

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

4-wire compact device
For flow measurement of
liquids and gases



CoriolisMaster simply fits!

The ideal NAMUR Standard Device

Measurement of massflow and volumeflow, density, temperature and concentration with only one meter with minimal investment costs

Minimum installation space requirements due to compact design

Minimum lifetime costs

FCH300 for all hygienic applications – EHEDG-certified

Minimum pressure drop, no moving parts, no wear out

Self draining: no measuring media residues remain in the meter

Worldwide approvals for hazardous areas and hygienic applications

State of the art transmitter

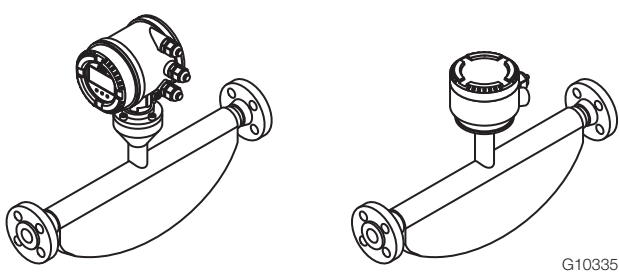
- Easy handling
- Data safety due to unique sensor memory concept
- Concentration measurement

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

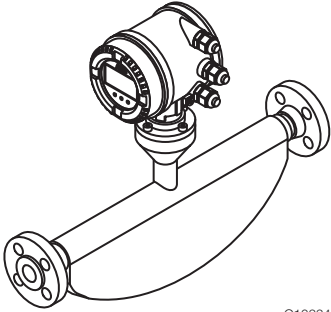
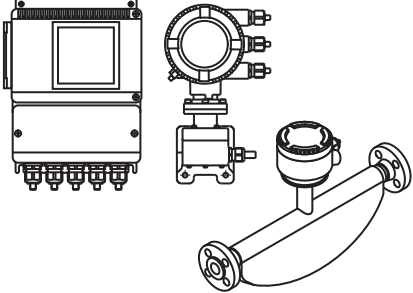
Overview of flowmeter sensor and transmitter designs

General remarks

FCB3xx and FCH3xx flowmeter sensor (integral mount design)				
		G10335		
Model number	FCB300 for standard applications		FCH300 for hygienic applications	
Process connections				
– Flange DIN 2501 / EN 1092-1	DN 10 ... 200, PN 40 ... 100	-		
– Flange ASME B16.5	DN 1/4" ... 8" PN CL150 ... CL600	-		
– Threaded pipe connection DIN 11851	DN 10 ... 100 (1/4" ... 4")	DN 15 ... 80 (1/2" ... 3")		
– Tri-Clamp	DIN 32676 (ISO 2852) BPE Tri-Clamp DN 10 ... 100 (1/4" ... 4")	DIN 32676 (ISO 2852) BPE Tri-Clamp DN 10 ... 100 (1/4" ... 4")		
– Other connections	On request	On request		
Wetted materials	Stainless steel Hasteloy C (optional)	Stainless steel, polished 1.4404 (AISI 316L) or 1.4435 (AISI 316L)		
Degree of protection acc. to EN 60529	IP 65 / 67, NEMA 4X	IP 65 / 67, NEMA 4X		
Approvals and certificates				
– Explosion protection ATEX / IECEx	Zone 0, 1, 2, 21, 22	Zone 0, 1, 2, 21, 22		
– Explosion protection cFMus	Class I Div. 1, Class I Div. 2, Zone 0, 1, 2, 20, 21	Class I Div. 1, Class I Div. 2, Zone 0, 1, 2, 20, 21		
– Explosion protection NEPSI	Zone 0, 1, 2, 21, 22	Zone 0, 1, 2, 21, 22		
– Hygienic and sterile requirements	-	EHEDG, FDA		
– Other approvals	On request			
Enclosure	Integral mount design, remote mount design			
Measuring accuracy for liquids	FCB330	FCB350	FCH330	FCH350
– Mass flow ¹⁾	0,4 % and 0,25 %	0,1 % and 0,15 %	0,4 % and 0,25 %	0,1 % and 0,15 %
– Volume flow ¹⁾	0,4 % and 0,25 %	0,15 %	0,4 % and 0,25 %	0,15 %
– Density	0,01 kg/l	– 0,002 kg/l – 0,001 kg/l (option) – 0,0005 kg/l ²⁾	0,01 kg/l	– 0,002 kg/l – 0,001 kg/l (option) – 0,0005 kg/l ²⁾
– Temperature	1 K	0,5 K	1 K	0,5 K
Measuring accuracy for gases ¹⁾	1 %	0,5 %	1 %	0,5 %
Permissible temperature of the medium being measured	-50 ... 160 °C (-58 ... 320 °F)	-50 ... 200 °C (-58 ... 392 °F)	-50 ... 160 °C (-58 ... 320 °F)	-50 ... 200 °C (-58 ... 392 °F)

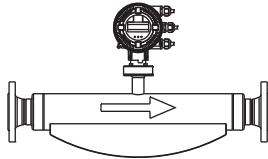
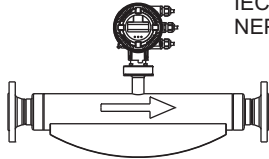
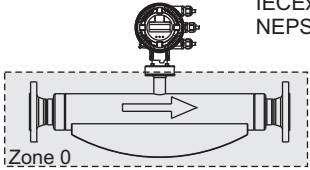
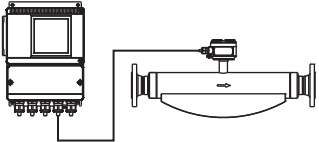
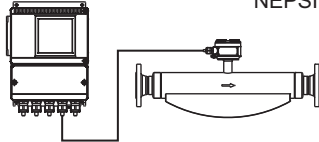
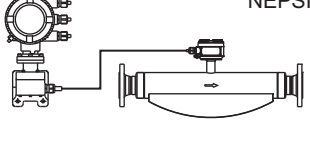
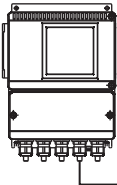
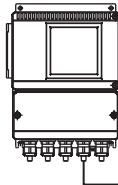
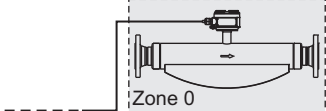
1) Stated measuring accuracy in % of rate (% o. r.)

2) Measuring accuracy following on-site calibration under operating conditions

		FCTxxx transmitter	
	 G10334	 G10846	
Enclosure	Integral mount design	Remote mount design	
Cable length	Maximum 10 m (33 ft), remote mount design only		
Power supply	100 ... 230 V AC, 24 V AC/DC		
Current output	Current output 1: 0/4 ... 20 mA active or 4 ... 20 mA passive Current output 2: 4 ... 20 mA passive		
Pulse output	Active (not Zone 1 / Div. 1) or passive		
External output zero return	Yes		
External totalizer reset	Yes		
Forward / reverse flow metering	Yes		
Communication	HART protocol		
Empty pipe detection	Yes, based on preconfigured density alarm < 0.5 kg/l		
Self-monitoring and diagnostics	Yes		
Local display / totalization	Yes		
Field optimization for flow and density	Yes		
Degree of protection acc. to EN 60529	Integral mount design: IP 65/IP 67, NEMA 4X Remote mount design: IP 67, NEMA 4X		

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

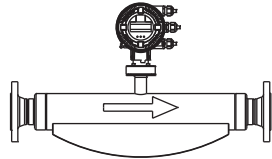
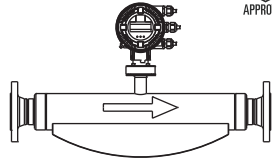
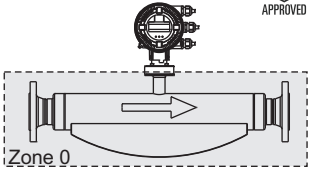
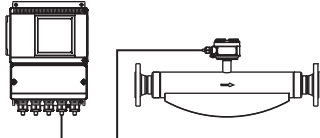
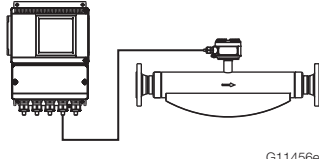
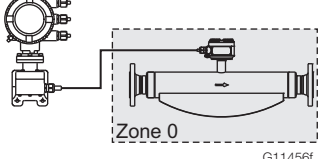
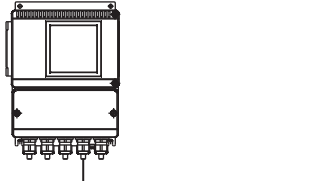
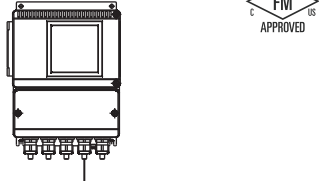
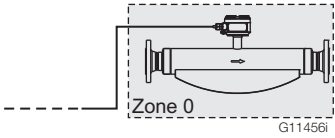
ATEX / IECEx device overview

	Standard / No explosion protection		Zone 2, 21, 22		Zone 1, 21 (Zone 0)	
Model number	FCx3xx Y0		FCx3xx A2, S2		FCx3xx A1, S1	
Integral mount design – Standard – Zone 2, 21, 22 – Zone 1, 21 – Zone 0	 G11455-01a		 ATEX IECEX NEPSI G11455-01b		 ATEX IECEX NEPSI Zone 0 G11455-01c	
Model number	FCT3xx Y0	FCx3xx Y0	FCT3xx A2	FCT3xx Y0	FCx3xx Y0	FCT3xx A2
Remote mount design Transmitter and flowmeter sensor – Standard – Zone 2, 21, 22 – Zone 1, 21 – Zone 0	 G11455-01d		 ATEX IECEX NEPSI G11455-01e		 ATEX IECEX NEPSI G11455-01f	
Model number	FCT3xx Y0		FCT3xx A2		FCx3xx A1, S1	
Remote mount design Transmitter – Standard – Zone 2, 21, 22 Flowmeter sensor – Zone 1, 21 – Zone 0	 G11455-01g		 ATEX IECEX NEPSI G11455-01h		 ATEX IECEX NEPSI Zone 0 G11455-01i	

IMPORTANT (NOTE)

Details can be found in chapter „Ex relevant specifications acc. to ATEX / IECEx / NEPSI“ or in the respective certificate.

cFMus device overview

	Standard / No explosion protection		Class I Div. 2 Zone 2, 21		Class I Div. 1 Zone 0, 1, 20, 21	
Model number	FCx3xx Y0		FCx3xx F2		FCx3xx F1	
Integral mount design — Standard — Class I Div. 2 — Class I Div. 1 — Zone 2, 21 — Zone 1, 21 — Zone 0, 20	 G11456a		 G11456b		 G11456c	
Model number	FCT3xx Y0	FCx3xx Y0	FCT3xx F2	FCT3xx Y0	FCx3xx Y0	FCT3xx F2
Remote mount design Transmitter and flowmeter sensor — Standard — Class I Div. 2 — Class I Div. 1 — Zone 2, 21 — Zone 1, 21 — Zone 0, 20	 G11456d		 G11456e		 G11456f	
Model number	FCT3xx Y0		FCT3xx F2		FCx3xx F1	
Remote mount design Transmitter — Standard — Class I Div. 2 — Zone 2, 21 Flowmeter sensor — Class I Div. 1 — Zone 1, 21 — Zone 0, 20	 G11456g		 G11456h		 G11456i	

IMPORTANT (NOTE)

Details can be found in chapter „Ex relevant specifications acc. to cFMus“ or in the respective certificate.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

General data

Device description

The CoriolisMaster FCB330, FCB350, FCH330, FCH350 is the most cost-effective and least complex ABB mass flowmeter featuring the new DSP transmitter.

The device is available in the integral mount design with internal transmitter and in the remote mount design with external transmitter.

The integral mount design reduces the time and effort spent on installation and wiring. Flowrate information can be viewed directly at the meter site and the meter can be installed in systems saving even more space than is currently possible.

The CoriolisMaster FCB330, FCB350, FCH330, FCH350 operates according to the Coriolis principle. The design offers the following benefits:

- Space-saving, rugged design
- Variety of process connection options
- Two separate current outputs for measuring mass or volume flow, density, or temperature, as well as one pulse output
- Digital input and output
- Communication via HART protocol
- 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 even after installation has been completed. The digital outputs can be configured as NAMUR outputs by the user

Transmitter with digital signal processor (DSP)

The transmitter for the CoriolisMaster FCB330, FCB350, FCH330, FCH350 incorporates a digital signal processor (DSP) that enables high-precision mass flow and density measurements to be taken. 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 CoriolisMaster FCB330, FCB350, FCH330, FCH350 transmitter is particularly well suited for use in the following cases:

- Whenever mass flowrate is to be metered with maximum accuracy
- Whenever the density of the medium being measured is being determined
- Whenever the components of a recipe being mixed
- When metering non-conductive media or highly viscous, solid-loaded liquids, for example
- In batch filling processes

Installation instructions

Installation requirements/System sizing information

The CoriolisMaster FCB330, FCB350, FCH330, FCH350 is suitable for both indoor and outdoor installations. The standard device has an IP 67 enclosure. The flowmeter sensor is bidirectional and can be installed in any mounting position. It is important to ensure that the meter pipes are always completely filled with fluid. The material resistance of all wetted parts must be clarified.

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).
- The presence of gas bubbles in the meter tube increases the likelihood of erroneous measurements, particularly when measuring density. Therefore, the 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 of the flowmeter sensor should be avoided to prevent the meter tube from draining.
- Once the flowmeter has been installed, check that it is not subject to mechanical tension.
- Check that the flowmeter sensor does not come into contact with other objects. Do not attach the flowmeter sensor to the enclosure.

- Make sure that any gases dissolved in the medium do not outgas and that the meter tubes are always completely full. To safeguard this, a minimum back pressure of 0.2 bar (2.9 psi) is recommended.
- In case of gas measurements ensure that the gases are dry and do not contain liquids.
- Make sure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or when liquids with a low boiling point are being processed.
- Do not install the flowmeter sensor in the vicinity of strong electromagnetic fields (e.g., pumps, motors, transformers, etc.).
- Make sure that there is no risk of cross talk between multiple flowmeter sensors. To prevent cross talk, the flowmeter sensors should be spaced distant from one other or the pipelines between them should be decoupled.

Supports

In order to support the weight of the flowmeter sensor and to ensure reliable measurements when adverse external effects exist (gas bubbles in the medium, for example), the flowmeter sensor should be installed in a rigid pipeline.

Two supports or hangers should be installed symmetrically and with zero tension in the direct vicinity of the 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 side
- In vertical installations at the inlet side

If possible, shut-off devices should be installed both upstream and downstream of the sensor.

Inlet sections

The flowmeter sensor does not require any inlet sections.

Make sure that any valves, gates, sight glasses, etc., in the vicinity of the flowmeter sensor do not cavitate and are not set in vibration by the flowmeter sensor.

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Model in remote mount design

Make sure that the flowmeter sensor and transmitter are assigned correctly. Compatible devices have the same end numbers, e. g., X001 and Y001 or X002 and Y002, on the name plate.

Pressure loss

Pressure loss is determined by the properties of the medium and the flow.

Documents to help you to calculate pressure loss can be downloaded from www.abb.com/flow.

Mounting positions

The flowmeter operates in any mounting position. The ideal installation position is vertical with flow from bottom to top.

IMPORTANT (NOTE)

EHEDG certification requires a self draining installation, only possible with a vertical installation.

Vertical installation in riser

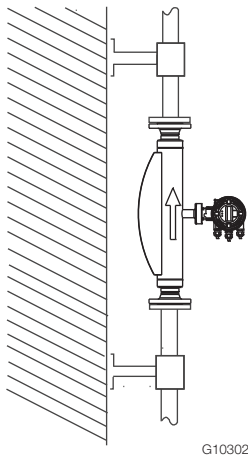


Fig. 1: Vertical installation, self-draining

Vertical installation in a drop line

Make sure that the flowmeter sensor is always completely full while measurements are being taken.

A pipeline reduction or an orifice must also be installed underneath the flowmeter sensor. The cross-section of the pipeline reduction or orifice must be smaller than the cross-section of the pipeline in order to prevent the flowmeter sensor from running dry while measurements are being taken.

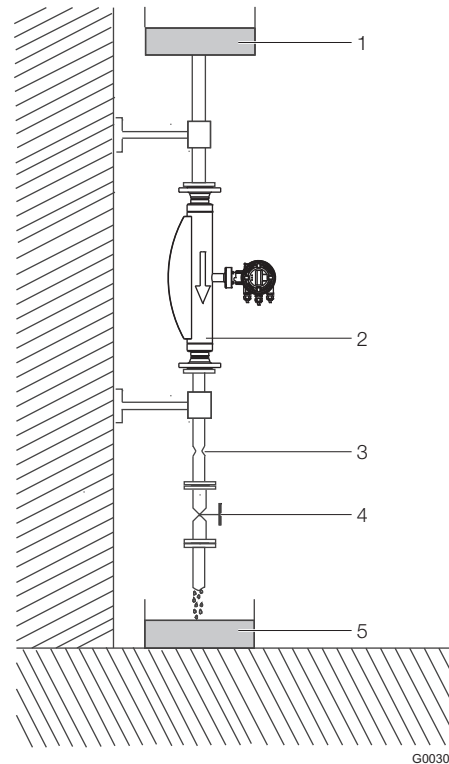


Fig. 2: Vertical installation in a drop line

1 Supply reservoir | 2 Flowmeter sensor |
3 Orifice or pipe constriction | 4 Valve | 5 Product reservoir

Horizontal installation in case of measurement of liquids

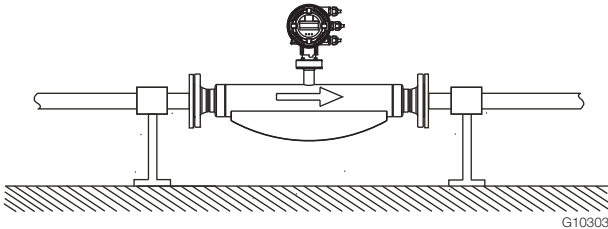


Fig. 3: Horizontal installation (liquids)

Horizontal installation in case of measurement of gases

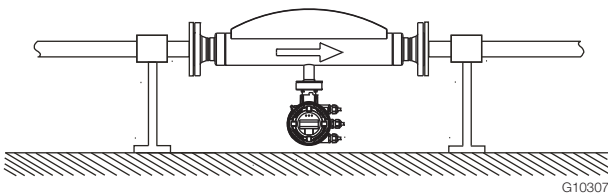


Abb. 4: Horizontal installation (gases)

In case of measurement of gases ensure that the transmitter housing or the terminal box pointing downwards.

Difficult installation locations for liquid measurement

The accumulation of air or gas bubbles in the meter tube will lead to increased inaccuracies.

Avoid the following installation locations in case of liquid measurement:

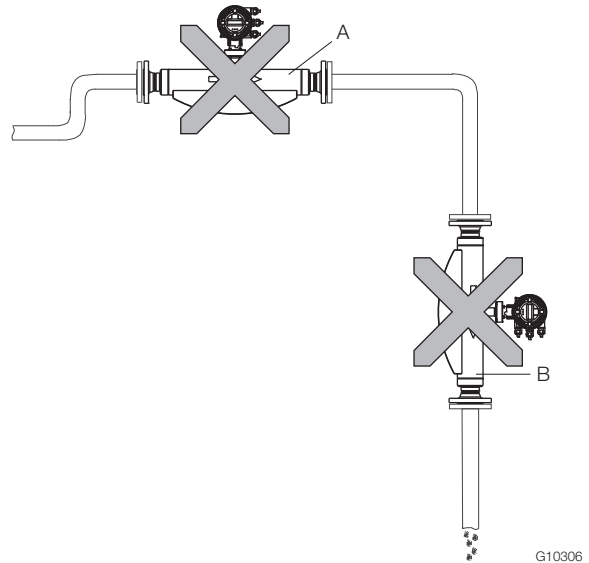


Fig. 5: Difficult installation locations

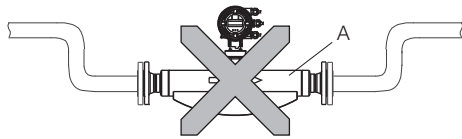
- "A": Installing the flowmeter sensor at the highest point of a pipeline leads to increased inaccuracies due to the accumulation of air or gas bubbles in the meter tube.
- "B": Installing the flowmeter sensor in a drop line means that there is no guarantee that the meter tube will be completely full while measurements are being taken and leads to increased inaccuracies.

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Difficult installation locations and gas metering

When metering gas, the accumulation of fluid or the formation of condensate in the meter tube will lead to increased inaccuracies.

Avoid the following installation locations when metering gas:



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Fig. 6: Difficult installation locations

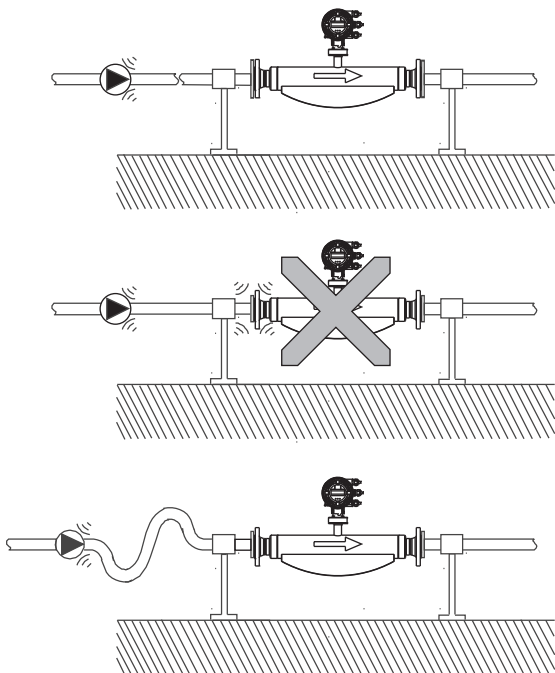
- "A": Installing the flowmeter sensor at the lowest point of a pipeline leads to increased inaccuracies due to the accumulation of fluid or the formation of condensate in the meter tube.

Installation in the vicinity of pumps

Strong vibrations in the pipeline must be damped using flexible damping devices.

The damping devices must be installed beyond the supported flowmeter section and outside of the section between the shut-off devices.

Do not connect flexible damping devices directly to the flowmeter sensor.



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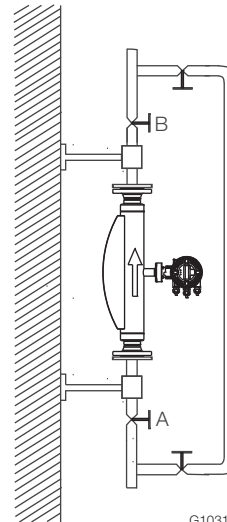
Fig. 7: Vibration damping

Zero balance

Before adjusting the zero under operating conditions, make sure that:

- The meter tube is completely full
- There are no gas bubbles or air in the meter tube (in case of liquid measurements)
- There are no condensates in the meter tube (in case of gas measurements)
- The pressure and temperature in the meter tube are appropriate for normal operating conditions

We recommend installing a bypass line to ensure that these conditions are met. Installing a bypass line means that adjustment can take place while the process is ongoing.



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Fig. 8: Bypass line

Installation dependent on the temperature of the medium being measured

The mounting position of the flowmeter sensor is determined by the temperature of the medium being measured T_{medium} . Be aware of the following mounting options!

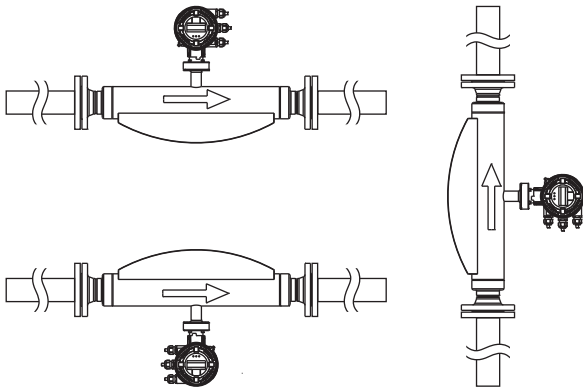


Fig. 9: Installation at $T_{\text{medium}} -50^{\circ} \dots 120^{\circ} \text{C}$ (-58 ... 248 °F)

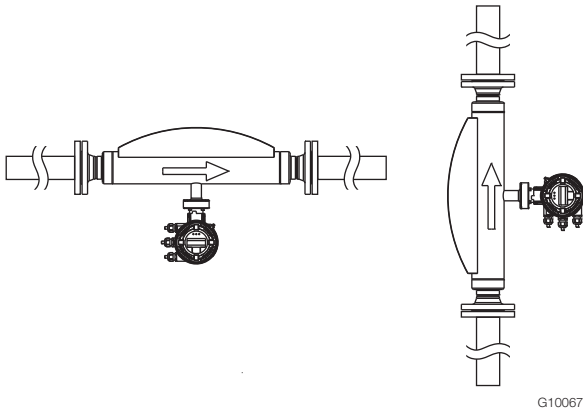


Fig. 10: Installation at $T_{\text{medium}} -50^{\circ} \dots 200^{\circ} \text{C}$ (-58 ... 392 °F)

Installation with option TE1 "extended tower length"

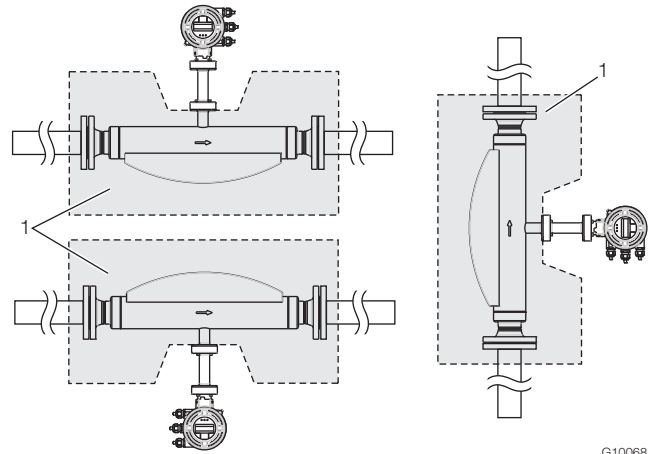


Fig. 11: Installation at $T_{\text{medium}} -50^{\circ} \dots 200^{\circ} \text{C}$ (-58 ... 392 °F)
1 Insulation

With option TE1 "extended tower length", the flowmeter sensor may be insulated as shown in Fig. 11.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Flowmeter sensor

Designs

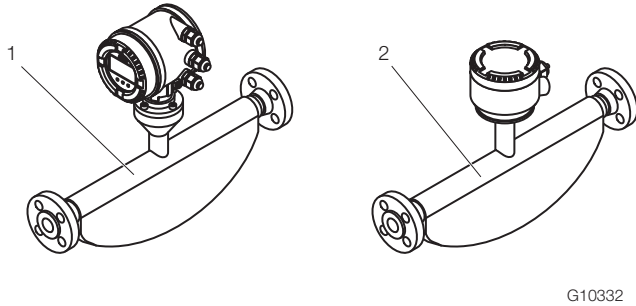


Fig. 12: FCB300 flowmeter sensor

- 1 Integral mount design |
2 Remote mount design (without transmitter)

Nominal diameter and measuring range

Nominal diameter	Q _{max} in kg/h (lb/h)
DN 15 (1/2")	0 ... 8,000 (0 ... 17,637)
DN 25 (1")	0 ... 35,000 (0 ... 77,162)
DN 50 (2")	0 ... 90,000 (0 ... 198,416)
DN 80 (3")	0 ... 250,000 (0 ... 551,156)
DN 100 (4")	0 ... 520,000 (0 ... 1,146,404)
DN 150 (6")	0 ... 860,000 (0 ... 1,895,975)

Recommended flow range

Fluids:

- The recommended flow range is 5 ... 100 % of Q_{max}.
- Flows < 1 % of Q_{max} should be avoided.

Gases:

- The flow velocity of gases in the meter tube should not exceed 0.3 Mach (approx. 100 m/s (328 ft/s)).
- Flow velocities above 80m/s may lead to increased reproducibility values.
- The maximum flow range of gases is determined by the operating density. Dimensioning guidelines are available at www.abb.com/flow.

Measuring accuracy

Reference conditions

Calibration fluid	Water <ul style="list-style-type: none"> — Temperature: 25 °C (77 °F) ±5 K — Pressure: 2 ... 4 bar (29 ... 58 psi)
Ambient temperature	25 °C (77 °F) +10 K / -5 K
Power supply	Line voltage according to name plate U _N ±1 %
Warm-up phase	30 minutes
Installation	<ul style="list-style-type: none"> — Installation according to chapter titled "Installation instructions" and "Mounting positions" — No visible gas phase — No external mechanical or hydraulic disturbances, particularly cavitation
Output calibration	Pulse output
Effect of the analog output on measuring accuracy	As pulse output ±0.1 % of measurement

Measured error

The measured error is calculated as follows for the flow:

Scenario 1:

If

$$\text{Flow} \geq \frac{\text{Zero stability}}{(\text{base accuracy} / 100)}$$

Then:

- Maximum measured error:
± base accuracy as % of measured value
- Reproducibility:
± 1/2 x base accuracy as % of measured value

Scenario 2:

If

$$\text{Flow} < \frac{\text{Zero stability}}{(\text{base accuracy} / 100)}$$

Then:

- Maximum measured error:
± (zero stability / measured value) x 100 % of measured value
- Reproducibility:
± 1/2 x (zero stability / measured value) x 100% of measured value

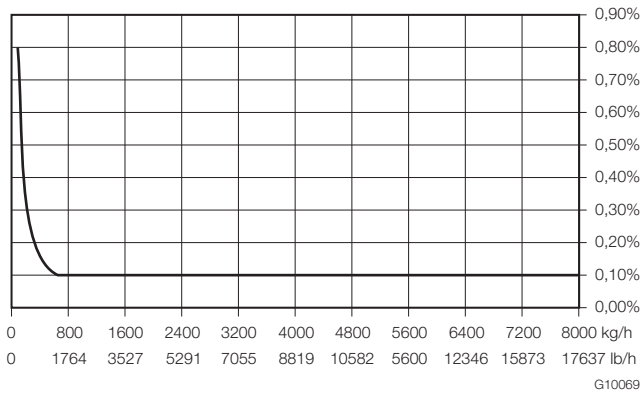


Fig. 13: Calculation of measured error FCB350 DN15 (example)

Measurement dynamic	Flow	Maximum measured error
100:1	80 kg/h (176.4 lb/h)	0.8 % o.r.
50:1	160 kg/h (352.7 lb/h)	0.4 % o.r.
10:1	800 kg/h (1763.7 lb/h)	0.1 % o.r.
2:1	4000 kg/h (8818.5 lb/h)	0.1 % o.r.
1:1	8000 kg/h (17637 lb/h)	0.1 % o.r.

Measured error and base accuracy for liquids

	FCx330	FCx350
Mass flow	± 0.4 % of rate ± 0.25 % of rate	± 0.15 % of rate ± 0.1 % of rate (option)
Volume flow	± 0.4 % of rate ± 0.25 % of rate	± 0.15 % of rate
Density	0.010 kg/l ¹⁾	0.002 kg/l ¹⁾ 0.001 kg/l ²⁾ 0.0005 kg/l (option) ³⁾
Reproducibility for density	0.002 kg/l	0.002 kg/l ¹⁾ 0.001 kg/l ²⁾ 0.00025 kg/l (option) ³⁾
Temperature	1 K	0.5 K

- 1) For the density range from 0.5 ... 1.8 kg/dm³
- 2) As 1 and for the medium temperature range from -10 ... 50 °C (14 ... 122 °F)
- 3) As 2 and following field adjustment under operating conditions

Measured error and base accuracy for gases

	FCx330	FCx350
Mass flow	± 1 % of rate	± 0.5 % of rate
Temperature	1 K	0.5 K

Zero stability

Nominal diameter	kg/h (lb/h)
DN 15 (1/2")	0.64 (1.41)
DN 25 (1")	2.16 (4.76)
DN 50 (2")	7.20 (15.87)
DN 80 (3")	20 (44)
DN 100 (4")	93.6 (206.35)
DN 150 (6")	68.8 (151.68)

Effect of the temperature of the medium being measured

For the flow, less than ± 0.0015 % of Q_{max} / 1 K.
For the density, less than 0.0001 kg/dm³ / 1 K.

Effect of the operating pressure

Nominal diameter	Flow [% of measurement / bar]	Density [kg/dm ³ / bar]
DN 15 (1/2")	No effect	No effect
DN 25 (1")	-0.013	No effect
DN 50 (2")	-0.01	0.0004
DN 80 (3")	-0.006	0.0005
DN 100 (4")	-0.009	0.0006
DN 150 (6")	-0.029	0.0008

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

Technical data

Pressure loss

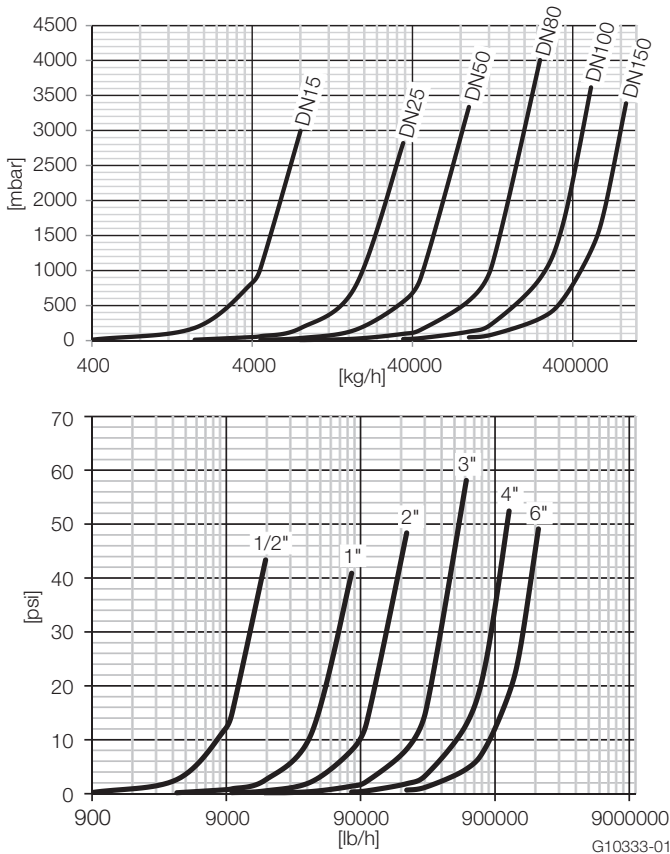


Fig. 14: Pressure loss curve (measured with water, viscosity: 1 mPas)

Viscosity range

Maximum dynamic viscosity:
≤ 1 Pas (1000 mPas = 1000 cP)

If you are working with higher viscosities, contact ABB.

Temperature limits °C (°F)

IMPORTANT (NOTE)

When using the device in hazardous areas, note the additional temperature data in the chapter titled "Technical data relevant to hazardous areas"!

Temperature range of the medium being measured

FCx350: -50 ... 160 °C (-58 ... 320 °F)

FCx350: -50 ... 200 °C (-58 ... 392 °F)

Ambient temperature range

Standard: -20 ... 60 °C (-4 ... 140 °F)

Optional: -40 ... 60 °C (-40 ... 140 °F)

Process connections

- Flange design according to EN / ASME
- Tri-Clamp according to DIN 32676 (ISO 2852)
- DN 15 ... 100 (1/2 ... 4"): Series 3
- BPE Tri-Clamp
- DN 15 ... 100 (1/2 ... 4")

Pressure rating

PN 16, PN 40, PN 100

CL 150, CL 300, CL 600

The maximum permissible operating pressure is determined by the respective process connection, the temperature of the medium to be measured, the screws, and the gasket material.

Enclosure as protective device (optional)

Maximum 60 bar (870 psi)

Pressure Equipment Directive

Conformity assessment according to Category III, fluid group 1, gas

Check the corrosion resistance of the meter tube materials against the measuring medium.

Notes about EHEDG conformity

Bacteria and chemical substances can contaminate or pollute pipeline systems and the materials they are made of.

The appropriate installation conditions must be observed in order to achieve an installation that complies with EHEDG requirements.

In order to achieve compliance with EHEDG requirements, the combination of process connection and gaskets selected by the operator must consist solely of EHEDG-compliant parts.

Note the information in the latest version of the following document:

EHEDG Position Paper: "Hygienic process connections to use with hygienic components and equipment".

Materials for transmitters

Enclosure	
Varnished alloy casting	
Enclosure color	
– Mid-section:	RAL 7012
– Cover:	RAL 9002
Varnish layer thickness:	80 ... 120 µm

Materials for flowmeter sensors

Wetted parts	
Stainless steel	
– 1.4404 (AISI 316L) or 1.4435 (AISI 316L)	
Stainless steel, polished	
– 1.4404 (AISI 316L) or 1.4435 (AISI 316L) certified to EHEDG with flowmeter sensor material (AISI 316L)	
– Hastelloy C4 (2.4610)	
– Optional: Hastelloy C22 (2.4602) or Hastelloy C276 (2.4819)	
Optional: Manufacture in accordance with NACE MR0175 and MR0103 (ISO 15156)	

Enclosure	
Stainless steel 1.4404 (AISI 316L), 1.4301 (AISI 304), 1.4308 (ASTM CF8)	

Material load for process connections

Design	Nominal diameter	PS _{max}	TS _{max}	TS _{min}
Threaded pipe connection (DIN 11851)	DN 15 ... 40 (1/2 ... 1 1/2")	40 bar (580 psi)	140 °C (284 °F)	-40 °C (-40 °F)
	DN 50 ... 100 (2 ... 4")	25 bar (363 psi)	140 °C (284 °F)	-40 °C (-40 °F)
Tri-Clamp (DIN 32676)	DN 15 ... 50 (1/2 ... 2")	16 bar (232 psi)	120 °C (248 °F)	-40 °C (-40 °F)
	DN 65 ... 100 (2 1/2 ... 4")	10 bar (145 psi)	120 °C (248 °F)	-40 °C (-40 °F)

Material load curves for flange devices

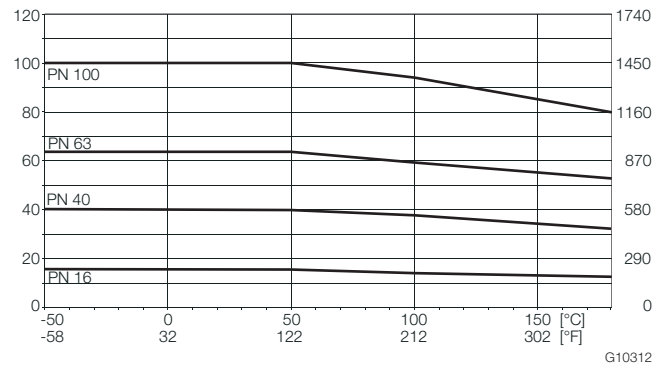


Fig. 15: Stainless steel DIN flange 1.4571 / 1.4404 (316Ti / 316L) up to DN 150 (6")

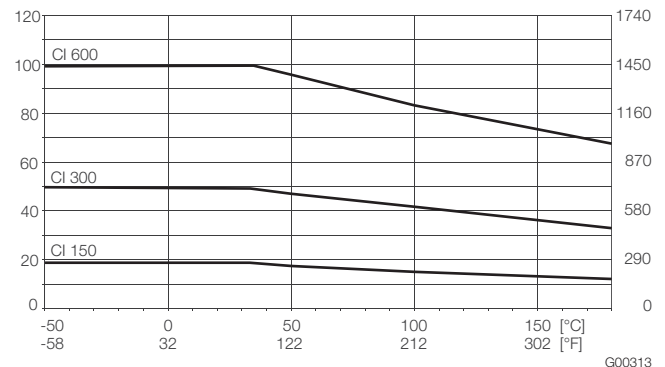


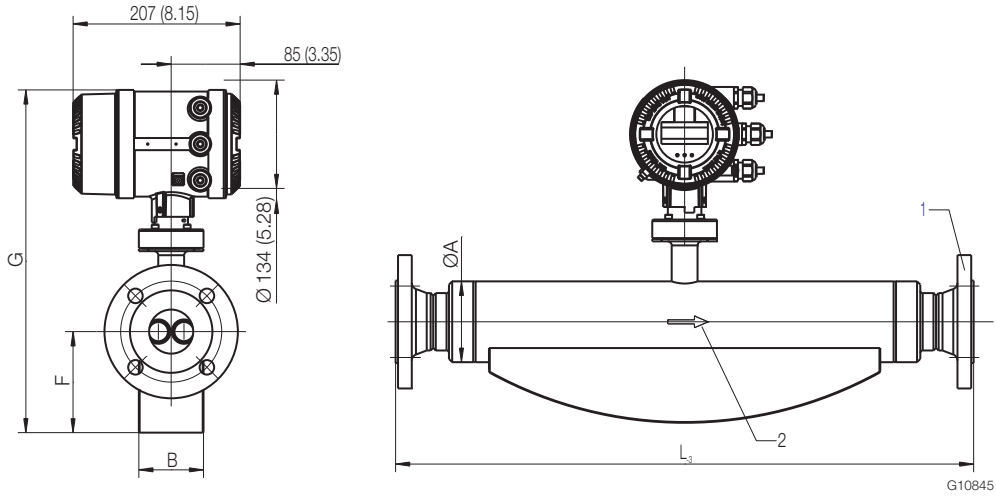
Fig. 16: Stainless steel ASME flange 1.4571 / 1.4404 (316Ti / 316L) up to DN 150 (6")

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

Dimensions

Integral mount design

Flange design acc. to EN / ASME



Flange design acc. to EN / ASME, option TE1, "extended tower length"

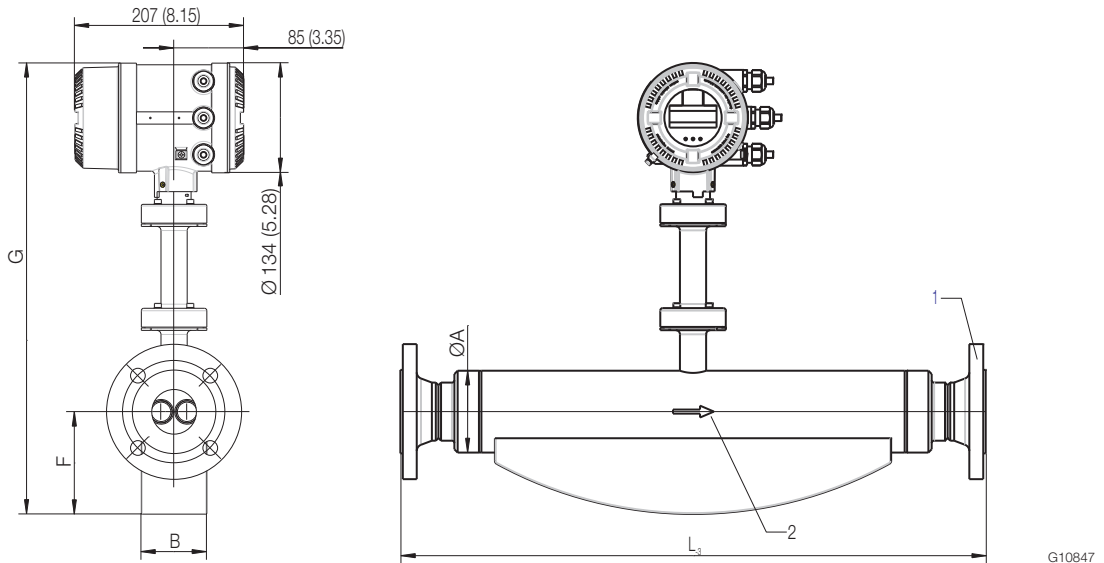


Fig. 17: Dimensions in mm (inch)

1 Flange acc. to EN 1092, ASME B16.5, ISO 7005 (connection dimensions for ASME flanges acc. to ASME B16.5 (ANSI)) | 2 Flow direction

Sensors with stainless steel wetted parts

Dimensions acc. to EN 1092-1										
Meter size	Process connection	L mm (inch)				G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		EN 1092-1								
		PN 16	PN 40	PN 63	PN 100					
DN 15 (1/2")	DN 10 (1/4")	— ²⁾	385 (15.16)	— ²⁾	— ²⁾	350 / 477 ¹⁾ (13.78 / 18.78 ¹⁾)	77 (3.03)	46 (1.81)	45 (1.77)	11 (24.25)
	DN 15 (1/2")		385 (15.16)	403 (15.87)	403 (15.87)					
	DN 20 (3/4")		421 (16.57)	— ²⁾	— ²⁾					
DN 25 (1")	DN 20 (3/4")	— ²⁾	576 (22.68)	— ²⁾	— ²⁾	387 / 514 ¹⁾ (15.24 / 16.34 ¹⁾)	103 (4.06)	62 (2.44)	70 (2.76)	13 (18.66)
	DN 25 (1")		525 (20.67)	564 (22.20)	564 (22.20)					
	DN 40 (1 1/2")		576 (22.68)	572 (22.52)	572 (22.52)					
DN 50 (2")	DN 40 (1 1/2")	— ²⁾	763 (30.04)	745 (29.33)	745 (29.33)	424 / 551 ¹⁾ (16.69 / 21.69 ¹⁾)	125 (4.92)	80 (3.15)	100 (3.94)	29 (63.93)
	DN 50 (2")		715 (28.15)	745 (29.33)	757 (29.80)					
	DN 65 (2 1/2")		763 (30.33)	— ²⁾	— ²⁾					
DN 80 (3")	DN 65 (2 1/2")	— ²⁾	— ²⁾	910 (35.83)	910 (35.83)	502 / 629 ¹⁾ (19.76 / 24.76 ¹⁾)	183 (7.20)	123 (4.84)	155 (6.10)	70 (155)
	DN 80 (3")	870 (34.25)	870 (34.25)	910 (35.83)	910 (35.83)					
	DN 100 (4")	— ²⁾	— ²⁾	1060 (41.73)	1080 (42.52)					
DN 100 (4")	DN 80 (3")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	606 / 733 ¹⁾ (23.86 / 28.86 ¹⁾)	260 (10.24)	163 (6.42)	195 (7.68)	110 (243)
	DN 100 (4")	1122 (44.17)	1144 (45.04)	— ²⁾	— ²⁾					
	DN 150 (6")	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 150 (6")	DN100 (4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	821 / 948 ¹⁾ (32.32 / 37.32 ¹⁾)	320 (12.60)	205 (8.07)	260 (10.24)	230 (508)
	DN150 (6")	1421 (55.94)	1461 (57.52)	— ²⁾	— ²⁾					
	DN200 (8")	— ²⁾	— ²⁾	— ²⁾	— ²⁾					

1) Dimension G, option TE1 "extended tower length"

2) On request

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Dimensions acc. to ASME B16.5 (ANSI)

Meter size	Process connection	L mm (inch)					G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		ASME CL									
		150	300	600	900 ²⁾	1500 ²⁾					
DN 15 (1/2")	DN 10 (1/4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	350 / 477 ¹⁾	77	46	45	11
	DN 15 (1/2")	435 (17.13)	421 (16.57)	421 (16.57)	421 (16.57)	421 (16.57)	(13.78 / 18.78 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 25 (1")	DN 20 (3/4")	575 (22.64)	— ³⁾	— ³⁾	— ³⁾	— ³⁾	387 / 514 ¹⁾	103	62	70	13
	DN 25 (1")	575 (22.64)	575 (22.64)	575 (22.64)	575 (22.64)	575 (22.64)	(15.24 / 16.34 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")	576 (22.68)	576 (22.68)	576 (22.68)	— ³⁾	— ³⁾					
DN 50 (2")	DN 40 (1 1/2")	763 (30.04)	756 (29.76)	756 (29.76)	— ³⁾	— ³⁾	424 / 551 ¹⁾	125	80	100	29
	DN 50 (2")	715 (28.15)	763 (30.04)	773 (30.43)	— ³⁾	— ³⁾	(16.69 / 21.69 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")	763 (30.04)	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 80 (3")	DN 65 (2 1/2")	905 (35.63)	920 (36.22)	920 (36.22)	965 (37.99)	965 (37.99)	502 / 629 ¹⁾	183	123	155	70
	DN 80 (3")	880 (34.65)	895 (35.24)	920 (36.22)	1100 (43.31)	1130 (44.49)	(19.76 / 24.76 ¹⁾)	(7.20)	(4.84)	(6.10)	(155)
	DN 100 (4")	960 (37.80)	1075 (42.32)	1100 (43.31)	1130 (44.49)	1150 (45.28)					
DN 100 (4")	DN 80 (3")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	606 / 733	260	163	195	110
	DN 100 (4")	1144 (45.04)	1324 (52.13)	1345 (52.95)	— ³⁾	— ³⁾	(23.86 / 28.86 ¹⁾)	(10.24)	(6.42)	(7.68)	(243)
	DN 150 (6")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 150 (6")	DN100 (4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	821 / 948 ¹⁾	320	205	260	230
	DN150 (6")	1485 (58.46)	1505 (59.25)	1555 (61.22)	— ³⁾	— ³⁾	(32.32 / 37.32 ¹⁾)	(12.60)	(8.07)	(10.24)	(508)
	DN200 (8")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					

Dimensions acc. to Tri-Clamp BPE, Tri-Clamp DIN 3276, Thread DIN 11851

Meter size	Process connection	L mm (inch)				G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		Tri-Clamp		Thread						
		BPE	DIN 3276	DIN 11851						
		PN 8 / 10	PN 16	PN 40	PN 25					
DN 15 (1/2")	DN 10 (1/4")	— ³⁾	410 (16.14)	413 (16.26)	— ³⁾	350 / 477 ¹⁾	77	46	45	11
	DN 15 (1/2")	433 (17.05)	410 (16.14)	413 (16.26)	— ³⁾	(13.78 / 18.78 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")	— ³⁾	410 (16.14)	413 (16.26)	— ³⁾					
DN 25 (1")	DN 20 (3/4")	— ³⁾	590 (23.23)	590 (23.23)	— ³⁾	387 / 514 ¹⁾	103	62	70	13
	DN 25 (1")	590 (23.23)	590 (23.23)	590 (23.23)	— ³⁾	(15.24 / 16.34 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")	— ³⁾	590 (23.23)	590 (23.23)	— ³⁾					
DN 50 (2")	DN 40 (1 1/2")	— ³⁾	763 (30.04)	763 (30.04)	— ³⁾	424 / 551 ¹⁾	125	80	100	29
	DN 50 (2")	740 (29.13)	740 (29.13)	— ³⁾	740 (29.13)	(16.69 / 21.69 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")	— ³⁾	740 (29.13)	— ³⁾	740 (29.13)					
DN 80 (3")	DN 65 (2 1/2")	950 (37.40)	950 (37.40)	— ³⁾	990 (38.98)	502 / 629 ¹⁾	183	123	155	70
	DN 80 (3")	910 (35.83)	910 (35.83)	— ³⁾	940 (37.01)	(19.76 / 24.76 ¹⁾)	(7.20)	(4.84)	(6.10)	(155)
	DN 100 (4")	910 (35.83)	910 (35.83)	— ³⁾	940 (37.01)					

1) Dimension G, option TE1 "extended tower length"

2) Please apply CI600 p-t-ratings for above CI900 and CI1500 flanges

3) On request

Sensors with Hastelloy C4, C22 or C276 wetted parts

Dimensions acc. to EN 1092-1 and ASME B16.5 (ANSI)											
Meter size	Process connection	L mm (inch)					G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		EN 1092-1		ASME CL							
		PN40	PN100	600	900 ²⁾	1500 ²⁾					
DN 15 (1/2")	DN 10 (1/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	350 / 477 ¹⁾ (13.78 / 18.78 ¹⁾)	77 (3.03)	46 (1.81)	45 (1.77)	11 (24.25)
	DN 15 (1/2")	442 (17.4)	442 (17.4)	442 (17.4)	442 (17.4)	442 (17.4)					
	DN 20 (3/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 25 (1")	DN 20 (3/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	387 / 514 ¹⁾ (15.24 / 16.34 ¹⁾)	103 (4.06)	62 (2.44)	70 (2.76)	13 (18.66)
	DN 25 (1")	607 (23.9)	607 (23.9)	607 (23.9)	607 (23.9)	607 (23.9)					
	DN 40 (1 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 50 (2")	DN 40 (1 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	424 / 551 ¹⁾ (16.69 / 21.69 ¹⁾)	125 (4.92)	80 (3.15)	100 (3.94)	29 (63.93)
	DN 50 (2")	762 (30.0)	762 (30.0)	762 (30.0)	762 (30.0)	762 (30.0)					
	DN 65 (2 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 80 (3")	DN 65 (2 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN 80 (3")										
	DN 100 (4")										
DN 100 (4")	DN 80 (3")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN 100 (4")										
	DN 150 (6")										
DN 150 (6")	DN100 (4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN150 (6")										
	DN200 (8")										

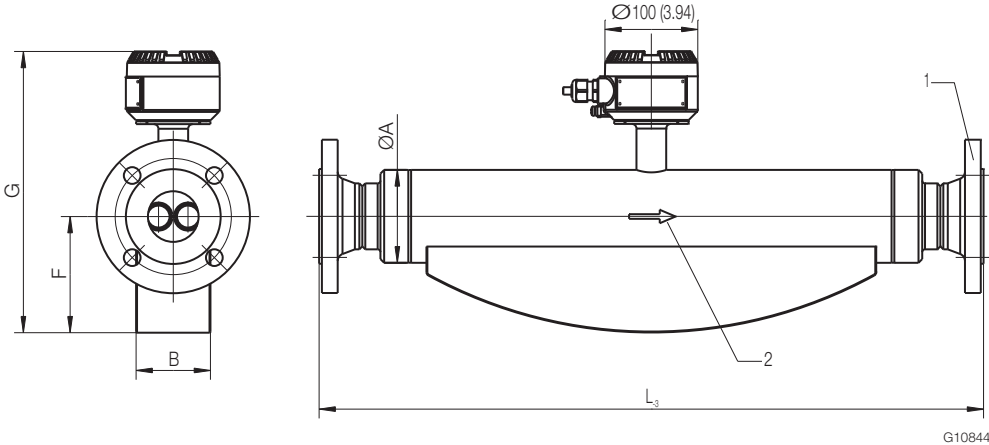
1) Dimension G, option TE1 "extended tower length"

2) On request

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

Remote mount design

Flange design acc. to EN / ASME



Flange design acc. to EN / ASME, option TE1, "extended tower length"

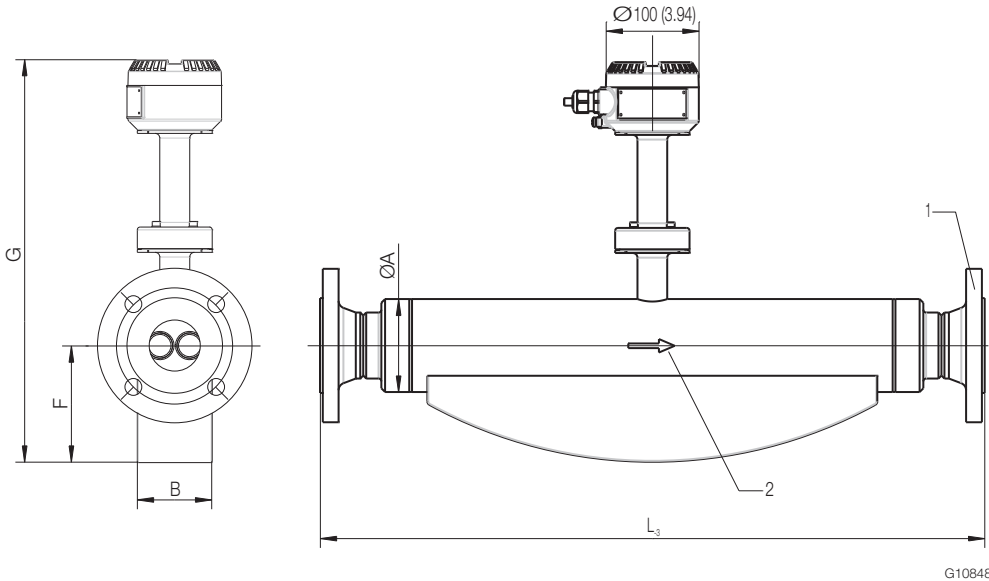


Fig. 18: Dimensions in mm (inch)
 1 Flange acc. to EN 1092, ASME B16.5, ISO 7005 (connection dimensions for ASME flanges acc. to ASME B16.5 (ANSI)) | 2 Flow direction

Sensors with stainless steel wetted parts

Dimensions acc. to EN 1092-1										
Meter size	Process connection	L mm (inch)				G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		EN 1092-1								
		PN 16	PN 40	PN 63	PN 100					
DN 15 (1/2")	DN 10 (1/4")	— ²⁾	385 (15.16)	— ²⁾	— ²⁾	227 / 354 ¹⁾	77	46	45	11
	DN 15 (1/2")		385 (15.16)	403 (15.87)	403 (15.87)	(8.94 / 13.94 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")		421 (16.57)	— ²⁾	— ²⁾					
DN 25 (1")	DN 20 (3/4")	— ²⁾	576 (22.68)	— ²⁾	— ²⁾	266 / 393 ¹⁾	103	62	70	13
	DN 25 (1")		525 (20.67)	564 (22.20)	564 (22.20)	(10.5 / 15.47 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")		576 (22.68)	572 (22.52)	572 (22.52)					
DN 50 (2")	DN 40 (1 1/2")	— ²⁾	763 (30.04)	745 (29.33)	745 (29.33)	303 / 430 ¹⁾	125	80	100	29
	DN 50 (2")		715 (28.15)	745 (29.33)	757 (29.80)	(11.9 / 16.93 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")		763 (30.33)	— ²⁾	— ²⁾					
DN 80 (3")	DN 65 (2 1/2")	— ²⁾	— ²⁾	910 (35.83)	910 (35.83)	381 / 508 ¹⁾	183	123	155	70
	DN 80 (3")	870 (34.25)	870 (34.25)	910 (35.83)	910 (35.83)	(15.0 / 20.0 ¹⁾)	(7.20)	(4.84)	(6.10)	(155)
	DN 100 (4")	— ²⁾	— ²⁾	1060 (41.73)	1080 (42.52)					
DN 100 (4")	DN 80 (3")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	485 / 612 ¹⁾	260	163	195	110
	DN 100 (4")	1122 (44.17)	1144 (45.04)	— ²⁾	— ²⁾	(19.1 / 24.1 ¹⁾)	(10.24)	(6.42)	(7.68)	(243)
	DN 150 (6")	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 150 (6")	DN100 (4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	700 / 827 ¹⁾	205	260	230	320
	DN150 (6")	1421 (55.94)	1461 (57.52)	— ²⁾	— ²⁾	(27.56 / 32.56 ¹⁾)	(8.07)	(10.24)	(508)	(12.60)
	DN200 (8")	— ²⁾	— ²⁾	— ²⁾	— ²⁾					

1) Dimension G, option TE1 "extended tower length"

2) On Request

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Dimensions acc. to ASME B16.5 (ANSI)

Meter size	Process connection	L mm (inch)					G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		ASME CL									
		150	300	600	900 ²⁾	1500 ²⁾					
DN 15 (1/2")	DN 10 (1/4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	227 / 354 ¹⁾	77	46	45	11
	DN 15 (1/2")	435 (17.13)	421 (16.57)	421 (16.57)	421 (16.57)	421 (16.57)	(8.94 / 13.94 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 25 (1")	DN 20 (3/4")	575 (22.64)	— ³⁾	— ³⁾	— ³⁾	— ³⁾	266 / 393 ¹⁾	103	62	70	13
	DN 25 (1")	575 (22.64)	575 (22.64)	575 (22.64)	575 (22.64)	575 (22.64)	(10.5 / 15.47 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")	576 (22.68)	576 (22.68)	576 (22.68)	— ³⁾	— ³⁾					
DN 50 (2")	DN 40 (1 1/2")	763 (30.04)	756 (29.76)	756 (29.76)	— ³⁾	— ³⁾	303 / 430 ¹⁾	125	80	100	29
	DN 50 (2")	715 (28.15)	763 (30.04)	773 (30.43)	— ³⁾	— ³⁾	(11.9 / 16.93 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")	763 (30.04)	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 80 (3")	DN 65 (2 1/2")	905 (35.63)	920 (36.22)	920 (36.22)	965 (37.99)	965 (37.99)	381 / 508 ¹⁾	183	123	155	70
	DN 80 (3")	880 (34.65)	895 (35.24)	920 (36.22)	1100 (43.31)	1130 (44.49)	(15.0 / 20.0 ¹⁾)	(7.20)	(4.84)	(6.10)	(155)
	DN 100 (4")	960 (37.80)	1075 (42.32)	1100 (43.31)	1130 (44.49)	1150 (45.28)					
DN 100 (4")	DN 80 (3")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	485 / 612 ¹⁾	260	163	195	110
	DN 100 (4")	1144 (45.04)	1324 (52.13)	1345 (52.95)	— ³⁾	— ³⁾	(19.1 / 24.1 ¹⁾)	(10.24)	(6.42)	(7.68)	(243)
	DN 150 (6")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					
DN 150 (6")	DN100 (4")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾	700 / 827 ¹⁾	320	205	260	230
	DN150 (6")	1485 (58.46)	1505 (59.25)	1555 (61.22)	— ³⁾	— ³⁾	(27.56 / 32.56 ¹⁾)	(12.60)	(8.07)	(10.24)	(508)
	DN200 (8")	— ³⁾	— ³⁾	— ³⁾	— ³⁾	— ³⁾					

Dimensions acc. to Tri-Clamp BPE, Tri-Clamp DIN 3276, thread DIN 11851

Meter size	Process connection	L mm (inch)				G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		Tri-Clamp		Thread						
		BPE	DIN 3276	DIN 11851						
		PN 8 / 10	PN 16	PN 40	PN 25					
DN 15 (1/2")	DN 10 (1/4")	— ³⁾	410 (16.14)	413 (16.26)	— ³⁾	227 / 354 ¹⁾	77	46	45	11
	DN 15 (1/2")	433 (17.05)	410 (16.14)	413 (16.26)	— ³⁾	(8.94 / 13.94 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")	— ³⁾	410 (16.14)	413 (16.26)	— ³⁾					
DN 25 (1")	DN 20 (3/4")	— ³⁾	590 (23.23)	590 (23.23)	— ³⁾	266 / 393 ¹⁾	103	62	70	13
	DN 25 (1")	590 (23.23)	590 (23.23)	590 (23.23)	— ³⁾	(10.5 / 15.47 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")	— ³⁾	590 (23.23)	590 (23.23)	— ³⁾					
DN 50 (2")	DN 40 (1 1/2")	— ³⁾	763 (30.04)	763 (30.04)	— ³⁾	303 / 430 ¹⁾	125	80	100	29
	DN 50 (2")	740 (29.13)	740 (29.13)	— ³⁾	740 (29.13)	(11.9 / 16.93 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")	— ³⁾	740 (29.13)	— ³⁾	740 (29.13)					
DN 80 (3")	DN 65 (2 1/2")	950 (37.40)	950 (37.40)	— ³⁾	990 (38.98)	381 / 508 ¹⁾	183	123	155	70
	DN 80 (3")	910 (35.83)	910 (35.83)	— ³⁾	940 (37.01)	(15.0 / 20.0 ¹⁾)	(7.20)	(4.84)	(6.10)	(155)
	DN 100 (4")	910 (35.83)	910 (35.83)	— ³⁾	940 (37.01)					

1) Dimension G, option TE1 "extended tower length"

2) Please apply CI600 p-t-ratings for above CI900 and CI1500 flanges

3) On request

Sensors with Hastelloy C4, C22 or C276 wetted parts

Dimensions acc. to EN 1092-1 and ASME B16.5 (ANSI)											
Meter size	Process connection	L mm (inch)					G mm (inch)	F mm (inch)	B mm (inch)	A mm (inch)	Weight kg (lb)
		EN 1092-1		ASME CL							
		PN40	PN100	600	900 ²⁾	1500 ²⁾					
DN 15 (1/2")	DN 10 (1/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	227 / 354 ¹⁾	77	46	45	11
	DN 15 (1/2")	442 (17.4)	442 (17.4)	442 (17.4)	442 (17.4)	442 (17.4)	(8.94 / 13.94 ¹⁾)	(3.03)	(1.81)	(1.77)	(24.25)
	DN 20 (3/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 25 (1")	DN 20 (3/4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	266 / 393 ¹⁾	103	62	70	13
	DN 25 (1")	607 (23.9)	607 (23.9)	607 (23.9)	607 (23.9)	607 (23.9)	(10.5 / 15.47 ¹⁾)	(4.06)	(2.44)	(2.76)	(18.66)
	DN 40 (1 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 50 (2")	DN 40 (1 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	303 / 430 ¹⁾	125	80	100	29
	DN 50 (2")	762 (30.0)	762 (30.0)	762 (30.0)	762 (30.0)	762 (30.0)	(11.9 / 16.93 ¹⁾)	(4.92)	(3.15)	(3.94)	(63.93)
	DN 65 (2 1/2")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
DN 80 (3")	DN 65 (2 1/2")						— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN 80 (3")										
	DN 100 (4")										
DN 100 (4")	DN 80 (3")						— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN 100 (4")	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾					
	DN 150 (6")										
DN 150 (6")	DN100 (4")						— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾
	DN150 (6")										
	DN200 (8")										

1) Dimension G, option TE1 "extended tower length"

2) On request

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Ordering information

Main ordering information CoriolisMaster FCB330, FCB350

Base model											
CoriolisMaster FCB330 Coriolis Mass Flowmeter	FCB330	XX	XX	XXXXX	XX	XX	X	X	XX	XX	X
CoriolisMaster FCB350 Coriolis Mass Flowmeter	FCB350	XX	XX	XXXXX	XX	XX	X	X	XX	XX	X
Explosion Protection Certification											
General Purpose		Y0									Continued see next page
ATEX / IECEX, (Zone 2 / 22)		A2									
ATEX / IECEX, (Zone 1 / 21)		A1									
cFMus version Class 1 Div. 2 (Zone 2 / 21)		F2									
cFMus version Class 1 Div. 1 (Zone 1 / 21)		F1									
NEPSI (Zone 2 / 22)		S2									
NEPSI (Zone 1 / 21)		S1									
Connection Design / Connection Box Material / Cable Glands											
Integral, defined by Transmitter housing		Y0									
Remote / Stainless Steel / 1 x M20 x 1.5		A1									
Remote / Stainless Steel / 1 x NPT 1/2 in.		A2									
Meter Size / Connection Size											
DN 15 (1/2 in.) / DN 10 (1/4 in.)											015E1
DN 15 (1/2 in.) / DN 15 (1/2 in.)											015R0
DN 15 (1/2 in.) / DN 20 (3/4 in.)											015R1
DN 25 (1 in.) / DN 20 (3/4 in.)											025E1
DN 25 (1 in.) / DN 25 (1 in.)											025R0
DN 25 (1 in.) / DN 40 (1-1/2 in.)											025R2
DN 50 (2 in.) / DN 40 (1-1/2 in.)											050E1
DN 50 (2 in.) / DN 50 (2 in.)											050R0
DN 50 (2 in.) / DN 65 (2-1/2 in.)											050R1
DN 80 (3 in.) / DN 65 (2-1/2 in.)											080E1
DN 80 (3 in.) / DN 80 (3 in.)											080R0
DN 80 (3 in.) / DN 100 (4 in.)											080R1
DN 100 (4 in.) / DN 80 (3 in.)											100E1
DN 100 (4 in.) / DN 100 (4 in.)											100R0
DN 100 (4 in.) / DN 150 (6 in.)											100R2
DN 150 (6 in.) / DN 100 (4 in.)											150E2
DN 150 (6 in.) / DN 150 (6 in.)											150R0
DN 150 (6 in.) / DN 200 (8 in.)											150R1

Main ordering information

CoriolisMaster FCB330 Coriolis Mass Flowmeter	XX	XX	X	X	XX	XX	X
CoriolisMaster FCB350 Coriolis Mass Flowmeter	XX	XX	X	X	XX	XX	X
Process Connection Type							Continued see next page
Flanges DIN PN 40	D4						
Flanges DIN PN 63	D5						
Flanges DIN PN 100	D6						
Flanges EN 1092-1 PN 40, NAMUR length (DN 15: 510 mm, DN 25: 600 mm, DN 50: 715 mm)	S5						
Flanges ANSI / ASME B16.5 Class 150	A1						
Flanges ANSI / ASME B16.5 Class 300	A3						
Flanges ANSI / ASME B16.5 Class 600	A6						
Flanges ANSI / ASME B16.5 Class 900 (p-t rating Cl 600)	A7						
Flanges ANSI / ASME B16.5 Class 1500 (p-t rating Cl 600)	A8						
Tri-Clamp acc. DIN 32676	T1						
Tri-Clamp acc. ASME BPE	T3						
Food industry fittings acc. DIN 11851	F1						
Female NPT thread	N5						
Female G thread	M5						
Material of Wetted Parts							
Stainless steel 1.4404 / 1.4435 (316L)	A1						
Flow Calibration							
Flow forward +/- 0.40 % of flow rate, Gas 1 % of flow rate	1)	A					
Flow forward +/- 0.25 % of flow rate, Gas 1 % of flow rate	1)	B					
Flow forward +/- 0,15 % of flow rate, Gas 0,5 % of flow rate	2)	C					
Flow forward +/- 0,10 % of flow rate, Gas 0,5 % of flow rate	2)	D					
Flow forward / reverse +/- 0.40 % of flow rate, Gas 1 % of flow rate	1)	J					
Flow forward / reverse +/- 0.25 % of flow rate, Gas 1 % of flow rate	1)	K					
Flow forward / reverse +/- 0,15 % of flow rate, Gas 0,5 % of flow rate	2)	L					
Flow forward / reverse +/- 0,10 % of flow rate, Gas 0,5 % of flow rate	2)	M					
Others		Z					
Density Calibration							
Density 10 g/l		1)	1				
Density 2 g/l		2)	3				
Density 1 g/l		2)	4				
Others			9				

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Main ordering information			
CoriolisMaster FCB330 Coriolis Mass Flowmeter	XX	XX	X
CoriolisMaster FCB350 Coriolis Mass Flowmeter	XX	XX	X
Connection Design / Transmitter Housing Type / Transmitter Housing Material / Cable Glands			
Integral / Dual compartment / Aluminium / 3 x M20 x 1.5	D1		
Integral / Dual compartment / Aluminium / 3 x NPT 1/2 in.	D2		
Remote / Not specified	Y0		
Others	Z9		
Outputs			
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive, no HART			A1
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART			A2
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART			A3
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive + HART			H1
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive + HART			H2
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive + HART			H3
Without			Y0
Others			Z9
Power Supply			
100 ... 230 V AC			A
24 V AC / DC			B
Without			Y

Additional ordering information

CoriolisMaster FCB330 Coriolis Mass Flowmeter	XX	XX
CoriolisMaster FCB350 Coriolis Mass Flowmeter	XX	XX
Certificates		
Test report 2.2 acc. EN 10204	C1	
Material monitoring with inspection certificate 3.1 acc. EN 10204	C2	
Material monitoring with inspection certificate 3.2 acc. EN 10204	C3	
Material monitoring NACE MR 01-75 with inspection certificate 3.1 acc. EN 10204	CN	
Declaration of compliance with the order 2.1 acc. EN 10204	C4	
Inspection certificate 3.1 acc. EN 10204 for visual, dimensional and functional test	C6	
Inspection certificate 3.1 acc. EN 10204 for positive material identification PMI	CA	
Pressure test acc. AD2000	CB	
Test package (pressure test, non-destructive test, welder & welding procedure certificate)	CT	
Certificate of compliance for calibration 2.1 acc. EN 10204	CM	
Others	CZ	
Special Operation Mode		
Standard + DensiMass concentration measurement	2)	N6

Additional ordering information

CoriolisMaster FCB330 Coriolis Mass Flowmeter	XX	XXX	XXX	XX	XXX	XXX
CoriolisMaster FCB350 Coriolis Mass Flowmeter	XX	XXX	XXX	XX	XXX	XXX
Documentation Language						
German	M1					
English	M5					
Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)	MW					
Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)	ME					
Others	MZ					
Pressure Rating of Sensor Secondary Containment						
4 MPa / 40 bar / 580 psi					PR4	
Signal Cable Length						
Without						SC0
5 m (approx. 15 ft)						SC1
10 m (approx. 30 ft)						SC2
15 m (approx. 49 ft)						SC3
20 m (approx. 66 ft)						SC4
25 m (approx. 82 ft)						SC5
30 m (approx. 98 ft)						SC6
40 m (approx. 131 ft)						SC8
50 m (approx. 164 ft)						SCA
Others						SC9
Device Identification Plate						
Stainless steel plate with TAG no.						T1
Others						TZ
Ambient Temperature Range						
-40 ... 60 °C (-40 ... 140 °F)						TA4
Extended Tower Length						
Tower length extension - meter insulation capability						TE1

- 1) Only with CoriolisMaster FCB330
2) Only with CoriolisMaster FCB350

Accessories

Description	Order no.
CoriolisMaster FCB300 signal cable	D173D148U02

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Main ordering information CoriolisMaster FCH330, FCH350

Base model											
CoriolisMaster FCH330 Coriolis Mass Flowmeter	FCH330	XX	XX	XXXXX	XX	XX	X	X	XX	XX	X
CoriolisMaster FCH350 Coriolis Mass Flowmeter	FCH350	XX	XX	XXXXX	XX	XX	X	X	XX	XX	X
Explosion Protection Certification											Continued see next page
General Purpose		Y0									
ATEX / IECEx, (Zone 2 / 22)		A2									
ATEX / IECEx, (Zone 1 / 21)		A1									
cFMus version Class 1 Div. 2 (Zone 2 / 21)		F2									
cFMus version Class 1 Div. 1 (Zone 1 / 21)		F1									
NEPSI (Zone 2 / 22)		S2									
NEPSI (Zone 1 / 21)		S1									
Connection Design / Connection Box Material / Cable Glands											
Integral, defined by Transmitter housing		Y0									
Remote / Stainless Steel / 1 x M20 x 1.5		A1									
Remote / Stainless Steel / 1 x NPT 1/2 in.		A2									
Meter Size / Connection Size											
DN 15 (1/2 in.) / DN 10 (1/4 in.)						015E1					
DN 15 (1/2 in.) / DN 15 (1/2 in.)						015R0					
DN 15 (1/2 in.) / DN 20 (3/4 in.)						015R1					
DN 25 (1 in.) / DN 20 (3/4 in.)						025E1					
DN 25 (1 in.) / DN 25 (1 in.)						025R0					
DN 25 (1 in.) / DN 40 (1-1/2 in.)						025R2					
DN 50 (2 in.) / DN 40 (1-1/2 in.)						050E1					
DN 50 (2 in.) / DN 50 (2 in.)						050R0					
DN 50 (2 in.) / DN 65 (2-1/2 in.)						050R1					
DN 80 (3 in.) / DN 65 (2-1/2 in.)						080E1					
DN 80 (3 in.) / DN 80 (3 in.)						080R0					
DN 80 (3 in.) / DN 100 (4 in.)						080R1					
Process Connection Type											
Tri-Clamp acc. DIN 32676							T1				
Tri-Clamp acc. ASME BPE							T3				
Food industry fittings acc. DIN 11851							F1				
Material of Wetted Parts											
Stainless steel, polished 1.4404 / 1.4435 (316L)										H2	

Main ordering information

CoriolisMaster FCH330 Coriolis Mass Flowmeter	X	X	XX	XX	X
CoriolisMaster FCH350 Coriolis Mass Flowmeter	X	X	XX	XX	X
Flow Calibration					
Flow forward +/- 0.40 % of flow rate, Gas 1 % of flow rate	1)	A			
Flow forward +/- 0.25 % of flow rate, Gas 1 % of flow rate	1)	B			
Flow forward +/- 0,15 % of flow rate, Gas 0,5 % of flow rate	2)	C			
Flow forward +/- 0,10 % of flow rate, Gas 0,5 % of flow rate	2)	D			
Flow forward / reverse +/- 0.40 % of flow rate, Gas 1 % of flow rate	1)	J			
Flow forward / reverse +/- 0.25 % of flow rate, Gas 1 % of flow rate	1)	K			
Flow forward / reverse +/- 0,15 % of flow rate, Gas 0,5 % of flow rate	2)	L			
Flow forward / reverse +/- 0,10 % of flow rate, Gas 0,5 % of flow rate	2)	M			
Others		Z			
Density Calibration					
Density 10 g/l	1)	1			
Density 2 g/l	2)	3			
Density 1 g/l	2)	4			
Others		9			
Connection Design / Transmitter Housing Type / Transmitter Housing Material / Cable Glands					
Integral / Dual compartment / Aluminium / 3 x M20 x 1.5				D1	
Integral / Dual compartment / Aluminium / 3 x NPT 1/2 in.				D2	
Remote / Not specified				Y0	
Others				Z9	
Outputs					
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive, no HART				A1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A3	
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive + HART				H1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H3	
Without				Y0	
Others				Z9	
Power Supply					
100 ... 230 V AC					A
24 V AC / DC					B
Without					Y

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Additional ordering information

CoriolisMaster FCH330 Coriolis Mass Flowmeter	XX	XX	XX	XXX
CoriolisMaster FCH350 Coriolis Mass Flowmeter	XX	XX	XX	XXX
Certificates				
Test report 2.2 acc. EN 10204	C1			
Material monitoring with inspection certificate 3.1 acc. EN 10204	C2			
Material monitoring with inspection certificate 3.2 acc. EN 10204	C3			
Material monitoring NACE MR 01-75 with inspection certificate 3.1 acc. EN 10204	CN			
Declaration of compliance with the order 2.1 acc. EN 10204	C4			
Inspection certificate 3.1 acc. EN 10204 for visual, dimensional and functional test	C6			
Inspection certificate 3.1 acc. EN 10204 for positive material identification PMI	CA			
Pressure test acc. AD2000	CB			
Test package (pressure test, non-destructive test, welder & welding procedure certificate)	CT			
Certificate of compliance for calibration 2.1 acc. EN 10204	CM			
Others	CZ			
Special Operation Mode				
Standard + DensiMass concentration measurement	2)	N6		
Documentation Language				
German			M1	
English			M5	
Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)			MW	
Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)			ME	
Others			MZ	
Pressure Rating of Sensor Secondary Containment				
4 MPa / 40 bar / 580 psi				PR4

Additional ordering information

CoriolisMaster FCH330 Coriolis Mass Flowmeter	XXX	XX	XXX	XXX
CoriolisMaster FCH350 Coriolis Mass Flowmeter	XXX	XX	XXX	XXX
Signal Cable Length				
Without			SC0	
5 m (approx. 15 ft)			SC1	
10 m (approx. 30 ft)			SC2	
15 m (approx. 49 ft)			SC3	
20 m (approx. 66 ft)			SC4	
25 m (approx. 82 ft)			SC5	
30 m (approx. 98 ft)			SC6	
40 m (approx. 131 ft)			SC8	
50 m (approx. 164 ft)			SCA	
Others			SC9	
Device Identification Plate				
Stainless steel plate with TAG no.				T1
Others				TZ
Ambient Temperature Range				
-40 ... 60 °C (-40 ... 140 °F)				TA4
Extended Tower Length				
Tower length extension - meter insulation capability				TE1

- 1) Only with CoriolisMaster FCB330
- 2) Only with CoriolisMaster FCB350

Accessories

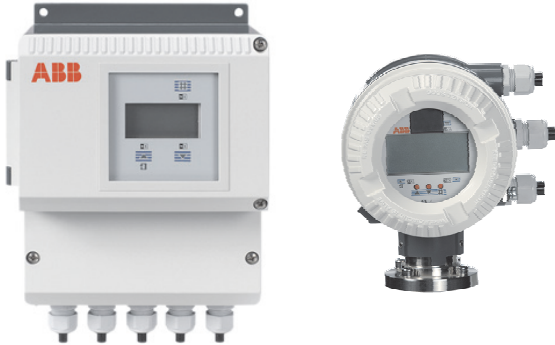
Description	Order no.
CoriolisMaster FCB300 signal cable	D173D148U02

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Transmitter

Technical data



G10320

Fig. 19: FCB300 transmitter in field enclosure

Measuring range

The measuring range can be set at will between 0.01 ... 1 Q_{max}.

Degree of protection

IP 65 / IP 67, NEMA 4X

Electrical connections

Cable gland M20 x 1.5 or 1/2" NPT

The maximum signal cable length for the remote mount design is 10 m (33 ft) (longer lengths on request).

Power supply

Supply voltage	100 ... 230 V AC, 47 ... 63 Hz (tolerance -15 % / +10 %)
	20.4 ... 26.4 V AC, 47 ... 63 Hz
	20.4 ... 31.2 V DC (ripple: ≤ 5 %)
Power consumption	S ≤ 25 VA

Response time

As step function 0 ... 99 % (corr. to 5 τ) ≥ 1 s

Ambient temperature

Standard: -20 ... 60 °C (-4 ... 140 °F)

Optional: -40 ... 60 °C (-40 ... 140 °F)

At operation below -20 °C (-4 °F), the LCD can no longer be read and the electronic unit should be operated with as few vibrations as possible.

Full functionality is assured at temperatures above -20 °C (-4 °F).

Housing design

Enclosure

Varnished alloy casting

Enclosure color

— Mid-section: RAL 7012

— Cover: RAL 9002

Varnish layer thickness: 80 ... 120 μm

Forward/reverse flow metering

The flow direction is indicated by the arrows on the transmitter LCD and via the digital switching output (if configured).

LCD display

LCD, 2 lines, backlit

Both lines of the LCD are freely configurable.

The following values can be displayed:

- Mass flow
- Volume flow
- Density or temperature
- Flow count, 7-digit with overflow counter and specification of physical unit for mass or volume.

On integral mount design devices, the transmitter enclosure can be rotated through approx. 180° in any direction. The LCD can be rotated to four positions to ensure optimum readability.

Operation

Three buttons on the transmitter are used to operate the device and enter parameters. Alternatively, if the enclosure cover on the transmitter is closed, operators can use a magnetic pen.

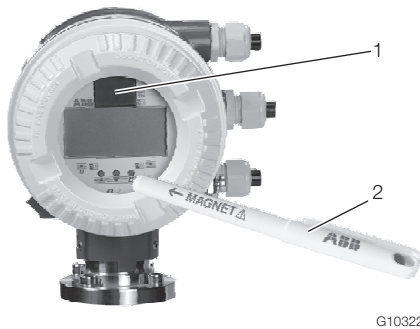


Fig. 20: Operation with magnetic pen
1 FRAM (plug-in) | 2 Magnetic pen

Data backup

Data is backed up to an FRAM integrated in the transmitter. Data is saved for a period of 10 years without power supply. Hardware and software are identified according to NAMUR recommendation NE53.

IMPORTANT (NOTE)

The device meets the requirements of the EMC directive 2004/108/EC (EN 61326) and the low-voltage directive 2006/95/EC (EN 61010-1).

DensiMass concentration measurement (FCB350 only)

The transmitter can calculate the current concentration from the measured density and temperature using concentration matrices.

The following concentration matrices are preconfigured in the transmitter as standard:

- Concentration of sodium hydroxide in water
- Concentration of alcohol in water
- Concentration of sugar in water
- Concentration of corn starch in water
- Concentration of wheat starch in water

The user can enter two more user-defined matrices containing up to 100 values.

Accuracy of concentration measurement

The accuracy of the concentration measurement is determined in the first instance by the quality of the matrix data entered. However, as the calculation is based on temperature and density (the input variables), the accuracy of the concentration measurement is ultimately determined by the measuring accuracy of temperature and density.

Example:

Density of 0 % alcohol in water at 20 °C (68 °F): 998.23 g/l

Density of 100 % alcohol in water at 20 °C (68 °F): 789.30 g/l

Concentration	Density
100 %	208.93 g/l
0.48 %	1 g/l
0.69 %	2 g/l

The accuracy class of the density measurement thus directly determines the accuracy of the concentration measurement. See the device operating instructions for detailed information.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Electrical data

Current outputs

Current output 1, active	
Output signal	Active, 0 ... 20 mA or 4 ... 20 mA switchable
Load	$0 \Omega \leq R_B \leq 600 \Omega$
Measurement uncertainty	< 0.1 % of measured value
Terminals	31 / 32
Measured values	Mass flow, volume flow, density, and temperature (freely configurable via software)

Current output 1, passive	
Output signal	4 ... 20 mA passive
Load	$0 \Omega \leq R_B \leq 600 \Omega$
Source voltage	$12 \text{ V} \leq U_q \leq 30 \text{ V}$
Measurement uncertainty	< 0.1 % of measured value
Terminals	31 / 32
Measured values	Mass flow, volume flow, density, and temperature (freely configurable via software)

Current output 2, passive	
Output signal	4 ... 20 mA passive
Load	$0 \Omega \leq R_B \leq 600 \Omega$
Source voltage	$12 \text{ V} \leq U_q \leq 30 \text{ V}$
Measurement uncertainty	< 0.1 % of measured value
Terminals	33 / 34
Measured values	Mass flow, volume flow, density, and temperature (freely configurable via software)

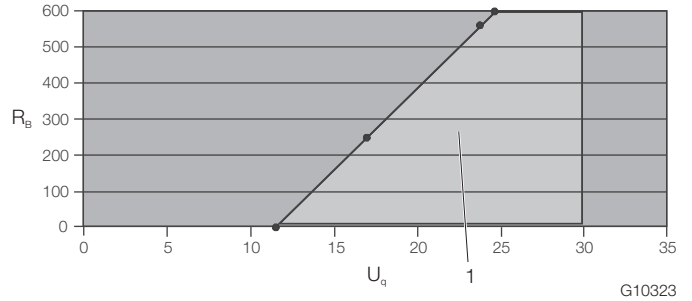


Fig. 21: Permissible source voltage as a function of load resistance, where $I_{\max} = 22 \text{ mA}$

1 Permissible range

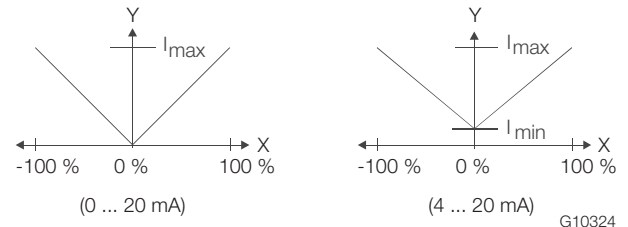


Fig. 22

IMPORTANT (NOTE)

Failure information according to NAMUR recommendation NE43.

Pulse output

Scaled pulse output (maximum 5 kHz) with configurable pulse factor between 0.001 and 1000 pulses per unit. The pulse width is configurable from 0.1 ... 2000 ms. The output is electrically isolated from the current outputs.

	Passive	Active
Operating voltage	$16\text{ V} \leq U_{CEH} \leq 30\text{ V DC}$ $0\text{ V} \leq U_{CEL} \leq 2\text{ V}$	$16\text{ V} \leq U \leq 30\text{ V DC}$ Load $\geq 150\ \Omega$
Operating current	$0\text{ mA} \leq I_{CEH} \leq 0.2\text{ mA}$ $2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$	-
fmax	5 kHz	5 kHz
Pulse width	0.1 ... 2000 ms	0.1 ... 2000 ms
Terminals	51 / 52	51 / 52

IMPORTANT (NOTE)

If you are using a mechanical totalizer, we recommend setting a pulse width of $\geq 30\text{ ms}$ and a maximum frequency of $f_{max} \leq 3\text{ kHz}$.

Digital switching outputs

The switching function can be selected via the software.

Switching function	<ul style="list-style-type: none"> – System monitoring (normally closed contact or normally open contact) – Forward / reverse (closed for forward) – Min. /max. alarm (normally closed contact or normally open contact)
Output "closed"	$0\text{ V} \leq U_{CEL} \leq 2\text{ V}$ $2\text{ mA} \leq I_{CEL} \leq 220\text{ mA}$
Output "open"	$16\text{ V} \leq U_{CEH} \leq 30\text{ V DC}$ $0\text{ mA} \leq I_{CEH} \leq 0.2\text{ mA}$
Terminals	41 / 42

Digital switching inputs

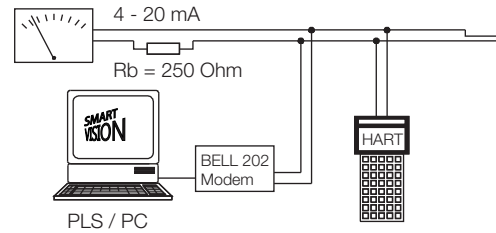
The switching function can be selected via the software.

Switching function	<ul style="list-style-type: none"> – External output zero return – External totalizer reset
Input "On"	$16\text{ V} \leq U_{KL} \leq 30\text{ V}$
Input "Off"	$0\text{ V} \leq U_{KL} \leq 2\text{ V}$
Internal resistance	$R_i = 2\text{ k}\Omega$
Terminals	81 / 82

All inputs and outputs are electrically isolated from one other.

HART protocol

The device is registered with the HART Communication Foundation.



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Fig. 23: Communication via HART protocol

HART protocol

Configuration	<ul style="list-style-type: none"> – Directly on the device – Via software DSV401 + HART-DTM
Transmission	FSK modulation on voltage output 4 ... 20 mA according to Bell 202 standard
Baud rate	1200 baud
Display	Logic 1: 1200 Hz Logic 0: 2200 Hz
Maximum signal amplitude	1.2 mAss
Load at current output	250 ... 560 Ω (in hazardous area: maximum 300 Ω)

Cable

Design	Two-wire cable AWG 24, twisted
Maximum length	1500 m (4921 ft)

See the interface description for detailed information.

System integration:

Communication (configuration, parameterization) can be performed with the DTM (Device Type Manager) available for the device and the corresponding framework applications as per FDT 0.98 or 1.2 (DSV401 R2).

Other tool/system integrations (e.g., Emerson AMS/Siemens PCS7) are available on request.

The necessary DTMs can also be downloaded from www.abb.com/flow.

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

Electrical connections

Connection of transmitter models to peripherals

Models FCB330, FCB350, FCH330, FCH350, FCT330, FCT350

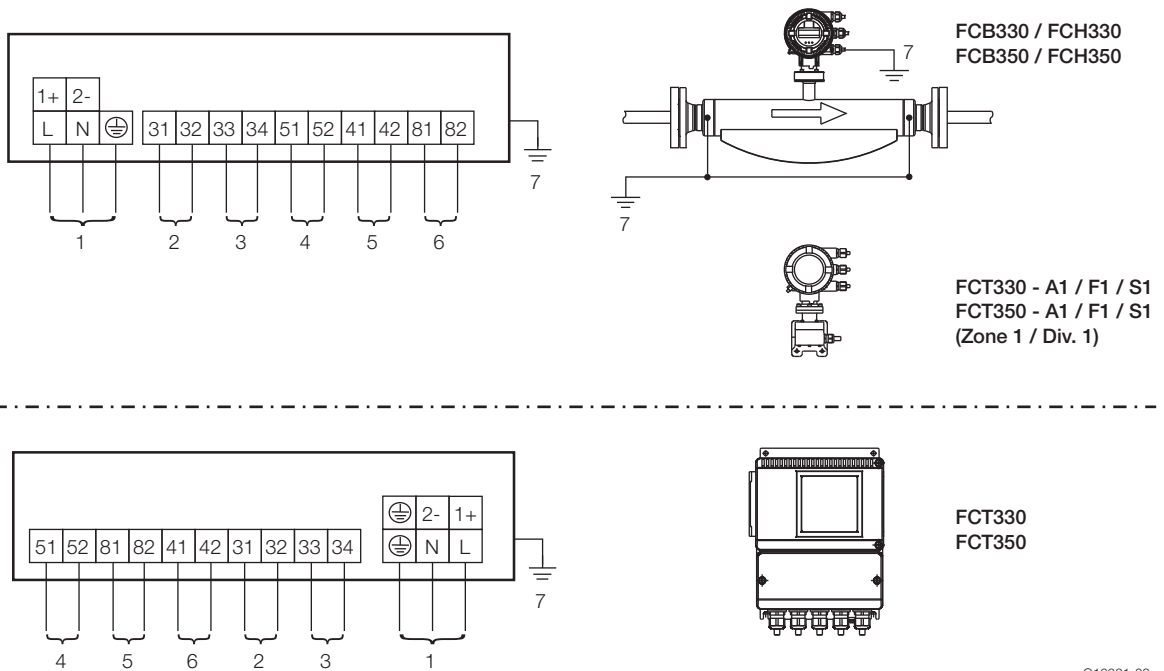


Fig. 24

1 Power supply | 2 Current output 1 | 3 Current output 2 | 4 Pulse output | 5 Digital switching output |
6 Digital switching input | 7 Equipotential bonding (PA)

IMPORTANT (NOTE)

When using the device in hazardous areas, note the additional connection data in the chapter titled "Ex relevant specifications"!

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Terminal	Function
L / N / PE	Power supply, 100 ... 230 V AC, 50/60 Hz
1+ / 2- / PE	Power supply — 24 V AC, 50/60 Hz — 24 V DC
31 / 32	Current output 1, active 0/4 ... 20 mA , ($0 \Omega \leq R_B \leq 560 \Omega$, FCT300-A1/F1:1 $0 \Omega \leq R_B \leq 300 \Omega$) Current output 1, passive 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$), source voltage $12 \leq U_q \leq 30$ V
33 / 34	Current output 2, passive 4 ... 20 mA ($0 \Omega \leq R_B \leq 600 \Omega$), source voltage $12 \leq U_q \leq 30$ V
51 / 52	Pulse output, passive $f_{max} = 5$ kHz, pulse width = 0.1 ... 2000 ms, 0.001 ... 1000 pulses/unit — "Closed": $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$ — "Open": $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V DC}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$ Pulse output active, $U = 16 \dots 30 \text{ V}$, load $\geq 150 \Omega$, $f_{max} = 5$ kHz
41 / 42	Digital switching output, passive — "Closed": $0 \text{ V} \leq U_{CEL} \leq 2 \text{ V}$, $2 \text{ mA} \leq I_{CEL} \leq 220 \text{ mA}$ — "Open": $16 \text{ V} \leq U_{CEH} \leq 30 \text{ V DC}$, $0 \text{ mA} \leq I_{CEH} \leq 0.2 \text{ mA}$
81 / 82	Digital switching input, passive — Input "On": $16 \text{ V} \leq UKL \leq 30 \text{ V}$ — Input "Off": $0 \text{ V} \leq UKL \leq 2 \text{ V}$
-	Equipotential bonding "PA" When the FCT300 transmitter is connected to the FCB3xx / FCH3xx flowmeter sensor, the transmitter must also be connected to "PA".

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Connection examples for the peripherals

Current outputs (including HART communication)

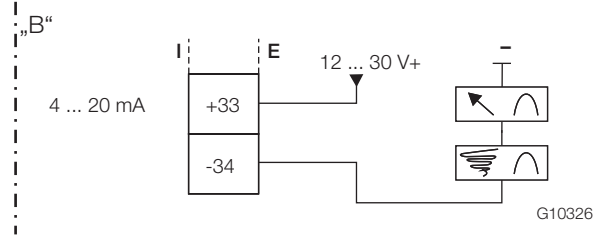
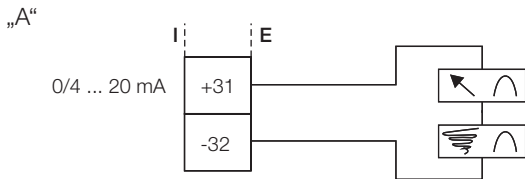


Fig. 25: Active / passive current outputs
 "A" Active | "B" Passive | I Internal | E External

Digital switching output and digital switching input

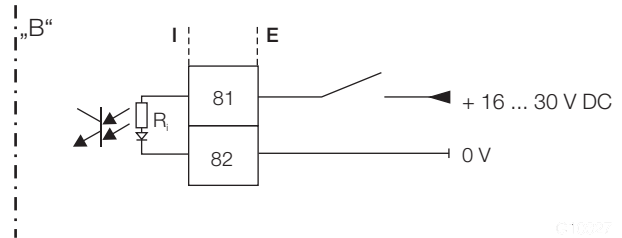
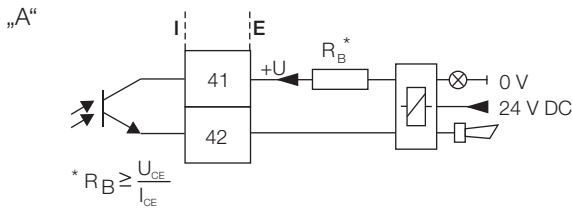


Fig. 26
 "A" Output for system monitoring, min. / max. alarm for empty meter tube or forward / reverse signal |
 "B" Input for external totalizer reset or external output zero return | I Internal | E External

Pulse output

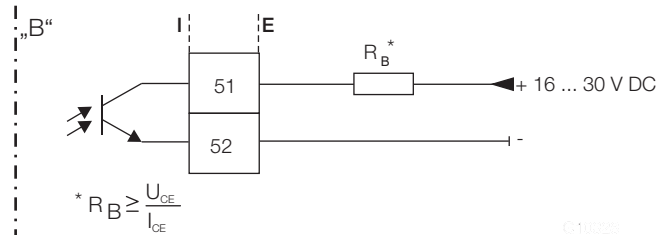
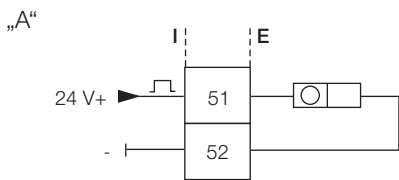
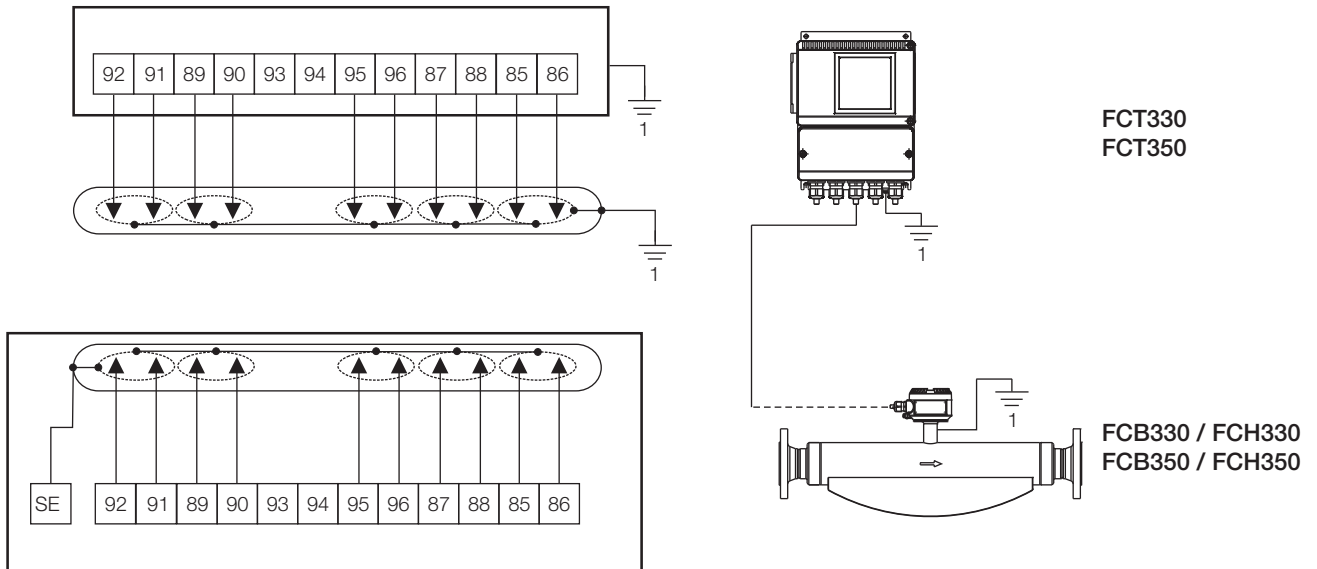


Fig. 27: Active / passive pulse output
 "A" Active | "B" Passive (optocoupler) | I Internal | E External

Connection of transmitter to flowmeter sensor

FCT330, FCT350 transmitter to FCB330, FCB350, FCH330, FCH350 flowmeter sensor



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Fig. 28
1 Equipotential bonding (PA)

Terminal	Corresponding wire color	Function
85	White	Sensor 1
86	Brown	Sensor 1
87	Green	Sensor 2
88	Yellow	Sensor 2
89	Black	Temperature
90	Violet	Temperature

Terminal	Corresponding wire color	Function
91	Gray	Driver
92	Pink	Driver
93	-	Not used
94	-	Not used
95	Blue	Temperature
96	Red	Temperature

IMPORTANT (NOTE)

The precise position of the PA terminals may vary according to the device type. Each terminal is marked accordingly. When the FCT330, FCT350 transmitter is connected to the FCB330, FCB350, FCH330, FCH350 flowmeter sensor, the transmitter must also be connected to "PA".

The following flowmeter sensor / transmitter combinations are permitted:

- FCB330, FCH330 flowmeter sensor with FCT330 transmitter
- FCB350, FCH350 flowmeter sensor with FCT350 transmitter

CoriolisMaster FCB330, FCB350, FCH330, FCH350 Coriolis Mass Flowmeter

Connection of transmitter to flowmeter sensor in Zone 1 / Div. 1

FCT330, FCT350 transmitter to FCB330, FCB350, FCH330, FCH350 flowmeter sensor

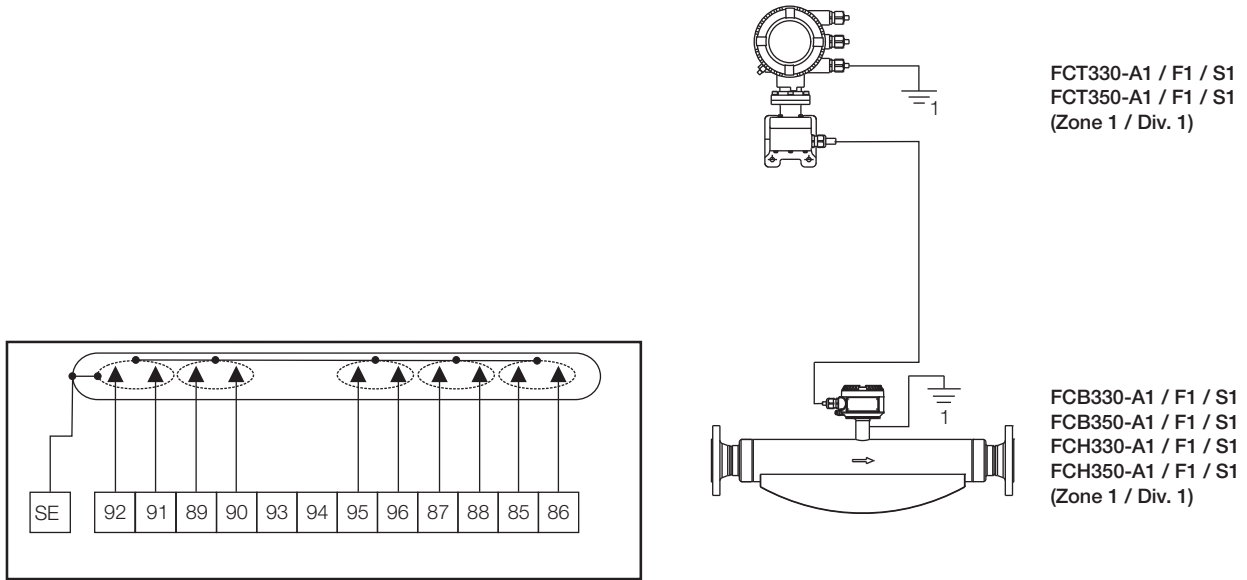


Fig. 29
1 Equipotential bonding (PA)

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Terminal	Corresponding wire color	Function
85	White	Sensor 1
86	Brown	Sensor 1
87	Green	Sensor 2
88	Yellow	Sensor 2
89	Black	Temperature
90	Violet	Temperature

Terminal	Corresponding wire color	Function
91	Gray	Driver
92	Pink	Driver
93	-	Not used
94	-	Not used
95	Blue	Temperature
96	Red	Temperature

IMPORTANT (NOTE)

The wires must be connected in pairs in order to ensure EMC protection.

The following flowmeter sensor / transmitter combinations are permitted:

- FCB330, FCH330 flowmeter sensor with FCT330 transmitter
- FCB350, FCH350 flowmeter sensor with FCT350 transmitter

Dimensions

Transmitter in remote mount design (option F1 or F2)

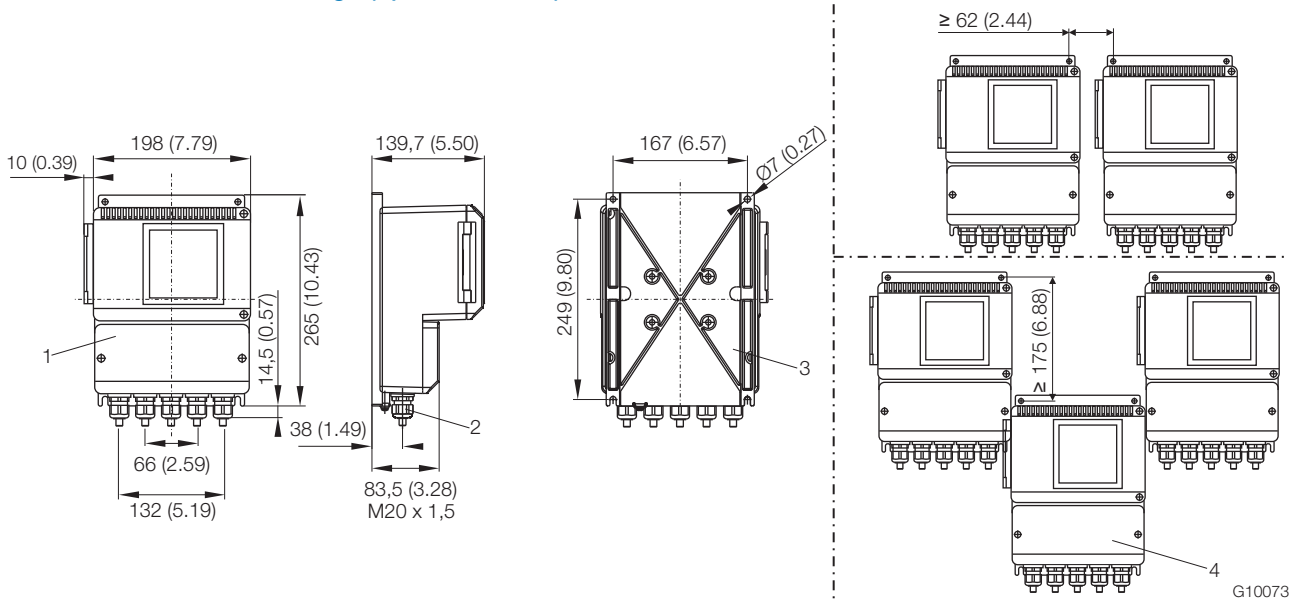


Fig. 30: Dimensions in mm (inch)

- 1 Field-mount enclosure with window | 2 Cable gland M20 x 1.5 or 1/2" NPT |
- 3 Installation holes for pipe mounting set, for 2" pipe installation; mounting set available on request (order no. 612B091U07) |
- 4 IP 67 degree of protection

Transmitter in remote mount design (option R1 or R2)

IP 65 / 67, NEMA 4X

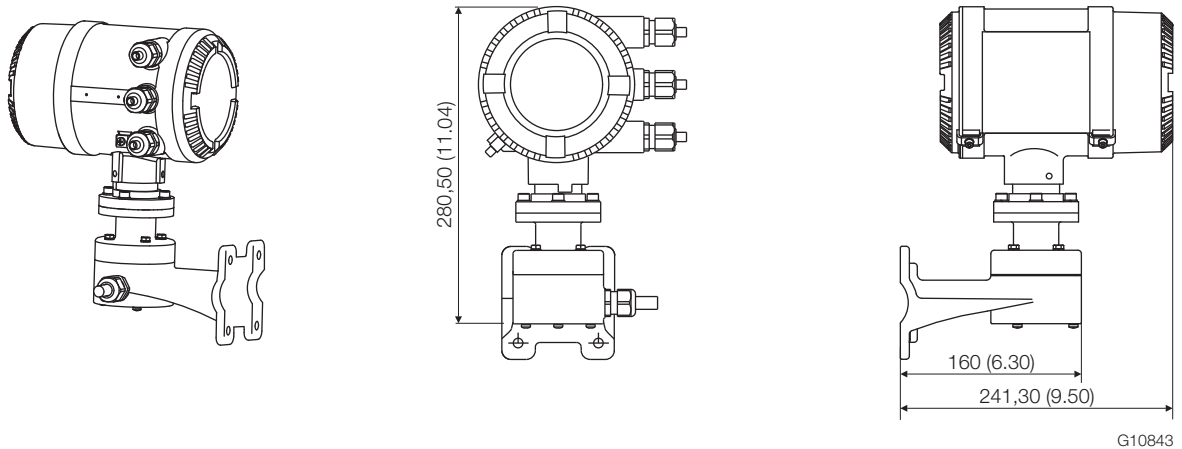


Fig. 31: Dimensions in mm (inch)

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Ordering information

Main ordering information CoriolisMaster FCT330

Base model	FCT330	XX	XX	XX	X
CoriolisMaster FCT330 Coriolis Mass Flowmeter Transmitter					
Explosion Protection Certification					
General Purpose		Y0			
ATEX / IECEX, (Zone 2 / 22)		A2			
ATEX / IECEX, (Zone 1 / 21)		A1			
cFMus version Class 1 Div. 2 (Zone 2 / 21)		F2			
cFMus version Class 1 Div. 1 (Zone 1 / 21)		F1			
NEPSI (Zone 2 / 22)		S2			
NEPSI (Zone 1 / 21)		S1			
Connection Design / Transmitter Housing Type / Transmitter Housing Material / Cable Glands					
Remote / Dual compartment, wall mounted / Aluminium / 4 x M20 x 1.5				R1	
Remote / Dual compartment, wall mounted / Aluminium / 4 x NPT 1/2 in.				R2	
Remote / Dual compartment, wall mounted (field) / Aluminium / 5 x M20 x 1.5				F1	
Remote / Dual compartment, wall mounted (field) / Aluminium / 5 x NPT 1/2 in.				F2	
Others				Z9	
Outputs					
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive, no HART				A1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A3	
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive + HART				H1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H3	
Others				Z9	
Power Supply					
100 ... 230 V AC					A
24 V AC / DC					B

Additional ordering information CoriolisMaster FCT330

	XX	XX	XX
Mounting Bracket Shape / Material			
For 2 in. pipe mounting / Carbon steel	B1		
Documentation Language			
German		M1	
English		M5	
Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)		MW	
Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)		ME	
Others		MZ	
Device Identification Plate			
Stainless steel plate with TAG no.			T1

Main ordering information CoriolisMaster FCT350

Base model	FCT350	XX	XX	XX	X
CoriolisMaster FCT350 Coriolis Mass Flowmeter Transmitter					
Explosion Protection Certification					
General Purpose		Y0			
ATEX / IECEx, (Zone 2 / 22)		A2			
ATEX / IECEx, (Zone 1 / 21)		A1			
cFMus version Class 1 Div. 2 (Zone 2 / 21)		F2			
cFMus version Class 1 Div. 1 (Zone 1 / 21)		F1			
NEPSI (Zone 2 / 22)		S2			
NEPSI (Zone 1 / 21)		S1			
Connection Design / Transmitter Housing Type / Transmitter Housing Material / Cable Glands					
Remote / Dual compartment, wall mounted / Aluminium / 4 x M20 x 1.5			R1		
Remote / Dual compartment, wall mounted / Aluminium / 4 x NPT 1/2 in.			R2		
Remote / Dual compartment, wall mounted (field) / Aluminium / 5 x M20 x 1.5			F1		
Remote / Dual compartment, wall mounted (field) / Aluminium / 5 x NPT 1/2 in.			F2		
Others			Z9		
Outputs					
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive, no HART				A1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive, no HART				A3	
Current output 1 active, Current output 2 passive, Pulse active, Contact in- and output passive + HART				H1	
Current output 1 active, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H2	
Current output 1 passive, Current output 2 passive, Pulse passive, Contact in- and output passive + HART				H3	
Others				Z9	
Power Supply					
100 ... 230 V AC					A
24 V AC / DC					B

Additional ordering information CoriolisMaster FCT350

	XX	XX	XX
Mounting Bracket Shape / Material			
For 2 in. pipe mounting / Carbon steel	B1		
Documentation Language			
German		M1	
English		M5	
Language package Western Europe / Scandinavia (Languages: DE, EN, DA, ES, FR, IT, NL, PT, FI, SV)		MW	
Language package Eastern Europe (Languages: DE, EL, CS, ET, LV, LT, HU, PL, SK, SL, RO, BG)		ME	
Others		MZ	
Device Identification Plate			
Stainless steel plate with TAG no.			T1

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Ex relevant specifications acc. to ATEX / IECEx / NEPSI

Electrical data

Overview of the different output options

Versions	ATEX, IECEx, NEPSI Zone 2	ATEX, IECEx, NEPSI Zone 1
Version I Output option A1, A2, H1, H2 in the order number	– Current output 1: Active – Current output 2: Passive – Pulse output: Active / passive, switchable – Switching input and output: Passive	– Current output 1: Active – Current output 2: Passive – Pulse output: Passive – Switching input and output: Passive
Version II Output option A3, H3 in the order number		– Current output 1: Passive – Current output 2: Passive – Pulse output: Passive – Switching input and output: Passive

Version I: Active / passive current outputs

Model FCx3xx-A1, FCT3xx-A1 or FCx3xx-A2, FCT3xx-A2 or FCx3xx-S2, FCT3xx-S2

	Type of protection "nA" (Zone 2)		General operating values		Type of protection "e" (Zone 1)		Type of protection "ib" (Zone 1)					
	U _i (V)	I _i (mA)	U _b (V)	I _b (mA)	U (V)	I (mA)	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
Switching output, passive Terminals 41 / 42	30	65	30	65	60	35	15	30	115	2.4	2.4	0.17
Switching 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 one other and from the power supply. Only current outputs 1 and 2 in zone 1 design are not electrically isolated from one another.

Version II: Passive / passive current outputs

Model FCx3xx-A1, FCT3xx-A1 or FCx3xx-A2, FCT3xx-A2 or FCx3xx-S2, FCT3xx-S2												
	Type of protection "nA" (Zone 2)		General operating values		Type of protection "e" (Zone 1)		Type of protection "ia" (Zone 1)					
	U _i (V)	I _i (mA)	U _b (V)	I _b (mA)	U (V)	I (mA)	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
Switching output, passive Terminals 41 / 42	30	65	30	65	60	35	60	300	2000	0.47	0.47	0.17
Switching 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 one other and from the auxiliary power.

Special connection conditions

The output circuits are designed so 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. When changing the type of protection, refer to the chapter titled "Changing the type of protection" in the commissioning instructions (CI/FCB300/FCH300) or the operating instructions (OI/FCB300/FCH300).

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 switching 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 (NOTE)

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 hazardous area.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Flowmeter sensor model FCB3xx / FCH3xx

Temperature class

Model FCx3xx-A1Y... or FCx3xx-S1Y... Zone 1			
Ambient temperature	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °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 FCx3xx-A2Y... or FCx3xx-S2Y... Zone 2			
Ambient temperature	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °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 ... 140 °F) (only for integral mount design devices)
T _{medium}	-50 ... 200 °C (-58 ... 392 °F)
Protection class	IP 65, IP 67, and NEMA 4X

Hazardous area approval ATEX / IECEx / NEPSI

Specific marking according to ATEX, IECEx and NEPSI applies depending on the design of the flowmeter sensor (integral or remote mount design).

IMPORTANT (NOTE)

ABB reserves the right to make changes to the Ex-marking. The exact marking can be found at the name plate of the meter.

Modell FCx3xx-A2A... or FCx3xx-S2A... (remote mount design in Zone 2)		
Approval	Marking	Comment
ATEX	II 3 G Ex nA IIC T6 ... T2 II 2 D Ex tD IIIC T85°C .. Tmedium	-
IECEx or NEPSI	Ex nA IIC T6 .. T2 Gc Ex tb IIIC T85°C Tmedium	-
Model FCx3xx-A1A... or FCx3xx-S1A... (remote mount design in Zone 1)		
Approval	Marking	Comment
ATEX	II 1 G Ex ia IIC T6 ... T2 II 1 D Ex ia IIIC T85°C... Tmedium	-
IECEx or NEPSI	T2 Ga Ex ia IIIC T85°C .. Tmedium Da	-
Model FCx3xx-A2Y... or FCx3xx-S2Y... (integral mount design in Zone 2)		
Approval	Marking	Comment
ATEX	II 3 G Ex nA nR IIC T6 ... T2 II 2 D Ex tD IIIC T85°C .. Tmedium	-
IECEx or NEPSI	Ex nA nR IIC T6 .. T2 Gc Ex tb IIIC T85°C Tmedium Db	-
Modell FCx3xx-A1Y... or FCx3xx-S1Y... (integral mount design in Zone 1)		
Approval	Marking	Comment
ATEX		
Version II	II 1/2 G Ex d e ia IIC T6 .. T2 II 2 D Ex ia tb IIIC T85°C .. Tmedium	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	II 1/2 G Ex d e ia ib IIC T6 .. T2 or II 1/2 G Ex d e ia IIC T6 .. T2 II 2 D Ex ia ia tb IIIC T85°C .. Tmedium or II 2 D Ex ia tb IIIC T85°C .. Tmedium	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.
IECEx or NEPSI		
Version II	Ex d e ia IIC T6 .. T2 Ga/Gb Ex ia tb IIIC T85°C .. Tmedium	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	Ex d e ia ib IIC T6 .. T2 Ga/Gb or Ex d e ia IIC T6 .. T2 Ga/Gb Ex ia ib tb IIIC T85°C .. Tmedium or Ex ia tb IIIC T85°C .. Tmedium	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Transmitter model FCT300 in remote mount design

Ambient and process conditions:

T_{amb} -20 ... 60 °C (-4 ... 140 °F)

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

Hazardous area approval ATEX / IECEx / NEPSI

Specific marking according to ATEX, IECEx and NEPSI applies depending on the design of the flowmeter sensor (integral or remote mount design).

IMPORTANT (NOTE)

ABB reserves the right to make changes to the Ex-marking. The exact marking can be found at the name plate of the meter.

Model FCT3xx-Y0... (Transmitter outside the hazardous area, Sensor in Zone 0, 1 or 2)		
Approval	Marking	Comment
ATEX	II (1) G [Ex ia] IIC	-
IECEx or NEPSI	[Ex ia Ga] IIC	-

Model FCT3xx-A2... or FCT3xx-S2... (Transmitter in Zone 2, Sensor in Zone 0, 1 or 2)		
Approval	Marking	Comment
ATEX	II 3(2) G Ex nA nR [ia] IIC T6 II 2 D Ex tb [ia] IIIC T85°C	-
IECEx or NEPSI	Ex nA nR [ia] IIC T6 Gc (Gb) Ex tb [ia] IIIC T85°C Db	-

Modell FCT3xx-A1... or FCT3xx-S1... (Transmitter in Zone 1, Sensor in Zone 0, 1 or 2)		
Approval	Marking	Comment
ATEX		
Version II	II 2 (1) G Ex d e ia IIC T6 II 2 (1) D Ex ia tb IIIC T85°C	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	II 2 (1) G Ex d e ib [ia] IIC T6 or II 2 (1) G Ex d e [ia] IIC T6 II 2 (1) D Ex ib tb [ia] IIIC T85°C or II 2 (1) D Ex tb [ia] IIIC T85°C	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.
IECEx or NEPSI		
Version II	Ex d e ia IIC T6 Gb (Ga) Ex ia tb IIIC T85°C Db (Da)	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	Ex d e ib [ia Ga] IIC T6 Gb or Ex d e [ia Ga] IIC T6 Gb Ex ib tb [ia Da] IIIC T85°C Db or Ex tb [ia Da] IIIC T85°C Db	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.

Ex relevant specifications acc. to cFMus

Overview of the different output options

Versions	Class I Div. 2	Class I Div. 1
Version I Output option A1, A2, H1, H2 in the order number	– Current output 1: Active – Current output 2: Passive – Pulse output: Active / passive, switchable – Switching input and output: Passive	– Current output 1: Active – Current output 2: Passive – Pulse output: Passive – Switching input and output: Passive
Version II Output option A3, H3 in the order number		– Current output 1: Passive – Current output 2: Passive – Pulse output: Passive – Switching input and output: Passive

Electrical data for Div. 2 / Zone 2

Version I: Active / passive current outputs and Version II: passive / passive current outputs

Model FCx3xx-F2, FCT3xx-F2	Type of protection NI	
	V _{max_o} (V)	I _{max_o} (mA)
Current output 1 Terminals 31 / 32	30	30
Current output 2 Terminals 33 / 34	30	30
Pulse output Terminals 51 / 52	30	65
Switching output Terminals 41 / 42	30	65
Switching input Terminals 81 / 82	30	10

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

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Electrical data for Div. 1 / Zone 1

Version I: Active / passive current outputs

Model FCx3xx-F1, FCT3xx-F1								
	Type of protection non IS		Type of protection IS					
	Vmax _o (V)	I _{max} _o (mA)	Vmax _o (V)	I _{max} _o (mA)	P _o (mW)	C _o (nF)	C _{o PA} (nF)	L _o (mH)
Current output 1, active Terminals 31 / 32	30	30	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 Terminals 33 / 34	30	30	30	100	760	2.4	2.4	0.17
Pulse output, active or passive Terminals 51 / 52	30	65	15	30	115	2.4	2.4	0.17
Switching output, passive Terminals 41 / 42	30	65	15	30	115	2.4	2.4	0.17
Switching input, passive Terminals 81 / 82	30	10	30	60	500	2.4	2.4	0.17

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

Version II: Passive / passive current outputs

Model FCx3xx-F1, FCT3xx-F1								
	Type of protection non IS		Type of protection IS					
	V _{max} (V)	I _{max} (mA)	V _{max} (V)	I _{max} (mA)	P _i (mW)	C _i (nF)	C _{iPA} (nF)	L _i (mH)
Current output 1, passive Terminals 31 / 32	30	30	60	300	2000	0.47	0.47	0.17
Current output 2, passive Terminals 33 / 34	30	30	60	300	2000	0.47	0.47	0.17
Pulse output, active or passive Terminals 51 / 52	30	65	60	300	2000	0.47	0.47	0.17
Switching output, passive Terminals 41 / 42	30	65	60	300	2000	0.47	0.47	0.17
Switching input, passive Terminals 81 / 82	30	10	60	300	2000	0.47	0.47	0.17

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

Special connection conditions

The output circuits are designed so 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. When changing the type of protection, refer to the chapter titled "Changing the type of protection" in the commissioning instructions (CI/FCB300/FCH300) or the operating instructions (OI/FCB300/FCH300).

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 retained.

IMPORTANT (NOTE)

The transmitter and flowmeter sensor enclosures must be connected to equipotential bonding PA. The operator must ensure that when connecting the protective conductor PE no potential differences can occur between the protective conductor PE and the equipotential bonding PA.

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Flowmeter sensor model FCB300 / FCH300

Temperature class

Model FCx3xx-F1..., in Class I Div. 1			
Ambient temperature	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °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 FCx3xx-F2..., in Class I Div. 2			
Ambient temperature	≤40 °C (≤104 °F)	≤50 °C (≤122 °F)	≤60 °C (≤140 °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 ... 140 °F) (only for integral mount design devices)

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

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

IMPORTANT (NOTE)

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) in length. Install conduit seals within 18" (45 cm).

Hazardous area approval cFMus

Specific marking according to FM applies depending on the design of the flowmeter sensor (integral or remote mount design).

IMPORTANT (NOTE)

ABB reserves the right to make changes to the Ex-marking. The exact marking can be found at the name plate of the meter.

Model FCx3xx-F2A... (remote mount design in Zone 2, Div 2)		
Approval	Marking	Comment
FM (marking US)	NI: CL I,II,III, DIV 2, GPS ABCDEFG CL I, ZN2, AEx nA IIC T6 ... T2 ZN 21 AEx tb IIIC T85°C ... T165°C	-
FM (marking Canada)	NI: CL I, II, III, Div 2 GPS ABCDEFG Ex nA IIC T6 ... T2	-
Model FCx3xx-F2Y... (integral mount design in Zone 2, Div 2)		
Approval	Marking	Comment
FM (marking US)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP : CL III, Div 1,2 CL I, ZN 2, AEx nA nR IIC T6 ... T2 ZN 21 AEx tb IIIC T85°C ... T165°C	-
FM (marking Canada)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP : CL III, Div 1,2 Ex nA nR IIC T6 ... T2	-
Model FCx3xx-F1A... (remote mount design in Zone 1, Div 1)		
Approval	Marking	Comment
FM (marking US)	CL I, II, III, Div 1, GPS ABCDEFG CL I, ZN0, AEx ia IIC T6 ... T2 ZN 20 AEx ia IIIC T85°C ... T165°C	-
FM (marking Canada)	CL I, II, III, Div 1, GPS ABCDEFG Ex ia IIC T6 ... T2	-

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Model FCx3xx-F1Y... (integral mount design in Zone 1, Div 1)		
Approval	Marking	Comment
FM (marking US)		
Version II	IS: CL I, Div 1, GPS ABCD NI: CL I,II,III, DIV2, GPS ABCDEFG XP: CL I, Div 1, GPS ABCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 CL I, ZN1, AEx d ia IIC T6 ZN 21 AEx ia tb IIC T85°C to T165°C	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, DIV2, GPS ABCDEFG XP: CL I, Div 1, GPS ABCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 CL I, ZN 1, AEx d ia ib IIC T6 or CL I, ZN 1, AEx d ia IIC T6 ZN 21 AEx ib ia tb IIC T85°C or ZN21 AEx tb ia IIC T6	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.
FM (marking Canada)		
Version II	IS: CL I, Div 1, GPS ABCD NI: CL I,II,III, Div 2, GPS ABCDEFG XP: CL I, Div 1, GPS BCD DIP CL II, Div 1, GPS EFG DIP CL III, Div 1, 2 Ex d ia IIC T6	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, Div 2, GPS ABCDEFG XP: CL I, Div 1, GPS BCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 Ex d ia ib IIC T6 or Ex d ia IIC T6	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.

Transmitter model FCT300 in remote mount design

Ambient and process conditions:

T_{amb} -20 ... 60 °C (-4 ... 140 °F)

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

Hazardous area approval cFMus

Specific coding according to FM applies depending on the design of the flowmeter sensor (integral or remote mount design).

IMPORTANT (NOTE)

ABB reserves the right to make changes to the Ex-marking. The exact marking can be found at the name plate of the meter.

Model FCT3xx-Y0... (Transmitter in General Purpose and Sensor in Zone 2, Div 2 or Zone 0, Div 1)		
Approval	Marking	Comment
FM (marking US)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP: CL III, Div 1,2	-
FM (marking Canada)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP: CL III, Div 1,2	-

Model FCT3xx-F2... (Transmitter and Sensor in Zone 2, Div 2)		
Approval	Marking	Comment
FM (marking US)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP: CL III, Div 1,2 CL I, ZN 2, AEx nA nR [ia] IIC T6 ZN 21 AEx tb [ia] IIIC T85°C	-
FM (marking Canada)	NI: CL I, II, III, Div 2 GPS ABCDEFG DIP: CL II Div 1 GPS EFG DIP: CL III, Div 1,2 Ex nA nR [ia] IIC T6	-

CoriolisMaster FCB330, FCB350, FCH330, FCH350

Coriolis Mass Flowmeter

Model FCT3xx-F1... (Transmitter in Zone 1, Div 1, Sensor in Zone 0, 1 or 2, Div 2 oder Div 1)		
Approval	Marking	Comment
FM (marking US)		
Version II	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, DIV2, GPS ABCDEFG XP: CL I, Div 1, GPS ABCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 CL I, ZN1, AEx d ia IIC T6 ZN 21 AEx ia tb IIIC T85°C	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, DIV2, GPS ABCDEFG XP: CL I, Div 1, GPS ABCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 CL I, ZN 1, AEx d ib [ia] IIC T6 or CL I, ZN1, AEx d [ia] IIC T6 ZN21 AEx ib tb [ia] IIIC T85°C or ZN21 AEx tb [ia] IIC T6	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.
FM (marking Canada)		
Version II	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, Div 2, GPS ABCDEFG XP: CL I, Div 1, GPS BCD DIP: CL II, Div 1, GPS EFG DIP: CL III, Div 1, 2 Ex d ia IIC T6	2 passive analog outputs, outputs "ia" / "e", depending on user wiring.
Version I	IS: CL I, Div 1, GPS ABCD NI: CL I, II, III, Div 2, GPS ABCDEFG XP: CL I, Div 1, GPS BCD DIP: CL II, Div 1, GPS EFG DIP CL III, Div 1, 2 Ex d ib [ia] IIC T6 or Ex d [ia] IIC T6	Active / passive analog outputs, outputs "ib" / "e", depending on user wiring.

Trademarks

™ Hastelloy C-4 is a Haynes International trademark

™ Hastelloy C-22 is a Haynes International trademark

™ Hastelloy C-276 is a Haynes International trademark

Questionnaire

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

Process medium:	Liquid content:	Gas content:
Flowrate: (min., max., operating point)	kg/h	
Density: (min., max., operating point)	kg/m ³	
Dynamic viscosity: (min., max., operating point)	mPas/cP	
Process medium 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"/> Integral mount design	<input type="checkbox"/> Remote mount design
Explosion protection:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Power supply:	<input type="checkbox"/> 100 ... 230 V AC, 50/60 Hz	<input type="checkbox"/> 24 V AC/DC, 50/60 Hz
Electrical outputs:	<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"/> Pulse output, passive	Communication: <input type="checkbox"/> HART protocol
Additional specifications:		
Pipeline diameter:mm	
Process connection:	

Notes

Notes

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Service



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