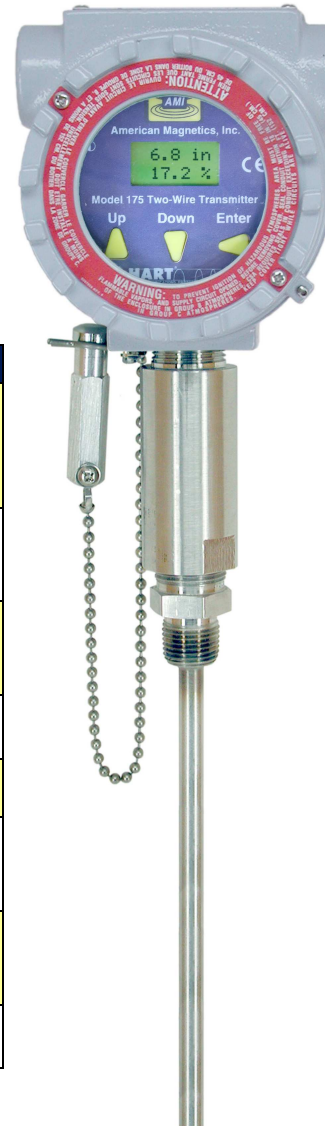


POWERFUL... RELIABLE... VERSATILE

The Model 175 is an advanced, state-of-the-art, two-wire, RF Capacitance-based level transmitter suitable for a wide range of process applications. The latest in microprocessor technology allows the transmitter to consistently and reliably measure the level of your process fluid. Built-in HART® communications allows for remote calibration and diagnostics. The onboard 2-line by 8-character display and 3-button keypad is for local display and calibration. A unique magnetic interface (**Magtouch™**) provides a way to actuate the keypad through the window in the enclosure, thereby negating the need for removing the cover after wiring.



FEATURES	BENEFITS OF OWNERSHIP
Magtouch™ keypad interface: Adjust transmitter in a hazardous environment without removing the enclosure cover	Safety
ProxCal™ calibration: Calibrate in one fluid, and use the transmitter in a different fluid	Application flexibility
Only a 2% change in span is required to calibrate the transmitter.	Simplifies calibration
HART® communications Interface	Improved process control
Powerful, onboard diagnostics	Reliability
2-line x 8-character alphanumeric display and 3-button keypad	Easy to use interface
Cryosense™ Probes – specifically designed for cryogenic fluids	Simple solution for a custom application
A wide variety of probes for virtually any application	Reduces product proliferation at your plant

Applications

- CONTINUOUS LEVEL MEASUREMENT
- OILS, SOLVENTS AND OTHER HYDROCARBONS
- ACIDS & CAUSTICS
- CRYOGENIC FLUIDS
- SLURRIES
- LIQUID-LIQUID INTERFACES

**Model 175 RF Capacitance
Level Transmitter**



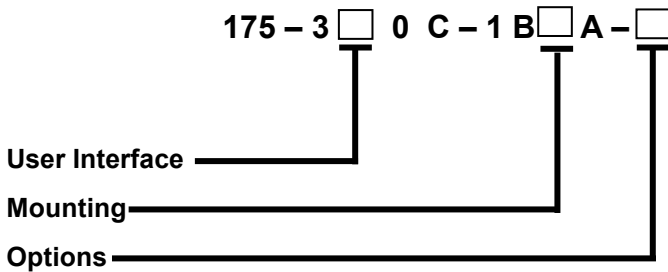
Principle of Operation

The probe in conjunction with the vessel wall and the process media (dielectric) form a capacitor. As the level of the media changes, a corresponding change in capacitance occurs. The Model 175 transmitter measures this change, compares it to the calibrated values and calculates the level of the media.

In conductive media applications, the probe and the process media are the capacitive plates and the insulation (Teflon[®]) on the probe is the dielectric. Cryogenic sensors consist of two concentric tubes. The process fluid fills the annulus between the tubes. The capacitance of the probe increases with the level of the fluid in the annulus.

When measuring any media in non-metallic vessels (ex. concrete sumps, plastic tanks, etc.) the second plate of the capacitor must be supplied. AMI offers a variety of options for this situation.

Instrument Model Configuration



Mounting

Description	Code
Integral	0
Remote	1

Options

Description	Code
HART [®] Lock	0
ProxCAL [™]	1

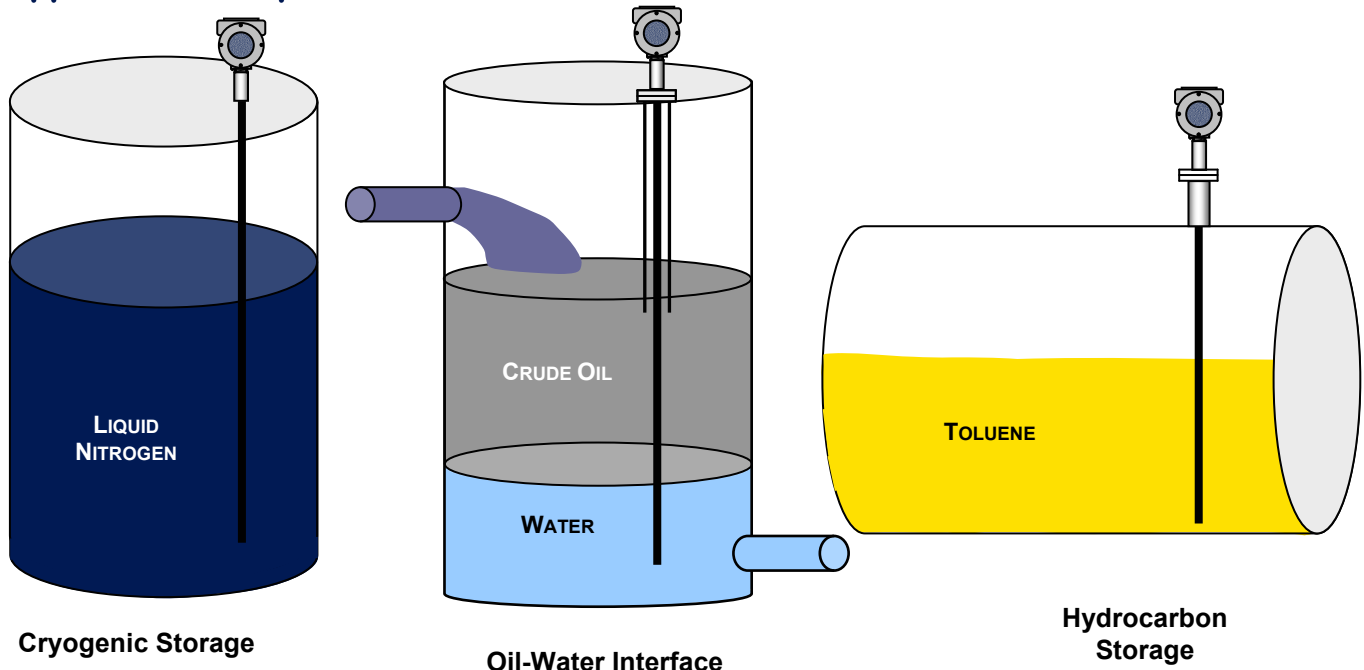
NOTE: HART Lock and ProxCAL are not available simultaneously

Digital Communications

Description	Code
4-20mA w/ HART [®] Communications	B
Hart Communication Only	D

A unique alphanumeric model number identifies the Model 175 transmitter. This number describes the exact configuration of the instrument for your application. American Magnetics offers the QuikShip Program, providing a lead-time of one week after receipt of order. To take advantage of QuikShip, simply select only the color-coded options. QuikShip applies to orders of five units or less. Contact your local representative for lead times of higher quantity orders or non-color coded options.

Application Examples

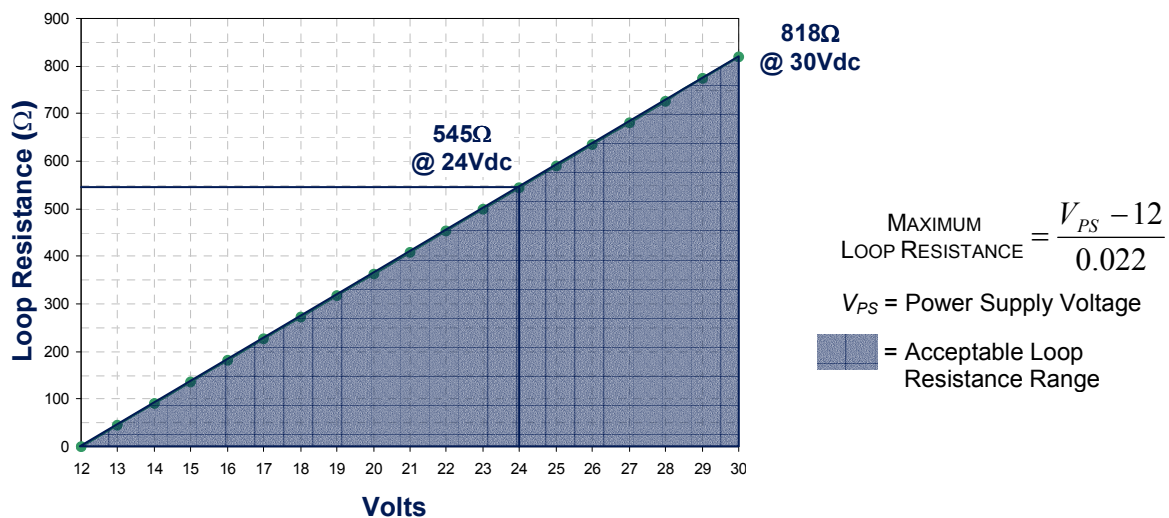


Model 175 Product Specifications

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		100% 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
Output	Analog	4-20mA; 3.8 – 20.5mA overtravel; reversible
	Digital	HART® communications protocol
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 electronics and the probe

*NOTE: Linearity is 0.25% when used with a flexible probe.

Loop Resistance



Process Media

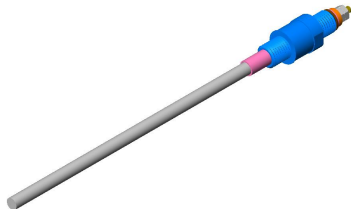
To select the correct probe for an application, it is important to classify the process media as either Non-conductive (low dielectric) or Conductive (high dielectric).

Non-conductive (conductivity of less than 10µsiemens/cm and a Dielectric Constant less than 10): Solvents, oils, hydrocarbons, and bulk solids fall into this category.

Conductive (conductivity of 10µsiemens or greater; a dielectric constant of 10 or greater): Acids, caustics, and water-containing fluids fall into this category.

Industrial Grade Probe Types

A typical probe consists of a probe rod / cable, process connection, and a seal. Each probe is designed for specific application conditions. The following is a description of the various probe types:

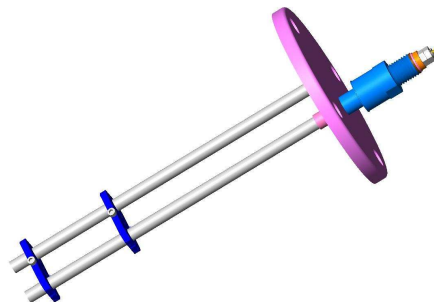
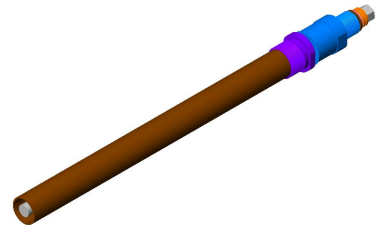


BARE PROBE (MODELS C1A & C1F)

Bare probes are used in non-conductive media. The rods are ½” in diameter, and have a maximum length of 234”. The probes can be bent to 90° at the factory. A bent probe can provide a vertical configuration, when a horizontal connection is used; and a horizontal configuration can be provided for a vertical connection. Typical process connection is ¾” NPT.

BARE STILLWELL PROBE (MODEL C1D)

Bare Stillwell Probes are used to provide a linear (parallel) ground reference in applications involving non-parallel vessel walls (horizontal cylinder), non-metallic vessels, or when the probe is mounted more than 10” away from the vessel wall. They can also provide some damping in heavy turbulence processes. Use in fluids with a viscosity less than 250 centipoise. Typical process connection is 1” NPT

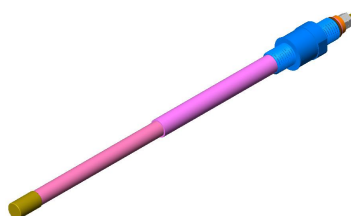
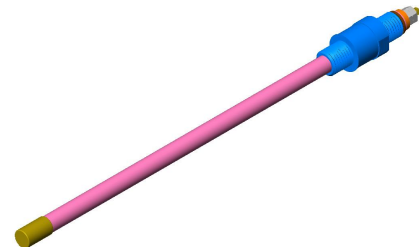


BARE REFERENCE ROD PROBE (MODEL C1E)

Bare Reference Rod Probes are used to provide a linear (parallel) ground reference in applications involving non-parallel vessel walls (bullet tanks), non-metallic vessels, or when the probe is mounted more than 10” away from the vessel wall. They are primarily used in media with viscosities between 250 – 20,000 centipoise. Typical process connection is 3” 150# ANSI Flange.

INSULATED PROBE (MODELS C2A & C2F)

Insulated probes are used in conductive media. The rods are ½” in diameter with 0.625” of PFA Teflon®, and have a maximum length of 234”. The probes can be bent to 90° at the factory. A bent probe can provide a vertical configuration, when a horizontal connection is used; and a horizontal configuration can be provided for a vertical connection. Typical process connection is ¾” NPT.

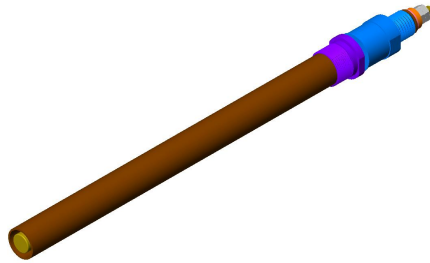
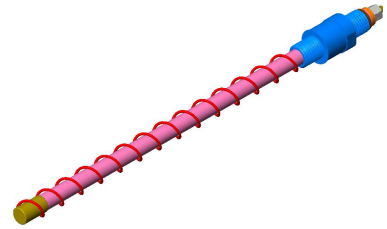


INSULATED INACTIVE SHEATH PROBE (MODEL C2B)

The “Inactive Sheath” blocks the upper portion of the probe from registering any capacitance change. This is useful if the probe is horizontally mounted in a nozzle, preventing any debris or “build-up” from causing a false level indication. It is also used in liquid – liquid interface applications to block the air / oil interface, allowing the instrument to measure the oil / water interface.

INSULATED REFERENCE WIRE PROBE (MODEL C2C)

Reference wire probes are used to provide a “ground” reference in non-metallic vessels. This probe is limited to clean liquids, as any “build-up” on the wire will result in a measurement error. Typical process connection is 3/4” NPT.

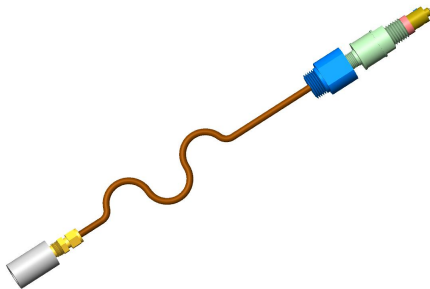
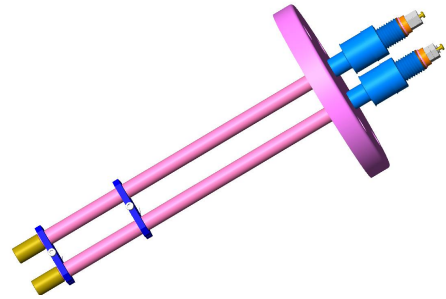


INSULATED STILLWELL PROBE (MODEL C2D)

Insulated Stillwell Probes are used to provide ground reference in non-metallic vessels. They can also provide some damping in heavy turbulence processes. Use in fluids with a viscosity less than 250 centipoise. Typical process connection is 1” NPT

INSULATED REFERENCE ROD PROBE (MODEL C2E)

Insulated Reference Rod Probes are used to provide ground reference in non-metallic vessels. They are primarily used in media with viscosities between 250 – 20,000 centipoise. Typical process connection is a 3” 150# ANSI Flange.

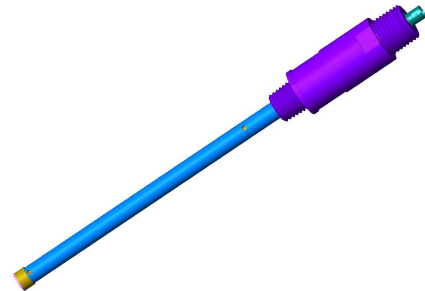


FLEXIBLE PROBE (MODEL C3A)

Flexible Probes are used in high dielectric / high conductivity fluids with a measurement range between 10 and 150 feet. The cable consists of a 1/4” stranded stainless steel cable, coated with Teflon to a diameter of 5/16”. Typical process connection is 1” NPT

CRYOSENSE™ CRYOGENIC PROBES (MODELS C4A, C4H, & C4J)

CRYOSENSE™ Probes are specifically designed for the measurement of industrial cryogenic fluids. They are a custom “Stillwell” style. The C4A probe is used in a variety of fluids. The C4H is specially designed for Liquid Hydrogen. The C4J is similar to the C4A, but with special materials designed not to ignite in Liquid Oxygen. Typical process connection is 3/4” NPT.

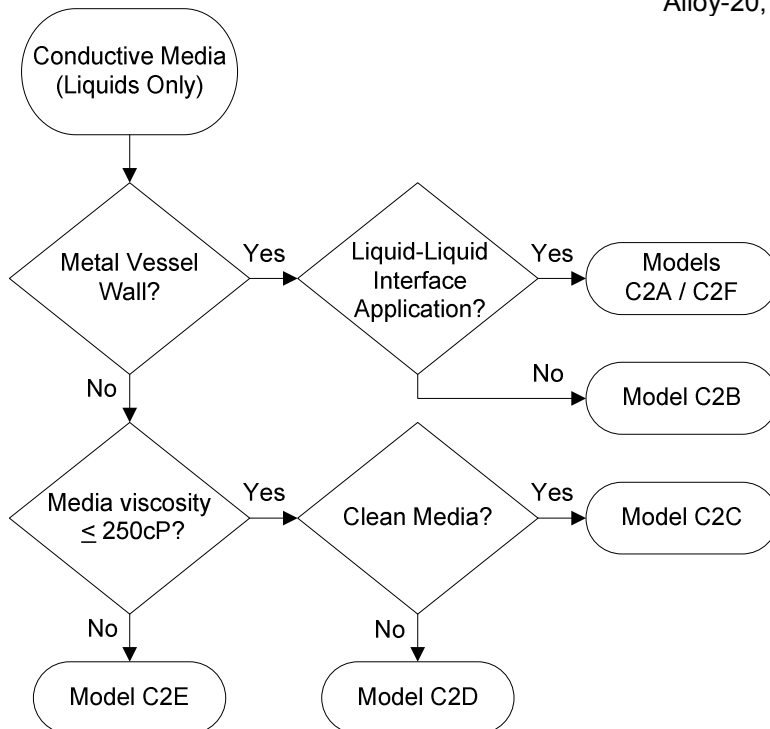
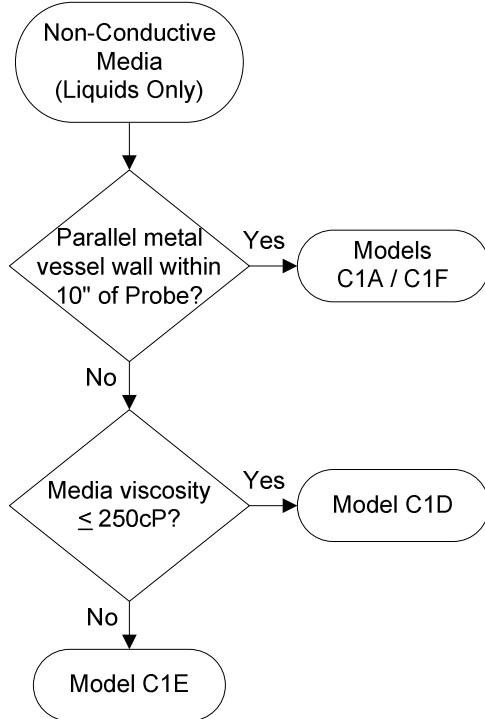


Probe Selection

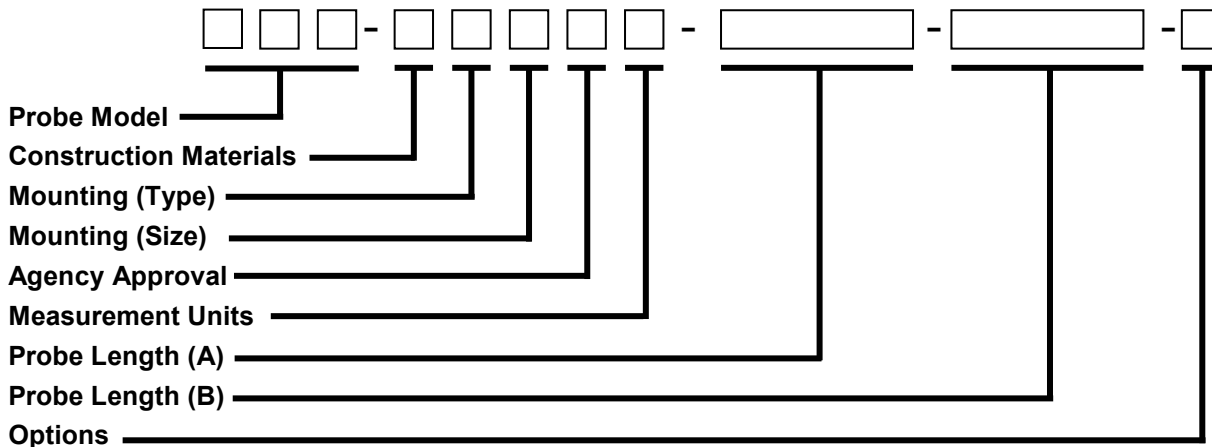
Selecting the right probe for your application is the most important part of applying an RF Capacitance system for your process. Using the flowcharts on the next page, you will be able to select a probe, offering a linear change in capacitance, as well as maximizing the amount of capacitance per unit level change. These flowcharts are to be used as a guideline only. Contact AMI for expert applications assistance

General Guidelines

- Use Bare probes for non-conductive media
- Use Insulated probes for conductive media. If uncertain of the conductivity value, use an Insulated probe.
- Consider using a Flexible probe for measurement ranges greater than 120". While the Bare and Insulated probes are available up to 234" in length, they can be difficult to handle during installation.
- Use Cryosense™ or Scientific Grade probes for cryogenic fluid applications.
- Use an Inactive Sheath probe for liquid-liquid interface applications.
- A "Reference" probe provides both plates of the capacitor, eliminating the use of the vessel wall. Use a Reference probe when measuring non-conductive media in a vessel where the distance is not constant (parallel) from the probe, or if the probe will be mounted more than 10" (254mm) from the vessel wall. A Reference probe must be used when measuring any media in a non-metallic vessel.
- Select a probe of the appropriate material for your application. 316 SS, Hastelloy-C®, Monel®, Alloy-20, Hastelloy-B®, Titanium, and Tantalum



Industrial Grade Probe Model Configuration



Probe Model

Description	Code
Bare Rod	C1A
Bare Stillwell	C1D
Bare Reference Rod	C1E
Bare Bent Rod	C1F
Insulated Rod	C2A
Insulated Inactive Sheath	C2B
Insulated Reference Wire	C2C
Insulated Stillwell	C2D
Insulated Reference Rod	C2E
Insulated Bent Rod	C2F
Flexible Cable	C3A
Cryogenic Liquid	C4A
Liquid Hydrogen (Cryogenic)	C4H
Liquid Oxygen (Cryogenic)	C4J

Construction Materials

Description	Code
316 SS (C1x)	0
Hastelloy-C [®] (C1x)	1
Monel [®] (C1x)	2
Alloy-20 (C1x)	3
Hastelloy-B [®] (C1x)	4
Titanium (C1x)	5
Tantalum (C1x)	6
304 SS (C4x)	7
316 SS w/ Teflon [®] (C2x, C3A)	A
Hastelloy-C [®] w/ Teflon [®] (C2x)	B
Monel [®] w/ Teflon [®] (C2x)	C
Alloy-20 w/ Teflon [®] (C2x)	D
Hastelloy-B [®] w/ Teflon [®] (C2x)	E
Titanium w/ Teflon [®] (C2x)	F
Tantalum w/ Teflon [®] (C2x)	H

Probe Length (B)

This dimension is used for C2B, CxF, and C4x probes only. For C2B probes this is the length of the inactive sheath. For the CxF probes, this is the 'B' dimension. The maximum length is limited by the formula: 'A' dim. + 'B' dim. + 3" ≤ 234". For C4x probes, this field represents the Active Length, which is defined as 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. Probe length fields are fixed as follows: xxx.x inches, xxx.x feet, xx.xx meters, and xxxxx millimeters. Use leading zeros if necessary to supply all five characters (the decimal point counts as a character). For probes not using this field, fill this space with zeros, using the format from Probe Length (A).

Mounting Type

Description	Code
NPT (Not C1E, C2E)	A
150# ANSI Flange	B
300# ANSI Flange	C
600# ANSI Flange	D
Sanitary Fitting (C2A)	E
Conflat (C4x)	1

Construction Materials

Description	Code
½" (ANSI Flange), (NPT – C4A & C4J)	A
¾" (ANSI Flange & NPT)	0
1" (ANSI Flange, NPT, & Sanitary)	1
1-½" (ANSI Flange, NPT, & Sanitary)	5
2" (ANSI Flange, NPT, & Sanitary)	2
3" (ANSI Flange & NPT)	3
4" (ANSI Flange & NPT)	4
6" (ANSI Flange & NPT)	6
8" (ANSI Flange & NPT)	8
1.33" (Conflat)	B
2-1/8" (Conflat)	C
2-3/4" (Conflat)	D

Probe Length (A)

This field represents the insertion length of the probe, which is defined as the length of the probe, measured from the bottom probe tip to the bottom of the mounting connection. C1x, C2x, and C4x probes are available in lengths up to 234". The C3A probe is available in lengths up to 150". For C4x probes, the minimum insertion length is Probe Length (B) + 2.375". For CxF probes this is the 'A' dimension. Probe length fields are fixed as follows: xxx.x inches, xxx.x feet, xx.xx meters, and xxxxx millimeters. Use leading zeros if necessary to supply all five characters (the decimal point counts as a character).

QuikShip provides a lead time of one week after receipt of order. To take advantage of QuikShip, simply select only the shaded options. QuikShip applies to orders of five units or less. Contact your local representative for lead times of higher quantity orders or non-shaded options.

Agency Approval

Description	Code
No Approval (All Probes)	0

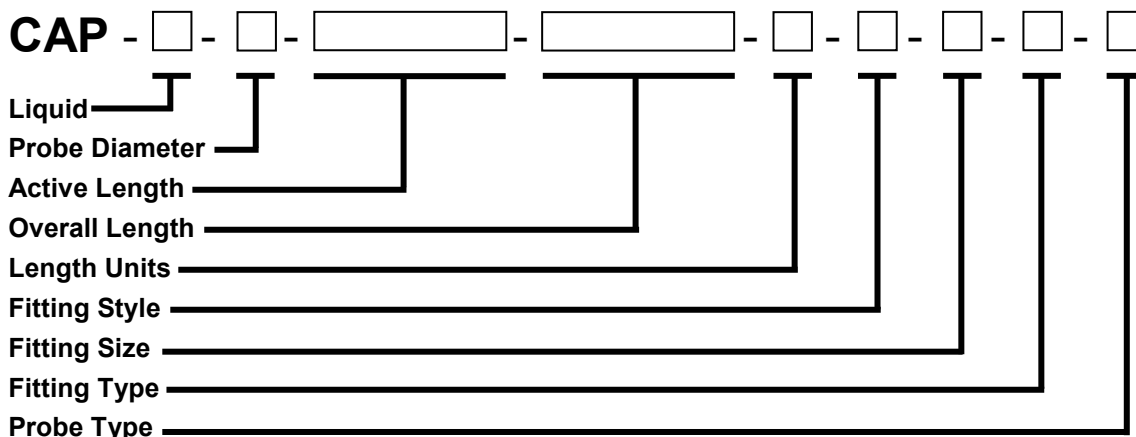
Measurement Units

Description	Code
Inches	0
Feet	1
Millimeters	2
Meters	3

Options

Description	Code
None	0
Seal Welding (ANSI Flanges)	1

Scientific Grade Probe Model Configuration (not for use in Hazardous Areas)



Liquid

Description	Code
Liquid Nitrogen	N2
Liquid Oxygen	O2
Liquid Hydrogen	H2
Liquid Carbon Dioxide	CO2

NOTE: Use commonly recognized chemical name for other fluids

Probe Diameter

Description	Code
1/4" Outer Diameter	1/4
3/8" Outer Diameter	3/8

NOTE: For 1/2" and 3/4" diameter use Industrial Grade probes

Length Units

Description	Code
Inches	IN
Feet	FT
Millimeters	MM
Centimeters	CM
Meters	M

Fitting Style

Description	Code
Nylon Swagelock	N/SW
SS Swagelock	SS/SW
Flange	F
Welded	W

NOTE: For NPT Threaded connections, selected "Welded" style

Fitting Size

Description	Code
1/4" (NPT & M174 Fitting Type)	1/4
3/8" (NPT & M174 Fitting Type)	3/8
1/2" (NPT & M174 Fitting Type)	1/2
3/4" (M174 Fitting Type)	3/4
1.33" (Conflat Fitting Type)	1.33
2-1/8" (Conflat Fitting Type)	2-1/8
2-3/4" (Conflat Fitting Type)	2-3/4

NOTE: For other sizes contact the factory

Fitting Type

Description	Code
NPT (Swagelock Fitting Style)	NPT
M174 (Welded Fitting Style)	M174
Conflat (Flange)	Conflat
ANSI (Flange)	ANSI

NOTE: M174 provides an NPT fitting welded to the probe. The M174 fitting must be used when integrally mounting the probe with the instrument.

Probe Type

Description	Code
Standard	S
Custom	C

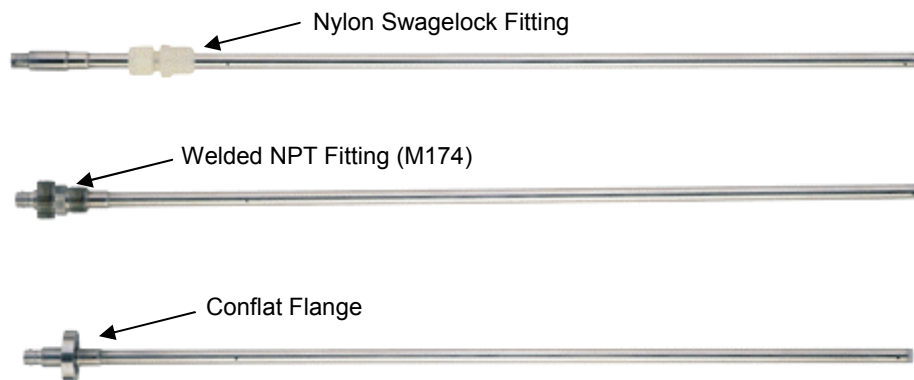
Active Length

This is defined as 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. Contact the factory for active lengths exceeding 140".

Overall Length

This is defined as the total length of the probe, measured from the bottom tip to the top of the BNC Connector. The minimum overall length is the Active Length + 3.25".

Scientific Grade Probes

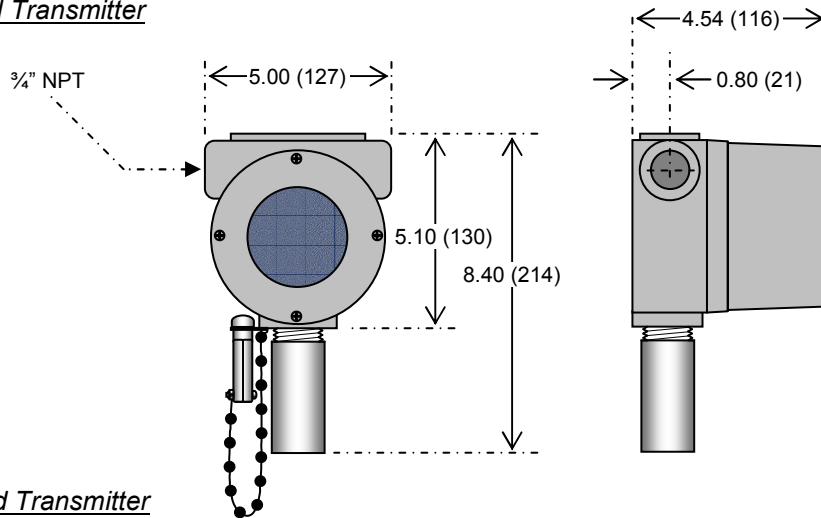


Probe Specifications

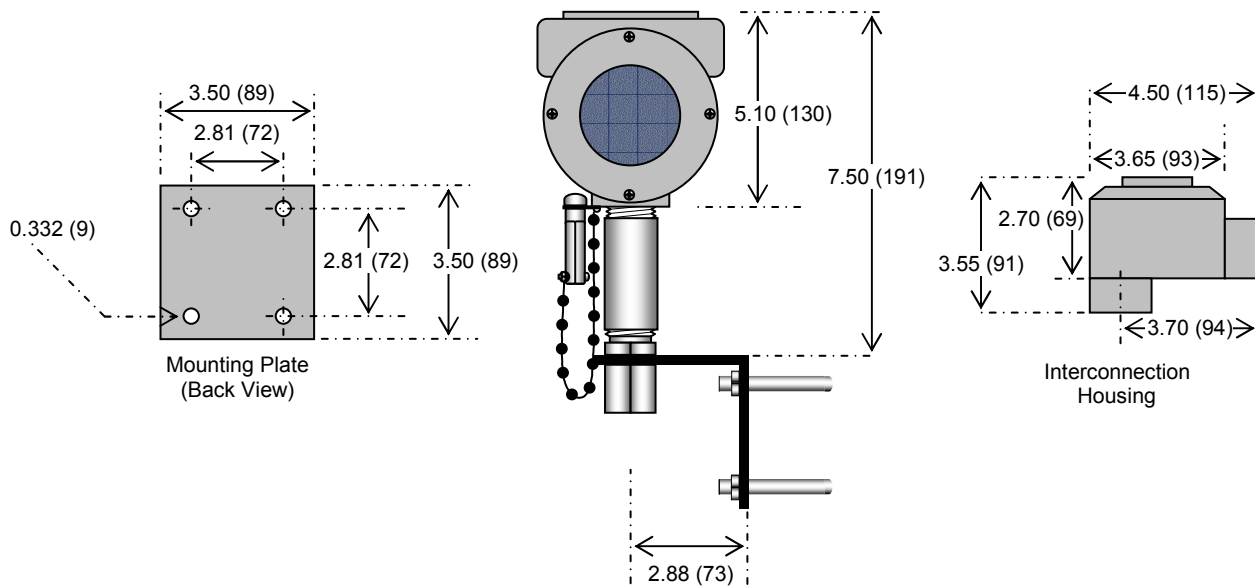
Description	Specification
Process Temperature Range @ 1psig (1bar)	C1x -100°F to 400°F (-73°C to 204°C)
	C2x -100°F to 400°F (-73°C to 204°C)
	C3A -50°F to 285°F (-45°C to 140°C)
	C4A -430°F to 180°F (-257°C to 82°C)
	C4H -430°F to 250°F (-257°C to 121°C)
	C4J -430°F to 400°F (-257°C to 204°C)
Process Pressure Range @ 100°F (37°C)	C1x Vacuum to 2,000 psig (0 bar to 139 bar)
	C2x Vacuum to 2,000 psig (0 bar to 139 bar)
	C3A 1 psig to 100 psig (1 bar to 8 bar)
	C4x Vacuum to 1,000 psig (0 bar to 70 bar)

Model 175 Dimensional Drawings – inches (mm)

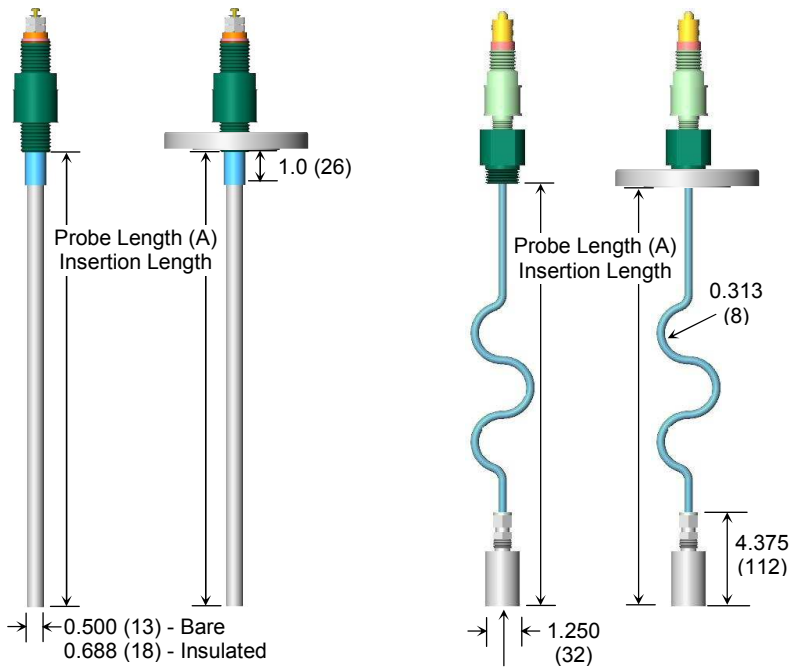
Integral-mounted Transmitter



Remote-mounted Transmitter

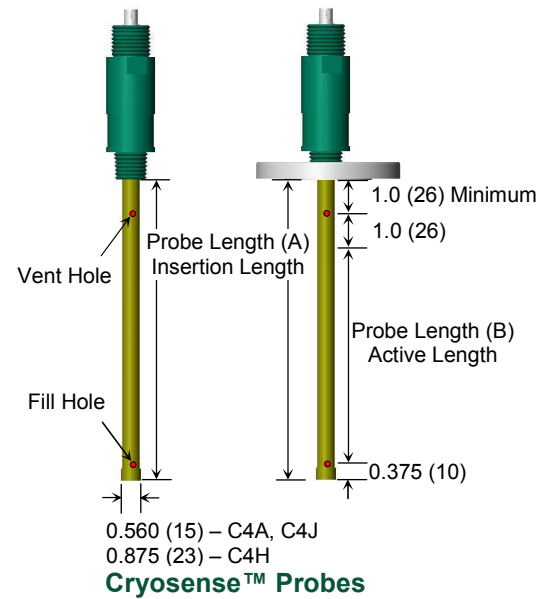


Probe Dimensional Drawings – inches (mm)

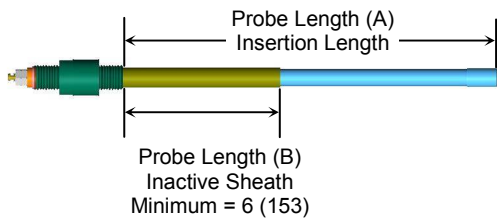


Bare & Insulated Probes

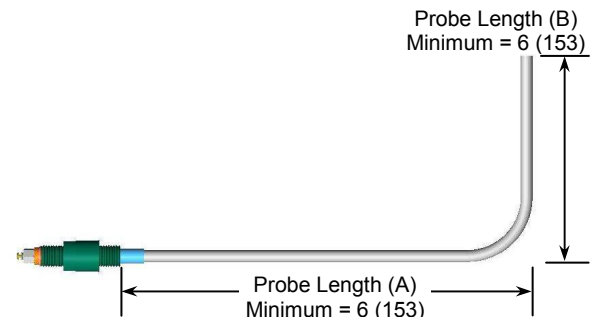
Flexible Probes



Cryosense™ Probes



Inactive Sheath Probe



Bent Probes

How to Proceed

Selecting a new Model 175 transmitter is a snap!

1. Contact your AMI sales representative and ask for an Applications Data Sheet.
2. Complete the sheet
3. Return the sheet for evaluation

An experienced Applications Engineer will evaluate your application, and select the best instrument to meet your needs. That's it!! It is that simple. So what are you waiting for?



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