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EMERSON Rosemount 2140 and 2140:SIS Level Detectors User Guide

Contents

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EMERSON Rosemount 2140 and 2140:SIS Level Detectors

About this guide

This Quick Start Guide provides basic guidelines for the Rosemount 2140 and 2140:SIS Level Detectors. Refer to the Rosemount 2140 and 2140:SIS Reference Manual for more instructions. The manual and this guide are also available electronically at Emerson.com/Rosemount.

Safety messages

WARNING
Failure to follow safe installation and servicing guidelines could result in death or serious injury.

Ensure the level detector is installed by qualified personnel and in accordance with applicable code of practice.

Use the level detector only as specified in this manual. Failure to do so may impair the protection provided by the level detector.

The weight of a level detector with a heavy flange and extended fork length may exceed 37 lb. (18 kg). A risk assessment is required before carrying, lifting, and installing the level detector.

For installations in hazardous locations, the level detector must be installed according to the Rosemount 2140 and 2140:SIS Level Detectors Product Certifications document.

WARNING

Explosions could result in death or serious injury.

Verify that the operating atmosphere of the level detector is consistent with the appropriate hazardous locations certifications.

Before connecting a handheld communicator in an explosive atmosphere, ensure that the instruments in the loop are installed in accordance with intrinsically safe or non incentive field wiring practices.

In explosion-proof/flameproof and non-incentive installations, do not remove the housing covers when power is applied to the level detector.
Both housing covers must be fully engaged to meet flameproof/explosion-proof requirements.

WARNING

Electrical shock could cause death or serious injury.

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

Ensure the power to the level detector is off, and the lines to any other external power source are disconnected or not powered while wiring the level detector.

Ensure the wiring is suitable for the electrical current and the insulation is suitable for the voltage, temperature, and environment.

WARNING

Process leaks could result in death or serious injury.
Ensure the level detector is handled carefully. If the process seal is damaged, gas might escape from the vessel (tank) or pipe.

WARNING

Physical access
Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.

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

CAUTION

Hot surfaces
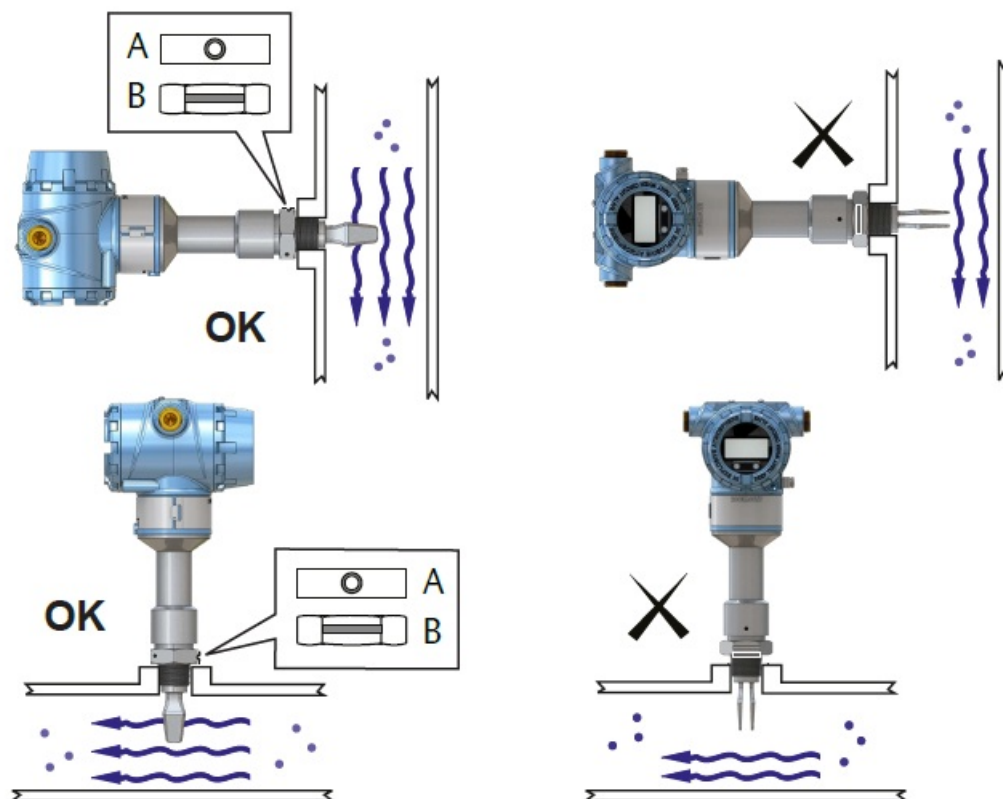The flange and process seal may be hot at high process temperatures. Allow to cool before servicing.

Installation

Fork alignment in a pipe installation

The fork is correctly aligned by positioning the groove or notch as indicated (Figure 2-1).

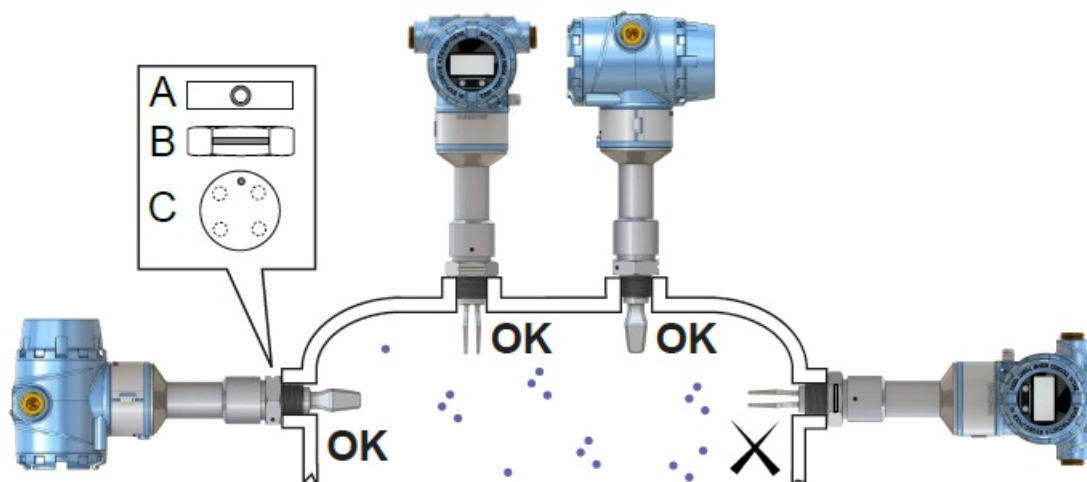**Figure 2-1: Correct Fork Alignment for Pipe Installation**

- A. Tri Clamp process connections have a circular notch
- B. Threaded process connections have a groove

Fork alignment in a vessel (tank) installation

The fork is correctly aligned by positioning the groove or notch as indicated (Figure 2-2).

**Figure 2-2: Correct Fork Alignment for Vessel (Tank) Installation**

- A. Tri Clamp process connections have a circular notch
- B. Threaded process connections have a groove
- C. Flanged process connections have a circular notch

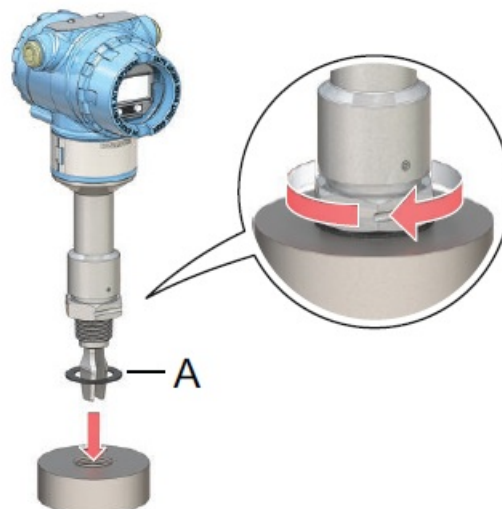**Threaded vessel (tank) or pipework connection**

Procedure

1. Seal and protect the threads. Use anti-seize paste or PTFE tape according to site procedures.

   A gasket may be used as a sealant for BSPP (G) threaded connections.
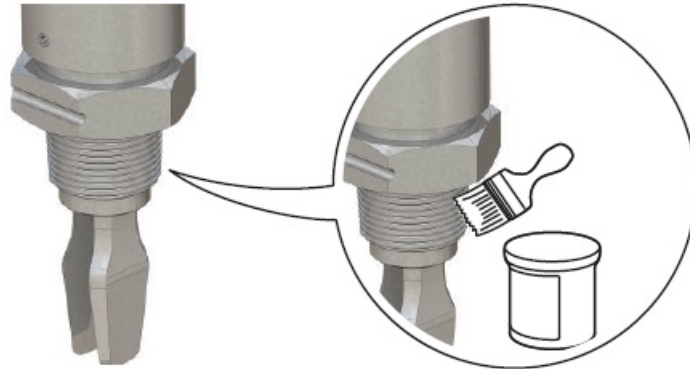
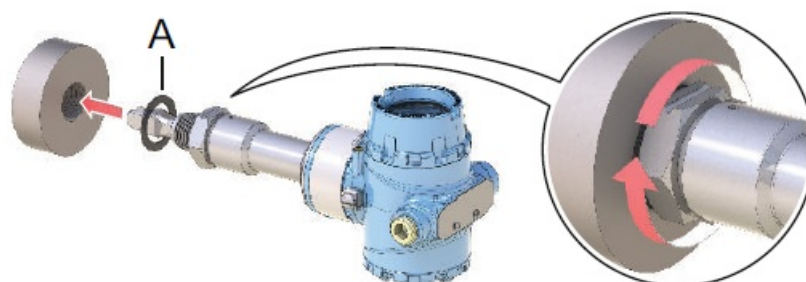2. Screw the level detector into the process connection.

Note: Tighten using the hexagon nut only.

Figure 2-3: Vertical Installation

A. Gasket for BSPP (G) threaded connection
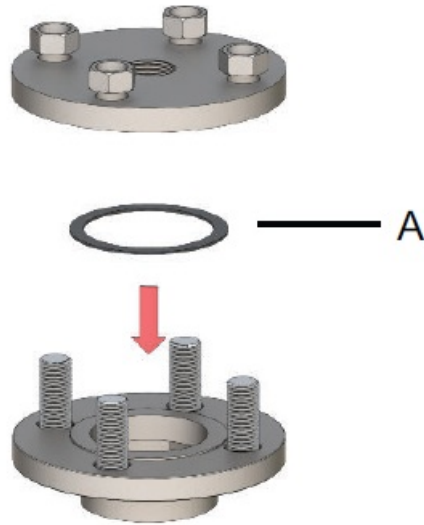
Figure 2-4: Horizontal Installation

A. Gasket for BSPP (G) threaded connection
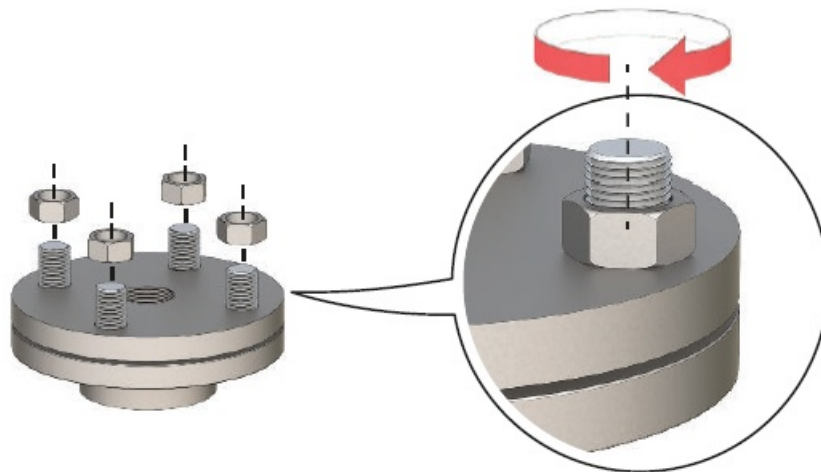
Threaded flange connection

Procedure

1. Place the customer-supplied flange and gasket on the vessel (tank) nozzle.
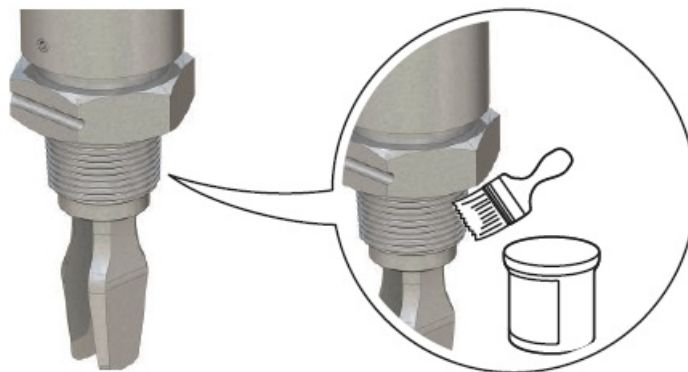
    A. Gasket (customer supplied)

2. Tighten the bolts and nuts with sufficient torque for the flange and gasket.

3. Seal and protect the threads. Use anti-seize paste or PTFE tape according to site procedures.

    A gasket may be used as a sealant for BSPP (G) threaded connections.

4. Screw the level detector into the flange thread.

    Note: Tighten using the hexagon nut only.

A. Gasket for BSPP (G) threaded connection

Mounting the flanged version

Procedure

1. Lower the level detector into the nozzle.

A. Gasket (customer supplied)

2. Tighten the bolts and nuts with sufficient torque for the flange and gasket.

Mounting the Tri Clamp version
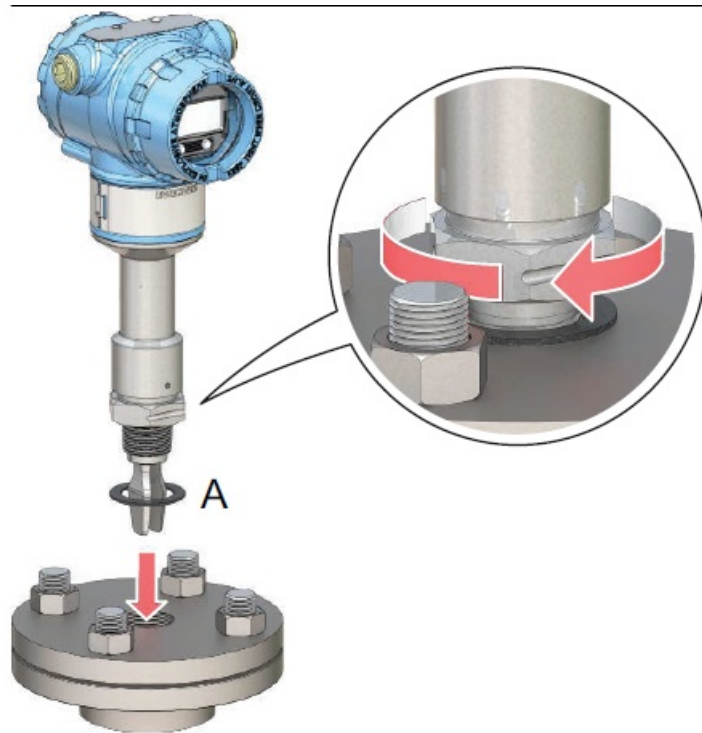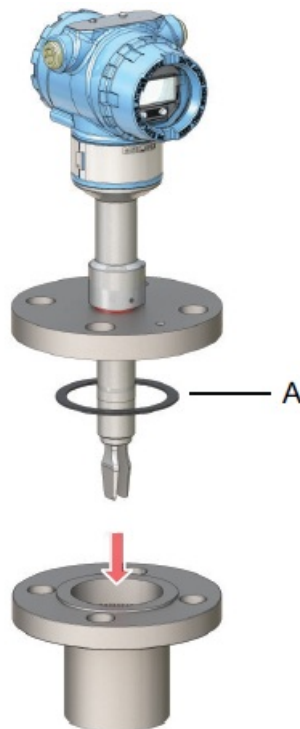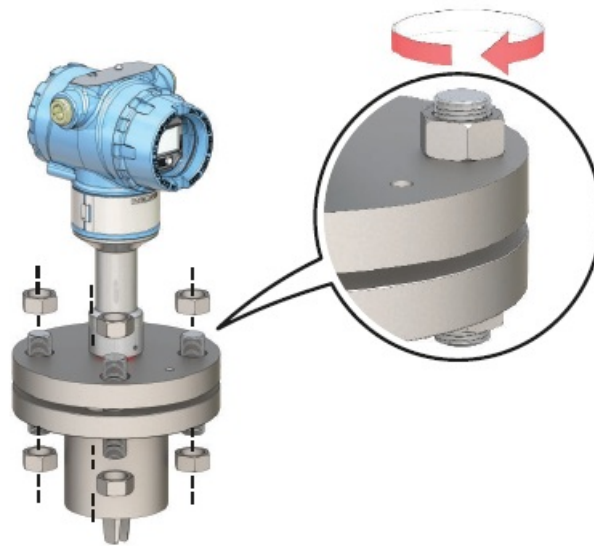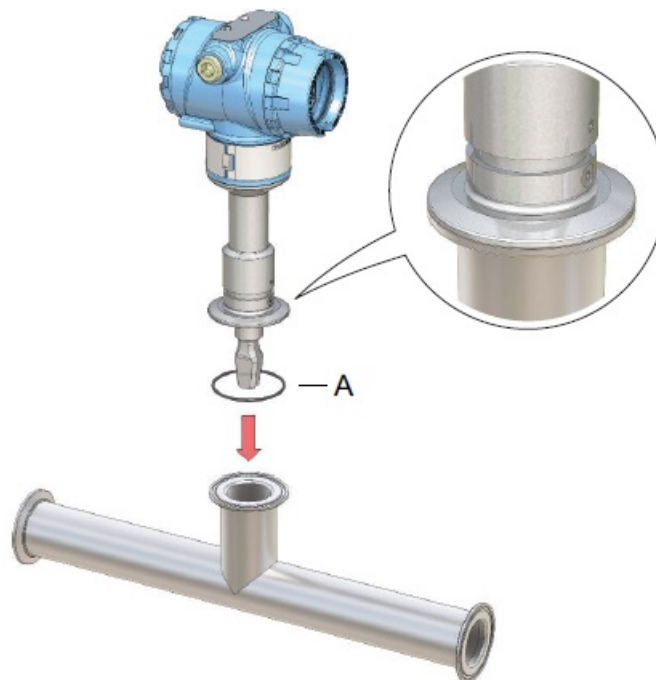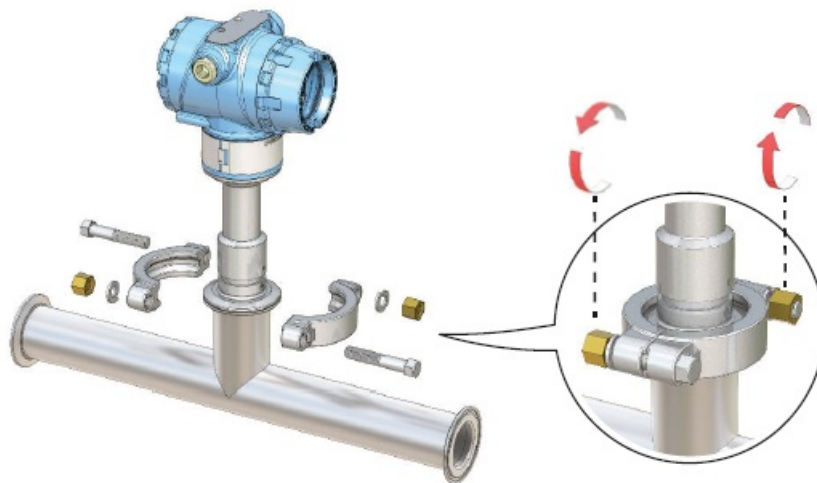
Procedure

1. Lower the level detector into the flange face.

   A. Seal (supplied with Tri Clamp)

2. Fit the Tri Clamp.

Adjust display orientation (optional)

To improve field access to wiring or to better view the optional LCD display:

Procedure

1. Loosen the set screw until the level detector housing can rotate smoothly.

   Do not unscrew all the way. Rotating the housing, without this screw in place, can damage the internal wiring.
2. First, rotate the housing clockwise to the desired location.

   If the desired location cannot be achieved due to thread limit, rotate the housing counterclockwise.
3. Re-tighten the set screw.

Note: Do not attempt to rotate the display beyond the thread limits.

Figure 2-5: Housing Rotation
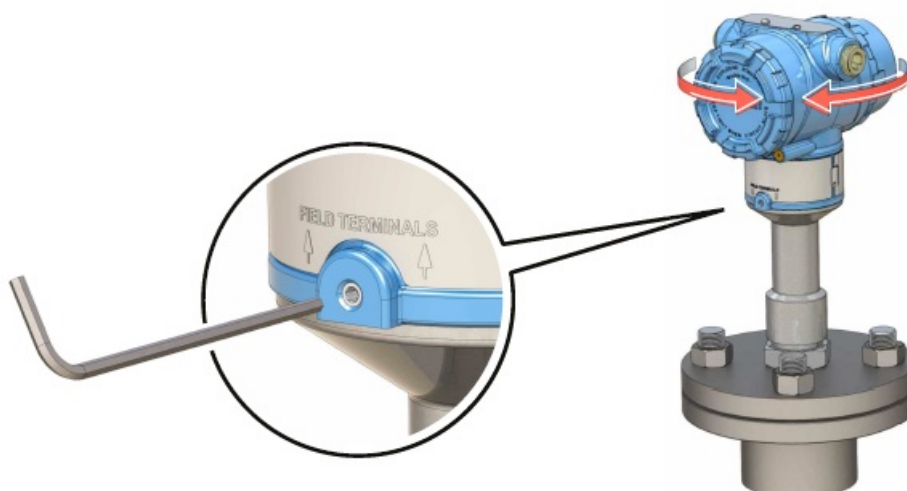
Torque 30 in-lb (3 Nm) H3/32 in.

Prepare the electrical connections

Cable selection

Use 24–14 AWG wiring. Twisted-pairs and shielded wiring is recommended for environments with high EMI (electromagnetic interference). Two wires can be safely connected to each terminal screw.

Cable glands/conduits

For intrinsically safe, explosion-proof/flameproof, and dust-proof installations, only use certified cable glands or conduit entry devices. Ordinary location installations can use suitably rated cable glands or conduit entry devices to maintain the Ingress Protection (IP) rating.

Unused conduit entries must always be sealed with a suitably rated blanking/stopping plug.

Note: Do not run signal wiring in conduit or open trays with power wiring or near heavy electrical equipment.

Power supply

Each level detector operates on 10.5 – 42.4 Vdc (10.5 – 30 Vdc in Intrinsically Safe installations) at the level detector terminals.

Power consumption

Maximum of 1 W, and current maximum is 23 mA.

Hazardous areas

When the device is installed in hazardous areas (classified locations), local regulations and the conditions-of-use specified in applicable certificates must be observed. Review the Rosemount 2140 Product Certifications document for information.

Load limitations

For HART® communications, a minimum load resistance of 250 Ω is required.

The maximum loop resistance is determined by the voltage level of the external power supply (see Figure 3-1).

Figure 3-1: Load Limitations
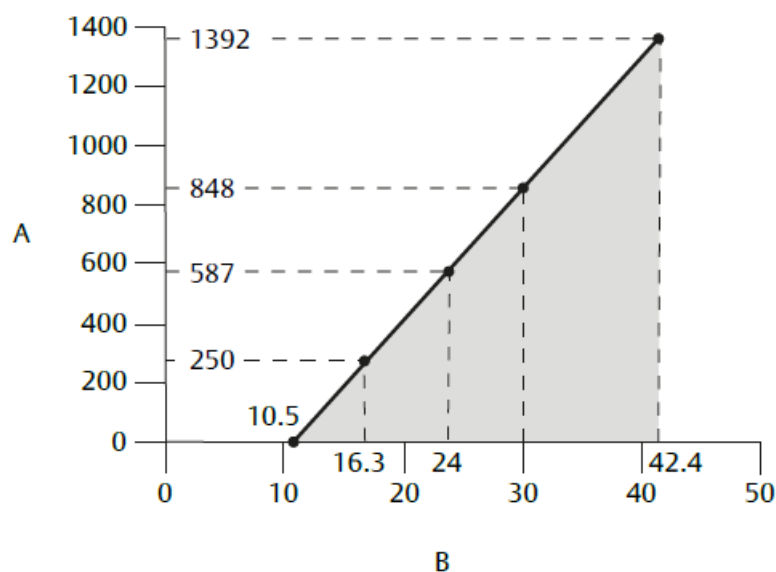
Maximum loop resistance = 43.5 × (external power supply voltage – 10.5)

- A. Loop resistance in Ohms (Ω)
- B. External power supply voltage (Vdc)

Wiring diagram

Figure 3-2: 4-20 mA/HART® Communication
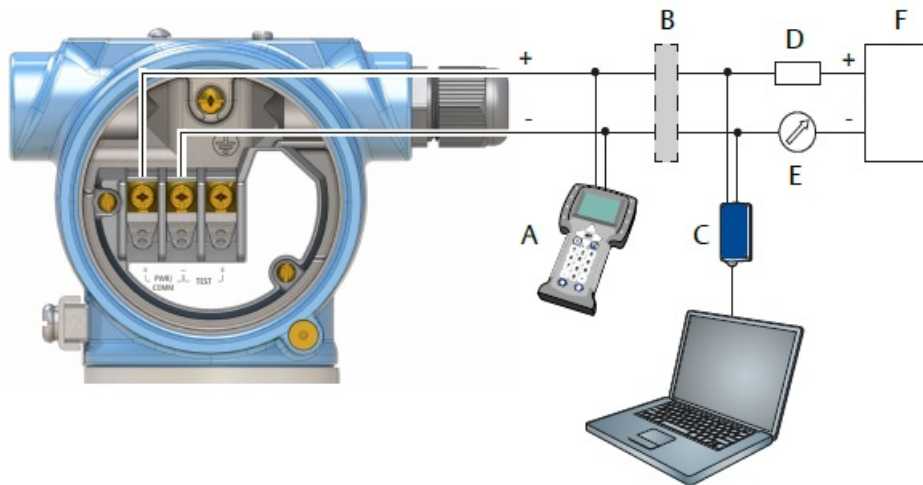

- A. Handheld communicator
- B. Approved IS barrier (for Intrinsically Safe installations only)
- C. HART modem
- D. Load resistance (≥250 Ω)
- E. Current meter
- F. Power supply

Grounding

Make sure grounding is done according to national and local electrical codes. Failure to do so may impair the protection provided by the equipment.

Grounding the housing

The most effective grounding method is direct connection to earth ground with minimal impedance. There are two grounding screw connections provided (see Figure 3-3).

Figure 3-3: Ground Screws

- A. External ground screw
- B. Internal ground screw

Signal cable shield grounding
Make sure the instrument cable shield is:

- Trimmed close and insulated from touching the housing.
- Continuously connected throughout the segment.
- Connected to a good earth ground at the power supply end.

Figure 3-4: Signal Cable Shield Grounding at Power Supply End
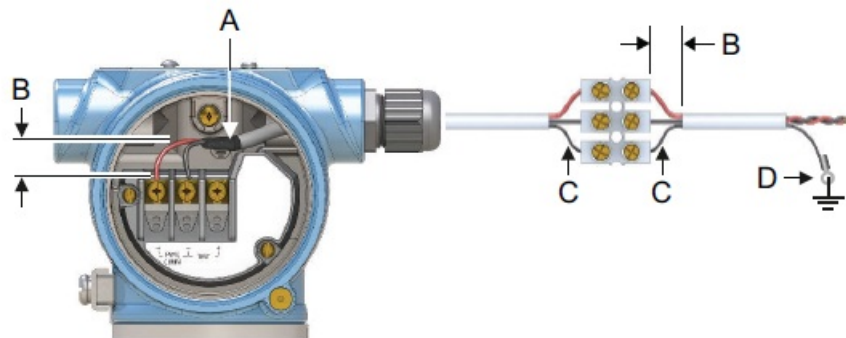
- A. Trim shield and insulate
- B. Minimize distance
- C. Trim shield
- D. Connect shield back to the power supply ground

Connect wiring and power-up

Procedure

1. Verify the power supply is disconnected.
2. Remove the field terminals cover.

   In an explosion-proof/flameproof installation, do not remove the level detector covers when power is applied to the unit. Covers are also not to be removed in extreme environmental conditions.

   - Turn the jam screw clockwise until it is completely threaded into the housing.
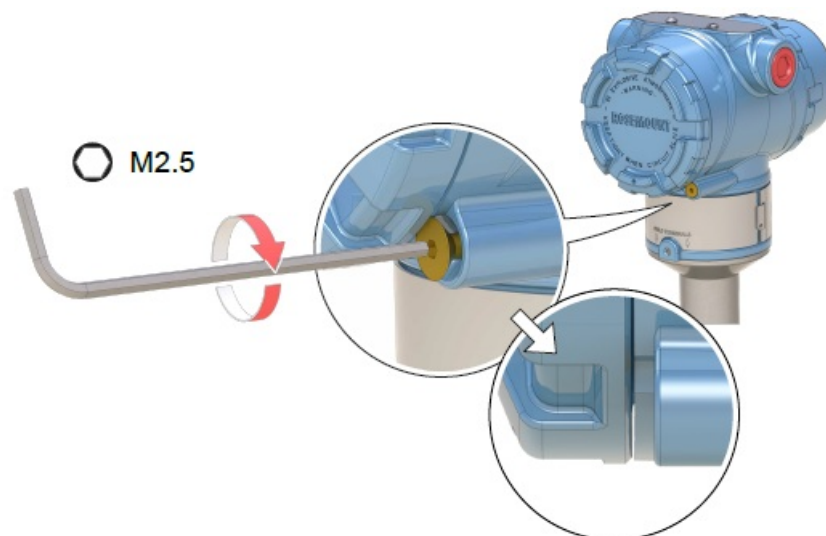
   - Turn the cover counter-clockwise until it is removed from the housing.

     Keep the cover O-ring safe. Replace the O-ring if it is worn or damaged.
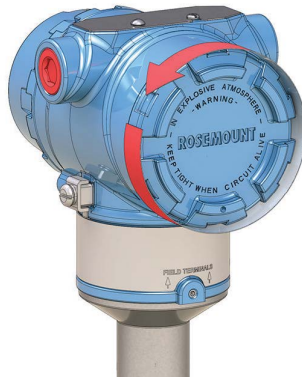
3. Remove the plastic plugs.

4. Pull the cable through the cable gland/conduit.

    Identification of thread size and type:
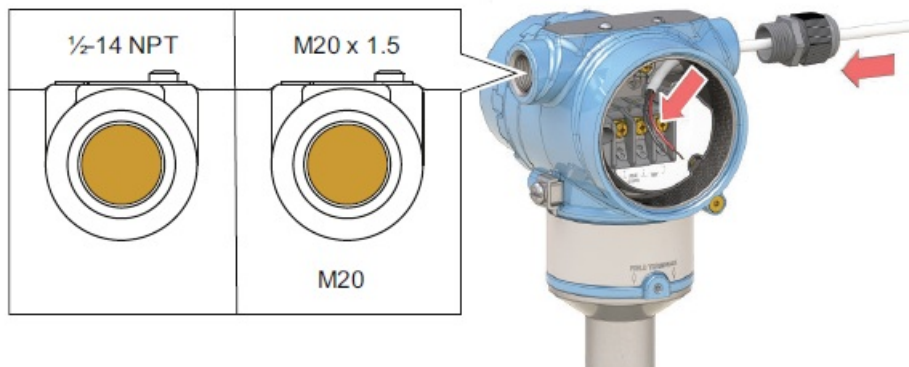
5. Connect the cable wires.

    Torque 7 in-lb (0.8 Nm)
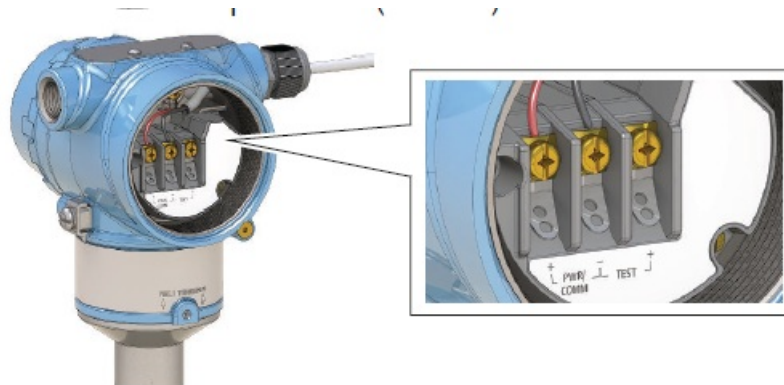
6. Ensure proper grounding.
7. Tighten the cable gland.

    Apply PTFE tape or other sealant to the threads.

Note: Make sure to arrange the wiring with a drip loop.

8. Plug and seal the unused conduit connection to avoid moisture and dust accumulation inside the housing.

   Apply PTFE tape or other sealant to the threads.

9. Attach and tighten the cover.

   - Verify the cover jam screw is completely threaded into the housing.

   M2.5

   - Attach and tighten the cover.

Make sure the cover is fully engaged. There should be no gap between the cover and the housing.

10. Required for explosion-proof/flameproof installations only:
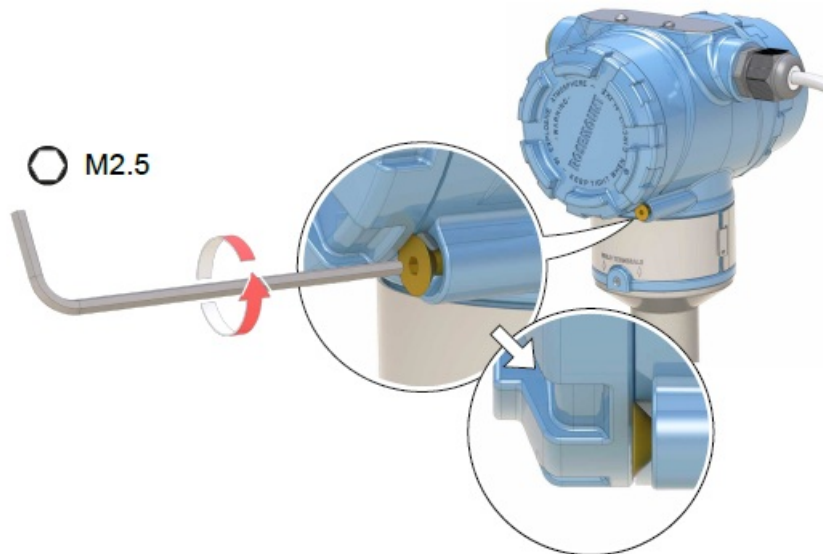   - Turn the cover jam screw counterclockwise until it contacts the cover.

    - Turn the jam screw an extra ½ turn counterclockwise to secure the cover.
    - Verify that the cover cannot be removed.
11. Connect the power supply.

Configuration

System readiness

Confirm correct device driver

- Verify that the correct Device Driver (DD), FDI Package, or Device Type
  Manager (DTM) is loaded on your systems to ensure proper communication.
- Download the latest DD/FDI Package/DTM at **Emerson.com/DeviceInstallKits**

Confirm HART® revision capability

If using HART-based control or asset management systems, confirm the HART capability of those systems prior to installation of the device. Not all systems are capable of communicating with HART Revision 7 protocol. This device can be configured for either HART Revision 5 or 7.

Switching HART revision with a generic menu

If the HART configuration tool is not capable of communicating with a HART Revision 7 device, it will load a generic menu with limited capability.

Procedure
Locate the "Message" field.

- To switch to HART Revision 5, enter HART5 and 27 spaces in the message field.
- To switch to HART Revision 7, enter HART7 and 27 spaces in the message field.

Switching HART revision using AMS Device Manager
To switch the HART revision mode from AMS Device Manager:

Prerequisites
AMS Device Manager versions 10.5 or later are compatible with HART Revision 7.

Procedure

1. Click on Manual Setup, and then select the HART tab.
2. Select Change HART Revision and then follow the on screen prompts.

Switching HART revision using a handheld communicator
To switch the HART revision mode from DD-based handheld communicator:

Procedure

1. From the Home screen, select Configure.
2. Select Manual Setup → HART → Communication Settings → Change HART Revision.
3. Change the HART revision.

Switching HART revision using the LOI
To switch the HART revision mode using the LOI (Local Operator Interface):

Procedure

1. Press any LOI configuration button to activate the menu.
2. Scroll down and then select EXTENDED MENU .
3. Scroll down and then select HART REV .
4. To change HART revision, select HART REV 5 , or scroll down and then select HART REV 7.
5. Exit the menu system by either waiting one minute for the **EXIT**

   MENU? prompt, or scrolling down menus to find and select **BACK TO MENU** and **EXIT MENU..**

Configure the level detector using guided setup

Configure using AMS Device Manager
The options available in the Guided Setup wizard include all items required for basic operation.

Procedure

1. Start AMS Device Manager.

2. Select View → Device Connection View.

3. In the Device Connection View, double-click the HART modem icon.

4. Double-click the device icon.

5. Select Configure → Guided Setup.

6. Select Basic Setup and follow the on-screen instructions.

Configure using a handheld communicator
The options available in the Guided Setup wizard include all items required for basic operation.

Procedure

1. Turn on the handheld communicator and connect to the device.

2. Select Configure → Guided Setup.

3. Select Basic Setup and follow the on-screen instructions.

Configure using the LOI
The Guided Setup wizard is not available on the LOI (Local Operator Interface).

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Documents / Resources

EMERSON Rosemount 2140 and 2140:SIS Level Detectors [pdf] User Guide
Rosemount 2140 and 2140 SIS Level Detectors, 2140 and 2140 SIS Level Detectors, Level Detectors, Detectors

References

- *Rosemount | Emerson US*
- *Emerson Global | Emerson*
- *Software Downloads & Drivers | Emerson US*