



Effective: April , 2020

Advanced mass metering technology GPE F1001 Coriolis mass flow meter

Typical application

- Custody Transfer
- Reactor Feed Ratio
- Density Measurement
- Batch Control

Industries

- Chemicals
- Food & Beverages
- Machinery
- Minerals & Mining
- Oil & Gas
- Pharmaceuticals
- Power Plant
- Pulp & Paper
- Water
- Waste Water



GPE TM FLOW MEASUREMENT EXPERT !

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F1001

Coriolis Mass Flowmeter

INTRODUCTION

GPE F1001 Coriolis mass flowmeter provides best mass flow, density and temperature measurement performance, and also calculate volume flow, total flow and fluid composition in real-time. Currently it has three styles available which are M type sensor, U type sensor and S type sensor, Meanwhile each series has its own compact and remote meters.

In general, a typical mass flowmeter is made up of a flow sensor and a signal transmitter. The flow sensor is designed to equip two flow tubes for vibration which resulting in signals for pickoff; The signal transmitter is employed with digital signal processor (DSP), and dynamic vibration balance (DVB) circuit to deliver fast response but accurate measurement performance. In addition, in situ node-configuration, diagnostics and data recording are easily handled via HART or Modbus RTU communication.



coriolis mass flow meter families

FEATURES

- Robust, no moving parts for long life
- Custom flow connectors& installation lengths
- Excellent repeatability (0.05%of flow rate) Optional Net Oil functionality
- NIST Traceable NTEP certificates for custody transfer

MATERIALS

- Tubes: SS316L (Hastalloy C for options)
- Flow Splitter: SS304 (SS316L and Hastalloy C for options)
- Flanges: SS304((SS316L and Hastalloy C for options)
- Housing case(NON WETTED PARTS)
SS304(SS316L for options)
- Options: NACE MR 0175/0103 compliant

EX Certificates



UL & CSA

ATEX & IECEx



Class I, Division. 1 Group B, C and D
Zone 1 and Zone 2: Groups IIA or
Group IIB or IIC, T1...T6
Ex db ib IIA/IIB/IIC T*Gb

BENEFITS

- Increased productivity, less maintenance
- Lower installation cost
- Increased product quality
- Simpler whole solution for Net Oil without PLC/RTU

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APPLICATION

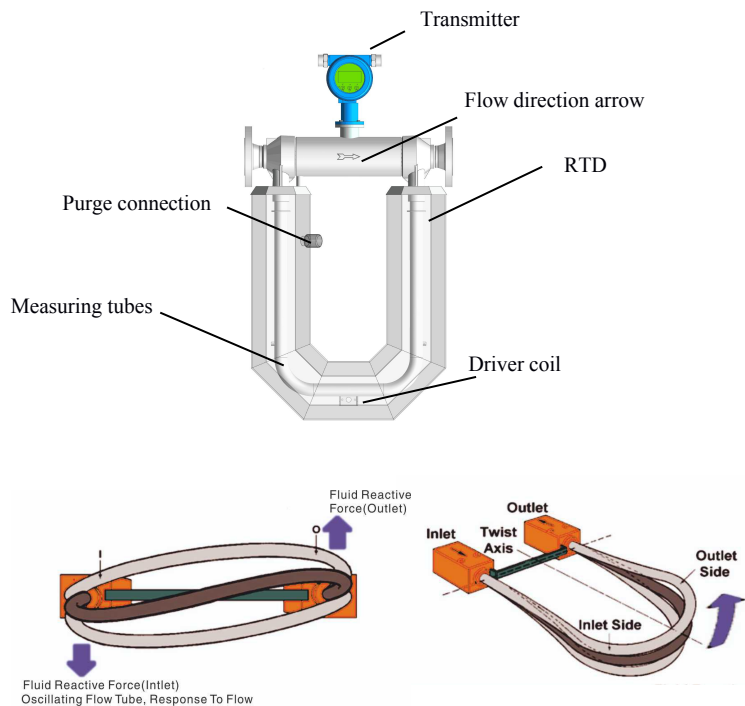
F1001 mass flowmeter is suitable for the most complex and challenging environment for liquid, gas and slurry applications.

Process fluid	Typical application	Industries	
Liquid	Custody Transfer	Chemicals	Pharmaceuticals
	Reactor Feed	Food & Beverages	
Gas	Ratio	Machinery	Power Plant
Slurry	Density Measurement	Minerals & Mining	Pulp & Paper
	Batch Control	Oil & Gas	Water



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.



Technical Specification

Flow rate	
Mass flow rate(max.):	3,307,000lb/h (1500,000 kg/h)
Volumetric Flow Rate (max.):	6604GPM or 9434BPD or 1500,000liter/h
PRESSURE	3770 PSI (26 MPa), 5800PSIG (40MPa) available (see pressure range table)

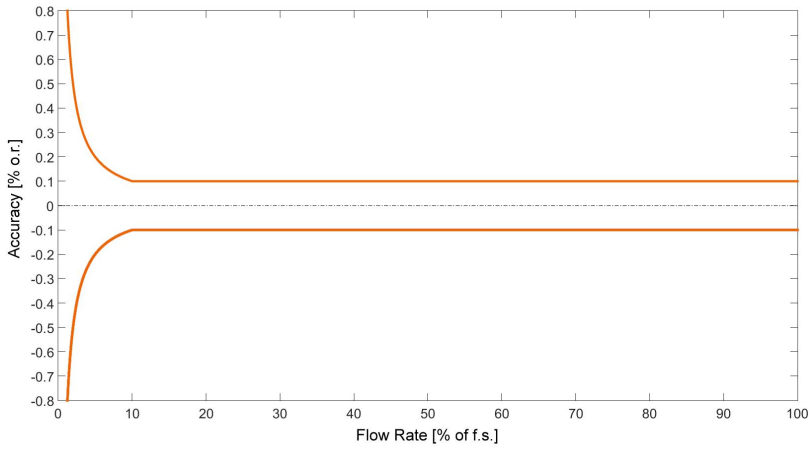
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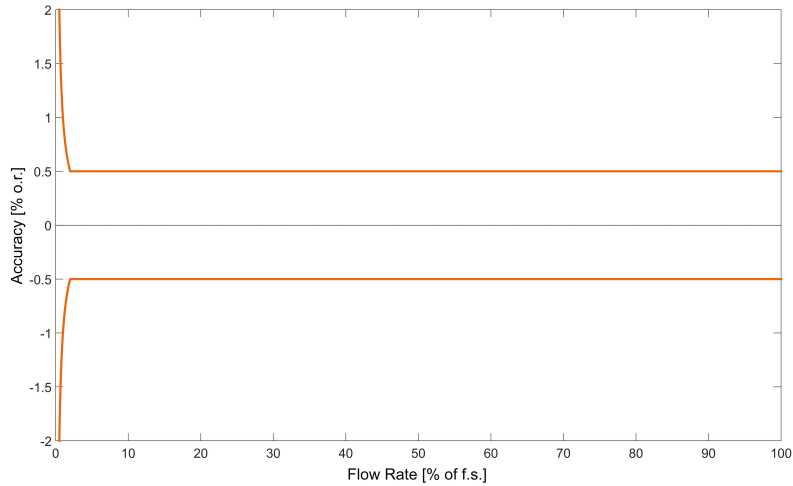
Accuracy For Liquids:

(Five-Point Calibration, Basic Accuracy: $\pm 0.1\%$)



Accuracy For Gases:

(Five-Point Calibration, Basic Accuracy: $\pm 0.5\%$)



Flow Rate of full Scale	Accuracy
$\geq \frac{\text{Zero Point}}{\text{Basic Accuracy}} * 100$	$\pm \text{Basic Accuracy}$
$< \frac{\text{Zero Point}}{\text{Basic Accuracy}} * 100$	$\pm \frac{\text{Zero Point}}{\text{Measured Value}} * 100$

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ACCURACY (LIQUIDS)

Basic Accuracy (Mass flow) ² :	±0.1%, ±0.15%, ±0.2% or ±0.5%
Mass Flow Repeatability:	0.05%, 0.075%, 0.1%, 0.25%
Basic Accuracy (Volume flow) ² :	±0.4 % (option: up to ±0.15 %) of flow rate
Repeatability (Volume Flow):	0.05 % of flow rate
Zero Stability:	±0.01 % of full scale

ACCURACY (GASES)

Basic Accuracy (Mass flow) ² :	±1% (option: up to ±0.5 %) of flow rate
Mass Flow Repeatability:	0.25 % of flow rate

DENSITY

Density Range:	up to 2500 kg/m ³ , 2.5 g/cm ³
Density Accuracy: ²	±1.0 kg/m ³ , ±0.001 g/cm ³
Density Repeatability:	0.5 kg/m ³ , 0.0005 g/cm ³

TEMPERATURE

Process Temperature Range:	-50 °C ... +250 °C (-40 °F ... +212 °F)
Option:	-196 °C ... +55 °C (-320.8...131 °F)
Temperature Accuracy:	±1 °C ±0.5 % of reading (±1.8 °F ± 0.5% of reading)
Temperature Repeatability:	0.2 °C (±0.36 °F)
Ambient Temperature	-40 to 131 °F (-40 to +55 °C)
Output	4-20 mA and Pulse/Frequency , Optional: HART or Modbus RS485 Pulse Output: 0 to 10 kHz, 0.001%F.S; Current Output: 4 to 20mA, 0.005%F.S
Electronics	Direct Mount or Remote Mount
Graphic Display	OLED
Operating Elements	3 optical keys for operator
Electromagnetic compatibility	Criteria A, complied with IEC 61000-4-2
Power Supply	85 to 265 VAC, 18 to 36 VDC
IP	Standard IP65, IP67 for options

- Stated flow accuracy combines the effects of repeatability, linearity and hysteresis.
- The specifications refer to standard conditions (for further information see GPE -F1001 Series Manual).

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Flow range

Flow range for liquid(Metric unit in kg/hr) Table 1.1

Model: F1001-U type sensor

F1001- U size 1 ½” inch to 8 inch

Size(inch)	Full flow range, kg/h r	Accuracy flow range, kg/h r		Zero stability, kg/h
		+/-0.1% and +/-0.15%	+/-0.2% and +/-0.5%	
1 ½”	240– 32,000	2,500 – 32,000	2,000 – 32,000	0.9
2”	500 – 50,000	3,500 – 50,000	2,500 – 50,000	1.5
3”	800– 140,000	8,000 – 140,000	7,000 – 140,000	3.5
4”	1,500– 200,000	15,000 – 200,000	12,000 – 200,000	7
6”	5,000 – 500,000	50,000 – 500,000	35,000 – 500,000	17
8”	10,000 – 1,200,000	200,000 – 1,200,000	12,000 – 1,200,000	45

Flow range for liquid(US unit in lb/hr) Table 1.2

Model: F1001-U type sensor

F1001- U: size 1 1/2inch to 8 inch

Size(inch)	Full flow range, lb/hr	Accuracy flow range, lb/hr		Zero stability, lb/hr
		+/-0.1% and +/-0.15%	+/-0.2% and +/-0.5%	
1 ½”	530-70,548	5,511-70,548	3,306-70,548	1.98
2”	1,103-110,231	7,716-110,231	4409-110,231	3.31
3”	1763-308,647	17,636-308,647	13,227-308,647	7.72
4”	3370-440,924	33,069-440,924	22,046-440,924	15.43
6”	11,023-1,102,311	110,231-1,102,311	61,729-1,102,311	37.48
8”	22,046-2,645,547	440,924-2,645,547	176,369-2,645,547	99.21

Flow range fo liquid(Metric unit in kg/hr) Table 1.3

Model: F1001-M series Micro bend sensor Size 1/8 inch to 10 inch

Size(inch)	Full flow range, kg/hr	Accuracy flow range, kg/hr		Zero stability, kg/hr
		+/-0.1% and +/-0.15%	+/-0.2% and +/-0.5%	
1/8”	1.2–120	10–120	6–120	0.004
3/8”	10 – 1,000	100– 1,000	70 – 1,000	0.045
1/2”	20 – 3,000	300 – 3,000	200 – 3,000	0.09
1”	80 – 8,000	600 – 8,000	300– 8,000	0.25
1 ½”	240– 32,000	2,400– 3,200	1,200– 3,200	1
2”	500 – 50,000	5,000 – 50,000	2,500– 50,000	2
3”	800– 120,000	10,000– 120,000	8,000– 120,000	3.5
4”	1,500– 200,000	20,000– 200,000	15,000– 200,000	7
6”	5,000 – 500,000	50,000 – 500,000	35,000 – 500,000	23
8”	10,000 – 1,000,000	100,000 – 1,000,000	70,000 – 1,000,000	45
10”	15,000 – 1,500,000	150,000–1,500,000	75,000–1,500,000	70

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U type super bend sensor

Size from 1 1/2 ”to 8 ”

These flowmeters are comprised of two tubes that are arranged in the shape of the letter ‘U’, a magnet and coil assembly, and sensors at the inlet and outlet of the tubes. Coriolis forces exerted by the flow medium are used to determine the mass flow rate and density of the medium. U type is the best and most stable sensor for custody transfer measurement.



M type Micro-bend sensor

Size from 1/8 ”to 12 ”

These flowmeters are comprised of two V-Shaped tubes in a casing with a considerably smaller radius than conventional U-Shaped Coriolis flowmeters. The smaller radius ensures a more compact instrument with significantly lower pressure Loss values compared to other flowmeters.



S type super bend sensor

Size from 2 ”to 3 ”

These flowmeters are comprised of two less bend tubes in a casing with a considerably smaller radius than conventional M-Shaped Coriolis flowmeters. less sizing means less installation dimension requirement for smart process

Ordering code

** Please contact your local GPE application engineer when ordering.

You also need to provide the following information when ordering :

Ordering Model	Fluid Name	Flange type	Temperature	Process pressure.

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