

Micro Motion™ TA-Series Flow and Density Meters



Safety messages

Safety messages are provided throughout this manual to protect personnel and equipment. Read each safety message carefully before proceeding to the next step.

Safety and approval information

This Micro Motion product complies with all applicable European directives when properly installed in accordance with the instructions in this manual. Refer to the EU declaration of conformity for directives that apply to this product. The EU declaration of conformity, with all applicable European directives, the complete ATEX Installation Drawings and Instructions, the IECEx Installation Instructions for installations outside of the European Union, and the CSA Installation Instructions for installations in North America are available on the internet at www.emerson.com or through your local Micro Motion support center.

Information affixed to equipment that complies with the Pressure Equipment Directive, can be found on the internet at www.emerson.com.

For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Other information

Full product specifications can be found in the product data sheet. Troubleshooting information can be found in the configuration manual. Product data sheets and manuals are available from the Micro Motion web site at www.emerson.com.

Return policy

Follow Micro Motion procedures when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Micro Motion employees. Micro Motion will not accept your returned equipment if you fail to follow Micro Motion procedures.

Return procedures and forms are available on our web support site at www.emerson.com, or by phoning the Micro Motion Customer Service department.

Emerson Flow customer service

Email:

- Worldwide: flow.support@emerson.com
- Asia-Pacific: APflow.support@emerson.com

Telephone:

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United States	800-522-6277	U.K. and Ireland	0870 240 1978	Australia	800 158 727
Canada	+1 303-527-5200	The Netherlands	+31 (0) 70 413 6666	New Zealand	099 128 804
Mexico	+52 55 5809 5010	France	+33 (0) 800 917 901	India	800 440 1468
Argentina	+54 11 4809 2700	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	+39 8008 77334	China	+86 21 2892 9000
Chile	+56 2 2928 4800	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
Peru	+51 15190130	Russia/CIS	+7 495 995 9559	South Korea	+82 2 3438 4600
		Egypt	0800 000 0015	Singapore	+65 6 777 8211
		Oman	800 70101	Thailand	001 800 441 6426
		Qatar	431 0044	Malaysia	800 814 008
		Kuwait	663 299 01		
		South Africa	800 991 390		
		Saudi Arabia	800 844 9564		
		UAE	800 0444 0684		

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1 Before you begin

1.1 About this document

This document provides information on planning, mounting, wiring, and grounding the TA-Series sensor.

The information in this document assumes that users understand basic transmitter and sensor installation, configuration, and maintenance concepts and procedures.

1.2 Hazard messages

This document uses the following criteria for hazard messages based on ANSI standards Z535.6-2011 (R2017).

 **DANGER**

Serious injury or death will occur if a hazardous situation is not avoided.

 **WARNING**

Serious injury or death could occur if a hazardous situation is not avoided.

 **CAUTION**

Minor or moderate injury will or could occur if a hazardous situation is not avoided.

NOTICE

Data loss, property damage, hardware damage, or software damage can occur if a situation is not avoided. There is no credible risk of physical injury.

Physical access

NOTICE

Unauthorized personnel can potentially cause significant damage and/or misconfiguration of end users' equipment. Protect against all intentional or unintentional unauthorized use.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access to protect users' assets. This is true for all systems used within the facility.

1.3 Related documentation

You can find all product documentation on the product documentation DVD shipped with the product or at www.emerson.com.

See any of the following documents for more information:

- The hazardous area approvals documentation shipped with the sensor or available at www.emerson.com/flowmeasurement.
- *Micro Motion TA-Series Flow and Density Meters Product Data Sheet*
- *Micro Motion 9-Wire Flow Meter Cable Preparation and Installation Guide*
- The transmitter installation and configuration and use guides

2 Planning


2.1 About this document

This manual provides information on planning, mounting, and grounding the meter. For information on full configuration, maintenance, troubleshooting, or service of the transmitter, see the configuration and use manual.

The information in this document assumes that users understand:

- Basic transmitter and sensor installation, configuration, and maintenance concepts and procedures
- All corporate, local government, and national government safety standards and requirements that guard against injuries and death

2.2 Installation checklist

- If possible, install the meter in a location that will prevent direct exposure to sunlight. The environmental limits for the meter may be further restricted by hazardous area approvals.
- If you plan to mount the meter in a hazardous area:
 -  **WARNING**
 - Verify that the meter has the appropriate hazardous area approval. Each meter has a hazardous area approval tag attached to the meter housing.
 - For ATEX/IECEx installations, strictly adhere to the safety instructions documented in the ATEX/IECEx approvals documentation available on the Product Documentation DVD shipped with the product or at www.emerson.com. Be sure to reference this documentation in addition to the information shown in this guide.
- Verify that the local ambient and process temperatures are within the limits of the meter.
- Follow the wiring instructions in the Model 5700 installation manual for signal and power wiring.
- Mount the meter in a location and orientation that allows sufficient clearance to open the housing cover. Allow 8 in (203 mm) to 10 in (254 mm) clearance at the wiring access points.
- Install the meter so that the flow direction arrow on the sensor case matches the actual forward flow of the process. Flow direction is also software-selectable.


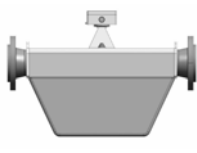
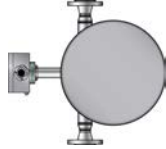

2.2.1 Orientation options

You can mount the meter in any orientation as long as the conduit openings or display do not point upward. Keep the sensor tubes full of process fluid to achieve best performance.

! CAUTION

Installing the meter with the conduit openings or display facing upward risks moisture entering the housing, which could damage the meter.

Table 2-1: Preferred sensor orientation

Type	TA010T - TA200T Models	TA300T Model
Liquids		
Slurries		

2.3 Best practices

- There are no pipe run requirements for Emerson meters. Straight runs of pipe upstream or downstream are unnecessary.
- If the meter is installed in a vertical pipeline, liquids and slurries should flow upward through the meters. Gases should flow downward.
- Keep the meter tubes full of process fluid.
- For halting flow through the meter with a single valve, install the valve downstream from the meter.
- Minimize bending and torsional stress on the meter. Do not use the meter to align misaligned piping.
- The meter does not require external supports. The flanges will support the sensor in any orientation.
- Do not use the junction box to pick up the meter.
- Do not use the junction box as a step.
- Do not unscrew and rotate the junction box as this will break the wires.
- Do not install the meter in suspended pipes.
- Do not adjust the meter position by pulling or grasping the meter.

2.4 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).

3 Mounting

3.1 Mount the meter

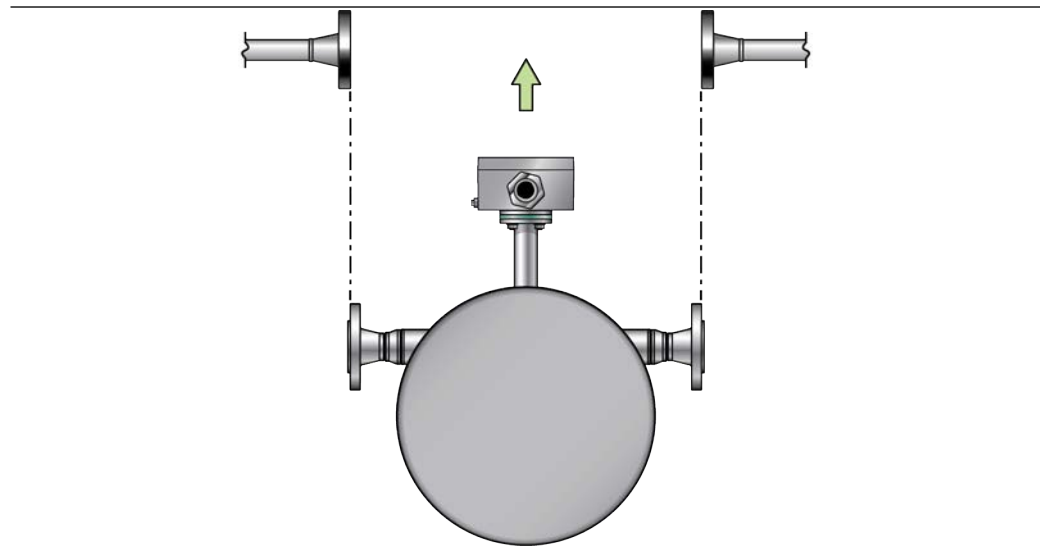
Use your common practices to minimize torque and bending load on process connections.

Prerequisites

Read the installation checklist and best practices if you have not yet done so already. See [Installation checklist](#) and [Best practices](#).

Procedure

Mount the meter using the following illustration.



4 Wiring

4.1 Tantalum wiring

- A 9-wire cable is limited to 1,000 ft (304.80 m) between the sensor and the transmitter.
- If you are using the Smart Meter Verification (SMV) application, the 9-wire cable is limited to 60 ft (18.29 m) maximum.
- Use Teflon™ jacketed cable for SMV applications.

! WARNING

Make sure the hazardous area specified on the sensor approval tag is suitable for the environment in which the sensor will be installed. Failure to comply with the requirements for intrinsic safety in a hazardous area could result in an explosion resulting in injury or death.

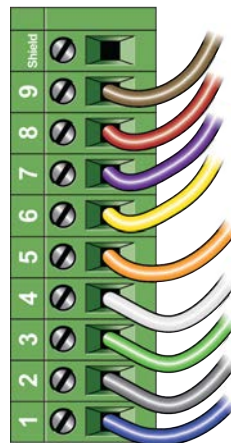
NOTICE

Fully close and tighten all housing covers and conduit openings. Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Inspect and grease all gaskets and O-rings.

4.1.1 Connect the 9-wire cable

Procedure

1. Prepare and install the cable according to the instructions in the *Micro Motion 9-Wire Flow Meter Cable Preparation and Installation Guide*.
2. Insert the stripped ends of the individual wires into the terminal blocks of the junction box. Ensure that no bare wires remain exposed.



Terminal block number	Wire color
1	Blue

Terminal block number	Wire color
2	Gray
3	Green
4	White
5	Orange
6	Yellow
7	Purple
8	Red
9	Brown
shield	

3. Match the wires color for color. For wiring at the transmitter or remote core processor, refer to the transmitter documentation.
4. Tighten the screws to hold the wires in place.
5. Ensure integrity of gaskets, then tightly close and seal the junction box cover and all housing covers.
6. Refer to the transmitter installation manual for signal and power wiring instructions.

5 Grounding

The meter must be grounded according to the standards that are applicable at the site. The customer is responsible for knowing and complying with all applicable standards.

Prerequisites

Use the following guides for grounding practices:

- In Europe, IEC 60079-14 is applicable to most installations, in particular sections 16.2.2.3 and 16.2.2.4.
- In the U.S.A. and Canada, ISA 12.06.01 Part 1 provides examples with associated applications and requirements.

If no external standards are applicable, follow these guidelines to ground the sensor:

- Use copper wire, 14 AWG (2.08 mm²) or larger wire size.
- Keep all ground leads as short as possible, less than 1 Ω impedance.
- Connect ground leads directly to earth, or follow plant standards.

NOTICE

Ground the flowmeter to earth, or follow ground network requirements for the facility. Improper grounding can cause measurement error.

Procedure

- Check the joints in the pipeline.
 - If the joints in the pipeline are ground-bonded, the sensor is automatically grounded and no further action is necessary (unless required by local code).
 - If the joints in the pipeline are not grounded, connect a ground wire to the grounding screw located on the sensor electronics.

Tip

The sensor electronics may be a transmitter, core processor, or junction box. The grounding screw may be internal or external.

6 Purge the sensor case

Prerequisites

Make sure the following are available before beginning the purge procedure:

- Teflon™ tape
- Argon or nitrogen gas sufficient to purge the sensor case

Whenever a purge plug is removed from the sensor case, you must purge the case again.

Procedure

1. Shut down the process, or set control devices for manual operation.

NOTICE

Before performing the case purging procedure, shut down the process or set the control devices for manual operation. Performing the purge procedure while the flowmeter is operating could affect measurement accuracy, resulting in inaccurate flow signals.

2. Remove both purge plugs from the sensor case. If purge lines are being used, open the valve in the purge lines.



WARNING

- If a rupture disk has been installed on the purge fitting, stay clear of the rupture disk pressure relief area. High-pressure fluid escaping from the sensor can cause severe injury or death. Orient the sensor so that personnel and equipment will not be exposed to any discharge along the pressure relief path.
- Take all necessary precautions when removing purge plugs. Removing a purge plug compromises the secondary containment of the sensor and could expose the user to process fluid.
- Improper pressurization of the sensor case could result in injury.

NOTICE

If a rupture disk has been installed on the purge fitting, use thread protectors when removing the purge fitting so as not to damage the disk membrane surrounding the rupture disk.

3. Prepare the purge plugs for reinstallation by wrapping them with 2–3 turns of Teflon tape.
4. Connect the supply of nitrogen or argon gas to the inlet purge connection or open inlet purge line. Leave the outlet connection open.

NOTICE

- Exercise caution to avoid introducing dirt, moisture, rust, or other contaminants into the sensor case.
- If the purge gas is heavier than air (such as argon), locate the inlet lower than the outlet, so that the purge gas will displace air from bottom to top.

- If the purge gas is lighter than air (such as nitrogen), locate the inlet higher than the outlet, so that the purge gas will displace air from top to bottom.
-

5. Make sure that there is a tight seal between the inlet connection and sensor case, so that air cannot be drawn by suction into the case or purge line during the purging process.
6. Run purge gas through the sensor.

The purge time is the amount of time required for full exchange of atmosphere to inert gas. The larger the line size, the greater amount of time is required to purge the case. If purge lines are being used, increase the purge time to fill the additional volume of the purge line.

Important

Keep the purge gas pressure below 7.25 psi (0.5 bar).

7. At the appropriate time, shut off the gas supply, then immediately seal the purge outlet and inlet connections with the purge plugs.
Avoid pressurizing the sensor case. If pressure inside the case elevates above atmospheric pressure during operation, the flowmeter density calibration will be inaccurate.
8. Make sure that the purge fitting seals are tight so that air cannot be drawn by suction into the sensor case.



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For more information: www.emerson.com

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MICRO MOTION™

