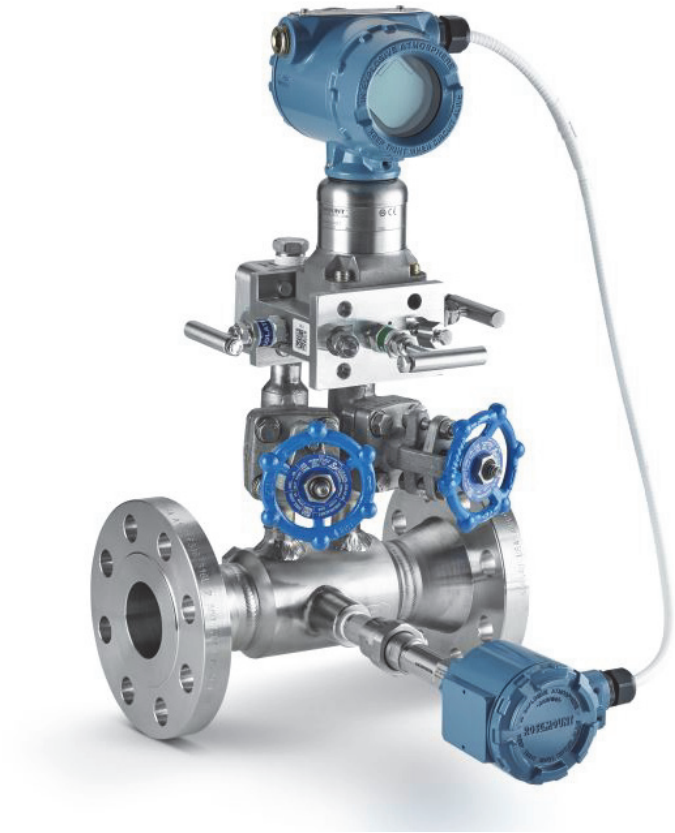
Quick Start Guide
00825-0100-4295, Rev AA
October 2018

Rosemount™ 9295 Process Flow Meter



EMERSON™

NOTICE

This guide provides basic guidelines for the installation of the Rosemount 9295 Primary Element. For comprehensive instructions on configuration, diagnostics, maintenance, service or troubleshooting, refer to the Rosemount 9295 Primary Element Reference Manual and appropriate transmitter reference manuals. The manual and this guide are also available electronically on Emerson.com/Rosemount.

If the Rosemount 9295 Primary Element was ordered assembled to a Rosemount Pressure Transmitter, Manifold or RTD, refer to the following Quick Start Guides for information on configuration and hazardous locations certifications:

- Rosemount 3051S Quick Start Guide
- Rosemount 3051SMV Quick Start Guide
- Rosemount 3051 Quick Start Guide
- Rosemount 2051 Quick Start Guide
- Rosemount 214C (RTD) Quick Start Guide

Hazardous Area Approvals: This assembly is assembled from certified pieces of equipment. The overall assembly is subject to inspection by the authority having jurisdiction over the installation.

If the meter was ordered with a wireless transmitter, the battery will be shipped separately due to freight carrier regulations.

⚠WARNING

Process leaks may cause harm or result in death.

To avoid process leaks, only use gaskets and O-rings designed for the corresponding flange to seal process connections.

Transmitter electronics maintenance should not be conducted on energized equipment in a hazardous atmosphere.

Failure to comply with the requirements for intrinsic safety in a hazardous atmosphere could result in an explosion.

If the process fluid is hazardous, the procedure outlined here should be modified as required.

Failure to do so could result in serious injury to personnel or death.

If the line is pressurized, always open valves slowly.

Failure to do so could result in serious injury to personnel or death.

During installation, never lift the meter by the transmitter, RTD or impulse lines/valves.

Doing so may result in meter damage and serious injury.

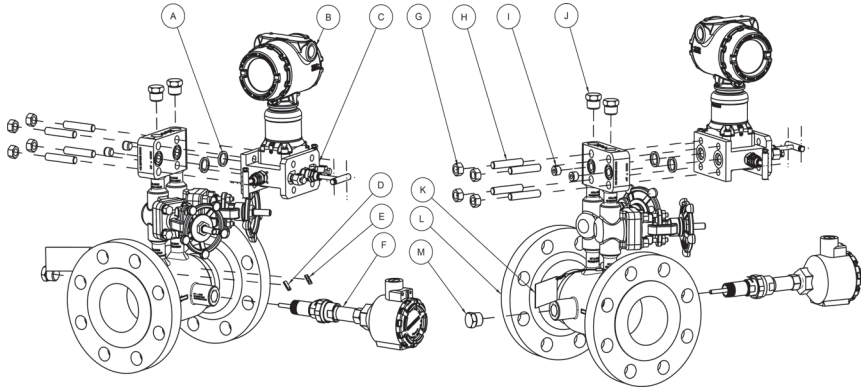
Contents

1.0 Before you begin

Before you begin the installation, consider the vibration and temperature limits of the meter:

- The vibration limit of the Rosemount 9295 primary element with direct mount transmitter is 0.5g amplitude, 10-500Hz frequency range. If the application exceeds the vibration limits above, mount the transmitter and manifold remotely.
- The process temperature limits are:
  - Direct mount transmitter: -20 °F (-28 °C) to 450 °F (232 °C)
  - Remote mount transmitter: -20 °F (-28 °C) to 850 °F (454 °C)

Figure 1. Exploded View



A. Manifold gasket
B. Transmitter
C. Transmitter manifold assembly
D. Label, low-side impulse line
E. Label, high-side impulse line
F. RTD assembly
G. Manifold attachment nut
H. Manifold attachment stud
I. Opposite side head plug
J. Rod-out plug (1/2" ANPT)
K. Primary element tag
L. Primary element
M. RTD assembly plug

The four steps to install and zero the Rosemount 9295 Process Flow Meter are described in this guide:

Locate the installation point

Orient the primary element

Install the primary element

Trim the transmitter

2.0 Locate the installation point

Locate the primary element installation point. If possible, install the meter at ground level to allow meter access. No straight run is required for disturbances in Table 1. In all cases, if additional straight run is available, a best practice is to position the Rosemount 9295 primary element where 80 percent of the run is upstream of the meter and 20 percent is downstream.

For redundant transmitter installations, it is recommended that the primary element be installed with a minimum of five diameters of straight run upstream of the meter. In cases where this isn't possible, please consult your Emerson™ representative for recommendations.

Table 1. Straight Pipe Requirements (Distance in Number of Pipe Diameters)(1)(2)

	Type of flow disturbance upstream of flow meter	Diameters of straight pipe run needed
Upstream (inlet) side of primary	Single 90° bends in the same plane	0
	Two or more 90° bends in the same plane	0
	Two or more 90° bends in different planes	0
	Up to 10° of swirl	0
	Reducer (One line size)	0
	Butterfly Valve (75%-100% open)	0
Downstream (outlet) side of primary (all disturbances)		0

(1) Consult an Emerson™ representative if a disturbance is not listed.
(2) Straight pipe lengths are measured from the upstream and downstream flanges of the Rosemount 9295 primary element. A zero diameter requirement implies that the primary element can be installed directly adjacent to a disturbance.

Figure 2. Process Flow Meter Installation (Gas Installation Example)

2.1 Reversing the electronics (transmitter and RTD)

The Rosemount 9295 primary element with direct mount transmitter has reversible electronics. If there is interference in the mounting location, the transmitter and RTD (if applicable) can be reinstalled on the opposite side of the meter by following the directions below. To reverse the electronics, use Figure 1, Figure 3, Table 2 and follow these instructions.

⚠WARNING

This operation should not be conducted on energized equipment in a hazardous atmosphere.

Failure to comply with the requirements for intrinsic safety in a hazardous atmosphere could result in an explosion.

1. (Not shown) Remove the opposite side head plus and RD assembly plug (if applicable).
2. Remove the manifold/transmitter assembly and switch it to the opposite side.
   - Install the electronics with the new gaskets that are provided.
   - If the meter is equipped with an RTD, the wiring will need to be removed from the transmitter.
3. Rotate the transmitter 180° on the manifold, ensuring high and low pressure ports match those on the Rosemount 9295 meter body.
4. Reinstall the bolts using a cross or star pattern. Refer to Table 2 for bolt torque guidelines.
5. Remove the RTD assembly and install it on the opposite side.
6. If the wiring was unhooked from the transmitter, reinstall it.
7. (Not shown) Reinstall the opposite side head plugs and the RTD assembly plug.

Figure 3. Reversing the Electronics

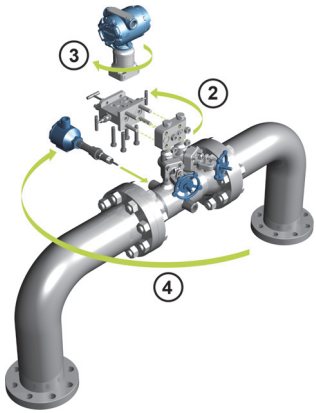
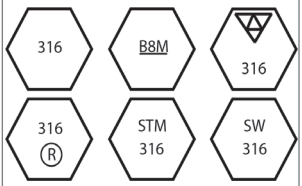


Table 2. Torque Values for Transmitter Mounting Bolts

Bolt material	Head markings	Initial torque	Final torque
Carbon steel (CS)		300 in-lb	650 in-lb
Stainless steel (SST)		150 in-lb	300 in-lb

3.0 Orient the primary element

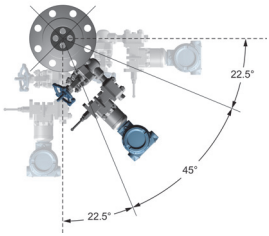
The primary element can be installed in any position around the circumference of the pipe, provided the vents are positioned within the recommended zone to allow for bleeding or venting. Orienting the unit within the recommended zone will also prevent inaccurate measurements. Determine the orientation based on the application type, mounting type, flow direction, single or dual transmitter and the flowmeter's orientation in relation to the pipe.

For steam applications, remote mount is recommended for vertical flow applications. For liquid applications, flow down is not a recommended installation.

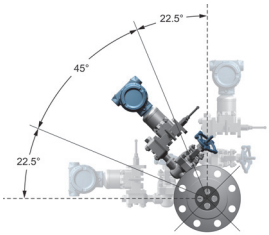
3.1 Integrated meter orientations

Figure 4. Horizontal Flow Orientation Based on Fluid Type

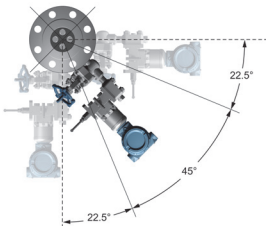
Liquids



Gas



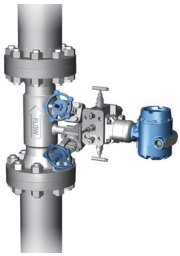
Steam



Note
Images above show acceptable orientation range; 45° is preferred.

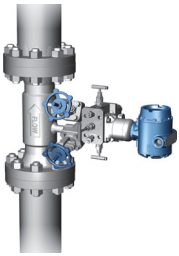
Figure 5. Vertical Flow Orientation Based on Fluid Type

Liquids



Not best practice; remote preferred

Gas



Steam

Not permitted

3.2 Remote transmitter mount meter orientations

Figure 6. Horizontal Flow Orientation Based on Fluid Type

Liquids Gas Steam

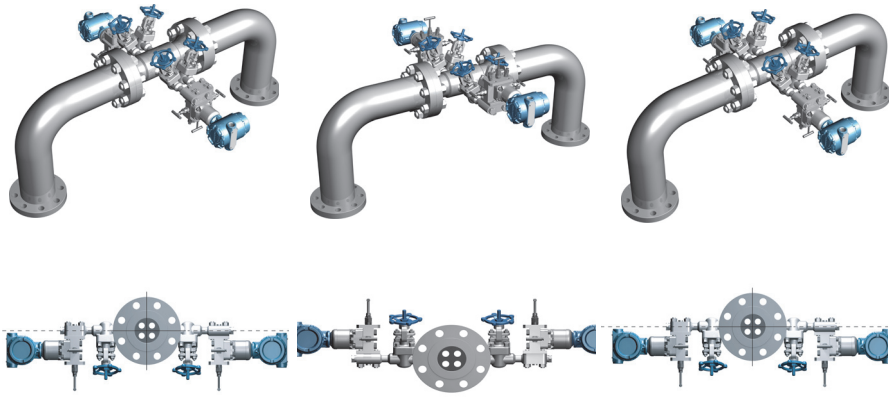
Figure 7. Vertical Flow Orientation Based on Fluid Type

Liquids Gas Steam

3.3 Redundant transmitter direct mount meter orientations

Figure 8. Horizontal Flow Orientation Based on Fluid Type

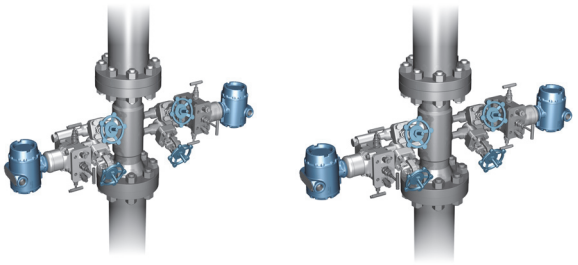
Liquids | Gas | Steam



> **Note**
> For all orientations, the meter should be level with the grade.

Figure 9. Vertical Flow Orientation Based on Fluid Type

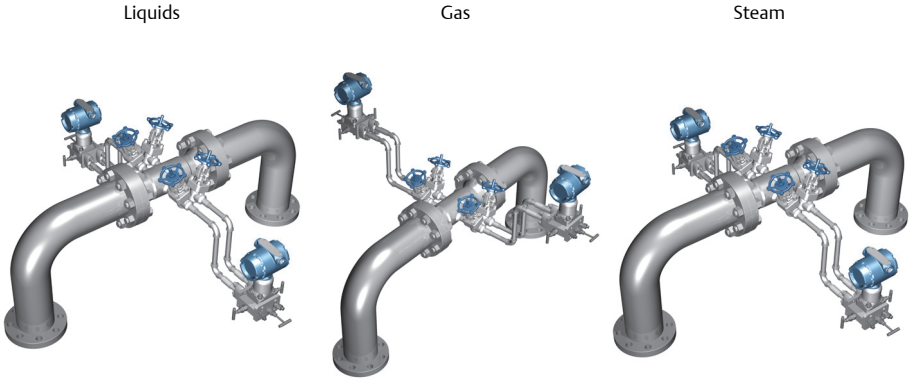
Liquids | Gas | Steam



Not permitted

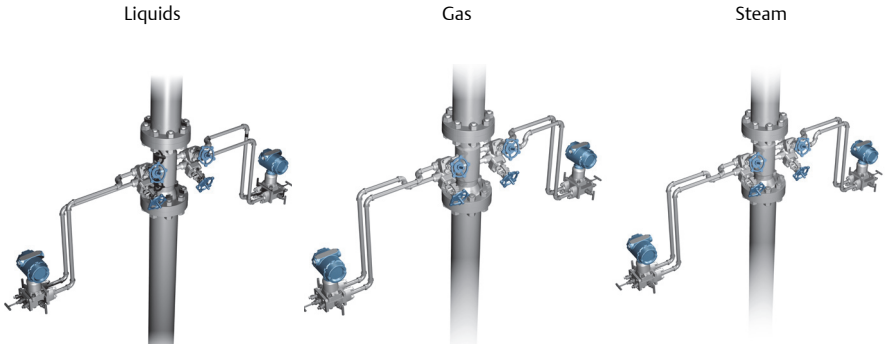
3.4 Redundant transmitter remote mount meter orientations

Figure 10. Horizontal Flow Orientation Based on Fluid Type



Note
For all orientations, the meter should be level with the grade.

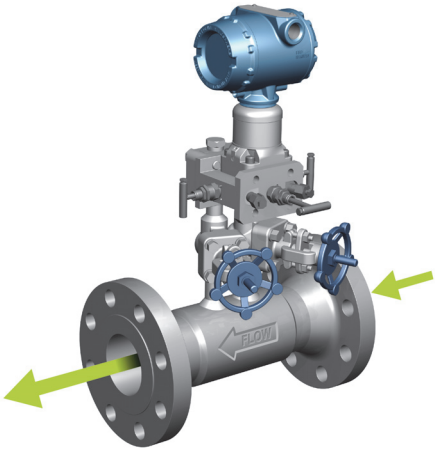
Figure 11. Vertical Flow Orientation Based on Fluid Type



4.0 Install the primary element

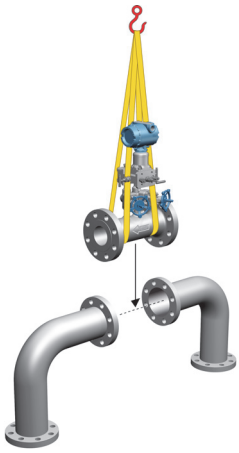
The unit must be oriented with the flow arrow pointing in the direction of flow. Otherwise, the primary element will produce erroneous readings. See Figure 12.

Figure 12. Flow Direction



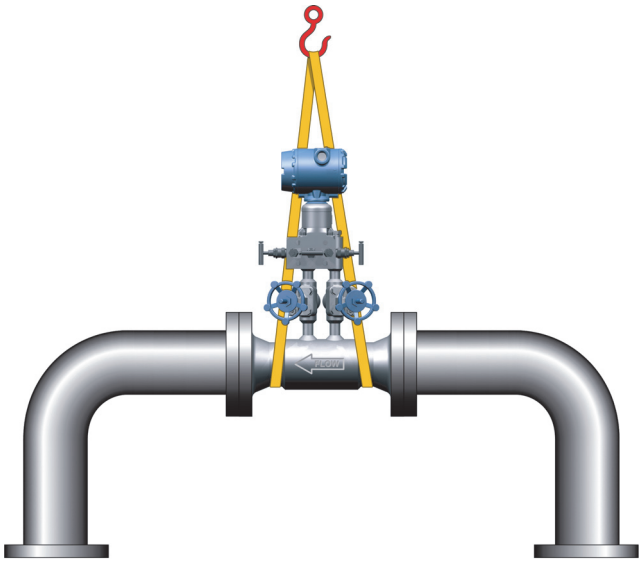
1. Lift the meter by using the straps on the body of the meter. See Figure 13. Follow local guidelines on lifting safety. Do not lift the meter by the impulse lines or the transmitter body. Ensure meter is secured correctly within straps. If not secured correctly, the meter may rotate during lifting operations.

Figure 13. Lifting the Meter Using Straps



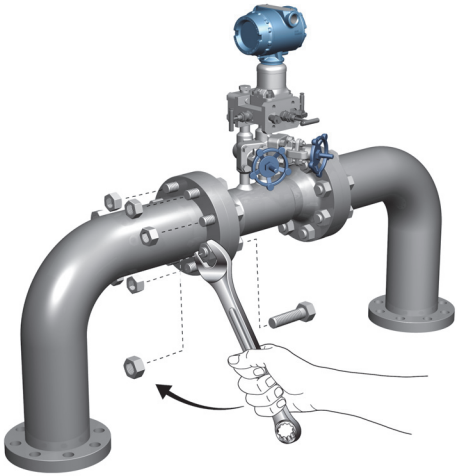
2. Install the flanged ends into the process pipe as shown in Figure 14.

Figure 14. Installed Meter



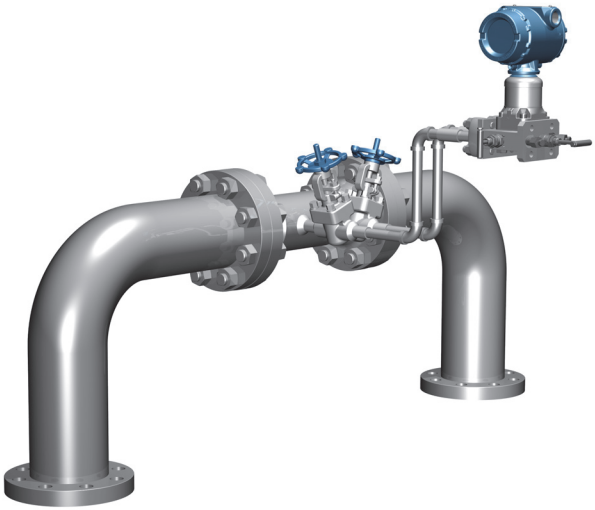
3. Use the appropriate studs, nuts, gaskets and torque spec for the given flange size, rating and process conditions. Tighten the nuts following a star pattern. See Figure 15.

Figure 15. Flange Bolting



For remote mount installations, use stainless steel tubing with the largest convenient internal diameter per site practices. A best practice is to minimize the length of the impulse lines. An example of a remote mount installation is shown in Figure 16.

Figure 16. Remote Mount Installation



Once the flow meter is installed in the line, wire the transmitter electronics into the control system.

⚠WARNING

Perform this task in an environment free of hazardous or combustible gases.

Failure to comply with the requirements for intrinsic safety in a hazardous atmosphere could result in an explosion.

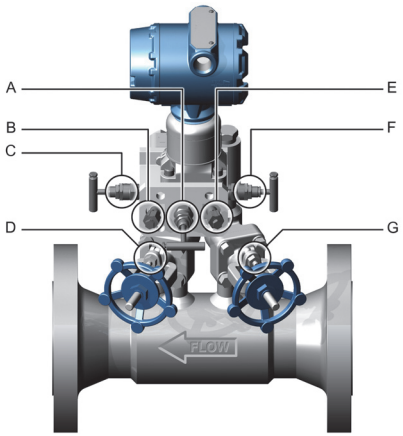
5.0 Trim the transmitter

Before the unit is put in service, a transmitter zero trim should be performed at normal line pressure:

1. Start the procedure by closing all the valves on the unit.
2. Open both primary isolation valves (D and G). See Figure 17.
3. Open both manifold isolation valves (C and F).
   - For liquid or steam service, open vent valves (B and E) slightly to allow removal of trapped gases. Actuate primary isolation valves (D and G) to remove any trapped gases.
   - For gas service, open vent valves (B and E) slightly to allow removal of trapped liquids.
4. Close both vent valves once Step 3 has been completed.
5. Close the manifold low side isolation valve (C).
6. Open the manifold equalization valve (A). The pressure will now be equal across the differential pressure transmitter.
7. Perform the zero trim. Refer to the transmitter Quick Start Guide for more information.
8. To put the transmitter back into service, close the equalization valve (A).
9. Open the manifold low side isolation (C).

The flow meter assembly is now ready for service.

Figure 17. Transmitter Components



A. Equalizer valve
B. Low pressure drain/vent
C. Low pressure secondary isolation valve
D. Low pressure primary isolation valve
E. High pressure drain/vent
F. High pressure secondary isolation valve
G. High pressure primary isolation valve

6.0 Additional information

6.1 Rod-out operation

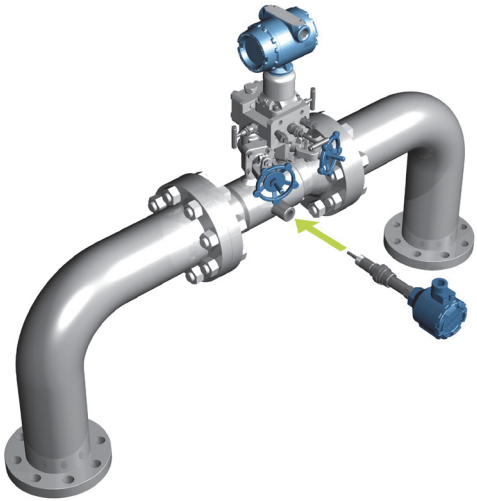
The Rosemount 9295 Process Flow Meter is designed to accommodate a right angle (90°) rod-out tool with 1/2" NPT connection. Straight rod-out tools may need a nipple extension installed in order to provide clearance for the transmitter housing.

Follow site-specific safety procedures when performing the rod-out operation.

6.2 Replacing the RTD

RTD replacement can be performed online as the assembly is not pressure containing. Refer to the RTD Quick Start Guide for more information.

Figure 18. Replacing the RTD



6.3 Insulation recommendations

To protect the transmitter electronics and ensure an accurate temperature measurement (when applicable), it is recommended that the meter body be covered with 4 in. (100 mm) of insulation up to the bottom of the valve bodies.

⚠ CAUTION

Do not insulate the valves, uppers impulse lines, manifold or transmitter.

Insulation could lead to overheating and premature failure of the electronics.

7.0 Declaration of Conformity

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EU Declaration of Conformity

CE

No: DSI 1000 Rev. Q

We,

Rosemount, Inc.
8200 Market Boulevard
Chanhassen, MN 55317-9685
USA

declare under our sole responsibility that the products,

Rosemount Primary Elements: 405x, 485, 585, 1195, 1495, 1595, 9295
Rosemount DP Flowmeters: 2051CFx, 3051CFx, 3051SFx

manufactured by,

Rosemount / Dieterich Standard, Inc.
5601 North 71st Street
Boulder, CO 80301
USA

to which this declaration relates, is in conformity with the provisions of the European Union Directives as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule. The object of the declaration described above is in conformity with the relevant Union harmonization legislation.

(signature) Director, Operations & Engineering (function)

Brian A. Fieser (name) 27-Nov-17 (date of issue)

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EU Declaration of Conformity

No: DSI 1000 Rev. Q

CE

PED Directive (2014/68/EU) ***This directive is valid from 19 July 2016***

Summary of Classifications – Group 1 Dangerous Fluids		
Model/Range	Hazard Classification	
	Gas	Liquid
585S (Flanged): CL150/PN16 to CL900/PN160 (Sensor 11, 22 & 44)	SEP	SEP
585S (Flanged): CL1500/PN250 to CL2500/PN400 (Sensor 11 & 22)	CAT I*	SEP
585S (Flanged): CL1500/PN250 & CL2500/PN400 (Sensor 44	CAT III	SEP
405A, 405C, 405P Compact Primary Element (x051xFC)	SEP	SEP
1195, x051xFP: 1/2" & 1" (All types & Ratings)	SEP	SEP
1195, x051xFP: CL150/PN16 1-1/2"	CAT I*	SEP
1195, x051xFP: CL300/PN40 1-1/2"	CAT II*	SEP
1195, x051xFP: CL600/PN100 to CL900/PN160 1-1/2"	CAT II*	CAT II
1195, x051xFP: 1-1/2" Threaded & Welded	CAT II*	CAT II
1495 Orifice Plate	SEP	SEP
1496 Orifice Flange Union	SEP	SEP
1595 Conditioning Orifice Plate	SEP	SEP
Pak-Lok – 485/x051xFA: All (CL600/PN100 Rating) All Lines	SEP	SEP
Flanged – 485/x051xFA: CL150/PN16 to CL900/PN160 All Lines	SEP	SEP
Flanged – 485/x051xFA: CL1500/PN250 & CL2500/PN400 All Lines	CAT I*	SEP
Flange-Lok – 485/x051xFA: CL150/PN16 to CL600/PN100 All Lines	SEP	SEP
Flo-Tap – 485/x051xFA: Sensor Size 1 CL150/PN16 to CL600/PN100 2" to 8" Line	SEP	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL150/PN16 6" to 24" Line	CAT I*	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL150/PN16 30" to 36" Line	CAT II*	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL300/PN40 6" to 36" Line	CAT II*	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL600/PN100 6" to 14" Line	CAT II*	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL600/PN100 16" to 36" Line	CAT III	CAT II
Flo-Tap – 485/x051xFA : Sensor Size 3 CL150/PN16 12" to 36" Line	CAT II*	SEP
Flo-Tap – 485/x051xFA : Sensor Size 3 CL150/PN16 42" to 72" Line	CAT III	CAT II
Flo-Tap – 485/x051xFA : Sensor Size 3 CL300/PN40 12 to 72" Line	CAT III	CAT II
Flo-Tap – 485/x051xFA : Sensor Size 3 CL600/PN100 12" to 36" Line	CAT III	CAT II
Flo-Tap – 485/x051xFA : Sensor Size 3 CL600/PN100 42" to 72" Line	CAT IV*	CAT II
Flo-Tap – 585: Sensor Size 44 CL150/PN16 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL150/PN16 (Line Size Code > 420, <=720)	CAT I*	SEP
Flo-Tap – 585: Sensor Size 44 CL300/PN40 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL300/PN40 (Line Size Code > 420, <=720)	CAT II*	SEP
Flo-Tap – 585: Sensor Size 44 CL600/PN10 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL600/PN100 (Line Size Code > 420, <=720)	CAT II*	SEP
585M: Sensor Size 44	CAT III*	SEP
9295, CL150/PN16, 2"	CAT I*	SEP
9295, CL150/PN16, 3" & 4"	CAT II*	SEP
9295, CL150/PN16, 6"	CAT II*	CAT II
9295, CL300/PN40 to CL900/PN160, 2"	CAT II*	SEP
9295, CL300/PN40 to CL900/PN160, 3" & 4"	CAT II*	CAT II
9295, CL300/PN40 to CL900/PN160, 6"	CAT III	CAT II

Certificate of Assessment– CE-0041-PED-H-RMT 001-16-USA

** When fluid is an unstable gas, these are increased to CAT III.*

IV Category IV Flo Tap requires a B1 Certificate for design examination and H1 Certificate for special surveillance*

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EU Declaration of Conformity

No: DSI 1000 Rev. Q

CE

Summary of Classifications – Group 2 All Other Fluids		
Model/Range	Hazard Classification	
	Gas	Liquid
585S (Flanged): CL150/PN16 to CL2500/PN400 (Sensor 11, 22, &44)	SEP	SEP
405A, 405C, 405P Compact Primary Element (x051xFC)	SEP	SEP
1195, x051xFP: 1/2" & 1" (All Versions)	SEP	SEP
1195, x051xFP: CL150/PN16 1-1/2"	SEP	SEP
1195, x051xFP: CL300/PN40 - CL900/PN160 1-1/2"	I	SEP
1195, x051xFP : 1-1/2" Threaded & Welded	I	SEP
1495 Orifice Plate	SEP	SEP
1496 Orifice Flange Union	SEP	SEP
Pak-Lok – 485/x051xFA: All (CL600/PN100 Rating) All Lines	SEP	SEP
Flanged – 485/x051xFA: CL150/PN16 to CL900/PN160 All Lines	SEP	SEP
Flanged – 485/x051xFA: CL1500/PN250 & CL2500/PN400 All Lines	SEP	SEP
Flange-Lok – 485/x051xFA: CL150/PN16 to CL600/PN100 All Lines	SEP	SEP
Flo-Tap – 485/x051xFA: Sensor Size 1 CL150/PN16 to CL600/PN100 2" to 8" Line	SEP	SEP
Flo-Tap – 485/x051xFA: Sensor Size 2 CL150/PN16 6" to 24" Line	SEP	SEP
Flo-Tap – 485/x051xFA : Sensor Size 2 CL150/PN16 30" to 36" Line	CAT I	SEP
Flo-Tap – 485/x051xFA: Sensor Size 2 CL300/PN40 6" to 36" Line	CAT I	SEP
Flo-Tap – 485/x051xFA: Sensor Size 2 CL600/PN100 6" to 14" Line	CAT I	SEP
Flo-Tap – 485/x051xFA: Sensor Size 2 CL600/PN100 16" to 36" Line	CAT II	SEP
Flo-Tap – 485/x051xFA: Sensor Size 3 CL150/PN16 12" to 36" Line	CAT I	SEP
Flo-Tap – 485/x051xFA: Sensor Size 3 CL150/PN16 42" to 72" Line	CAT II	SEP
Flo-Tap – 485/x051xFA: Sensor Size 3 CL300/PN40 12 to 72" Line	CAT II	SEP
Flo-Tap – 485/x051xFA: Sensor Size 3 CL600/PN100 12" to 36" Line	CAT III	SEP
Flo-Tap – 485/x051xFA: Sensor Size 3 CL600/PN100 42" to 72" Line	CAT III	SEP
Flo-Tap – 585: Sensor Size 44 CL150/PN16 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL150/PN16 (Line Size Code > 420, <=720)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL300/PN40 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL300/PN40 (Line Size Code > 420, <=720)	CAT I	SEP
Flo-Tap – 585: Sensor Size 44 CL600/PN10 (Line Size Code <= 420)	SEP	SEP
Flo-Tap – 585: Sensor Size 44 CL600/PN100 (Line Size Code > 420, <=720)	CAT I	SEP
585M: Sensor Size 44	SEP	SEP
9295, CL150/PN16, 2"	SEP	SEP
9295, CL150/PN16, 3" to 6"	I	SEP
9295, CL300/PN40 to CL900/PN160, 2" to 4"	I	SEP
9295, CL300/PN40 to CL900/PN160, 6"	II	SEP

Pressure Equipment Directive Notified Body:

Bureau Veritas UK Limited [Notified Body Number: 0041]
Parklands, Wilmslow Road, Didsbury
Manchester M20 2RE
United Kingdom

00825-0100-4295

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Global Headquarters
Emerson Automation Solutions
6021 Innovation Blvd.
Shakopee, MN 55379, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RFQ.RMD-RCC@Emerson.com

North America Regional Office
Emerson Automation Solutions
8200 Market Blvd.
Chanhassen, MN 55317, USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RMT-NA.RCCRFQ@Emerson.com

Latin America Regional Office
Emerson Automation Solutions
1300 Concord Terrace, Suite 400
Sunrise, FL 33323, USA
+1 954 846 5030
+1 954 846 5121
RFQ.RMD-RCC@Emerson.com

Europe Regional Office
Emerson Automation Solutions
Neuhofstrasse 19a P.O. Box 1046
CH 6340 Baar
Switzerland
+41 (0) 41 768 6111
+41 (0) 41 768 6300
RFQ.RMD-RCC@Emerson.com

Asia Pacific Regional Office
Emerson Automation Solutions
1 Pandan Crescent
Singapore 128461
+65 6777 8211
+65 6777 0947
Enquiries@AP.Emerson.com

Middle East and Africa Regional Office
Emerson Automation Solutions
Emerson FZE P.O. Box 17033
Jebel Ali Free Zone - South 2
Dubai, United Arab Emirates
+971 4 8118100
+971 4 8865465
RFQ.RMTMEA@Emerson.com

Linkedin.com/company/Emerson-Automation-Solutions

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Google.com/+RosemountMeasurement

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