

# Model 570TM Magmeter Flowtube





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# Model 570TM Magnetic Flowtube

## NOTICE

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this product.

Within the United States, Rosemount Inc. has two toll-free assistance numbers:

**Customer Central**

Technical support, quoting, and order-related questions.

1-800-999-9307 (7:00 am to 7:00 pm CST)

**North American Response Center**

Equipment service needs.

1-800-654-7768 (24 hours—includes Canada)

Outside of the United States, contact your local Rosemount representative.

## ⚠ CAUTION

The products described in this document are NOT designed for nuclear-qualified applications. Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact your local Rosemount Sales Representative.



# Section 1 Introduction

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## SYSTEM DESCRIPTION

The Rosemount® Series 8700 Magnetic Flowmeter System combines separate flowtube and transmitter units, and measures volumetric flow rate by detecting the velocity of a conductive liquid that passes through a magnetic field. Magnetic Flowmeter Systems consist of a flowtube and a transmitter.

- Flanged Model 570TM

There are three Rosemount magnetic flowmeter transmitters:

- Model 8712C/U
- Model 8732C
- Model 8742C

The flowtube is installed in-line with process piping — either vertically or horizontally. Coils located on opposite sides of the flowtube create a magnetic field. A conductive liquid moving through the magnetic field generates a voltage at the two electrodes that is proportional to the flow velocity.

The transmitter drives the coils to generate a magnetic field and electronically conditions the voltage detected by the electrodes. The transmitter then amplifies and conditions the electrode signal to provide a flow signal. The transmitter can be integrally mounted or remotely mounted from the flowtube.

This manual is designed to assist in the installation and operation of a Rosemount Magnetic Flowmeter Transmitter and Model 570TM Magnetic Flowmeter Flowtubes.

**⚠ WARNING**

Attempting to install and operate the Model 570TM Magnetic Flowmeter Flowtubes with the Model 8712C/U/H, Model 8732, or Model 8742 Magnetic Flowmeter Transmitter without reviewing the instructions contained in this manual could result in personal injury or equipment damage.

## **Section 1: Introduction**

- system description
- safety message
- return of materials

## **Section 2: Installation**

- transmitter commissioning
- flowtube installation
- flowtube/transmitter configuration

## **Section 3: Configuration**

- flowtube calibration number
- quick start-up

## **Section 4: Operation and Maintenance**

- hardware maintenance

## **Section 5: Troubleshooting**

- troubleshooting procedures
- electrical circuit diagrams

## **Appendix A: Reference Data**

- specifications
- ordering tables
- dimensional drawings



**SAFETY MESSAGES**

Procedures and instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations. Refer to the safety messages listed at the beginning of each section before performing any operations.

**RETURN OF MATERIALS**

To expedite the return process outside the United States, contact the nearest Rosemount representative.

Within the United States and Canada, call the North American Response Center using the 800-654-RSMT (7768) toll-free number. The Response Center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the name of the process material to which the product was last exposed.



Mishandling products exposed to a hazardous substance may result in death or serious injury. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDS) for each hazardous substance identified must be included with the returned goods.

The North American Response Center will detail the additional information and procedures necessary to return goods exposed to hazardous substances.



See Safety Information on page 2-1 for complete warning information.



# Section 2 Installation

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Transmitter Symbols .....	page 2-2
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Step 2: Mounting .....	page 2-3
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Step 6: Installation Check and Guide .....	page 2-14

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This section covers the steps required to physically install the flowtube. Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please refer to the following safety messages before performing any operation in this section.

## SAFETY INFORMATION

**⚠ 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.


**⚠ CAUTION**


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.

## TRANSMITTER SYMBOLS

 Caution Symbol — Check product documentation for details.

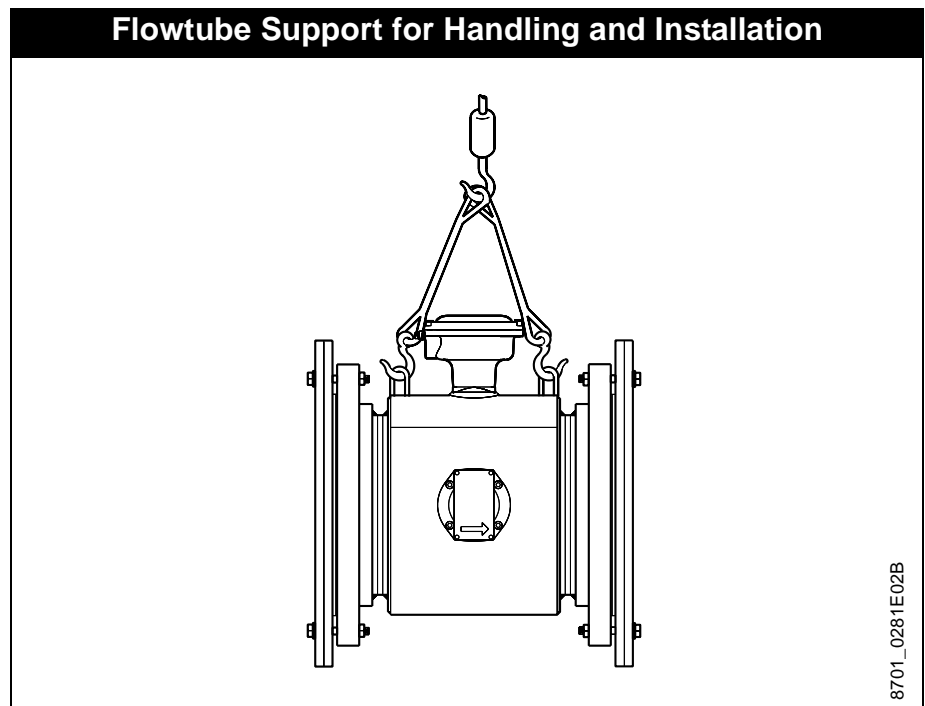
 Protective conductor (grounding) terminal.


## STEP 1: HANDLING

 Handle all parts carefully to prevent damage. Whenever possible, transport the system to the installation site in the original shipping containers.

Flowtubes come with a lifting lug on each flange. The lifting lugs make the flowtube easier to handle when it is transported and lowered into place at the installation site.

The drawings below show flowtubes that are correctly supported for handling and installation. Notice the plywood end pieces are still in place to protect the flowtube liner during transportation.



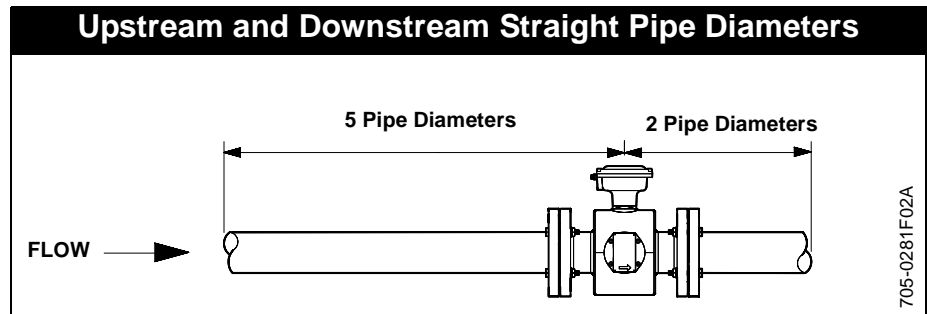
 See Safety Information on page 2-1 for complete warning information.

**STEP 2: MOUNTING**

Physical mounting of a flowtube is similar to installing a typical section of pipe. Conventional tools, equipment, and accessories (bolts, gaskets, and grounding hardware) are required.

**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.



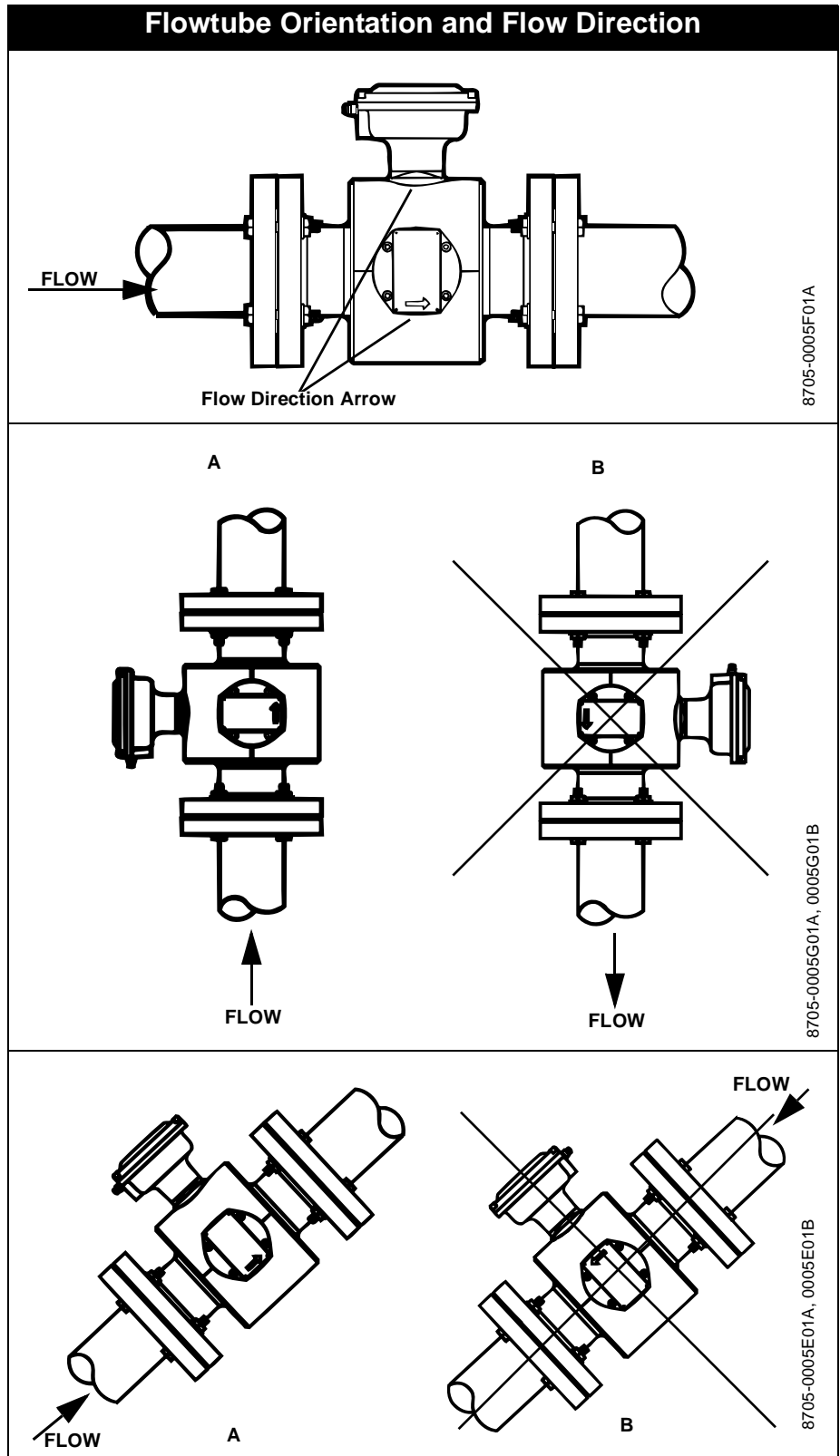
**Flowtube Orientation**

The flowtube should be installed in a position that ensures the flowtube remains full during operation. Horizontal or inclined positions are preferred. The following drawings show the proper flowtube orientation for the most common installations.

The following orientations ensure that the electrodes are in the optimum plane to minimize the effects of entrapped gas. As illustrated, avoid *downward* flows where back pressure does not ensure that the flowtube remains full at all times.

**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. In this mounting configuration, the conduit ports point upstream.

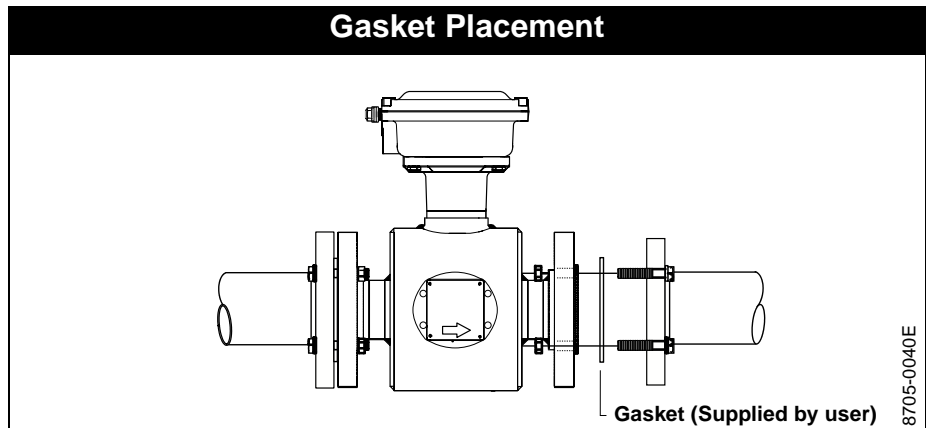
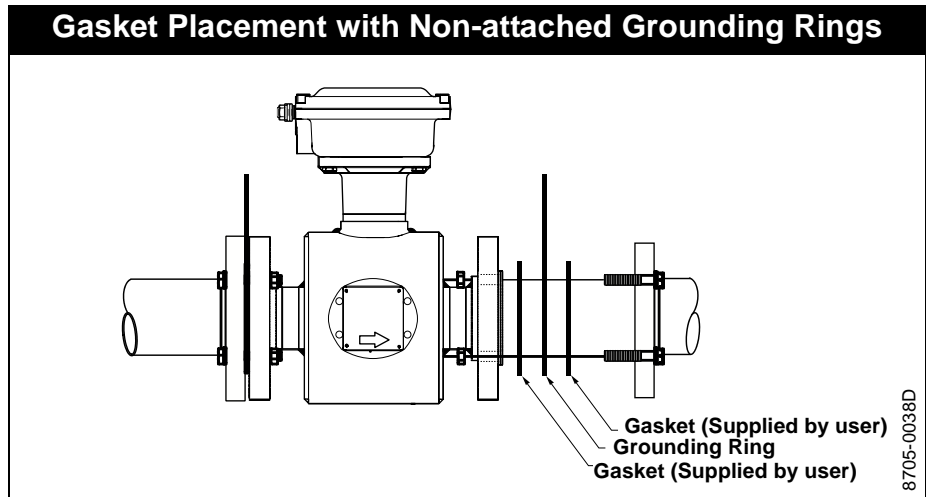


**STEP 3: INSTALLATION**

The following should be used as a guide during installation of the Model 570TM 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. If the gaskets will be removed frequently, protect the liner ends. All other applications (including flowtubes with lining protectors or a grounding electrode) require only one gasket on each end connection. Gaskets are also required on each side of a grounding ring.



⚠ See Safety Information on page 2-1 for complete warning information.

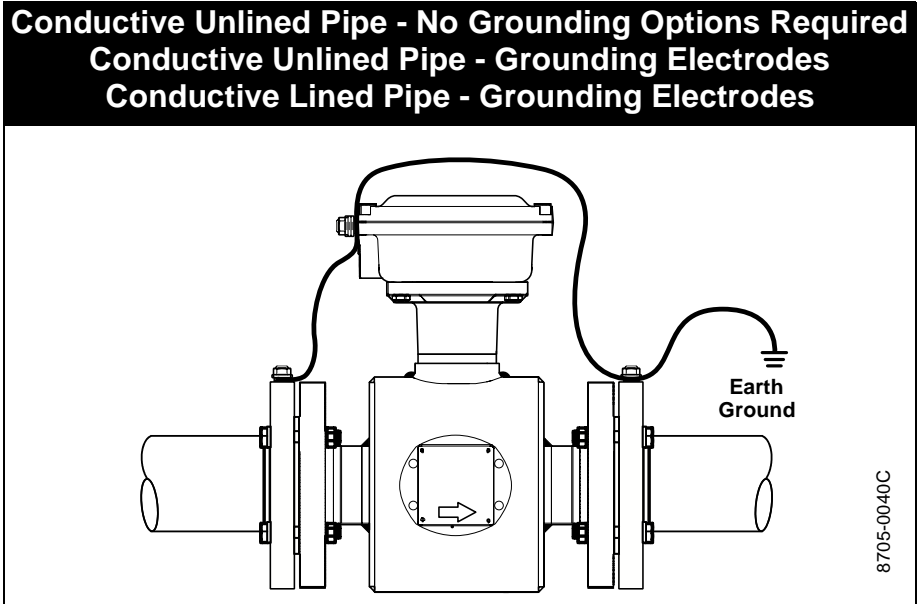


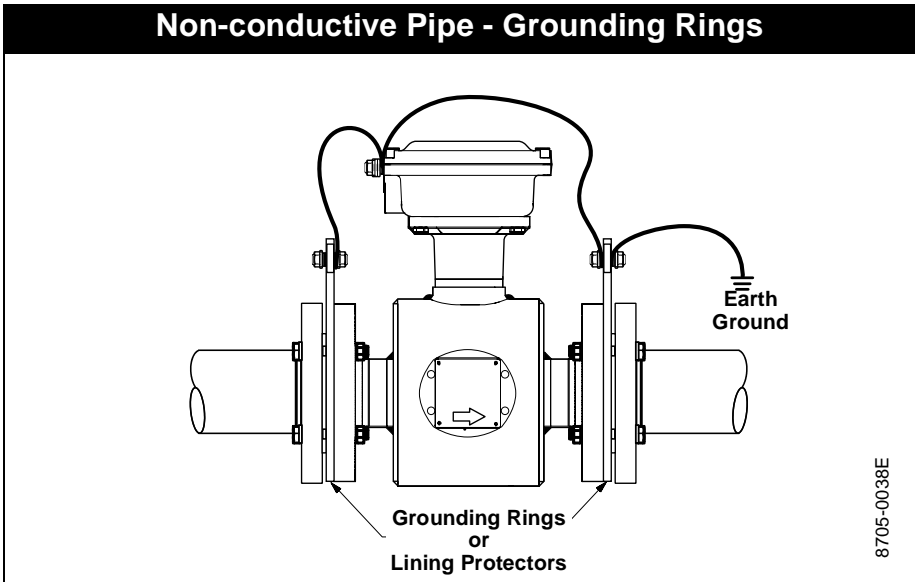
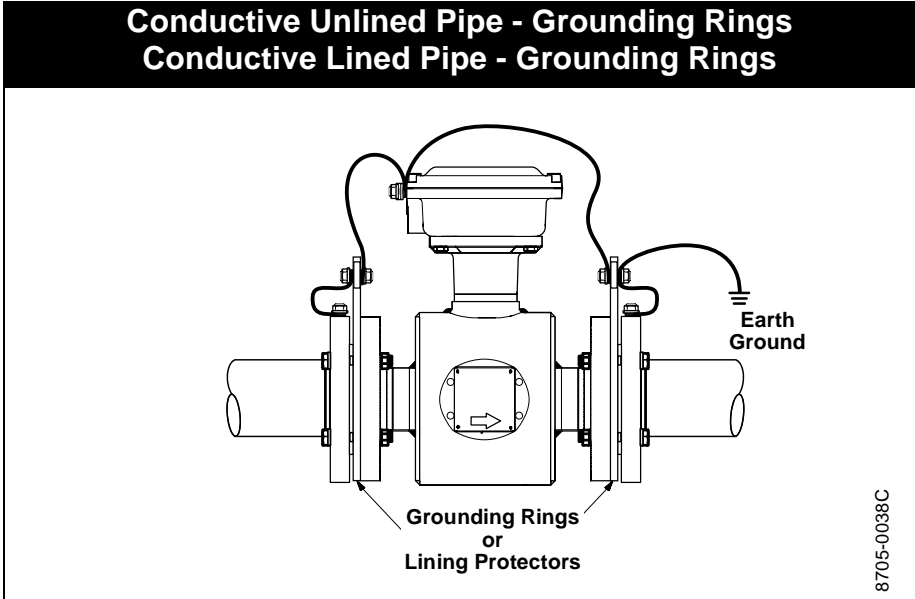


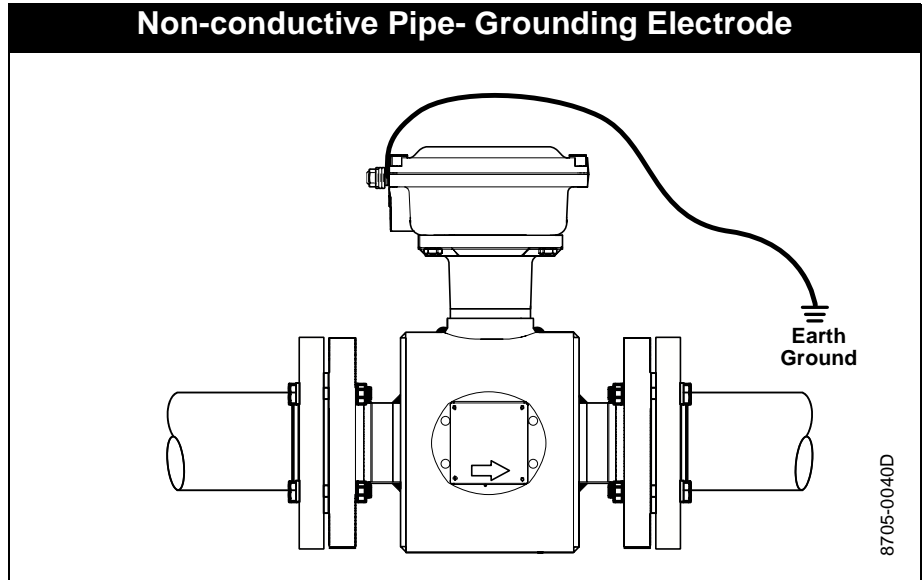
The Internal Ground Connection (Protective Ground Connection) located inside the junction box is the Internal Ground Connection screw. This screw is identified by the ground symbol: 

Table 2-2. Grounding Installation

Type of Pipe	Grounding Options		
	No Grounding Options	Grounding Rings	Grounding Electrodes
Conductive Unlined Pipe	See Figure	Not Required	Not Required
Conductive Lined Pipe	Insufficient Grounding	See Figure	See Figure
Non-Conductive Pipe	Insufficient Grounding	See Figure	See Figure







### STEP 5: WIRING

Correct cable preparation is important for a successful installation. The conduit connections needed for installation depend on transmitter location. A conduit run between the flowtube and transmitter is not required if the transmitter is integrally mounted on the flowtube.

### Conduit Ports and Connections

The flowtube junction box has ports for 1/2-inch NPT conduit connections. These connections should be made in accordance with local or plant electrical codes. Plastic ports shipped with product should be removed and sealed with metal plugs. Housing damage will result if metal plugs are overtightened.

Proper electrical installation is necessary to prevent errors due to electrical noise and interference. Shielded cable must be used for best results in electrically noisy environments.

### Conduit Connections

The transmitter has ports for 3/4-inch NPT conduit connections. If the port is not being used, conduit seals should be installed. In some cases, conduits may also require drainage if moisture could build up in the line.

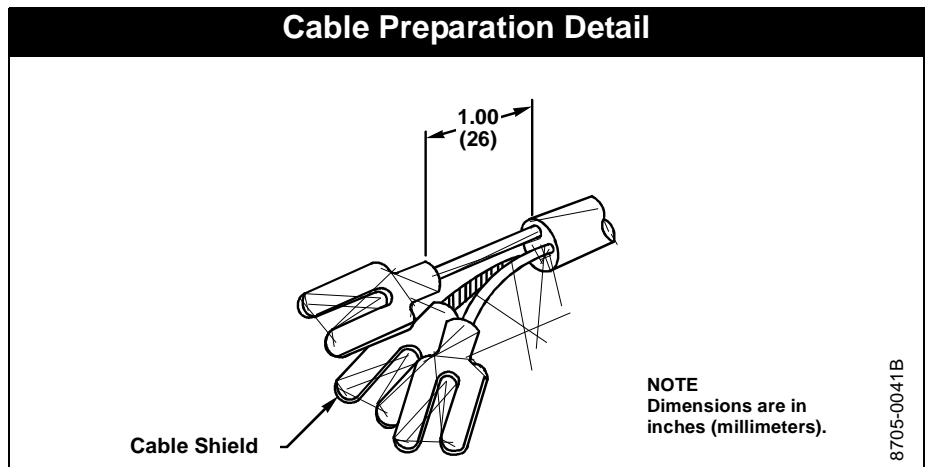
### Conduit Cables

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 . Limit the unshielded wire length to 1-inch on both the electrode and coil drive cables.

**NOTE**

Excessive lead length or failure to connect cable shields can create electrical noise resulting in unstable meter readings.



### Transmitter to Flowtube Wiring

Flanged and wafer flowtubes have two conduit ports. Either one may be used for both the coil drive and electrode cables. Use a stainless steel plug to seal the unused conduit port.

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.

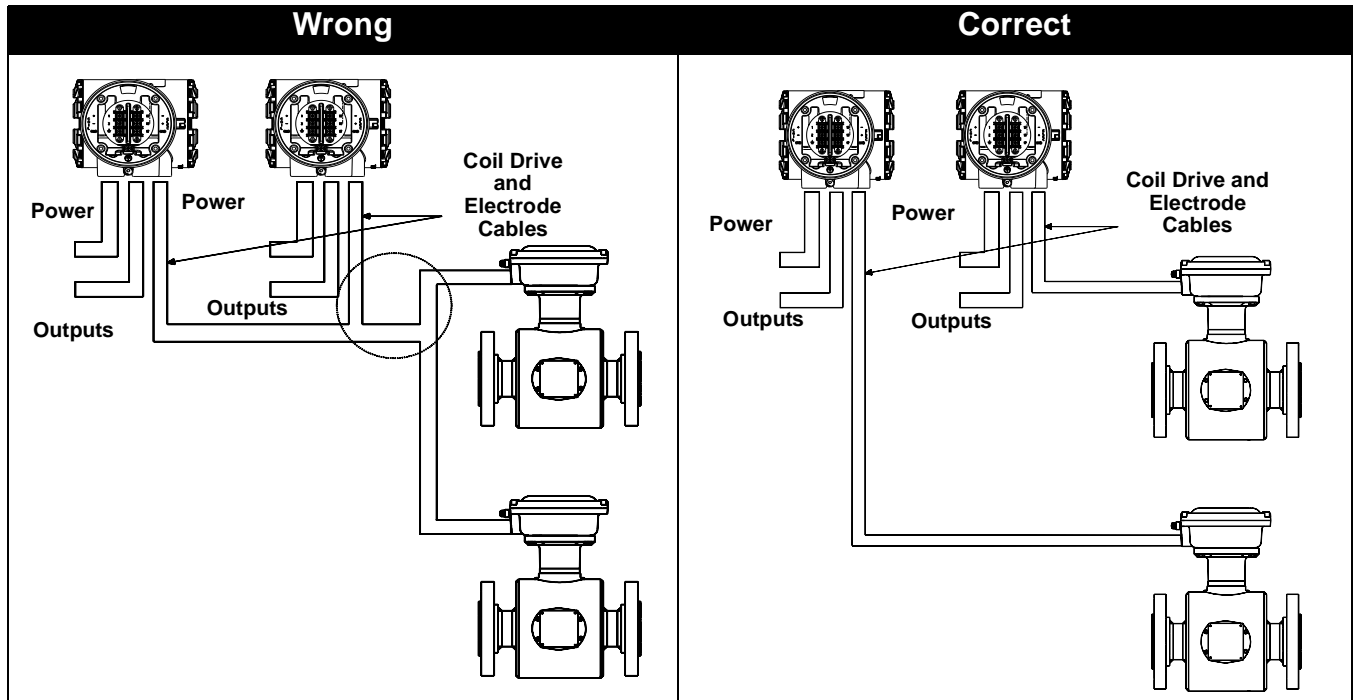


Table 2-3. Cable Requirements

Description	Part Number
Signal Cable (20 AWG) Belden 8762, Alpha 2411 equivalent	08712-0061-0001
Coil Drive Cable (14 AWG) Belden 8720, Alpha 2442 equivalent	08712-0060-0001
Combination Signal and Coil Drive Cable (18 AWG) Belden 9368 equivalent	08712-0750-0001

Remote transmitter installations require equal lengths of signal and coil drive cables. Integrally mounted transmitters are factory wired and do not require interconnecting cables.


Lengths from 5 to 1,000 feet (1.5 to 300 meters) may be specified, and will be shipped with the flowtube.

**Flowtube to Remote Mount Transmitter Connections**

Connect coil drive and electrode cables as shown below.

**⚠ WARNING**

This is a pulsed dc magnetic flowmeter. **Do not connect ac power to the flowtube or to terminals 1 and 2 of the transmitter**, or replacement of the electronics board will be necessary.



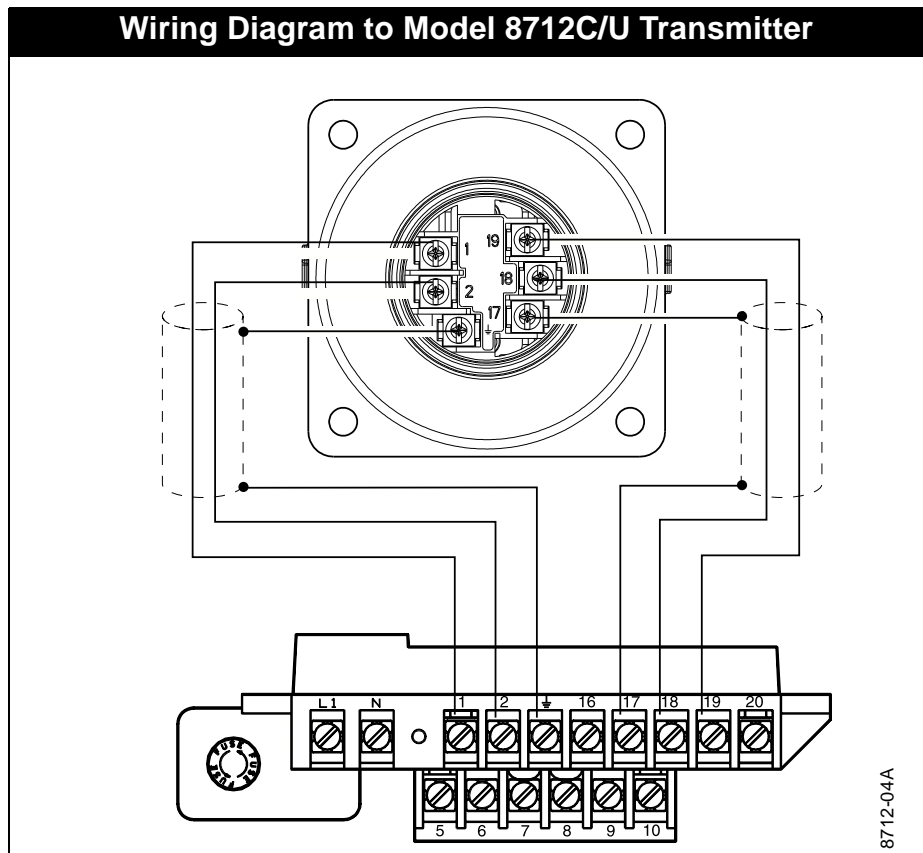


Table 2-4. Flowtube to 8712 Transmitter

Rosemount Model 8712C/U Transmitters	Rosemount Model 8705/8707/8711 Flowtubes
1	1
2	2
⊥	⊥
17	17
18	18
19	19

**Flowtube to Integral  
Mount Transmitter  
Connections**

Connect coil drive and electrode cables.

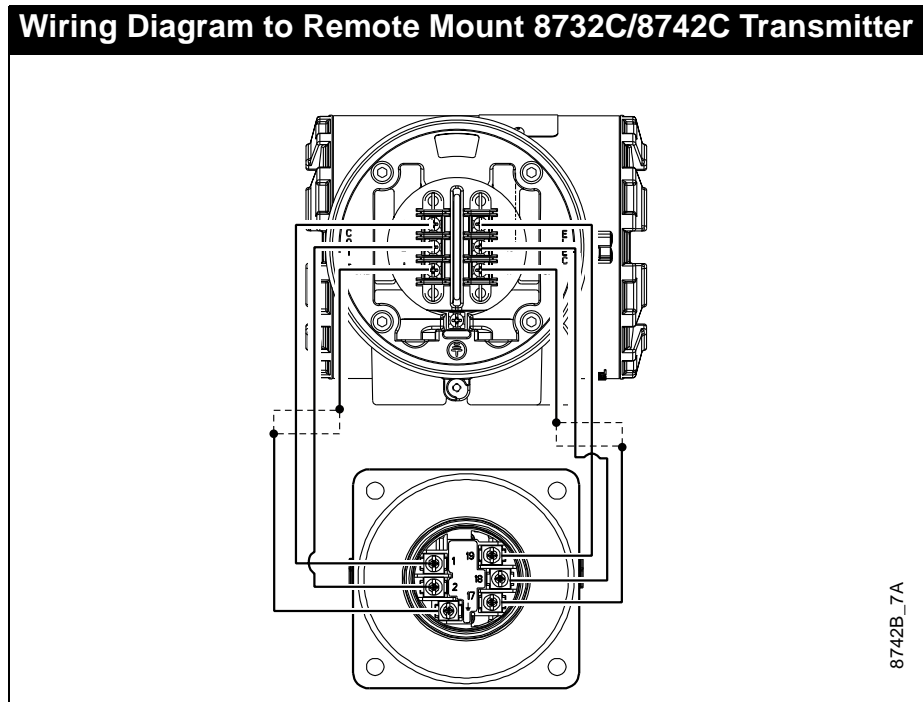
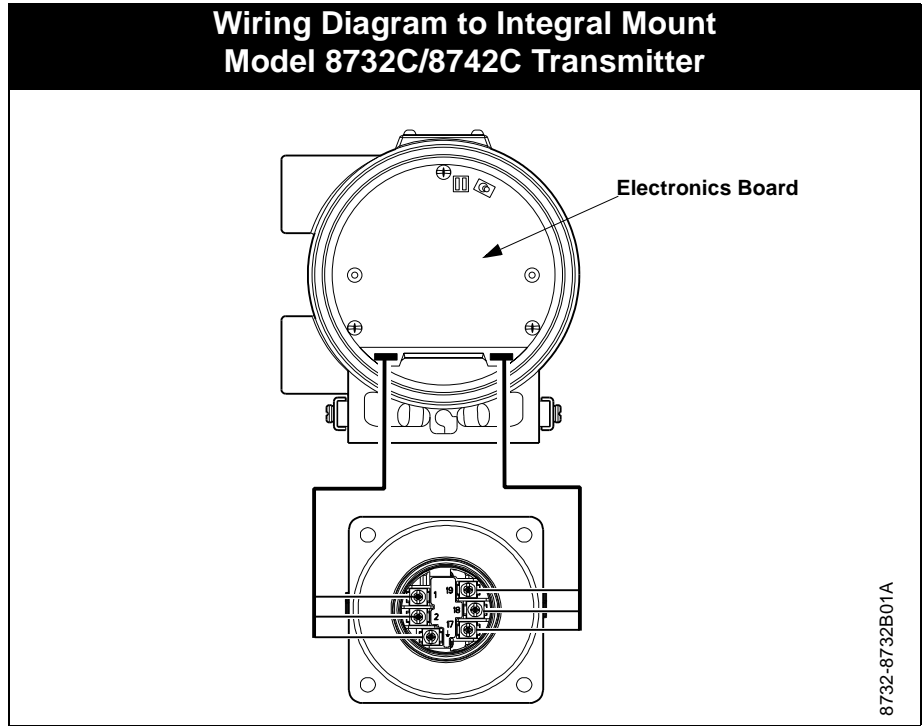


Table 2-5. Flowtube to 8732/8742 Transmitter

Rosemount Model 8732C/8742C	Rosemount Model 8705/8711 Flowtubes
1	1
2	2
$\frac{1}{2}$	$\frac{1}{2}$
17	17
18	18
19	19

**STEP 6: INSTALLATION CHECK AND GUIDE**

The magnetic flowmeter system is ready for configuration when the previous seven steps have been completed. Listed below are the most common errors and corrective actions that occur during start-up.

**Transmitter**

1. Check for the correct **flowtube calibration number** entered in the software. (The calibration number is listed on the flowtube nameplate.)
2. Check for the correct **flowtube line size** entered in the software. (The line size value is listed on the flowtube nameplate.)

**Flowtube**

1. For **horizontal flow installations**, ensure that the electrodes are in a plane such that they remain covered by process fluid.
2. For **vertical or inclined installations**, ensure that process fluid is flowing up into the flowtube to keep the electrodes covered by process fluid.
3. Ensure that the **grounding straps** on the flowtube are connected to grounding rings, lining protectors, or the adjacent pipe flanges. Improper process grounding will cause erratic operation of the system.

**Process Fluid**

1. Process fluid conductivity should be 5  $\mu$ mhos per centimeter, minimum.
2. The process fluid must be free of air and gasses. The flowtube should be full of process fluid.



## Section 3 Configuration

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Flowtube Calibration Number .....	page 3-1
Quick Start-up .....	page 3-1

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Once the magnetic flowmeter system is installed and communication is established, configuration of the transmitter must be completed. The standard transmitter configuration, without option code C1, Custom Configuration is shipped with the following parameters:

- Engineering Units: ft/s
- Tube Size: 3-in
- Flowtube Calibration Number: 100000501000000

### FLOWTUBE CALIBRATION NUMBER

A unique flowtube calibration number, imprinted on the flowtube tag, enables any flowtube to be used with any Rosemount transmitter without further calibration. Rosemount flow lab tests determine individual flowtube output characteristics. The characteristics are identified by a 16-digit calibration number.

The 16-digit calibration number can be programmed into the Model 8712C/U/H or Model 8732C transmitter using the Local Operator Interface (LOI) or the Model 275 HART® Communicator. Refer to the appropriate transmitter product manual for complete instructions. In a FOUNDATION™ fieldbus environment, the Model 8742C can be configured using the DeltaV™ configuration tool or another FOUNDATION fieldbus configuration device.

The calibration number is more than a correction factor, or K- factor, for the flowtube. The first five digits represent the low frequency gain. The ninth through thirteenth digits represent the high frequency gain. Both numbers are normalized from an ideal number of 10000. Standard configurations use the low frequency gain, but in noisy applications it may be worthwhile to switch to the higher frequency. An additional transmitter procedure, called Auto Zero, is required to move to the higher coil drive frequency and maintain system accuracy. The full procedure can be found in the appropriate transmitter manual. The seventh and eighth digits represent the zero offset at both frequencies. The nominal value is 50.

### QUICK START-UP

To initiate a basic transmitter start-up, only four parameters are required:

- Tube calibration number
- Tube size
- Units
- Analog output range (URV)

Refer to the Model 8712C/U/H, Model 8732C, or Model 8742C product manuals for complete transmitter start-up instructions.



# Section 4      Operation and Maintenance

**Safety Information** ..... page 4-1

This section covers basic operation and maintenance instructions. Magnetic flowmeter flowtubes contain no moving parts and do not require any maintenance. Once the flowtube has been installed and is working properly other periodic maintenance is not required. If the flowtube is not functioning properly, consult Section 5 of this manual.

## SAFETY INFORMATION

### **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.

## INDEPENDENT FLOWTUBE AND TRANSMITTER REPLACEMENT

Rosemount flow lab tests determine individual flowtube characteristics and account for them with the 16-digit calibration number. Flowtube interchangeability reduces the need for spare transmitters. It also ensures factory-calibrated accuracy without additional calibration procedures or equipment. The unique calibration number is loaded into the transmitters, enabling the interface of a Rosemount flowtube to communicate with a Rosemount transmitter. A description of the flowtube calibration number is included on page 3-1.



# Section 5 Troubleshooting

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Step 1: Wiring Errors	page 5-2
Step 2: Process Noise	page 5-2
Step 3: Installed Flowtube Tests	page 5-2
Step 4: Uninstalled Flowtube Tests	page 5-3

This section covers basic flowtube troubleshooting. Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources when identifying a problem in your system. If the problem persists, consult your local Rosemount representative to determine if the material should be returned to the factory.

## SAFETY INFORMATION

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Please read the following safety messages before performing any operation described in this section. Refer to these warnings when appropriate throughout this section.

**⚠ 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.

Mishandling products exposed to a hazardous substance may result in death or serious injury. If the product being returned was exposed to a hazardous substance as defined by OSHA, a copy of the required Material Safety Data Sheet (MSDA) for each hazardous substance identified must be included with the returned goods.

The Magnetic Flowmeter Transmitter performs self diagnostics on the entire magnetic flowmeter system: the transmitter, the flowtube, and the interconnecting wiring. By sequentially troubleshooting each individual piece of the magmeter system, it becomes easier to pin point the problem and make the appropriate adjustments. Refer to the specific magmeter transmitter manual for descriptions of error messages.

If there are problems with a new magmeter installation, see Section 2: Step 6: Installation Check and Guide for a quick guide to solve the most common installation problems.

# Model 570TM

## STEP 1: WIRING ERRORS

The most common magmeter problem is wiring between the flowtube and the transmitter in remote mount installations. The signal wire and coil drive wire must be twisted shielded cable: 20 AWG twisted shielded cable for the electrodes and 14 AWG twisted shielded cable for the coils. Ensure that the cable shield is connected at both ends of the electrode and coil drive cables. Signal and coil drive wires must have their own cables. The single conduit that houses both the signal and coil drive cables should not contain any other wires. For more information on proper wiring practices, refer to Section 2: Installation, Step 5: Wiring.

## STEP 2: PROCESS NOISE

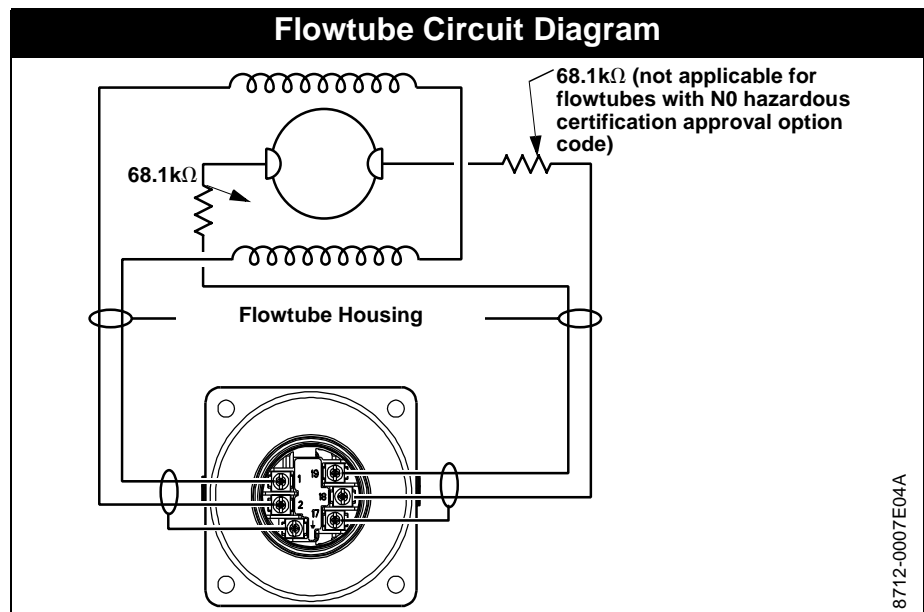
In some circumstances, process conditions rather than the magmeter can cause the meter output to be unstable. There are three possible solutions to reducing process noise. When the output attains the desired stability, no further steps are required.

The first solution is increasing the coil drive frequency. Run this function only with the transmitter and flowtube installed in the process. Before running the auto zero function, be sure the coil drive mode is set to 37.5 Hz. Set the loop to manual if necessary and begin the auto zero procedure. The transmitter completes the procedure automatically in about two minutes. A symbol appears in the lower right-hand corner of the display to indicate that the procedure is running. The second solution is to turn on the filter mode in the transmitter. The last solution is to increase the analog damping in the transmitter.

## STEP 3: INSTALLED FLOWTUBE TESTS

If a problem with an installed flowtube is identified, the following chart can assist in troubleshooting the flowtube. Before performing any of the flowtube tests, disconnect or turn off power to the transmitter. Always check the operation of test equipment before each test.

If possible, take all readings from inside the flowtube junction box. If the flowtube junction box is inaccessible, take measurements as close as possible. Readings taken at the terminals of remote-mount transmitters that are more than 100 feet away from the flowtube may provide incorrect or inconclusive information and should be avoided.



Test equipment (such as Fluke Model 25, 27, 83, 85, 87, or 8060A multimeter and a B&K Model 878 LCR meter or equivalent) is needed to conduct these tests. Some of the tests will require measuring conductance (nS, nanosiemens), the reciprocal of resistance. It is possible to test a multimeter or LCR meter by selecting the units nS and holding the leads apart. The value should be less than one nS, while touching the leads together should result in an overload value. The LCR meter may be used with flow in the flowtube.

Test	Flowtube Location	Required Equipment	Measuring at Connections	Expected Value	Potential Cause	Corrective Action
A. Flowtube Coil	Installed or Uninstalled	Multimeter	1 and 2 = R	$2\Omega \leq R \leq 18\Omega$	<ul style="list-style-type: none"> <li>Open or Shorted Coil</li> </ul>	<ul style="list-style-type: none"> <li>Remove and replace flowtube</li> </ul>
B. Shields to Case	Installed or Uninstalled	Multimeter	17 and $\frac{1}{\perp}$ $\frac{1}{\perp}$ and case ground 17 and case ground	$< 0.2\Omega$	<ul style="list-style-type: none"> <li>Moisture in terminal block</li> <li>Leaky electrode</li> <li>Process behind liner</li> </ul>	<ul style="list-style-type: none"> <li>Clean terminal block</li> <li>Remove flowtube</li> </ul>
C. Coil Shield to Coil	Installed or Uninstalled	Multimeter	1 and $\frac{1}{\perp}$ 2 and $\frac{1}{\perp}$	$\infty\Omega (< 1nS)$ $\infty\Omega (< 1nS)$	<ul style="list-style-type: none"> <li>Process behind liner</li> <li>Leaky electrode</li> <li>Moisture in terminal block</li> </ul>	<ul style="list-style-type: none"> <li>Remove flowtube and dry</li> <li>Clean terminal block</li> <li>Confirm with flowtube coil test</li> </ul>
D. Electrode Shield to Electrode	Installed	LCR (Set to Resistance and 120 Hz)	18 and 17 = $R_1$ 19 and 17 = $R_2$	$R_1$ and $R_2$ should be stable NO: $ R_1 - R_2  \leq 300\Omega$ N5, E5, CD, ED: $ R_1 - R_2  \leq 1500\Omega$	<ul style="list-style-type: none"> <li>Unstable <math>R_1</math> or <math>R_2</math> values confirm coated electrode</li> <li>Shorted electrode</li> <li>Electrode not in contact with process</li> <li>Empty Pipe</li> <li>Low conductivity</li> </ul>	<ul style="list-style-type: none"> <li>Remove coating from flowtube wall</li> <li>Use bulletnose electrodes</li> <li>Repeat measurement</li> </ul>

#### STEP 4: UNINSTALLED FLOWTUBE TESTS



An uninstalled flowtube can also be used for flowtube troubleshooting. Take measurements from the terminal block and on the electrode head inside the flowtube. The measurement electrodes, 18 and 19, are on opposite sides in the inside diameter. If applicable, the third grounding electrode is in between the other two electrodes. The different flowtube models will have slightly different resistance readings.

To insure accuracy of resistance readings, zero out multimeter by shorting and touching the leads together. If any of these tests fail, refer to Section 1: Return of Materials on page 1-3 or contact Rosemount to interpret the results.



See Safety Information on page 4-1 for complete warning information.





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# Appendix A      Reference Data

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Specifications .....	page A-1
Dimensional Drawings .....	page A-4
Ordering Information .....	page A-5

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## SPECIFICATIONS

### NOTE

All transmitter specifications can be found in the Product Data Sheet 00813-0100-4727.

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### Functional Specifications

#### Service

Conductive liquids and slurries

#### Line Sizes

42-48 inch (1050–1200 mm)

#### Flowtube Compatibility and Interchangeability

The Model 570TM Flowtubes are interchangeable with Model 8712C/U. System accuracy is maintained regardless of line size or optional features. Each flowtube nameplate has a sixteen-digit calibration number that can be entered into the transmitter through the Local Operator Interface (LOI) or the HART Communicator. The Model 8712U transmitter is also compatible with AC and DC powered flowtubes of other magnetic flowmeter manufactures. No further calibration is necessary.

#### Flowtube Compensation

Rosemount flowtubes are flow-calibrated and assigned a calibration factor at the factory. The calibration factor is entered into the transmitter, enabling interchangeability of flowtubes without calculations or a compromise in accuracy.

#### Conductivity Limits

Process liquid must have a conductivity of 5 microsiemens/cm (5 micromhos/cm) or greater. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

## Performance Specifications

### Flowtube Coil Resistance

Model 8712C: 25  $\Omega$  maximum

### Flow Rate Range

Capable of processing signals from fluids that are traveling between 0.04 and 30 ft/s (0.01 to 10 m/s) for both forward and reverse flow in all flowtube sizes. Full scale continuously adjustable between -30 and 30 ft/s (-10 to 10 m/s).

### Flowtube Ambient Temperature Limits

-20 to 140 °F (-30 to 60 °C)

### Process Temperature Limits

#### Neoprene Lining

-22 to 140 °F (-30 to 60 °C)

### Pressure Limits

150 psi at 68°F (20°C).

Verify process temperature does not exceed liner material specifications.

### Vacuum Limits

Full vacuum at maximum lining material temperature; consult factory.

### Submergence Protection (Flowtube)

IP 68. Continuous to 30 feet (10 meters)

*(System specifications are given using the frequency output and with the unit at referenced conditions).*

### Accuracy

#### Model 8712C/U with Model 570TM Flowtube

System accuracy is 1% of rate from 1.6 to 30 ft/s (0.5 to 10 m/s); includes combined effects of linearity, hysteresis, repeatability, and calibration uncertainty; between 0.04 and 1.0 ft/s (0.01 and 0.5 m/s), the system has an accuracy of  $\pm 0.5$  ft/s. Analog output has the same accuracy as frequency output plus an additional 0.1% of span.

### Repeatability

$\pm 0.1\%$  of reading

### Response Time

0.2 seconds maximum response to step change in input

### Stability

$\pm 0.1\%$  of rate over six months

### Ambient Temperature Effect

$\pm 1\%$  per 100 °F (37.8 °C)

### Mounting Position Effect

None when installed to ensure flowtube remains full.

## Physical Specifications

### Mounting

Integrally mounted transmitters are factory-wired and do not require interconnecting cables. The transmitter can rotate in 90° increments. Remote mounted transmitters require only a single conduit connection to the flowtube.

### Cable Requirements for Remote Transmitters

Table A-1. Transmitter Input Power

Description	P/N
Signal Cable (20 AWG) Belden 8762, Alpha 2411 equivalent	08712-0061-0001
Coil Drive Cable (14 AWG) Belden 8720, Alpha 2442 equivalent	08712-0060-0001
Combination Signal and Coil Drive Cable (18 AWG) Belden 9368 equivalent	08712-0750-0001

Remote transmitter installations require equal lengths of signal and coil drive cables. Lengths from 5 to 1,000 feet (1.5 to 300 meters) may be specified, and will be shipped with the flowtube. When ordering the combination cable, the lengths specified must be from 5 to 500 feet (1.5 to 150 meters). Cable longer than 100 feet (30 meters) is not recommended for high-signal systems.

### Non-Wetted Materials (Flowtube)

#### Flowtube

Carbon Steel (wrapper), 304 Stainless Steel (pipe)

#### Flanges

ASTM A 36 steel plate

#### Housing

Welded steel

#### Paint

Polyurethane

### Process Wetted Materials (Flowtube)

#### Liner

Neoprene

#### Electrodes

316L SST, Hastelloy C-276

### Process Connections

#### AWWA C207 Table 2 Class D

42- and 48-inch

### Electrical Connections (Flowtube)

Two 1/2–14 NPT connections with number 8 screw terminals are provided in the terminal enclosure for electrical wiring.

### Grounding Electrode

A grounding electrode is installed similarly to the measurement electrodes through the flowtube lining. It is available in all electrode materials.

# Model 570TM

## Grounding Rings

Grounding rings are installed between the flange and the tube face on both ends of the flowtube. They have an I.D. slightly larger than the flowtube I.D. and an external tab to attach ground wiring. Grounding rings are available in 316L SST.

## Flowtube Dimensions

Refer to Dimensional Drawings

## DIMENSIONAL DRAWINGS

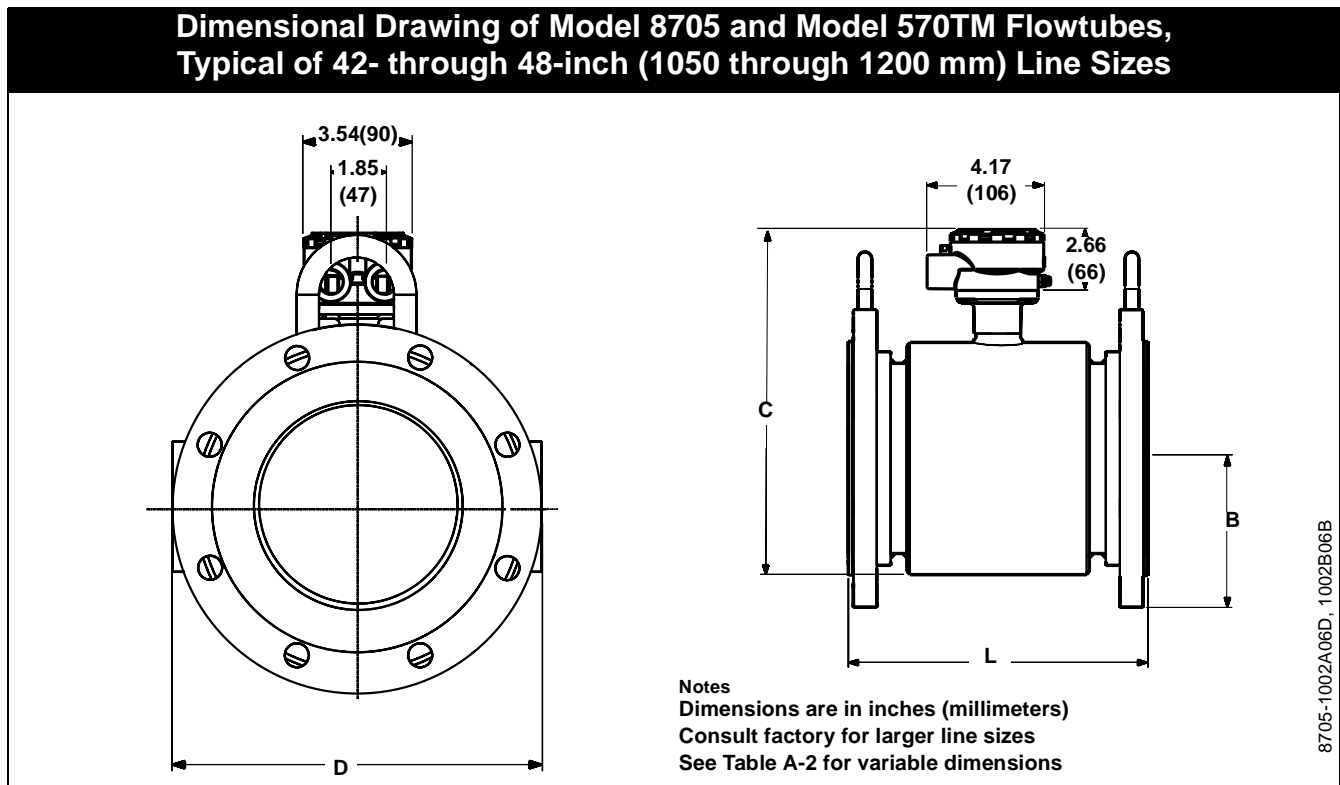


Table A-2. Model 570 TM Dimensions in Inches (Millimeters) Refer to Dimensional Drawing Figure

Line Size and Flange Rating (AWWA 16.5)	Process Flange Rad. "B"	Overall Flowtube Length "L"(1)	Body Height "C"	Body Width "D"	Bolt Hole Circle Diameter	Bolt Hole Diameter	Number and Size of Bolts
42 in.	26.50 (673)	47.24 (1200)	58.15 (1477)	53.0 (1346)	49.5 (1257)	1.5 (38.1)	36-1.5 in.
48 in.	29.75 (756)	51.18 (1300)	67.24 (1708)	59.5 (1511)	56.0 (1422)	1.5 (38.1)	44-1.5 in.

**Dimensions with ASME B16.5 (ANSI) Flanges**

(1) When grounding rings (2 rings per meter) are specified, add 0.25 inch (6.35 mm) for 0.50- through 14-inch (15 through 350 mm) flowtubes, add 0.50 inch (12.7 mm) for 16-inch (400 mm) and larger. When lining protectors are specified, add 0.25 inch (6.35 mm) for ½- through 12-inch (15 through 300 mm) flowtubes, add 0.50 inch (12.7 mm) for 14- through 36-inch (350 through 900 mm) flowtubes.

**ORDERING  
 INFORMATION**

Model	Product Description	Availability
570TM	Magnetic Flowmeter Flowtube <sup>(1)</sup>	
Code	Line Size	
1050	42 in (1050 mm)	
1200	48 in (1200 mm)	
Code	Design Level	
C	Level	
Code	Lining Material	
4	Neoprene	
Code	Electrode Material	
SS	316 Stainless Steel	
HC	Hastelloy C	
Code	Process Connection	
F	Flanged	
Code	Flanged Type	
6	AWWA Class D	
Code	Flange Material	
A	Carbon Steel	
Code	Grounding Ring	
1	No Grounding Ring	
2	304 Stainless Steel Grounding Rings	
Code	Options	
A	Grounding Electrode	
M	Submergence Protection (IP68)	
<b>Typical Model Number: 570TM 1050 C 4 SS F 6 A 1 A</b>		

*(1) Model 570TM flowtube will be shipped separately from the transmitter. Integral mount flowtubes will be shipped with appropriate hardware and can be field-mounted.*

## Reference Manual

00809-0100-4900, Rev AA

December 2001

# Model 570TM

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