

# Rosemount® 8700M Magnetic Flowmeter Platform with Modbus® RS-485 Protocol



**NOTICE**

This document provides basic installation guidelines for the Rosemount 8700M Magnetic Flowmeter Platform with Modbus RS-485 Protocol. For information about installing, configuring, maintaining, or troubleshooting this product, refer to Reference Manual 00809-0400-4444. The reference manual—as well as this quick start guide—are available online at [www.rosemount.com](http://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 the installation is done safely and is consistent with the operating environment.
- If installed in explosive atmospheres (hazardous areas, classified areas, or an “Ex” environment), it must be assured that the device certification and installation techniques are suitable for that particular environment.
- Explosion hazard—Do not disconnect equipment when a flammable or combustible atmosphere is present.
- To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing circuits.
- Do not connect a Rosemount 8732EM Transmitter to a non-Rosemount sensor that is located in an explosive atmosphere.
- Substitution of components may impair Intrinsic Safety.
- Follow national, local, and plant standards to properly earth ground the transmitter and sensor. The earth ground must be separate from the process reference ground.
- Rosemount Magnetic Flowmeters ordered with non-standard paint options or non-metallic labels may be subject to electrostatic discharge. To avoid electrostatic charge build-up, do not rub the flowmeter with a dry cloth or clean with solvents.

**NOTICE**

- The sensor liner is vulnerable to handling damage. Never place anything through the sensor for the purpose of lifting or gaining leverage. Liner damage may render the sensor inoperable.
- Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor. If spiral wound or metallic gaskets are required for the application, lining protectors must be used. If frequent removal is anticipated, take precautions to protect the liner ends. Short spool pieces attached to the sensor ends are often used for protection.
- Correct flange bolt tightening is crucial for proper sensor operation and life. All bolts must be tightened in the proper sequence to the specified torque specifications. Failure to observe these instructions could result in severe damage to the sensor lining and possible sensor replacement.
- In cases where high voltage/high current are present near the meter installation, ensure proper protection methods are followed to prevent stray voltage/current from passing through the meter. Failure to adequately protect the meter could result in damage to the transmitter and lead to meter failure.
- Completely remove all electrical connections from both sensor and transmitter prior to welding on the pipe. For maximum protection of the sensor, consider removing it from the pipeline.

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## Step 1: Transmitter installation

Installation of the Rosemount Magnetic Flowmeter includes both detailed mechanical and electrical installation procedures.

Before installing the Rosemount 8732EM 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

### 1.1 Identify options and configurations

The typical installation of the 8732EM includes a device power connection, a Modbus RS-485 output connection, and sensor coil and electrode connections. Other applications may require one or more of the following configurations or options:

- Pulse Output
- Discrete Input/Discrete Output

#### Hardware switches

The 8732EM electronics stack is equipped with user-selectable hardware switches. These switches set the Internal/External Pulse Power and Transmitter Security. The factory default settings for these switches is as follows:

**Table 1. Hardware Switch Default Settings**

Hardware switch	Default setting
Internal/External Pulse Power	External
Transmitter Security	Off

In most cases, it will not be necessary to change the hardware switch settings. If the settings need to be changed, follow the steps outlined under “Changing hardware switch settings” in Reference Manual 00809-0400-4444.

#### Note

To prevent switch damage, use a non-metallic tool to move switch positions.

Be sure to identify any additional options and configurations that apply to the installation. Keep a list of these options for consideration during the installation and configuration procedures.

### 1.2 Mechanical considerations

The mounting site for the Rosemount 8732EM transmitter should provide enough room for secure mounting, easy access to conduit entries, full opening of the transmitter covers, and easy readability of the LOI screen, if equipped.

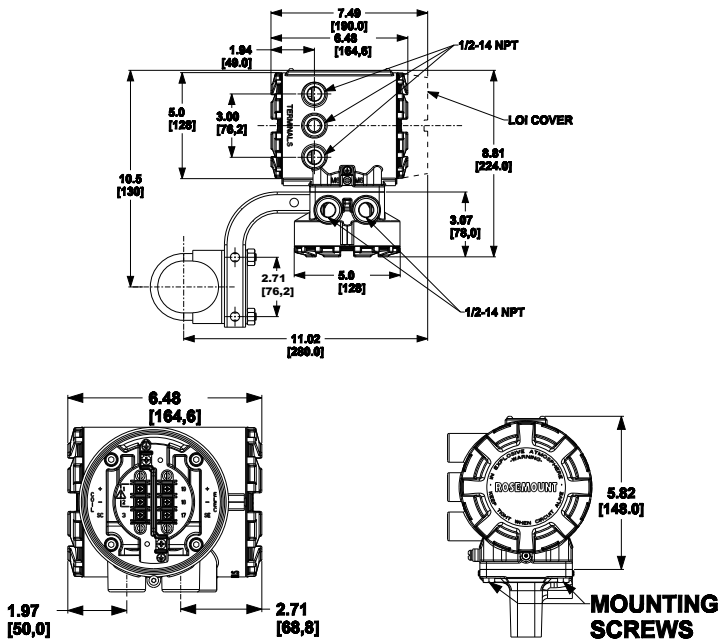
For remote mount transmitter (8732EMRxxx) installations, a mounting bracket is provided for use on a 2-inch pipe or a flat surface (see [Figure 1](#)).

**Note**

If the Rosemount 8732EM is mounted separately from the sensor, it may not be subject to limitations that might apply to the sensor.

**Rotate integral mount transmitter housing**

The transmitter housing can be rotated on the sensor in 90-degree increments by removing the four mounting screws on the bottom of the housing. Do not rotate the housing more than 180 degrees in any one direction. Prior to tightening, be sure the mating surfaces are clean, the O-ring is seated in the groove, and there is no gap between the housing and the sensor.

**Figure 1. Rosemount 8732EM Dimensional Drawing****Note**

Conduit entries are 1/2-in. NPT or M20 connections. If an alternate thread connection is required, thread adapters must be used.

**1.3 Electrical considerations**

Before making any electrical connections to the Rosemount 8732EM, consider national, local, and plant electrical installation requirements. Be sure to have the proper power supply, conduit, and other accessories necessary to comply with these standards.

Both remotely and integrally mounted Rosemount 8732EM transmitters require external power, so there must be access to a suitable power source.

**Table 2. Electrical Data**

<b>Rosemount 8732EM Flow Transmitter</b>	
Power input	90–250VAC, 0.45A, 40VA 12–42VDC, 1.2A, 15W
Pulsed circuit	Internally powered (Active): Outputs up to 12VDC, 12.1 mA, 73mW Externally powered (Passive): Input up to 28VDC, 100mA, 1W
Modbus output circuit	Internally powered (Active): Outputs up to 3.3VDC, 100mA, 100mW
Termination resistors	Typically 120 ohms. Refer to the MODBUS over Serial Line Specification & Implementation Guide ( <a href="http://www.modbus.org">http://www.modbus.org</a> ) for more details.
Um	250V
Coil excitation output	500mA, 40V max, 9W max
<b>Rosemount 8705-M and 8711-M/L Sensor<sup>(1)</sup></b>	
Coil excitation input	500mA, 40V max, 20W max
Electrode circuit	5V, 200uA, 1mW

1. Provided by the transmitter

## 1.4 Environmental considerations

To ensure maximum transmitter life, avoid extreme temperatures and excessive vibration. Typical problem areas include the following:

- High-vibration lines with integrally mounted transmitters.
- Tropical/desert installations in direct sunlight.
- Outdoor installations in arctic climates.

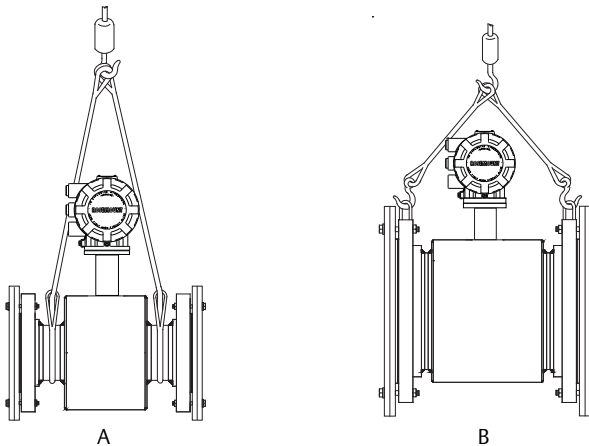
Remote-mounted transmitters may be installed in the control room to protect the electronics from the harsh environment and to provide easy access for configuration or service.

## Step 2: Handling and lifting

- Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping container.
- PTFE-lined sensors are shipped with end covers that protect it from both mechanical damage and normal unrestrained distortion. Remove the end covers just before installation.
- Keep the shipping plugs in the conduit connections until you are ready to connect and seal them.
- The sensor should be supported by the pipeline. Pipe supports are recommended on both the inlet and outlet sides of the sensor pipeline. There should be no additional support attached to the sensor.
- Additional safety recommendations for mechanical handling:
  - Use proper PPE (Personal Protection Equipment) including safety glasses and steel toed shoes.
  - Do not drop the device from any height.

- Do not lift the meter by holding the electronics housing or junction box. The sensor liner is vulnerable to handling damage. Never place anything through the sensor for the purpose of lifting or gaining leverage. Liner damage can render the sensor useless.
- If provided, use the lifting lugs on each flange to handle the Magnetic Flowmeter when it is transported and lowered into place at the installation site. If lifting lugs are not provided, the Magnetic Flowmeter must be supported with a lifting sling on each side of the housing.
  - Standard Pressure 3-in. through 36-in. Flanged Magnetic Flowmeters come with lifting lugs.
  - High Pressure (above 600#) 1-in. through 24-in. Flanged Magnetic Flowmeters come with lifting lugs.
  - Wafers and Sanitary Magnetic Flowmeters do not come with lifting lugs.

**Figure 2. Rosemount 8705 Sensor Support for Handling and Lifting**



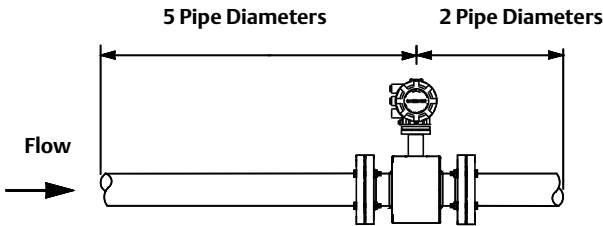
A. Without lifting lugs  
B. With lifting lugs

## Step 3: Mounting

### 3.1 Upstream/downstream piping

To ensure specified accuracy over widely varying process conditions, install the sensor with a minimum of five straight pipe diameters upstream and two pipe diameters downstream from the electrode plane (see [Figure 3](#)).

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**Figure 3. Upstream and Downstream Straight Pipe Diameters**



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Installations with reduced upstream and downstream straight runs are possible. In reduced straight run installations, the meter may not meet absolute accuracy specifications. Reported flow rates will still be highly repeatable.

### 3.2 Flow direction

The sensor should be mounted so that the arrow points in the direction of flow. See [Figure 4](#).

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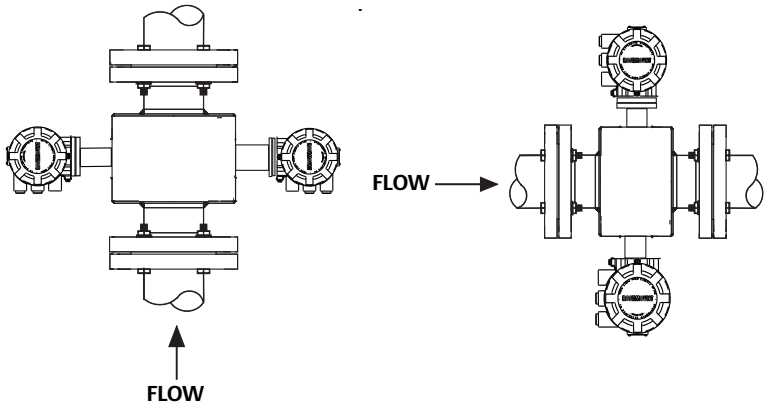
**Figure 4. Flow Direction Arrow**



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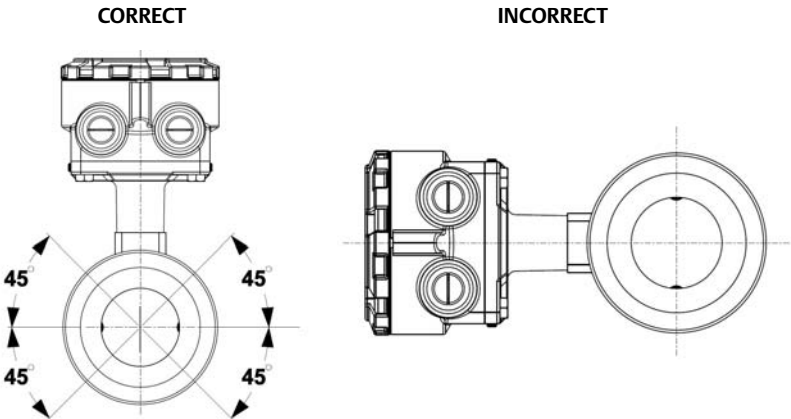
### 3.3 Sensor location

The sensor should be installed in a location that ensures it remains full during operation. Vertical installation with 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.

**Figure 5. Sensor Orientation**

### 3.4 Electrode orientation

The electrodes in the sensor are properly oriented when the two measurement electrodes are in the 3 and 9 o'clock positions or within 45 degrees from the horizontal, as shown on the left of [Figure 6](#). Avoid any mounting orientation that positions the top of the sensor at 90 degrees from the vertical position as shown in [Figure 6](#).

**Figure 6. Mounting Position**

For hazardous location installations, refer to Appendix D of Reference Manual 00809-0400-4444 for sensor orientation pertaining to specific T-code compliance.



## Step 4: Sensor installation

### Flanged sensors

#### 4.1 Gaskets

The sensor requires a gasket at each process connection. The gasket material must be compatible with the process fluid and operating conditions. Gaskets are required on each side of a grounding ring (see [Figure 7](#)). All other applications (including sensors with lining protectors or a grounding electrode) require only one gasket on each process connection.

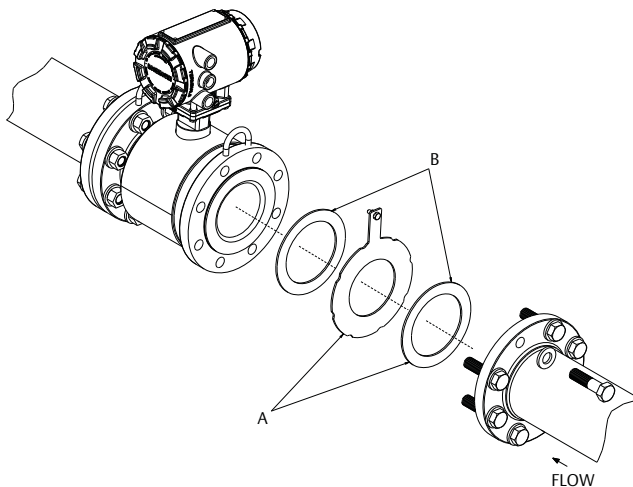
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**Note**

Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor. If spiral wound or metallic gaskets are required for the application, lining protectors must be used.

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**Figure 7. Flanged Gasket Placement**



- A. Grounding Ring and Gasket (Optional)
  - B. Customer-supplied Gasket
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## 4.2 Flange bolts

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### Note

Do not bolt one side at a time. Tighten both sides simultaneously. Example:

1. Snug upstream
2. Snug downstream
3. Tighten upstream
4. Tighten downstream

Do not snug and tighten the upstream side and then snug and tighten the downstream side. Failure to alternate between the upstream and downstream flanges when tightening bolts may result in liner damage.

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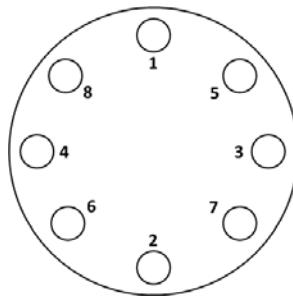
Suggested torque values by sensor line size and liner type are listed in [Table 4](#) for ASME B16.5 flanges and [Table 5](#) for EN flanges. Consult the factory if the flange rating of the sensor is not listed. Tighten flange bolts on the upstream side of the sensor in the incremental sequence shown in [Figure 8](#) to 20% of the suggested torque values. Repeat the process on the downstream side of the sensor. For sensors with greater or fewer 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.

If leakage occurs 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 to distinct torque values to stop leakage due to the unique combinations of flanges, bolts, gaskets, and sensor liner material.

Check for leaks at the flanges after tightening the bolts. Failure to use the correct tightening methods can result in severe damage. While under pressure, sensor materials may deform over time and require a second tightening 24 hours after the initial installation.

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**Figure 8. Flange Bolt Torquing Sequence**



Prior to installation, identify the lining material of the flow sensor to ensure the suggested torque values are applied.

**Table 3. Lining Material**

Fluoropolymer liners	Other liners
T - PTFE	P - Polyurethane
F - ETFE	N - Neoprene
A - PFA	L - Linatex (Natural Rubber)
K - PFA+	D - Adiprene

**Table 4. Suggested Flange Bolt Torque Values for Rosemount 8705 (ASME)**

Size code	Line size	Fluoropolymer liners		Other liners	
		Class 150 (pound-feet)	Class 300 (pound-feet)	Class 150 (pound-feet)	Class 300 (pound-feet)
005	0.5-in. (15 mm)	8	8	N/A	N/A
010	1-in. (25 mm)	8	12	N/A	N/A
015	1.5-in. (40 mm)	13	25	7	18
020	2-in. (50 mm)	19	17	14	11
025	2.5-in. (65 mm)	22	24	17	16
030	3-in. (80 mm)	34	35	23	23
040	4-in. (100 mm)	26	50	17	32
050	5-in. (125 mm)	36	60	25	35
060	6-in. (150 mm)	45	50	30	37
080	8-in. (200 mm)	60	82	42	55
100	10-in. (250 mm)	55	80	40	70
120	12-in. (300 mm)	65	125	55	105
140	14-in. (350 mm)	85	110	70	95
160	16-in. (400 mm)	85	160	65	140
180	18-in. (450 mm)	120	170	95	150
200	20-in. (500 mm)	110	175	90	150
240	24-in. (600 mm)	165	280	140	250
300 <sup>(1)</sup>	30-in. (750 mm)	195	415	165	375
360 <sup>(1)</sup>	36-in. (900 mm)	280	575	245	525

1. Torque values are valid for ASME and AWWA flanges.

**Table 5. Flange Bolt Torque and Load Specifications for 8705 (EN 1092-1)**

<b>Fluoropolymer liners (in Newton-meters)</b>					
<b>Size code</b>	<b>Line size</b>	<b>PN10</b>	<b>PN 16</b>	<b>PN 25</b>	<b>PN 40</b>
005	0.5-in. (15 mm)	N/A	N/A	N/A	10
010	1-in. (25 mm)	N/A	N/A	N/A	20
015	1.5-in. (40 mm)	N/A	N/A	N/A	50
020	2-in. (50 mm)	N/A	N/A	N/A	60
025	2.5-in. (65 mm)	N/A	N/A	N/A	50
030	3-in. (80 mm)	N/A	N/A	N/A	50
040	4-in. (100 mm)	N/A	50	N/A	70
050	5-in. (125 mm)	N/A	70	N/A	100
060	6-in. (150mm)	N/A	90	N/A	130
080	8-in. (200 mm)	130	90	130	170
100	10-in. (250 mm)	100	130	190	250
120	12-in. (300 mm)	120	170	190	270
140	14-in. (350 mm)	160	220	320	410
160	16-in. (400 mm)	220	280	410	610
180	18-in. (450 mm)	190	340	330	420
200	20-in. (500 mm)	230	380	440	520
240	24-in. (600 mm)	290	570	590	850
<b>Other liners (in Newton-meters)</b>					
<b>Size code</b>	<b>Line size</b>	<b>PN10</b>	<b>PN 16</b>	<b>PN 25</b>	<b>PN 40</b>
010	1-in. (25 mm)	N/A	N/A	N/A	20
015	1.5-in. (40 mm)	N/A	N/A	N/A	30
020	2-in. (50 mm)	N/A	N/A	N/A	40
025	2.5-in. (65 mm)	N/A	N/A	N/A	35
030	3-in. (80 mm)	N/A	N/A	N/A	30
040	4-in. (100 mm)	N/A	40	N/A	50
050	5-in. (125 mm)	N/A	50	N/A	70
060	6-in. (150 mm)	N/A	60	N/A	90
080	8-in. (200 mm)	90	60	90	110
100	10-in. (250 mm)	70	80	130	170
120	12-in. (300 mm)	80	110	130	180
140	14-in. (350 mm)	110	150	210	280
160	16-in. (400 mm)	150	190	280	410
180	18-in. (450 mm)	130	230	220	280
200	20-in. (500 mm)	150	260	300	350
240	24-in. (600 mm)	200	380	390	560

## Wafer sensors

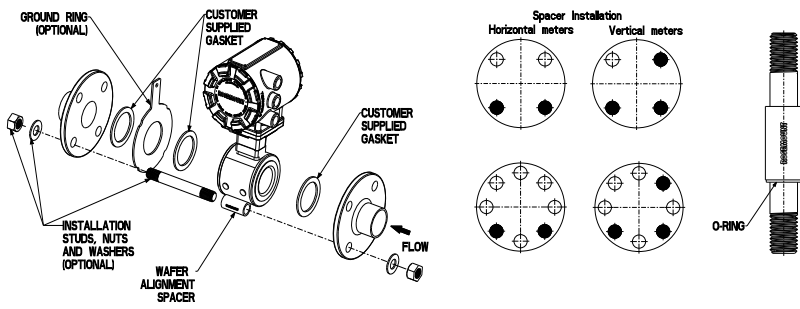
### 4.3 Gaskets

The sensor requires a gasket at each process connection. The gasket material selected must be compatible with the process fluid and operating conditions. Gaskets are required on each side of a grounding ring. See [Figure 9](#) below.

#### Note

Metallic or spiral-wound gaskets should not be used as they will damage the liner face of the sensor.

**Figure 9. Wafer Gasket Placement**



### 4.4 Alignment

1. On 1.5-in. through 8-in. (40 through 200 mm) line sizes, Rosemount requires installing the alignment spacers to ensure proper centering of the wafer sensor between the process flanges.
2. Insert studs for the bottom side of the sensor between the pipe flanges and center the alignment spacer in the middle of the stud. See [Figure 9](#) for the bolt hole locations recommended for the spacers provided. Stud specifications are listed in [Table 6](#).
3. Place the sensor between the flanges. Make sure the alignment spacers are properly centered on the studs. For vertical flow installations, slide the O-ring over the stud to keep the spacer in place. See [Figure 9](#). Ensure the spacers match the flange size and class rating for the process flanges. See [Table 7](#).
4. Insert the remaining studs, washers, and nuts.
5. Tighten to the torque specifications shown in [Table 8](#). Do not over-tighten the bolts or the liner may be damaged.

**Table 6. Stud Specifications**

Nominal sensor size	Stud specifications
1.5 through 8-inch (40 through 200 mm)	CS, ASTM A193, Grade B7, threaded mounting studs

**Table 7. Rosemount Alignment Spacer Table**

Dash no. (-xxxx)	Line size		Flange rating
	(in)	(mm)	
0A15	1.5	40	JIS 10K-20K
0A20	2	50	JIS 10K-20K
0A30	3	80	JIS 10K
0B15	1.5	40	JIS 40K
AA15	1.5	40	ASME - 150#
AA20	2	50	ASME - 150#
AA30	3	80	ASME - 150#
AA40	4	100	ASME - 150#
AA60	6	150	ASME - 150#
AA80	8	200	ASME - 150#
AB15	1.5	40	ASME - 300#
AB20	2	50	ASME - 300#
AB30	3	80	ASME - 300#
AB40	4	100	ASME - 300#
AB60	6	150	ASME - 300#
AB80	8	200	ASME - 300#
DB40	4	100	EN 1092-1 - PN10/16
DB60	6	150	EN 1092-1 - PN10/16
DB80	8	200	EN 1092-1 - PN10/16
DC80	8	200	EN 1092-1 - PN25
DD15	1.5	40	EN 1092-1 - PN10/16/25/40
DD20	2	50	EN 1092-1 - PN10/16/25/40
DD30	3	80	EN 1092-1 - PN10/16/25/40
DD40	4	100	EN 1092-1 - PN25/40
DD60	6	150	EN 1092-1 - PN25/40
DD80	8	200	EN 1092-1 - PN40
RA80	8	200	AS40871-PN16
RC20	2	50	AS40871-PN21/35
RC30	3	80	AS40871-PN21/35
RC40	4	100	AS40871-PN21/35
RC60	6	150	AS40871-PN21/35
RC80	8	200	AS40871-PN21/35

To order an Alignment Spacer Kit (qty 3 spacers) use p/n 08711-3211-xxxx where xxxx equals the dash number above.

## 4.5 Flange bolts

Wafer sensors require threaded studs. See [Figure 8 on page 10](#) for torque sequence. Always check for leaks at the flanges after tightening the flange bolts. All sensors require a second tightening 24 hours after initial flange bolt tightening.

**Table 8. Rosemount 8711 Torque Specifications**

Size code	Line size	Pound-feet	Newton-meter
015	1.5-in. (40 mm)	15	20
020	2-in. (50 mm)	25	34
030	3-in. (80 mm)	40	54
040	4-in. (100 mm)	30	41
060	6-in. (150 mm)	50	68
080	8-in. (200 mm)	70	95

## Step 5: Process reference connection

[Figure 10](#) through [Figure 13](#) illustrate process reference connections only. Earth safety ground is also required as part of the installation, but is not shown in the figures. Follow national, local, and plant electrical codes for safety ground.

Use [Table 9](#) to determine which process reference option to follow for proper installation.

**Table 9. Process Reference Installation**

Process reference options				
Type of pipe	Grounding straps	Grounding rings	Reference electrode	Lining protectors
Conductive Unlined Pipe	See <a href="#">Figure 10</a>	See <a href="#">Figure 11</a> <sup>(1)</sup>	See <a href="#">Figure 13</a> <sup>(1)</sup>	See <a href="#">Figure 11</a> <sup>(1)</sup>
Conductive Lined Pipe	Insufficient Grounding	See <a href="#">Figure 11</a>	See <a href="#">Figure 10</a>	See <a href="#">Figure 11</a>
Non-Conductive Pipe	Insufficient Grounding	See <a href="#">Figure 12</a>	Not Recommended	See <a href="#">Figure 12</a>

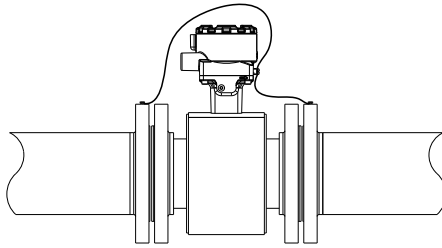
1. Grounding ring, reference electrode, and lining protectors are not required for process reference. Grounding straps per [Figure 10](#) are sufficient.

### Note

For line sizes 10-inch and larger, the ground strap may come attached to the sensor body near the flange. See [Figure 14](#).

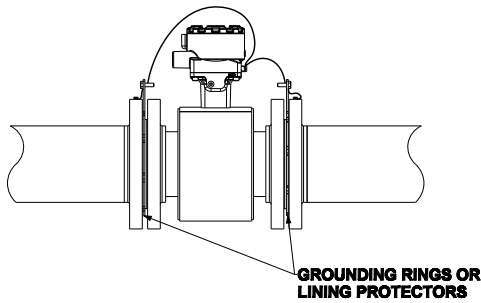
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**Figure 10. Grounding Straps in Conductive Unlined Pipe or Reference Electrode in Lined Pipe**



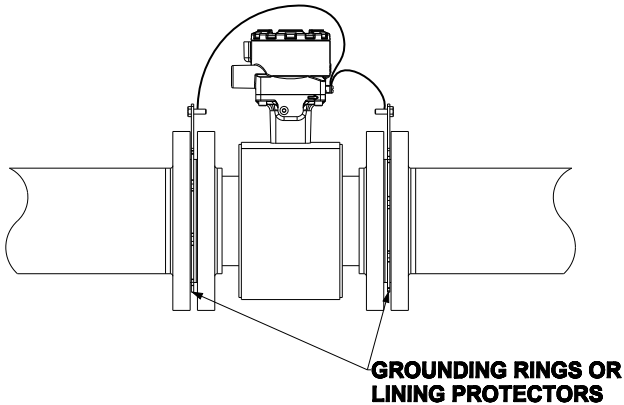
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**Figure 11. Grounding with Grounding Rings or Lining Protectors in Conductive Pipe**



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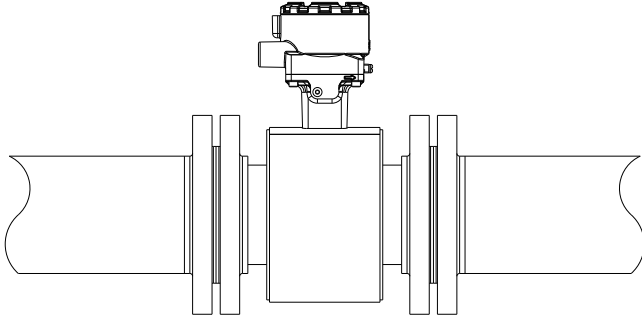
**Figure 12. Grounding with Grounding Rings or Lining Protectors in Non-conductive Pipe**





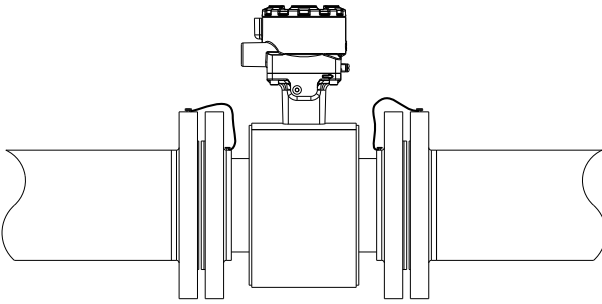
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**Figure 13. Grounding with Reference Electrode in Conductive Unlined Pipe**



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**Figure 14. Grounding for Line Sizes 10-in. and Larger**



## Step 6: Wiring the transmitter

This section covers the wiring between the transmitter and sensor, the Modbus output, and supplying power to the transmitter. Follow the conduit, cable, and electrical disconnect requirements in the sections below. For sensor wiring diagrams, see [Figure 29 on page 50](#). For hazardous locations, refer to Appendix D of Reference Manual 00809-0400-4444.

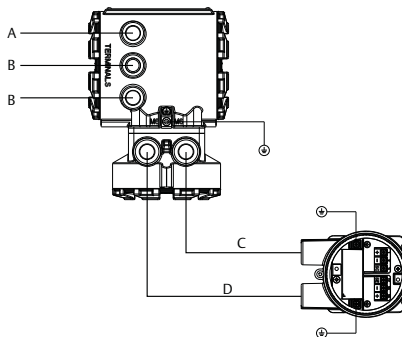
### 6.1 Conduit entries and connections

Conduit entries for the transmitter and sensor are available with 1/2-inch NPT or M20 connections. Conduit connections should be made in accordance with national, local, and plant electrical codes. Unused conduit entries should be sealed with the appropriate certified plugs. The flow sensor is rated IP68 to a depth of 33 feet (10 meters) for 48 hours. For sensor installations requiring IP68 protection, the cable glands, conduit, and conduit plugs must be rated for IP68. The plastic shipping plugs do not provide ingress protection.

### 6.2 Conduit requirements

- For installations with an intrinsically safe electrode circuit, a separate conduit for the coil cable and the electrode cable may be required. Refer to Appendix D of Reference Manual 00809-0400-4444.
- For installations with non-intrinsically safe electrode circuit, or when using the combination cable, a single dedicated conduit run for the coil drive and electrode cable between the sensor and the remote transmitter may be acceptable. Bundled cables from other equipment in a single conduit are likely to create interference and noise in the system. See [Figure 15](#).
- Electrode cables should not be run together and should not be in the same cable tray with power cables.
- Output cables should not be run together with power cables.
- Select conduit size appropriate to feed cables through to the flowmeter.

**Figure 15. Best Practice Conduit Preparation**



- A. Power
- B. Output
- C. Coil
- D. Electrode

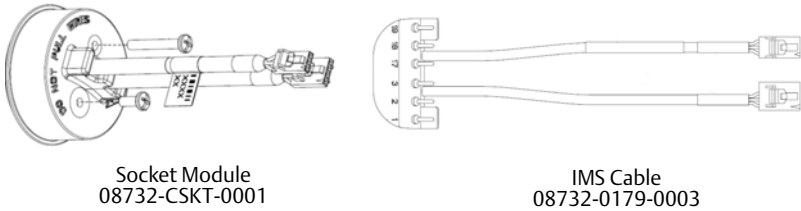
## 6.3 Connecting sensor to transmitter

### Integral mount transmitters

Integral mount transmitters ordered with a sensor will be shipped assembled and wired at the factory using an interconnecting cable. (See [Figure 16](#)). Use only the socket module or IMS cable provided by Emerson™ Process Management.

For replacement transmitters, use the existing interconnecting cable from the original assembly. Replacement cables are available.

**Figure 16. Interconnecting Cables**



### Remote mount transmitters

Cables kits are available as individual component cables or as a combination coil/electrode cable. Remote cables can be ordered direct from Rosemount using the kit numbers shown in [Table 10](#). Equivalent Alpha cable part numbers are also provided as an alternative. To order cable, specify length as quantity desired. Equal length of component cables is required.

Example: 25 feet = Qty (25) 08732-0065-0001

**Table 10. Component Cable Kits**

<b>Standard temperature (-20°C to 75°C)</b>			
<b>Cable kit #</b>	<b>Description</b>	<b>Individual cable</b>	<b>Alpha p/n</b>
08732-0065-0001 (feet)	Kit, Component Cables, Std Temp. Coil + Electrode	Coil Electrode	518243 518245
08732-0065-0002 (meters)	Kit, Component Cables, Std Temp. Coil + Electrode	Coil Electrode	518243 518245
08732-0065-0003 (feet)	Kit, Component Cables, Std Temp. Coil + I.S. Electrode	Coil Intrinsically Safe Blue Electrode	518243 518244
08732-0065-0004 (meters)	Kit, Component Cables, Std Temp. Coil + I.S. Electrode	Coil Intrinsically Safe Blue Electrode	518243 518244

<b>Extended temperature (-50°C to 125°C)</b>			
<b>Cable kit #</b>	<b>Description</b>	<b>Individual cable</b>	<b>Alpha p/n</b>
08732-0065-1001 (feet)	Kit, Component Cables, Ext Temp. Coil + Electrode	Coil Electrode	840310 518189
08732-0065-1002 (meters)	Kit, Component Cables, Ext Temp. Coil + Electrode	Coil Electrode	840310 518189
08732-0065-1003 (feet)	Kit, Component Cables, Ext Temp. Coil + I.S. Electrode	Coil Intrinsically Safe Blue Electrode	840310 840309
08732-0065-1004 (meters)	Kit, Component Cables, Ext Temp. Coil + I.S. Electrode	Coil Intrinsically Safe Blue Electrode	840310 840309

**Table 11. Combination Cable Kits**

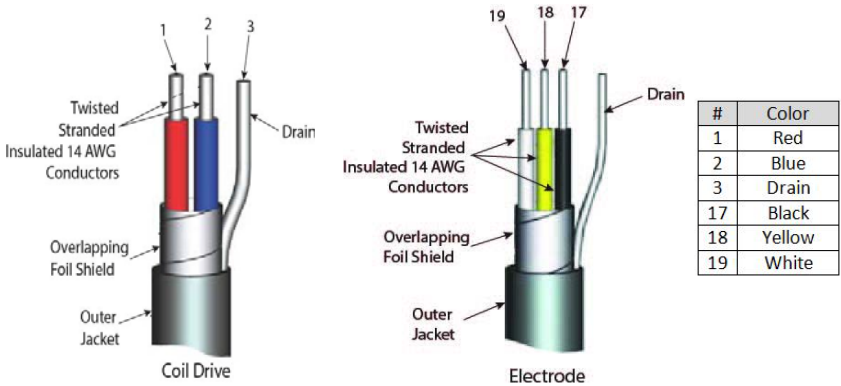
<b>Coil and electrode cable (-20°C to 80°C)</b>	
<b>Cable kit #</b>	<b>Description</b>
08732-0065-2001 (feet)	Kit, Combination Cable, Standard
08732-0065-2002 (meters)	
08732-0065-3001 (feet)	Kit, Combination Cable, Submersible (80°C dry/60°C Wet) (33ft Continuous)
08732-0065-3002 (meters)	

### Cable requirements

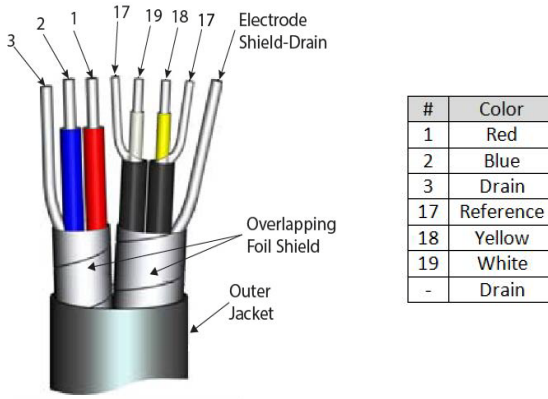
Shielded twisted pairs or triads must be used. For installations using the individual coil drive and electrode cable, see [Figure 17](#). Cable lengths should be limited to less than 500 feet (152 m). Consult factory for length between 500–1000 feet (152–304 m). Equal length cable is required for each.

For installations using the combination coil drive/electrode cable, see [Figure 18](#). Combination cable lengths should be limited to less than 330 feet (100 m).

**Figure 17. Individual Component Cables**



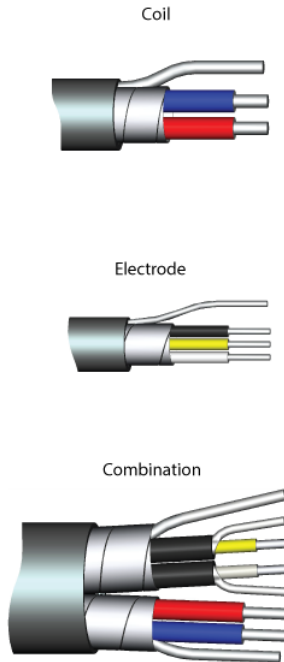
**Figure 18. Combination Coil and Electrode Cable**



## Cable preparation

When preparing all wire connections, remove only the insulation required to fit the wire completely under the terminal connection. Prepare the ends of the coil drive and electrode cables as shown in [Figure 19](#). Limit the unshielded wire length to less than 1 inch on both the coil drive and electrode cables. Any length of unsheathed conductor should be insulated. Excessive removal of insulation may result in an unwanted electrical short to the transmitter housing or other wire connections. Excessive unshielded lead length, or failure to connect cable shields properly, may expose the unit to electrical noise, resulting in an unstable meter reading.

**Figure 19. Cable Ends**



## **⚠️ WARNING**

### **Shock Hazard**

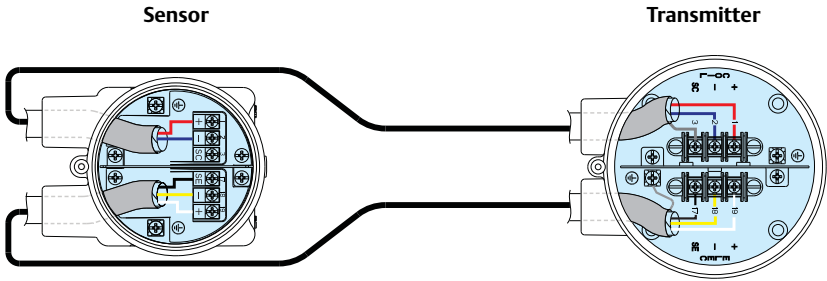
Potential shock hazard across remote junction box terminals 1 & 2 (40V).

### **Explosion Hazard**

Electrodes exposed to process. Use only compatible transmitter and approved installation practices.

For process temperatures greater than 284 °F (140 °C), use a wire rated for 257 °F (125 °C).

**Figure 20. Remote Junction Box Views**



Wire	Terminal
RED	1
BLUE	2
BLACK	17
YELLOW	18
WHITE	19

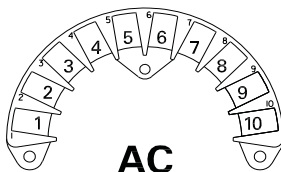
Wire	Terminal
RED	1
BLUE	2
Shield	3
BLACK	17
YELLOW	18
WHITE	19

For sensor wiring diagrams, see [Figure 29 on page 50](#). For hazardous locations, refer to Appendix D of Reference Manual 00809-0400-4444.

### 6.4 8732EM terminal block connections

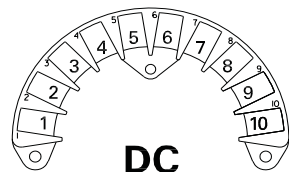
Remove the back cover of the transmitter to access the terminal block. See [Figure 21](#) for terminal identification. To connect pulse output and/or discrete input/output, refer to Reference Manual 00809-0400-4444. For installations with intrinsically safe outputs, refer to Appendix D of Reference Manual 00809-0400-4444.

**Figure 21. Terminal Block Connections**



- 8732 WIRING DIAGRAM**
- |              |              |
|--------------|--------------|
| 1 Modbus (B) | 6 DI/O 1 (+) |
| 2 Modbus (A) | 7 DI/O 2 (-) |
| 3 PULSE (-)  | 8 DI/O 2 (+) |
| 4 PULSE (+)  | 9 AC N / L2  |
| 5 DI/O 1 (-) | 10 AC L1     |

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- 8732 WIRING DIAGRAM**
- |              |              |
|--------------|--------------|
| 1 Modbus (B) | 6 DI/O 1 (+) |
| 2 Modbus (A) | 7 DI/O 2 (-) |
| 3 PULSE (-)  | 8 DI/O 2 (+) |
| 4 PULSE (+)  | 9 DC (-)     |
| 5 DI/O 1 (-) | 10 DC (+)    |

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## 6.5 Modbus output

The Modbus output is a Modbus RTU signal using RS-485. Follow these cable recommendations for RS-485 interface (Modbus over serial line).

### Cable characteristics

<b>Type</b>	Shielded twisted pair cable with 2 conductors and a drain wire, or Ethernet cable of Cat 5/5e/6
<b>Conductor gauge</b>	20–24 AWG for lengths up to 1000 feet 16–20 AWG for lengths up to 4000 feet
<b>Characteristic impedance</b>	100–130 ohm
<b>Conductor-to-conductor capacitance</b>	<30 pF/ft
<b>Conductor-to-shield capacitance</b>	<60 pF/ft
<b>Voltage rating</b>	300 V/600 V
<b>Recommended insulation material</b>	PVC (<1000 ft) or PE (≥1000 ft)

### Bus cable

Bus to be connected device to device. For example, daisy chained (not star connected).

Maximum 4000 feet depending on speeds, cable, and loads.

Cable shield must be grounded at only one point.

Due to the use of galvanically isolated Modbus connections, a third common wire is not necessary for this product. If a 3-conductor cable is used, the third wire should be left unterminated and insulated from ground.

### Derivations (spurs)

Avoid derivations (spurs) when possible. If required, derivations from the bus must be as short as possible (65 feet maximum).

### Termination

A single 120 ohm terminator should be placed at each physical end of the bus (at the two most remote bus devices) to minimize reflections in the transmission cable. Do not place terminators on a spur connection.

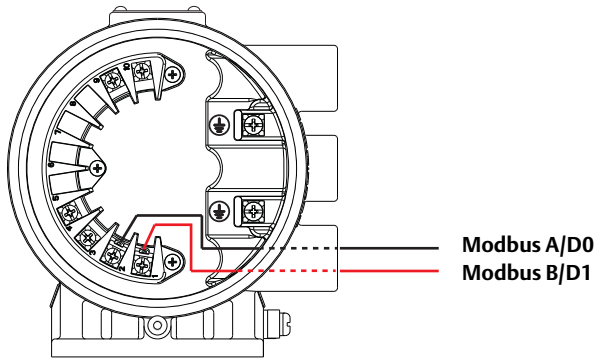
### Modbus wiring

The Modbus signal is a 24VDC active output.

Wire terminal 1 (B/D1) and terminal 2 (A/D0). See [Figure 22](#).



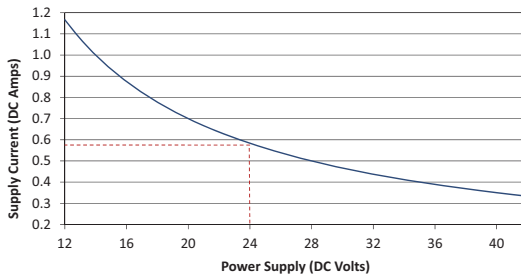
**Figure 22. Modbus Wiring—Internal Power**



### 6.6 Powering the transmitter

The Rosemount 8732EM transmitter is available in two models. The AC powered transmitter is designed to be powered by 90–250VAC (50/60Hz). The DC powered transmitter is designed to be powered by 12–42VDC. Before connecting power to the Rosemount 8732EM, be sure to have the proper power supply, conduit, and other accessories. Wire the transmitter according to national, local, and plant electrical requirements for the supply voltage. See [Figure 23](#) or [Figure 24](#).

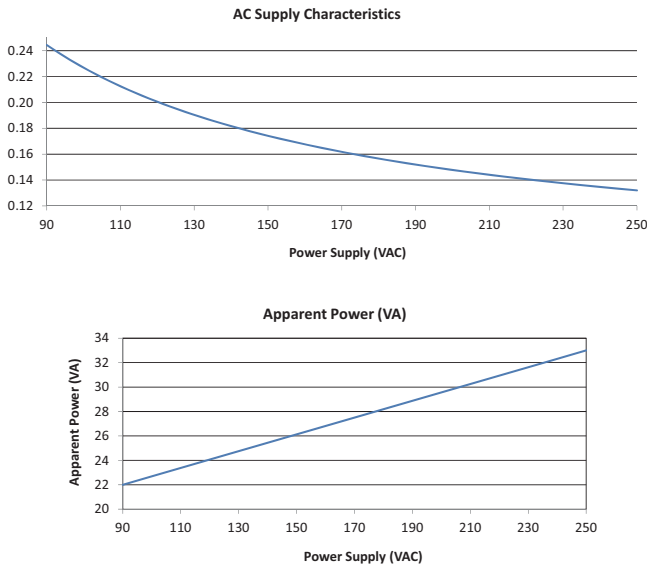
**Figure 23. DC power Requirements**



Peak inrush is 42A at 42VDC supply, lasting approximately 1ms.

Inrush for other supply voltages can be estimated with:

$$\text{Inrush (Amps)} = \text{Supply (Volts)} / 1.0$$

**Figure 24. AC power Requirements**

Peak inrush is 35.7A at 250VAC supply, lasting approximately 1ms

Inrush for other supply voltages can be estimated with:

$$\text{Inrush (Amps)} = \text{Supply (Volts)} / 7.0$$

### Supply wire requirements

Use 10–18 AWG wire rated for the proper temperature of the application. For wire 10–14 AWG use lugs or other appropriate connectors. For connections in ambient temperatures above 122 °F (50 °C), use a wire rated for 194 °F (90 °C). For DC powered transmitters with extended cable lengths, verify that there is a minimum of 12VDC at the terminals of the transmitter with the device under load.

### Electrical disconnect requirements

Connect the device through an external disconnect or circuit breaker per national and local electrical code.

### Installation category

The installation category for the 8732EM is OVERVOLTAGE CAT II.

### Overcurrent protection

The Rosemount 8732EM transmitter requires overcurrent protection of the supply lines. Fuse rating and compatible fuses are shown in [Table 12](#).

**Table 12. Fuse Requirements**

Input voltage	Fuse rating	Compatible fuse
90–250VAC rms	1 Amp, 250V, $I^2t \geq 1.5 \text{ A}^2\text{s}$ Rating, Fast Acting	Bussman AGC-1, Littelfuse 31201.5HXP
12–42VDC	3 Amp, 250V, $I^2t \geq 14 \text{ A}^2\text{s}$ Rating, Fast Acting	Bel Fuse 3AG 3-R, Littelfuse 312003P, Schurter 0034.5135

### Power terminals

See [Figure 21](#) for terminal block connections.

For AC powered transmitter (90–250VAC, 50/60 Hz):

- Connect AC Neutral to terminal 9 (AC N/L2) and AC Line to terminal 10 (AC/L1).

For DC powered transmitter:

- Connect negative to terminal 9 (DC -) and positive to terminal 10 (DC +).
- DC powered units may draw up to 1.2A.

### Cover jam screw

For flow meters shipped with a cover jam screw, the screw should be installed after the instrument has been wired and powered up. Follow these steps to install the cover jam screw:

1. Verify the cover jam screw is completely threaded into the housing.
2. Install the housing cover and verify the cover is tight against the housing.
3. Using a 2.5 mm hex wrench, loosen the jam screw until it contacts the transmitter cover.
4. Turn the jam screw an additional  $1/2$  turn counterclockwise to secure the cover.

---

#### Note

Application of excessive torque may strip the threads.

---

5. Verify the cover cannot be removed.

## Step 7: Modbus configuration

### Note

Each register is identified by its address (or starting address). Depending on the PLC that will be used to communicate with the transmitter, you may need to subtract 1 from the address or starting address of the register. Refer to your PLC documentation to know if this applies to you.

## Local operator interface

To activate the LOI, press the **DOWN** arrow. Use the **UP**, **DOWN**, **LEFT (E)**, and **RIGHT** arrows to navigate the menu structure. Maps of the LOI menus are shown in Figures 25 through 28.

The display can be locked to prevent unintentional configuration changes. The display lock can be activated by holding the **UP** arrow for three seconds and then following the on-screen instructions.

When the display lock is activated, a lock symbol will appear in the lower right hand corner of the display. To deactivate the display lock, hold the **UP** arrow for three seconds and follow the on-screen instructions. Once deactivated, the lock symbol will no longer appear in the lower right hand corner of the display.

### 7.1 Address (register 109)

Configures the address of the transmitter for the Modbus network.

### 7.2 Floating point byte order (register 110)

Sets the order that information is sent by the transmitter.

Register value	Byte order
0	0-1-2-3 (default)
1	2-3-0-1
2	1-0-3-2
3	3-2-1-0

### 7.3 Baud rate (Register 115)

Sets the communication speed of the transmitter.

Register value	Baud rate
0	1200
1	2400
2	4800
3	9600
4	19200 (default)
5	38400
6	57600
7	115200

## 7.4 Parity (register 116)

Used to configure error-checking methodology for the data.

Register value	Parity
0	No parity
1	Odd
2	Even (default)

## 7.5 Stop bits (register 117)

Sets the last bit of the data packet.

Register value	Stop bits
1	1 bit (default)
2	2 bits

# Step 8: Basic configuration

Once the magnetic flowmeter is installed and power has been supplied, the transmitter must be configured through the basic setup. These parameters can be configured through either a local operator interface or a Modbus communication tool. Configuration settings are saved in nonvolatile memory within the transmitter. A complete map of the Modbus registries and descriptions of the more advanced functions is available in Reference Manual 00809-0400-4444.

## Basic setup

### 8.1 Tag (Registers 68–71)

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.

## 8.2 Flow units (Register 61)

The flow units variable specifies the format in which the flow rate will be displayed. Units should be selected to meet your particular metering needs.

Volume units	
Register value	Units
241	Barrels (31 gal) / sec
242	Barrels (31 gal) / min
243	Barrels (31 gal) / hour
244	Barrels (31 gal) / day
132	Barrels (42 gal) / sec
133	Barrels (42 gal) / min
134	Barrels (42 gal) / hour
135	Barrels (42 gal) / day
248	Cubic cm / minute
26	Cubic feet / second
15	Cubic feet / minute
130	Cubic feet / hour
27	Cubic feet / day
28	Cubic meters / second
131	Cubic meters / minute

Volume units	
Register value	Units
19	Cubic meters / hour
29	Cubic meters / day
22	Gallons / second
16	Gallons / minute
136	Gallons / hour
235	Gallons / day
137	Imperial gallons / sec
18	Imperial gallons / min
30	Imperial gallons / hour
31	Imperial gallons / day
24	Liters / second
17	Liters / minute
138	Liters / hour
240	Liters / day

Mass units	
Register value	Units
73	Kilograms / second
74	Kilograms / minute
75	Kilograms / hour
76	Kilograms / day
77	Metric ton / minute
78	Metric ton / hour
79	Metric ton / day
80	Pounds / second
81	Pounds / minute
82	Pounds / hour
83	Pounds / day
84	Short tons / minute
85	Short tons / hour
86	Short tons / day

Other units	
Register value	Units
20	Feet / second (default)
21	Meters / second
253	Special units <sup>1</sup>

1. Refer to the "Configure special units" section of Reference Manual 00809-0400-4444.

### 8.3 Line size (Register 65)

The line size (sensor size) must be set to match the actual sensor connected to the transmitter.

Register value	Line size
0	0.10-in. (2 mm)
1	0.15-in. (4 mm)
2	0.25-in. (6 mm)
3	0.30-in. (8 mm)
4	0.50-in. (15 mm)
5	0.75-in. (18 mm)
6	1-in. (25 mm)
7	1.5-in. (40 mm)
8	2-in. (50 mm)
9	2.5-in. (65 mm)
10	3-in. (80 mm) (default)
11	4-in. (100 mm)
12	5-in. (125 mm)
13	6-in. (150 mm)
14	8-in. (200 mm)
15	10-in. (250 mm)
16	12-in. (300 mm)
17	14-in. (350 mm)

Register value	Line size
18	16-in. (400 mm)
19	18-in. (450 mm)
20	20-in. (500 mm)
21	24-in. (600 mm)
22	28-in. (700 mm)
23	30-in. (750 mm)
24	32-in. (800 mm)
25	36-in. (900 mm)
26	40-in. (1000 mm)
27	42-in. (1050 mm)
28	44-in. (1100 mm)
29	48-in. (1200 mm)
30	54-in. (1350 mm)
31	56-in. (1400 mm)
32	60-in. (1500 mm)
33	64-in. (1600 mm)
34	66-in. (1650 mm)
35	72-in. (1800 mm)
36	78-in. (1950 mm)

### 8.4 Calibration number (Registers 413–420)

The sensor calibration number is a 16-digit number generated at the Rosemount factory during flow calibration and is unique to each sensor and is located on the sensor tag.

Figure 25. Totalizer Menu Map

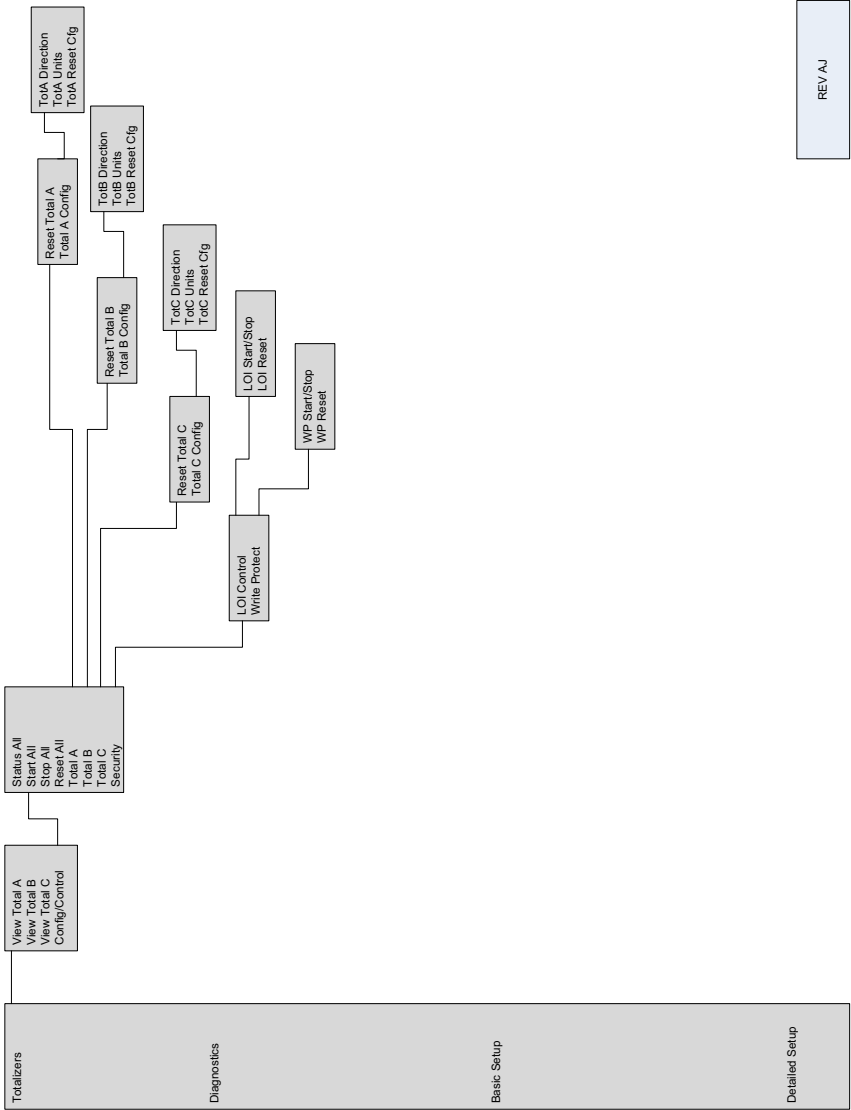




Figure 26. Diagnostics Menu Map

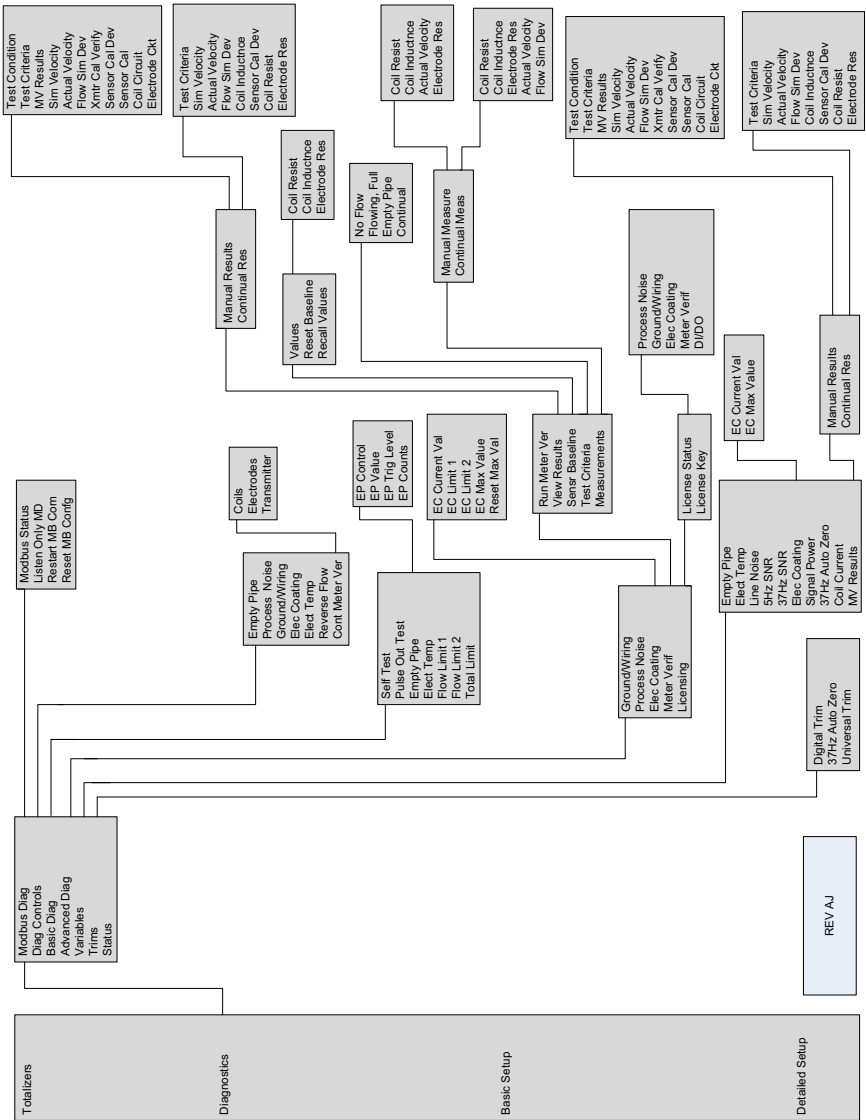
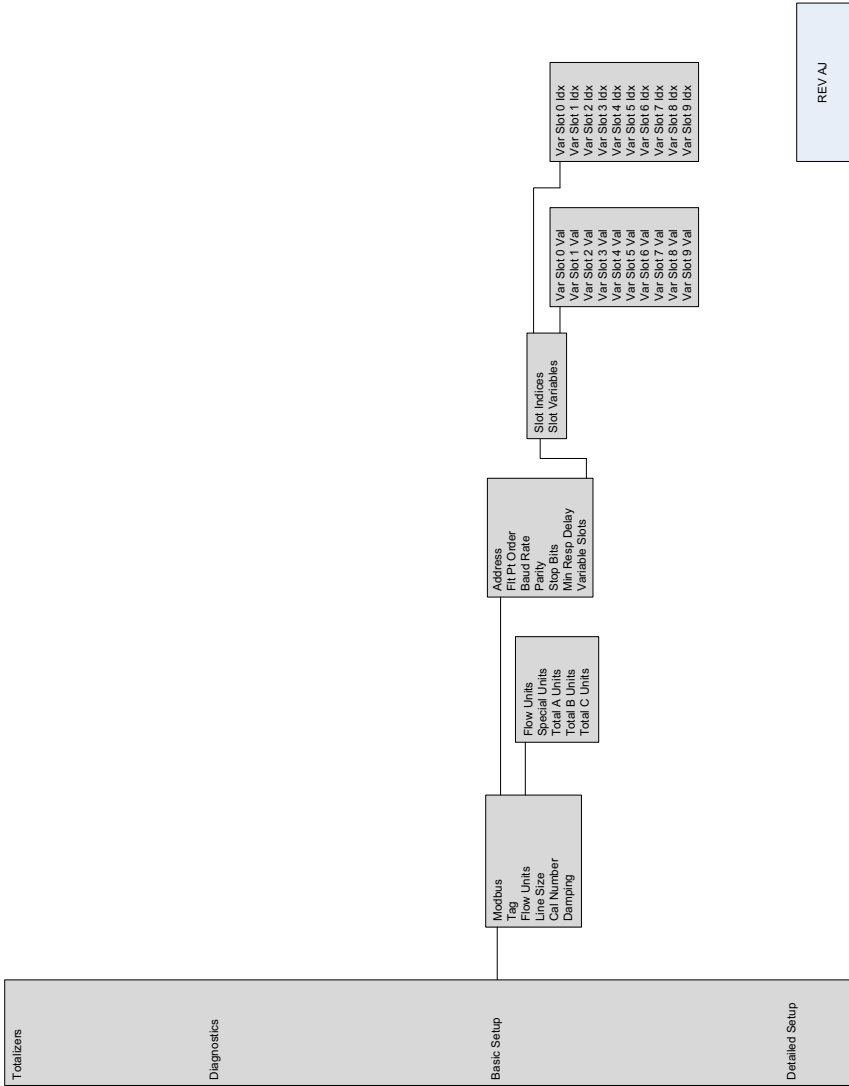
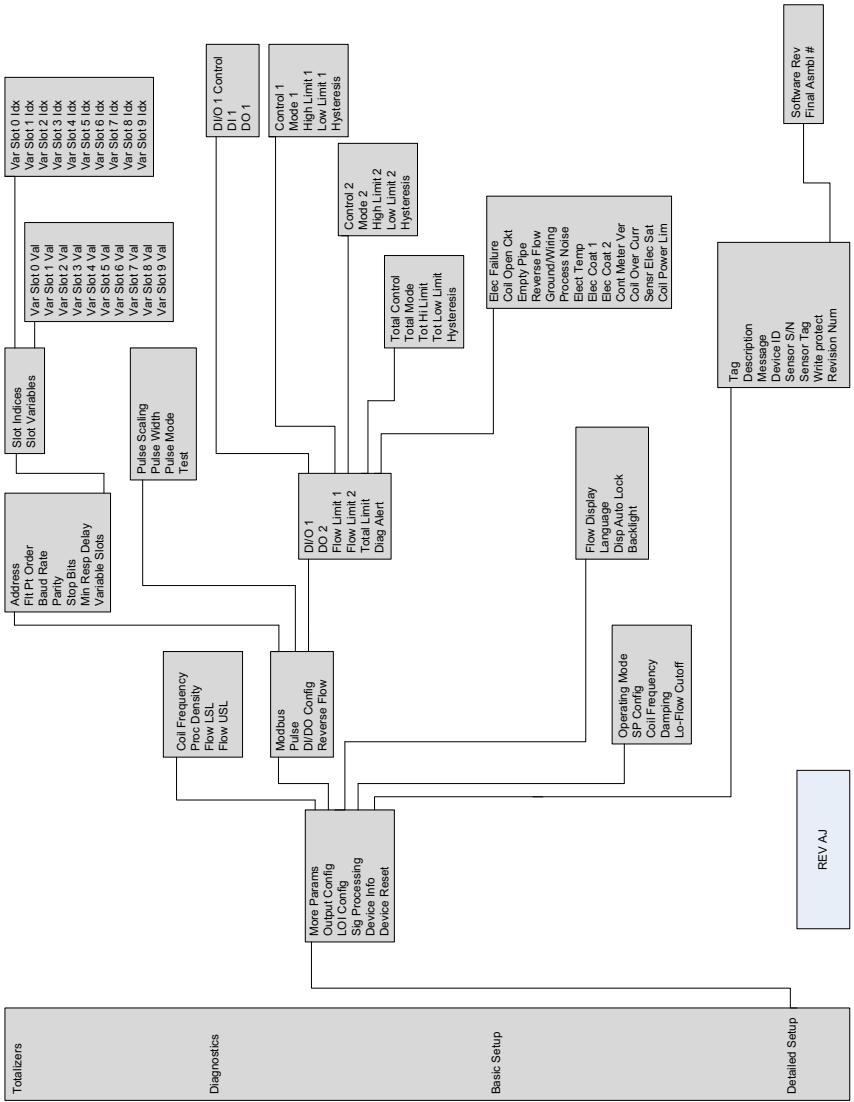


Figure 27. Basic Setup Menu Map



REV A/J

Figure 28. Detailed Setup Menu Map













# Product Certifications

Approvals Document  
July 24, 2015  
08732-AP01, Rev AF

## Rosemount 8700M Magnetic Flowmeter Platform

Order Code	8732EM Transmitter Rating	8705M and 8711M/L Flowtube Rating	Region	Agency	Certification Number
-	Ordinary Locations *	Ordinary Location *	USA EU	FM	3048793
N5	FM Non-Incendive Class I Div 2; DIP	FM Non-Incendive with Intrinsically Safe Electrodes Class I Div 2; DIP	USA	FM	3048793
K5	FM Explosion-Proof Class I Div 1; DIP	FM Explosion-Proof with Intrinsically Safe Electrodes Class I Div 1; DIP	USA	FM	3048793
N6	CSA Non-Incendive Class I Div 2; DIP	CSA Non-Incendive with Intrinsically Safe Electrodes Class I Div 2; DIP	USA & Canada	CSA	70030489
KU	CSA Explosion-Proof Class I Div 1; DIP	CSA Explosion-Proof with Intrinsically Safe Electrodes Class I Div 1; DIP	USA	CSA	70030489
K6	CSA Flameproof, Increased Safety, and Dust. Zone 0 & 1	CSA Increased Safety with Intrinsically Safe Electrodes and Dust. Zone 0 & 1	Canada	CSA	***
ND	ATEX Dust	ATEX Dust	EU	DEKRA	14ATEX0071 X
N1	ATEX Non-Sparking ATEX Dust	ATEX Non-Sparking with Intrinsically Safe Electrodes ATEX Dust	EU	DEKRA	14ATEX0071 X
K1	ATEX Flameproof with Increased Safety ATEX Dust	ATEX Increased Safety with Intrinsically Safe Electrodes ATEX Dust	EU	DEKRA	14ATEX0071 X
NF	IECEx Dust	IECEx Dust	Global	DEKRA	IECEx DEK14.0031X
N7	IECEx Non-Sparking IECEx Dust	IECEx Non-Sparking with Intrinsically Safe Electrodes IECEx Dust	Global	DEKRA	IECEx DEK14.0031X
K7	IECEx Flameproof with Increased Safety IECEx Dust	IECEx Increased Safety with Intrinsically Safe Electrodes IECEx Dust	Global	DEKRA	IECEx DEK14.0031X
N8	EAC Non-Sparking EAC Dust	EAC Non-Sparking with Intrinsically Safe Electrodes EAC Dust	Russia **	***	***
K8	EAC Flameproof with Increased Safety EAC Dust	EAC Increased Safety with Intrinsically Safe Electrodes EAC Dust	Russia **	***	***
N2	INMETRO Non-Sparking INMETRO Dust	INMETRO Non-Sparking with Intrinsically Safe Electrodes INMETRO Dust	Brazil	DEKRA - INMETRO	DEKRA 15.0007 X
K2	INMETRO Flameproof with Increased Safety INMETRO Dust	INMETRO Increased Safety with Intrinsically Safe Electrodes INMETRO Dust	Brazil	DEKRA - INMETRO	DEKRA 15.0007 X
N9	KOSHA Non-Sparking KOSHA Dust	KOSHA Non-Sparking with Intrinsically Safe Electrodes KOSHA Dust	Korea	***	***
K9	KOSHA Flameproof with Increased Safety KOSHA Dust	KOSHA Increased Safety with Intrinsically Safe Electrodes KOSHA Dust	Korea	***	***
N3	NEPSI Non-Sparking NEPSI Dust	NEPSI Non-Sparking with Intrinsically Safe Electrodes NEPSI Dust	China	NEPSI	GYJ15.1180X
K3	NEPSI Flameproof with Increased Safety NEPSI Dust	NEPSI Increased Safety with Intrinsically Safe Electrodes NEPSI Dust	China	NEPSI	GYJ15.1180X
KN	CCOE Flameproof with Increased Safety	CCOE Increased Safety with Intrinsically Safe Electrodes	India	PESO	P354747/1
*	Complies with only the local country product safety, electromagnetic, pressure and other applicable regulations. Cannot be used in a classified or zoned hazardous location environment. No ordering code required.				
**	Customs Union (Russia, Belarus and Kazakhstan)				
***	Planned submittal or in process with Agency.				

## Approval Markings and Logos

Symbol	Marking or Symbol Name	Region	Meaning of Marking or Symbol
	CE	European Union	Compliance with all applicable European Union Directives.
	ATEX	European Union	Compliance with Equipment and Protective systems intended for use in Potentially Explosive Atmospheres directive (ATEX) (94/9/EC)
	C-tick	Australia	Compliance with Australian applicable electromagnetic compatibility standards
	FM Approved	United States	Compliance with the applicable ANSI standards.
	CSA	US = United States C = Canada	Indicates that the product was tested and has met the applicable certification requirements for the noted countries.
	Eurasian Conformity (EAC)	Eurasian Customs Union (Russia, Belarus and Kazakhstan)	Compliance with all of the applicable technical regulations of the EAC Customs Union
	EAC Hazardous Location	Eurasian Customs Union (Russia, Belarus and Kazakhstan)	Compliance with Technical regulation, (TR CU 012/2011) – The safety of equipment for use in explosive environments.
	INMETRO	Brazil	Compliance with all of the applicable technical regulations of Brazil.
	NEPSI	China	Compliance with all of the applicable technical regulations of China.
	KCS	Korea	Compliance with all of the applicable technical regulations of Korea.

Ordinary Location labels will be marked with CE, C-tick, FM, CSA and EAC logos.

## European Directive Information

A copy of the EC Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EC Declaration of Conformity can be found at [www.rosemount.com](http://www.rosemount.com).

### Electro Magnetic Compatibility (EMC) (2004/108/EC)

Transmitter and Flowtube: EN 61326-1: 2013

Transmitters with output code "B" require shielded cable for the 4-20mA output, with shield terminated at the transmitter.

### Low Voltage Directive (LVD) (2006/95/EC)

EN 61010-1: 2010

**Ingress Protection Rating** for dust and water per EN 60079-0 and EN 60529 – **IP66/68** (The IP68 rating only applies to the flowtube and the remote junction box when the transmitter is remotely mounted. The IP68 rating does not apply to the transmitter. The IP68 rating is only valid at a depth of 10 meters for 48 hours)

### European Pressure Equipment Directive (PED) (97/23/EC)

PED Certification requires the "PD" option code.

CE marked models that are ordered without the "PD" option will be marked "Not Compliant to (97/23/EC)"

Mandatory CE-marking with notified body number 0575, for all flowtubes is located on the flowmeter label.

Category I assessed for conformity per module A procedures.

Categories II – III assessed for conformity per module H procedures.

QS Certificate of Assessment

EC No. 4741-2014-CE-HOU-DNV

Module H Conformity Assessment

### 8705 M Flanged Flowtubes

Line size 40mm to 900mm (1½-in to 36-in)

EN 1092-1 flanges and ASME B16.5 class 150 and ASME B16.5 Class 300 flanges.

Also available in ASME B16.5 Class 600 flanges in limited line sizes.

### 8711 Wafer Flowtubes

Line size 40mm to 200mm (1½-in to 8-in)

All other Rosemount Flowtubes – line sizes of 25mm (1-in) and less: Sound Engineering Practice (SEP).

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

## Certifications

### Factory Mutual (FM)

#### Ordinary Location Certification for FM Approvals

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

#### 8732EM Transmitter

**Note:** For Intrinsically Safe (IS) 4-20mA and Pulse Outputs on the 8732EM, output code "B" must be selected.

- N5** Non-Incendive for Class I, Division 2, Groups ABCD: T4  
Dust-Ignition Proof for Class II/III, Division 1, Groups EFG: T5  
-40°C ≤ Ta ≤ 60°C  
Enclosure Type 4X, IP66  
Install per drawing 08732-2062

Special Conditions for Safe Use (X):

1. Units marked with "Warning: Electrostatic Charging Hazard" may either use non-conductive paint thicker than 0.2 mm or non-metallic labeling. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.
2. The intrinsically safe 4-20mA and pulse output cannot withstand the 500V isolation test due to integral transient protection. This must be taken into consideration upon installation.
3. Conduit entries must be installed to maintain the enclosure ingress rating of IP66.
4. Unused conduit entries must use either used the Rosemount-supplied blanking plugs, or blanking plugs certified in accordance with the protection type.

- K5** Explosion-Proof for Class I Division 1, Groups CD: T6  
Non-Incendive for Class I, Division 2, Groups ABCD: T4  
Dust-Ignition Proof for Class II/III, Division 1, Groups EFG: T5  
-40°C ≤ Ta ≤ 60°C  
Enclosure Type 4X, IP66  
Install per drawing 08732-2062

Special Conditions for Safe Use (X):

1. Units marked with "Warning: Electrostatic Charging Hazard" may either use non-conductive paint thicker than 0.2 mm or non-metallic labeling. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.
2. The intrinsically safe 4-20mA and pulse output cannot withstand the 500V isolation test due to integral transient protection. This must be taken into consideration upon installation.
3. Conduit entries must be installed to maintain the enclosure ingress rating of IP66.
4. Unused conduit entries must use either used the Rosemount-supplied blanking plugs, or blanking plugs certified in accordance with the protection type.

**8705-M and 8711-M/L Flowtube**

**Note:** When used in hazardous (classified) locations:  
The 8705-M and 8711-M/L may only be used with a certified 8732EM transmitter.

- N5** Non-Incendive with Intrinsically Safe Electrodes  
for Class I, Division 2, Groups ABCD: T3...T5  
Dust-Ignition Proof for Class II/III, Division 1, Groups EFG: T2...T5  
-29°C ≤ Ta ≤ 60°C  
Enclosure Type 4X, IP66/68 (IP68 remote mount only)  
Install per drawing 08732-2062

## Special Conditions for Safe Use (X):

1. Units marked with "Warning: Electrostatic Charging Hazard" may either use non-conductive paint thicker than 0.2 mm or non-metallic labeling. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.
2. If used with flammable process fluid, the electrode circuit must be installed as intrinsically safe (Ex ia).
3. Conduit entries must be installed to maintain a minimum enclosure ingress rating of IP66.
4. Unused conduit entries must use either the Rosemount-supplied blanking plugs, or blanking plugs certified in accordance with the protection type.

- K5** Explosion-Proof with Intrinsically Safe Electrodes  
for Class I Division 1, Groups CD: T3...T6  
Non-Incendive with Intrinsically Safe Electrodes  
for Class I, Division 2, Groups ABCD: T3...T5  
Dust-Ignition Proof for Class II/III, Division 1, Groups EFG: T2...T5  
-29°C ≤ Ta ≤ 60°C  
Enclosure Type 4X, IP66/68 (IP68 remote mount only)  
Install per drawing 08732-2062

## Special Conditions for Safe Use (X):

1. Units marked with "Warning: Electrostatic Charging Hazard" may either use non-conductive paint thicker than 0.2 mm or non-metallic labeling. Precautions shall be taken to avoid ignition due to electrostatic charge on the enclosure.
2. If used with flammable process fluid, or if installed in a Class I Division I area, the electrode circuit must be installed as intrinsically safe (Ex ia).
3. Conduit entries must be installed to maintain a minimum enclosure ingress rating of IP66.
4. Unused conduit entries must use either used the Rosemount-supplied blanking plugs, or blanking plugs certified in accordance with the protection type.



Approvals Document  
 July 24, 2015  
 08732-AP01, Rev AF

**Canadian Standards Association (CSA)**

**CLASS 2258 02 - PROCESS CONTROL EQUIPMENT** - For Hazardous Locations – To Canadian Requirements.

- N6 Class I, Groups A, B, C and D (Intrinsically Safe Output and Electrode circuit)**  
**N6 Class I, Division 2, Groups A, B, C and D (Non-Incendive)**  
**N6 Class II, Division 1, Groups E, F and G (Dust Ignition Proof)**

**Magnetic Flow Meter** – Model 8732EM Transmitter with integral or remote mount to Model 8705M or Model 8711M/L Magnetic Flow Tubes. Enclosure Type 4X and IP 66 Rated.

For Remote Mount Configuration – Temperature Code T4 with an Ambient Operating Temperature Range:  $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ , with or without LCD meter, with or without digital I/O and/or pulse outputs when installed per Rosemount Drawing 08732-2061.

For Integral Mount Configuration – Ambient Operating Temperature Range:  $-29^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ . Temperature Code T3-T6 dependent on line size of Flow Tubes for Process Temperature. The T-Code is defined as per Rosemount Drawing 08705-00CS and 08732-00CS for 'N6' option or 'KU' option.

**CLASS 2258 82 - PROCESS CONTROL EQUIPMENT** - For Hazardous Locations –To US Requirements

- KU Class I, Division 1, Groups C and D (Explosion Proof)**  
**N6, KU Class I, Groups A, B, C and D (Intrinsically Safe Output and Electrode circuit)**  
**N6, KU Class I, Division 2, Groups A, B, C and D (Non-Incendive)**  
**N6, KU Class II, Division 1, Groups E, F and G (Dust Ignition Proof)**

**Magnetic Flow Meter** – Model 8732EM Transmitter with integral or remote mount to Model 8705M or Model 8711M/L Magnetic Flow Tubes. Enclosure Type 4X and IP 66 Rated.

For Remote Mount Configuration – Temperature Code T6 for Explosion Proof, T5 for Dust Ignition Proof, and T4 for Non-Incendive. Ambient Operating Temperature Range:  $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ , with or without LCD meter, with or without digital I/O and/or pulse outputs when installed per Rosemount Drawing 08732-2061.

For Integral Mount Configuration – Ambient Operating Temperature Range:  $-29^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ . Temperature Code T3-T6 dependent on line size of Flow Tubes for Process Temperature. The T-Code is defined as per Rosemount Drawing 08705-00CS and 08732-00CS for 'N6' option or 'KU' option.

**Special Conditions of Safe Use:**

1. For use with the appropriate 8705M and 8711M/L Flow tubes only.
2. When the 8732EM transmitter is integrally mounted to 8705M or 8711M/L Flow Tubes, the ambient temperature ranges marked on each product need to be taken into consideration before installation. The Ambient temperature range for 8732EM transmitter is  $-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$  and the ambient temperature range for 8705M or 8711M/L Flow Tubes is  $-29^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ . Therefore, the  $-29^{\circ}\text{C}$  rating of the flow tubes will limit the overall cold temperature range of the complete system unless other approved temperature control methods are employed.



## EC Declaration of Conformity

No: RFD 1094 Rev. E

We,

**Emerson Process Management**  
**Rosemount Flow**  
**12001 Technology Drive**  
**Eden Prairie, MN 55344**  
**USA**

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

### **Rosemount 8700M Magnetic Flowmeter Platform**

to which this declaration relates, is in conformity with the provisions of the European Community Directives, 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 Community notified body certification, as shown in the attached schedule.

(signature)

22 July 2015

(date of issue)

Mark Fleigle

(name - printed)

Vice President Technology and New Products

(function name - printed)



**Schedule**  
**EC Declaration of Conformity RFD 1094 Rev. E**

**EMC Directive (2004/108/EC)**

**All Models**  
EN 61326-1: 2013

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**LVD Directive (2006/95/EC)**

**All Models**  
EN 61010-1: 2010

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**PED Directive (97/23/EC)**

**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 3 of the PED Directive (97/23/EC)**

**Model 8705-M Magnetic Flowtube with Option "PD", in Line Sizes 1.5"- 36"**

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

**Model 8705-M with Option "PD", in Line Sizes .5" – 1.0"**

Sound Engineering Practice  
ASME B31.3: 2010

**Model 8711-M/L Magnetic Flowmeter with Option "PD", in Line Sizes 1.5"- 8"**

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

**Model 8721 Magnetic Flowmeter, all sizes:**

Sound Engineering Practice  
ASME B31.3: 2010


**ROSEMOUNT**


### Schedule

#### EC Declaration of Conformity RFD 1094 Rev. E

ATEX Directive (94/9/EC)

Magnetic Flow Transmitter and Flow Tubes,  
Model 8732EM and Models 8705-M and 8711-M/L

DEKRA 14ATEX0071 X – CERTIFICATE

Equipment Marking Summary:



II 2 (1) G	Ex d e [Ia Ga] IIC T6...T3 Gb
II 2 (1) G	Ex d [Ia Ga] IIC T6...T3 Gb
II 3 (1) G	Ex nA [Ia Ga] IIC T4...T3 Gc
II (1) G	[Ex ia Ga] IIC
II 1/2 G	Ex e ia IIC T5...T3 Ga/Gb
II 2 G	Ex e Ib IIC T5...T3 Gb
II 1/3 G	Ex nA ia IIC T5...T3 Ga/Gc
II 3 G	Ex nA Ic IIC T5...T3 Gc
II 2 D	Ex tb IIC T 80 °C...T 200 °C Db

EN 60079-0 : 2012 +A11: 2013 EN 60079-1 : 2007

EN 60079-7 : 2007 EN 60079-11 : 2012

EN 60079-15 : 2010 EN 60079-26 : 2007

EN 60079-31 : 2014

#### PED Notified Body

DNV GL [Notified Body Number: 0575]

Veritasveien 1, N-1322

Hovik, Norway

#### ATEX Notified Body

DEKRA Certification B.V. [Notified Body Number: 0344]

Meander 1051, 6825 MJ Arnhem

P.O. Box 5185, 6802 ED Arnhem

The Netherlands

#### ATEX Quality Assurance Notified Body

DNV GL [Notified Body Number: 0575]

Veritasveien 1, N-1322

Hovik, Norway

**Rosemount 8700M Magnetic Flowmeter Platform  
IEC EX & ATEX Approval Document**

January 29, 2015,  
08732-AP02, Rev AB

1. Equipment Markings – See section VI in the tables on the following pages
  - a. EC-Type Examination Certificate (ATEX): DEKRA 14ATEX0071\_X
  - b. Certificate of Conformity (IEC Ex): IEC Ex DEK 14.0031X
2. Required Documentation:
  - a. 08732-2060 Installation Drawing Model 8732EM, 8705M, 8711-M/L ATEX/IEC Ex Hazardous (Ex) Locations
  - b. 08732-1504 Installation Drawing, 8732EM Transmitter Wiring
3. Referenced Documentation:
  - a. 00825-0100-4444.pdf(Hart) & 00825-0400-4444(Modbus), Quick Installation Guide
  - b. 00809-0100-4444.pdf, Reference Manual
  - c. 08732-AP01, Approvals Document
4. The Required and Referenced Documents listed above address the following items:
  - a. Instructions for safety i.e.
    - i. Putting into service
    - ii. Use
    - iii. Assembling and dismantling
    - iv. Maintenance, overhaul and repair
    - v. Installation
    - vi. Adjustment
  - b. Where necessary, training instructions
  - c. Details which allow a decision to be made as to whether the equipment can be used safely in the intended area under the expected operating conditions
  - d. Electrical parameters, maximum surface temperatures and other limit values
    - i. Electrical –
      1. See document 08732-2060
      - 2.

<b>Rosemount 8732EM Flow Transmitter</b>	
<i>Power input</i>	90 - 250VAC, 0.45A, 40VA  12 - 42VDC, 1.2A, 15W
<i>Pulsed circuit</i>	<i>Internally powered (Active): Outputs up to 12VDC, 12.1mA, 73mW Externally powered (Passive): Input up to 28VDC, 100mA, 1W</i>
<i>4-20mA output circuit</i>	<i>Internally Powered (Active): Outputs up to 25mA, 24VDC, 600mW Externally Powered (Passive): Input up to 25mA, 30VDC, 750mW</i>
<i>MODBUS</i>	<i>Internally Powered (Active): Outputs up to 100mA, 3.3VDC, 100mW</i>
<i>Um</i>	250V
<i>Coil excitation output</i>	500mA, 40V max, 9W max
<b>Rosemount 8705-M and 8711-M/L Flowtube<sup>(1)</sup></b>	
<i>Coil excitation input</i>	500mA, 40V max, 20W max
<i>Electrode circuit</i>	5V, 200uA, 1mW

(1) Provided by the transmitter

- e. Special Conditions for Safe Use (X):

## Rosemount 8700M Magnetic Flowmeter Platform IEC EX & ATEX Approval Document

January 29, 2015,  
08732-AP02, Rev AB

- i. For processes requiring EPL Ga and Gb, rated equipment: electrode, grounding ring, and lining protector materials Titanium and Zirconium are not allowed.
  - ii. When "Special Paint Systems" are applied, instructions for safe use regarding potential electrostatic charging hazard have to be followed.
  - iii. Terminals 1,2,3,4, for data communication, cannot withstand the 500 V isolation test between signal and ground, due to integral transient protection. This must be taken into account upon installation.
  - iv. Conduit entries must be installed to maintain the enclosure ingress rating of IP66.
  - v. In order to maintain the ingress protection level on the M3 and M4 electrode housing, the copper crush washer that seals the electrode access plug shall be replaced when the plug is reinstalled. The copper crush washer is one time use only.
  - vi. The flow tube and transmitter are not allowed to be thermally insulated.
  - vii. The property class of the special fasteners which attach the Magnetic Flow Tube or Transmitter Remote Junction Box to the Magnetic Transmitter is A2-70 or A4-70 SST.
  - viii. For information on the dimensions of the flameproof joints the manufacturer shall be contacted.
  - ix. The Magnetic Flow Meter Tube contains nonconductive liners over the grounded tube. For process requiring EPL Ga, precautions shall be taken to avoid the liner being charged by the flow of nonconductive media.
- f. Where necessary, the essential characteristics of tools which may be fitted to the equipment
- g. List of the standards, including the issue date, with which the equipment is declared to comply:
- i. ATEX - EN 60079-0: 2012 +A11, EN 60079-1: 2007, EN 60079-7: 2007, EN 60079-11: 2012, EN 60079-15: 2010, EN 60079-26: 2007, EN 60079-31: 2014
  - ii. IEC EX - IEC 60079-0: 2011, IEC 60079-1: 2007, IEC 60079-7: 2006 IEC 60079-11: 2011, IEC 60079-15: 2010, IEC 60079-26: 2006, IEC 60079-31: 2013
- h. Supply wire requirements;  
Use 10 - 18 AWG wire rated for the proper temperature of the application. For wire 10 - 14 AWG use lugs or other appropriate connectors. For connections in ambient temperatures above 122°F (50 °C), use a wire rated for 194 °F (90 °C).
- i. Contact address;
- i. Rosemount Inc.  
12001 Technology Drive  
Eden Prairie  
MN 55344  
United States of America

**Rosemount 8700M Magnetic Flowmeter Platform  
IEC EX & ATEX Approval Document**

January 29, 2015,  
08732-AP02, Rev AB

**Nomenclature Magnetic Flow Transmitter Model 8732EM and electrical data**

8732EM R 1 B 2 K1 ... M4 RT50 ... SH ... V2 ... F090...  
I II III IV V VI VII VIII IX X

Designation	Explanation	Value	Explanation
I	Model	8732EM	Magnetic Flow Transmitter – Field Mount
II	Transmitter Mount	R T	Remote Mount Integral Mount
III	Transmitter Power Supply	1 2	AC (90 - 250 Vac, 50 / 60 Hz), not for Ex nA DC (12 - 42 Vdc)
IV	Outputs	A B M	4 - 20 mA with digital HART Protocol & Scalable Pulse Output 4 - 20 mA Intrinsically Safe Output with digital HART Protocol & Intrinsically Safe Scalable Pulse Output Modbus RS-485
V	Conduit entries	1 or 4 2 or 5	1/2-14 NPT female CM20, M20 female
VI	Safety Approval Option	K1 ATEX	Ⓜ II 2 (1) G Ex d e [ia Ga] IIC T6...T3 Gb Ⓜ II 2 D Ex tb IIIC T80 °C...T200 °C Db
			Ⓜ II 2 (1) G Ex d [ia Ga] IIC T6...T3 Gb * Ⓜ II 2 D Ex tb IIIC T80 °C...T200 °C Db
		K7 IECEx	Ex d e [ia Ga] IIC T6...T3 Gb Ex tb IIIC T80 °C...T200 °C Db
			Ex d [ia Ga] IIC T6...T3 Gb * Ex tb IIIC T80 °C...T200 °C Db
		N1 ATEX	Ⓜ II 3 (1) G Ex nA [ia Ga] IIC T4...T3 Gc *** Ⓜ II 2 D Ex tb IIIC T80 °C...T200 °C Db
			Ex nA [ia Ga] IIC T4...T3 Gc *** Ex tb IIIC T80 °C...T200 °C Db
		ND ATEX	Ⓜ II 2 D Ex tb IIIC T80 °C...T200 °C Db Ⓜ II (1) G [Ex ia Ga] IIC **
			Ex tb IIIC T80 °C...T200 °C Db
NF IECEx	Ex tb IIIC T80 °C...T200 °C Db [Ex ia Ga] IIC **		
NOTE: * Integral Mount (see II) option only ** Intrinsically Safe Output (see IV) option only *** DC Transmitter Power Supply only (12 - 42 Vdc)			
VII	Display Option	M4 M5	LOI Display
VIII	Remote Cable Option	RTxx ****	Standard Temperature Component
		RHxx ****	Extended Temperature Component
NOTE: **** Length = xx * 10 ft, max. 500 ft			
IX	Options	-- SH Vx	Aluminum, standard paint Stainless Steel Electronics Housing Special Paint Systems *****
X	Specials	F090x	Special Paint Systems *****
NOTE: ***** Subject to special conditions for safe use.			

**Rosemount 8700M Magnetic Flowmeter Platform  
IEC EX & ATEX Approval Document**

January 29, 2015,  
08732-AP02, Rev AB

**Nomenclature Magnetic Flow Tube Model 8705-M and electrical data**

8705 ... S A 005 ... M4 K1 ... G1 L1 B3 ... J1 SJ ... V1 ... SH ... F090x  
I II III IV V VI VII VIII IX X XI XII XIII XIV

Designation	Explanation	Value	Explanation
I	Model	8705	Magnetic Flowtube
II	Electrode Material	Custom	See special conditions for safe use
III	Electrode Types	Custom	Seal of electrodes comply with IEC 61010-1
IV	Line Size	005 to 360	½" NPS (15 mm) to 36" NPS (900 mm)
V	Electrode Housing *	M0 M1 M2 M3 M4	Category 2 G or 3 G, EPL Gb or Gc Category 2 G or 3 G, EPL Gb or Gc Category 1/2 G or 1/3 G, EPL Ga/Gb or Ga/Gc Category 1/2 G or 1/3 G, EPL Ga/Gb or Ga/Gc Category 1/2 G or 1/3 G, EPL Ga/Gb or Ga/Gc
VI	Safety Approvals	K1 ATEX	Ⓜ II 1/2 G Ex e ia IIC T5...T3 Ga/Gb * Ⓜ II 2 D Ex tb IIIC T 80 °C...T 200 °C Db Ⓜ II 2 G Ex e ib IIC T5...T3 Gb ** Ⓜ II 2 D Ex tb IIIC T 80 °C...T 200 °C Db
		K7 IECEX	Ex e ia IIC T5...T3 Ga/Gb * Ex tb IIIC T 80 °C...T 200 °C Db Ex e ib IIC T5...T3 Gb ** Ex tb IIIC T 80 °C...T 200 °C Db
		N1 ATEX	Ⓜ II 1/3 G Ex nA ia IIC T5...T3 Ga/Gc * line sizes 8"-36" Ⓜ II 2 D Ex tb IIIC T 80 °C...T 200 °C Db Ⓜ II 3 G Ex nA ic IIC T5...T3 Gc * line sizes 0.5" - 6" / ** Ⓜ II 2 D Ex tb IIIC T 80 °C...T 200 °C Db
		N7 IECEX	Ex nA ia IIC T5...T3 Ga/Gc * line sizes 8"-36" Ex tb IIIC T 80 °C...T 200 °C Db Ex nA ic IIC T5...T3 Gc * line sizes 0.5" - 6" / ** Ex tb IIIC T 80 °C...T 200 °C Db
		ND ATEX	Ⓜ II 2 D Ex tb IIIC T 80 °C...T 200 °C Db
		NF IECEX	Ex tb IIIC T 80 °C...T 200 °C Db
			NOTE: * Electrode Housing M2, M3 and M4 only ** Electrode Housing M0 and M1 only
VII	Grounding rings material	Custom	See special conditions for safe use
VIII	Lining protector material	Custom	See special conditions for safe use
IX	Mounting Configuration	B3	Integral Mount with Model 8732EM
X	Optional conduit entries	J1	CM20, M20 female
XI	Remote Junction Box (RJB) material	-- SJ	Aluminum, Standard Paint 316 Stainless Steel
XII	Special paint options	Vx	Special Paint Systems ***
XIII	Wrapper (housing) material	-- SH	Carbon Steel (w. Aluminum RJB), Standard Paint 316 Stainless Steel (w. Stainless Steel RJB)
XIV	Specials	F090x	Special Paint Systems *** NOTE: *** Subject to special conditions for safe use.



**Rosemount 8700M Magnetic Flowmeter Platform  
IEC EX & ATEX Approval Document**

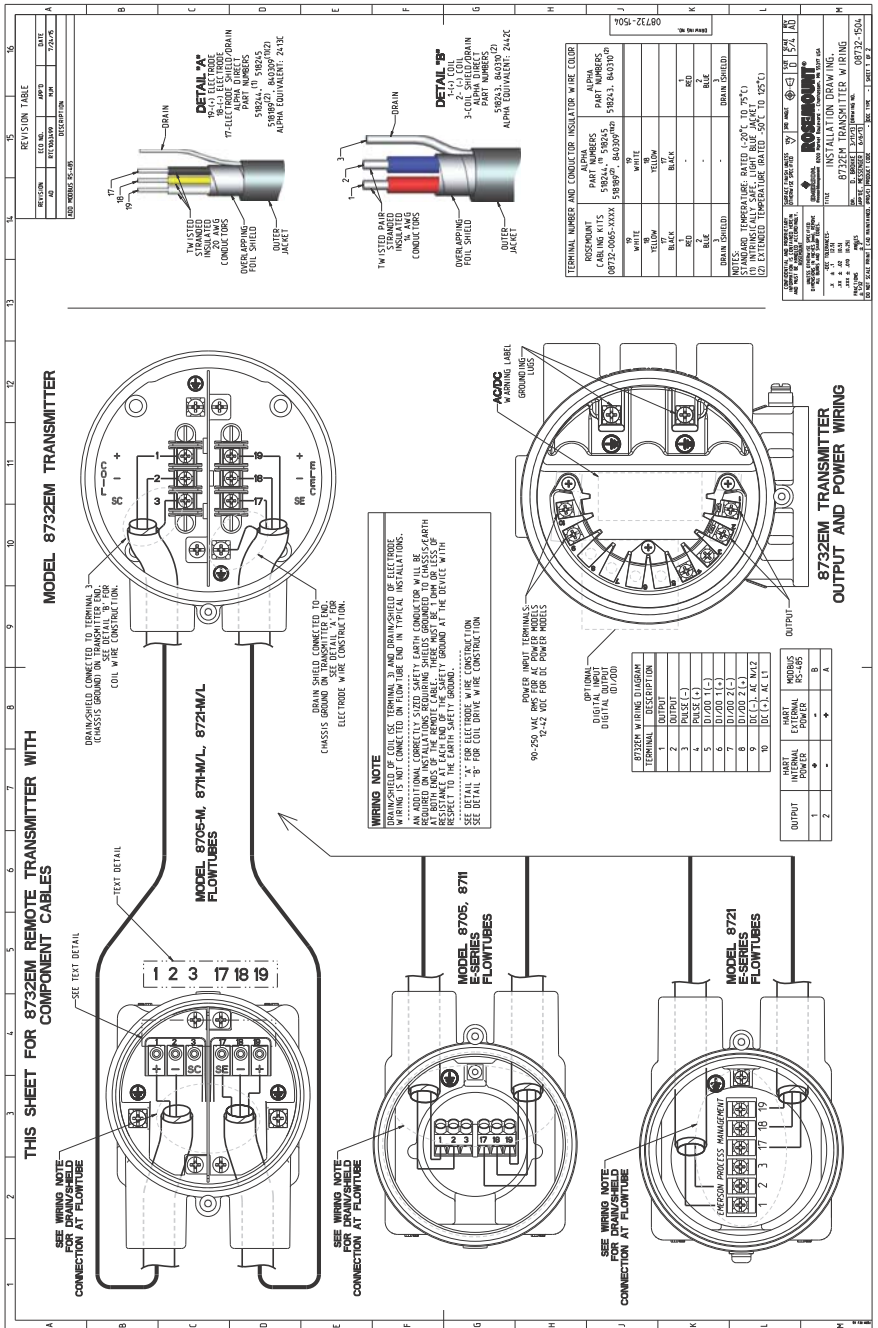
January 29, 2015,  
08732-AP02, Rev AB

**Nomenclature Magnetic Flow Tube Model 8711-M/L and electrical data**

8711 ... S A 15F L ... K1 ... G1 ... J1 SJ ... V1 ... F090x  
I II III IV V VI VII VIII IX X XI

Designation	Explanation	Value	Explanation
I	Model	8711	Magnetic Flow Tube
II	Electrode Material	Custom	See special conditions for safe use
III	Electrode Types	Custom	Seal of electrodes comply with IEC 61010-1.
IV	Line Size	015 to 080	1½" NPS (40 mm) to 8" NPS (900 mm)
V	Mounting Configuration	L M	Remote Mount from Transmitter Integral Mount with Transmitter
VI	Safety Approvals	K1 ATEX	Ex e ib IIC T5...T3 Gb Ex tb IIIC T 80 °C...T 200 °C Db
		K7 IECEx	Ex e ib IIC T5...T3 Gb Ex tb IIIC T 80 °C...T 200 °C Db
		N1 ATEX	Ex nA ic IIC T5...T3 Gc Ex tb IIIC T 80 °C...T 200 °C Db
		N7 IECEx	Ex nA ic IIC T5...T3 Gc Ex tb IIIC T 80 °C...T 200 °C Db
		ND ATEX NF IECEx	Ex tb IIIC T 80 °C...T 200 °C Db Ex tb IIIC T 80 °C...T 200 °C Db
VII	Grounding rings material	Custom	See special conditions for safe use
VIII	Optional conduit entries	J1	CM20, M20 female
IX	Remote Junction Box material	--	Aluminum, Standard Paint *
		SJ	316 Stainless Steel * NOTE:* Flowtube with Carbon Steel Wrapper (housing)
X	Special paint options	Vx	Special Paint Systems **
XI	Specials	F090x	Special Paint Systems ** NOTE: ** Subject to special conditions for safe use.

Figure 29. Rosemount 8732EM Installation and Wiring Drawings







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