American Magnetics

MODEL 175

Two-Wire Continuous Level Transmitter

INSTALLATION, OPERATION & MAINTENANCE MANUAL

CE

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SECTION A

Foreword

This section contains the Installation instructions for the American Magnetics (AMI) Model 175 Two-Wire Continuous Level Transmitter. Since it is impossible to cover all possible sensor/systems configurations, only the most common are discussed in this document. The user is encouraged to contact an authorized American Magnetics Customer Support Representative for specific situations.

Foreword discusses safety precautions and safety notations as well as other generic information used throughout this manual.

Introduction explains the functions and characteristics of the instrument, describes the model number configurations for the instrument and the probe, and documents the performance specifications, as well as, an explanation of the operating principle.

Installation describes the procedure for properly unpacking and installing the transmitter into your vessel.

Safety Precautions

Conventions

The conventions used in this manual follow ANSI Z535.4-2002 for "Product Safety Signs and Labels". The safety markings in this manual are as follows:

⚠ WARNING — WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION — CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. This category also includes potential equipment damage.

Cryogen Safety

Cryogenic liquefied gases are potentially extreme suffocation hazards since a small amount of liquid will vaporize and yield a very large volume of oxygen-displacing gas. Always ensure the location where the cryogen used is well ventilated.

Cryogenic liquids, due to their extremely low temperatures, will burn the skin in a similar manner as hot liquids. Never permit cryogenic liquids to come into contact with the skin or allow them to soak clothing. Serious burns may result from careless handling. Never touch uninsulated pipes or vessels containing cryogenic liquids. Flesh will stick to extremely cold materials. Even nonmetallic materials are dangerous to touch at low temperatures. The vapors expelled during the venting process are sufficiently cold to burn flesh or freeze optic tissues.

Containers of cryogenic liquids are self-pressurizing (as the liquid boils off, vapor pressure increases). Hoses or lines used to transfer these liquids should never be sealed at both ends (i.e. by closing valves at both ends).

The properties of many materials at extremely low temperatures may be quite different from the properties that these same materials exhibit at room temperatures. Exercise extreme care when handling materials cooled to cryogenic temperatures until the properties of these materials under these conditions are known.

Cryogenic storage systems are complex systems with the potential to seriously injure personnel or equipment if not operated according to procedures. Proper use of safety mechanisms (pressure relief valves, rupture disks, etc.) included in the cryostat and top plate assembly are necessary.

Warranty

American Magnetics, Inc. warrants its products to conform to the specifications described in its quotation for a period of fifteen months from the date of shipment. AMI makes no other warranty of any kind, expressed or implied. In the event of failure occurring during normal use, AMI, at its option, will repair or replace all products or components that fail under warranty and such repair or replacement shall constitute a fulfillment of all AMI liabilities with respect to its products. Since, however, AMI does not have control over the installation conditions or the use to which its products are put, no warranty can be made of fitness for a particular purpose, and AMI cannot be liable for special or consequential damages. All repairs are F.O.B. Oak Ridge, Tennessee, USA. If the repairs are covered under this warranty then standard shipping for return to the customer is paid for by AMI within the USA.

Return Authorization

Before shipping any item to AMI for repair, you must first obtain an RMA number from an authorized AMI representative. Do not attempt to repair or replace any items without first speaking to an authorized AMI representative. Doing so may expose the customer to hazards and will void this warranty. Customers requiring a more comprehensive warranty program may purchase additional coverage, the price of which may vary by product type.

Introduction

The instructions in this manual pertain to the American Magnetics, Inc. Model 175 Two-Wire Continuous Level Transmitter. The Model 175 is designed to measure the level of various liquids and cryogenic fluids.

The instrument is available in two different mounting configurations: integral-mounting with the probe (see Photo #1), or remote-mounting a maximum of 10 feet from the probe (Photo #2).

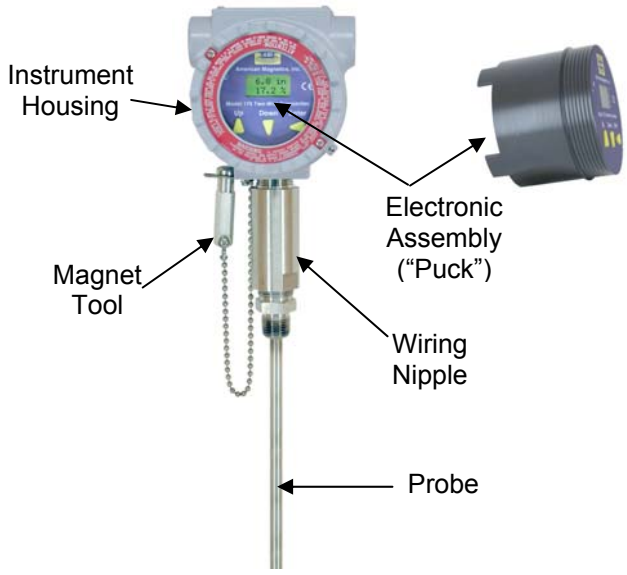


Photo #1

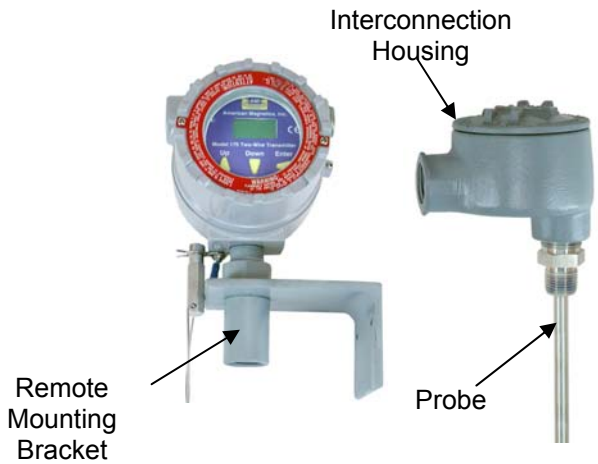


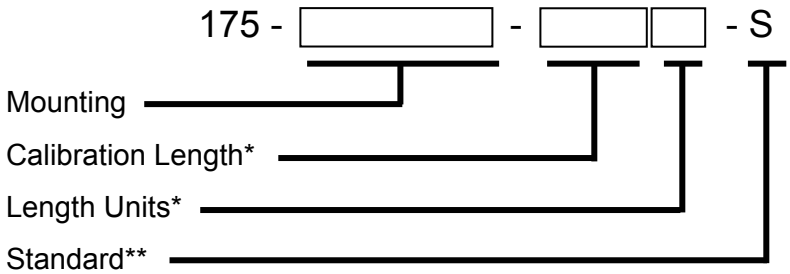
Photo #2

System Description

The Model 175 liquid level system consists of the Model 175 Instrument and an AMI CAPSEN Capacitance Probe. The instrument consists of the electronic assembly ("puck"), an explosion-proof NEMA 4X enclosure with installed I/O board, and an interconnection nipple. The enclosure provides two additional ¾″ NPT conduit openings for external wiring. The windowed cover allows for viewing of process variables, and a magnet tool allows set-up and calibration of the instrument without removing the cover. The probe is a concentric-tube assembly designed to electrically and physically mate to the Model 175, either directly or remotely (up to 10-feet).

Photo #3

Instrument Model Configuration



**Custom versions of the Model 175 are not available.

Mounting

Description	Code
Integral	Integral
Remote	Remote

Length Units

Description	Code
Inches	in
Centimeters	cm

*Calibration Length and Length Units

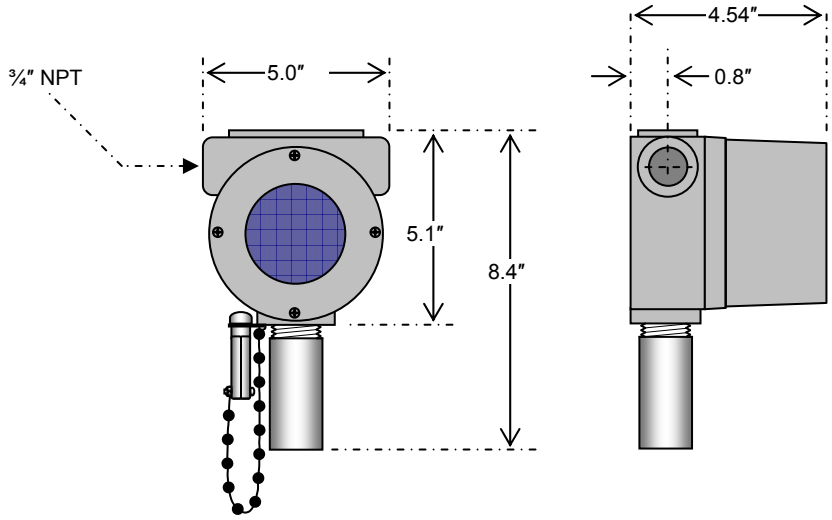
Calibration length will normally be set at the Active Length of the probe as defined in the probe configuration (see page 7). No leading zeroes.

Liquid

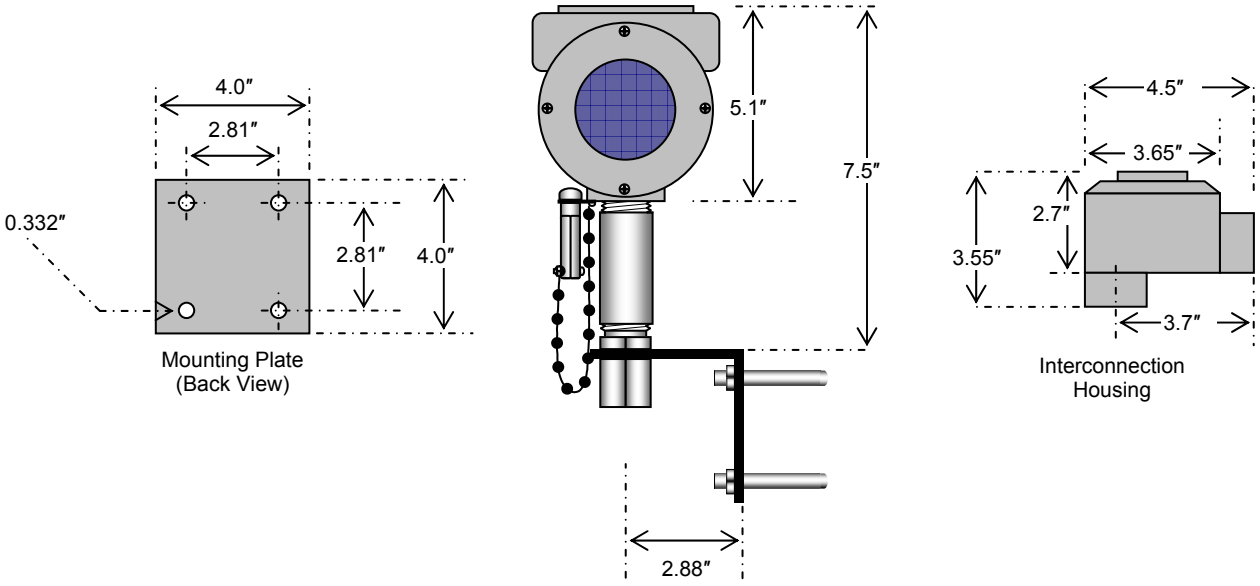
The liquid is not part of the instrument configuration, but is required when calibrating the instrument to the probe. This information will be specified as part of the probe configuration (see page 7).

Model 175 Transmitter Dimensions – Inches

Integral-mounted Transmitters



Remote-mounted Transmitters



Probe (Capacitance Sensor) Model Configuration

⚠ CAUTION Welded fittings cannot be adjusted. Ensure the dimensions are such that when the probe fitting is fully engaged, the probe does not tighten against the bottom of the container! Contact AMI Sales if you have any questions concerning the dimensions or options. See dimensional drawing below.

CAPSEN - ☐ - ☐ - ☐ / ☐ ☐ - ☐ - ☐

- Diameter
- Fitting
- Active Length
- Overall Length
- Length Units
- Liquid
- Options, Type, or Custom Specification

Diameter

Description	Code
3/8″ Outer Diameter	OD3/8
1/2″ Outer Diameter	OD1/2

Fitting

Description	Code
Model 175 Welded ½″ NPT (⅜″ or ½″ dia sensor)	M175NPT

Active Length

This is the measurement range of the probe. It starts 0.375″ above the bottom tip of the probe, and ends 1″ below the upper-most vent hole on the probe.

Overall Length

This is defined as the total length of the probe, measured from the bottom tip to the top of the connector. Contact the factory to discuss lengths exceeding the Maximum Overall Lengths:

100″ for ⅜″-diameter, and
144″ for ½″-diameter.

Lengths and Length Units

Description	Code
Inches (nearest 1/10″)	in
Centimeters (integer, no decimal)	cm

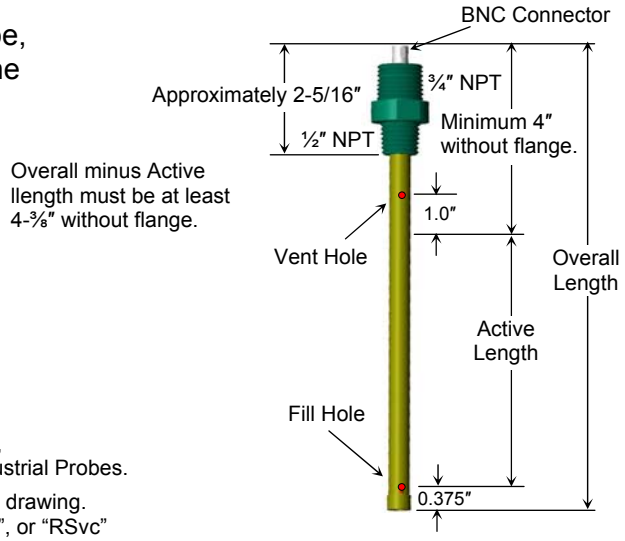
Liquid*

Description	Code
Liquid Nitrogen	LN2
Liquid Oxygen	O2
Liquid Hydrogen	H2
Liquid Carbon Dioxide	CO2

*For others, the commonly recognized chemical formula (or abbreviation) will be used. Contact factory.

Options**

Description	Code
Standard (⅜″ only)	S
High Capacitance (½″ dia. only)	HCap
Rugged Service (½″ dia. only)	RSvc
Flange – Custom***, contact AMI.	TBD: per Spec



Typical Capacitance Probe with M175NPT Welded Fitting and BNC Connector

**For expanded possibilities or FM-Approved requirements, consider the AMI Model 32E and FM-Approved line of Industrial Probes.

***Custom probes require an AMI-approved customer-signed drawing. "Custom" applies to any probe not falling in the "S", "HCap", or "RSvc" Option categories. Also probes having a fitting other than the basic M175NPT with BNC, those deviating from the length limits, or special probes for use in conductive media.

Instrument Specifications

Description		Specification
Power Supply		12 – 30Vdc ±10%; 24Vdc nominal
Supply Voltage Effect		Less than 0.01%/volt change
Ambient Temperature Range		-40°F to 176°F (-40°C to 80°C)
Humidity		99% non-condensing
Accuracy		±0.1% of span
Repeatability		±0.05% of span
Linearity		±0.1% of span
Resolution		0.01mA
Response Time		300 msec.
Temperature Effect		±0.01% of span/°F (0.018% of span/°C)
Operator Interface	Data Entry	3-button keypad
	Display	2 Line by 8 Character LCD
Analog Output		4-20mA; 3.8 – 20.5mA overtravel; reversible
Error Indication		3.6mA, 22mA, or Hold last value; field selectable
Range		15 – 100,000pF
Damping		0 – 60 seconds; field adjustable in 1 sec. increments
Maximum Remote Cable Length		10 feet between the transmitter and the probe.

Probe Specifications

Description	Specification
Process Temperature Range @ 0 psig (1 Bar)	-435°F – 180°F (-259°C – 82°C)
Process Pressure Range @ 100°F (37°C)	Vacuum to 1,000 psig

Operating Principle

The probe materials and the media form a capacitor with the media being a portion of the dielectric (non-conductive media applications). As the level of the media changes over the Active Length, a corresponding change in capacitance occurs. The Model 175 transmitter measures this change, compares it to the calibrated values, and calculates and displays the level of the media. A special insulated probe is required for conductive media. The probe insulation then serves as the dielectric.

Installation

Unpacking

Upon receiving the Model 175 transmitter, check all components carefully for damage incurred in shipping. If damage is evident, or suspected, do not attempt installation. Notify the carrier immediately and request a damage inspection. Check each item against the packing list.

Mounting Location

Model 175 transmitters should be mounted in a location that is a free as possible from mechanical shock, vibration, and corrosive atmospheres. The area should have an ambient temperature in the range of –40°F to 176°F (-40°C to 80°C).

Integral-mounted Transmitter Installation

⚠ WARNING

Before starting installation procedures in hazardous areas, insure that all power sources have been turned off and locked out. "Live" electrical circuits can ignite flammable gasses and dusts.

Follow the wiring practices set forth in the National Electric Code, as well as local electrical codes. These Codes supercede any information in this manual.

⚠ CAUTION

Do not apply more than 33Vdc to the transmitter, as this may damage the instrument. Ensure all cables are routed via the cable stays to avoid pinching and damaging the instrument or other devices (see Photo #5).

1.) Remove the cover from the instrument enclosure.

2.) Remove the electronic assembly ("puck"), Photo #4, from the instrument enclosure. Hold the puck firmly around the diameter and pull it out of the enclosure. No tools are necessary.

Photo #4

This will allow access to the user interface circuit board, shown in Photo #5.

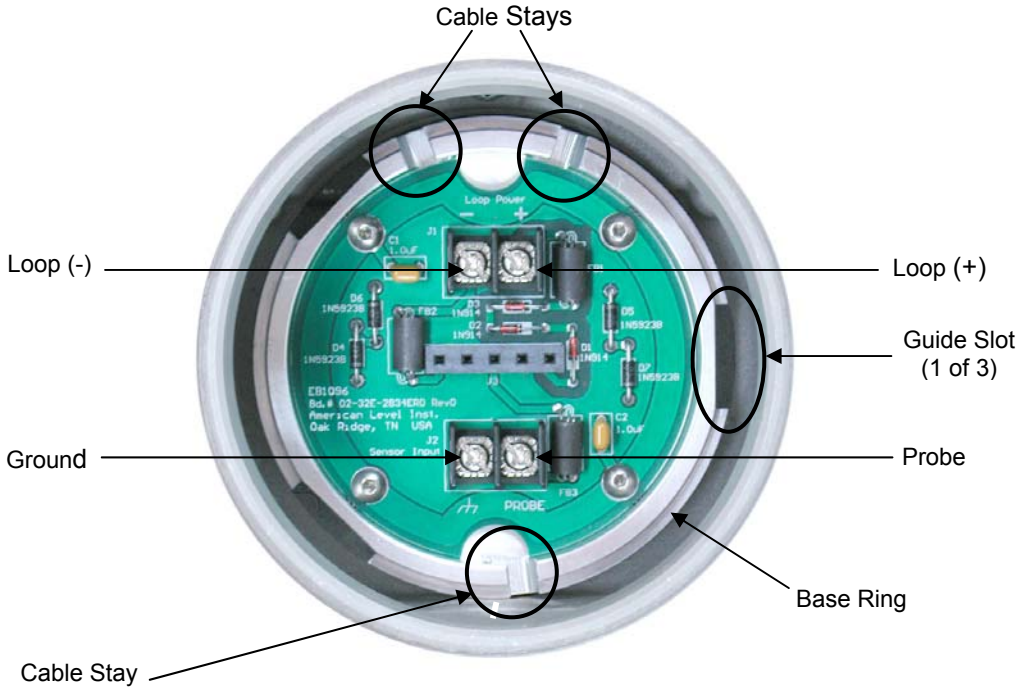


Photo #5

3.) The wiring nipple is attached to the instrument enclosure at the factory (see Photo #1). The probe will normally have a coax electrical connector on top. Connect the supplied short cable to the probe connector (the center conductor at the opposite end of the cable is the "probe" wire). Thread the probe "pigtailed" cable end through the wiring nipple (into the instrument housing) and tighten nipple onto the top of the probe. **DO NOT** use the instrument enclosure for tightening.

4.) Connect the "probe" wire (center conductor of the coax) to the PROBE terminal (see Photo #5) in the base of the instrument enclosure. The shield connects to the ground terminal. Make sure the cable is under the cable stay.

5.) Install a conduit fitting to one of the conduit openings at the top of the instrument enclosure. Use the supplied conduit plug for the other conduit opening. Follow all applicable electrical codes when installing this conduit and wiring. It is strongly recommended that you use a drip-loop to prevent water from entering the instrument enclosure from the conduit.

6.) Using a twisted, shielded pair cable, connect the positive wire to the Loop (+) terminal and the negative wire to the Loop (-) terminal. Tape over the shield - **DO NOT** connect the shield and/or drain wire to the transmitter. At the power supply end, connect the (+) to plus and (-) to minus, and also connect the shield and/or drain wire to ground. Connect an earth ground-wire to the green screw inside the Instrument Enclosure.

7.) Reinsert the puck into the instrument enclosure by visually lining the three tabs on the puck with the corresponding guide slots in the base ring, and using firm pressure, seat the puck. It can only fit in one orientation, **DO NOT FORCE**.

8.) Refer to Section B for calibration instructions.

Remote-mounted Transmitter Installation

WARNING

Before starting installation procedures in hazardous areas, ensure that all power sources have been turned off and locked out. "Live" electrical circuits can ignite flammable gasses and dusts.

Follow the wiring practices set forth in the National Electric Code, as well as local electrical codes. These Codes supercede any information in this manual.

CAUTION

Do not apply more than 33Vdc to the transmitter, as this may damage the instrument. Ensure all cables are routed via the cable stays to avoid pinching and damaging the instrument or other devices (see Photo #5).

1.) The probe will normally have a coax electrical connector on top. Connect the supplied short coax cable to the probe connector (the center conductor at the opposite end of the cable is the "probe" wire).

2.) Remove the cover of the interconnection housing.

3.) Thread the probe "pigtailed" cable end into the bottom of the interconnection housing. Screw the interconnection housing onto the probe. Use the wrench flats on the nipple and the body of the housing for tightening.

4.) The probe wire is the center conductor of the coax cable. Connect the Probe wire to one of the two inner terminals on the terminal block inside the Interconnection Housing. The shield connects to an outer (ground) terminal (Photo #6).

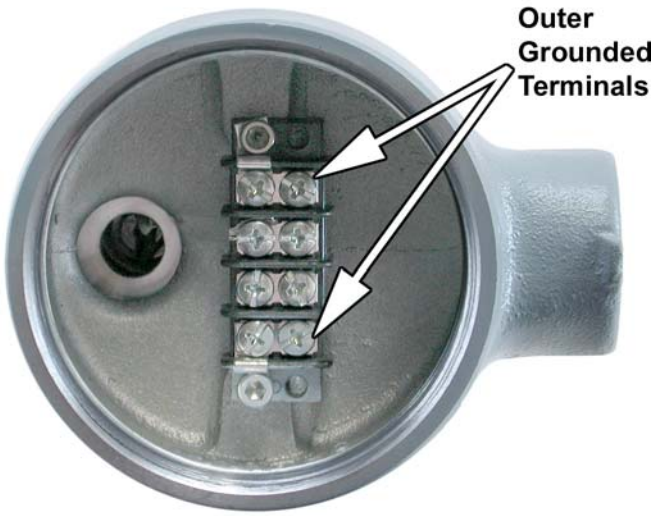


Photo #6

5.) Remove the cover from the instrument enclosure.

6.) Remove the electronic assembly ("puck") from the instrument enclosure. Hold the puck firmly around the diameter and pull it out of the enclosure. No tools are necessary.

7.) Using the U-Bolts provided, attach the Remote-Mounting Bracket (Photo #7) to a pipe stand or railing. The U-Bolts are sized for a 2″ diameter pipe.

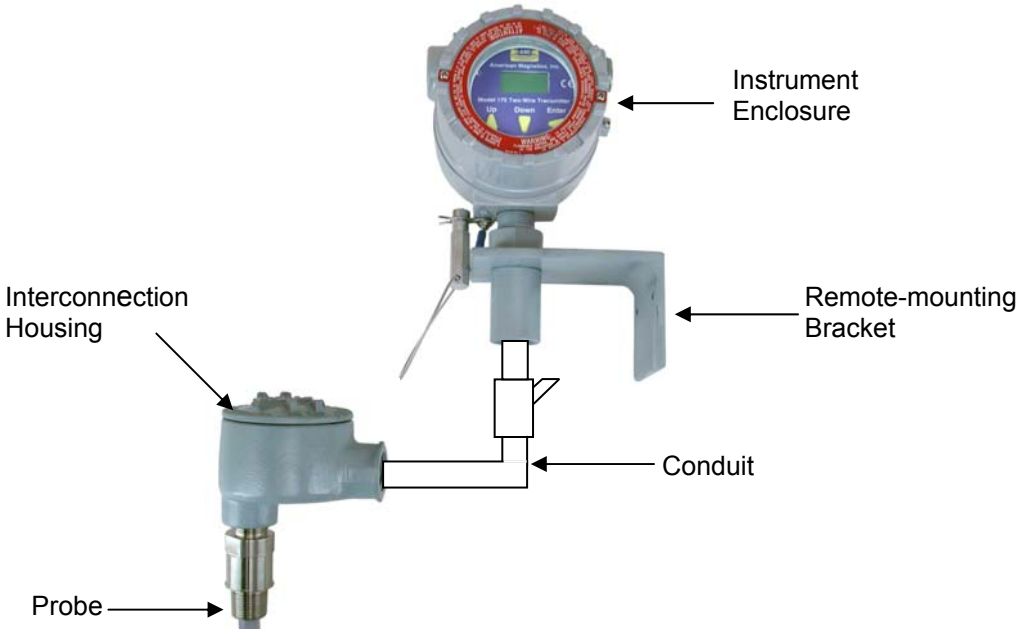


Photo #7

8.) Screw the base of the instrument enclosure onto the remote-mounting bracket. Connect conduit between the Interconnection Housing and the Remote-Mounting Bracket (see Photo #7).

9.) At the Interconnection Housing end, using the supplied 10-ft. coaxial cable through the conduit, connect the center wire to the screw terminal opposite the probe-cable center-conductor. Connect the shield to either of the outer (ground) terminals. Connect an earth ground-wire to the green screw inside the Interconnection Housing.

10.) At the instrument end, connect the center wire of the supplied 10-ft. coaxial cable to the "PROBE" terminal in the base of the instrument enclosure. Connect the shield wire to the ground terminal (not the green screw).

11.) Connect conduit to one of the conduit openings at the top of the instrument enclosure. Use the supplied conduit plug for the other conduit opening. Follow all applicable electrical codes when installing this conduit and wiring. It is strongly recommended that you use a drip-loop to prevent water from entering the instrument enclosure from the conduit.

12.) Using a twisted, shielded pair cable, connect the positive wire to the Loop (+) terminal and the negative wire to the Loop (-) terminal. Tape over the shield - **DO NOT** connect the shield and/or drain wire to the transmitter. At the power supply end, connect the (+) to plus and (-) to minus, and also connect the shield and/or drain wire to ground. Connect an earth ground-wire to the green screw inside the Instrument Enclosure.

13.) Reinsert the puck into the instrument enclosure by visually aligning the three tabs (Photo #4) on the puck with the guide slots in the base ring and using firm pressure to seat the puck. It can only fit in one orientation, **DO NOT FORCE**.

14.) Refer to Section B for calibration and programming instructions.

SECTION B

This section contains the Operation and Maintenance instructions for the American Magnetics, Inc. Model 175 Two-Wire Continuous Level Transmitter. Since it is impossible to cover all possible sensor/systems configurations, only the most common are discussed in this document. The user is encouraged to contact an authorized American Magnetics Instrument Technical Support Representative for special situations.

Set-up details the software commands and procedures for matching (calibrating) the transmitter to your particular application.

Troubleshooting provides information and various tests used to determine the cause of any issues with the Model 175 transmitter.

Set-Up

The Model 175 Transmitter displays information locally in a 2-line by 8-character format. The normal operating display can be set to either LEVEL & %OUTPUT, or LEVEL & LOOP CURRENT. The keypad consists of three buttons. "Up" and "Down" are used to scroll through the menu or change the numeric value of a particular option. Depress either of the buttons continuously to rapidly change the numeric value. "Enter" is used to accept the data that has been selected with the "Up" and "Down" buttons.

The buttons can be actuated through the glass window in the cover using the supplied Magnet Tool. It is not necessary to remove the cover to set-up this transmitter.

ProxCal™ Calculation

This method is the least accurate form of calibration and should be used only when it is impossible to change the level of the process fluid. This method requires a substitute fluid to be used for calibration. A cryogenic or stilling well probe must be used if the actual process vessel is not available for the calibration process.

To use ProxCal, the level measurements used for Probe LO and Probe HI must be referenced from the tip of the probe (probe bottom). In other words the probe bottom must be considered zero (inches or mm).

The dielectric constant for the reference (substitute) fluid ε_1, and the target (process) fluid ε_2 are needed for the ProxCal factor calculation. The equation is as follows:

$$\text{ProxCal Factor} = \frac{\varepsilon_2 - 1}{\varepsilon_1 - 1} \times 100$$

Install the transmitter into the target vessel containing the process fluid. Go to the "Menu Structure" section for directions on how to enter the ProxCal factor into the transmitter.

If you do not know the dielectric constant of the fluids, obtain the actual level of the process fluid in the target vessel. Install the transmitter into the target vessel. Adjust the ProxCal factor until the transmitter displays the level in the vessel obtained previously.

Menu Item Descriptions

FUNCTION	DESCRIPTION
Units	This is used to select the measurement units shown on the display. These units are used during the calibration process.
Hi Cal	This is used to set the high calibration point on the probe. This can either be the highest liquid level on the probe (preferably), or the highest achievable level during calibration. The order in which the "Lo Cal" and "Hi Cal" are set is not important, only that the "Lo Cal" must be below the "Hi Cal". A minimum 2% of span change is required between the two points. These points are independent of the 4mA/20mA points.
Lo Cal	This is used to set the low calibration point on the probe. This can either be the lowest liquid level on the probe (preferably), or the lowest achievable level during calibration. The order in which the "Lo Cal" and "Hi Cal" are set is not important, only that the "Lo Cal" is below the "Hi Cal". A minimum 2% of span change is required between the two points. These points are independent of the 4mA & 20mA points.
20 mA Pt	These are the levels in the vessel corresponding to the 4mA and 20mA outputs. They will usually be different from the "Lo Cal" & "Hi Cal" points.
4 mA Pt	
Prox Cal	After the unit has been calibrated for a particular fluid, "ProxCal" will allow you to adjust the calibration for a different fluid without changing the level in the vessel. The "Hi Cal" and "Lo Cal" points must not be changed when using ProxCal. If you recalibrate the transmitter in the new fluid, change the ProxCal value back to 100.0
Damping	This is an exponential decay filter used to slowdown the output response time of the transmitter. This, in effect, stabilizes the output and display in a turbulent vessel.
Error	This determines the value of the output current upon detection of a fault condition (capacitance out of range, dead oscillator, loss of signal, etc.).
Trim 20	This allows for an adjustment of the D/A converter for the 4-20mA output. This insures that the unit display matches the actual 4-20mA signal. (measured with a mA meter).
Trim 4	
Poll Adr	Not used.
Loop Cur	This feature allows the user to set the transmitter output to a fixed value from 3.6 to 22mA. This allows the user to test other devices in the loop.
RNG:CNTS	RNG displays the calibration range (0 to 7). The transmitter automatically selects the Range value during the calibration process. 0 = 0 to 781pF 1 = 0 to 1,562pF 2 = 0 to 3,125pF 3 = 0 to 6,250pF 4 = 0 to 12,500pF 5 = 0 to 25,000pF 6 = 0 to 50,000pF 7 = 0 to 100,000pF CNTS displays the digital counts that correspond to the capacitance being measured within the Range selected (Troubleshooting tool). 0 to 65,535 counts within each range.
Clr Mem?	This erases **all** values in the transmitter, and resets them back to factory default values. Recalibration is required if "Clr Mem?" is used.

Menu Structure

DISPLAY	FUNCTION	Notes
0.0 *Lu* 0.0 %	Run Mode (Display)	Level Measurement = in. or mm Level % = Percentage of loop current span
0.0 *lu* 4.0 mA	Run Mode (Display)	Level Measurement = in. or mm Loop Current
Units *lu*	Select level measurement units. (*lu* = level units)	Press “Enter”. Use “Up” / “Down” to select between inches and mm. Press “Enter” to store the value.
Hi Cal XXX.X *lu*	Enter the Upper Calibration Point	Press “Enter”. Use “Up” / “Down” to select the actual level in the vessel. Press “Enter” to lock the value. Press “Enter” again to store the value.
Lo Cal XXX.X *lu*	Enter the Lower Calibration Point	Press “Enter”. Use “Up” / “Down” to select the actual level in the vessel. Press “Enter” to lock the value. Press “Enter” again to store the value.
20 mA Pt XXX.X *lu*	Enter the 20mA Point	Press “Enter”. Use “Up” / “Down” to select the level in the vessel equal to the 20mA output. Press “Enter” to store the value.
4 mA Pt XXX.X *lu*	Enter the 4mA Point	Press “Enter”. Use “Up” / “Down” to select the level in the vessel equal to the 4mA output. Press “Enter” to store the value.
ProxCal 100.0	Enter the dielectric compensation value	Press “Enter”. Use “Up” / “Down” to select the value calculated to correctly adjust the calibration. Press “Enter” to store the value. (See section “ProxCal Calculation” to determine this value).
Damping XX sec	Select the Damping value	Press “Enter”. Use “Up” / “Down” to select the number of seconds (0 – 60) needed to stabilize your output.
Error 3.6 mA	Select the Error Output State	Press “Enter”. Use “Up” / “Down” to select between “3.6mA”, “22mA”, or “Hold”. Press “Enter” to store.
Trim 20 XXXX	Enter the 20mA Trim Value	Connect a mA Meter in the loop. Press “Enter”. Use “Up” / “Down” to adjust the current output until the mA Meter matches the transmitter display. Press “Enter” to store the value.
Trim 4 XXXX	Enter the 4mA Trim Value	Connect a mA Meter in the loop. Press “Enter”. Use “Up” / “Down” to adjust the current output until the mA Meter matches the transmitter display. Press “Enter” to store the value.
Poll Adr XX	Not used.	Not used.
Loop Cur XX.X mA	Manually change the loop current	Press “Enter”. Use “Up” / “Down” to select the desired loop current. Press “Enter to select this value. Press “Enter” to end the test and return to the actual loop current value
RNG:CNTS 0:66535	RNG: Calibration range (Display) CNTS: Digital measurement counts (Display)	RNG Valid value = 0 - 7 CNTS Valid value = 0 – 65535
Clr Mem?	Reset the transmitter to factory default settings.	Press “Enter”. If you really want to clear the memory, press “Enter” again. Otherwise, press “Up” or “Down”.

Troubleshooting

General

Indication	Cause	Solution
Level, Level %, and Loop values are incorrect	Poor Calibration	Recalibrate using more accurate Cal Points. Increase the distance between the Cal Points.
Level readings are repeatable, but consistently wrong.	Poor Calibration	Recalibrate using more accurate Cal Points. Increase the distance between the Cal Points.
Display values "bounce"	Turbulence	Adjust the Damping value. Increase it until the display is stable.

Error Display

Indication	Cause	Solution
EEPROM failure	Bad Checksum	Press "Up" & "Down" simultaneously, and hold until the display changes. This will completely reset the transmitter back to factory default values. **Recalibration will be necessary.** If this occurs again, contact the factory.
<No LO>	The LO Cal point has not been set	Calibrate the LO Cal point
<No HI>	The HI Cal point has not been set	Calibrate the HI Cal point
<No Cal>	The transmitter has not been calibrated	Calibrate the transmitter
Overrange (output is greater than 20.5mA)	The capacitance measured is greater than the cal Range	Increase the 20mA Pt value
Underrange (output is less than 3.8mA)	The capacitance measured is less than the cal Range	Decrease the 4mA Pt value
	Open Probe	Check the wiring between the Probe terminals in the Instrument housing and the Probe
No Input	Shorted Probe	Test the Probe using the procedure shown in the "Check Probe" section.
	Shorted Probe Wiring	Check the wiring between the Probe terminals in the Instrument housing and the Probe

⚠ WARNING **"Live" electrical circuits can ignite flammable gasses and dusts. Insure that the unit is properly grounded, and that a suitable intrinsically safe barrier has been installed between the Power Supply and this unit.**

Drift Test

This test will determine if the transmitter or probe/application is the cause of a drifting (unstable) output.

1.) Open the instrument housing and remove the electronic assembly ("puck").
2.) Disconnect the probe wiring from the terminals on the base board.
3.) Connect a temperature stable (COG-type) 200pF capacitor between the "Probe" and ground terminals.
4.) Observe the output over a 24-hour period. Check for stability.
5.) If the reading has drifted, contact the factory. If the reading is stable, either the probe or the application must be the cause. Go the "Check Probe" section to test the probe. If the probe is OK, contact the factory for application assistance.

⚠ WARNING **"Live" electrical circuits can ignite flammable gasses and dusts. Insure that the unit is properly grounded, and that a suitable intrinsically safe barrier has been installed between the Power Supply and this unit.**

System Loop Test

This test will determine is the correct voltage is available for the transmitter.

1.) Disconnect the loop wires from the transmitter.
2.) Use a voltmeter to measure the open circuit voltage of the loop. The value must be between 12 and 30 Vdc.
3.) Reconnect the loop wires to the transmitter.
4.) Use a voltmeter to measure the voltage at the Loop (+) and Loop (-) terminals. The value must be between 12 and 30 Vdc.
5.) If you don't get these values, contact the factory for assistance.

⚠ WARNING **"Live" electrical circuits can ignite flammable gasses and dusts. Insure that power has been removed from the unit before performing this test.**

Check Probe

This test will determine whether the probe is functional

Integral-mounted Units

1.) Open the instrument housing and remove the electronic assembly ("puck").
2.) Disconnect the probe wiring from the terminals on the base board.
3.) Unscrew the Instrument Housing / Wiring Nipple assembly from the probe.
4.) Lower the process fluid level below the bottom of the probe. If this is not possible, remove the probe from the process vessel. **DO NOT** remove any coating or residue present on the probe.
5.) Use an Ohmmeter to measure the resistance between the center of the BNC Connection at the top of the probe and the probe mounting nut.
6.) If the resistance is below 40MegΩ wipe any coating or residue off the probe, and repeat the measurement. If the reading is still below 40MegΩ contact the factory.

Remote-mounted Units

1.) Open the interconnection housing.

2.) Disconnect the probe wiring from the terminal block.

3.) Lower the process fluid level below the bottom of the probe. If this is not possible, remove the probe from the process vessel. **DO NOT** remove any coating or residue present on the probe.

4.) Use an Ohmmeter to measure the resistance between the center of the BNC Connection at the top of the probe and the probe mounting nut.

5.) If the resistance is below 40MegΩ wipe any coating or residue off the probe, and repeat the measurement. If the reading is still below 40MegΩ contact the factory.