Quick Installation Guide
00825-0100-4729, Rev BB
August 2015

Rosemount Magnetic Flowmeter Systems (Transmitter and Flowtube)

Start

Step 1: Pre-Installation
Step 2: Handling
Step 3: Mounting
Step 4: Installation (Flanged Flowtubes)
Step 4: Installation (Wafer Flowtubes)
Step 4: Installation (Sanitary Flowtubes)
Step 5: Grounding
Step 6: Wiring
Step 7: Basic Configuration
Step 8: Process Leak Protection (Optional)
Step 9: Power up the Transmitter
Step 10: Check Process Connections
Step 11: Confirm Configuration
End
IMPORTANT NOTICE

This installation guide provides basic guidelines for the Rosemount® 8712H. It does not provide instructions for detailed configuration, diagnostics, maintenance, service and troubleshooting installations. Refer to the 8712H reference manual (document number 00809-0100-4729) for more instruction. The manual and this QIG are also available electronically on www.rosemount.com.

WARNING

Failure to follow these installation guidelines could result in death or serious injury:

Installation and servicing instructions are for use by qualified personnel only. Do not perform any servicing other than that contained in the operating instructions, unless qualified. Verify that the operating environment of the flowtube and transmitter is consistent with the appropriate FM or CSA approval. Do not connect a Rosemount 8712H to a non-Rosemount flowtube that is located in an explosive atmosphere.
**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. Please review the approvals section of the 8712H reference manual for any restrictions associated with a safe installation.

- 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.

In an Explosion-Proof/Flame-Proof installation, do not remove the flowtube cover when power is applied to the unit.

**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.

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**WARNING**

The flowtube liner is vulnerable to handling damage. Never place anything through the flowtube for the purpose of lifting or gaining leverage. Liner damage can render the flowtube useless.

To avoid possible damage to the flowtube liner ends, do not use metallic or spiral-wound gaskets. If frequent removal is anticipated, take precautions to protect the liner ends. Short spool pieces attached to the flowtube ends are often used for protection.

Correct flange bolt tightening is crucial for proper flowtube operation and life. All bolts must be tightened in the proper sequence to the specified torque limits. Failure to observe these instructions could result in severe damage to the flowtube lining and possible flowtube replacement.
STEP 1: PRE-INSTALLATION

Before installing the Rosemount 8712H Magnetic Flowmeter Transmitter, there are several pre-installation steps that should be completed to make the installation process easier:

- Identify the options and configurations that apply to your application
- Set the hardware switches if necessary
- Consider mechanical, electrical, and environmental requirements

Mechanical Considerations

The mounting site for the Rosemount 8712H transmitter should provide enough room for secure mounting, easy access to conduit ports, full opening of the transmitter covers, and easy readability of the LOI screen (see Figure 1). The transmitter should be mounted in an upright position.

If the 8712H is mounted separately from the flowtube, it is not subject to limitations that might apply to the flowtube.

Figure 1. Rosemount 8712H Dimensional Drawing
Environmental Considerations
To ensure maximum transmitter life, avoid excessive heat and vibration. Typical problem areas:

- high-vibration lines with integrally mounted transmitters
- warm-climate installations in direct sunlight
- outdoor installations in cold climates.

Remote-mounted transmitters may be installed in the control room to protect the electronics from the harsh environment and provides easy access for configuration or service.

Both remotely and integrally mounted Rosemount 8712H transmitters require external power and there must be access to a suitable power source.

Installation Procedures
Rosemount 8712H installation includes both detailed mechanical and electrical installation procedures.

Mount the Transmitter
At a remote site the transmitter may be mounted on a pipe up to two inches in diameter or against a flat surface.

Pipe Mounting
To mount the transmitter on a pipe:
1. Attach the mounting plate to the pipe using the mounting hardware.
2. Attach the 8712H to the mounting plate using the mounting screws.

Surface Mounting
To surface mount the transmitter:
1. Attach the 8712H to the mounting location using the mounting screws.
Identify Options and Configurations

The standard application of the 8712H includes a 4–20 mA output and control of the flowtube coils. Other applications may require one or more of the following configurations or options:

- Multidrop Communications
- PZR (Positive Zero Return)
- Ultrasonic Control
- Auxiliary Output
- Pulse Output

Additional options may apply. Be sure to identify those options and configurations that apply to your situation, and keep a list of them nearby for consideration during the installation and configuration procedures.

Hardware Jumpers/Switches

The 8712H electronics board is equipped with three user-selectable hardware switches. These switches set the Failure Alarm Mode, Internal/External Analog Power, and Transmitter Security. The standard configuration for these switches when shipped from the factory are as follows:

- Failure Alarm Mode: HIGH
- Internal/External Analog Power: INTERNAL
- Transmitter Security: OFF

Changing Hardware Switch Settings

In most cases, it is not necessary to change the setting of the hardware switches. If you need to change the switch settings, complete the steps outlined in the manual.

Electrical Considerations

Before making any electrical connections to the 8712H, consider the following standards and be sure to have the proper power supply, conduit, and other accessories.
**STEP 2: HANDLING**

Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping containers. Teflon® lined flowtubes are shipped with end covers that protect it from both mechanical damage and normal unrestrained distortion. Remove the end covers just before installation.

*Figure 2: Rosemount 8705 Flowtube Support for Handling*
STEP 3: MOUNTING

Upstream/Downstream Piping
To ensure specification accuracy over widely varying process conditions, install the flowtube a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane (see Figure 3).

Flow Direction
The flowtube should be mounted so that the FORWARD end of the flow arrow, shown on the flowtube identification tag, points in the direction of flow through the tube.

Flowtube Orientation
The flowtube should be installed in a position that ensures the flowtube remains full during operation. Vertical installation allows upward process fluid flow keeps the cross-sectional area full, regardless of flow rate. Horizontal installation should be restricted to low piping sections that are normally full. In these cases, orient the electrode plane to within 45 degrees of horizontal.
The electrodes in the Rosemount 8705 flowtube are properly orientated when the two measurement electrodes are in the 3 and 9 o'clock positions, as shown on the right of Figure 4.

45° Electrode Plane
STEP 4: INSTALLATION (FLANGED FLOWTUBE)

Gaskets
The flowtube requires a gasket at each of its connections to adjacent devices or piping. The gasket material selected must be compatible with the process fluid and operating conditions. Metallic or spiral-wound gaskets can damage the liner. Gaskets are required on each side of the grounding ring. All other applications (including flowtubes with lining protectors or a grounding electrode) require only one gasket on each end connection.

Flange Bolts
Suggested torque values by flowtube line size and liner type are listed in Table 1 for ASME B16.5 (ANSI) and Table 2 for DIN flanges. Consult the factory if the flange rating of the flowtube is not listed. Tighten flange bolts on the upstream side of the flowtube in the incremental sequence shown in Figure 6 to 20% of the suggested torque values. Repeat the process on the downstream side of the flowtube. For flowtubes with more or less flange bolts, tighten the bolts in a similar crosswise sequence. Repeat this entire tightening sequence at 40%, 60%, 80%, and 100% of the suggested torque values or until the leak between the process and flowtube flanges stop.

If leakage has not stopped at the suggested torque values, the bolts can be tightened in additional 10% increments until the joint stops leaking, or until the measured torque value reaches the maximum torque value of the bolts. Practical consideration for the integrity of the liner often leads the user to distinct torque values to stop leakage due to the unique combinations of flanges, bolts, gaskets, and flowtube liner material.

Check for leaks at the flanges after tightening the bolts. Failure to use the correct tightening methods can result in severe damage. Flowtubes require a second tightening 24 hours after the initial installation. Over time, flowtube liner materials may deform under pressure.
Table 1. Suggested Flange Bolt Torque Values for Rosemount 8705 and 8707 High-Signal Flowtubes

<table>
<thead>
<tr>
<th>Size Code</th>
<th>Line Size</th>
<th>Teflon/Tefzel/PFA liners</th>
<th>Polyurethane/Neoprene/Linatex liners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Class 150 (pound-feet)</td>
<td>Class 300 (pound-feet)</td>
</tr>
<tr>
<td>005</td>
<td>1/2-inch (15 mm)</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>010</td>
<td>1 inch (25 mm)</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>015</td>
<td>1 1/2 inch (40 mm)</td>
<td>13</td>
<td>25</td>
</tr>
<tr>
<td>020</td>
<td>2 inch (50 mm)</td>
<td>19</td>
<td>17</td>
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<td>030</td>
<td>3 inch (80 mm)</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>040</td>
<td>4 inch (100 mm)</td>
<td>26</td>
<td>50</td>
</tr>
<tr>
<td>060</td>
<td>6 inch (150mm)</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>080</td>
<td>8 inch (200 mm)</td>
<td>60</td>
<td>82</td>
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<td>100</td>
<td>10 inch (250 mm)</td>
<td>55</td>
<td>80</td>
</tr>
<tr>
<td>120</td>
<td>12 inch (300 mm)</td>
<td>65</td>
<td>125</td>
</tr>
<tr>
<td>140</td>
<td>14 inch (350 mm)</td>
<td>85</td>
<td>110</td>
</tr>
<tr>
<td>160</td>
<td>16 inch (400 mm)</td>
<td>85</td>
<td>160</td>
</tr>
<tr>
<td>180</td>
<td>18 inch (450 mm)</td>
<td>85</td>
<td>110</td>
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<td>200</td>
<td>20 inch (500 mm)</td>
<td>110</td>
<td>175</td>
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<tr>
<td>240</td>
<td>24 inch (600 mm)</td>
<td>165</td>
<td>280</td>
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<tr>
<td>300</td>
<td>30 inch (750 mm)</td>
<td>195</td>
<td>415</td>
</tr>
<tr>
<td>360</td>
<td>36 inch (900 mm)</td>
<td>280</td>
<td>575</td>
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</table>
### Table 2. Flange Bolt Torque and Bolt Load Specifications for 8705

<table>
<thead>
<tr>
<th>Size Code</th>
<th>Line Size</th>
<th>Flange/Teflon</th>
<th>PN10 (Newton-meter)</th>
<th>PN 16 (Newton)</th>
<th>PN 25 (Newton-meter)</th>
<th>PN 40 (Newton)</th>
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</thead>
<tbody>
<tr>
<td>005</td>
<td>0.5-inch (15 mm)</td>
<td>10</td>
<td>4400</td>
<td>10</td>
<td>4400</td>
<td></td>
</tr>
<tr>
<td>010</td>
<td>1 inch (25 mm)</td>
<td>10</td>
<td>10100</td>
<td>10</td>
<td>10100</td>
<td></td>
</tr>
<tr>
<td>015</td>
<td>1.5 inch (40 mm)</td>
<td>50</td>
<td>16100</td>
<td>50</td>
<td>16100</td>
<td></td>
</tr>
<tr>
<td>020</td>
<td>2 inch (50 mm)</td>
<td>90</td>
<td>20100</td>
<td>90</td>
<td>20100</td>
<td></td>
</tr>
<tr>
<td>030</td>
<td>3 inch (60 mm)</td>
<td>50</td>
<td>16800</td>
<td>50</td>
<td>16800</td>
<td></td>
</tr>
<tr>
<td>040</td>
<td>4 inch (80 mm)</td>
<td>50</td>
<td>17800</td>
<td>70</td>
<td>19600</td>
<td></td>
</tr>
<tr>
<td>060</td>
<td>6 inch (100 mm)</td>
<td>90</td>
<td>24700</td>
<td>130</td>
<td>28700</td>
<td></td>
</tr>
<tr>
<td>080</td>
<td>8 inch (200 mm)</td>
<td>130</td>
<td>35200</td>
<td>190</td>
<td>38300</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>10 inch (250 mm)</td>
<td>100</td>
<td>28300</td>
<td>190</td>
<td>38600</td>
<td></td>
</tr>
<tr>
<td>120</td>
<td>12 inch (300 mm)</td>
<td>120</td>
<td>32800</td>
<td>190</td>
<td>38800</td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>14 inch (350 mm)</td>
<td>160</td>
<td>43800</td>
<td>220</td>
<td>49500</td>
<td></td>
</tr>
<tr>
<td>160</td>
<td>16 inch (400 mm)</td>
<td>220</td>
<td>50600</td>
<td>280</td>
<td>56200</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>18 inch (450 mm)</td>
<td>190</td>
<td>43200</td>
<td>340</td>
<td>68400</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>20 inch (500 mm)</td>
<td>230</td>
<td>51100</td>
<td>380</td>
<td>69800</td>
<td></td>
</tr>
<tr>
<td>240</td>
<td>24 inch (600 mm)</td>
<td>290</td>
<td>58600</td>
<td>570</td>
<td>93600</td>
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### Polyurethane, Linatex, and Neoprene Liners

<table>
<thead>
<tr>
<th>Size Code</th>
<th>Line Size</th>
<th>PN 10 (Newton-meter)</th>
<th>PN 16 (Newton-meter)</th>
<th>PN 25 (Newton-meter)</th>
<th>PN 40 (Newton-meter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>1 inch (25 mm)</td>
<td>20</td>
<td>1040</td>
<td>20</td>
<td>1040</td>
</tr>
<tr>
<td>015</td>
<td>1.5 inch (40 mm)</td>
<td>30</td>
<td>10700</td>
<td>30</td>
<td>10700</td>
</tr>
<tr>
<td>020</td>
<td>2 inch (50 mm)</td>
<td>40</td>
<td>1340</td>
<td>40</td>
<td>1340</td>
</tr>
<tr>
<td>030</td>
<td>3 inch (80 mm)</td>
<td>30</td>
<td>11100</td>
<td>30</td>
<td>11100</td>
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<tr>
<td>040</td>
<td>4 inch (100 mm)</td>
<td>40</td>
<td>11700</td>
<td>50</td>
<td>13200</td>
</tr>
<tr>
<td>060</td>
<td>6 inch (150 mm)</td>
<td>60</td>
<td>16400</td>
<td>90</td>
<td>19200</td>
</tr>
<tr>
<td>080</td>
<td>8 inch (200 mm)</td>
<td>90</td>
<td>23400</td>
<td>90</td>
<td>19400</td>
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<td>100</td>
<td>10 inch (250 mm)</td>
<td>70</td>
<td>18600</td>
<td>80</td>
<td>18800</td>
</tr>
<tr>
<td>120</td>
<td>12 inch (300 mm)</td>
<td>80</td>
<td>21300</td>
<td>110</td>
<td>25500</td>
</tr>
<tr>
<td>140</td>
<td>14 inch (350 mm)</td>
<td>110</td>
<td>29100</td>
<td>150</td>
<td>33000</td>
</tr>
<tr>
<td>160</td>
<td>16 inch (400 mm)</td>
<td>150</td>
<td>33700</td>
<td>190</td>
<td>37400</td>
</tr>
<tr>
<td>180</td>
<td>18 inch (450 mm)</td>
<td>130</td>
<td>28700</td>
<td>230</td>
<td>45600</td>
</tr>
<tr>
<td>200</td>
<td>20 inch (500 mm)</td>
<td>150</td>
<td>34100</td>
<td>260</td>
<td>45900</td>
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<tr>
<td>240</td>
<td>24 inch (600 mm)</td>
<td>200</td>
<td>39200</td>
<td>380</td>
<td>62400</td>
</tr>
</tbody>
</table>
STEP 5: GROUNDING

Use Table 3 to determine which grounding option to follow for proper installation. The flowtube case should always be earth grounded in accordance with national and local electrical codes. Failure to do so may impair the protection provided by the equipment. The Internal Ground Connection (Protective Ground Connection) located in side the junction box is the Internal Ground Connection screw. This screw is identified by the ground symbol.

Table 3. Grounding Installation

<table>
<thead>
<tr>
<th>Type of Pipe</th>
<th>Grounding Options</th>
<th>Grounding Options</th>
<th>Grounding Electrodes</th>
<th>Lining Protectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Grounding</td>
<td>Rings</td>
<td>Electrodes</td>
<td>Protectors</td>
</tr>
<tr>
<td>Conductive Unlined</td>
<td>See Figure 7</td>
<td>Not Required</td>
<td>Not Required</td>
<td>See Figure 8</td>
</tr>
<tr>
<td>Pipe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conductive Lined</td>
<td>Insufficient</td>
<td>See Figure 8</td>
<td>See Figure 7</td>
<td>See Figure 8</td>
</tr>
<tr>
<td>Pipe</td>
<td>Grounding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Conductive Pipe</td>
<td>Insufficient</td>
<td>See Figure 9</td>
<td>See Figure 10</td>
<td>See Figure 9</td>
</tr>
<tr>
<td>Grounding</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 7. No Grounding Options or Grounding Electrode in Lined Pipe
Figure 8. Grounding with Grounding Rings or Lining Protectors

Figure 9. Grounding with Grounding Rings or Lining Protectors
STEP 6: WIRING

Conduit Ports and Connections
Both the flowtube and transmitter junction boxes have ports for ¾-inch NPT conduit connections. These connections should be made in accordance with local or plant electrical codes. Unused ports should be sealed with metal plugs. Proper electrical installation is necessary to prevent errors due to electrical noise and interference. Separate conduits are not necessary for the two cables, but a dedicated conduit line between each transmitter and flowtube is required. Shielded cable must be used for best results in electrically noisy environments.

Conduit Cables
Run the appropriate size cable through the conduit connections in your magnetic flowmeter system. Run the power cable from the power source to the transmitter. Run the coil drive and electrode cables between the flowmeter and transmitter. Prepare the ends of the coil drive and electrode cables as shown in Figure 11. Limit the unshielded wire length to 1-inch on both the electrode and coil drive cables. Excessive lead length or failure to connect cable shields can create electrical noise resulting in unstable meter readings.
Step 6.1 Transmitter Coil Input

This wiring section covers supplying power to the flowtube coils through the transmitter. The transmitter coil input power sends a pulsed DC frequency to the flowtube.

NOTE
Dimensions are in inches (millimeters).
Quick Installation Guide
00825-0100-4729, Rev BB
August 2015

Wire the transmitter according to local electrical requirements. Ground the transmitter cage via the threaded conduit connection (see Figure 11). For ac power applications, connect ac Neutral to terminal N and connect ac Line to terminal L1. For dc power applications, properly connect the positive and negative terminals. Units powered by 10-30 V dc power supply may draw up to 1 amp of current. In addition, follow the supply wire and disconnect requirements below:

**Figure 13. Power Supply Current**

![Graph showing power supply current vs. volts]

**Supply Wire Requirements**

Use 12 to 18 AWG wire rated for the proper temperature application. For connections in ambient temperatures above 140 °F (60 °C), use a wire rated for at least 176 °F (80 °C). For ambients greater than 176 °F (80 °C), use a wire rated for at least 230 °F (110 °C).

**Disconnects**

Connect the device through an external disconnect or circuit breaker. Clearly label the disconnect or circuit breaker and locate it near the transmitter and per local electrical control.
Quick Installation Guide
00825-0100-4729, Rev BB
August 2015

Rosemount 8712H

Installation Category
The installation category for the Rosemount 8712H is (Overvoltage) Category II.

Overcurrent Protection
The Rosemount 8712H Flowmeter Transmitter requires overcurrent protection of the supply lines. Maximum ratings of overcurrent devices are as follows:

<table>
<thead>
<tr>
<th>Power System</th>
<th>Fuse Rating</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 V ac</td>
<td>250 V; 1 Amp, Quick Acting</td>
<td>Bussman AGCI or Equivalent</td>
</tr>
<tr>
<td>220 V ac</td>
<td>290 V; 0.5 Amp, Quick Acting</td>
<td>Bussman AGCI or Equivalent</td>
</tr>
</tbody>
</table>

Requirements for 115 V ac or 230 V ac Power Supply
Wire the transmitter according to local electrical requirements for 115 V ac or 230 V ac. In addition, follow the supply wire and disconnect requirements below:

Requirements for 10–30 V dc Power Supply
Units powered with 10–30 V dc may draw up to 2 amps of current. As a result, the input power wire must meet certain gauge requirements. For combinations not shown, you can calculate the maximum distance given the surge current, the voltage of the source, and the minimum start-up voltage of the transmitter, 10 V dc, using the following equation:

\[
\text{Maximum Resistance} = \frac{\text{Supply Voltage} - 10 \text{Vdc}}{\text{Surge Current}}
\]
Table 4. Length of Annealed Copper (Cu) Wires

<table>
<thead>
<tr>
<th>Wire Gauge</th>
<th>Annealed Cu (milliohms/m)</th>
<th>30 V Supply ft (m)</th>
<th>24 V Supply ft (m)</th>
<th>20 V Supply ft (m)</th>
<th>14 V Supply ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>10.15 (33.29)</td>
<td>1,230 (375)</td>
<td>625 (191)</td>
<td>365 (111)</td>
<td>115 (35)</td>
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<td>18</td>
<td>6.385 (20.94)</td>
<td>1,955 (596)</td>
<td>990 (302)</td>
<td>585 (178)</td>
<td>185 (56)</td>
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<td>16</td>
<td>4.016 (13.17)</td>
<td>3,110 (946)</td>
<td>1,580 (482)</td>
<td>930 (283)</td>
<td>295 (90)</td>
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<td>14</td>
<td>2.525 (8.28)</td>
<td>4,950 (1,509)</td>
<td>2,515 (767)</td>
<td>1,485 (453)</td>
<td>475 (145)</td>
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<td>12</td>
<td>1.588 (5.21)</td>
<td>7,870 (2,399)</td>
<td>3,995 (1,218)</td>
<td>2,360 (719)</td>
<td>755 (230)</td>
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<tr>
<td>10</td>
<td>0.999 (3.28)</td>
<td>12,510 (3,813)</td>
<td>6,355 (1,937)</td>
<td>3,750 (1,143)</td>
<td>1,200 (366)</td>
</tr>
</tbody>
</table>

Table 5. Length of Hand-drawn Copper (Cu) Wires

<table>
<thead>
<tr>
<th>Wire Gauge</th>
<th>Hand-drawn Cu (milliohms/m)</th>
<th>30 V Supply ft (m)</th>
<th>24 V Supply ft (m)</th>
<th>20 V Supply ft (m)</th>
<th>14 V Supply ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>6.640 (21.78)</td>
<td>1,880 (573)</td>
<td>955 (291)</td>
<td>565 (172)</td>
<td>180 (55)</td>
</tr>
<tr>
<td>16</td>
<td>4.176 (13.70)</td>
<td>2,990 (911)</td>
<td>1,520 (463)</td>
<td>895 (273)</td>
<td>285 (87)</td>
</tr>
<tr>
<td>14</td>
<td>2.626 (8.61)</td>
<td>4,760 (1,451)</td>
<td>2,415 (736)</td>
<td>1,425 (434)</td>
<td>455 (139)</td>
</tr>
<tr>
<td>12</td>
<td>1.652 (5.42)</td>
<td>7,565 (2,300)</td>
<td>3,840 (1,170)</td>
<td>2,270 (692)</td>
<td>725 (221)</td>
</tr>
<tr>
<td>10</td>
<td>1.039 (3.41)</td>
<td>12,030 (3,667)</td>
<td>6,110 (1,862)</td>
<td>3,605 (1,099)</td>
<td>1,155 (352)</td>
</tr>
</tbody>
</table>
Step 6.2 Transmitter Communication Input

Connect 4–20 mA Loop External Power Source

The 4–20 mA output loop signal may be powered internally or externally. The default position of the internal/external analog power jumper is in the internal position. The user-selectable power supply jumper is located on the electronics board.

**Internal**

The 4–20 mA analog power loop may be powered from the transmitter itself. Resistance in the loop must be 1,000 ohms or less. If a HART Communicator or control system will be used, it must be connected across a minimum of 250 ohms resistance in the loop.

**External**

HART multidrop installations require a 10–30 V dc external analog power source. If a HART Communicator or control system is to be used, it must be connected across a minimum of 250 ohms resistance in the loop.

To connect external power to the 4–20 mA loop, connect -dc to Terminal 8 and +dc to Terminal 7. (See Figure 12)
Quick Installation Guide
00825-0100-4729, Rev BB
August 2015

Rosemount 8712H

NOTE
To connect any of the other output options (pulse output for totalizing, auxiliary output for switch closure, or positive zero return), consult the comprehensive product manual.

Step 6.3 Transmitter to Flowtube Wiring
A single dedicated conduit run for the coil drive and electrode cables is needed between a flowtube and a remote transmitter. Bundled cables in a single conduit are likely to create interference and noise problems in your system. Use one set of cables per conduit run.

Table 6. Cable Requirements

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Cable (20 AWG) Belden</td>
<td>ft</td>
<td>08712-0061-0001</td>
</tr>
<tr>
<td>8762, Alpha 2411 equivalent</td>
<td>m</td>
<td>08712-0061-0003</td>
</tr>
<tr>
<td>Coil Drive Cable (14 AWG) Belden</td>
<td>ft</td>
<td>08712-0000-0001</td>
</tr>
<tr>
<td>8720, Alpha 2442 equivalent</td>
<td>m</td>
<td>08712-0000-0003</td>
</tr>
<tr>
<td>Combination Signal and Coil Drive Cable (18 AWG) (1)</td>
<td>ft</td>
<td>08712-0752-0001</td>
</tr>
<tr>
<td></td>
<td>m</td>
<td>08712-0752-0003</td>
</tr>
</tbody>
</table>

(1) Combination signal and coil drive cable is not recommended for high-signal magmeter system. For remote mount installations, combination signal and coil drive cable should be limited to less than 100 ft. (30 m).
Step 7: Basic Configuration

Once the magnetic flowmeter is installed and power has been supplied, transmitter must be configured through the basic setup. These parameters can be configured through either a local operator interface, a HART Communicator or AMS. A table of all the parameters are on page 25. Descriptions of the more advanced functions are included in the comprehensive product manual.

Basic Setup

Tag

Tag is the quickest and shortest way of identifying and distinguishing between transmitters. Transmitters can be tagged according to the requirements of your application. The tag may be up to eight characters long.
Flow Rate Units
The flow rate units variable specifies the format in which the flow rate will be displayed. Units should be selected to meet your particular metering needs.

URV (Upper Range Value)
The upper range value (URV), or analog output range, is preset to 30 ft/s at the factory. The units that appear will be the same as those selected under the units parameter.

LRV (Lower Range Value)
Reset the lower range value (LRV), or analog output zero, to change the size of the range (or span) between the URV and LRV. Under normal circumstances, the LRV should be set to a value near the minimum expected flow rate to maximize resolution. The LRV must be between –30 ft/s to 30 ft/s.

Line Size
The line size (tube size) must be set to match the actual flowtube connected to the transmitter. The size must be specified in inches according to the available sizes listed below.

Calibration Number
The tube calibration number is a 16-digit number used to identify flowtubes calibrated at the Rosemount factory.
### Quick Installation Guide

**00825-0100-4729, Rev BB**  
August 2015  
Rosemount 8712H

**Function** | **HART Fast Keys** | **LOI Key**  
--- | --- | ---  
**PROCESS VARIABLES**  
Analog Output Test | 1, 1 | Aux. function  
Pulse Output Test | 1, 2 | Aux. Function  
Self Test | 1, 2, 1, 2 | Aux. Function  
D/A Trim and (4-20 mA Output Trim) | 1, 2, 4, 1 | Aux. Function  
Scaled D/A Trim | 1, 2, 4, 2 |  
Electronics Trim | 1, 2, 4, 3 | Aux. Function  
Auto Zero Trim | 1, 2, 4, 4 | Aux. Function  
Universal Auto Trim (8712U Only) | 1, 2, 4, 5 | Aux. Function  
**DIAGNOSTICS AND SERVICE**  
Analog Output Test | 1, 1, 3 | Aux. function  
Pulse Output Test | 1, 2, 3 | Aux. Function  
Self Test | 1, 2, 1, 2 | Aux. Function  
D/A Trim and (4-20 mA Output Trim) | 1, 2, 4, 1 | Aux. Function  
Scaled D/A Trim | 1, 2, 4, 2 |  
Electronics Trim | 1, 2, 4, 3 | Aux. Function  
Auto Zero Trim | 1, 2, 4, 4 | Aux. Function  
Universal Auto Trim (8712U Only) | 1, 2, 4, 5 | Aux. Function  
**BASIC SETUP**  
Tag | 1, 3, 1 | XMTR Info  
Flow Rate Units | 1, 3, 2, 1 | Units  
URV (Upper Range Value) | 1, 3, 3 | Analog Output Range  
LRV (Lower Range Value) | 1, 3, 4 | Aux. Function  
Line Size | 1, 3, 5 | Tube Size  
Calibration Number | 1, 3, 6 | Tube Cal No.  
Damping | 1, 3, 7 | Damping  
**DETAILED SETUP**  
Pulse Output Scaling | 1, 4, 3, 2, 1 | Aux. Function  
Pulse Width | 1, 4, 3, 2, 2 | Aux. Function  
Special Units | 1, 3, 2, 2 | Aux. Function  
User-Defined Volume Unit | 1, 3, 2, 2, 1 | Aux. Function  
Base Volume Unit | 1, 3, 2, 2, 2 | Aux. Function  
Conversion Number | 1, 3, 2, 2, 3 | Aux. Function  
Base Tim Unit | 1, 3, 2, 2, 4 | Aux. Function  
User-Defined Flow Unit | 1, 3, 2, 2, 5 | Aux. Function  
Auxiliary Output | 1, 4, 3, 3 | Aux. Function  
Totalizer | 1, 1, 4 | Totalizer  
Measure Gross Total | 1, 1, 4, 1 | Totalizer  
Start Totalizer | 1, 1, 4, 4 | Totalizer  
Stop Totalizer | 1, 1, 4, 5 | Totalizer  
Reset Totalizer | 1, 1, 4, 6 | Totalizer  
Low Flow Cut Off | 1, 4, 4, 1 | Aux. Function  
Coil Dive Frequency | 1, 4, 1, 3 | Aux. Function  
Control Status | 1, 4, 4, 4 | Aux. Function
<table>
<thead>
<tr>
<th>Function</th>
<th>HART Fast Keys</th>
<th>LOI Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Processing Control</td>
<td>1, 4, 4</td>
<td>Aux. Function</td>
</tr>
<tr>
<td>Number of Samples</td>
<td>1, 4, 4, 5</td>
<td>Aux. Function</td>
</tr>
<tr>
<td>Maximum Percent Limit</td>
<td>1, 4, 4, 6</td>
<td>Aux. Function</td>
</tr>
<tr>
<td>Time Limit</td>
<td>1, 4, 4, 7</td>
<td>Aux. Function</td>
</tr>
</tbody>
</table>

**REVIEW VARIABLES**

- Review: 1, 5

**MISCELLANEOUS FUNCTIONS**

- Coil Current (8712U Only): 1, 4, 1, 7 Aux. Function
- Transmitter Gain (8712U Only): 1, 4, 1, 8 Aux. Function
- Flowtube Gain (8712U Only): 1, 4, 1, 9 Aux. Function
- Message: 1, 4, 5, 4 XMTR Info
- Date: 1, 4, 5, 5 XMTR Info
- Flowtube Tag: 1, 4, 5, 8 XMTR Info
- Flowtube Serial Number: 1, 4, 5, 7 XMTR Info
- Liner Material: XMTR Info
- Electrode Type: XMTR Info
- Electrode Material: XMTR Info
Quick Installation Guide
00825-0100-4729, Rev BB
August 2015

Product Certificates

Approved Manufacturing Locations
Rosemount Inc. — Eden Prairie, Minnesota, USA
Fisher-Rosemount Technologias de Flujo, S.A. de C.V. — Chihuahua, Chihuahua, Mexico

Other important guidelines
Only use new, original parts.
To prevent the process medium escaping, do not unscrew or remove process flange bolts, adapter bolts or bleed screws during operation.
Maintenance shall only be done by qualified personnel.

Hazardous Location Certifications

North American Certifications

Factory Mutual (FM)

N0 Division 2 Approval (All transmitters)
Class I, Division 2, Groups A, B, C, D
Temp Codes – T4 (at 40°C),
Dust-ignition proof Class II/III, Division 1, Groups E, F, G
Temp Codes – T4 (at 40°C),
Enclosure Type 4X

Canadian Standards Association (CSA)

N0 Suitable for Class I, Division 2, Groups A, B, C, D
Temp Codes – T4 (at 60°C)
Dust-ignition proof Class II/III, Division 1, Groups E, F, G
Enclosure Type 4X
Factory Mutual (FM)

N0 Division 2 Approval for
  Non-Flammable Fluids (8707)
  Class I, Division 2, Groups A, B, C, D
  Temp Code – T5 (8705/8711 at 60°C)
  Temp Code – T3C (8707 at 60°C)
  Dust-Ignition proof Class II/III, Division 1, Groups E, F, G
  Temp Code – T6 (8705/8711 at 60°C)
  Temp Code – T5 (8707 at 60°C)
  Enclosure Type 4X

Canadian Standards Association (CSA)

N0 Suitable for Class I, Division 2, Groups A, B, C, D
  Temp Code – T5 (8705/8711 at 60°C)
  Temp Code – T3C (8707 at 60°C)
  Dust-Ignition proof Class II/III, Division 1, Groups E, F, G
  Enclosure Type 4X