1 About this guide

This guide provides basic guidelines for the Rosemount™ 8800D Series Vortex Flowmeter. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, Explosion-proof, Flameproof, or Intrinsically Safe (I.S.) installations. Refer to the reference manual for more instruction. The manuals and this quick start guide are also available electronically on EmersonProcess.com/Rosemount.

⚠️ WARNING

Explosions could result in death or serious injury. Installation of this transmitter in an explosive environment must be in accordance with the appropriate local, national, and international standards, codes, and practices. Review the approvals section of the reference manual for any restrictions associated with a safe installation.

- Before connecting a handheld communicator in an explosive atmosphere, make sure the instruments in the loop are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the flowmeter is consistent with the appropriate product certifications.
- In an Explosion-proof/Flameproof installation, do not remove the flowmeter covers when power is applied to the unit. Electrical shock can result in death or serious injury.

⚠️ WARNING

Electrical shock can result in death or serious injury.

- Avoid contact with the leads and terminals. High voltage that may be present on leads can cause electrical shock.

1.1 Return policy

Emerson procedures must be followed when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Emerson employees. Failure to follow Emerson procedures will result in your equipment being refused delivery.
1.2 Emerson Flow customer service

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

Telephone:

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2 Installation

2.1 Mount the flowmeter

Design process piping so the meter body will remain full, with no entrapped air. The vortex flowmeter can be installed in any orientation without affecting accuracy. However, the following are guidelines for certain installations.

2.1.1 Vertical mounting

If the vortex flowmeter will be installed in a vertical orientation:

- Install upward or downward flow for gas or steam.
- Install upward flow for liquids.

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**Figure 2-1: Vertical installation**

A. *Gas flow*

B. *Liquid or gas flow*
2.1.2 Horizontal mounting

**Figure 2-2: Horizontal installation**

A. Preferred installation—meter body installed with electronics to side of pipe
B. Acceptable installation—meter body installed with electronics above pipe

For steam and fluids with small solids content, it is recommended to have the flowmeter installed with the electronics to the side of the pipe. This will minimize potential measurement errors by allowing the condensate or solids to flow under the shedder bar without interrupting the vortex shedding.

2.1.3 High temperature mounting

The maximum temperature for integral electronics is dependent on the ambient temperature where the flowmeter is installed. The electronics must not exceed 185 °F (85 °C).

**Figure 2-3** shows combinations of ambient and process temperatures needed to maintain a housing temperature of less than 185 °F (85 °C).
**Figure 2-3: Ambient/Process temperature limits**

A. Ambient temperature °F (°C)
B. Process temperature °F (°C)
C. 185 °F (85 °C) Housing temperature limit.

**Note**
The indicated limits are for horizontal pipe and vertical meter position, with meter and pipe insulated with 3 in. (77 mm) of ceramic fiber insulation.

The following orientations are recommended for applications with high process temperatures.

- Install with electronics head beside or below process pipe.
- Insulation around pipe may be necessary to maintain ambient temperature below 185 °F (85 °C).

**Note**
Insulate pipe and meter body only. Do not insulate support tube bracket or transmitter so heat can be dissipated.

### 2.1.4 Steam installations

Avoid installation shown in Figure 2-4. Such conditions may cause a water-hammer condition at start-up due to trapped condensation.
2.1.5 **Upstream/downstream requirements**

The flowmeter may be installed with a minimum of ten straight pipe diameters (D) upstream and five straight pipe diameters (D) downstream by following the K-factor corrections as described in the 8800 Installation Effects Technical Data Sheet (00816-0100-3250). No K-factor correction is required if 35 straight pipe diameters upstream (35D) and 10 straight pipe diameters downstream (10D) are present.

2.1.6 **External pressure/temperature transmitters**

When using pressure and temperature transmitters in conjunction with the flowmeter for compensated mass flows, install the transmitters downstream of the flowmeter as shown in Figure 2-5.
2.1.7 Wafer style installation

**Figure 2-6: Wafer style installation**

A. Installation studs and nuts (supplied by customer)
B. Alignment ring
C. Gaskets (supplied by customer)
D. Flow direction
2.1.8 Flanged style installation

**Figure 2-7: Flanged style installation**

- **A.** Installation bolts and nuts (supplied by customer)
- **B.** Gaskets (supplied by customer)
- **C.** Flow direction

**Note**
The required bolt load for sealing the gasket joint is affected by several factors, including operating pressure, gasket material, width, and condition. A number of factors also affect the actual bolt load resulting from a measured torque, including condition of bolt threads, friction between the nut head and the flange, and parallelism of the flanges. Due to these application-dependent factors, the required torque for each application may be different. Follow the guidelines outlined in ASME PCC-1 for proper bolt tightening. Make sure the flowmeter is centered between flanges of the same nominal size as the flowmeter.

2.1.9 Insert integral temperature sensor (MTA option only)

**About this task**

**Note**
Step number of procedure corresponds with number in Figure 2-8.
**Figure 2-8: Thermocouple assembly**

**Procedure**

1. Slide the thermocouple bolt (1) over the thermocouple (TC).
2. Place the 2-part ferrule (2) over the end tip of the thermocouple (TC).
3. Insert the thermocouple into the thermowell hole (TW) on the bottom side of the meter body.

   **Important**
   Carefully push the thermocouple into the thermowell completely. This is critical to get the proper insertion depth. Then thread the thermocouple bolt into the hole.

4. When the thermocouple bolt is hand tight, mark the position of the bolt in relation to the meter body (the mark will help determine rotations). Using a ½-in. wrench turn the bolt clockwise ¾ turn to seat the ferrule.

   **Note**
   After completing Step 4, the ferrule and thermocouple bolt will be permanently installed on the thermocouple.

5. Verify the rubber O-ring is installed on the electronics connection end of the thermocouple.
6. Verify the 2.5 mm hex head screw is installed.
7. Insert the electronics end connector into the transmitter housing. Tighten the screw with a 2.5 mm hex bit to secure the connection.

   **Important**
   Do not over tighten hex screw.
2.2 Install remote electronics

About this task
If you order one of the remote electronics options (options R10, R20, R30, or RXX), the flowmeter assembly ships in two parts:

1. The meter body with an adapter installed in the support tube and an interconnecting coaxial cable attached to it.
2. The electronics housing installed on a mounting bracket.

If you ordered the armored remote electronics options, follow the same instructions as for the standard remote cable connection with the exception that the cable may not need to be run through conduit. Armored includes the glands.

Prerequisites

1. Mount the meter body in the process flow line as described in Mount the flowmeter.
2. Mount the bracket and electronics housing in the desired location. The housing can be repositioned on the bracket to facilitate field wiring and conduit routing.

About this task
Refer to Figure 2-9 and these steps to connect the loose end of the coaxial cable to the electronics housing.
Figure 2-9: Remote electronics installation

A. 1/2 NPT conduit adapter or cable gland (supplied by customer)
B. Coaxial cable
C. Meter adapter
D. Union
E. Washer
F. Nut
G. Sensor cable nut
H. Support tube
I. Meter body
J. Electronics housing
K. Coaxial cable nut
L. Conduit adapter (optional-supplied by customer)
M. Housing adapter screws
N. Housing adapter
O. Housing base screw
P. Ground connection

Procedure

1. If you plan to run the coaxial cable in conduit, carefully cut the conduit to the desired length to provide for proper assembly at the housing. A junction box may be placed in the conduit run to provide a space for extra coaxial cable length.
The coaxial remote cable cannot be field terminated or cut to length. Coil any extra coaxial cable with no less than a 2-in. (51 mm) radius.

2. Slide the conduit adapter or cable gland over the loose end of the coaxial cable and fasten it to the adapter on the meter body support tube.

3. If using conduit, route the coaxial cable through the conduit.

4. Place a conduit adapter or cable gland over the end of the coaxial cable.

5. Remove the housing adapter from the electronics housing.

6. Slide the housing adapter over the coaxial cable.

7. Remove one of the four housing base screws.

8. Attach and securely tighten the coaxial cable nut to the connection on the electronics housing.

9. Attach the coaxial cable ground wire to the housing via the housing base ground screw.

10. Align the housing adapter with the housing and attach with two screws.

11. Tighten the conduit adapter or cable gland to the housing adapter.

To prevent moisture from entering the coaxial cable connections, install the interconnecting coaxial cable in a single dedicated conduit run or use sealed cable glands at both ends of the cable.

Note
Refer to the reference manual for details for the CPA option.
3 Consider housing rotation

The entire electronics housing may be rotated in 90° increments for easy viewing. Use the following steps to change the housing orientation,

Procedure

1. Loosen the three housing rotation set screws at the base of the electronics housing with a 5/32” hex wrench by turning the screws clockwise (inward) until they clear the support tube.
2. Slowly pull the electronics housing out of the support tube.

⚠️ CAUTION

Do not pull the housing more than 1.5 in. (40 mm) from the top of the support tube until the sensor cable is disconnected. Damage to the sensor may occur if this sensor cable is stressed.

3. Unscrew the sensor cable from the housing with a 5/16” open end wrench.
4. Rotate the housing to the desired orientation.
5. Hold it in this orientation while you screw the sensor cable onto the base of the housing.

⚠️ CAUTION

Do not rotate the housing while the sensor cable is attached to the base of the housing. This will stress the cable and may damage the sensor.

6. Place the electronics housing into the top of the support tube.
7. Use a hex wrench to turn the three housing rotation screws counterclockwise (outward) to engage the support tube.
4 Set jumpers

Adjust jumpers to desired settings.

4.1 HART jumpers

If alarm and security jumpers are not installed, the flowmeter will operate normally with the default alarm condition alarm high and the security off.

Figure 4-1: HART jumpers and LCD display

4.2 Foundation fieldbus

If security and simulate enable jumpers are not installed, the flowmeter will operate normally with the default security “OFF” and simulate enable “OFF”.

Figure 4-2: Foundation fieldbus jumpers and LCD display
5 Connect wiring and power up

5.1 Power supply (HART)

The dc power supply should provide power with less than two percent ripple. The total resistance load is the sum of the resistance of the signal leads and the load resistance of the controller, indicator, and related pieces. Note that the resistance of intrinsic safety barriers, if used, must be included.

Figure 5-1: Load limitation

![Graph showing load limitation]

A. **Rloop in ohms**  
B. **Power supply voltage**

Maximum Loop Resistance = 41.7 (Power Supply Voltage - 10.8) The Field Communicator requires a minimum loop resistance of 250 ohms.

5.2 Power supply (Foundation fieldbus)

The flowmeter requires 9-32 Vdc at the power terminals. Each fieldbus power supply requires a power conditioner to decouple the power supply output from the fieldbus wiring segment.

5.3 Conduit installation

Prevent condensation in any conduit from flowing into the housing by mounting the flowmeter at a high point in the conduit run. If the flowmeter is mounted at a low point in the conduit run, the terminal compartment could fill with fluid.

If the conduit originates above the flowmeter, route conduit below the flowmeter before entry. In some cases a drain seal may need to be installed.
5.4 Wire the flowmeter

Use the following figures and steps to wire the flowmeter:

**About this task**

**Figure 5-3: 4–20 mA wiring**

- **A. Power supply**
Figure 5-4: 4–20 mA and pulse wiring with electronic totalizer/counter

A. Power supply
B. Power supply with counter
**Figure 5-5: Flowmeter field wiring for Foundation fieldbus protocol**

A. 6234 ft (1900 m) max, depending upon cable characteristics
B. Integrated power conditioner and filter
C. Terminators
D. Fieldbus segment
E. Power supply
F. (Trunk)
G. (Spur)
H. Devices 1 through 16

**Note**
The power supply, filter, first terminator, and configuration tool are typically located in the control room.

**Procedure**

1. Remove the housing cover on the side marked FIELD TERMINALS.
2. Connect the positive lead to the “+” terminal and the negative lead to the “−” terminal as shown in Figure 5-3 for HART installations and Figure 5-5 for Foundation fieldbus installations.

**Note**
Foundation fieldbus terminals are not polarity sensitive.

\(1\) Intrinsically safe installations may allow fewer devices per I.S. barrier.
3. For HART installations utilizing the pulse output, connect the positive lead to the “+” terminal of the pulse output and the negative lead to the “−” terminal of the pulse output as shown in Figure 5-4. A separate 5 to 30 Vdc power supply is required for the pulse output. Maximum switching current for the pulse output is 120 mA.

**CAUTION**

Do not connect the powered signal wiring to the test terminals. Power could damage the test diode in the test connection. Twisted pairs are required to minimize noise pick up in the 4–20 mA signal and digital communication signal. For high EMI/RFI environments, shielded signal wire is required and preferred in all other installations. Use 24 AWG or larger wire and do not exceed 5,000 feet (1,500 meters). For ambient temperatures above 140 °F (60 °C) use wire rated to 176 °F (80 °C) or higher.

Figure 5-3 and Figure 5-4 show wiring connections necessary to power a transmitter and enable communications with a hand-held Field Communicator.

Figure 5-5 shows wiring connections necessary to power a transmitter with Foundation fieldbus.

4. Plug and seal unused conduit connections. Use pipe sealing tape or paste on threads to ensure a moisture-tight seal. Housing conduit entries marked with M20 will require M20 x 1.5 blanking plug thread. Unmarked conduit entries will require a ½–14 NPT blanking plug thread.

**Note**

Straight threads require a minimum of three wraps of tape to obtain a tight seal.

5. If applicable, install wiring with a drip loop. Arrange the drip loop so the bottom is lower than the conduit connections and the flowmeter housing.

**Note**

Installation of the transient protection terminal block does not provide transient protection unless the transmitter case is properly grounded.

**CAUTION**

Flowmeters ordered with painted meter body may be subject to electrostatic discharge. To avoid electrostatic charge build-up, do not rub the meter body with a dry cloth or clean with solvents.
5.5 Secure cover jam screw

For transmitter housings shipped with a cover jam screw, the screw should be properly installed once the transmitter has been wired and powered up. The cover jam screw is intended to disallow the removal of the transmitter cover in flameproof environments without the use of tooling.

Procedure

1. Verify the cover jam screw is completely threaded into the housing.
2. Install the transmitter housing cover and verify that the cover is tight against the housing.
3. Using an M4 hex wrench, loosen the jam screw until it contacts the transmitter cover.
4. Turn the jam screw an additional ½ turn counterclockwise to secure the cover.

⚠️ CAUTION

Application of excessive torque may strip the threads.

5. Verify that the cover cannot be removed.
6 Verify configuration

Before operating the flowmeter in an installation, you should review the configuration data to ensure that it reflects the current application. In most cases, all of these variables are pre-configured at the factory. Configuration may be required if your flowmeter is not configured or if the configuration variables need revision. Rosemount recommends the following variables are reviewed before startup.

**HART**
- Tag
- Transmitter Mode
- Process Fluid
- Reference K-Factor
- Flange Type
- Mating Pipe ID
- PV Units
- PV Damping
- Process Temperature Damping
- Fixed Process Temperature
- Auto Adjust Filter
- LCD Display Configuration (For units with a display only)
- Density Ratio (For Standard or Normal flow units only)
- Process Density and Density Units (For mass flow units only)
- Variable Mapping
- Range Values
- Pulse Output Configuration (For units with a pulse output only)

**Foundation fieldbus configuration**
- Tag
- Transmitter Mode
- Process Fluid
- Reference K-Factor
- Flange Type
- Mating Pipe ID
- PV Units (configured in the AI block)
- Flow Damping
- Process Temperature Damping
- Fixed Process Temperature
- Auto Adjust Filter
- LCD Display Configuration (for units with a display only)
- Density Ratio (for Standard or Normal flow units only)
- Process Density and Density Units (for mass flow units only)

Table 6-1: Fast Keys for Rosemount 8800D Device Revision 1 DD Revision 2 and Device Revision 2 DD Revision 1

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### Table 6-1: Fast Keys for Rosemount 8800D Device Revision 1 DD Revision 2 and Device Revision 2 DD Revision 1 (continued)

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<td>1, 1, 4, 2, 2</td>
<td>Wetted Material</td>
<td>1, 4, 1, 4</td>
</tr>
<tr>
<td>Mating Pipe ID (Inside Diameter)</td>
<td>1, 3, 5</td>
<td>Write Protect</td>
<td>1, 4, 4, 6</td>
</tr>
<tr>
<td>Message</td>
<td>1, 4, 4, 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 6-2: Fast Keys for Rosemount 8800D Device Revision 2 DD Revision 3

<table>
<thead>
<tr>
<th>Function</th>
<th>HART Fast Keys</th>
<th>Function</th>
<th>HART Fast Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm Direction</td>
<td>1, 3, 1, 3, 2</td>
<td>Percent of Range</td>
<td>3, 4, 3, 2</td>
</tr>
<tr>
<td>Analog Output</td>
<td>3, 4, 3, 1</td>
<td>Polling Address</td>
<td>2, 2, 7, 1</td>
</tr>
<tr>
<td>Analog Trim</td>
<td>3, 4, 3, 6</td>
<td>Primary Variable Damping</td>
<td>2, 1, 4, 1</td>
</tr>
<tr>
<td>Base Time Unit</td>
<td>2, 2, 2, 3, 2</td>
<td>Primary Variable</td>
<td>2, 2, 2, 1, 1</td>
</tr>
<tr>
<td>Base Volume Unit</td>
<td>2, 2, 2, 3, 1</td>
<td>Process Density Units</td>
<td>2, 2, 2, 2, 6</td>
</tr>
<tr>
<td>Burst Mode</td>
<td>2, 2, 7, 2</td>
<td>Process Fluid Type</td>
<td>2, 2, 1, 1, 2</td>
</tr>
<tr>
<td>Function</td>
<td>HART Fast Keys</td>
<td>Function</td>
<td>HART Fast Keys</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------</td>
<td>------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Burst Option</td>
<td>2, 2, 7, 3</td>
<td>Process Temp Units</td>
<td>2, 2, 3, 1, 2</td>
</tr>
<tr>
<td>Burst Slot 0</td>
<td>2, 2, 7, 4, 1</td>
<td>Process Variables</td>
<td>3, 2, 1</td>
</tr>
<tr>
<td>Burst Slot 1</td>
<td>2, 2, 7, 4, 2</td>
<td>Pulse Output</td>
<td>3, 2, 4, 4</td>
</tr>
<tr>
<td>Burst Slot 2</td>
<td>2, 2, 7, 4, 3</td>
<td>Pulse Output Test</td>
<td>3, 5, 3, 4</td>
</tr>
<tr>
<td>Burst Slot 3</td>
<td>2, 2, 7, 4, 4</td>
<td>Recall Factory</td>
<td>3, 4, 3, 8</td>
</tr>
<tr>
<td>Burst Variable Mapping</td>
<td>2, 2, 7, 4, 5</td>
<td>Reference K-Factor</td>
<td>2, 2, 1, 2, 1</td>
</tr>
<tr>
<td>Compensated K-Factor</td>
<td>2, 2, 1, 2, 2</td>
<td>Reset Transmitter</td>
<td>3, 4, 1, 2</td>
</tr>
<tr>
<td>Conversion Number</td>
<td>2, 2, 2, 3, 4</td>
<td>Restore Default Filters</td>
<td>2, 1, 4, 6</td>
</tr>
<tr>
<td>Date</td>
<td>2, 2, 8, 2, 1</td>
<td>Revision Numbers</td>
<td>2, 2, 8, 3</td>
</tr>
<tr>
<td>Descriptor</td>
<td>2, 2, 8, 2, 2</td>
<td>Scaled Analog Trim</td>
<td>3, 4, 3, 7</td>
</tr>
<tr>
<td>Density Ratio</td>
<td>2, 2, 3, 3, 2</td>
<td>2nd Variable</td>
<td>2, 2, 2, 1, 2</td>
</tr>
<tr>
<td>Device ID</td>
<td>2, 2, 8, 1, 5</td>
<td>Self Test</td>
<td>3, 4, 1, 1</td>
</tr>
<tr>
<td>Display</td>
<td>2, 1, 1, 2</td>
<td>Set Variable Mapping</td>
<td>2, 2, 2, 1, 5</td>
</tr>
<tr>
<td>Electronics Temp</td>
<td>3, 2, 5, 4</td>
<td>Shedding Frequency</td>
<td>3, 2, 4, 2</td>
</tr>
<tr>
<td>Electronics Temp Units</td>
<td>2, 2, 2, 2, 5</td>
<td>Signal Strength</td>
<td>3, 2, 5, 2</td>
</tr>
<tr>
<td>Final Assembly Number</td>
<td>2, 2, 8, 1, 4</td>
<td>Special Flow Unit</td>
<td>2, 2, 2, 3, 5</td>
</tr>
<tr>
<td>Fixed Process Density</td>
<td>2, 2, 1, 1, 5</td>
<td>Special Volume Unit</td>
<td>2, 2, 2, 3, 3</td>
</tr>
<tr>
<td>Fixed Process Temperature</td>
<td>2, 2, 1, 1, 4</td>
<td>Status</td>
<td>1, 1, 1</td>
</tr>
<tr>
<td>Flange Type</td>
<td>2, 2, 1, 4, 2</td>
<td>Tag</td>
<td>2, 2, 8, 1, 1</td>
</tr>
<tr>
<td>Flow Simulation</td>
<td>3, 5, 1</td>
<td>3rd Variable</td>
<td>2, 2, 2, 1, 3</td>
</tr>
<tr>
<td>4th Variable</td>
<td>2, 2, 2, 1, 4</td>
<td>Total</td>
<td>1, 3, 6, 1</td>
</tr>
<tr>
<td>Installation Effects</td>
<td>2, 2, 1, 1, 7</td>
<td>Totalizer Configuration</td>
<td>1, 3, 6, 3</td>
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Table 6-2: Fast Keys for Rosemount 8800D Device Revision 2 DD Revision 3 (continued)

<table>
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<th>Function</th>
<th>HART Fast Keys</th>
<th>Function</th>
<th>HART Fast Keys</th>
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<tbody>
<tr>
<td>Lower Range Value</td>
<td>2, 2, 4, 1, 4</td>
<td>Totalizer Control</td>
<td>1, 3, 6, 2</td>
</tr>
<tr>
<td>Lower Sensor Limit</td>
<td>2, 2, 4, 1, 5, 2</td>
<td>Transmitter Mode</td>
<td>2, 2, 1, 1, 1</td>
</tr>
<tr>
<td>Loop Test</td>
<td>3, 5, 2, 6</td>
<td>Trigger Level</td>
<td>2, 1, 4, 5</td>
</tr>
<tr>
<td>Low Flow Cutoff</td>
<td>2, 1, 4, 3</td>
<td>Upper Range Value</td>
<td>2, 2, 4, 1, 3</td>
</tr>
<tr>
<td>Low-pass Corner Frequency</td>
<td>2, 1, 4, 4</td>
<td>Upper Sensor Limit</td>
<td>2, 2, 4, 1, 5, 1</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>2, 2, 8, 1, 2</td>
<td>Velocity Flow</td>
<td>3, 2, 3, 4</td>
</tr>
<tr>
<td>Mass Flow</td>
<td>3, 2, 3, 6</td>
<td>Velocity Flow Units</td>
<td>2, 2, 2, 2, 2</td>
</tr>
<tr>
<td>Mass Flow Units</td>
<td>2, 2, 2, 2, 2, 4</td>
<td>Velocity Measurement Base</td>
<td>2, 2, 2, 2, 3</td>
</tr>
<tr>
<td>Mating Pipe ID (Inside Diameter)</td>
<td>2, 2, 1, 1, 6</td>
<td>Volume Flow</td>
<td>3, 2, 3, 2</td>
</tr>
<tr>
<td>Message</td>
<td>2, 2, 8, 2, 3</td>
<td>Volume Flow Units</td>
<td>2, 2, 2, 2, 1</td>
</tr>
<tr>
<td>Meter Body Number</td>
<td>2, 2, 1, 4, 5</td>
<td>Wetted Material</td>
<td>2, 2, 1, 4, 1</td>
</tr>
<tr>
<td>Minimum Span</td>
<td>2, 2, 4, 1, 6</td>
<td>Write Protect</td>
<td>2, 2, 8, 1, 6</td>
</tr>
<tr>
<td>Optimize DSP</td>
<td>2, 1, 1, 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6-3: Fast Keys for Rosemount 8800D HART 7 Device Revision 2 (DD Revision 1)/ HART 5 Device Revision 3 (DD Revision 1)

<table>
<thead>
<tr>
<th>Function</th>
<th>Fast Key</th>
<th>Function</th>
<th>Fast Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Output</td>
<td>3, 4, 3, 1</td>
<td>Polling Address</td>
<td>2, 2, –(1), 2, 1</td>
</tr>
<tr>
<td>Analog Trim</td>
<td>3, 4, 3, 7</td>
<td>Primary Variable</td>
<td>2, 2, 2, 1</td>
</tr>
<tr>
<td>Base Mass Unit (MF)</td>
<td>2, 2, 2, 8, 1</td>
<td>Process Fluid Type</td>
<td>2, 2, 1, 1, 3</td>
</tr>
<tr>
<td>Base Process Density</td>
<td>2, 2, 3, 2, 1</td>
<td>Process Variables</td>
<td>3, 2, 3</td>
</tr>
<tr>
<td>Base Time Unit (CVF)</td>
<td>2, 2, 2, 9, 4</td>
<td>Pulse Output</td>
<td>3, 2, 5, 3</td>
</tr>
<tr>
<td>Base Time Unit (MF)</td>
<td>2, 2, 2, 8, 4</td>
<td>Pulse Output Test</td>
<td>3, 5, 3, 4</td>
</tr>
<tr>
<td>Base Time Unit (VF)</td>
<td>2, 2, 2, 7, 4</td>
<td>Reference K-Factor</td>
<td>2, 2, 1, 2, 1</td>
</tr>
<tr>
<td>Base Volume Unit (CVF)</td>
<td>2, 2, 2, 9, 1</td>
<td>Reset Transmitter</td>
<td>3, 4, 4, 1, 2</td>
</tr>
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</table>

Quick Start Guide          October 2018
Rosemount™ 8800D Series Vortex Flowmeter
<table>
<thead>
<tr>
<th>Function</th>
<th>Fast Key</th>
<th>Function</th>
<th>Fast Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Volume Unit (VF)</td>
<td>2, 2, 2, 7, 1</td>
<td>Restore Default Filters</td>
<td>2, 1, 4, 6</td>
</tr>
<tr>
<td>Compensated K-Factor</td>
<td>2, 2, 1, 2, 2</td>
<td>Restore Factory Calibration</td>
<td>3, 4, 3, 9</td>
</tr>
<tr>
<td>Conversion Factor (CVF)</td>
<td>2, 2, 2, 9, 2</td>
<td>Revision Numbers</td>
<td>2, 2, –(1), 2</td>
</tr>
<tr>
<td>Conversion Factor (MF)</td>
<td>2, 2, 2, 8, 2</td>
<td>Scaled Analog Trim</td>
<td>3, 4, 3, 8</td>
</tr>
<tr>
<td>Conversion Factor (VF)</td>
<td>2, 2, 2, 7, 2</td>
<td>Second Variable</td>
<td>2, 2, 2, 2</td>
</tr>
<tr>
<td>Date</td>
<td>2, 2, –(1), 1, 5</td>
<td>Self Test</td>
<td>3, 4, 4, 1, 1</td>
</tr>
<tr>
<td>Corrected Volumetric Flow</td>
<td>3, 2, 1</td>
<td>Set Damping</td>
<td>2, 1, 4, 1</td>
</tr>
<tr>
<td>Corrected Volumetric Flow Units</td>
<td>2, 2, 2, 6, 2</td>
<td>Set Low Flow Cutoff</td>
<td>2, 1, 4, 3</td>
</tr>
<tr>
<td>Density Ratio</td>
<td>2, 2, 3, 4</td>
<td>Set Low-pass Corner Frequency</td>
<td>2, 1, 4, 4</td>
</tr>
<tr>
<td>Descriptor</td>
<td>2, 2, –(1), 1, 6</td>
<td>Set Trigger Level</td>
<td>2, 1, 4, 5</td>
</tr>
<tr>
<td>Device ID</td>
<td>2, 2, –(1), 1</td>
<td>Shedding Frequency</td>
<td>3, 2, 5, 1</td>
</tr>
<tr>
<td>Device Status</td>
<td>1, 1</td>
<td>Signal Strength</td>
<td>3, 4, 2, 1, 4</td>
</tr>
<tr>
<td>Display</td>
<td>2, 1, 1, 2</td>
<td>Special Flow Unit (CVF)</td>
<td>2, 2, 2, 9, 5</td>
</tr>
<tr>
<td>Electronics Temp</td>
<td>3, 2, 6</td>
<td>Special Flow Unit (MF)</td>
<td>2, 2, 2, 8, 5</td>
</tr>
<tr>
<td>Electronics Temp Units</td>
<td>2, 2, 2, 6, 7</td>
<td>Special Flow Unit (VF)</td>
<td>2, 2, 2, 7, 5</td>
</tr>
<tr>
<td>Final Assembly Number</td>
<td>2, 2, 1, 4, 3</td>
<td>Special Volume Unit</td>
<td>2, 2, 2, 7, 3</td>
</tr>
<tr>
<td>Fixed Process Density</td>
<td>2, 2, 1, 1, 5</td>
<td>Tag</td>
<td>2, 2, –(1), 1, 1</td>
</tr>
<tr>
<td>Fixed Process Temperature</td>
<td>2, 2, 1, 1, 4</td>
<td>Third Variable</td>
<td>2, 2, 2, 3</td>
</tr>
<tr>
<td>Flange Type</td>
<td>2, 2, 1, 4, 2</td>
<td>Total</td>
<td>2, 2, 4, 3, 1</td>
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</tbody>
</table>
Table 6-3: Fast Keys for Rosemount 8800D HART 7 Device Revision 2 (DD Revision 1)/ HART 5 Device Revision 3 (DD Revision 1) (continued)

<table>
<thead>
<tr>
<th>Function</th>
<th>Fast Key</th>
<th>Function</th>
<th>Fast Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Simulation</td>
<td>3, 5, 1, 2, 1</td>
<td>Totalizer Configuration</td>
<td>2, 2, 4, 3, 3</td>
</tr>
<tr>
<td>Fourth Variable</td>
<td>2, 2, 2, 4</td>
<td>Totalizer Control</td>
<td>2, 2, 4, 3, 2</td>
</tr>
<tr>
<td>Loop Test</td>
<td>3, 5, 2, 7</td>
<td>Transmitter Mode</td>
<td>2, 2, 1, 1, 1</td>
</tr>
<tr>
<td>Lower Range Value</td>
<td>2, 2, 4, 1, 4</td>
<td>Upper Range Value</td>
<td>2, 2, 4, 1, 3</td>
</tr>
<tr>
<td>Lower Sensor Limit</td>
<td>2, 2, 4, 1, 6</td>
<td>Upper Sensor Limit</td>
<td>2, 2, 4, 1, 5</td>
</tr>
<tr>
<td>Mass Flow</td>
<td>3, 2, 1</td>
<td>Variable Mapping</td>
<td>2, 2, 2, 5</td>
</tr>
<tr>
<td>Mass Flow Units</td>
<td>2, 2, 2, 6, 5</td>
<td>Velocity Flow</td>
<td>3, 2, 1</td>
</tr>
<tr>
<td>Message</td>
<td>2, 2, –(1), 1, 7</td>
<td>Velocity Flow Units</td>
<td>2, 2, 2, 6, 3</td>
</tr>
<tr>
<td>Meter Factor</td>
<td>2, 2, 1, 1, 7</td>
<td>Velocity Measurement Base</td>
<td>2, 2, 2, 6, 4</td>
</tr>
<tr>
<td>Minimum Span</td>
<td>2, 2, 4, 1, 7</td>
<td>Volume Flow</td>
<td>3, 2, 1</td>
</tr>
<tr>
<td>Optimize DSP</td>
<td>2, 1, 1, 3</td>
<td>Volume Flow Units</td>
<td>2, 2, 2, 6, 1</td>
</tr>
<tr>
<td>Percent of Range</td>
<td>3, 4, 3, 2</td>
<td>Wetted Material</td>
<td>2, 2, 1, 4, 1</td>
</tr>
<tr>
<td>Pipe Inside Diameter</td>
<td>2, 2, 1, 1, 6</td>
<td>Write Protect</td>
<td>2, 2, 4, 1</td>
</tr>
</tbody>
</table>

(1) These items are in a list format without numeric labels. To access these features, you must scroll to this option in the HART Communicator.

Note
For detailed configuration information, refer to the product reference manual.
7 Safety instrumented systems installation

For safety certified installations, refer to the Rosemount 8800D Safety Manual (Document # 00809-0200-4004) for installation procedure and system requirements.
8 Product certifications

Flameproof enclosure Ex d protection type in accordance with IEC 60079-1, EN 60079-1

- Transmitters with Flameproof enclosure type protection shall only be opened when power is removed.
- Closing of entries in the device must be carried out using the appropriate Ex d cable gland or blanking plug. Unless otherwise marked on housing, the standard conduit entry thread forms are 1/2–14 NPT.

Type n protection type in accordance with IEC 60079-15, EN60079-15

Closing of entries in the device must be carried out using the appropriate Ex e or Ex n cable gland and metal blanking plug or any appropriate ATEX or IECEx approved cable gland and blanking plug with IP66 rating certified by an EU approved certification body.

8.1 European directive information

The CE Declaration of Conformity for all applicable European directives for this product can be found on our website at www.emerson.com/rosemount. A hard copy may be obtained by contacting our local sales office.

8.2 ATEX Directive

Emerson Process Management complies with the ATEX Directive.

8.3 European Pressure Equipment Directive (PED)

Rosemount 8800D Vortex Flowmeter line size 40 mm to 300 mm

- Certificate Number 4741-2014-CE-HOU-DNV
- C€ 0575 or 0496
- Module H Conformity Assessment
- Mandatory CE-marking for flowmeters in accordance with Article 15 of the PED can be found on the flowtube body.
- Flowmeter categories I – III use module H for conformity assessment procedures.

Rosemount 8800D Vortex Flowmeter line size 15 mm and 25 mm

Sound Engineering Practice (SEP)  Flowmeters that are SEP are outside the scope of PED and cannot be marked for compliance with PED.
9 Hazardous location certifications

9.1 US and Canadian Certifications

**E5 or E6**  
Explosion-Proof for Class I, Division 1, Groups B, C, and D  
Dust ignition-proof for Class II, III Division 1, Groups E, F, G.  
Ex db [ia] IIC T6...T1 Gb  
Class I, Zone 1, AEx db [ia] IIC T6...T1 Gb (-50 °C ≤ Ta ≤ 70 °C)  
Thermal data:

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<thead>
<tr>
<th>Ambient temperature (°C)</th>
<th>Process temperature (°C)</th>
<th>T-Class sensor (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50 to +70</td>
<td>-200 to +75</td>
<td>T6</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +95</td>
<td>T5</td>
</tr>
<tr>
<td>-50 to +70</td>
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<td>-50 to +70</td>
<td>-200 to +195</td>
<td>T3</td>
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<td>-50 to +70</td>
<td>-200 to +290</td>
<td>T2</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +427</td>
<td>T1</td>
</tr>
</tbody>
</table>

Factory Sealed; Single Seal  
Enclosure Type 4X  
Install per drawing 08800-0112;

**I5 or I6**  
Intrinsically safe for use in Class I, II, III Division 1, Groups A, B, C, D, E, F, G  
Non-incendive for Class I, Division 2, Groups A, B, C and D  
Class I, Zone 0, AEx ia IIC T4 Ga  
Temperature Code T4 (-50 °C ≤ Ta ≤ 70 °C) 4-20 mA HART  
Temperature Code T4 (-50 °C ≤ Ta ≤ 60 °C) Fieldbus  
Single Seal; Enclosure Type 4X  
Install per drawing 08800-0112

**IE or IF**  
FISCO for Class I, Division 1, Groups A, B, C, and D  
FNICO for Class I Division 2, Groups A, B, C, and D  
Class I, Zone 0, AEx ia IIC T4 Ga  
Temperature Code T4 (-50 °C ≤ Ta ≤ 60 °C)  
Single Seal; Enclosure Type 4X  
Install per drawing 08800-0112
**Combined North America certifications**

**K5, K6, or KB**

Combination of E5 and I5 or E6 and I6.

**Special conditions for safe use (X):**

1. The Flowmeter shall be provided with special fasteners of property class A2-70 or A4-70.

2. For information regarding the dimensions of the flameproof joints the manufacturer shall be contacted.

3. When fitted with the 90V transient suppressors, the equipment is not capable of passing the 500V insulation test. This must be taken into account upon installation.

4. When the equipment is installed, precautions shall be taken to ensure the ambient temperature of the transmitter lies between -50 °C to +70 °C, taking into account process fluid effects. If the ambient temperature is outside this range remote transmitters shall be used.

5. Units marked with “Warning: Electrostatic Charging Hazard” may use non-conductive paint thicker than 0.2mm. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.

6. The enclosure may be made from aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.

---

**9.2 European certifications (ATEX)**

**ATEX I.S. certification**

- EN 60079-0: 2012 +A11: 2013
- EN 60079-11: 2012

**II1 Certification No. Baseefa05ATEX0084X**

ATEX marking:

- Ex IIC T4 Ga (-60 °C ≤ Ta ≤ 70 °C) 4–20 mA HART
- Ex IIC T4 Ga (-60 °C ≤ Ta ≤ 60 °C) Fieldbus
- CE 2460

<table>
<thead>
<tr>
<th>4–20 mA HART entity parameters</th>
<th>Fieldbus entity parameters</th>
<th>FISCO input parameters</th>
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</thead>
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<td>= 30 VDC</td>
<td>$U_i$ = 30 VDC</td>
</tr>
<tr>
<td>$I_i^{(1)}$ = 185 mA</td>
<td>$I_i^{(1)}$ = 300 mA</td>
<td>$I_i^{(1)}$ = 380 mA</td>
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<td>4–20 mA HART entity parameters</td>
<td>Fieldbus entity parameters</td>
<td>FISCO input parameters</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>$P_i^{(1)} = 1.0 \text{ W}$</td>
<td>$P_i^{(1)} = 1.3 \text{ W}$</td>
<td>$P_i^{(1)} = 5.32 \text{ W}$</td>
</tr>
<tr>
<td>$C_i = 0 \text{ µF}$</td>
<td>$C_i = 0 \text{ µF}$</td>
<td>$C_i = 0 \text{ µF}$</td>
</tr>
<tr>
<td>$L_i = 0.97 \text{ mH}$</td>
<td>$L_i &lt; 10 \text{ µH}$</td>
<td>$L_i &lt; 10 \text{ µH}$</td>
</tr>
</tbody>
</table>

$(1)$ Total for transmitter.

**ATEX FISCO**

**IA** Certification No. Baseefa05ATEX0084X

ATEX marking:
- $\text{Ex II 1 G Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ 60 °C)}$
- $\text{CE 2460}$

Special conditions for safe use (X):
1. When fitted with 90V transient suppressors (T1 option), the equipment is not capable of passing the 500V isolation test. This must be taken into account upon installation.
2. The enclosure may be made from aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0 environment. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.
3. When the equipment is installed, particular precautions must be taken to ensure taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

**ATEX Type 'n' certification**
- EN 60079-0: 2012 + A11: 2013
- EN 60079-11: 2012
- EN 60079-15: 2010

**N1** Certification No. Baseefa05ATEX0085X

ATEX marking:
- $\text{Ex II 3 G Ex nA ic IIC T5 Gc (-50 °C ≤ Ta ≤ 70 °C)}$ 4–20 mA HART
- $\text{Ex II 3 G Ex nA ic IIC T5 Gc (-50 °C ≤ Ta ≤ 60 °C)}$ Fieldbus

Maximum Working Voltage = 42 VDC 4–20 mA HART
Maximum Working Voltage = 32 VDC Fieldbus
Special conditions for safe use (X):

1. When fitted with 90V transient suppressors (T1 Option), the equipment is not capable of passing the 500V isolation test. This must be taken into account upon installation.

2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.

3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

**ATEX Dust certification**

- EN 60079-0: 2012 + A11: 2013
- EN 60079-31: 2014

**ND** Certificate: BaseefaATEX17.0020X

II 2 D Ex tb IIC T85°C Db (-20 °C ≤ Ta ≤ 70 °C)

2460

Maximum Working Voltage = 42 VDC 4–20 mA HART
Maximum Working Voltage = 32 VDC Fieldbus

Special conditions for safe use (X):

1. The enclosure may be made from aluminium alloy with a protective polyurethane paint finish which may constitute a potential electrostatic ignition risk. Care should be taken to protect it from external conditions conducive to the build-up of electrostatic charge on such surfaces. The enclosure must not be rubbed or cleaned with a dry cloth.

2. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

**ATEX Flameproof certification**

- EN 60079-0: 2012 + A11: 2013
- EN 60079-1: 2014
- EN 60079-11: 2012
- EN 60079-26: 2015

**E1** Certificate: KEMA99ATEX3852X;
Integral Flowmeter marked:

\(\text{II 1/2 G Ex db [ia] IIC T6...T1 Ga/Gb (-50 °C ≤ Ta ≤ 70 °C)}\)

Remote Transmitter marked:

\(\text{II 2(1) G Ex db [ia Ga] IIC T6 Gb (-50 °C ≤ Ta ≤ 70 °C)}\)

with meter body marked:

\(\text{II 1 G Ex ia IIC T6...T1 Ga (-50 °C ≤ Ta ≤ 70 °C)}\)

EPL Ga piezo sensor and thermocouple connections.

EPL Gb transmitter enclosure.

C Е 2460

42 VDC Max 4–20 mA HART

32 VDC Max Fieldbus

\(U_m = 250V\)

Thermal data:

<table>
<thead>
<tr>
<th>Ambient temperature (°C)</th>
<th>Process temperature (°C)</th>
<th>T-Class sensor (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>−50 to +70</td>
<td>−200 to +75</td>
<td>T6</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +95</td>
<td>T5</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +130</td>
<td>T4</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +195</td>
<td>T3</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +290</td>
<td>T2</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +427</td>
<td>T1</td>
</tr>
</tbody>
</table>

Installation instructions:

1. The cable and conduit entry devices shall be of a certified flameproof type Ex d, suitable for the conditions of use and correctly installed.
2. Unused apertures shall be closed with suitable blanking elements.
3. When the ambient temperature at the cable or conduit entries exceed 60 °C, cables suitable for at least 90 °C shall be used.
4. Remote mounted sensor; in type of protection Ex ia IIC, only to be connected to the associated Model 8800D Vortex Flowmeter electronics. The maximum allowable length of the interconnecting cable is 152 m (500 ft).

Special conditions for safe use (X):

1. For information regarding the dimensions of the flameproof joints, the manufacturer shall be contacted.
2. The Flowmeter shall be provided with special fasteners of property class A2-70 or A4-70.
3. Units marked with “Warning: Electrostatic Charging Hazard” may use non-conductive paint thicker than 0.2 mm. Precaution shall be taken to avoid ignition due to electrostatic charge on the enclosure.
4. When the equipment is installed, precautions shall be taken to ensure the ambient temperature of the transmitter lies between –50 °C to +70 °C, taking into account process fluid effects. If the ambient temperature is outside this range remote transmitters shall be used.

Combined ATEX certifications

K1 Combination of E1, I1, N1, and ND.

9.3 International certifications (IECEx)

IECEx I.S. certification

- IEC 60079-0: 2011
- IEC 60079-11: 2011

I7 Certificate No. IECEx BAS05.0028X

Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ 70 °C) 4-20 mA HART
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ 60 °C) Fieldbus

<table>
<thead>
<tr>
<th>4–20 mA HART entity parameters</th>
<th>Fieldbus entity parameters</th>
<th>FISCO input parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_i$</td>
<td>$U_i$</td>
<td>$U_i$</td>
</tr>
<tr>
<td>$I_{i(1)}$</td>
<td>$I_{i(1)}$</td>
<td>$I_{i(1)}$</td>
</tr>
<tr>
<td>$P_{i(1)}$</td>
<td>$P_{i(1)}$</td>
<td>$P_{i(1)}$</td>
</tr>
<tr>
<td>$C_i$</td>
<td>$C_i$</td>
<td>$C_i$</td>
</tr>
<tr>
<td>$L_i$</td>
<td>$L_i$</td>
<td>$L_i$</td>
</tr>
</tbody>
</table>

(1) Total for transmitter.

FISCO

IG Certificate: IECEx BAS 05.0028X

Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ 60 °C)

Special conditions for safe use (X):
1. When fitted with 90V transient suppressors (T1 Option), the equipment is not capable of passing the 500V isolation test. This must be taken into account upon installation.

2. The enclosure may be made from aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0 environment. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.

3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

**Type 'n' certification**

- IEC 60079-0: 2011
- IEC 60079-11: 2011
- IEC 60079-15: 2010

N7 Certificate No. IECEx BAS05.0029X  
Ex nA ic IIC T5 Gc (-50 °C ≤ Ta ≤ 70 °C) 4-20 mA HART  
Ex nA ic IIC T5 Gc (-50 °C ≤ Ta ≤ 60 °C) Fieldbus  
Maximum Working Voltage = 42 VDC 4-20 mA HART  
Maximum Working Voltage = 32 VDC Fieldbus  
Special conditions for safe use (X):

1. When fitted with 90V transient suppressors (T1 Option), the equipment is not capable of passing the 500V isolation test. This must be taken into account upon installation.

2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.

3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

**IECEx Dust certification**

- IEC 60079-0: 2011
- IEC 60079-31: 2013

NF Certificate: IECEx BAS 17.0019X
Ex tb IIIC T85°C Db (-20 °C ≤ Ta ≤ 70 °C)

Maximum Working Voltage = 42 VDC 4-20 mA HART

Maximum Working Voltage = 32 VDC Fieldbus

Special conditions for safe use (X):

1. The enclosure may be made from aluminium alloy with a protective polyurethane paint finish which may constitute a potential electrostatic ignition risk. Care should be taken to protect it from external conditions conducive to the build-up of electrostatic charge on such surfaces. The enclosure must not be rubbed or cleaned with a dry cloth.

2. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

IECEx Flameproof certification

- IEC 60079-0: 2011
- IEC 60079-1: 2014
- IEC 60079-11: 2011
- IEC 60079-26: 2014

E7 Certificate: IECEx KEM05.0017X

Integral Flowmeter marked:
Ex db [ia] IIC T6...T1 Ga/Gb (-50 °C ≤ Ta ≤ 70 °C)

Remote Transmitter marked: Ex db [ia Ga] IIC T6 Gb (-50 °C ≤ Ta ≤ 70 °C)

with meter body marked: Ex ia IIC T6...T1 Ga (-50 °C ≤ Ta ≤ 70 °C)

EPL Ga piezo sensor and thermocouple connections.

EPL Gb transmitter enclosure.

42 VDC Max 4-20 mA HART

32 VDC Max Fieldbus

$U_m = 250V$

Thermal data:

<table>
<thead>
<tr>
<th>Ambient temperature (°C)</th>
<th>Process temperature (°C)</th>
<th>T-Class sensor (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>−50 to +70</td>
<td>−200 to +75</td>
<td>T6</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +95</td>
<td>T5</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +130</td>
<td>T4</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +195</td>
<td>T3</td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>Process temperature (°C)</td>
<td>T-Class sensor (°C)</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>–50 to +70</td>
<td>–200 to +290</td>
<td>T2</td>
</tr>
<tr>
<td>–50 to +70</td>
<td>–200 to +427</td>
<td>T1</td>
</tr>
</tbody>
</table>

Installation instructions:
1. The cable and conduit entry devices shall be of a certified flameproof type Ex d, suitable for the conditions of use and correctly installed.
2. Unused apertures shall be closed with suitable blanking elements.
3. When the ambient temperature at the cable or conduit entries exceed 60 °C, cables suitable for at least 90 °C shall be used.
4. The remote mounted sensor may only be connected to the transmitter with the associated cable, supplied by the manufacturer.

Special conditions for safe use (X):
1. For information regarding the dimensions of the flameproof joints, the manufacturer shall be contacted.
2. The Flowmeter shall be provided with special fasteners of property class A2-70 or A4-70.
3. Units marked with “Warning: Electrostatic Charging Hazard” may use non-conductive paint thicker than 0.2 mm. Precaution shall be taken to avoid ignition due to electrostatic charge on the enclosure.
4. When the equipment is installed, precautions shall be taken to ensure the ambient temperature of the transmitter lies between –50 °C to +70 °C, taking into account process fluid effects. If the ambient temperature is outside this range remote transmitters shall be used.

**Combined IECEx certifications**

**K7** Combination of E7, I7, N7, and NF.

**9.4 Chinese certifications (NEPSI)**

**Flameproof certification**
- GB3836.1 – 2010
- GB3836.2 – 2010
- GB3836.4 – 2010
- GB3836.20 – 2010
E3 Certification No. GYJ17.1404X
Ex ia / d IIC T6 Ga/Gb (Integral Transmitter)
Ex d [ia Ga] IIC T6 Gb (Remote Transmitter)
Ex ia IIC T6 Ga (Remote Sensor)
Ambient temperature range: -50 °C ≤ Ta ≤ +70 °C
Process temperature range: -202 °C to +427 °C
Power Supply: 42 Vdc Max 4-20 mA HART
Power Supply: 32 Vdc Max Fieldbus
U_m = 250V

Special conditions for safe use (X):
1. The maximum allowable length of the interconnecting cable between transmitter and sensor is 152 m. The cable shall also be provided by Rosemount Inc., or by Emerson Process Management Flow Technologies Co., Ltd.
2. Suitable heat-resisting cables rated at least +80 °C shall be used when the temperature around the cable entry exceeds +60 °C.
3. Dimensions of flameproof joints are other than the relevant minimum or maximum specified in Table 3 of GB3836.2-2010. Contact manufacturer for details.
4. The Flowmeter is provided with special fasteners of property class A2-70 or A4-70.
5. Any friction should be prevented in order to avoid the risk of electrostatic charge on the enclosure due to non-conductive paint.
6. The earthing terminal should be connected to the ground reliably at site.
7. Do not open when energized.
8. The cable entry holes have to be connected by means of suitable entry device or stopping plugs with type of protection of Ex d IIC Gb the cable entry device and stopping plugs are approved in accordance with GB3836.1-2010 and GB3836.2-2010, and which are covered by a separate examination certificate, any unused entry hole is to be fitted with type of protection of Ex d IIC Gb flameproof stopping plug.
9. Users are forbidden to change the configuration to ensure the explosion protection performance of the equipment. Any faults shall be settled with experts from the manufacturer.
10. Precautions shall be taken to ensure that the electronic parts are within permissible ambient temperature considering the effect of the allowed fluid temperature.
11. During installation, operation and maintenance, users shall comply with the relevant requirements of the product

### I.S. certification

- GB3836.1 – 2010
- GB3836.4 – 2010
- GB3836.20 – 2010

**I3** Certification No. GYJ17.1196X
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ + 70 °C) 4-20 mA HART
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ + 60 °C) Fieldbus

<table>
<thead>
<tr>
<th>4–20 mA HART entity parameters</th>
<th>Fieldbus entity parameters</th>
<th>FISCO input parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_i$</td>
<td>$U_i$</td>
<td>$U_i$</td>
</tr>
<tr>
<td>$I_i^{(1)}$</td>
<td>$I_i^{(1)}$</td>
<td>$I_i^{(1)}$</td>
</tr>
<tr>
<td>$P_i^{(1)}$</td>
<td>$P_i^{(1)}$</td>
<td>$P_i^{(1)}$</td>
</tr>
<tr>
<td>$C_i$</td>
<td>$C_i$</td>
<td>$C_i$</td>
</tr>
<tr>
<td>$L_i$</td>
<td>$L_i$</td>
<td>$L_i$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4–20 mA HART entity parameters</th>
<th>30 VDC</th>
<th>300 mA</th>
<th>17.5 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fieldbus entity parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISCO input parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Total for transmitter.

### FISCO

**IH** Certification No. GYJ17.1196X
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ +60 °C)

Special conditions for safe use (X):

1. Cable between transmitter and sensor shall be provided by the manufacturer.
2. During installation, users shall comply with Clause 12.2.4 in GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas (other than mines).”
3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

4. Only be connected to the certified associated apparatus, the Vortex Flowmeter could be used in the explosive atmosphere. The connection should be complied with the requirements of the manual of the associated apparatus and the Vortex Flowmeter.

5. The enclosure should be taken to protect it from impact.

6. Any friction should be prevented in order to avoid the risk of electrostatic charge on the enclosure due to non-conductive paint.

7. The cable with shield is suitable for connection, and the shield should be connected to earth.

8. Users are forbidden to change the configuration to ensure the explosion protection performance of the equipment. Any faults shall be settled with experts from the manufacturer.


**Type ‘n’ certification**

- GB3836.1 – 2010
- GB3836.4 – 2010
- GB3836.8 – 2014

**N3** Certification No. GYJ17.1197X

\[\text{Ex nA ic IIC T5 Gc (-50 °C ≤ T_a ≤ +70 °C) 4-20 mA HART}\]

\[\text{Ex nA ic IIC T5 Gc (-50 °C ≤ T_a ≤ +60 °C) Fieldbus}\]

Special conditions for safe use (X):

1. Cable between transmitter and sensor shall be provided by the manufacturer.
2. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

3. During installation, users shall comply with Clause 12.2.4 in GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas (other than mines).”

4. Any friction should be prevented in order to avoid the risk of electrostatic charge on the enclosure due to non-conductive paint.

5. Do not open when energized.

6. The cable entry holes must be connected by means of suitable cable entry. The cable entry shall meet Ex d/Ex e/Ex nA installation requirements according to GB3836 and with Ex approval certificate. The installation method shall ensure the equipment satisfies degree of protection IP66 according to GB4208-2008.

7. Users are forbidden to change the configuration to ensure the explosion protection performance of the equipment. Any faults shall be settled with experts from the manufacturer.


See NEPSI Cert GYJ17.1181X

**Combined Chinese certifications (NEPSI)**

**K3** Combination of E3, I3, N3, and Dust.

**Japanese certifications (CML)**

**Flameproof certification**

- JNIOSH-TR-46-1
Certificate: CML17JPN1145X

Ex d [ia] IIC T6...T1 Ga/Gb (integral transmitter and sensor)
Ex d [ia Ga] IIC T6 Gb (remote transmitter)
Ex ia IIC T6...T1 Ga (remote sensor)

Ambient temperature range: -20 °C to +60 °C
Process temperature range: -202 °C to +427 °C

<table>
<thead>
<tr>
<th>Ambient temperature (°C)</th>
<th>Process temperature (°C)</th>
<th>T-Class sensor (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50 to +70</td>
<td>-200 to +75</td>
<td>T6</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +95</td>
<td>T5</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +130</td>
<td>T4</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +195</td>
<td>T3</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +290</td>
<td>T2</td>
</tr>
<tr>
<td>-50 to +70</td>
<td>-200 to +427</td>
<td>T1</td>
</tr>
</tbody>
</table>

42 VDC Max, 4-20 mA HART
32 VDC Max, Fieldbus

$U_m = 250V$

Special conditions for safe use (X):
1. For information regarding the dimensions of the flameproof joints, the manufacturer shall be contacted.
2. The Flowmeter shall be provided with special fasteners of property class A2-70 or A4-70.
3. Units marked with “Warning: Electrostatic Charging Hazard” may use non-conductive paint thicker than 0.2mm. Precaution shall be taken to avoid ignition due to electrostatic charge on the enclosure.

9.6 Brazilian certifications (INMETRO)

I. S. certification
- ABNT NBR IEC 60079-0: 2013
- ABNT NBR IEC 60079-11: 2013
- Portaria INMETRO no. 179: 18 May 2010

Certification Number: DNV 18.0003 X
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ +70 °C) 4-20 mA HART
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ +60 °C) Fieldbus

IB  Certification Number: DNV 18.0003 X
Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ +60 °C)

Special conditions for safe use (X):
1. When fitted with 90V transient suppressors, the equipment is not capable of passing the 500V insulation test. This must be taken into account upon installation.
2. The enclosure may be made from aluminum alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0. The polyurethane paint finish may constitute an electrostatic hazard and must only be cleaned with a damp cloth.
3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

Flameproof certification
- ABNT NBR IEC 60079-0: 2013
- ABNT NBR IEC 60079-1: 2016
- ABNT NBR IEC 60079-11: 2013
- ABNT NBR IEC 60079-26: 2016
- Portaria INMETRO no. 179: 18 May 2010

E2  Certification Number: DNV 18.0004 X
Ex d [ia] IIC T6 Ga/Gb (Integral Transmitter)
Ex d [ia Ga] IIC T6 Gb (Remote Transmitter)
Ex ia IIC T6 Ga (Remote Sensor)

Ambient temperature range: -50 °C ≤ Ta ≤ +70 °C
Process temperature range: -202 °C to +427 °C
Temperature class transmitter: T6
Temperature class sensor: see table below

<table>
<thead>
<tr>
<th>Ambient temperature (°C)</th>
<th>Process temperature (°C)</th>
<th>T-Class sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>−50 to +70</td>
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<td>T6</td>
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<td>T5</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +130</td>
<td>T4</td>
</tr>
<tr>
<td>Ambient temperature (°C)</td>
<td>Process temperature (°C)</td>
<td>T-Class sensor</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +195</td>
<td>T3</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +290</td>
<td>T2</td>
</tr>
<tr>
<td>−50 to +70</td>
<td>−200 to +427</td>
<td>T1</td>
</tr>
</tbody>
</table>

Power Supply: 42 Vdc Max 4-20 mA HART
Power Supply: 32 Vdc Max Fieldbus Transmitter
$U_m = 250$ V

**Remote mounted sensor**

In type of protection Ex ia IIC, only to be connected to the associated Model 8800D Vortex Flowmeter electronics. The maximum length of the interconnecting cable is 152 m (500 ft).

Special conditions for safe use (X):

1. For information regarding the dimensions of the flameproof joints, the manufacturer shall be contacted.
2. The Flowmeter is provided with special fasteners of property class A2-70 of A4-70.
3. Units marked with “Warning: Electrostatic Charging Hazard” may use non-conductive paint thicker than 0.2 mm. Precautions shall be taken to avoid ignition due to electrostatic charge of the enclosure.
4. When the equipment is installed, precautions shall be taken to ensure the ambient temperature of the transmitter lies between -50 °C to +70 °C, taking into account process fluid effects. If the ambient temperature is outside this range remote transmitters shall be used.

**Combined Brazilian certifications (INMETRO)**

K2 Combination of E2 and I2.

9.7 **EurAsian Conformity (EAC)**

This section addresses compliance with the requirements of technical regulations of the Customs Union.

- TR CU 020/2011—Electromagnetic compatibility of technical means
- TR CU 032/2013—On the safety of equipment operating under excessive pressure
- TR CU 012/2011—About the safety of equipment for use in potentially explosive atmospheres
- GOST R IEC 60079-0-2011
- GOST R IEC 60079-1-2011
Type of protection flameproof enclosure «d» with intrinsically safe flow sensor

Ex marking of the integral installation:
Ga/Gb Ex d [ia] IIC T6 X (-50°C ≤ Ta ≤ 70°C)

Ex marking of the remote installation: electronics module:
1Ex d [ia Ga] IIC T6 Gb X (-50°C ≤ Ta ≤ 70°C) flow sensor:
0Ex ia IIC T6 Ga X (-50°C ≤ Ta ≤ 70°C)

Electrical parameters:
Maximum DC supply voltage (with output signal 4-20 mA HART/pulse) 42 V;  
Maximum DC supply voltage (with output signal Foundation Fieldbus and FISCO) 32 V

Special conditions for safe use (X):
1. For flowmeters with Ex marking 0Ex ia IIC T6 Ga X, Ga / Gb Ex d [ia] IIC T6 X and transmitter with Ex marking 1Ex d [ia Ga] IIC T6 Gb X cabling in explosive area must be conducted according to requirements of IEC 60079-14-2011. Sheath cables must be designed for a maximum ambient temperature;
2. Remote installation should be made only with special coaxial cable provided by the manufacturer of flowmeters;
3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range;
4. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure

Type of protection "intrinsically safe circuit" level «ia»

Ex marking: 0Ex ia IIC T4 Ga X

Ambient temperature range:
- (I8) Flowmeters with pulse output signals, 4-20 mA /HART (-60°C ≤ Ta ≤ 70°C)
- Flowmeters with output Fieldbus (I8) and FISCO (G8) (-60°C ≤ Ta ≤ 60°C)
Table 9-1: Input intrinsically safe parameters

<table>
<thead>
<tr>
<th>Intrinsically safe parameters</th>
<th>Output signal</th>
<th>4–20mA/HART pulse</th>
<th>Foundation fieldbus</th>
<th>FISCO</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_i^{(1)}$, V</td>
<td>30</td>
<td>30</td>
<td>17.5</td>
<td></td>
</tr>
<tr>
<td>$I_i^{(1)}$, mA</td>
<td>185</td>
<td>300</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>$P_i^{(1)}$, W</td>
<td>1</td>
<td>1.3</td>
<td>5.32</td>
<td></td>
</tr>
<tr>
<td>$L_i$, uH</td>
<td>970</td>
<td>20</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>$C_i$, nF</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

(1) Applicable values $U_i$, $I_i$ are limited by the maximum input power $P_i$. It is not allowed to apply max values of $U_i$, $I_i$ at the same time.

Special conditions for safe use (X):

1. Power supply of flowmeters with Ex marking 0Ex ia IIC T4 Ga X must be implemented through intrinsically safe barriers having certificate of conformity for appropriate subgroups of electrical equipment.

2. Inductance and capacitance of intrinsically safe circuits of flowmeters with Ex marking 0Ex ia IIC T4 Ga X, with given parameters connecting cables must not exceed maximum values shown on the intrinsically safe barrier from the side of explosive zone.

3. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

4. When fitted with the 90V transient suppressors, the equipment is not capable of passing the 500V insulation test. This must be taken into account upon installation.

5. The enclosure may be made from aluminium alloy with a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion when located in Zone 0.

N8 Type of protection «n» and "intrinsically safe" level «ic»

Ex marking: 2Ex nA ic IIC T5 Gc X (-50°C ≤ $T_a$ ≤ 70°C)

Electrical parameters:
- The maximum DC voltage (with output 4-20 mA HART/pulse) 42V;
• Maximum supply DC voltage (with output signal Foundation Fieldbus and FISCO) 32V

Special conditions for safe use (X):

1. When the equipment is installed, particular precautions must be taken to ensure, taking into account the effect of process fluid temperature, that the ambient temperature of the electrical housing of the equipment meets the marked protection type temperature range.

2. When fitted with the 90V transient suppressors, the equipment is not capable of passing the 500V insulation test. This must be taken into account upon installation.

3. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.

**Combined EurAsian Conformity (EAC) certifications**

**K8** Combination of E8, I8, N8.
9.8 Rosemount 8800 Declaration of Conformity

EU Declaration of Conformity
No: RFD 1029 Rev. V

We,
Emerson – Rosemount, Micro Motion Inc.
12001 Technology Drive
Eden Prairie, MN 55344
USA

declare under our sole responsibility that the product(s),

Rosemount Model 8800D Vortex Flowmeters

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

Assumption of conformity is based on the application of harmonized or applicable technical standards and, when applicable or required, a European Union Legislation notified body certification, as shown in the attached schedule.

23 January 2018
(date of issue)

(signature)
Mark Fleigle
(name - printed)

Vice President Technology and New Products
(function name - printed)
EMERSON
Process Management

ROSEMOUNT

Schedule
EU Declaration of Conformity RFD 1029 Rev. V


PED Directive 2014/68/EU: Model 8800D Vortex Flowmeter with option ‘PD’, in Line Sizes 1.5”- 12”

Equipment without the ‘PD’ option is NOT PED compliant and cannot be used in the EEA without further assessment unless the installation is exempt under Article 1, paragraph 2 of the PED Directive 2014/68/EU.

QS Certificate of Assessment - EC No. 4741-2014-CE-HOU-DNV
Module H Conformity Assessment - ASME B31.3: 2010

Model 8800D Vortex Flowmeter with option ‘PD’, in Line Sizes .5”- 1”

Sound Engineering Practice - ASME B31.3: 2010

ATEX Directive 2014/34/EU: Model 8800D Vortex Flowmeter

Baseeu05ATEX084 X – Intrinsic Safety Certificate
Equipment Group II, Category 1 G (Ex ia IIC T4 Ga)

Baseeu05ATEX085 X – Type n Certificate
Equipment Group II, Category 3 G (Ex nA ic IIC T5 Gc)

Basefa17ATEX002X – Protection by Enclosure ‘tb’ Certificate
Equipment Group II, Category 2 D (Ex tb IIIC T85°C Db)

KEMA99ATEX3852X – Flameproof with Intrinsically Safe Connection(s) Certificate
Equipment Group II, Category 1/2 G (Ex db [ia] IIC T6...T1 Ga/Gb) – Integral Transmitter
Equipment Group II, Category 2(1) G (Ex db [ia Ga] IIC T6 Gb) – Remote Transmitter
Equipment Group II, Category 1 G (Ex ia IIC T6...T1 Ga) – Remote Sensor
Schedule
EU Declaration of Conformity RFD 1029 Rev. V

PED Notified Body

DNV GL
[Notified Body Number: 0575]
Veritasveien 1, N-1322
Hovik, Norway

OR

DNV GL Business Assurance S.r.l.
[Notified Body Number: 0496]
Via Energy Park 14
Vimercate, 20871 Italy

ATEX Notified Bodies

DEKRA Certification B.V. [Notified Body Number: 0344]
Meander 1051, 6825 MJ Arnhem
P.O. Box 5185, 6802 ED Arnhem
The Netherlands

SGS Basetfa Limited [Notified Body Number: 1180]
Rockhead Business Park, Studen Lane
Buxton, Derbyshire SK17 9RZ
United Kingdom

ATEX Notified Body for Quality Assurance

DNV Nemko Presafe AS [Notified Body number: 2460]
P.O. Box 73, Blindern
0314 Oslo, Norway