

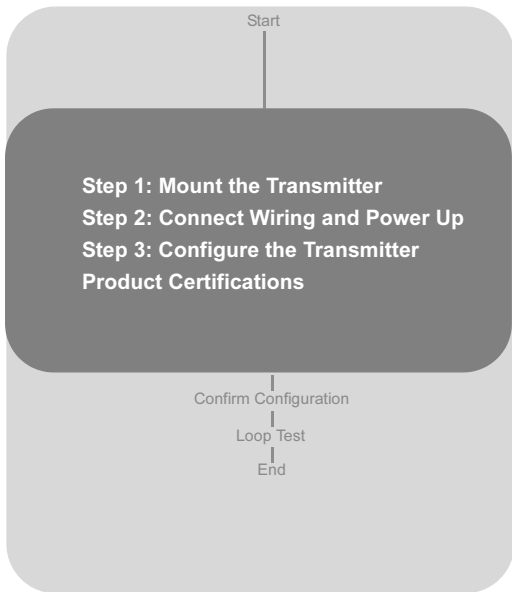
Quick Installation Guide

00825-0100-4024, Rev AA

March 2004

Rosemount 5600 Series

Rosemount 5600 Series Radar Level Transmitter with HART[®] and Foundation[™] fieldbus protocol



HART[®]



ROSEMOUNT[®]

www.rosemount.com



EMERSON[™]
Process Management

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IMPORTANT NOTICE

This installation guide provides basic guidelines for the Rosemount® 5600. It does not provide instructions for detailed configuration, diagnostics, maintenance, service, troubleshooting, or installations. Refer to the Rosemount 5600 reference manuals (document number 00809-0100-4024 and 00809-0100-4025) for more instruction. The manual and this QIG are also available electronically on www.rosemount.com.

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WARNING

Failure to follow safe installation and service guidelines could result in death or serious injury

- Make sure only qualified personnel perform installation or service.
- Use the equipment only as specified in this QIG and the Reference Manual. Failure to do so may impair the protection provided by the equipment.
- Repair, e.g. substitution of components etc. may jeopardize safety and is under no circumstances allowed.

Explosions could result in death or serious injury

- Verify that the operating environment of the transmitter is consistent with the appropriate hazardous locations specifications.
- In an Explosion-proof/Flame-proof installation, do not remove the transmitter covers when power is applied to the unit.
- Before connecting a HART-based 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.

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.
- Make sure the main power to the 5600 transmitter is off and the lines to any other external power source are disconnected or not powered while wiring the transmitter.

Process leaks may cause harm or result in death

- Install and tighten antenna and flanges before applying pressure.
- To avoid process leaks, do not remove tank seal while tank is under pressure.

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STEP 1: MOUNT THE TRANSMITTER

Identify which type of antenna to install and find the relevant section below:

- A. Mounting the Rod Antenna, Flanged Version
- B. Mounting the Rod Antenna, Threaded Version
- C. Mounting the Cone Antenna
- D. Mounting the Process Seal Antenna
- E. Mounting the Cone Antenna in a Still-pipe/Bridle
- F. Mounting the Extended Cone Antenna
- G. Mounting the Cone Antenna with Flushing Connections

A. Mounting the Rod Antenna, Flanged Version

- A1. Mount the flange on top of the rod antenna. Make sure the bottom side of the flange is flat and all parts are clean and dry.
- A2. Secure the flange with the locking nut. Make sure the nut fits tightly to the flange.
- A3. Mount the adapter on top of the sleeve.

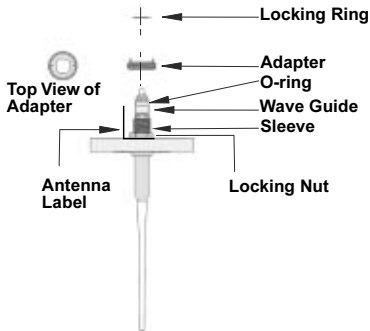


Figure 1. Mounting the adapter

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- A4. Secure the adapter with the locking ring.
- A5. Carefully fit the flange and the rod antenna on the tank nozzle with an appropriate gasket in between. Tighten with screws and nuts.
- A6. Insert the wave guide into the upper wave guide. Make sure the o-ring at the lower end of the wave guide tube is in place.
- A7. Place the protection sleeve on the flange. Mount the transmitter head and tighten the nut. Check that the pins on the adapter enter the corresponding grooves on the upper wave guide.
- A8. Proceed with *Step 2: Connect Wiring and Power Up*.

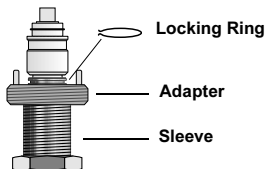


Figure 2. Securing the adapter

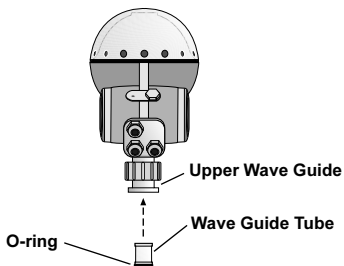


Figure 3. Inserting wave guide tube

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B. Mounting the Rod Antenna, Threaded Version

- B1. Carefully fit the rod antenna into the threaded nozzle and screw it in place.

NOTE

For adapters with NPT threads, pressure-tight joints may require a sealant.

- B2. Insert the wave guide tube into the upper wave guide. Make sure the o-ring at the lower end of the wave guide tube is in place. See *Figure 3. Inserting wave guide tube*

- B3. Place the protection sleeve on the flange. Mount the transmitter head and tighten the nut. Check that the guide pins on the adapter enter the corresponding grooves on the upper wave guide.
- B4. Proceed with *Step 2: Connect Wiring and Power Up.*

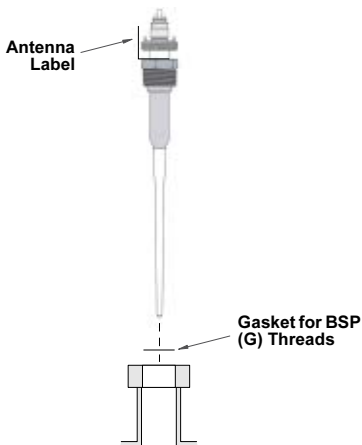


Figure 4. Mounting the rod antenna



Figure 5. Completed mechanical installation

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C. Mounting the Cone Antenna

C1. Mount the flange on top of the cone antenna. Make sure that the bottom side of the flange is flat and all parts are clean and dry.

C2. Secure the flange with the locking nut. Make sure that the nut fits tightly to the flange.

C3. Mount the adapter on top of the sleeve.

C4. Secure the adapter with the locking ring. See *Figure 2. Securing the adapter*

C5. Carefully fit the flange and the cone antenna on the tank nozzle.

C6. Tighten with screws and nuts.

C7. Insert the wave guide tube into the upper wave guide. Make sure the o-ring at the lower end of the wave guide tube is in place. See *Figure 3. Inserting wave guide tube*

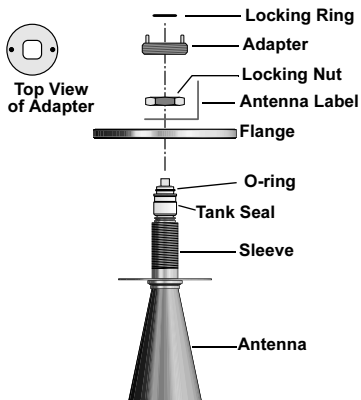


Figure 6. Mounting the Adapter

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- C8. Place the protection sleeve on the flange. Mount the transmitter head and tighten the nut. Check that the guide pins on the adapter enter the corresponding grooves on the upper wave guide.
- C9. Proceed with *Step 2: Connect Wiring and Power Up*.

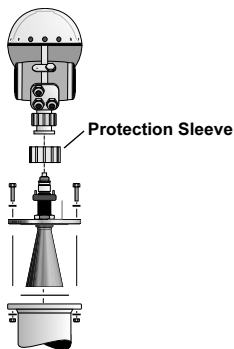


Figure 7. Mounting the transmitter head

D. Mounting the Process Seal Antenna

- D1. Place a gasket on top of the socket and mount the antenna. Use gasket supplied with the process seal antenna.
- D2. Put the loose flange on top of the antenna.
- D3. Mount the antenna by tightening the flange to the tank nozzle.

NOTE

Tighten the flange screws carefully to the recommended torque in *Table 1*. Tighten opposite screws in pair.

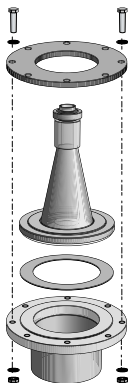


Figure 8. Mounting the process seal antenna

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Table 1. Recommended Torque (Nm) PTFE Seal

DIN Flange	PN16	PN40
DN100	11	15
DN150	15	-
ANSI Flange	150 Psi	300 Psi
4 in.	11	15
6 in.	15	10

- D4. Insert the wave guide tube into the upper wave guide.
- D5. Mount the transmitter head onto the adapter.
- D6. Tighten the nut and make sure that the transmitter head fits tightly to the antenna.
- D7. Proceed with *Step 2: Connect Wiring and Power Up.*

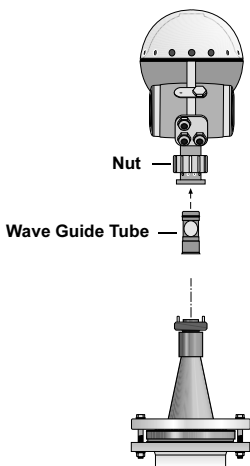


Figure 9. Insert wave guide tube and mount transmitter head

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E. Mounting the Cone Antenna in a Still-pipe/Bridle

E1. Mount the antenna and the transmitter head in the same way as a standard cone antenna. See *C. Mounting the Cone Antenna*.

E2. Make sure that the inclination of the transmitter is less than 1° .

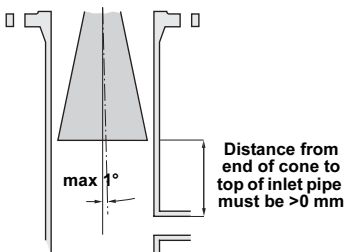


Figure 10. Inclination of transmitter

E3. In order to minimize the influence of disturbing echoes from inlet and outlet pipes you may need to rotate the transmitter head 90° .

E4. Proceed with *Step 2: Connect Wiring and Power Up*.

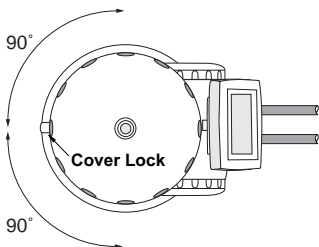


Figure 11. Rotate transmitter head

F. Mounting the Extended Cone Antenna

F1. Mount the antenna and transmitter head in the same way as a transmitter with a standard cone antenna. See *C. Mounting the Cone Antenna*.

F2. Proceed with *Step 2: Connect Wiring and Power Up*.

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G. Mounting the Cone Antenna with Flushing Connections

G1. The flange is a part of the antenna assembly and welded to the cone antenna. Carefully fit the antenna assembly and appropriate gasket on the tank nozzle.

G2. Insert the wave guide tube into the upper wave guide. Make sure the o-ring at the lower end of the wave guide tube is in place. See *Figure 3. Inserting wave guide tube.*

G3. Mount the transmitter head and tighten the nut. Check that the guide pins on the adapter enter the corresponding grooves on the upper wave guide.

G4. Connect your tubing to the antenna for cleaning, purging, or cooling purposes. Use a minimum 0.4 in. (10 mm) tube or pipe.

Typical media to use are nitrogen, air, water, or steam.

G5. Proceed with *Step 2: Connect Wiring and Power Up.*

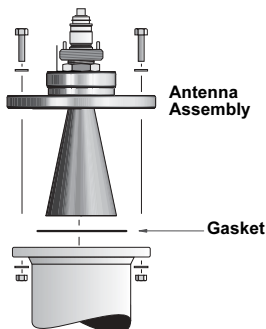


Figure 12. Mount the flushing cone antenna on the nozzle

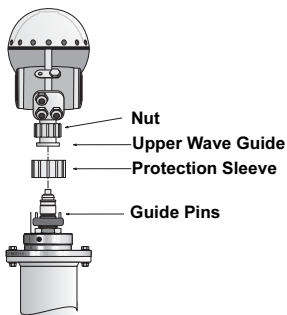


Figure 13. Mount the transmitter head

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STEP 2: CONNECT WIRING AND POWER UP

Use information on transmitter label for identification of enabled options. After identification, use the relevant connection information on the following pages.

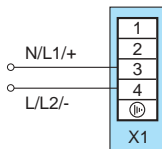
For identification of installed options, see label on the transmitter head. Find the 5601 xxxxZZxxx where ZZ is the primary output identification, see table.



- 5A Non-IS HART/4-20 mA, passive
- 5B IS HART/4-20 mA, passive
- 5C Non-IS HART/4-20 mA, active
- 5D IS HART/4-20 mA, active
- 7A Foundation Fieldbus, non-IS
- 7B Foundation Fieldbus, IS

Figure 14. Example of the Rosemount 5600 transmitter head label

Ultra wide 24-240 V DC or AC 0-60 Hz



Junction Box X1 EEx e

Figure 15. Power Supply

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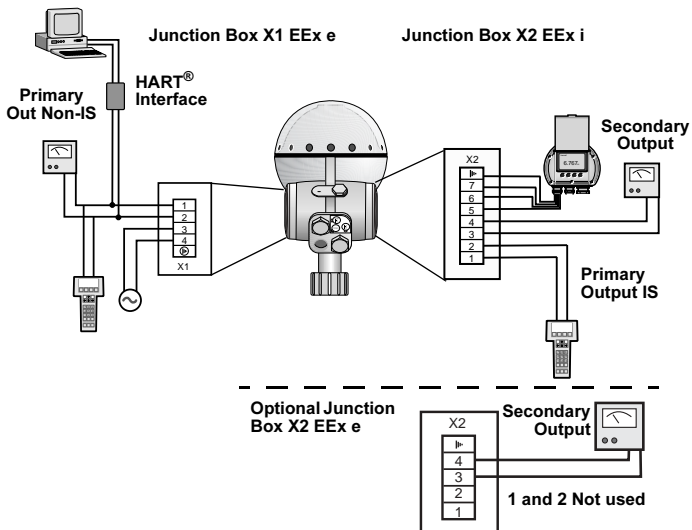


Figure 16. Schematic illustration of the Rosemount 5600 transmitter connection

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Connecting HART devices

Junction Box Option 5A Non-IS HART/4-20 mA, passive
EEx e

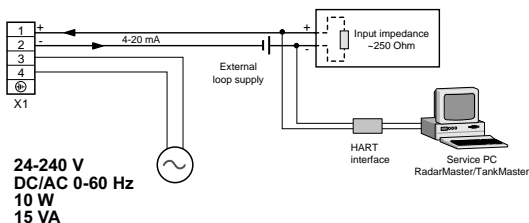


Figure 17. Typical HART passive output non-IS (primary)

Option 5B IS HART/4-20 mA, passive

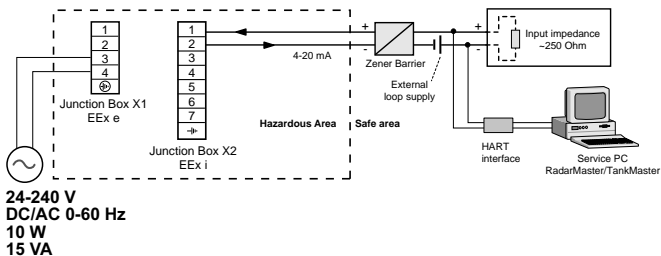


Figure 18. Typical HART passive output IS (primary)

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Option 5C Non-IS HART/4-20 mA, active

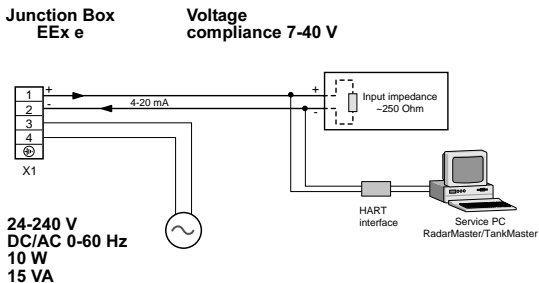


Figure 19. Typical HART active output non-IS

Option 5D IS HART/4-20 mA, active

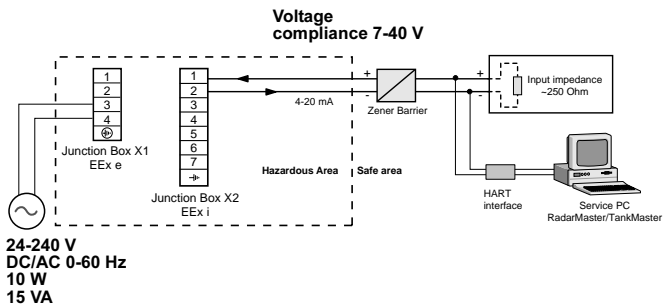


Figure 20. Typical HART active output IS

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FOUNDATION Fieldbus Non-Intrinsically Safe Wiring

1. Connect fieldbus wires to terminal 1 and 2 on the X1 side. These terminals are marked BUS terminals. The BUS terminals are polarity insensitive.
2. Connect the power wires to terminal 3 and 4 on the X1 side. These wires are separate from the fieldbus wires.

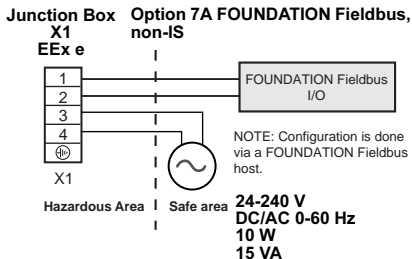


Figure 21. Transmitter Terminal Block (Non-IS Wiring)

FOUNDATION Fieldbus Intrinsically Safe Wiring

1. Connect fieldbus wires to terminals 1 and 2 on the X2 side. These terminals are marked BUS terminals. The BUS terminals are polarity insensitive.
2. Connect the power wires to terminal 3 and 4 on the X1 side. These wires are separate from the fieldbus wires.

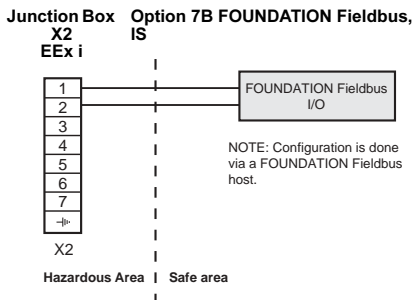


Figure 22. Transmitter Terminal Block (IS Wiring)

NOTE

Do not ground out the live signal wiring to the housing when working on a segment. Grounding the communication wires may result in temporary loss of communication with all devices on the segment.

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Connecting the Rosemount 2210 Display Unit

Connect the Display Unit to the X2 terminal in the Intrinsically Safe Junction Box by the following four wires:

- Grounding wire to the ground terminal
- Signal wires to terminal 6 and 7
- Supply voltage to terminal 5

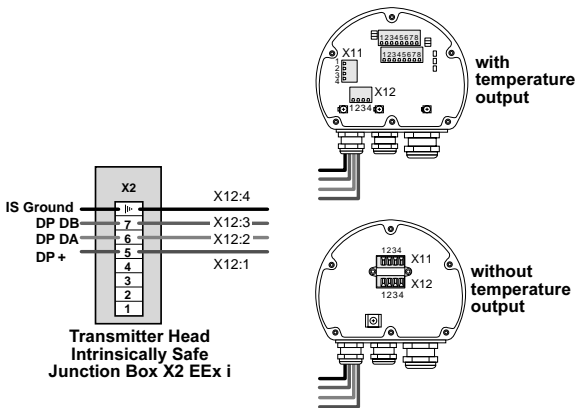


Figure 23. Connection of junction box with and without temperature outputs

1. For power supply connect a wire between terminal block X2, position 5 and terminal block X12, position 1.
2. For communication connect a wire between terminal block X2, position 6 and terminal block X12, position 2, and a wire between terminal block X2 position 7 and terminal block X12 position 3.

Finally for grounding connect a wire from the IS Ground screw in the X2 terminal compartment to terminal block X12 position 4.

NOTE

For detailed information on connecting temperature sensors, see Reference Manual 00809-0100-4024.

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STEP 3: CONFIGURE THE TRANSMITTER

Configure your Rosemount 5600 transmitter using one of the following available configuration tools.

PC Configuration Software Radar Master

The program on the CD will automatically start and suggest an installation of the Radar Master software. You will need to restart your PC prior to running the Radar Master program.

Configure the Transmitter using the Wizard

The guided setup contains seven steps and guides you through the basic setup procedure.

Hand-held Communicator

For more information on the 375 Field Communicator see document 00809-0100-4276 and for the 275 HART Communicator see document 00275-8026-0002.

2210 Display Unit

Use the four softkeys to navigate through the different menus and to select various functions for service and configuration. To install the Rosemount 5600 select setup from the Main Menu and choose your setup option. For further information see document number 00809-0100-4024.

AMS

The program on the CD will automatically start and suggest an installation using AMS. You will need to restart your PC prior to running the AMS program.

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PRODUCT CERTIFICATIONS

Approved Manufacturing Locations

Saab Marine Electronics AB – Gothenburg, Sweden

European Union Directive Information

The EC declaration of conformity for all applicable European directives for this product can be found on the Rosemount website at www.rosemount.com. A hard copy may be obtained by contacting our local sales representative.

ATEX Directive (94/9/EC)

Rosemount Inc. complies with the ATEX Directive.

Ordinary Location Certification for Factory Mutual

As standard, the transmitter has been examined and tested to determine that the design meets basic electrical, mechanical, and fire protection requirements by FM, a nationally recognized testing laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

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Hazardous Locations Certifications

ATEX Approvals

5600 Series Level Transmitter

E1 Certificate Number: Sira 03ATEX 1294X

ATEX Category Marking Ex II 1/2 G

With Intrinsically Safe Outputs (only)

ATEX Marking: EX II (2) (1) 1/2 G

Safety Coding: EEx de [ib] [ia] IIC T6 (T_{amb} -40°C, +70°C)

With Non-IS Primary Output and IS Display Output

ATEX Marking: EX II (1) 1/2 G

Safety Coding: EEx de [ia] IIC T6 (T_{amb} -40°C, +70°C)

With Non-IS Primary and/or Non-IS Secondary Outputs

ATEX Marking: EX II 1/2 G

Safety Coding: EEx de IIC T6 (T_{amb} -40°C, +70°C)

Max supply voltage: 55 Vdc

Passive analog output 4-20mA,

Label identification = HART passive.

Voltage compliance 7-30V:

$U_i < 30 \text{ V}$

$I_i < 200 \text{ mA}$

$P_i < 1.3 \text{ W}$

$C_i = 0 \text{ }\mu\text{F}$

$L_i = 0 \text{ mH}$

Active analog output 4-20mA,

Label identification = HART active.

Max load 300 Ω :

$U_o < 23.1 \text{ V}$

$I_o < 125.7 \text{ mA}$

$P_o < 0.726 \text{ W}$

$C_{\text{ext}} < 0.14 \text{ }\mu\text{F}$

$L_{\text{ext}} < 2.2 \text{ mH}$

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FOUNDATION Fieldbus,
Label identification = FOUNDATION fieldbus.

$U_i < 30 \text{ V}$

$I_i < 300 \text{ mA}$

$P_i < 1.3 \text{ W}$

$C_i = 0 \text{ } \mu\text{F}$

$L_i = 0 \text{ mH}$

SPECIAL CONDITIONS FOR SAFE USE (X)

As alloys may be used as the enclosure (or other parts) material and be at the accessible surface of this equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the equipment is being installed in locations that specifically require group II, category 1G equipment.

Under certain extreme circumstances, the non-metallic parts of the equipment may be capable of generating an ignition-capable level of electrostatic charge. Therefore, when used for applications that specifically require group II, category 1 equipment, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. Additionally, the equipment non-metallic parts shall only be cleaned with a damp cloth.

INSTRUCTIONS SPECIFIC TO HAZARDOUS AREA INSTALLATION

The equipment may be used with flammable gases and vapors with apparatus Group IIC.

The Transmitter Head is certified for use in ambient temperatures in the range -40°C to 70°C and should not be used outside this range.

The equipment is designed to be mounted across the boundary between a cat 1 and cat 2 area. There are various cat 1 area within the range from -40°C to 400°C , -1 to 55 bar that can be considered. It is the responsibility of the user to select the appropriate antenna

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including tank seal to match the tank process conditions.

The product must be installed by suitably trained personnel and carried out in accordance with all appropriate international, national, and local standard codes of practice and site regulations for intrinsically safe apparatus and in accordance with the instructions contained within this manual.

Repair of this equipment shall be carried out by the manufacturer or in accordance with the applicable code of practice.

All externally connected intrinsically safe apparatus must comply with the specified IS entity parameters.

The Flameproof/Explosionproof enclosure may not be opened while energized.

The certificate has special conditions for safe use associated with it, noted by the X on the end of the certificate no., which must be observed when the equipment is installed.

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances - e.g. solvents that may affect polymeric materials

Suitable precautions - e.g. regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

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2210 Display Unit

E1 Certificate Number: Sira 00ATEX 2062

ATEX Category Marking  II 1/2 G

Without Temperature Inputs

ATEX Marking: EX II 1/2 G

Safety Coding: EEx ib IIC T4 (T_{amb} -40°C, +70°C)

With Temperature Inputs

ATEX Marking: EX II 1/2 G

Safety Coding: EEx ib [ia] IIC T4, (T_{amb} -40°C, +70°C)

Factory Mutual (FM)

5600 Series Level Transmitter

E5 Certificate Number: 4D5A9.AX

With Intrinsically safe outputs

(all versions except those listed below)

Explosion proof with IS outputs for HAZLOC

Class I, Division 1, Group A, B, C and D

Max operating temperature +70°C

Use conductors rated at least 85°C

Shall be installed in accordance with System control drawing 9150074-994.

With Non-IS Secondary Outputs (codes 1 and 3)

Explosion proof

Class I, Division 1, Group A, B, C and D

Max operating temperature +70°C

Use conductors rated at least 85°C

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2210 Display Unit

E5 Certificate: 4D5A9.AX

All Versions

Intrinsic Safe for HAZLOC

Class I, Division 1, Group A, B, C and D T4

Max operating temperature +70°C

Shall be installed in accordance with System control drawing 9150074-997.

Canadian Standards Association (CSA)

5600 Series Level Transmitter

E6 Certificate Number: 2003.153280-1346169

With Non-IS Primary and/or Secondary Outputs

Explosion proof Ex de IIC T6

Shall be installed in accordance with System control drawing 9150074-937.

Factory seal, conduit seal not required.

With IS Display Outputs, IS Primary and/or Secondary Outputs

Explosion proof Ex de [ib/ia] IIC T6

Shall be installed in accordance with System control drawing 9150074-939.

Factory seal, conduit seal not required.

2210 Display Unit

E6 Certificate Number: 2003.153280-1346165

Without Temperature Inputs

Intrinsically safe EEx ib IIC T4, (T_{amb} -40°C, +70°C)

With Temperature Inputs

Intrinsically safe EEx ib [ia] IIC T4, (T_{amb} -40°C, +70°C)

Shall be installed in accordance with System control drawing 9150074-944.

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Table 2. Symbols used on 5600 Series Level Transmitter and 2210 Display Unit



The CE marking symbolizes the conformity of the product with the applicable Community requirements.



The Ex Certificate is a statement of an independent Certification Body declaring that this product meets the requirement of the applicable European Intrinsic Safety directives.



The FM symbol indicates that the marked equipment is certified by FM - Factory Mutual Research Corporation according to FMRC standards and are applicable for installation in hazardous locations.



The device uses non-harmonized radio frequencies.



Protective Earth



Ground



Power Supply

75°C

External cabling must be approved for use in min. 75°C.

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