

Micro Motion[®] TA-Series Flow and Density Meters



Best fit for application

- Remote transmitters available to match installation mounting requirements
- All wetted materials constructed from tantalum to handle corrosive applications such as acids

Exceptional reliability and safety

- Low operating frequency for robust measurement
- Reliable sensor design minimizes down time and process interruption costs

Micro Motion TA-Series flow meters

Tantalum (TA) meters deliver superb measurement with exceptional flow and density performance as well as outstanding reliability in corrosive service environments.

Optimal flow and density fit for corrosive process control applications

- High performance rugged measurement in a compact design
- Low frequency, high sensitivity fit-and-forget meter provides robust measurements even under demanding process conditions
- Multiple line sizes provide an ideal platform for batching, distribution, allocation and intra-plant measurement applications

Industry-leading capabilities that unleash your process potential

- Available exclusively with the Model 5700 transmitter, with a wide range of input and output options, and an intuitive interface
- State of the art, ISO/IEC 17025 compliant calibration stands achieving $\pm 0.014\%$ uncertainty drive exceptional measurement accuracy
- True multi-variable technology measures necessary flow and density process variables simultaneously

Smart Meter Verification

Provides a quick, complete assessment of a Micro Motion Coriolis meter, determining whether the meter has been affected by erosion, corrosion, or other influences affecting meter calibration. No secondary references are required to perform this operation, and the meter can continue normal process measurement while the test is in progress.

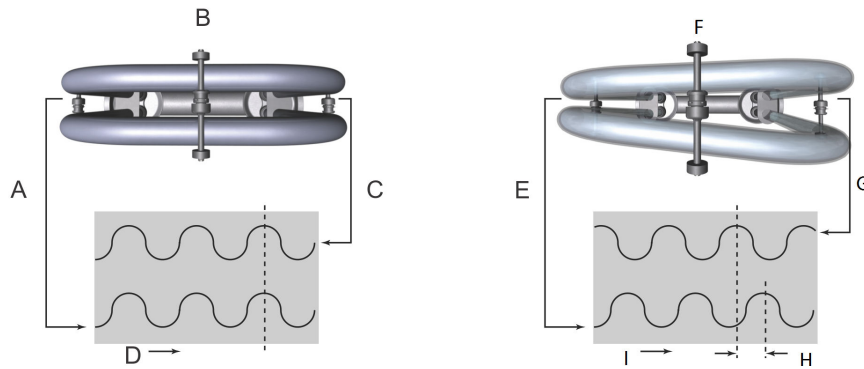
Measurement principles

As a practical application of the Coriolis effect, the Coriolis mass flow meter operating principle involves inducing a vibration of the flow tube through which the fluid passes. The vibration, though it is not completely circular, provides the rotating reference frame which gives rise to the Coriolis effect. While specific methods vary according to the design of the flow meter, sensors monitor and analyze changes in frequency, phase shift, and amplitude of the vibrating flow tubes. The changes observed represent the mass flow rate and density of the fluid.

Mass flow measurement

The measuring tubes are forced to oscillate producing a sine wave. At zero flow, the two tubes vibrate in phase with each other. When flow is introduced, the Coriolis forces cause the tubes to twist resulting in a phase shift. The time difference between the waves is measured and is directly proportional to the mass flow rate.

Watch this video to learn more about how a Coriolis flow meter measures mass flow and density (click the link and select **View Videos**): <https://www.emerson.com/en-us/automation/measurement-instrumentation/flow-measurement/coriolis-flow-meters>.



- A. Inlet pickoff displacement
- B. No flow
- C. Outlet pickoff displacement
- D. Time
- E. Inlet pickoff displacement
- F. With flow
- G. Outlet pickoff displacement
- H. Time difference
- I. Time

Temperature measurement

Temperature is a measured variable that is available as an output. The temperature is also used internal to the sensor to compensate for temperature influences on Young's Modulus of Elasticity.

Meter characteristics

- Measurement accuracy is a function of fluid mass flow rate independent of operating temperature, pressure, or composition. However, pressure drop through the sensor is dependent upon operating temperature, pressure, and fluid composition.
- Specifications and capabilities vary by model and certain models may have fewer available options. For detailed information regarding performance and capabilities, either contact customer service or refer to www.emerson.com/flowmeasurement.

Performance specifications

Reference operating conditions

For determining the performance capabilities of our meters, the following conditions were used as a basis:

- Water at 68 °F (20.0 °C) to 77 °F (25.0 °C) and 14.5 psig (1.000 barg) to 29 psig (2.00 barg)
- Accuracy based on industry leading accredited calibration stands according to ISO 17025/IEC 17025
- All models have a density range up to 2 g/cm³ (2,000 kg/m³)

Accuracy and repeatability

Accuracy and repeatability on liquids and slurries

Performance specification	All models
Mass flow accuracy ⁽¹⁾	±0.10% of rate ±z.s.
Volume flow accuracy ⁽¹⁾ Volume flow accuracy is a combination of mass flow and density accuracy.	±0.10% of rate ±z.s.
Mass flow repeatability ⁽²⁾	±0.05% ± [½ (zero stability / flow rate) × 100] % of rate
Volume flow repeatability ⁽²⁾	±0.05% ± [½ (zero stability / flow rate) × 100] % of rate
Density accuracy	±0.001 g/cc
Density repeatability	±0.0005 g/cc
Temperature accuracy	±1.5 °C ±0.5% of reading
Temperature repeatability	±1.5 °C

(1) Accuracy = +/-0.10% +/- (zero stability/flow rate) x 100%

(2) Repeatability = ±0.05% ± [½ (zero stability / flow rate) × 100]% of rate

Liquid flow rates

Nominal flow rate

Micro Motion has adopted the term nominal flow rate, which is the flow rate at which water at reference conditions causes approximately 14.5 psig (1.000 barg) of pressure drop across the meter.

Mass flow rates for all models

Model	Nominal line size	Nominal flow rate	Maximum flow rate
TA010T	0.098 in (2.49 mm)	11.9 lb/min 325 kg/h	12.9 lb/min 350 kg/h
TA025T	0.24 in (6.1 mm)	41.5 lb/min 1130 kg/h	44.1 lb/min 1200 kg/h
TA050T	0.5 in (13 mm)	110.2 lb/min 3000 kg/h 8.267 psig (0.56999 barg)	110.2 lb/min 3000 kg/h
TA075T	0.75 in (19.0 mm)	191.1 lb/min 5200 kg/h	220.5 lb/min 6000 kg/h
TA100T	0.98 in (24.9 mm)	503.4 lb/min 13700 kg/h	661.4 lb/min 18000 kg/h
TA200T	2 in (51 mm)	1102.3 lb/min 30000 kg/h	1102.3 lb/min 30000 kg/h

Volume flow rates for all models

Model	Nominal flow rate			Maximum flow rate		
	gal/min	barrels/h	l/h	gal/min	barrels/h	l/h
TA010T	1.4	2	325	1.5	2.1	350
TA025T	5	6.8	1130	5.3	7.2	1200
TA050T	13.2 ⁽¹⁾	18 ⁽¹⁾	3000 ⁽¹⁾	13.2	18	3000
TA075T	22.9	31.2	5200	26.5	36	6000
TA100T	60.4	82.2	13700	79.4	108	18000
TA200T	132.3	180	30000	132.3	180	30000

(1) 8.267 psig (0.56999 barg)

Zero stability for all models

Zero stability is used when the flow rate approaches the low end of the flow range where the meter accuracy begins to deviate from the stated accuracy rating, as depicted in the turndown section. When operating at flow rates where meter accuracy begins to deviate from the stated accuracy rating, accuracy is governed by the formula: accuracy = (zero stability/flow rate) x 100%. Repeatability is similarly affected by low flow conditions.

Model	Zero stability
TA010T	0.001 lb/min 0.035 kg/h
TA025T	0.004 lb/min 0.12 kg/h
TA050T	0.011 lb/min 0.3 kg/h
TA075T	0.022 lb/min 0.6 kg/h
TA100T	0.066 lb/min 1.8 kg/h
TA200T	0.110 lb/min 3 kg/h

Process pressure ratings

Sensor maximum working pressure reflects the highest possible pressure rating for a given sensor.

All sensors comply with Council Directive 2014/68/EU on pressure equipment.

All sensors comply with ASME B31.3 process piping code and Council Directive 97/23/EC of 29 May 1997 on pressure equipment.

Model	Pressure
TA010T	2,245 psig (154.79 barg)
TA025T	1,142 psig (78.74 barg)
TA050T	852 psig (58.74 barg)

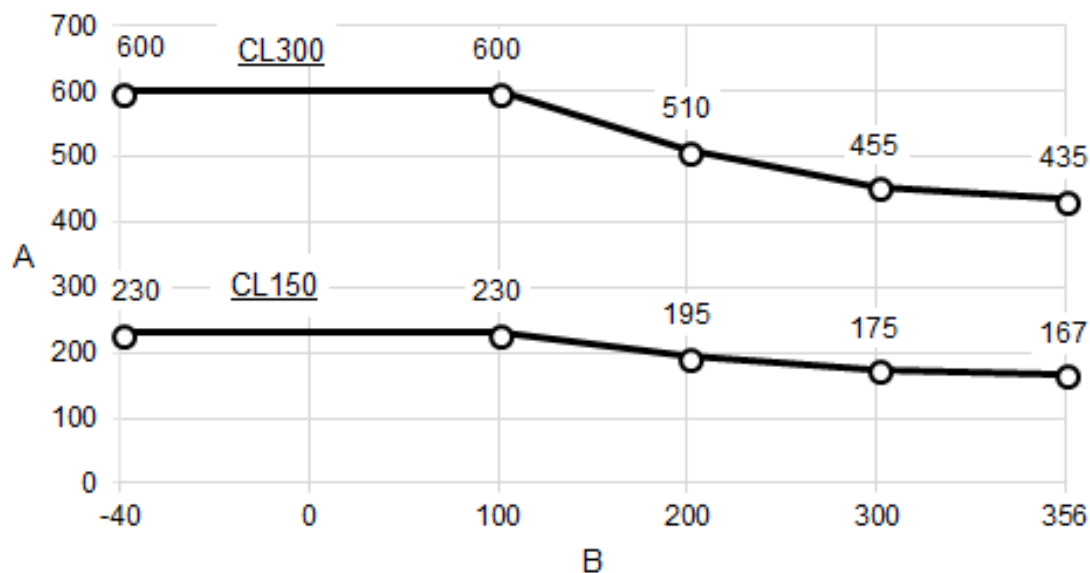
Model	Pressure
TA075T	1,432 psig (98.73 barg)
TA100T	920 psig (63.43 barg)
TA200T	687 psig (47.37 barg)

Temperature and pressure de-ratings

Note

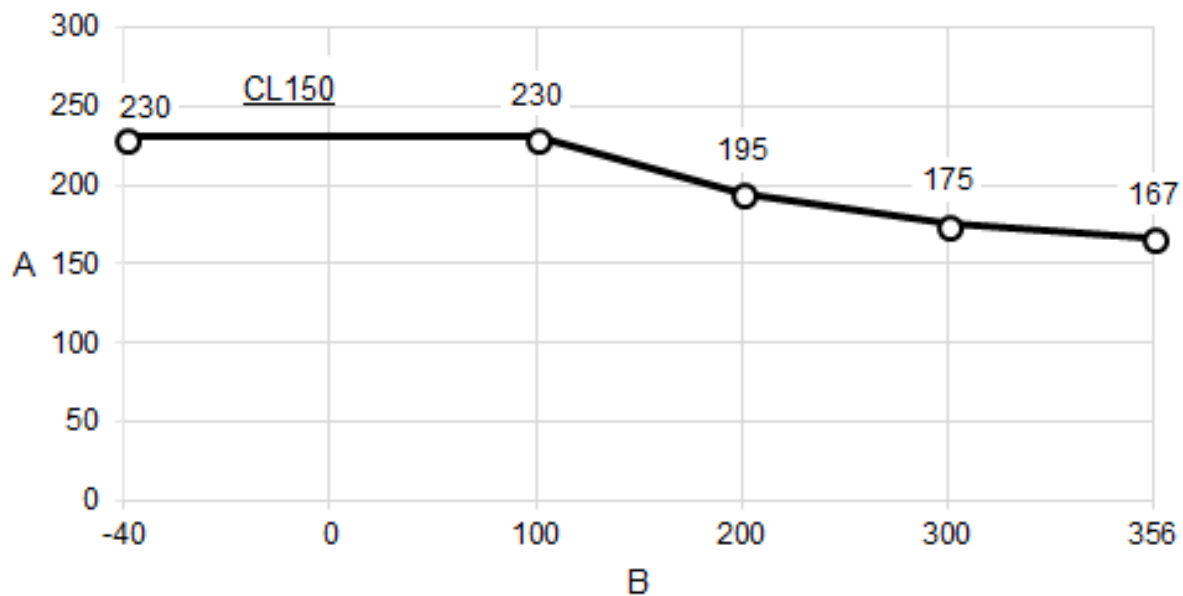
- The ratings in this section apply to the combined sensor and process connection to ensure that the meter does not exceed the limits of either component.
- The temperature and pressure de-ratings graphs do not represent all possible model and fitting combinations. For combinations not listed here, contact a sales representative or the factory.

TA010T–TA100T—ASME B16.5 EN1.4404



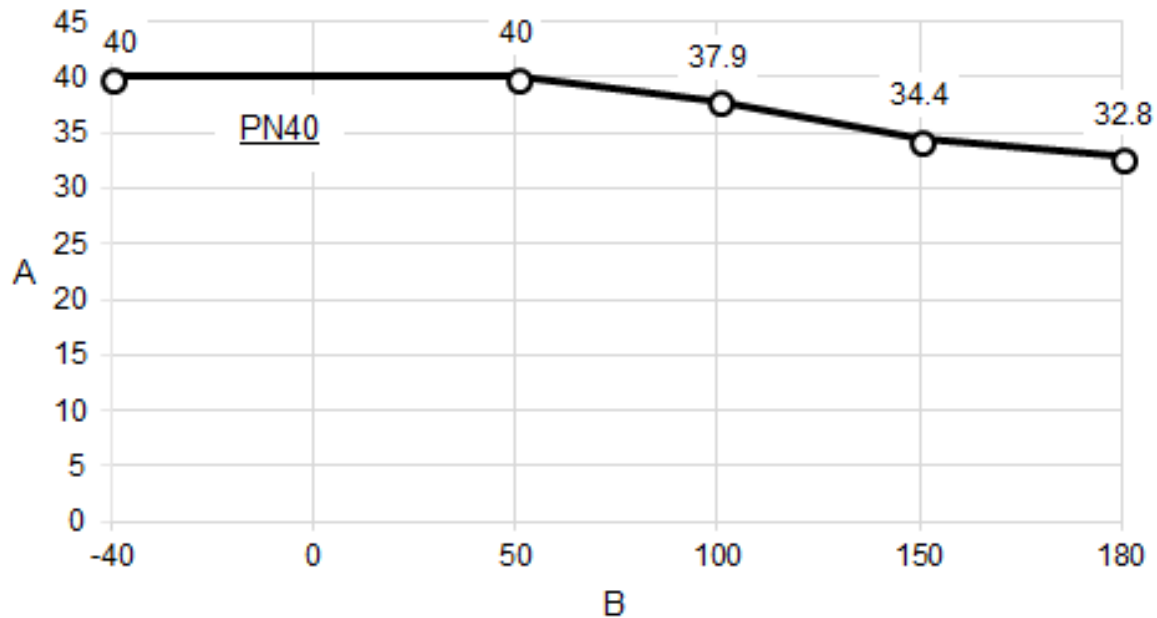
- A. Pressure (psi)
- B. Temperature (°F)

TA200T - ASME B16.5 EN1.4404



- A. Pressure (psi)
- B. Temperature (°F)

TA010T-TA200T EN 1092-1 EN1.4404



- A. Pressure (Bar)
B. Temperature (°C)

Operating conditions: Environmental

Vibration limits

Meets IEC 60068-2-6, endurance sweep, 1 to 150 Hz, 20 sweep cycles at 1.0 g.

Temperature limits

Temperature type	Min	Max
Process temperature	-40 °F (-40.0 °C)	356 °F (180.0 °C)
Ambient temperature	-40 °F (-40.0 °C)	176 °F (80.0 °C)

Use the extended mount junction box (electronic interface code H) for process temperatures above 176 °F (80.0 °C).

Operating conditions: Process

Process temperature effect

- For mass flow measurement, process temperature effect is defined as the change in sensor flow accuracy due to process temperature change away from the calibration temperature. Temperature effect can be corrected by zeroing at the process conditions.
- For density measurement, process temperature effect is defined as the change in sensor density accuracy due to process temperature change away from the calibration density. See the *Micro Motion TA-Series Flow and Density Meters Installation Guide* for proper setup and configuration.


Model code	Mass flow rate (% of maximum rate) per °C	Density per °C
TA010T - TA200T	±0.00175	±0.0001 g/cm ³ (±0.1 kg/m ³)

Note

Operating at pressures significantly above calibration pressure may also impact measurement performance. Contact the factory with questions.

Hazardous area classifications

Approvals and certifications

Type	Approval or certification (typical)	
CSA and CSA C-US	Ambient temperature: -40 °F (-40.0 °C) to 176 °F (80.0 °C) Class 1, Div 1, Groups A, B, C, and D Class I, Div. 2, Groups A, B, C, and D	
ATEX		II 1/2G Exia IIC T2...T6 Ga/Gb
IECEX	Ex ia IIC T2...T6 Ga/Gb	
EMC effects	Complies with EMC directive 2014/30/EU per EN 61326 Industrial	
	Complies with NAMUR NE-21 (22.08.2007)	

Note

When a meter is ordered with hazardous area approvals, detailed information is shipped along with the product.

Industry standards

Type	Standard
Industry standards and commercial approvals	<ul style="list-style-type: none"> Pressure Equipment Directive (PED) Canadian Registration Number (CRN) SIL2 and SIL3 safety certifications

Transmitter interface

A Micro Motion flowmeter system provides a wide range of output capabilities and advanced diagnostics that are tailor-fit to specific applications.

The Model 5700 transmitter is required for all TA-Series meters, which are available with a wide variety of field mount options to accommodate harsh conditions.

TA-Series meters are available with an expansive selection of input and output connectivity options including the following:

- 4-20 mA
- Modbus/USP
- Modbus/RS-485, HART/RS-485
- HART/Bell 202
- FOUNDATION™ fieldbus
- EtherNet/IP/Ethernet
- Modbus TCP/Ethernet
- PROFINET/Ethernet

Physical specifications

Materials of construction

General corrosion guidelines do not account for cyclical stress, and therefore should not be relied upon when choosing a wetted material for a Micro Motion meter. Refer to the *Micro Motion Corrosion Guide* for material compatibility information.

For the Model 5700 transmitter specifications, see the *Micro Motion Model 5700 Product Data Sheet*.

Wetted part materials

All wetted materials are pure tantalum.

Model	Sensor weight
TA010T	11.0 lb (5 kg)
TA025T	26.5 lb (12 kg)
TA050T	33.1 lb (15 kg)
TA075T	33.1 lb (15 kg)
TA100T	52.9 lb (24 kg)
TA200T	88.2 lb (40 kg)

Note

Weight specifications are based upon the ASME B16.5 CL150 flange and do not include electronics.

Non-wetted part materials

Component	Enclosure rating	304 stainless steel	Polyurethane-painted aluminum
Sensor housing	—	✓	
Junction box housing	NEMA 4X (IP66)		✓

Component	Enclosure rating	304 stainless steel	Polyurethane-painted aluminum
Model 5700 transmitter housing	NEMA 4X (IP66)		✓

Flanges

Sensor type	Flange types
All sensor models	<ul style="list-style-type: none"> ▪ ASME B16.5 SM3 (up to CL300) ▪ EN 1092-1 Form B2 (up to PN40)

Note

For flange compatibility, please refer to the Online Store Sizing and Selection Tool at www.emerson.com/flowmeasurement.

Detailed specifications

TA-Series flow and density accuracy options

	Liquid flow accuracy	Density accuracy (g/cm ³)
	0.1% +/- z.s	0.001
TA010T	•	•
TA025T	•	•
TA050T	•	•
TA075T	•	•
TA100T	•	•
TA200T	•	•

Flow tube information

Model	Number of tubes	Tube inside diameter	Tube length
TA010T	2	0.12 in (3 mm)	28.2 in (716 mm)
TA025T	2	0.20 in (5 mm)	30.1 in (765 mm)
TA050T	2	0.35 in (9 mm)	37.9 in (963 mm)
TA075T	2	0.39 in (10 mm)	38.7 in (983 mm)
TA100T	2	0.63 in (16 mm)	47.9 in (1,217 mm)
TA200T	2	0.87 in (22 mm)	42.9 in (1,090 mm)

ASME B16.5 specification flange compatibility

Model	0.75 in (19.0 mm)	1 in (25 mm)	2 in (51 mm)	3 in (76 mm)
TA010T	•			

Model	0.75 in (19.0 mm)	1 in (25 mm)	2 in (51 mm)	3 in (76 mm)
TA025T	•			
TA050T		•		
TA075T		•		
TA100T			•	
TA200T				•

EN1092-1 specification flange compatibility

Model	DN15	DN25	DN50	DN80
TA010T	•			
TA025T	•			
TA050T		•		
TA075T		•		
TA100T			•	
TA200T				•

Transmitter compatibility

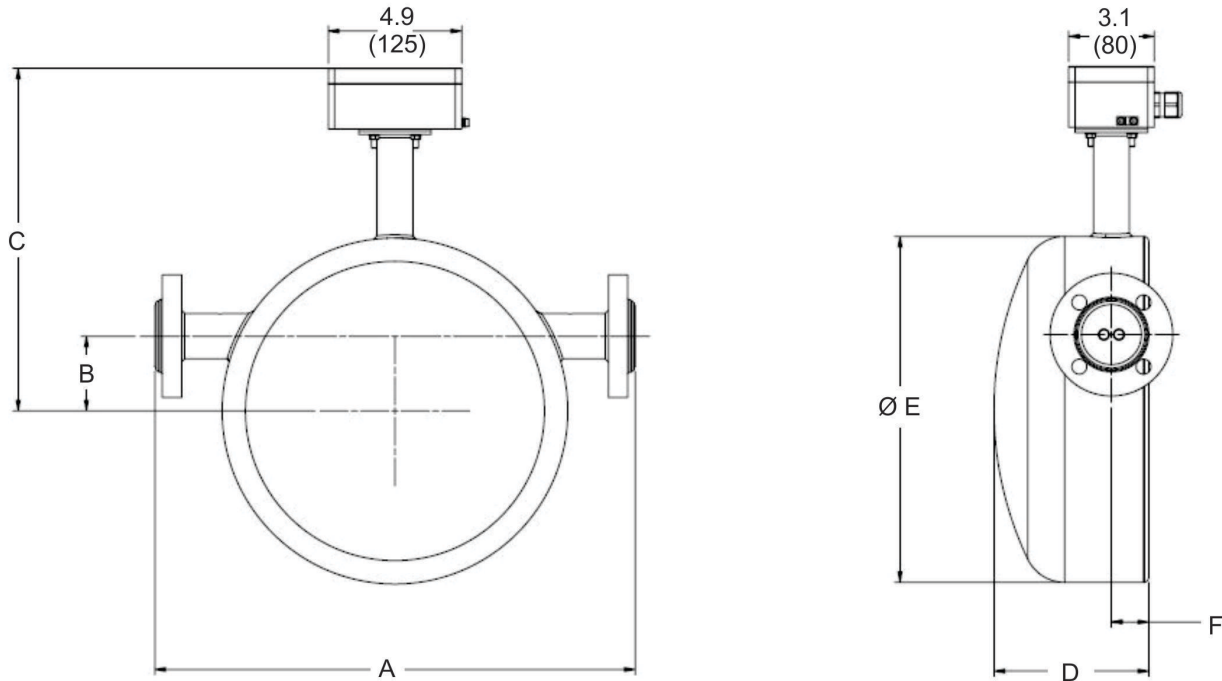
The Model 5700 transmitter is required for all TA-Series meters.

Dimensions

These dimensional drawings are intended to provide a basic guideline for sizing and planning. They are representative of a sensor fitted with a junction box meant for a remote mount transmitter.

All dimensions in tables are ± 0.12 in (± 3.0 mm)

Example dimensions for models TA010T to TA200T with a standard welded body



Note

Junction box dimensions are in inches (mm)

Model	Dim A	Dim B	Dim C ⁽¹⁾	Dim D	Dim E	Dim F
TA010T	13.8 in (351 mm)	0.8 in (20 mm)	9.8 in (249 mm) (13.8 in (351 mm))	3.7 in (94 mm)	8.6 in (218 mm)	1.1 in (28 mm)
TA025T	15.7 in (399 mm)	0.8 in (20 mm)	9.8 in (249 mm) (13.8 in (351 mm))	3.7 in (94 mm)	8.6 in (218 mm)	1.1 in (28 mm)
TA050T	17.7 in (450 mm)	2.7 in (69 mm)	9.9 in (251 mm) (13.9 in (353 mm))	5.7 in (145 mm)	12.8 in (325 mm)	1.4 in (36 mm)
TA075T	17.7 in (450 mm)	2.8 in (71 mm)	12.6 in (320 mm) (16.7 in (424 mm))	5.7 in (145 mm)	12.8 in (325 mm)	1.4 in (36 mm)
TA100T	25.6 in (650 mm)	3.0 in (76 mm)	14.3 in (363 mm) (18.3 in (465 mm))	9.1 in (231 mm)	16.0 in (406 mm)	3.1 in (79 mm)

Model	Dim A	Dim B	Dim C ⁽¹⁾	Dim D	Dim E	Dim F
TA200T	29.5 in (749 mm)	3.0 in (76 mm)	16.3 in (414 mm) (20.3 in (516 mm))	13.0 in (330 mm)	20.0 in (508 mm)	4.7 in (119 mm)

(1) Measurement in parenthesis is for the extended mount option.

Ordering information

Base model

Code descriptions

Model	Size and material
TA010T	0.079 in (2.0 mm) (DN2), tantalum
TA025T	0.25 in (6 mm) (DN6), tantalum
TA050T	0.59 in (15.0 mm) (DN15), tantalum
TA075T	0.79 in (20.1 mm) (DN20), tantalum
TA100T	1 in (25 mm) (DN25), tantalum
TA200T	2 in (51 mm) (DN50), tantalum

Process connections

Models TA010T and TA025T

Code	Description					
D15	DN15	PN40	EN 1092-1	EN1.4404	Socket weld flange	Form B1
D17	0.75 in (19.0 mm)	CL150	ASME B16.5-2003	EN1.4404	Socket weld flange	SM3
D18	0.75 in (19.0 mm)	CL300	ASME B16.5-2003	EN1.4404	Socket weld flange	SM3

Models TA050T and TA075T

Code	Description					
D25	DN25	PN40	EN 1092-1	EN1.4404	Socket weld flange	Form B1
D27	1 in (25 mm)	CL150	ASME B16.5-2003	EN1.4404	Socket weld flange	SM3

Code	Description					
D28	1 in (25 mm)	CL300	ASME B16.5-2003	EN1.4404	Socket weld flange	SM3

Model TA100T

Code	Description					
D50	DN50	PN40	EN 1092-1	EN1.4404	Socket weld flange	Form B1
D52	2 in (51 mm)	CL150	ASME B16.5	EN1.4404	Socket weld flange	SM3
D53	2 in (51 mm)	CL300	ASME B16.5	EN1.4404	Socket weld flange	SM3

Model TA200T

Code	Description					
D80	DN80	PN40	EN 1092-1	EN1.4404	Socket weld flange	Form B1
D82	3 in (76 mm)	CL150	ASME B16.5	EN1.4404	Socket weld flange	SM3

Case options**Case options for all models**

Code	Case option
N	Standard case (300-Series stainless steel)
P	Standard case (300-Series stainless steel) with purge fittings (0.5 in (13 mm) NPT female)
G	Standard case (300-Series stainless steel) with purge fittings (G1/2 female)

Electronics interface (available on all models)

Code	Electronics interface	Temperature service rating
R	9-wire polyurethane-painted aluminum box	-40 °F (-40.0 °C) to 212 °F (100.0 °C)
H	9-wire extended mount polyurethane-painted aluminum box	-40 °F (-40.0 °C) to 356 °F (180.0 °C)

Conduit connections (available on all models)

Code	Description
A	No gland

Code	Description
H	Brass nickel cable gland
J	Stainless steel cable gland

Approvals (available on all models)

Code	Description
M	Micro Motion Standard (no approval, without CE/EAC markings)
N	Micro Motion Standard / PED compliant (with CE/EAC markings)
A	CSA (US and Canada): Class I, Division 1, Groups C, and D
Z	ATEX - Equipment Category 2 (Zone 1)
I	IECEx Zone 1

Future option 1

Code	Future option 1
Z	Reserved for future use

Future option 2

Code	Future option 2
Z	Reserved for future use

Calibration (available on all models)

Code	Calibration option
Z	0.10% +/- mass flow and 0.001 g/cc density calibration ($\pm 0.1\%$ +/- volume flow)

Measurement application software (all models)

Code	Measurement application software option
Z	No measurement application software

Factory options

Code	Factory option
Z	Standard product

Certificate, tests, calibrations and services (all optional)

Code	Material quality examination tests and certificates
MC	Material Inspection Certificate 3.1 (Supplier Lot Traceability per EN 10204) Available on all models

Code	Pressure testing
HT	Hydrostatic Test Certificate 3.1 Available on all models

Code	Dye penetrant examination
D1	Dye Penetrant Test Package 3.1 (sensor only; Liquid Dye Penetration NDE Qualification) Available on all models except TA010T

Code	Positive material testing
PM	Positive Material Test Certificate 3.1 (without carbon content) Available on all models

Code	Sensor completion options
SP	Special packaging Available on all models

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