, parameterization) can occur with the corresponding framework applications according to FDT 0.98 or 1.2 respectively. Other desired tool/system integrations (e.g. AMS-/ Siemens S7) are available.

SMART VISION®, the ABB communication tool for HART® including all DTMs, is also available as a free 90-day test version.

PROFIBUS PA protocol

The PROFIBUS PA FCM2000 interface conforms to the Profile 3.0 (Standard PROFIBUS, EN 50170, DIN 19245 [PRO91]). The converter transmission signal is designed according to IEC 61158-2. The manufacturer-specific PROFIBUS PA Ident-No. of the FCM2000 is: 0849 hex. The device can be operated alternatively with the PROFIBUS standard Ident-No. 9700 hex or 9742 hex. Further information see separate interface description part no. D184B093U35. Stored data is preserved in the event of a power failure.

Bus cable

A shielded, twisted cable is recommended (in accordance to IEC 61158-2, types A or B are preferred). You can find further configuration information in detail in the "PROFIBUS suggested installation" brochure from ABB. Supplemental information is also available on our homepage www.abb.de/Feldbus as well as on the PROFIBUS international organization homepage www.profibus.com.

Information on voltage/current consumption

The middle current consumption of the FCM2000 amounts to 14 mA. In the event of an error, the integrated FDE function (= Fault Disconnection Electronic) integrated in the device is ensures that the current consumption can rise to a maximum of 26 mA. The upper limit of the voltage is electronically limited. The voltage on the bus line must lie in the range of 9-32 V.

Bus topology

Tree and or line structure is possible. The bus termination must take place passively on both wire ends of the bus main wire (RC-element R = 100 Ω, C = 1 µF).

FOUNDATION Fieldbus

The FOUNDATION field bus interface of the FCM2000 is compliant to the specifications FF-890/891 as well as FF-902. The transmission signal of the converter is designed according to IEC 61158-2. The device is registered with the Fieldbus FOUNDATION. The registration is recorded at the Fieldbus FOUNDATION under the manufacturer ID: 0x000320 and the Device ID 0x0018.

Bus address settings

The bus address is automatically allocated at the FF. However, it can also be manually set in the system. The device detection occurs via an explicit combination of manufacturer ID, device ID and device serial number.

Information on voltage/current consumption

The middle current consumption of the FCM2000 amounts to 14 mA. In the event of an error, the integrated FDE function (= Fault Disconnection Electronic) integrated in the device is ensures that the current consumption can rise to a maximum of 26 mA. The upper limit of the voltage is electronically limited. The voltage on the bus line must lie in the range of 9-32 V.

System integration

For integration into a process control system, a DD file (device description), which contains the device description, as well as a CFF file (common file format) are required. The CFF file is required for the segment engineering. The engineering can be undertaken online or offline.

You can find both files, as well as the interface description on the supplied CD (part no.: D699D002U01). When needed, this can be re-ordered at any time from ABB at no cost. The files needed for operation can also be downloaded at www.abb.de/durchfluss -> Coriolis Masse -> Fieldbus & HART Files.

Bus topology

Tree and or line structure is possible. The bus termination must take place passively on both wire ends of the bus main wire (RC-element R = 100 Ω, C = 1 µF)

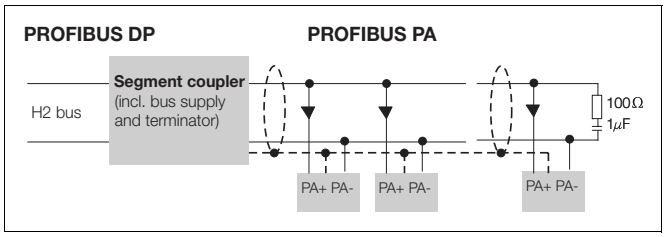


Abb. 24: Example for PROFIBUS PA interface connection

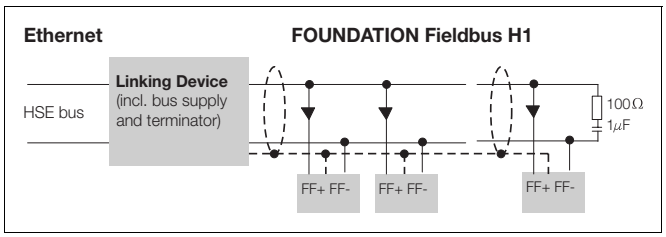
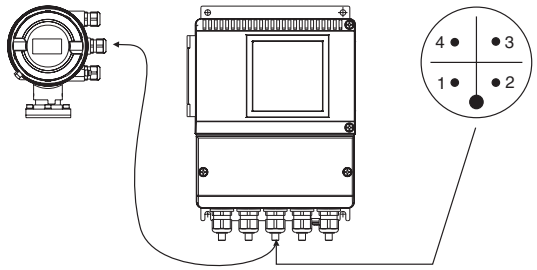


Abb. 25: Example for FOUNDATION Fieldbus interface connection

The resistance R and the capacitor C form the bus terminator. They are to be installed if the device is connected at the end of the entirebus cable. R = 100 Ohm; C = 1 µF

Termination via M12 plug (option, only with PROFIBUS PA design)

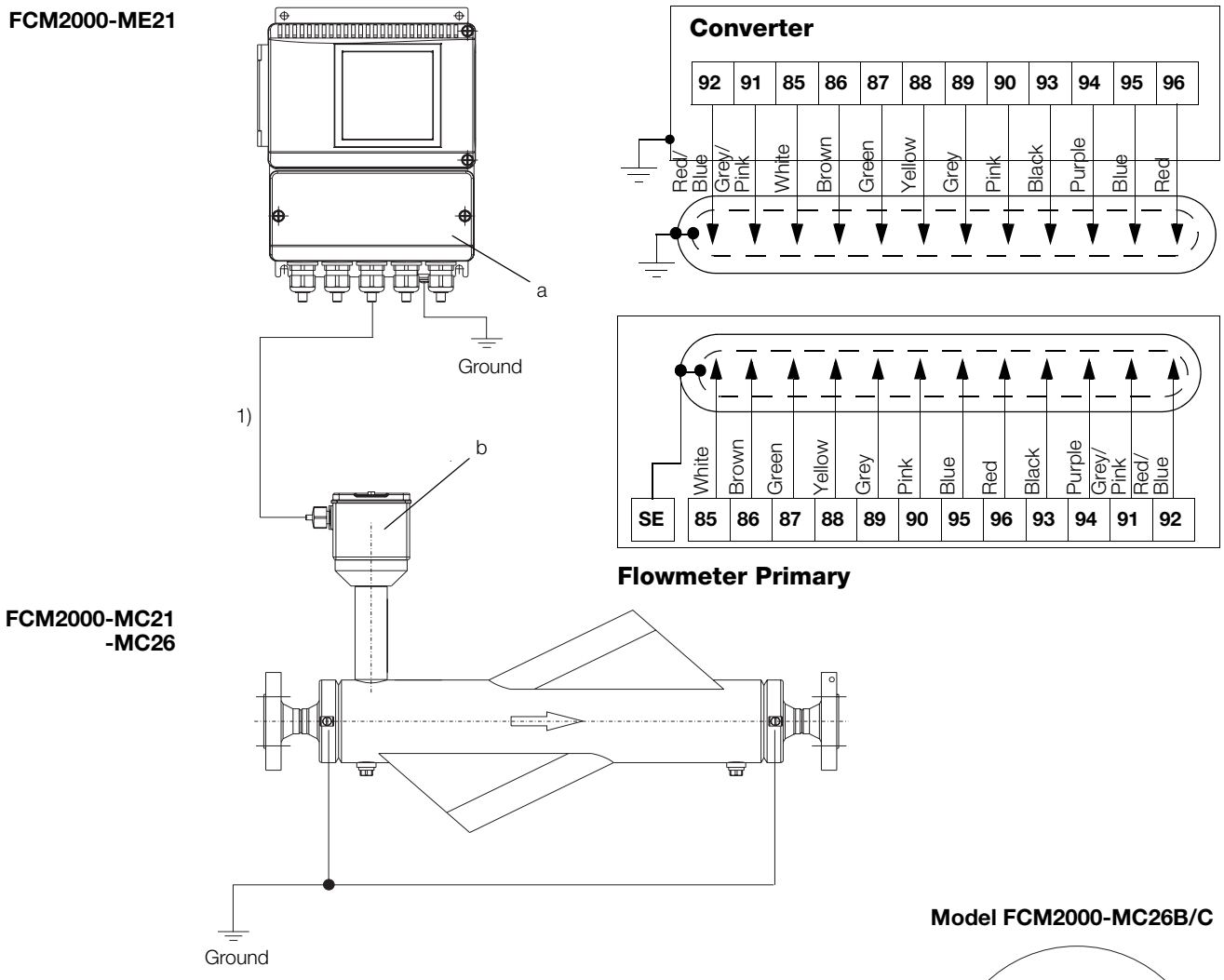
The bus terminator can also optionally occur via a M12 plug (see device ordering requirements) instead of the cable fitting. The device is then shipped completely prewired.
You can find appropriate connectors as well as additional accessories in the data sheet "Device overview PROFIBUS PA" (10/63-0.46 EN).



Plug assignment
(front view of pin inserts and pins)
PIN 1 = PA+
PIN 2 = nc
PIN 3 = PA-
PIN 4 = shield

Fig. 26: Connection example for peripherals with PROFIBUS PA or FOUNDATION Fieldbus

Interconnection Diagram: Flowmeter Primary MC2/Converter ME2



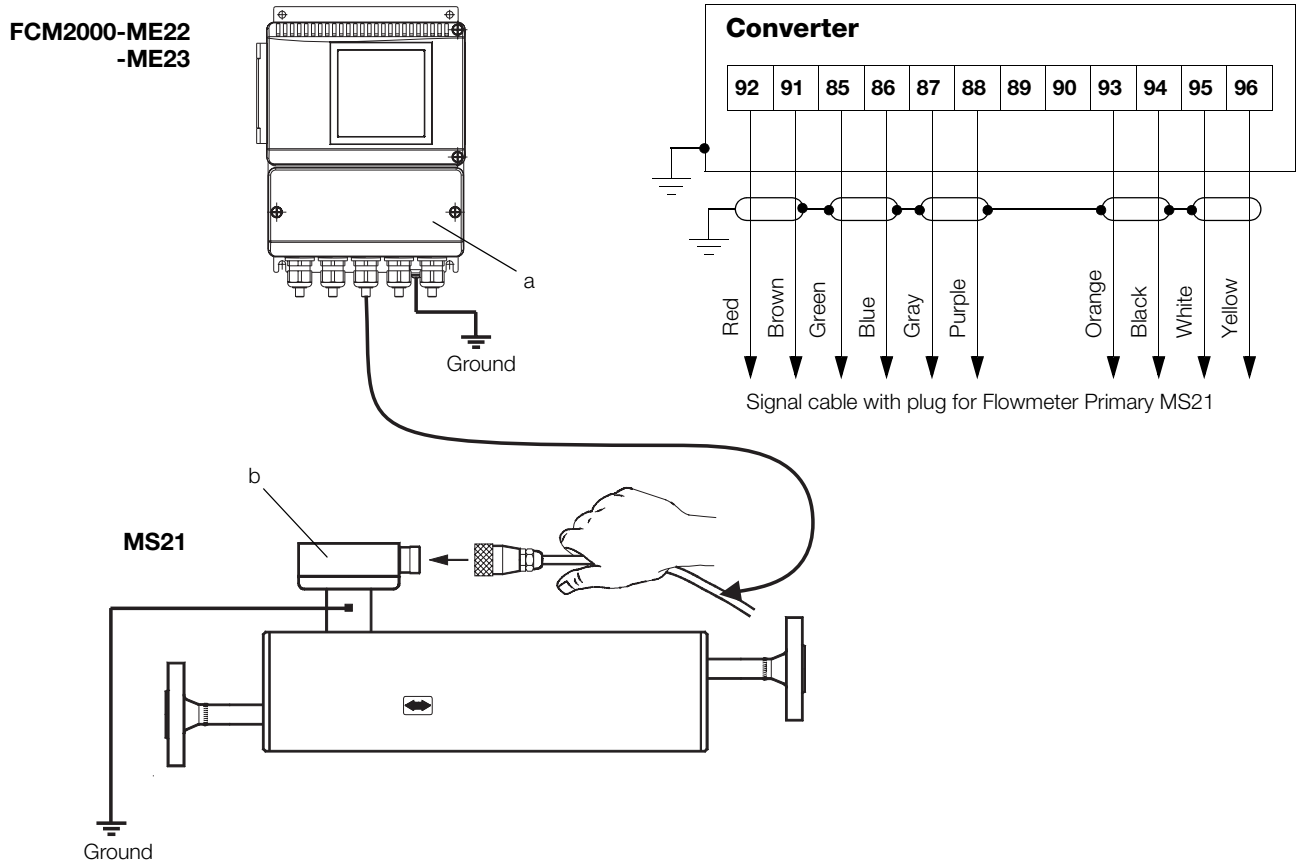
Connections

- 91/92 Driver
  93/94/95/96 Temperature
  85/86 Sensor A
  87/88 Sensor B
- Install signal cable D173D146U01 in the connection areas of the converter (a) and the flowmeter primary (b).
- Prepare the signal cable in accordance with the information in the Operation Manual.
- The foil shield is electrically conductive on only one side and may not be connected to SE.
- Cabling per the Electrical Interconnection Diagrams Abb. which means terminal 92 primary with terminal 92 converter etc.

[1] Shielded signal cable, ABB Part No. D173D146U01, 10 m included with shipment.

Fig. 27: Interconnection Diagram, Flowmeter Primary/Converter

Interconnection Diagram: Flowmeter Primary MS2/Converter ME2



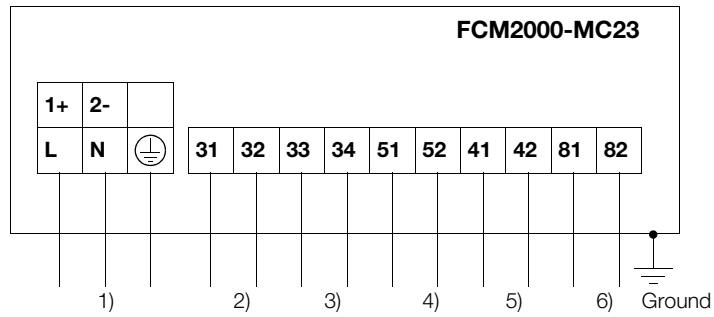
Connections

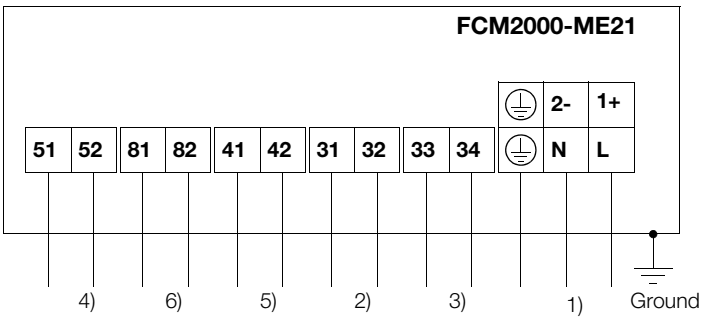
- 91/92 Driver
  93/94/95/96 Temperature
  85/86 Sensor A
  87/88 Sensor B
  apply signal cable in connection box of converter (a) with coloured identification. Twist the single shield of signal conductor pairs and attach on clamp yoke in the connection box. The signal cable is plugged to primary (b).
- Assemble signal cable according to Operating Instruction.

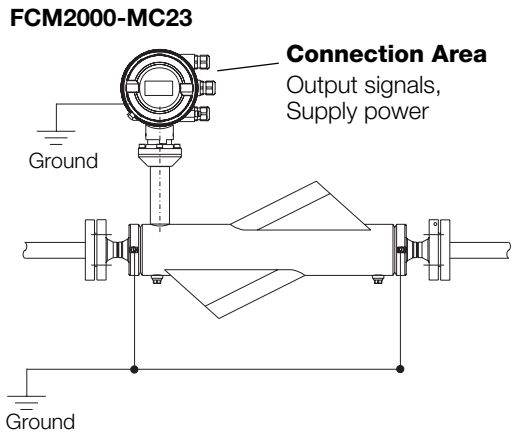
Signal cable can be ordered in length of 5, 10, 25, 50 m.

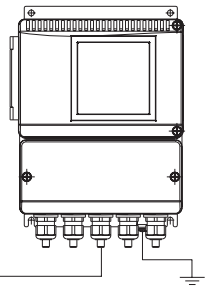
Fig. 28: Interconnection Diagram, Flowmeter Primary MS21/Converter FCM2000-ME21

Interconnection Diagram: Input and Output Signals, Supply Power MC2/ME2









FCM2000-ME21
-ME22
-ME23

Connection Area
Output signals,
Supply power

Ground

1) Supply Power
High voltage U_{AC} = 100 V ... 230 V, Terminals L, N, ⏚
Low voltage U_{AC} = 24 V, Frequency 50/60 Hz, Terminals: 1+, 2-
Low voltage U_{DC} = 24 V

2) Current Output 1, software selectable
Function: active
Terminals: 31, 32, 0/4–20 mA, (0 Ω ≤ R_L ≤ 560 Ω)

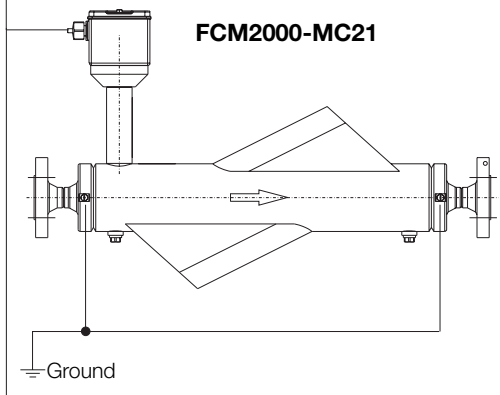
3) Current Output 2, software selectable
Function: passive
Terminals: 33, 34, 4–20 mA, 0 Ω ≤ R_L ≤ 600 Ω
Source voltage: 12 ≤ Us ≤ 30 V

4.1) Pulse Output, passive
Terminals: 51, 52
fmax: 5 kHz, pulse width 0.1 ms–2000 ms
Setting range: 0.001–1000 pulses/unit
„closed“ 0 V ≤ UCE_L ≤ 2 V, 2 mA ≤ ICE_L ≤ 220 mA
„open“ 16 V ≤ UCE_H ≤ 30 V, 0 mA ≤ ICE_H ≤ 0.2 mA

4.2) Pulse Output active
16 V ≤ U ≤ 30 V DC
Load ≥ 150 Ω
fmax = 5 kHz

5) Contact Output, passive
Terminals: 41, 42
„closed“ 0 V ≤ UCE_L ≤ 2 V, 2 mA ≤ ICE_L ≤ 220 mA
„open“ 16 V ≤ UCE_H ≤ 30 V, 0 mA ≤ ICE_H ≤ 0.2 mA

6) Contact Input, passive
Terminals: 81, 82
„ON“ 16 V ≤ U_{KL} ≤ 30 V
„OFF“ 0 V ≤ U_{KL} ≤ 2 V
R_i = 2 kΩ



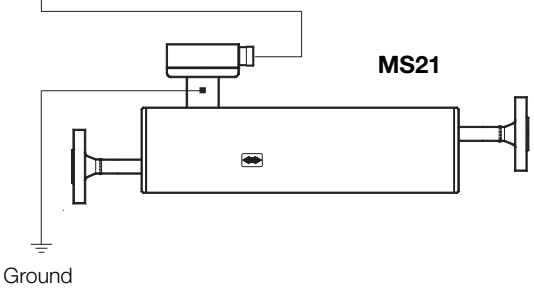
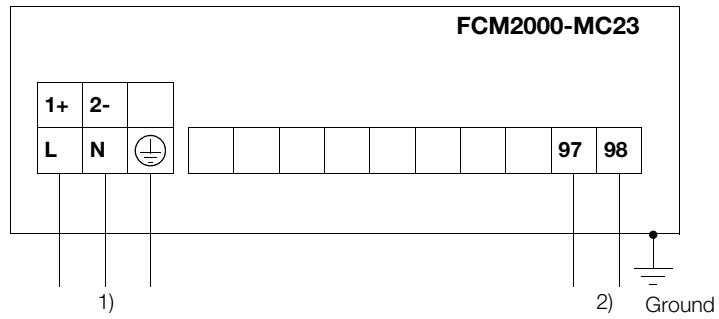
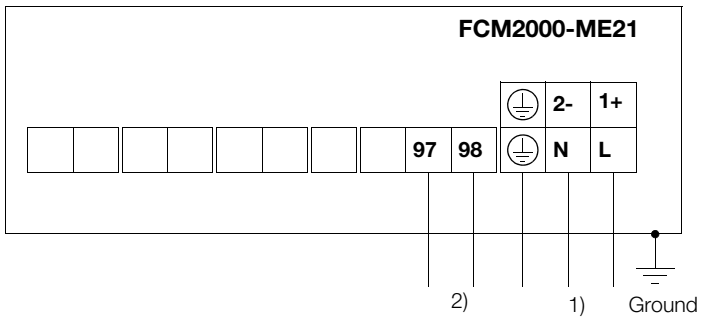
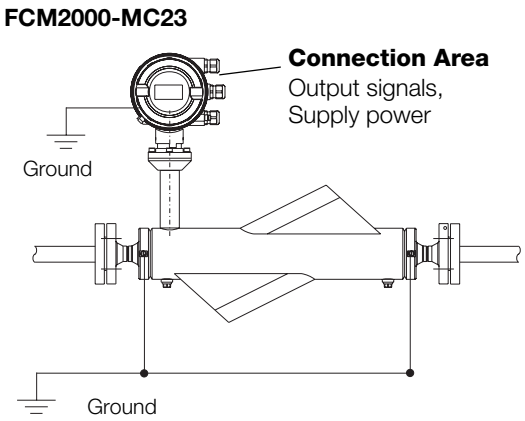


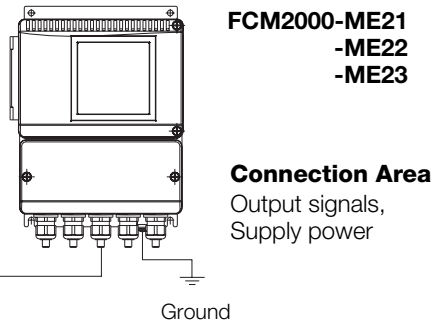
Fig. 29: Interconnection Diagram

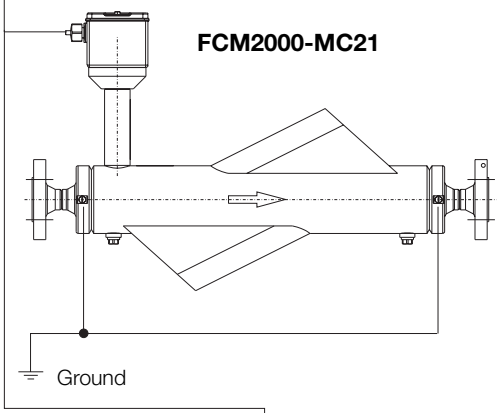
Interconnection Diagram: PROFIBUS PA/FOUNDATION Fieldbus, Supply Power

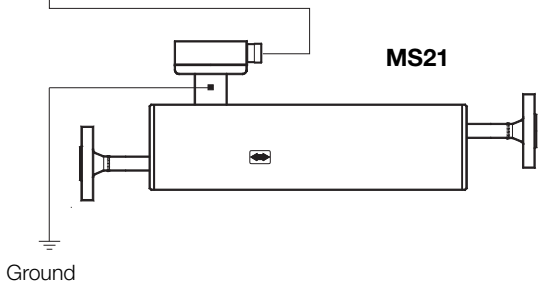












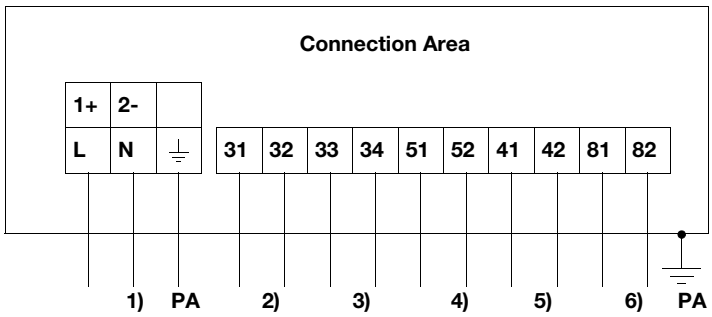
1) Supply Power
High voltage U_{AC} = 100 V ... 230 V, Terminals L, N, ⏚
Low voltage U_{AC} = 24 V, Frequency 50/60 Hz, Terminals: 1+, 2-
Low voltage U_{DC} = 24 V

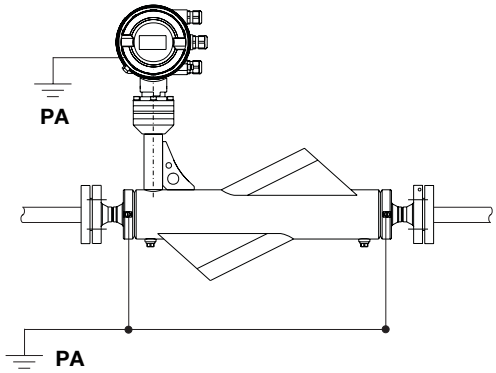
2a) PROFIBUS PA design according to IEC 61158-2 (Profile 3.0)
U = 9-32 V, I = 13 mA (normal operation)
I = 17 mA (in the event of error/FDE)
Terminals 97/98, PA+/PA-
Connection example via M12 plug see Fig. 26

2b) FOUNDATION Fieldbus according to IEC 61158-2
U = 9-32 V, I = 13 mA (normal operation)
I = 17 mA (in the event of error/FDE)
Terminals 97/98, PA+/PA-
Connection example via M12 plug see Fig. 26

Fig. 30: Interconnection Diagram

Interconnection Diagram: Ex-Design, ATEX, FM MC2





Modell FCM2000-MC27B/C

1) Supply Power
High voltage U_{AC} = 100 V ... 230 V, Terminals L, N, ⏚
Low voltage U_{AC} = 24 V, Frequency 50/60 Hz, Terminals: 1+, 2-
Low voltage U_{DC} = 24 V

2) Current Output 1, software selectable
Function: active
Terminals: 31, 32, 0/4–20 mA,
(0 Ω ≤ R_L ≤ 300 Ω)

3) Current Output 2, software selectable
Function: passive
Terminals: 33, 34, 4–20 mA, 0 Ω ≤ R_L ≤ 300 Ω
Source voltage: 12 ≤ Us ≤ 20 V

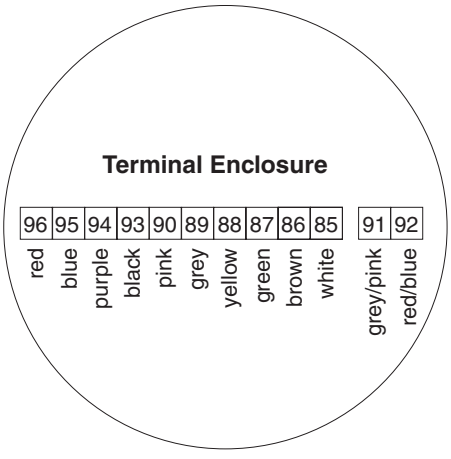
4) Pulse output, passive
Terminals: 51, 52
fmax: 5 kHz, pulse width 0.1 ms–2000 ms
Setting range: 0.001–1000 pulses/unit
0 V ≤ U_{CEL} ≤ 2 V, 16 V ≤ U_{CEH} ≤ 30 V
0 mA ≤ I_{CEH} ≤ 0.2 mA, 2 mA ≤ I_{CEL} ≤ 220 mA

5) Contact Output, passive
Terminals: 41, 42
0 V ≤ U_{CEL} ≤ 2 V, 16 V ≤ U_{CEH} ≤ 30 V
0 mA ≤ I_{CEH} ≤ 0.2 mA, 2 mA ≤ I_{CEL} ≤ 220 mA

6) Contact Input, passive
Terminals: 81, 82
„ON“ 16 V ≤ U_{KL} ≤ 30 V
„OFF“ 0 V ≤ U_{KL} ≤ 2 V
R_i = 2 kΩ

Specifications Ex “ib“/Ex “e“ for Model MC27B see Safety Specifications

Modell FCM2000-MC26B/C



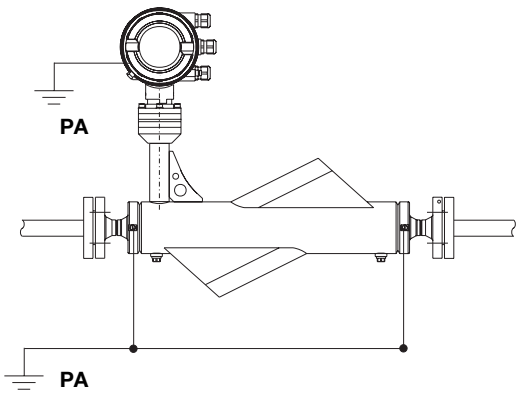


Fig. 31: Interconnection Diagram Ex-Design, ATEX, FM

Safety Specifications for the In- and Outputs, Model FCM2000-MC27B

<table>
<tr><td></td><td colspan="6">MC27B</td><td>MC27B</td></tr>
<tr><td>Current Output</td><td colspan="6">Intrinsically Safe EEx ib IIC/IIB</td><td>Non-intrinsically safe
U_T = 60 V</td></tr>
<tr><td rowspan="5">Current output
active
Terminals 31/32
Terminal 32 is to be connected to PA.</td><td colspan="6">U_O = 20 V</td><td rowspan="5">U_T = 30 V
I_T = 30 mA</td></tr>
<tr><td>I_O</td><td>P_O</td><td colspan="2">EEx ib IIC</td><td colspan="2">EEx ib IIB</td></tr>
<tr><td>[mA]</td><td>[mW]</td><td>C_O [nF]</td><td>L_O [mH]</td><td>C_O [nF]</td><td>L_O [mH]</td></tr>
<tr><td>100</td><td>500</td><td>217</td><td>3.8</td><td>1400</td><td>14.8</td></tr>
<tr><td colspan="6">Curve: linear
Internal capacitance C_I = 2.4 nF, internal inductance L_I = 0.17 mH
Only for connection to a passive, intrinsically safe circuit or intrinsically safe circuits with the following maximum values: U_I = 60 V</td></tr>
<tr><td>Current output
passive
Terminals 33/34
Terminal 34 is connected to PA.</td><td colspan="3">U_I = 30 V
I_I = 100 mA</td><td colspan="2">C_I = 2.4 nF
L_I = 0.17 mH</td><td>U_T = 30 V
I_T = 30 mA</td></tr>
<tr><td>Contact output
Terminals 41/42
Pulse output
Terminals 51/52</td><td colspan="3">U_I = 15 V
I_I = 30 mA
P_I = 115 mW</td><td colspan="2">C_I = 2.4 nF
L_I = 0.17 mH</td><td>U_T = 30 V
I_T = 220 mA</td></tr>
<tr><td>Contact input
passive
Terminals 81/82</td><td colspan="3">U_I = 30 V
I_I = 250 mA
P_I = 1.1 W</td><td colspan="2">C_I = 2.4 nF
L_I = 0.17 mH</td><td>U_T = 30 V
I_T = 10 mA</td></tr>
</table>

Special Requirements:
The output circuits are designed to be connected to either intrinsically safe or non-intrinsically safe circuits. A combination of intrinsically safe and non-intrinsically safe circuits is not permissible. For intrinsically safe current outputs Potential Equalization must exist along the entire circuit. The test voltage for non-intrinsically safe circuits is U_T = 60 V.

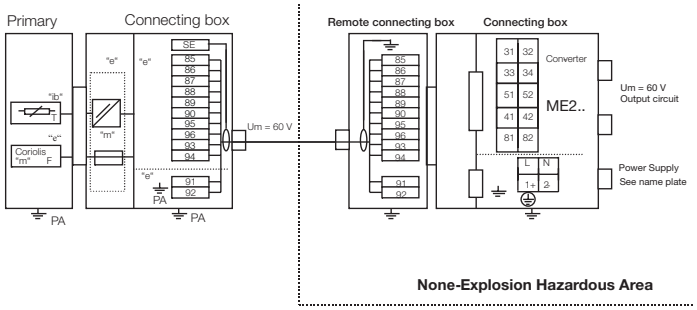
The contact output and pulse output can be configured internally (Terminals 41/42, 51/52) as NAMUR-Contacts for connection to a NAMUR-Amplifier.

The meters are shipped with the black cable connectors installed. If the signal outputs are connected to intrinsically safe circuits, it is recommended that the light blue cable connectors included with the shipment be installed for the corresponding cable entries.

Important:
If the ground wire PE in connection box of flowmeter is connected it has to be assured that no dangerous potential difference between the ground PE and potential balance can show up in the explosive area.

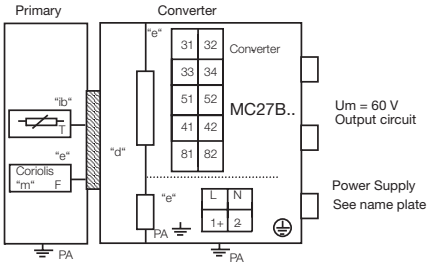
MC26B

II 2G EEx em [ib] IIC T6
II 1/2G EEx em [ib] IIC T6
II 2D T115°C...Tmed IP67



MC27B..

II 2G EEx emd [ib] IIC T6
II 1/2G EEx emd [ib] IIC T6
II 2D T115°C...Tmed IP67



Explosion Hazardous Area
Category 2G (Zone 1)

Isolation: MC26.., MC27..

Insulation: MC26.., MC27..

The pipeline and the flowmeter primary insulation should be installed as shown. The max. insulation thickness at the flowmeter primary is 100 mm.

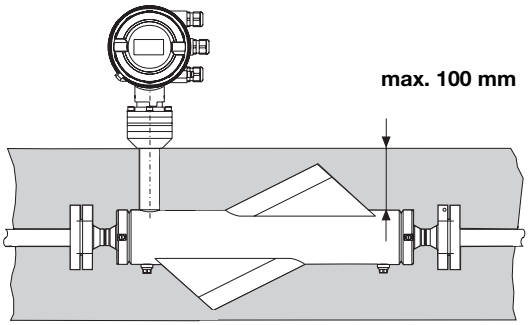
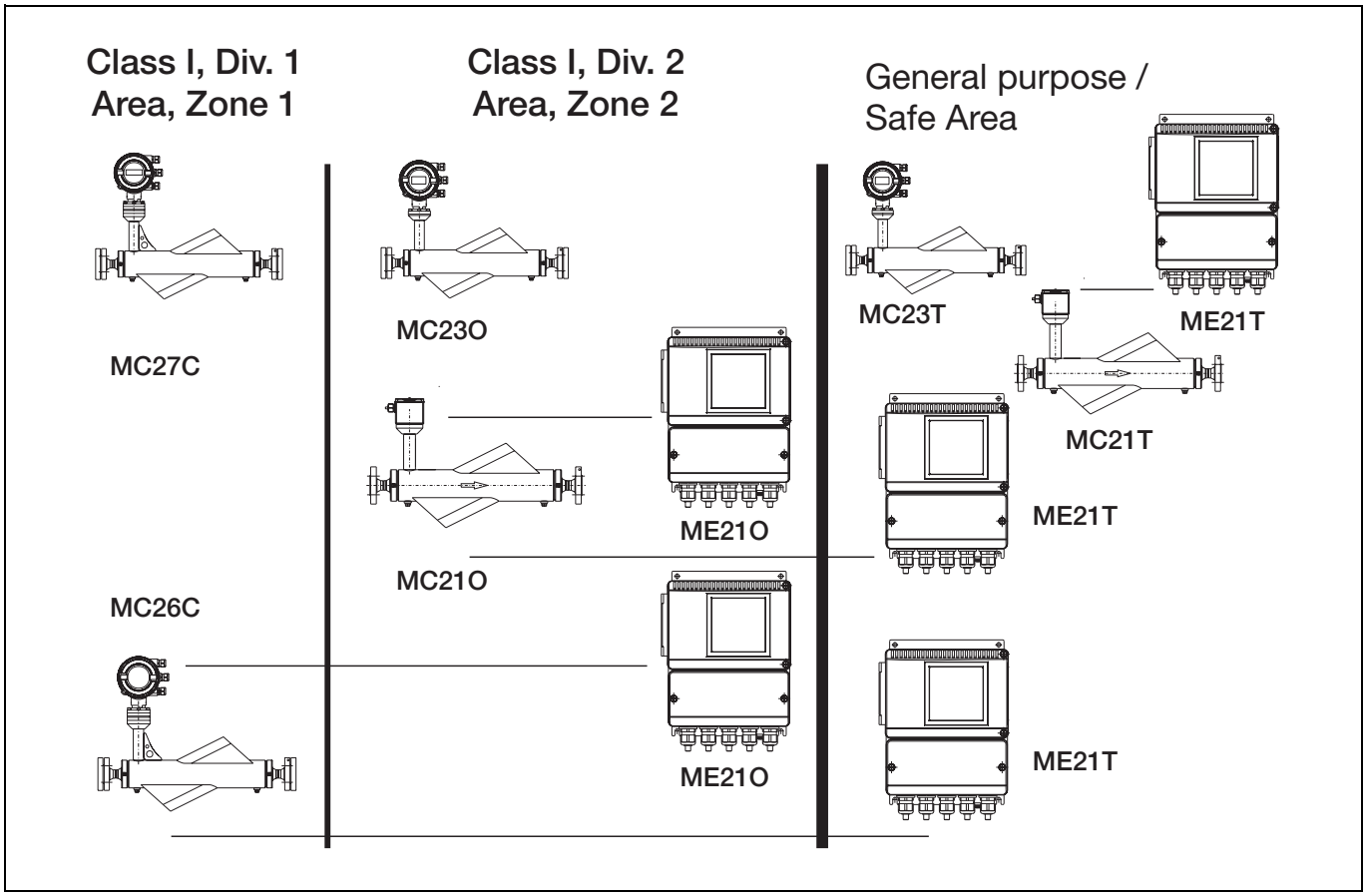
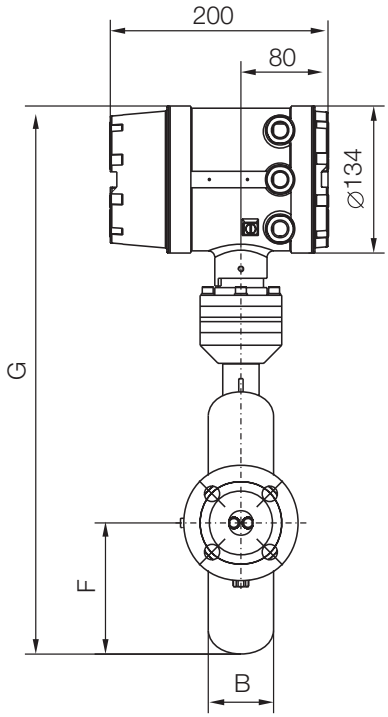


Fig. 32:

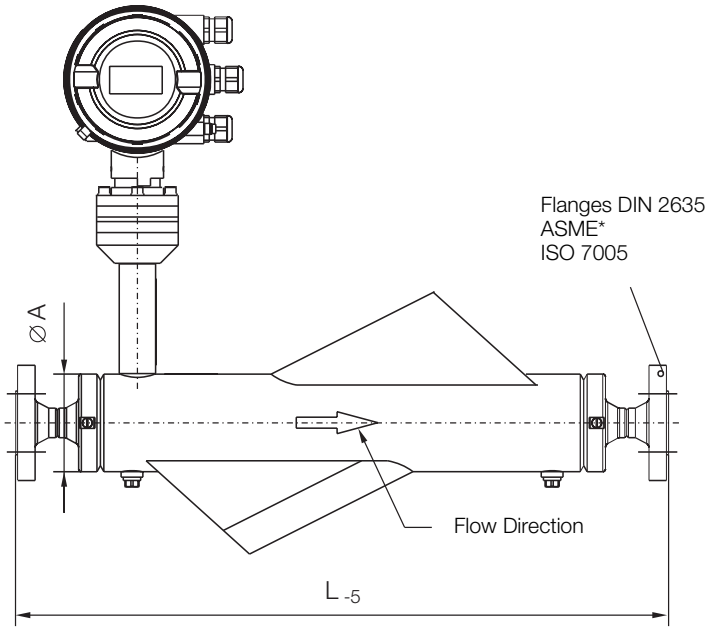
FM Installation Class I, Div.1/ Div.2 FCM2000



Dimensions Compact Design, Flanged Construction „E“ to „F“, DIN/ASME



FCM2000-MC23/MC27



						Process Conn's	L_{-5}						Weight appr. kg
Meter Size DN Size) Inch	A	F	B	G MC23	G MC27	DN	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	
20 („E“) 3/4	89	127	66	470	494	15 [1/2”]	693	705	705	708	718	730	16
						20 [3/4”]	598	–	–	618	628	645	16
						25 [1”]	698	735	735	728	738	753	17
25 („F“) 1	89	127	66	470	494	20 [3/4”]	758	–	–	778	788	802	17
						25 [1”]	658	693	693	688	698	710	17
						40 [1-1/2”]	808	840	840	838	855	868	20

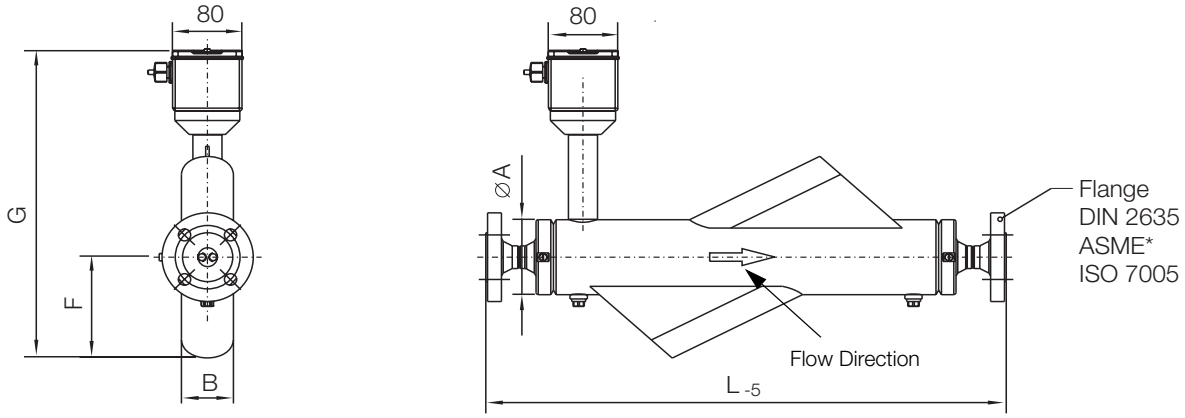
*** Connecting dimensions for flanges according to ASME B16.5 (ANSI)**

All dim´s in mm ISO Projection Method E

Fig. 33: Dimensions Compact Design, Flanged Construction „E“ to „F“, DIN/ASME

Dimensions, Remote Design, Flanged Construction „E“ to „F“, DIN/ASME

FCM2000-MC21



Meter Size DN	Size)	Inch	Process Conn's		L_{-5} DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	G	F	B	⌀ A	Weight [kg]
20	„E“	3/4	DN 15	[1/2“]	693	705	705	708	718	730	358	127	66	89	15
			DN 20	[3/4“]	598	–	–	618	628	645					15
			DN 25	[1“]	698	735	735	728	738	753					16
25	„F“	1	DN 20	[3/4“]	758	–	–	778	788	802	358	127	66	89	16
			DN 25	[1“]	658	693	693	688	698	710					16
			DN 40	[1-1/2“]	808	840	840	838	855	868					19

*** Connecting dimensions for flanges according to ASME B16.5 (ANSI)**

All dim´s in mm

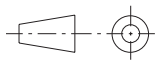
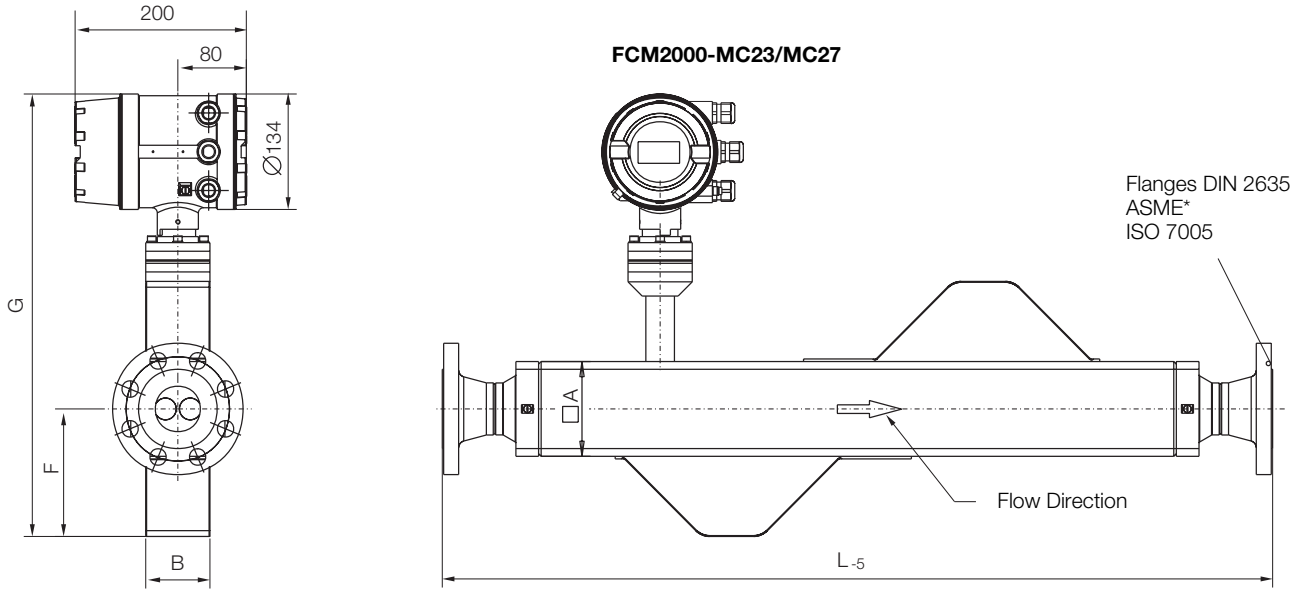


Fig. 34: Dimensions, Remote Design, Flanged Construction „E“ to „F“, DIN/ASME

Dimensions, Compact Design, Flanged Construction „G“ to „L“, DIN/ASME



						Process Conn's	L -5							Weight appr kg
Meter Size DN Size) Inch	A	F	B	G MC23	G MC27	DN	DIN 2633 PN 16	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL150	ASME CL300	ASME CL 600	
40 („G“) 1-1/2	90	129	64	486	511	25 [1”]		879	914	914	910	922	932	21
						40 [1-1/2”]		780	813	813	810	825	843	23
						50 [2”]		940	967	979	970	980	1001	24
50 („H“) 2	110	148	80	515	540	40 [1-1/2”]		1045	1078	1078	1075	1090	1108	33
						50 [2”]		940	967	979	970	980	1001	35
						65 [2-1/2”]		1100	1132	1148	1218	1228	1248	39
65 („I“) 2-1/2	130	164	97	541	566	50 [2”]		1220	1248	1259	1250	1260	1281	44
						65 [2-1/2”]		1100	1132	1148	1218	1228	1249	49
						80 [3”]		1220	1248	1260	1240	1260	1282	51
80 („J“) 3	140	186	108	568	593	65 [2-1/2”]		1330	1362	1378	1365	1375	1396	57
						80 [3”]		1220	1248	1260	1240	1260	1282	59
						100 [4”]	1450	1480	1494	1530	1500	1520	1568	70
100 („K“) 4	170	215	131	612	637	80 [3”]		1640	1668	1680	1660	1680	1702	85
						100 [4”]	1450	1480	1494	1530	1500	1520	1568	92
						150 (6“)	1736	1776	1816	–	1806	1826	–	
150 („L“) 6	250	285	190	725	750	150 [6”]	2000	2040	2080	–	2070	2090	–	240

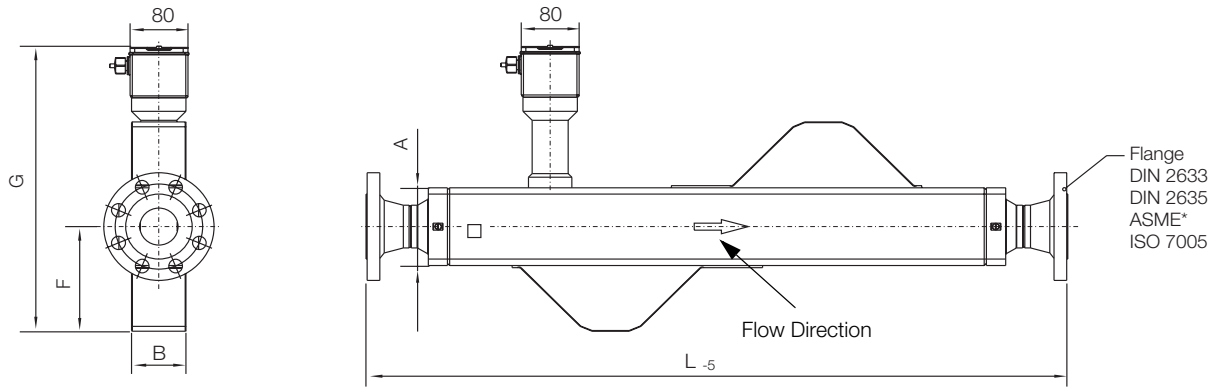
*** Connecting dimensions for flanges according to ASME B16.5 (ANSI)**

All dim´s in mm ISO Projection Method E

Fig. 35: Dimensions, Compact Design, Flanged Construction „G“ to „L“, DIN/ASME

Dimensions, Remote Design, Flanged Construction „G“ to „L“, DIN/ASME

FCM2000-MC21



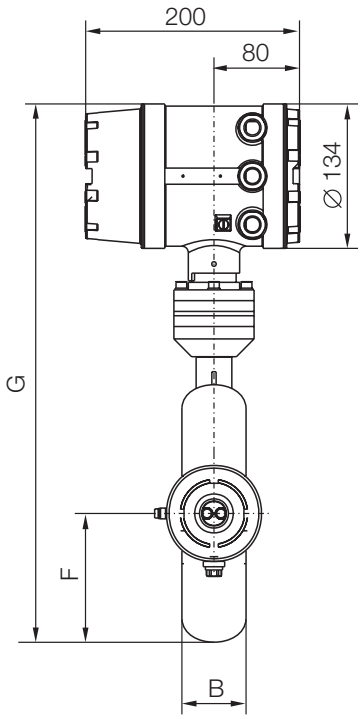
Meter Size DN	Size) Inch	Process Conn's		L -5 DIN 2633 PN 16	DIN 2635 PN 40	DIN 2636 PN 64	DIN 2637 PN 100	ASME CL 150	ASME CL 300	ASME CL 600	G	F	B	A	Weight [kg]
40	„G“ 1-1/2	DN 25	[1“]		879	914	914	910	922	932	374	129	64	90	20
		DN 40	[1-1/2“]		780	813	813	810	825	843					22
		DN 50	[2“]		940	967	979	970	980	1001					23
50	„H“ 2	DN 40	[1-1/2“]		1045	1078	1078	1075	1090	1108	403	148	80	110	32
		DN 50	[2“]		940	967	979	970	980	1001					34
		DN 65	[2-1/2“]		1100	1132	1148	1218	1228	1248					38
65	„I“ 2-1/2	DN 50	[2“]		1220	1248	1259	1250	1260	1281	429	164	97	130	43
		DN 65	[2-1/2“]		1100	1132	1148	1218	1228	1249					48
		DN 80	[3“]		1220	1248	1260	1240	1260	1282					50
80	„J“ 3	DN 65	[2-1/2“]		1330	1362	1378	1365	1375	1396	456	186	108	140	56
		DN 80	[3“]		1220	1248	1260	1240	1260	1282					58
		DN 100	[4“]	1450	1480	1494	1530	1500	1520	1568					69
100	„K“ 4	DN 80	[3“]		1640	1668	1680	1660	1680	1702	500	215	131	170	84
		DN 100	[4“]	1450	1480	1494	1530	1500	1520	1568					91
		DN 150	(6“)	1736	1776	1816	–	1806	1826	–					120
150	„L“ 6	DN 150	[6“]	2000	2040	2080	–	2070	2090	–	613	285	190	250	240

*** Connecting dimensions for flanges according to ASME B16.5 (ANSI)**

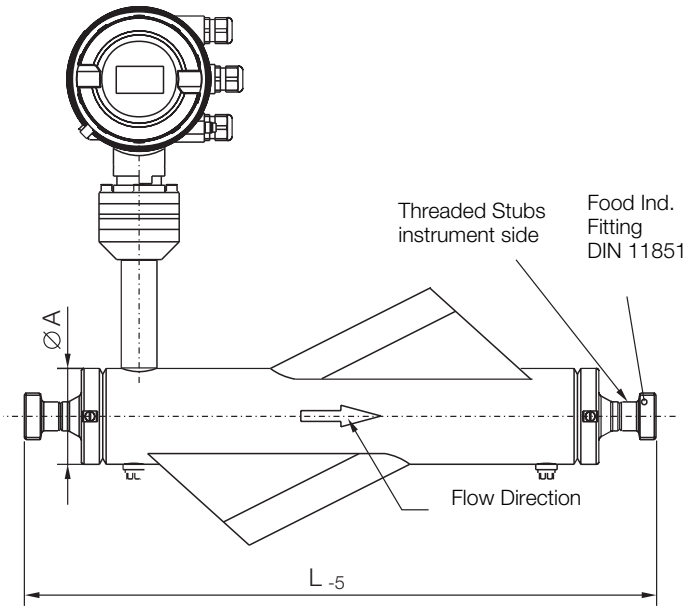
All dim´s in mm ISO Projection Method E

Fig. 36: Dimensions, Remote Design, Flanged Construction „G“ to „L“, DIN/ASME

Dimensions, Compact Design, Food Industry Fitting „E“ to „F“, DIN 11851



FCM2000-MC23/MC27



						Process Conn's	L -5	Weight ca. kg
DN (Size)	A	F	B	G (MC23)	G (MC27)	DN	DIN 11851	
20 („E“) [3/4”]	89	127	66	470	494	15	672	14
						20	583	
						25	683	
25 („F“) [1”]	89	127	66	470	494	20	743	15
						25	643	
						40	786	

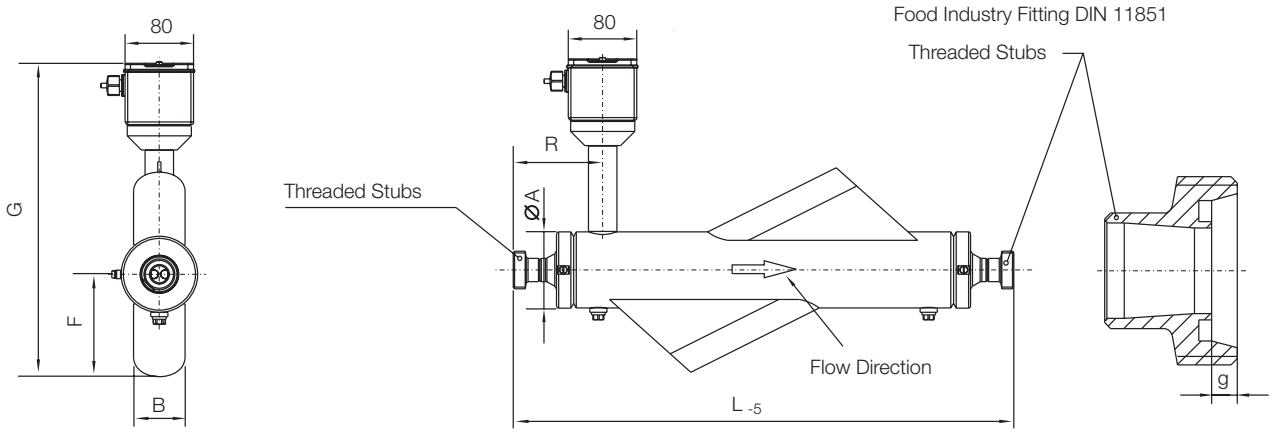
If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

All dim´s in mm ISO Projection Method E

Fig. 37: Dimensions, Compact Design, Food Industry Fitting „E“ to „F“, DIN 11851

Dimensions, Remote Design, Food Industry Fitting „E“ to „F“, DIN 11851

FCM2000-MC21



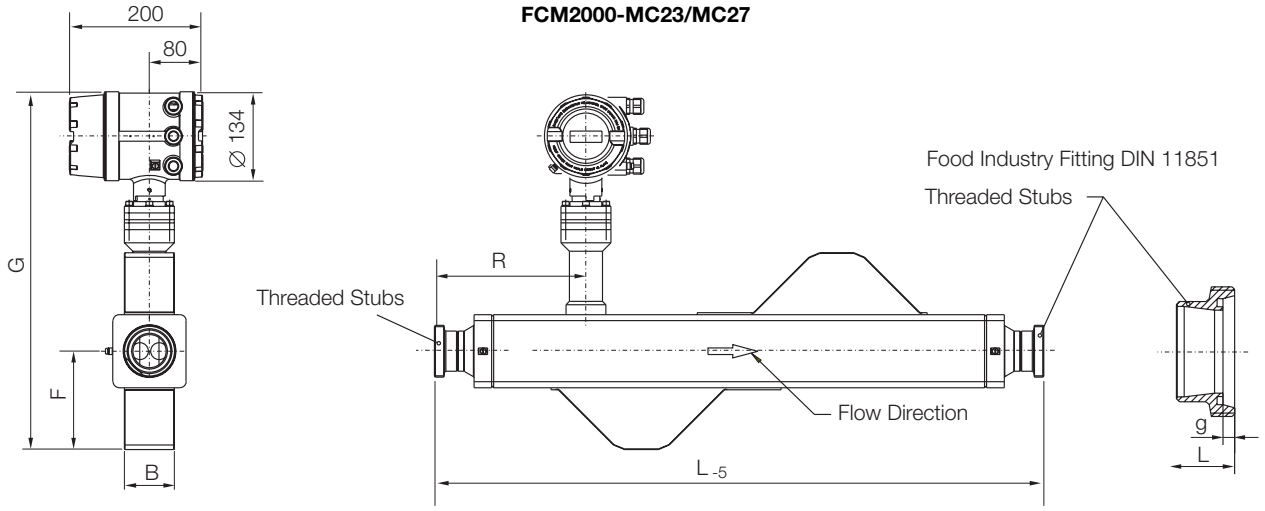
DN (Size)	Process Conn's	L -5	g	G	F	B	∅ A	R	Weight [kg]
20 („E“) [3/4”]	DN 15 / [1/2“] Rd 34 x 1/8	672	4	358	127	66	89	152	13
	DN 20 / [3/4“] Rd 44 x 1/6	583	6					102	
	DN 25 / [1“] Rd 52 x 1/6	683	7					152	
25 („F“) [1”]	DN 20 / [3/4“] Rd 44 x 1/6	743	6	358	127	66	89	162	14
	DN 25 / [1“ Rd 52 x 1/6	643	7					112	
	DN 40 / [1-1/2“] Rd 65 x 1/6	786	7					185	

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

All dim´s in mm ISO Projection Method E

Fig. 38: Dimensions, Remote Design, Food Industry Fitting „E“ to „F“, DIN 11851

Dimensions, Compact Design, Food Industry Fitting „G“ to „K“, DIN 11851



						Process Conn's					Weight appr. kg
DN (Size)	A	F	B	G (MC23)	G (MC27)	DN	L -5	g	M	R	
40 („G“) [1-1/2”]	90	129	64	486	511	25 [1”]	864	7	Rd 52 x 1/6	218	21
						40 [1-1/21/2”]	761	7	Rd 65 x 1/6	164	23
						50 [2”]	918	7	Rd 78 x 1/6	241	24
50 („H“) [2”]	110	148	80	515	540	40 [1-1/2”]	1025	7	Rd 65 x 1/6	233	33
						50 [2”]	918	7	Rd 78 x 1/6	177	35
						65 [2-1/2”]	1081	8	Rd 95 x 1/6	254	39
65 („I“) [2-1/2”]	130	164	97	541	566	50 [2”]	1197	7	Rd 78 x 1/6	291	44
						65 [2-1/2”]	1081	8	Rd 95 x 1/6	227	48
						80 [3”]	1200	8	Rd 110 x 1/4	281	51
80 („J“) [3”]	140	186	108	568	593	65 [2-1/2”]	1310	8	Rd 95 x 1/6	319	57
						80 [3”]	1200	8	Rd 110 x 1/4	258	59
						100 [4”]	1463	10	Rd 130 x 1/4	381	70
100 („K“) [4”]	170	215	131	612	637	80 [3”]	1618	8	Rd 110 x 1/4	401	85
						100 [4”]	1463	10	Rd 130 x 1/4	314	92

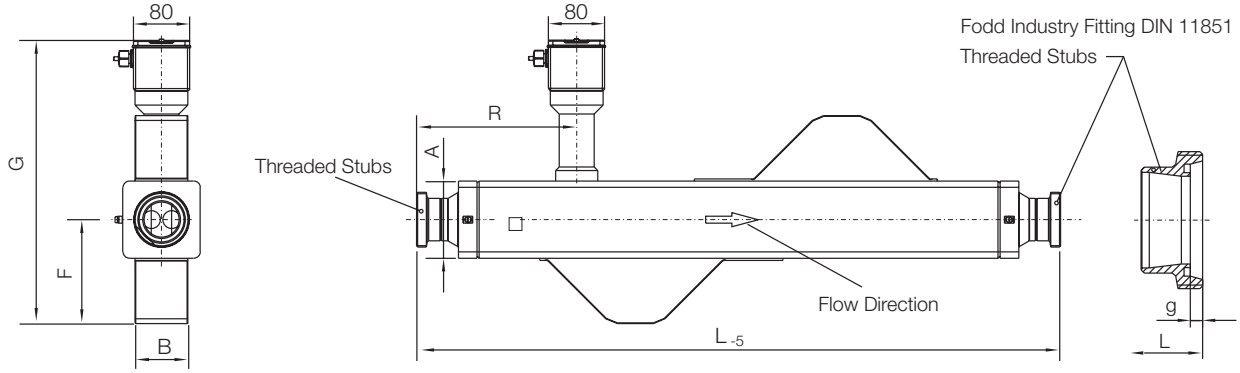
If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

All dim´s in mm ISO Projection Method E

Fig. 39: Dimensions, Compact Design, Food Industry Fitting „G“ to „K“, DIN 11851

Dimensions, Remote Design, Food Industry Fitting „G“ to „K“, DIN 11851

FCM2000-MC21



Meter Size DN („Size“) Inch	Process Conn’s	L -5	g	G	F	B	A	R	Weight [kg]
40 („G“) 1-1/2	DN 25 / [1“] Rd 52 x 1/6	864	7	374	129	64	90	218	16
	DN 40 / [1-1/2“] Rd 65 x 1/6	761	7					164	18
	DN 50 / [2“] Rd 78 x 1/6	918	7					241	19
50 („H“) 2	DN 40 / [1-1/2“] Rd 65 x 1/6	1025	7	403	148	80	110	233	28
	DN 50 / [2“] Rd 78 x 1/6	918	7					177	30
	DN 65 / [2-1/2“] Rd 95 x 1/6	1081	8					254	34
65 („I“) 2-1/2	DN 50 / [2“] Rd 78 x 1/6	1197	7	429	164	97	130	291	40
	DN 65 / [2-1/2“] Rd 95 x 1/6	1081	8					227	44
	DN 80 / [3“] Rd 110 x 1/4	1200	8					281	47
80 („J“) 3	DN 65 / [2-1/2“] Rd 95 x 1/6	1310	8	456	186	108	140	319	54
	DN 80 / [3“] Rd 110 x 1/4	1200	8					258	56
	DN 100 / [4“] Rd 130 x 1/4	1463	10					381	60
100 („K“) 4	DN 80 / [3“] Rd 110 x 1/4	1618	8	500	215	131	170	401	82
	DN 100 / [4“] Rd 130 x 1/4	1463	10					314	86

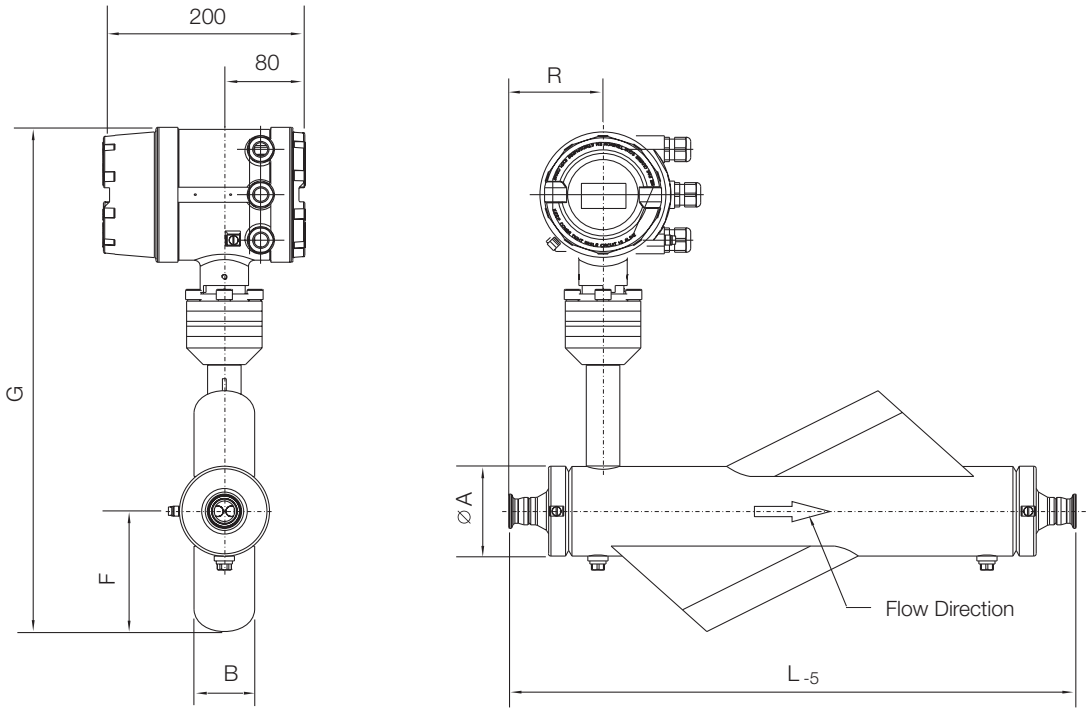
If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

All dim´s in mm ISO Projection Method E

Fig. 40: Dimensions, Remote Design, Food Industry Fitting „G“ to „K“, DIN 11851

Dimensions, Compact Design, Tri-Clamp DIN 32676 „E“ to „F“

FCM2000-MC23/MC27



Meter Size DN	(Size) Inch	A	F	B	G (MC23)	G (MC27)	Process Conn's DN	L -5	R	Weight appr kg
20	(„E“) 3/4	89	127	66	470	494	15	656	140	14
							20	561	92	
							25	661	142	
25	(„F“) 1	89	127	66	470	494	20	721	152	15
							25	621	102	
							40	773	180	

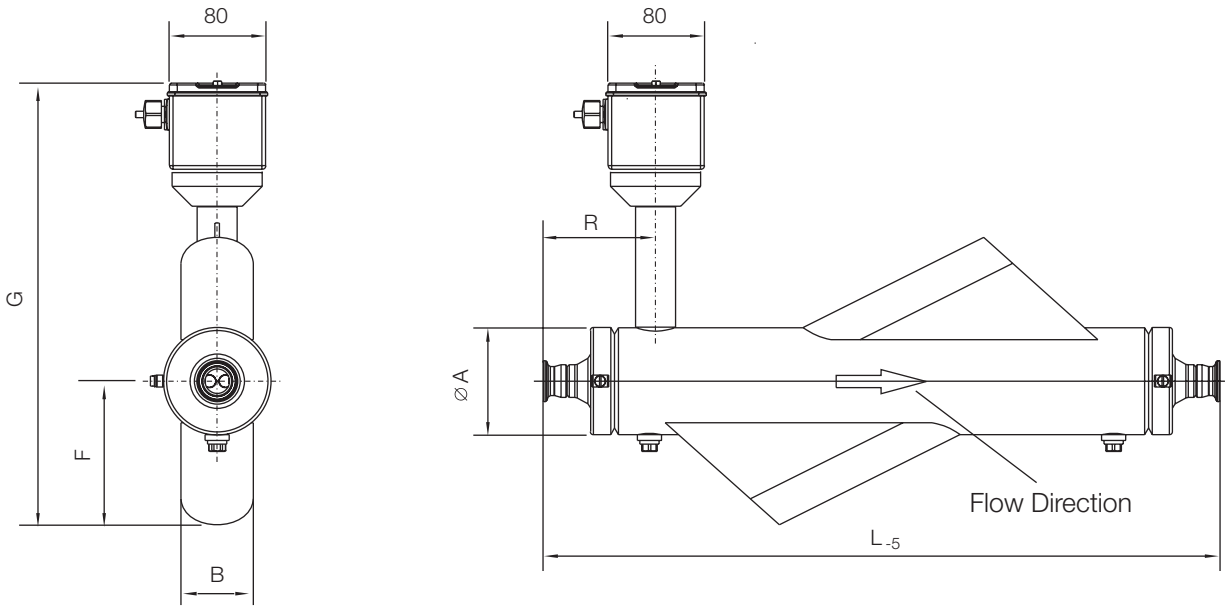
If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

All dim´s in mm ISO Projection Method E

Fig. 41: Dimensions, Compact Design, Tri-Clamp DIN 32676 „E“ to „F“

Dimensions, Remote Design, Tri-Clamp DIN 32676 „E“ to „F“

FCM2000-MC21



Meter Size DN	(Size) Inch	Process Conn's	L -5	G	F	B	Ø A	R	Weight [kg]
20	(„E“) 3/4	DN 15 DN 20 DIN 32676 DN 25	656 561 661	358	127	66	89	140 92 142	12
25	(„F“) 1	DN 20 DN 25 DIN 32676 DN 40	721 621 773	358	127	66	89	152 102 180	13

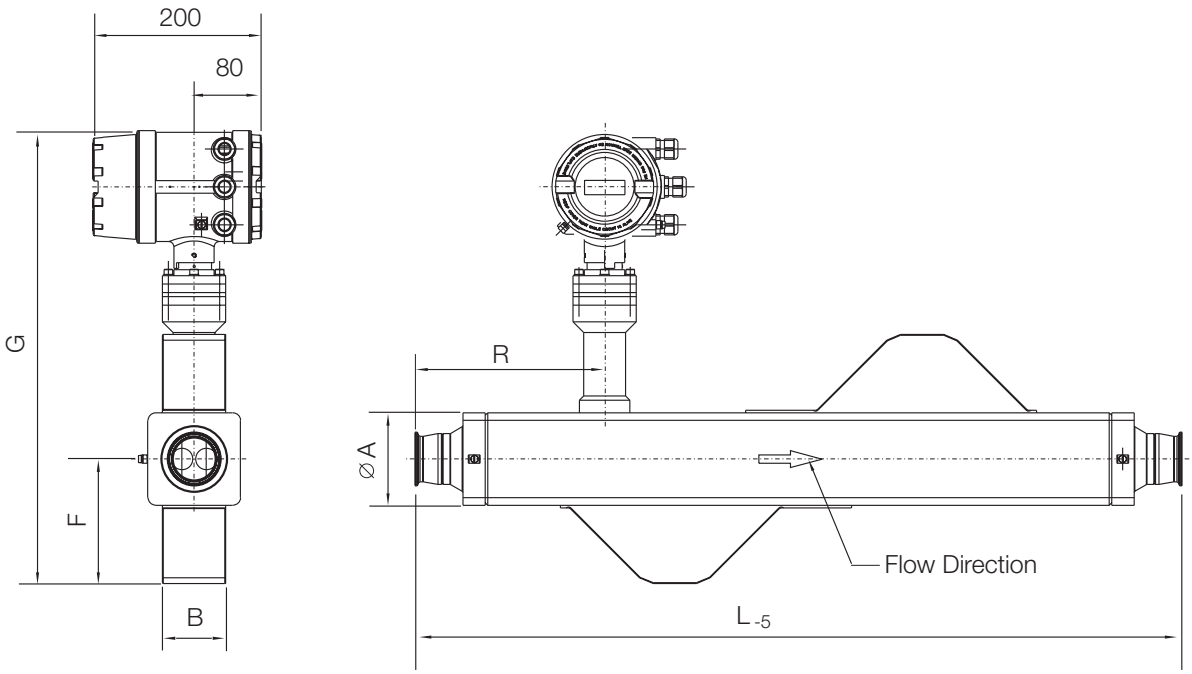
If this connection is supplied with an EHEDG-certified device, the device nominal sizes must correspond with the connection nominal sizes!

All dim´s in mm ISO Projection Method E

Fig. 42: Dimensions, Remote Design, Tri-Clamp DIN 32676 „E“ to „F“

Dimensions, Compact Design, Tri-Clamp DIN 32676 „G“ to „K“

FCM2000-MC23/MC27



Meter Size DN (Size) Inch	A	F	B	G (MC23)	G (MC27)	Process Conn's DN	L -5	R	Weight appr. kg
40 („G“) 1-1/2	90	129	64	486	511	25 [1”]	842	242	17
						40 [1-1/2”]	748	195	17
						50 [2”]	913	278	18
50 („H“) 2	110	148	80	515	540	40 [1-1/2”]	1012	275	27
						50 [2”]	913	225	26
						65 [2-1/2”]	1073	305	27
65 „I“) 2-1/2	130	164	97	541	566	50 [2”]	1192	335	36
						65 [2-1/2”]	1073	275	37
						80 [3”]	1180	328	38
80 („J“) 3	140	186	108	568	593	65 [2-1/2”]	1302	378	45
						80 [3”]	1180	296	44
						100 [4”]	1448	430	46
100 („K“) 4	170	215	131	612	637	80 [3”]	1598	440	71
						100 [4”]	1448	365	69

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

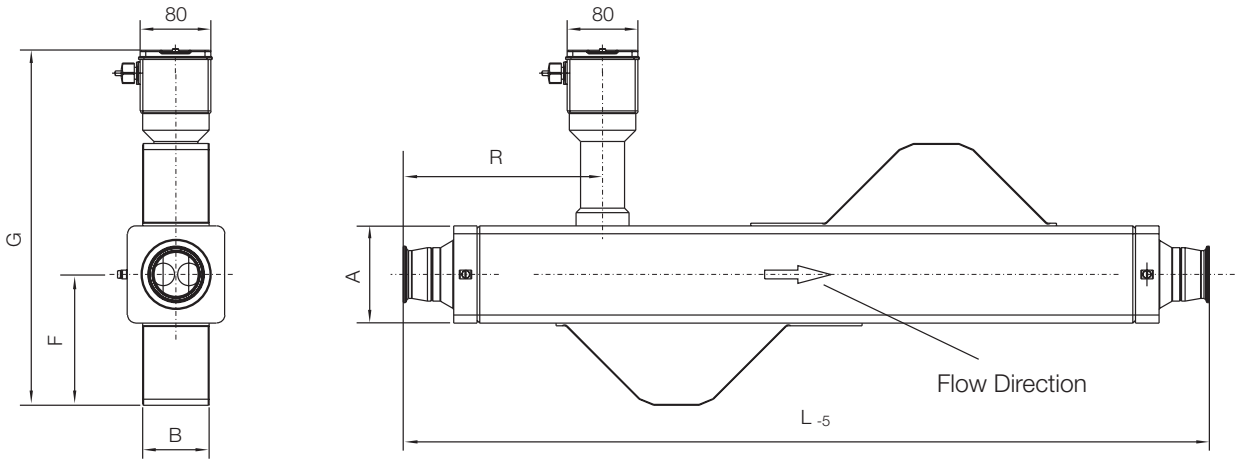
All dim´s in mm

ISO Projection Method E

Fig. 43: Dimensions, Compact Design, Tri-Clamp DIN 32676 „G“ to „K“

Dimensions, Remote Design, Tri-Clamp DIN 32676 „G“ to „K“

FCM2000-MC21



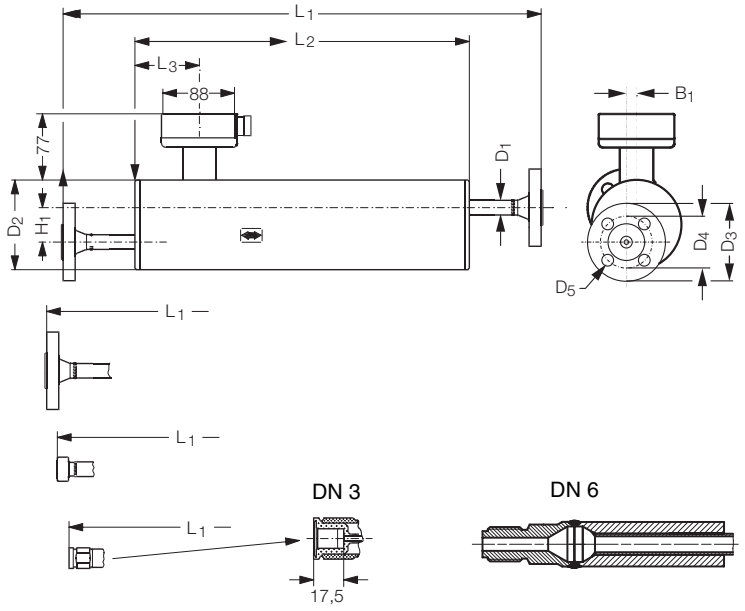
Meter Size DN (Size) Inch	Process Conn's	L -5 ± 3	G	F	B	A	R	Weight [kg]
	DN 25 [1“]	842					242	17
40 („G“) 1-1/2	DN 40 [1-1/2“]	748	374	129	64	90	195	17
	DN 50 [2“]	913					278	18
	DN 40 [1-1/2“]	1012					275	27
50 („H“) 2	DN 50 [2“]	913	403	148	80	110	225	26
	DN 65 [2-1/2“]	1073					305	27
	DN 50 [2“]	1192					335	36
65 „I“ 2-1/2	DN 65 [2-1/2“]	1073	429	164	97	130	275	37
	DN 80 [3“]	1180					328	38
	DN 65 [2-1/2“]	1302					378	45
80 („J“) 3	DN 80 [3“]	1180	456	186	108	140	296	44
	DN 100 [4“]	1448					430	46
100 („K“) 4)	DN 80 [3“]	1598	500	215	131	170	440	71
	DN 100 [4“]	1448					365	69

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

All dim´s in mm ISO Projection Method E

Fig. 44: Dimensions, Remote Design, Tri-Clamp DIN 32676 „G“ to „K“

Dimensions, Remote Design, MS21



Meter size DN	Connection			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm	Weight appr. kg
	Type	Pressure PN	Size											
3 [1/8“]	Threaded connection ISO 228/1-G 1/4	100	1/4“	400	280	75.0	60	0	21.3	104	–	–	–	4
	Threaded connection ANSI/ASME B 1.20.1 - 1/4“ NPT	100	1/4“	400	280	75.0	60	0	21.3	104				
6 [1/4“]	Flange DIN 2635	40	DN 10	560	390	62.0	40	12	17.0	104	90,0	60,0	140,	8
	Flange ANSI B 16.5	Class 150	1/2“	624	390	62.0	40	12	17.0	104	88,9	60,5	15,7	
	Screw connection DIN 11851	40	DN 10	532	390	62.0	40	12	17.0	104	–	–	–	
	Threaded connection ISO 228/1-G 1/4	100	1/4“	562	390	62,0	40	12	17,0	104	–	–	–	
	Screw connection ANSI/ASME B 1.20.1 - 1/4" NPT	100	1/4“	562	390	62,0	40	12	17,0	104	–	–	–	

Fig. 45: Dimensions, Remote Design, MS21 DN 3 [1/8“], DN 6 [1/4“]

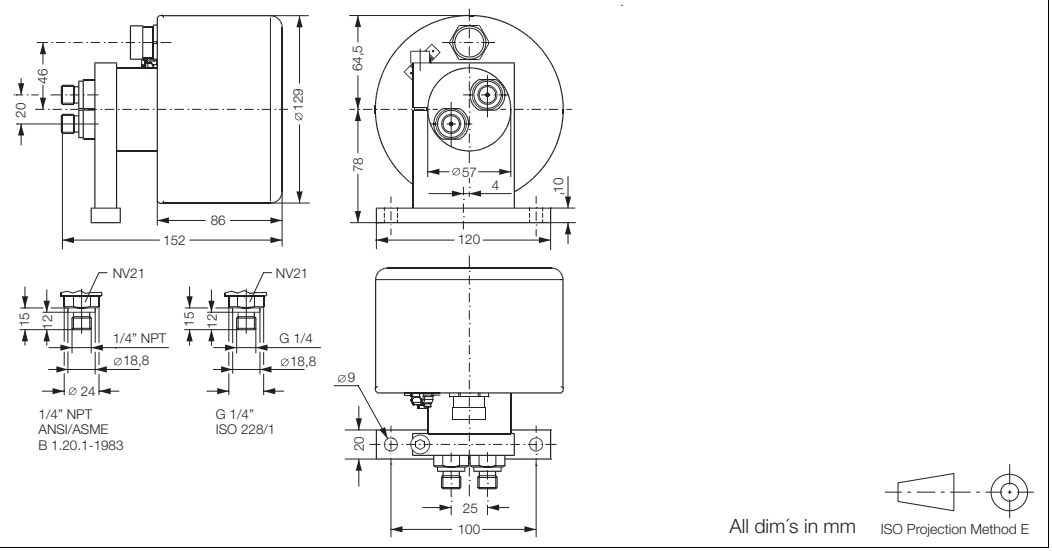


Fig. 46: Dimensions, Remote Design, MS21 DN 1.5 [1/16“]

Dimensions, Converter Field Mount Housing, Rectangular

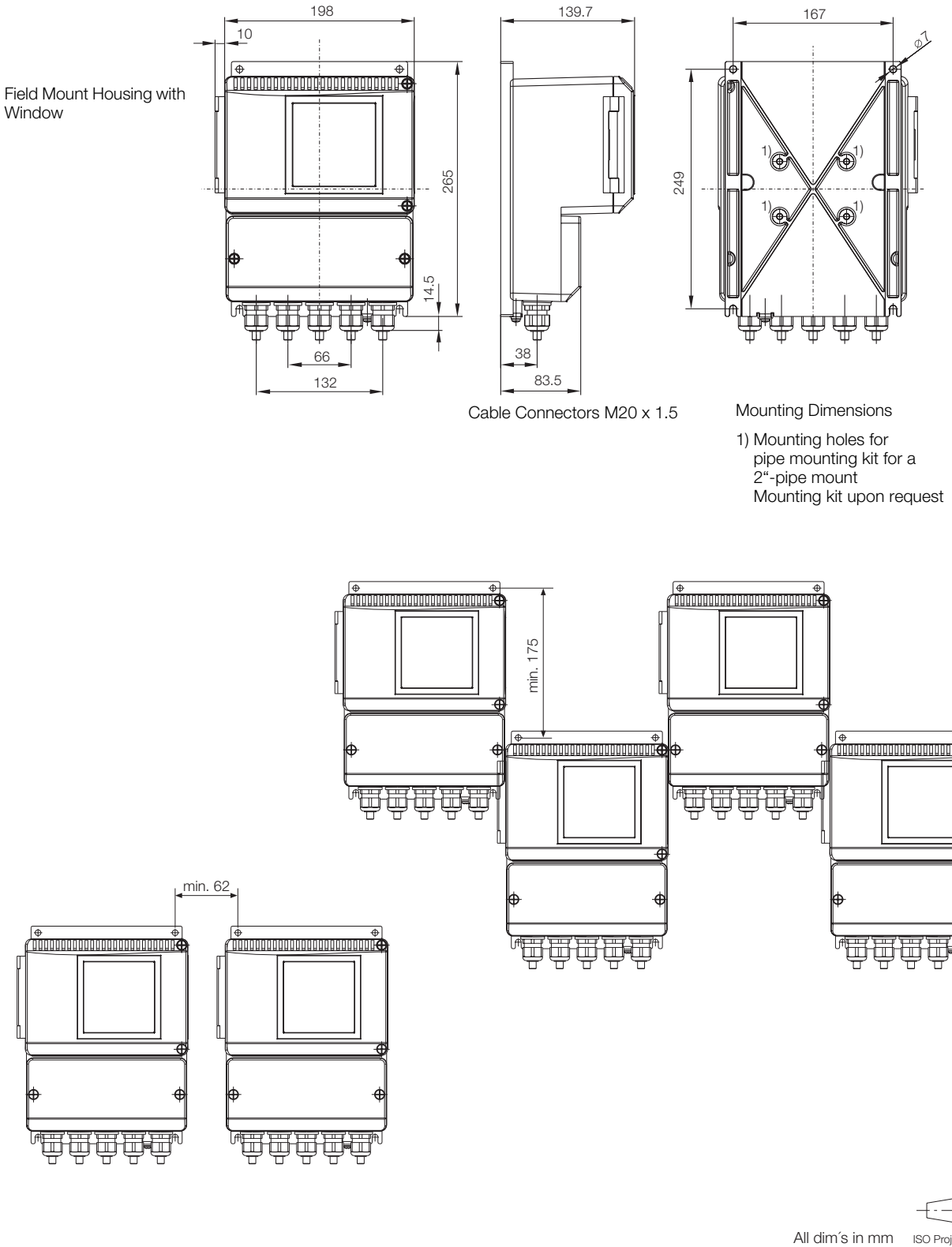


Fig. 47: Dimensions, Converter Field Mount Housing, Rectangular

Ordering information

Coriolis Mass Flowmeter Variant digit No.	1 - 4	5	6	7	8	9	10	11	12	13	14			
FCM2000-MC2 Catalog No.	**MC2-**													
Design														
Remote design		1												
Compact (Integral) design		3												
Ex, remote design, ATEX, FM Class I, Div. 1	3) 4)	6												
Ex, compact (Integral) design, ATEX, FM Class I, Div. 1		7												
Explosion Protection / Connection / Ambient Temperature														
none / connection M20 x 1.5 / Standard			A											
none / connection NPT 1/2 in. / Standard			T											
none / connection M20 x 1.5 / extended -40 ... 60 °C		1)	U											
none / connection NPT 1/2 in. / extended -40 ... 60 °C		1)	X											
ATEX / connection M20 x 1.5 / Standard		2)	B											
ATEX / connection M20 x 1.5 / extended -40 ... 60 °C		2)	E											
FM Class I, Div. 1, Zone 1 / connection NPT 1/2 in. / Standard		2)	C											
FM Class I, Div. 2, Zone 2 / connection NPT 1/2 in. / Standard			O											
FM Class I, Div. 1, Zone 1 / connection NPT 1/2 in. / extended -40 ... 60 °C		2)	Y											
FM Class I, Div. 2, Zone 2 / connection NPT 1/2 in. / extended -40 ... 60 °C		1)	V											
Certificate, material / pressure tests														
Standard				1										
EN 10204 3.1 B				2										
Material certificate 3.1.B + pressure test AD-2000				3										
Pressure test per AD-2000				4										
Certificate NACE material				5										
Certificate NACE + Pressure test				6										
Tube material														
CrNi 1.4571 / 316Ti (Stainless Steel)					1									
1.4435 (316L) EHEDG design	only with process connection DIN 11851 or Tri-Clamp and size "E" ... "J" (DN 20 ... DN 80, 3/4 ... 3 in.)				3									
Hastelloy C4 (2.4610)	only DIN PN 40 / ASME CL 150 and size "E" ... "K" (DN 20 ... DN 100, 3/4 ... 4 in.)				4									

Measuring range		**Max. measuring range**		**Size**	**Connection size**									
kg/min	**lbs./min**	**kg/min**	**lbs./min**											
0 ... 75	0 ... 165	0 ... 100	0 ... 220	"E"	DN 20	0.75 in.		E	2	0				
0 ... 125	0 ... 275	0 ... 160	0 ... 352	"F"	DN 25	1 in.		F	2	5				
0 ... 365	0 ... 803	0 ... 475	0 ... 1045	"G"	DN 40	1.5 in.		G	4	0				
0 ... 710	0 ... 1562	0 ... 920	0 ... 2024	"H"	DN 50	2 in.		H	5	0				
0 ... 1450	0 ... 3190	0 ... 1890	0 ... 4158	"I"	DN 65	2.5 in.		I	6	5				
0 ... 1890	0 ... 4158	0 ... 2460	0 ... 5412	"J"	DN 80	3 in.		J	8	0				
0 ... 3200	0 ... 7040	0 ... 4160	0 ... 9152	"K"	DN 100	4 in.		K	1	H				
0 ... 8500	0 ... 18700	0 ... 11000	0 ... 24200	"L"	DN 150	6 in.		L	1	F				
0 ... 75	0 ... 165	0 ... 100	0 ... 220	"E"	DN 15	0.5 in.		E	1	5				
0 ... 125	0 ... 275	0 ... 160	0 ... 352	"F"	DN 20	0.75 in.		F	2	0				
0 ... 365	0 ... 803	0 ... 475	0 ... 1045	"G"	DN 25	1 in.		G	2	5				
0 ... 710	0 ... 1562	0 ... 920	0 ... 2024	"H"	DN 40	1.5 in.		H	4	0				
0 ... 1450	0 ... 3190	0 ... 1890	0 ... 4158	"I"	DN 50	2 in.		I	5	0				
0 ... 1890	0 ... 4158	0 ... 2460	0 ... 5412	"J"	DN 65	2.5 in.		J	6	5				
0 ... 3200	0 ... 7040	0 ... 4160	0 ... 9152	"K"	DN 80	3 in.		K	8	0				
0 ... 75	0 ... 165	0 ... 100	0 ... 220	"E"	DN 25	1 in.		E	2	5				
0 ... 125	0 ... 275	0 ... 160	0 ... 352	"F"	DN 40	1.5 in.		F	4	0				
0 ... 365	0 ... 803	0 ... 475	0 ... 1045	"G"	DN 50	2 in.		G	5	0				
0 ... 710	0 ... 1562	0 ... 920	0 ... 2024	"H"	DN 65	2.5 in.		H	6	5				
0 ... 1450	0 ... 3190	0 ... 1890	0 ... 4158	"I"	DN 80	3 in.		I	8	0				
0 ... 1890	0 ... 4158	0 ... 2460	0 ... 5412	"J"	DN 100	4 in.		J	1	H				

1) only in combination with design code 3
2) only in combination with design code 7
3) with converter ME21 for non-hazardous area
4) FM in preparation

Continued on next page

Ordering information (continued)

Coriolis Mass Flowmeter Variant digit No.	1 - 4	12	13	14	15	16	17	18	19	20	21
FCM2000-MC2 Catalog No.	**MC2-**										
Process connection											
Flange DIN PN 16		D									
Flange DIN PN 40		F									
Flange DIN PN 100	5)	H									
Flange ASME CL 150		P									
Flange ASME CL 300		Q									
Flange ASME CL 600	6)	R									
Tri-Clamp acc. to DIN 32676	5)	U									
Pipe connection acc. to DIN 11851	5)	V									
Housing (primary)											
Standard			1								
Housing as secondary containment 40 bar (565 psi)	5)		2								
Heating / Cooling											
without				1							
Calibration											
Flow forward ± 0,40 % of flow rate / density (± 5 g/l)					A						
Flow forward ± 0,25 % of flow rate / density (± 5 g/l)					B						
Flow forward ± 0,15 % of flow rate / density (± 5 g/l)			5)		C						
Flow forward ± 0,40 % of flow rate / density (± 1 g/l)			5)		D						
Flow forward ± 0,25 % of flow rate / density (± 1 g/l)			5)		E						
Flow forward ± 0,15 % of flow rate / density (± 1 g/l)			5)		F						
Flow forward/reverse ± 0,40 % of flow rate / density (± 5 g/l)					G						
Flow forward/reverse ± 0,25 % of flow rate / density (± 5 g/l)					H						
Flow forward/reverse ± 0,15 % of flow rate / density (± 5 g/l)			5)		I						
Flow forward/reverse ± 0,40 % of flow rate / density (± 1 g/l)			5)		J						
Flow forward/reverse ± 0,25 % of flow rate / density (± 1 g/l)			5)		K						
Flow forward/reverse ± 0,15 % of flow rate / density (± 1 g/l)			5)		L						
Name plate / Documentation											
German						G					
English						E					
Design Level (specified by ABB)							A				
End of ordering information for remote design, continue only with compact design											
Operating mode / Software version											
Standard software (Mass and density measurement)								A			
Outputs additional to current output I (active), contact output (passive) and contact input (passive)											
Current output II (passive), pulse output (active) (Ex not possible)									A		
Current output II (passive), pulse output (passive)									B		
Current output I (passive) current output II (passive), pulse output (passive) (only with MC27) 7)									D		
Communication											
without										0	
HART protocol										1	
PROFIBUS PA										3	
FOUNDATION Fieldbus								7)		5	
PROFIBUS PA with M12 plug										7	
Power supply											
High voltage 85 ... 235 V AC											G
Low voltage 24 V AC/DC											K

Accessories														
Signal cable (10 m included in base price) Price per meter	D173D146U01													

5) not for size "L" (DN 150 / 6 in.)
6) not for size "L" (DN 150 / 6 in.). Size "K" (DN 100 / 4 in.) on request
7) in preparation

Ordering information

Coriolis Mass Flowmeter	Variant digit No.	1 - 4	5	6	7	8	9	10	11	12	13	14	15	16	17
FCM2000-MS2	Catalog No.	**MS2-**													
Design															
Remote design			1												
Application															
Standard				A											
Certificate															
Standard					1										
Tube material															
316L / 1.4435						3									
Measuring range	**[kg/h]**														
0 ... 65	DN 1.5						S								
0 ... 250	DN 3						T								
0 ... 1000	DN 6						U								
Temperature version															
max. 125 °C	(only DN 1.5)							1							
max. 180 °C	(DN 3 and DN 6)							2							
Process connection															
G 1/4 in. ISO 228-1, PN 100									A						
1/4 in. NPT, ANSI / ASME B 1.20.1, PN 100									B						
Flange DN 10, PN 40	(only DN 6)								C						
Flange 1/2 in., Class 150	(only DN 6)								I						
DN 10, DIN 11851, PN 40	(only DN 6)								M						
Construction															
Standard										1					
Heating / Cooling															
without											0				
Calibration															
0.40 % / 10 g/l	Forward flow											A			
0.25 % / 10 g/l	Forward flow											B			
0.15 % / 10 g/l	Forward flow											C			
0.40 % / 10 g/l	Forward / reverse flow											G			
0.25 % / 10 g/l	Forward / reverse flow											H			
0.15 % / 10 g/l	Forward / reverse flow											I			
Name plate															
German													G		
English													E		
Design Level	(specified by ABB)													*	
Signal cable	with plug at primary														
5 m															1
10 m															2
25 m															3
50 m															4

Ordering information

Coriolis Mass Flowmeter Variant digit No.	1 - 4	5	6	7	8	9	10	11	12			
FCM2000-ME2 Catalog No.	**ME2-**											
Design (converter)												
Remote design in combination with flowmeter primary MC21 or MC26		1										
Remote design in combination with flowmeter primary MS2, DN 1.5		2										
Remote design in combination with flowmeter primary MS2, DN 3 and DN 6		3										
Explosion Protection / Connection / Ambient Temperature												
none / connection M20 x 1.5 / Standard			A									
none / connection NPT 1/2 in. / Standard			T									
FM Class I, Div. 2, Zone 2 / connection NPT 1/2 in. / Standard			O									
Housing												
Field housing, rectangular				3								
Operating mode / Software version												
Standard software (Mass and density measurement)					A							
Outputs												
additional to current output I (active), contact output (passive) and contact input (passive)												
Current output II (passive), Pulse output (active) (Ex not possible)						A						
Current output II (passive), Pulse output (passive)						B						
Communication												
without							0					
HART protocol							1					
PROFIBUS PA							3					
FOUNDATION Fieldbus					1)		5					
PROFIBUS PA with M12 plug							7					
Power supply												
High voltage 85 ... 235 V AC								G				
Low voltage 24 V AC/DC								K				
Name plate												
German									G			
English									E			

1) in preparation

Questionnaire: Coriolis Mass Flowmeter FCM2000

Customer:	**Date:**	
Mr./Mrs./Ms.:	**Department:**	
Telephone:	**Telefax:**	
Fluid:	Liquid component:	Gas component:
Flowrate: (Min, Max, Operating)	kg/h	
Density: (Min, Max, Operating)	kg/m^3	
Dyn. Viscosity: (Min, Max, Operating)	mPas / cP	
Fluid Temperature: (Min, Max, Operating) **Ambient Temperature:**	°C °C	
Pressure: (Min, Max, Operating)	bar	
Flow:	☐ Steady	☐ Pulsating
Batch Operation:	☐ Yes	☐ No
Concentration Calculations:	☐ Yes	☐ No
Converter Design:	☐ Compact	☐ Remote
Ex-Protection:	☐ Yes	☐ No
Supply Power:	High voltage: ☐ 100 V to 240 V AC, 50/60 Hz	Low voltage: ☐ 24 V AC/DC, 50/60 Hz
Electrical Outputs:		Communication:
	☐ Current output 1: 0/4–20 mA	
	☐ Current output 2: 0/4–20 mA	
	☐ Pulse output, active	☐ HART
	☐ Pulse output, passive	
Additional Specifications:		
Pipeline diameter	. . . . . .mm . . . . . inch	
Process connections	. . . . .	

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