

Rosemount® 8600 Series Vortex Flowmeter



1 About this guide

This guide provides basic guidelines for the Rosemount™ 8600D 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:

North and South America		Europe and Middle East		Asia Pacific	
United States	800 522 6277	U.K.	0870 240 1978	Australia	800 158 727
Canada	+1 303 527 5200	The Netherlands	+31 (0) 704 136 666	New Zealand	099 128 804
Mexico	+41 (0) 41 7686 111	France	0800 917 901	India	800 440 1468
Argentina	+54 11 4837 7000	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	8008 77334	China	+86 21 2892 9000
Venezuela	+58 26 1731 3446	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
		Russia/CIS	+7 495 981 9811	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		

2 Installation

2.1 Mount the flowmeter

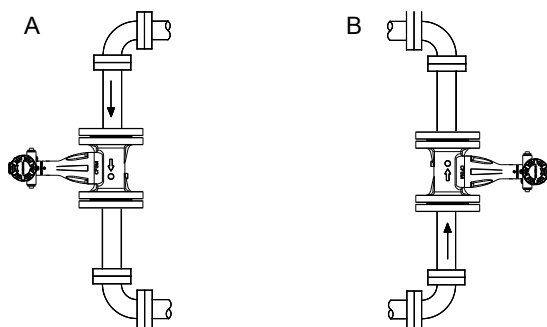
Design process piping so the meter body will remain full, with no entrapped air. The vortex flowmeter can be installed in any orientation without affecting accuracy. However, the following are guidelines for certain installations.

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.

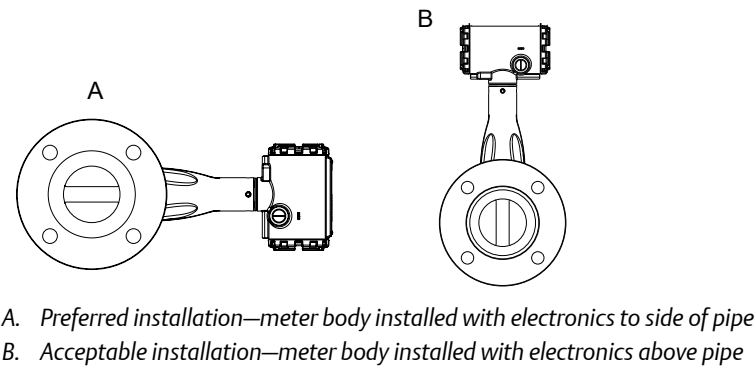
Figure 2-1: Vertical installation



- A. Gas flow
B. Liquid or gas flow
-

2.1.2 Horizontal mounting

Figure 2-2: Horizontal installation



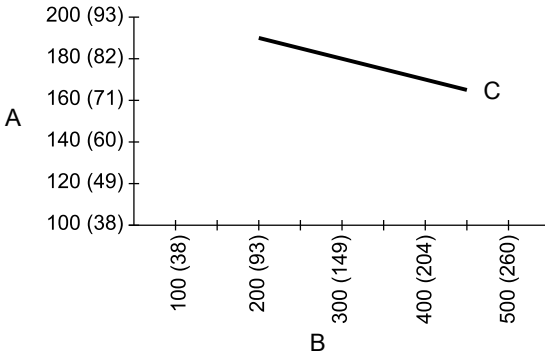
For steam and fluids with small solids content, it is recommended to have the flowmeter installed with the electronics to the side of the pipe. This will minimize potential measurement errors by allowing the condensate or solids to flow under the shedder bar without interrupting the vortex shedding.

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).

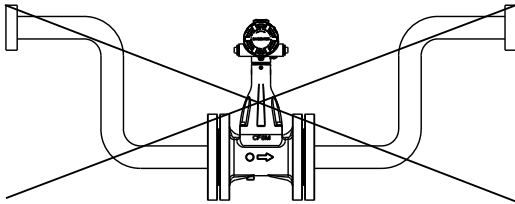
Note

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.

Figure 2-4: Improper installation



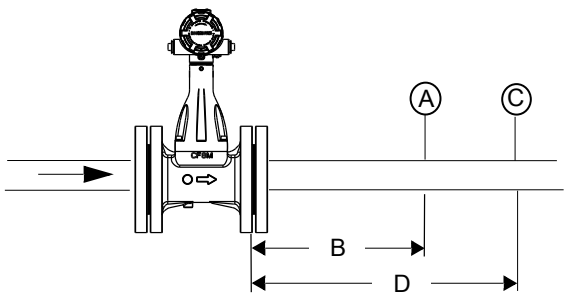
2.1.5 Upstream/downstream requirements

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](#).

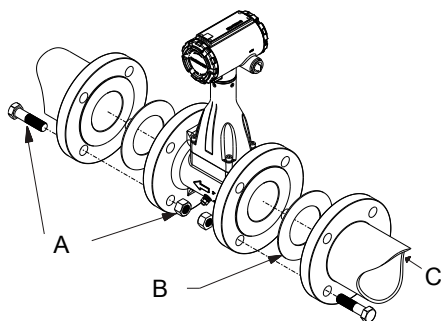
Figure 2-5: Upstream/Downstream piping



- A. Pressure transmitter
- B. Four straight pipe diameters downstream
- C. Temperature transmitter
- D. Six straight pipe diameters downstream

2.1.7 Flanged style installation

Figure 2-6: 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.

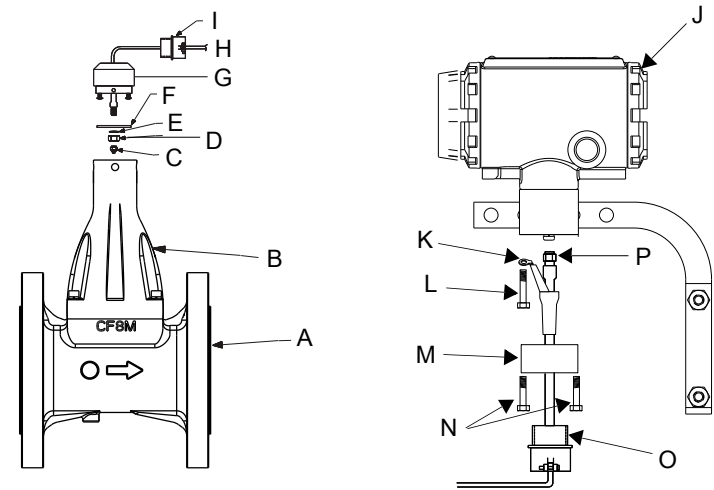
2.2 Install remote electronics

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.

Refer to [Figure 2-7](#) and these steps to connect the loose end of the coaxial cable to the electronics housing.

Figure 2-7: Remote electronics installation



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

Prerequisites

1. Mount the meter body in the process flow line as described in [Section 2.1](#).
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.

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.

CAUTION!

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.

CAUTION!

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.

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,

1. Loosen the four 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 four housing rotation screws counter-clockwise (outward) to engage the support tube.

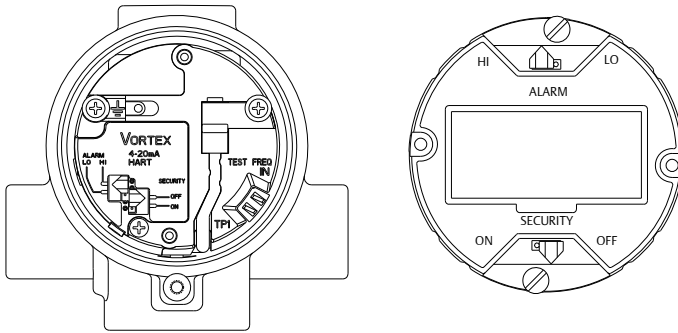
4 Set jumpers

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

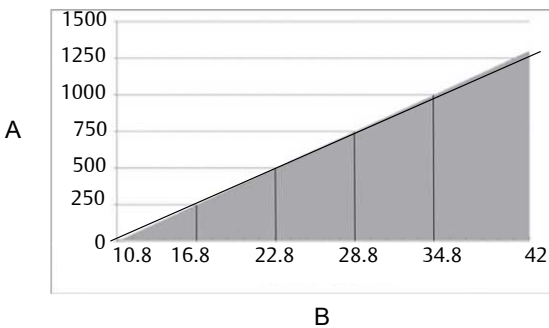


5 Connect wiring and power up

5.1 Power supply

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



A. Rloop in ohms

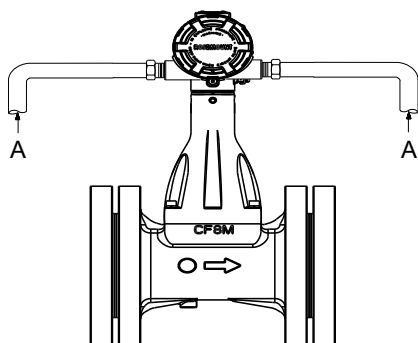
B. Power supply voltage

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

5.2 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.

Figure 5-2: Proper conduit installation

A. Conduit line

5.3 Wire the flowmeter

Use the following steps to wire the flowmeter:

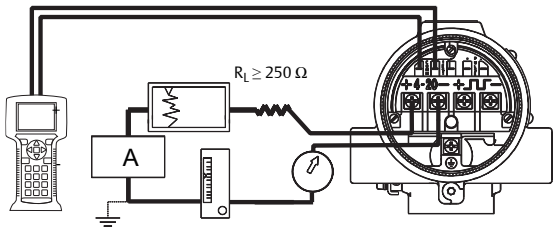
1. Remove the housing cover on the side marked FIELD TERMINALS.
2. Connect the positive lead to the “+” terminal and the negative lead to the “-” terminal as shown in [Figure 5-3](#) for HART installations.
3. For HART installations utilizing the pulse output, connect the positive lead to the “+” terminal 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.

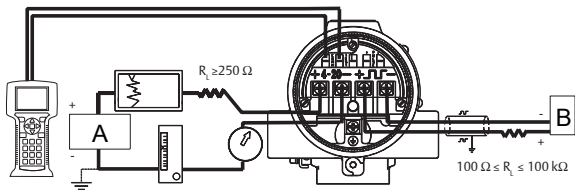
[Figure 5-3](#) and [Figure 5-4](#) show wiring connections necessary to power a transmitter and enable communications with a hand-held Field Communicator.

Figure 5-3: 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

- 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.

5.4 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.

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 $\frac{1}{2}$ 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)

Table 6-1: Field Communicator fast key sequences

Function	HART Fast Key	Function	HART Fast Key
Alarm Jumpers	1, 4, 2, 1, 3	Meter Body Number	1, 4, 1, 5
Analog Output	1, 4, 2, 1	Minimum Span	1, 3, 8, 3
Auto Adjust Filter	1, 4, 3, 1, 4	Num Req Preams	1, 4, 2, 3, 2
Base Time Unit	1, 1, 4, 1, 3, 2	Poll Address	1, 4, 2, 3, 1
Base Volume Unit	1, 1, 4, 1, 3, 1	Process Fluid Type	1, 3, 2, 2
Burst Mode	1, 4, 2, 3, 4	Process Variables	1, 1
Burst Option	1, 4, 2, 3, 5	Pulse Output	1, 4, 2, 2, 1
Burst Variable 1	1, 4, 2, 3, 6, 1	Pulse Output Test	1, 4, 2, 2, 2

Table 6-1: Field Communicator fast key sequences (continued)

Function	HART Fast Key	Function	HART Fast Key
Burst Variable 2	1, 4, 2, 3, 6, 2	PV Damping	1, 3, 9
Burst Variable 3	1, 4, 2, 3, 6, 3	PV Mapping	1, 3, 6, 1
Burst Variable 4	1, 4, 2, 3, 6, 4	PV Percent Range	1, 1, 2
Burst Xmtr Variables	1, 4, 2, 3, 6	QV Mapping	1, 3, 6, 4
Conversion Number	1, 1, 4, 1, 3, 4	Range Values	1, 3, 8
D/A Trim	1, 2, 5	Review	1, 5
Date	1, 4, 4, 5	Revision Numbers	1, 4, 4, 8
Descriptor	1, 4, 4, 3	Scaled D/A Trim	1, 2, 6
Density Ratio	1, 3, 2, 4, 1, 1	Self Test	1, 2, 1, 5
Device ID	1, 4, 4, 8, 6	Signal to Trigger Ratio	1, 4, 3, 2, 2
Electronics Temp	1, 1, 4, 7	STD/ Nor Flow Units	1, 1, 4, 1, 2
Electronics Temp Units	1, 1, 4, 7, 2	Special Units	1, 1, 4, 1, 3
Filter Restore	1, 4, 3, 3	Status	1, 2, 1, 1
Final Assembly Number	1, 4, 4, 8, 5	SV Mapping	1, 3, 6, 2
Fixed Process Density	1, 3, 2, 4, 2	Tag	1, 3, 1
Fixed Process Temperature	1, 3, 2, 3	Total	1, 1, 4, 4, 1
Flange Type	1, 3, 4	Totalizer Control	1, 1, 4, 4
Flow Simulation	1, 2, 4	Transmitter Mode	1, 3, 2, 1
Installation Effects	1, 4, 1, 6		
K-Factor	1, 3, 3	TV Mapping	1, 3, 6, 3
Local Display	1, 4, 2, 4	Trigger Level	1, 4, 3, 2, 5
Loop Test	1, 2, 2	URV	1, 3, 8, 1
Low Flow Cutoff	1, 4, 3, 2, 3	User Defined Units	1, 1, 4, 1, 3, 3
Low Pass Filter	1, 4, 3, 2, 4	USL	1, 3, 8, 4
LRV	1, 3, 8, 2	Shedding Frequency	1, 1, 4, 6
LSL	1, 3, 8, 5	Variable Mapping	1, 3, 6
Manufacturer	1, 4, 4, 1	Velocity Flow	1, 1, 4, 3
Mass Flow	1, 1, 4, 2	Velocity Meas Base	1, 1, 4, 3, 3
Mass Flow Units	1, 1, 4, 2, 2	Volumetric Flow	1, 1, 4, 1
Mating Pipe ID (Inside Diameter)	1, 3, 5	Wetted Material	1, 4, 1, 4
Message	1, 4, 4, 4	Write Protect	1, 4, 4, 6

Note

For detailed configuration information, refer to the product reference manual.

7 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.

7.1 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.

7.2 ATEX Directive

Emerson Process Management complies with the ATEX Directive.

7.3 European Pressure Equipment Directive (PED)

Rosemount 8600D Vortex Flowmeter line size 40 mm to 200 mm

- Certificate Number 4741-2014-CE-HOU-DNV
- CE 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 8600D Vortex Flowmeter line size 25 mm

Sound Engineering Practice (SEP)

Flowmeters that are SEP are outside the scope of PED and cannot be marked for compliance with PED.

8 Hazardous location certifications

8.1 North American certifications

Canadian Standards Association (CSA)

- E6** Explosion proof–Intrinsically Safe for Class I, Division 1, Groups B, C, and D
Ex d[ia] IIC T6 Gb / Class I, Zone 1, AEx d[ia] IIC T6 Gb
Dust-ignition proof for Class II/III, Division 1, Groups E, F, and G
Temperature Code T6 ($-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)
Factory Sealed; Dual Seal;
Enclosure Type 4X, IP66
Install per drawing 08800-0112
- I6** Intrinsically safe for use in Class I, II, III Division 1, Groups A, B, C, D, E, F, and G
Ex ia IIC T4 Ga SECURITE INTRINSEQUE Class I, Zone 0, AEx ia IIC T4 Ga.
Non-incendive for Class I, Division 2, Groups A, B, C and D
Temperature Code T4 ($-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)
4-20 mA HART Dual Seal
Enclosure Type 4X, IP66
Install per drawing 08800-0112

Combined Canadian certifications (CSA)

- K6** E6 and I6 combination
Special conditions for safe use (X):
1. 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.
 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.
 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.

8.2 International certifications (IECEx)

IECEx I.S. certification

- IEC 60079-0: 2011
- IEC 60079-11: 2011-06

I7 Certification No. IECEx BAS 12.0053X

Ex ia IIC T4 Ga ($-60\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$)

- $U_i = 30\text{ VDC}$
- $I_i = 185\text{ mA}$
- $P_i = 1.0\text{ W}$
- $C_i = 0\mu\text{F}$
- $L_i = 0.97\text{ mH}$

Special conditions for safe use (X):

1. 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.
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.
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 Type 'n' certification

- IEC 60079-0: 2011
- IEC 60079-11: 2011-06
- IEC 60079-15: 2010

N7 Certification No. IECEx BAS 12.0054X

Ex nA ic IIC T5 Gc ($-40\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$)

Maximum Working Voltage = 42 VDC

Special conditions for safe use (X):

1. 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.

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 Dust Certification

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

NF Certificate: IECEx BAS 17.0018X

Ex tb IIIC T85°C Db ($-20^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)

Maximum Working Voltage = 42 VDC

Special conditions for safe use (X):

1. 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.
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 Certification No. IECEx DEK 11.0022X

Integral Transmitter marked: Ex db [ia] IIC T6...T2 Ga/Gb

Remote Transmitter marked: Ex db [ia Ga] IIC T6 Gb

Remote Sensor marked: Ex ia IIC T6...T2 Ga

EPL Ga piezo sensor and thermocouple connections.

EPL Gb transmitter enclosure.

Ambient temperature range: $-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$

Power Supply: 42 Vdc Max.

Transmitter $U_m=250\text{ V}$

Thermal data:

Ambient temperature (°C)	Process temperature (°C)	T-Class sensor
-50 to +70	-50 to +75	T6
-50 to +70	-50 to +95	T5
-50 to +70	-50 to +130	T4
-50 to +70	-50 to +195	T3
-50 to +70	-50 to +250	T2

Remote mounted sensor: in type of protection Ex ia IIC, only to be connected to the associated Model 8600D 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 or 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 IECEx Certifications

K7 Combination of E7, I7, N7, and NF

8.3 Chinese certifications (NEPSI)

Flameproof certification

- GB3836.1—2010
- GB3836.2—2010
- GB3836.4—2010
- GB3836.20—2010

E3 Certification No. GYJ16.1280X

Ex d ia IIC T6 Gb/Ga ($-50\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$)

Process temperature range: $-202\text{ }^{\circ}\text{C}$ to $+427\text{ }^{\circ}\text{C}$

Power Supply: 42 Vdc

Max. Transmitter $U_m = 250\text{ V}$

Special conditions for safe use (X):

1. The maximum allowable length of the interconnecting cable between transmitter and sensor is 152m. The cable shall also be provided by Rosemount Inc., or by Emerson Process Management Co., Ltd., or by Emerson Process Management Flow Technologies., Ltd.
2. Suitable heat-resisting cables rated at least $+80\text{ }^{\circ}\text{C}$ shall be used when the temperature of the cable entry around exceed $+60\text{ }^{\circ}\text{C}$.
3. Dimensions of flameproof joints are other than the relevant minimum or maximum specified in Table 3 of GB3836.2-2010. Please 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 db IIC, 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 db IIC 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 instruction manual, GB3836.13-1997 "Electrical apparatus

for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”, GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas (other than mines)”, GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”, and GB50257-1996 “Code for construction and acceptance of electrical device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

I.5 certification

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

I3 Certification No. GYJ17.1198X

Ex ia IIC T4 Ga ($-60^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$)

- $U_i = 30 \text{ Vdc}$
- $I_i = 185 \text{ mA}$
- $P_i = 1.0 \text{ W}$
- $C_i = 0\mu\text{F}$
- $L_i = 0.97\text{mH}$

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.
9. During installation, operation and maintenance, users shall comply with the relevant requirements of the product instruction manual, GB3836.13-2013 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”, GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas (other than mines)”, GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”, and GB50257-2014 “Code for construction and acceptance of electrical device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

Type 'n' certification

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

N3 Certification No. GYJ17.1199X

Ex nA ic IIC T5 Gc ($-40^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$)

Maximum working voltage 42 Vdc

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.
8. During installation, operation and maintenance, users shall comply with the relevant requirements of the product instruction manual, GB3836.13-2013 “Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres”, GB3836.15-2000 “Electrical apparatus for explosive gas atmospheres Part 15: Electrical installations in hazardous areas (other than mines)”, GB3836.16-2006 “Electrical apparatus for explosive gas atmospheres Part 16: Inspection and maintenance of electrical installation (other than mines)”, and GB50257-2014 “Code for construction and acceptance of electrical device for explosion atmospheres and fire hazard electrical equipment installation engineering”.

Combined Chinese certifications (NEPSI)

K3 Combination of E3, I3, N3, and Dust

8.4 European certifications (ATEX)

ATEX I.S. certification

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

I1 Certification No. Baseefa12ATEX0179X

ATEX Marking:  II 1 G Ex ia IIC T4 Ga (-60 °C ≤ Ta ≤ +70 °C)

- $U_i = 30 \text{ VDC}$
- $I_i = 185 \text{ mA}$
- $P_i = 1.0 \text{ W}$
- $C_i = 0 \mu\text{F}$
- $L_i = 0.97 \text{ mH}$

Special conditions for safe use (X):

1. When fitted with 90V transient suppressors, 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.
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. Baseefa12ATEX0180X

ATEX Marking:  II 3 G Ex nA ic IIC T5 Gc (-40 °C ≤ Ta ≤ +70 °C)

Maximum working voltage = 42 Vdc

- $U_i = 30 \text{ VDC}$
- $I_i = 185 \text{ mA}$
- $P_i = 1.0 \text{ W}$
- $C_i = 0 \mu\text{F}$
- $L_i = 0.97 \text{ mH}$

Special conditions for safe use (X):

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

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 Dust Certification

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

ND Certificate: BaseefaATEX17.0019X;

 II 2 D Ex tb IIC T85°C Db ($-20^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)

Maximum Working Voltage = 42 VDC

Special conditions for safe use (X):


1. 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.
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 Certification No. DEKRA12ATEX0189X

Integral transmitter marked: ATEX marking:

 II 1/2 G Ex db [ia] IIC T6...T2 Ga/Gb

Remote transmitter marked: ATEX marking:

 II 2(1) G Ex db [ia Ga] IIC T6 Gb

Remote sensor marked: ATEX marking:  II 1 G; Ex ia IIC T6...T2 Ga

EPL Ga piezo sensor and thermocouple connections.

EPL Gb transmitter enclosure.

Ambient temperature range: $-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$

Maximum Working Voltage = 42 Vdc

Transmitter Um = 250V

Thermal data:

Ambient temperature (°C)	Process temperature (°C)	T-Class sensor
-50 to +70	-50 to +75	T6
-50 to +70	-50 to +95	T5
-50 to +70	-50 to +130	T4
-50 to +70	-50 to +195	T3
-50 to +70	-50 to +250	T2

Remote mounted sensor: in type of protection Ex ia IIC, only to be connected to the associated Model 8600D Vortex Flow meter 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 is 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. 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 ATEX certifications

K1 Combination of E1, I1, N1, and ND

8.5 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
- GOST R IEC 60079-11-2010
- GOST R IEC 60079-15-2010
- GOST 31610.26-2002/IEC 60079-26:2006

E8 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 ($-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)

Ex marking of the remote installation:

- Electronics module:
1Ex d [ia Ga] IIC T6 Gb X ($-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)
- Flow sensor: 0Ex ia IIC T6 Ga X ($-50^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)

Electrical parameters: Maximum DC supply voltage (with output signal 4-20 mA HART/pulse) 42 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.

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

Ex marking: 0Ex ia IIC T4 Ga X

Ambient temperature range: Flowmeters with pulse output signals, 4-20 mA /HART ($-60^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$)

Table 8-1: Input intrinsically safe parameters

Intrinsically safe parameters	Output signal
	4–20mA/HART pulse
$U_i^{(1)}$ V	30
$I_i^{(1)}$ mA	185
$P_i^{(1)}$ W	1
L_i , μ H	970
C_i , nF	0

(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 (-40°C ≤ Ta ≤ 70°C)

Electrical parameters: The maximum DC voltage (with output 4-20 mA HART/pulse) 42V

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.

K8 Combination of E8, I8, N8

8.6 Rosemount 8600D Declaration of Conformity



EU Declaration of Conformity
No: RFD 1092 Rev. H

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 8600D 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)

Mark Fleigle
(name - printed)

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


(signature)

FILE ID: 8600D CE Marking

Page 1 of 3

RFD1092.docx



Schedule
EU Declaration of Conformity RFD 1092 Rev. H

EMC Directive 2014/30/EU: All Models - EN 61326-1: 2013

PED Directive 2014/68/EU: Model 8600D Vortex Flowmeter with option 'PD', in Line Sizes 1.5"- 8"

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 8600D Vortex Flowmeter, in Line Sizes: 1"
Sound Engineering Practice - ASME B31.3: 2010

ATEX Directive 2014/34/EU: Model 8600D Vortex Flowmeter

Baseefa12ATEX0179 X – Intrinsic Safety Certificate

Equipment Group II, Category 1 G (Ex ia IIC T4 Ga)
EN 60079-0: 2012 + A11: 2013 EN 60079-11: 2012

Baseefa12ATEX0180 X – Type n Certificate

Equipment Group II, Category 3 G (Ex nA ic IIC T5 Gc)
EN 60079-0: 2012 + A11: 2013 EN 60079-11: 2012 EN 60079-15: 2010

Baseefa17ATEX0019X – Protection by Enclosure 'tb' Certificate

Equipment Group II, Category 2 D (Ex tb IIIC T85°C Db)
EN 60079-0: 2012 + A11: 2013 EN 60079-31: 2014

DEKRA 12ATEX0189 X – Flameproof with Intrinsically Safe Connection(s) Certificate

Equipment Group II, Category 1/2 G (Ex db [ia] IIC T6...T2 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...T2 Ga) – Remote Sensor
EN 60079-0: 2012 + A11: 2013 EN 60079-1: 2014 EN 60079-11: 2012 EN 60079-26: 2015



Schedule
EU Declaration of Conformity RFD 1092 Rev. H

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
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ATEX Notified Bodies

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

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

ATEX Notified Body for Quality Assurance

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



Quick Start Guide
00825-0100-4860, rev. EB
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