



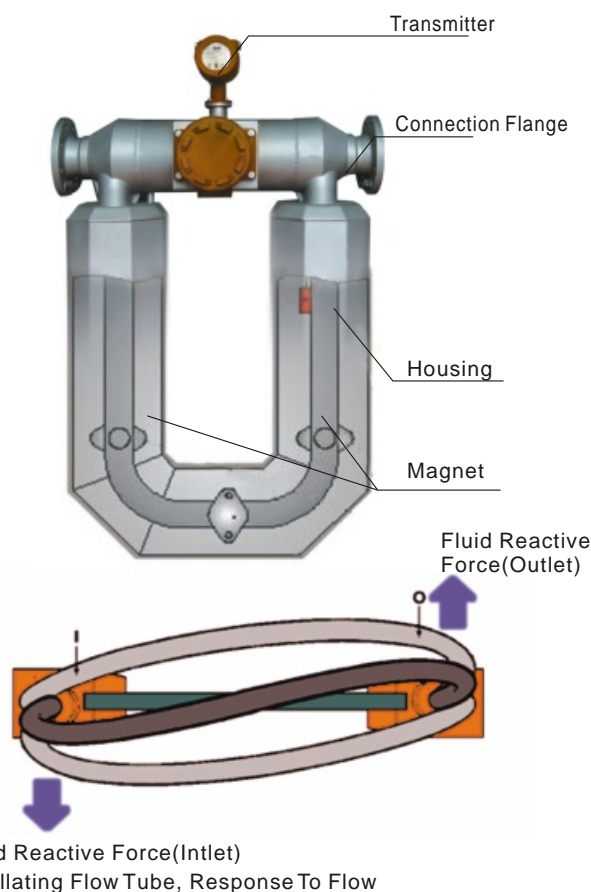
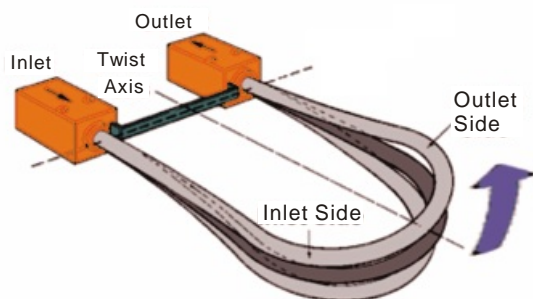
F1001

Coriolis Mass Flow Meter

VF1001-002.00-13/04

Principle

F1001 Coriolis Mass Flow Meter uses two parallel arranged pipes which are rotated at their resonant frequency by coils. Any mass flow passing through the tubes will generate coriolis forces which appear whenever a mass moves radially in a rotating system. The forces have opposed effects on the inlet and outlet sides, they slightly deform the pipes. The excursion of the pipes is detected by sensors on the inlet and outlet side. The phase shift between the rotational frequencies of both pipes are proportional to the mass flow rate. The resonant frequency of both pipes changes in accordance with the density of the medium. This effect determines the density. Using one sensor density and temperature can also be measured. The extent of deformation of the pipes depends on temperature. Therefore the temperature is measured for compensation purposes.



Liquid Flow Range (kg/h)

General Version

Size	Allowable Flow Range	Normal Flow Range for Accuracy $\pm 0.1\%$ & $\pm 0.15\%$	Normal Flow Range for Accuracy $\pm 0.2\%$ & $\pm 0.5\%$	Stability of Zero Point (kg/h)
1/2"	30 to 3000	150 to 3000	100 to 3000	0.38
1"	80 to 8000	400 to 8000	300 to 8000	1
1 1/2"	320 to 32000	2000 to 32000	1500 to 32000	4
2"	500 to 50000	3500 to 50000	2500 to 50000	6.25
3"	1400 to 140000	6000 to 140000	6000 to 140000	17.5
4"	2000 to 200000	15000 to 200000	10000 to 200000	25
6"	5000 to 500000	35000 to 500000	25000 to 500000	62.5
8"	10000 to 1000000	70000 to 1000000	50000 to 1000000	125

Micro-bend Version

Size	Allowable Flow Range	Normal Flow Range for Accuracy $\pm 0.1\%$ & $\pm 0.15\%$	Normal Flow Range for Accuracy $\pm 0.2\%$ & $\pm 0.5\%$	Stability of Zero Point (kg/h)
1 1/2"	240 to 24000	2400 to 24000	1200 to 32000	4
2"	500 to 50000	5000 to 50000	2500 to 50000	6.25
3"	800 to 120000	8000 to 120000	6000 to 140000	17.5
4"	1500 to 200000	15000 to 200000	10000 to 200000	25
6"	5000 to 500000	50000 to 500000	25000 to 500000	62.5
8"	10000 to 1000000	100000 to 1000000	50000 to 1000000	125

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Coriolis Mass Flow Meter

Description

Coriolis mass Flow Meter is a major advance in massflow measurement. These meters have got a precedent for accuracy and repeatability under a wide variety of flow conditions. The inherent precision has established it as a standard for numerous industrial applications. The ability of these meters to measure mass flow and density directly has led to their use in applications ranging from metering food products to corrosive chemicals, **CNG and LNG**. Coriolis meters have proven extremely reliable when metering noncorrosive **medium**. The same reliability can be achieved in corrosive services if consideration is given to the compatibility of the process **medium** with the sensor materials of construction. Coriolis technology appealed to us, after all, coriolis is the most accurate technique available for measuring process mass and volume flow.

Features

- DSP transmitter with superior accuracy $\pm 0.1\%$
- 20:1 turndown ratio
- 5 to 8 calibration points
- Mass flow, density, temperature and volume flow can be measured at the same time
- Improved startup and availability with simple commissioning and reduced risk
- No moving parts result in no maintenance
- Install anywhere with no flow conditioning or straight pipe required

Specification

- Flow Range: 16 kg/h to 2500 t/h
- Connection: Flange/Thread
- Operating Pressure: Customized
- Process Temperature: Up to 662° F (up to +350 °C)
- Body Material: 304 Stainless Steel
- Measuring Tube Material: 316L Stainless Steel
- Ambient Temperature: -40 to 131° F (-40 to +55 °C)
- Working Humidity: (5% to 95%) RH@77° F (+25°C)
- Accuracy: Up to $\pm 0.1\%$
- Repeatability: $\pm 0.05\%$
- Protection: IP 65 (IP 67 optional)
- Approvals: CE, Exd (ib)II CT4
- RS 485 Output
- Pulse Output: 0 to 10 kHz, $\pm 0.001\% \text{F.S}/^\circ\text{C}$
- Current Output: 4 to 20mA, $\pm 0.005\% \text{F.S}/^\circ\text{C}$,
- Power Supply: 85 to 265 VAC, 18 to 36 VDC
- Density Measuring:
 - Range: 0.2 to 2.0 kg/l,
 - Repeatability: 0.001 kg/l

Application

F1001 Coriolis Mass Flow Meter measures the mass flow directly.

The Coriolis measuring principle operates independently of physical fluid properties, such as viscosity and density. It is a proven technology that has been employed in a wide variety of industries such as petroleum, petrochemical industry, **pharmaceutical industry**, paper mill, food and energy, etc.

The typical applications are as follows:

- Batch Control
- Blending
- Process Control
- Filling & Dosing
- Loading and Unloading
- Custody transfer
- Process gas measurement



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GPE

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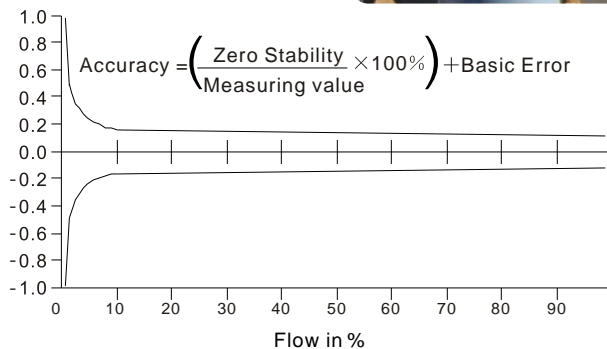


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Coriolis Mass Flow Meter



Accuracy



The diagram shows typical values.
Individual values may be taken from the
calibration records supplied with each meter.

Repeatability

Accuracy	± 0.10%	± 0.20%	± 0.50%
Repeatability	± 0.05%	± 0.1%	± 0.25%

Accuracy is calculated based on the water measurement under the condition of +20°C to 25°C and 0.1MPa to 0.2MPa.

Density Measuring

Density Range	(0.2 to 2.0) g/cm ³
Basic Error	± 0.002g/cm ³ (Affected by the transducer)
Repeatability	0.001g/cm ³

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Coriolis Mass Flowmeter

Dimension and Weight

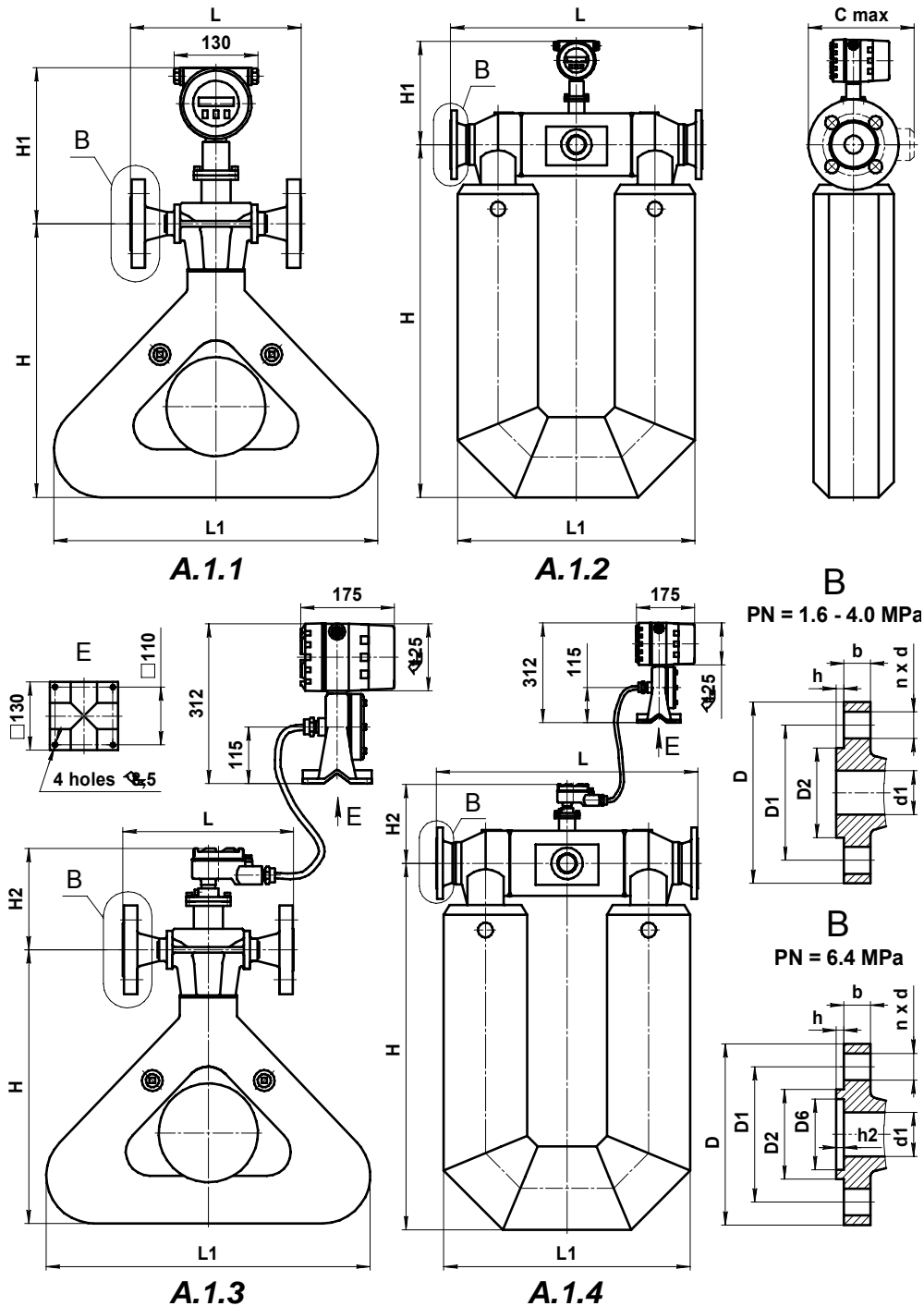


Figure A.1 Outline dimensions

Compact version – Figure A.1.1, A.1.2 (F1001-T and F1001-U series)

Remote version – Figure A.1.3, A.1.4 (F1001-T and F1001-U series)

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Coriolis Mass Flowmeter

Table A.1 – Outline dimensions and weight

Process connection size	Figure	L, mm		L1, mm	H, mm	H1, mm	H2, mm	C max, mm *	Weight, kg	
		1.6-4.0 MPa	6.3 MPa						A.1.1, A.1.2	A.1.3, A.1.4
DN10,3/8 inch	A.1.1; A.1.3	150	170	350	290	260	190	95	11	14
DN15,1/2 inch	A.1.1; A.1.3	180	194	350	300	260	190	95	11	14
DN25,1 inch	A.1.1; A.1.3	200	248	450	420	280	210	115	15	18
DN40,1 1/2 inch	A.1.2; A.1.4	520	547	470	660	280	210	150	30	33
DN50,2 inch	A.1.2; A.1.4	558	588	550	730	290	220	165	35	38
DN80,3 inch	A.1.2; A.1.4	780	808	710	1040	320	250	205	80	83
DN100,4 inch	A.1.2; A.1.4	920	948	860	1140	350	280	416	185	188
DN150,6 inch	A.1.2; A.1.4	1100	1140	1050	1520	380	310	440	320	323
DN200,8 inch	A.1.2; A.1.4	1364	1410	1160	1655	420	350	535	625	628

* Overall width of the body, excluding transmitter

Table A.2 – Flowmeter flange dimensions

Process connection size	PN, MPa	d1, mm	D6, mm	D2, mm	D1, mm	D, mm	b, mm	h, mm	h2, mm	n	d, mm
DN10,3/8 inch	1.6; 2.5; 4	10	–	40	60	90	12	2	–	4	14
	6.4	8	35	41	70	100	16	4	3	4	14
DN15,1/2 inch	1.6; 2.5; 4	15	–	46	65	95	12	2	–	4	14
	6.4	11.6	40	46	75	105	16	4	3	4	14
DN25,1 inch	1.6; 2.5; 4	27.3	–	65	85	115	13	3	–	4	14
	6.4	24.8	58	65	100	140	20	4	3	4	18
DN40,1 1/2 inch	1.6; 2.5; 4	41.1	–	85	110	150	15	3	–	4	18
	6.4	37	76	84	125	170	22	4	3	4	22
DN50,2 inch	1.6; 2.5; 4	52.3	–	99	125	165	18	2	–	4	18
	6.4	47	88	99	135	180	22	4	3	4	22
DN80,3 inch	1.6; 2.5; 4	79.5	–	132	160	200	20	2	–	8	18
	6.4	77	121	132	170	215	24	4	3	8	22
DN100,4 inch	1.6; 2.5; 4	101.7	–	156	190	235	21	3	–	8	22
	6.4	94	150	156	200	250	25.5	4.5	3.5	8	26
DN150,6 inch	1.6; 2.5; 4	154	–	211	250	300	26	2	–	8	26
	6.4	142	204	211	280	345	31.5	4.5	3.5	8	33
DN200,8 inch	1.6; 2.5; 4	200	–	285	320	375	35	3	–	12	30
	6.4	198	260	284	345	415	37.5	4.5	3.5	12	36

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Coriolis Mass Flowmeter

Dimension and Weight

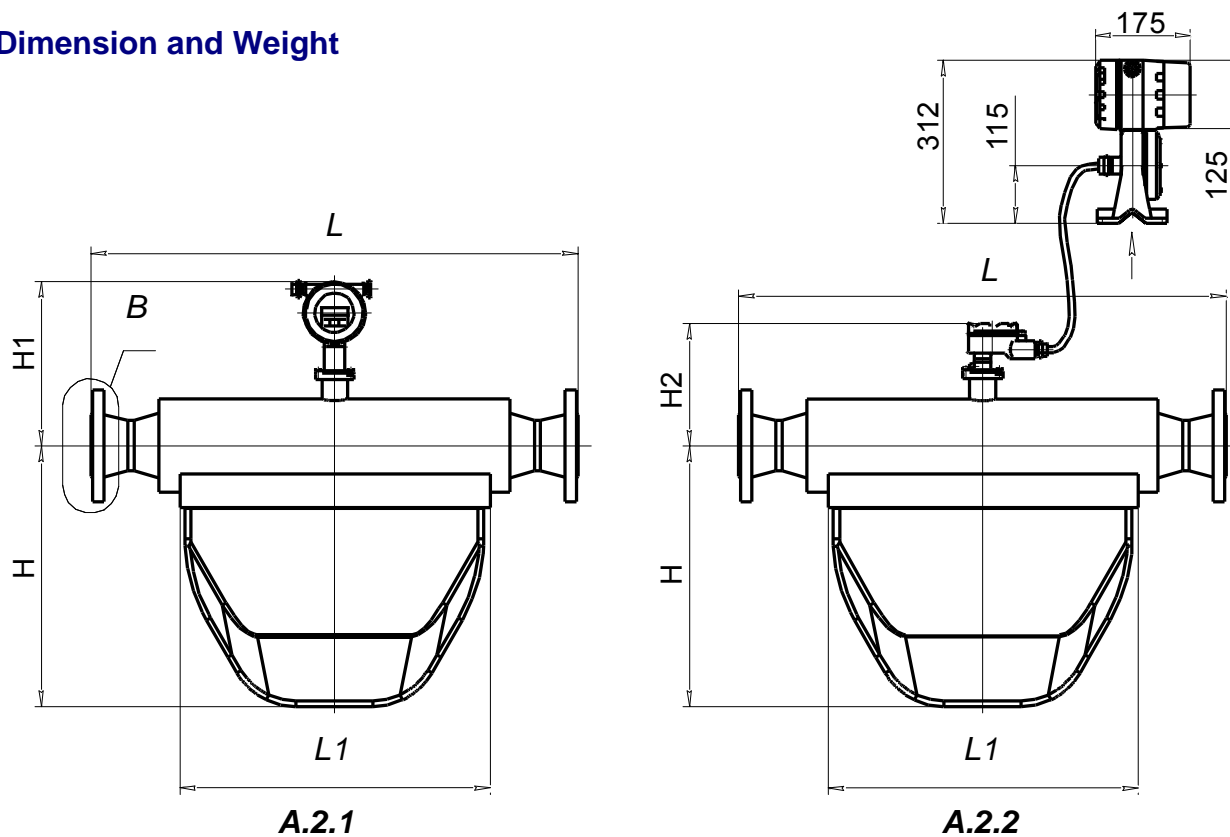


Figure A.2 Outline dimensions (F1001-M series)
Integral type – Figure A.2.1 Separate type – Figure A.2.2

Table A.3 – Outline dimensions and weight

Process connection size	Figure	L, mm		L ₁ , mm	H, mm	H ₁ , mm	H ₂ , mm	C max, mm *	Weight, kg	
		1.6-4.0 MPa	6.3 MPa						A.2.1	A.2.2
DN10, 3/8 inch	A.2	360	374	240	180	290	220	95	10	13
DN15, 1/2 inch	A.2	400	414	280	184	290	220	115	11	14
DN25, 1 inch	A.2	500	536	360	250	300	230	150	15	18
DN40, 1 1/2 inch	A.2	600	634	460	300	310	240	165	30	33
DN50, 2 inch	A.2	800	828	640	410	320	250	205	35	38
DN80, 3 inch	A.2	900	928	700	490	350	280	416	75	78
DN100, 4 inch	A.2	1130	1156	860	660	370	290	440	132	135
DN150, 6 inch	A.2	1410	1450	1200	900	400	330	535	263	265
DN200, 8 inch	A2	1800	1844	1450	1170	420	350	580	427	430

* Overall width of the body, excluding transmitter

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Coriolis Mass Flowmeter

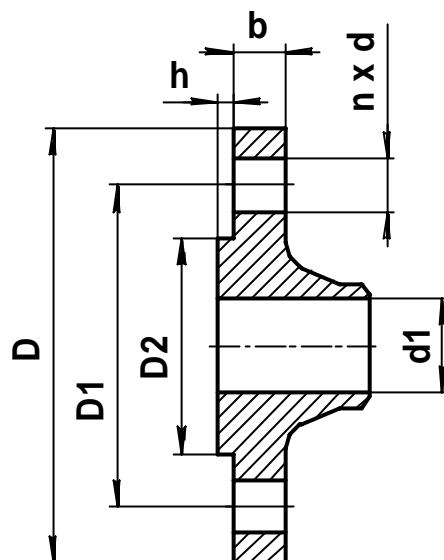


Figure A.2 Outline dimensions of connection kit flanges

Table A.4 – Connection kit flange dimensions and weight

DN(mm), inch	PN, MPa	d1, mm	D2, mm	D1, mm	D, mm	b, mm	h, mm	n	d, mm	Weight, kg
DN10, 3/8inch	1.6; 2.5; 4	10	40	60	90	12	2	4	14	0.7
	6.4	8	34	70	100	16	4	4	14	1.0
DN15, 1inch	1.6; 2.5; 4	15	46	65	95	12	2	4	14	0.8
	6.4	11.6	39	75	105	16	4	4	14	1.1
DN25, 1inch	1.6; 2.5; 4	27.3	65	85	115	13	3	4	14	1.2
	6.4	24.8	57	100	140	20	4	4	18	2.3
DN40, 1 1/2inch	1.6; 2.5; 4	41.1	85	110	150	13	3	4	18	2.1
	6.4	37	75	125	170	22	4	4	22	3.7
DN50, 2 inch	1.6; 2.5; 4	52.3	99	125	165	18	2	4	18	2.8
	6.4	47	87	135	180	22	4	4	22	4.6
DN80, 3 inch	1.6; 2.5; 4	79.5	132	160	200	20	2	8	18	4.8
	6.4	77	120	170	215	24	4	8	22	7.2
DN100, 4 inch	1.6; 2.5; 4	101.7	156	190	235	21	3	8	22	7.0
	6.4	94	149	200	250	25.5	4.5	8	26	10.7
DN150, 6inch	1.6; 2.5; 4	154	211	250	300	26	2	8	26	13.2
	6.4	142	203	280	345	31.5	4.5	8	33	25.4
DN200, 8inch	1.6; 2.5; 4	200	285	320	375	35	3	12	30	24.0
	6.4	198	259	345	415	37.5	4.5	12	36	38.5

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Coriolis Mass Flowmeter

Dimension and Weight

Flange connection

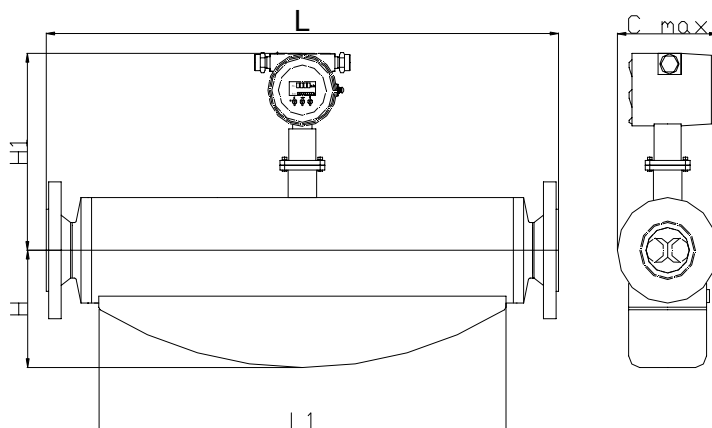


Figure A.3.1 Outline dimensions (F1001-S series)

Table A.3.1 – Outline dimensions and weight

Process connection size	Figure	L, mm		L ₁ , mm	H, mm	H ₁ , mm	C max, mm *	Weight, kg
		1.6-4.0 MPa	6.3MPa					A.3
DN50, 2 inch	A.3	800	834	450	200	315	205	30
DN80, 3 inch	A.3	935	973	645	200	335	416	60

* Overall width of the body, excluding transmitter

Tri-clamp connection

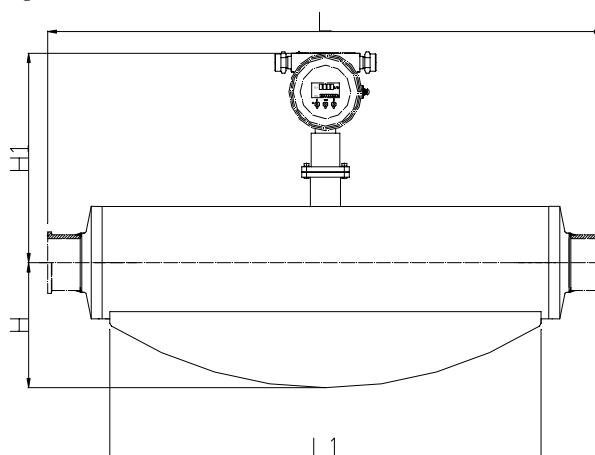


Figure A.3.2 Outline dimensions (F1001-S series)

Table A.3.2 – Outline dimensions and weight

Process connection size	Figure	L, mm		L ₁ , mm	H, mm	H ₁ , mm	C max, mm *	Weight, kg
		1.6-4.0 MPa	6.3 MPa					A.3
DN50, 2 inch	A.4	800	834	450	200	315	205	30
DN80, 3 inch	A.4	935	973	645	200	335	416	60

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Coriolis Mass Flow Meter

Model Selection

F1001-Series

Example F1001-025 LAN2COMEX2P1

F1001	Size	Medium	Sensor Version	Connection	PN	Struct.	Ex	Power	Output	Accuracy	Description	
½"	015										Size	
1"	025											
1½"	040											
2"	050											
3"	080											
4"	100											
6"	150											
8"	200											
Liquid												L
Gas		G										
Triangle-shaped Version (Size from 1/2" to 1")		T									Meter Body Shape	
U-shaped Version (Size from 1 1/2" to 8")		U										
Micro-bend Version(Size from 1/2" to 8")		M										
Super Micro-bend Version (Size 3")		S										
ANSI			AN									Flange Standard
DIN			DI									
JIS			JS									
Sanitary fitting(for micro-bend version only)			SF									
Others			OF									
230psi(16bar)					1						Max. Working Pressure	
360psi(25bar)					2							
580psi(40bar)					3							
915psi(63bar)					4							
Compact Version (-58 ° F to +257 ° F)						COM						Housing
Remote Version (-58 ° F to +482 ° F)						REM						
Non-Explosion							NX					Approval
Explosion proof							EX					
DC18 to 36V								1				Power Supply
AC85 to 265V								2				
4 to 20mA/Pulse									P			Signal Output
RS485+Pulse+4 to 20mA									R			
Hart+Pulse+4 to 20mA									H			
±0.1%										1	Accuracy	
±0.2%										2		
±0.5%										5		

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