



Capacitance Series

*A Capacitance Level Solution for **Every Application.***

Capacitance Series



A capacitance level solution for every application.

With 20+ probe styles and service to 1500 psig and 850 °F, Delta has a capacitance solution for the more unique and demanding level applications of today's industries. Delta's probes are available in a variety of materials, including carbon steel, stainless steel, monel, Hastelloy®, Teflon™, ceramic, and others upon request. With 45+ years of expertise in capacitance technology, Delta's engineered products provide reliable and accurate operation in critical applications.

Engineered Capacitance Solutions

105 Capacitance Level Switch **52**

DPDT

107 Capacitance Level Switch **54**

Multi-point, Two or Four DPDT

173 Capacitance Level Transmitter **56**

Loop Powered

P21 Capacitance Probe **58**

Tubular Ground

P25 Capacitance Probe **60**

High Temperature & Pressure Service, Tubular Ground

P26 Capacitance Probe **62**

High Temperature & Pressure Service, Slotted Tubular Ground for Interface Service

P31 Capacitance Probe **64**

External Cage, Vertical

P51 Capacitance Probe **66**

General Purpose Service, Solid Rod

P52 Capacitance Probe **68**

Heavy-Duty Service

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High Temperature & Pressure Service

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High Temperature & Pressure Service, Tubular Ground

P57 Capacitance Probe **76**

Parallel Ground

P61 Capacitance Probe **78**

Sanitary Service

P62 Capacitance Probe **80**

Sanitary Service, Tubular Ground



P66 Capacitance Probe **82**

Sanitary Service, Metal Ion Free

P68 Capacitance Probe **84**

Sanitary Service, Metal Ion Free, Parallel Ground

P71 Capacitance Probe **86**

Flexible Cable

P72 Capacitance Probe **88**

Flexible Cable, Parallel Ground

P80 Series 1 Capacitance Probe **90**

Dry Granulated Solids & Powders, Rigid Rod

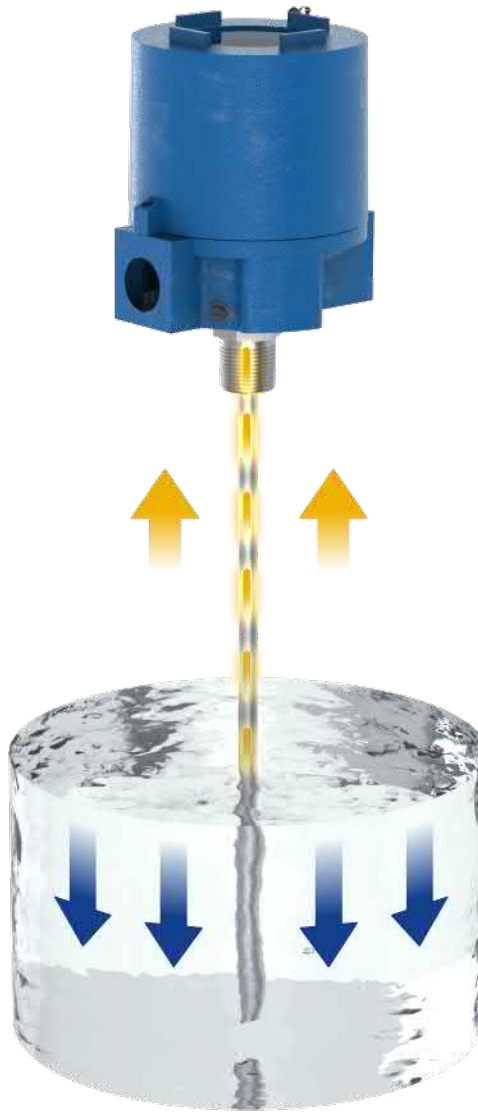
P80 Series 2 Capacitance Probe **92**

Dry Granulated Solids & Powders, Flexible Cable

P91 Capacitance Probe **94**

Floating Probe for Oil Skimmer

Theory of Operation



Capacitance technology senses how much of a sensing probe is covered by a liquid. This is accomplished by generating a radio frequency pulse of energy which travels from the sensing probe to the ground reference (usually the tank wall). The amount of liquid between the two determines how much energy is transferred. The amount of energy flowing is a highly repeatable measure of the liquid level or interface position. The amount is compared to an internal reference and produces a switching action or 4-20 mA direct current signal output at a selected material elevation.

Electronics Housings



4X Housing



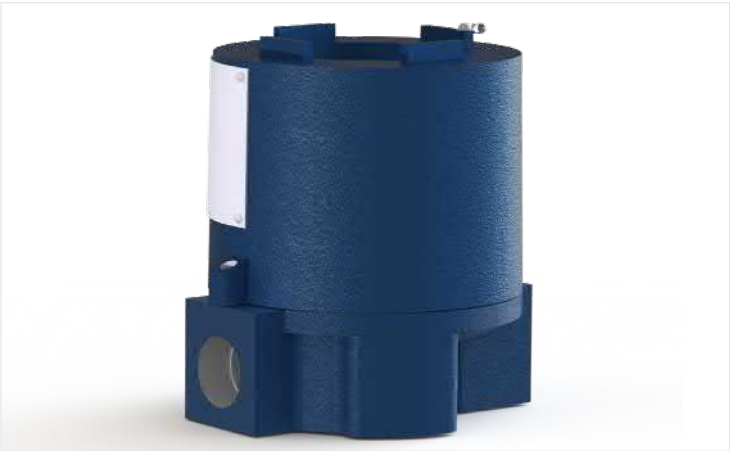
PH4 Housing



7T Housing

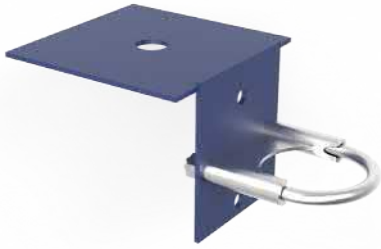


PH7 Housing



7W Housing

Options



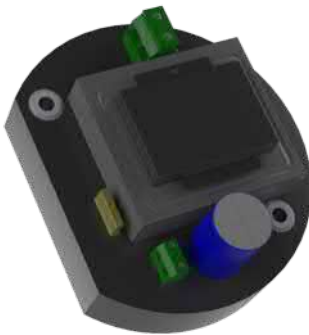
Mounting Bracket

Available on certain models, the optional 'PSM' option offers a mounting bracket as well as for surface or 2 inch pipe stand mounting.



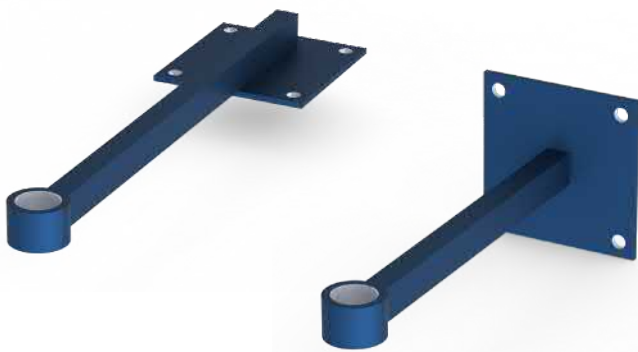
Display Module

The optional '328' display module offers a 3.5 digit display for local measurement information.



Power Supply

The optional 'PS1' power supply module offers 120 VAC to 24 VDC power mounted in the enclosure.



Cable Clamp Support Arms

Available on the P80 Series 2, the optional 'VBKT' and 'HBKT' carbon steel support arms offer cable or pipe clamp support for vertical and horizontal applications.



Temperature Extension

The optional temperature extensions are used to extend the electronics or remote cable away from high temperature processes to lower the ambient temperature. The temperature extension length measurement is separate from the total insertion length and inactive shield measurement.

Weight

Available on cable probes, the optional 'WT' offers a 6 lbs, 1.5 in outside diameter weight on the bottom termination to reduce probe movement.

Vacuum Service

The 'VR' option offers special probe sealing to permit reliable operation in vacuum service.

Inter gland Vent Connection

The 'IC' option on the Model P55 and P56 offers an inter gland vent connection on the probe for toxic and hazardous applications.

Display Window

The 'DW' option on the Model 107 offers a display window for external viewing of the standard LCD display.

Integral Mount

Electronics can typically be mounted integrally to the probe or remotely via PVC or FEP cable.

Probe Insertion Measurement

Probe insertion is measured from the tip of the probe to the base of the process connection.

Optional Inactive Shield

The optional inactive shield includes a portion of the probe that is not actively sensing the level. The inactive length is included in the total insertion length of the probe.



Model 105 • Capacitance Level Switch, DPDT

Features

- ⚡ RF admittance measuring circuitry
- ⊗ Insensitive to process coatings and buildup
- ⚡ Integral or remote electronics housing
- ⚡ Heavy-duty sealed relay contacts
- ↕ High or low relay fail-safe action
- 🕒 Adjustable time delay of 1 to 60 seconds
- 🔧 Epoxy sealed electronics module survives harsh environments and area vibration
- ✓ Application specific probe shapes, styles, configurations, and process connections
- 🛡️ Sealed relay for corrosive conditions

Description

The Delta Control **Model 105** Capacitance Level Switch uses **RF Admittance technology** to produce a switching action when a material level crosses the set point. The interface position of two liquids with different dielectric constants is **accurately detected**, including with cloudy interface conditions. One of the liquids should be nonconductive. Model 105 is not sensitive to specific gravity (SPG) variations.

Many probe configurations are available. Integral mounting produces a simple one-piece unit generally resulting in the **lowest installed cost**. Alternately, the Model 105 electronics module may be connected via coaxial cable up to 50 feet away.

Horizontal mounting is usually preferred for alarm action as it provides the sharpest switch point definition. Model 105 must be mounted vertically or at an angle to use the adjustable differential action. The material level must move past the two points on the probe where switch action is to occur.



Model 105

Specifications

Range (Equivalent Admittance):	0 pF to 1000 pF (differential adjustable 1% to 50% of range)
Relay Contacts:	Sealed for corrosive conditions 5 A at 250 ACV DPDT
Time Delay:	0.25 s to 60 s
Basic Supply Voltage (Optional):	120 ACV, 24 DCV
Ambient Operating Temperature:	-40 °F to +185 °F (-40 °C to +85 °C)
Temperature Effect (0 °F to 150 °F):	± 0.25 SU Typically < 0.10 in (2 mm) (water)
Housings:	4X Hose-proof; Class 1, Division 1, Groups BCD, EFG explosion-proof
Housing Material:	Aluminum, PVC, stainless steel (other materials available)
Certifications:	Third Party Listed by CSA NRTL/C (USA and Canada) Class I, Groups B, C and D; Class II, Groups E, F and G; Class III; Encl 4X
Housing Option:	

Model 107 • Capacitance Level Switch, Multi-point, Two or Four DPDT Relays

Features

- ⚡ RF admittance type circuitry
- ⊗ Insensitive to process coatings and buildup
- 📺 LCD direct reading level display
- 👆 Digital pushbutton setup and calibration
- ⊕ Simple, two point calibration without emptying tank
- ↔ Direct or reverse calibrated
- 🔧 Built-in self-diagnostics
- ⬇ Integral or remote mounted electronics housing
- 🌡 Process temperature -350 °F to +750 °F (-210 °C to 435 °C)
- ↕ High or low relay fail-safe action
- 🕒 Adjustable time delay of 1 to 60 seconds
- 🔩 Epoxy sealed electronics module
- ⬆ Pressure Rating: Vacuum to 10 000 psig (-1 bar to +700 bar)
- ✓ Application specific probe shapes, styles, configurations, and process connections
- 🔩 Wetted materials include stainless steel, PTFE, Kynar®, Monel, and ceramic

Description

The Delta Controls **Model 107** Multi-point Capacitance Switch uses **RF admittance technology** to produce switching action when a material level crosses the switchpoint. The interface position between two liquids with different dielectric constants is **accurately detected**, including with cloudy interface conditions. One of the liquids should be nonconductive. Model 107 is not sensitive to specific gravity (SPG) variations.

Many probe configurations are available. The electronics module can be remotely mounted.

107 features digital circuitry, pushbutton setup, LCD display, and is potted for **severe environments**. Simple, two point calibration allows calibration and recalibration to occur without emptying tank. On/off elevation is separately selectable for each of the **two 5 A DPDT relays**.



Specifications

Level range (Independently Programmable):	On and off set points along entire probe length, 0 pF to 8000 pF
Number of Relays:	Two 5 A at 250 ACV DPDT
Time Delay:	0.25 s to 30 s
Basic Supply Voltage:	120 ACV (optional 240 ACV or 24 DCV)
Ambient Operating Temperature:	-40 °F to +180 °F (-40 °C to +85 °C)
Temperature Effect (0 °F to 150 °F):	Typically < 0.25 in (6 mm) (water)
Housing:	4X hose-proof, 6 submersible, Class 1, Division 1, Groups BCD, EFG explosion-proof optional
Housing Material:	Aluminum, PVC, stainless steel
Certifications:	Third Party Listed by CSA NRTL/C (USA and Canada)
Housing Option:	Class I, Groups B, C and D; Class II, Groups E, F and G; Class III; Encl 4X

Model Numbering System

MODEL EXAMPLE	MODEL	-	SUPPLY VOLTAGE	-	HOUSING RATING	-	MOUNTING LOCATION	-	OPTIONS ²
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107C

1

7WI

AA

AA

MODEL	DESCRIPTION
107C	Capacitance level switch, multi-point, 2 DPDT relays
107D	Capacitance level switch, multi-point, 4 DPDT relays

SUPPLY VOLTAGE	DESCRIPTION
1	120 ACV
2	240 ACV
3	24 DCV

HOUSING RATING	DESCRIPTION
4XR	Environment-proof, 4X, PVC, Classes 1 & 2, Divisions 1 & 2, Groups ABCD, EFG, remote mount
7WI	Explosion-proof, 7X, aluminum, Classes 1 & 2, Divisions 1 & 2, Groups BCD, EFG, integral mount
7WR	Explosion-proof, 7X, aluminum, Classes 1 & 2, Divisions 1 & 2, Groups BCD, EFG, remote mount
7TI	Explosion-proof, 7X, 300 Stainless Steel, Classes 1 & 2, Divisions 1 & 2, Groups BCD, EFG, integral mount
7TR	Explosion-proof, 7X, 300 Stainless Steel, Classes 1 & 2, Divisions 1 & 2, Groups BCD, EFG, remote mount
AA	None

MOUNTING LOCATION	DESCRIPTION
AA	None (integral)
**P	** feet of interconnecting cable for remote mounting, includes sensor and compensation cable, 160° PVC
**D	** feet of interconnecting cable for remote mounting, includes sensor and compensation cable, 400° FEP

OPTIONS ²	DESCRIPTION
AA	None
PSM	2 in pipe stand or surface remote kit ³
DW	Display window for 4X hoseproof housing ⁴

Notes:

² A hyphen will separate multiple options selected

³ PSM, **P, **D only available with remote mount housing

⁴ DW only available with 4XR housing

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

Model 173 • Capacitance Level Transmitter, Loop Powered, Digital Circuitry

Features

- ◆ Optional HART® Protocol
- 📊 10-point linearization for irregularly shaped tanks
- 🔧 Digital RF admittance measuring circuitry
- ⊗ Insensitive to process coatings and buildup
- ⚙️ Simple, two point calibration
- ↺ Reverse calibrated capability
- 🔧 Built-in self-diagnostics
- ✓ Integral or remote electronics module
- 🛡️ Optional corrosion resistant NACE MR-01-75
- 🔧 Wide choice of wetted materials including 316 Stainless Steel, PTFE, Alloy 20, PVDF, Monel, and ceramics
- 📺 LCD digital display with 4 key input
- 🔧 Epoxy sealed electronics module survives harsh environments and area vibration
- ⚡ Built-in voltage spike protection, heavy 12 gauge terminals

Description

The Delta Controls **Model 173** Capacitance Level transmitter transmits a 4-20 mA direct current signal proportional to the level or volume in a vessel. Model 173 can be programmed for up to **10 fluid elevations** to linearize the output signal in irregularly shaped tanks. 173 has built-in self-diagnostic. The potted electronics is capable of handling **severe environments** in most difficult services.

The 173 is easily calibrated using two levels in the tank. No need to fill or empty the vessel as the second known elevation is acquired by a simple level change.



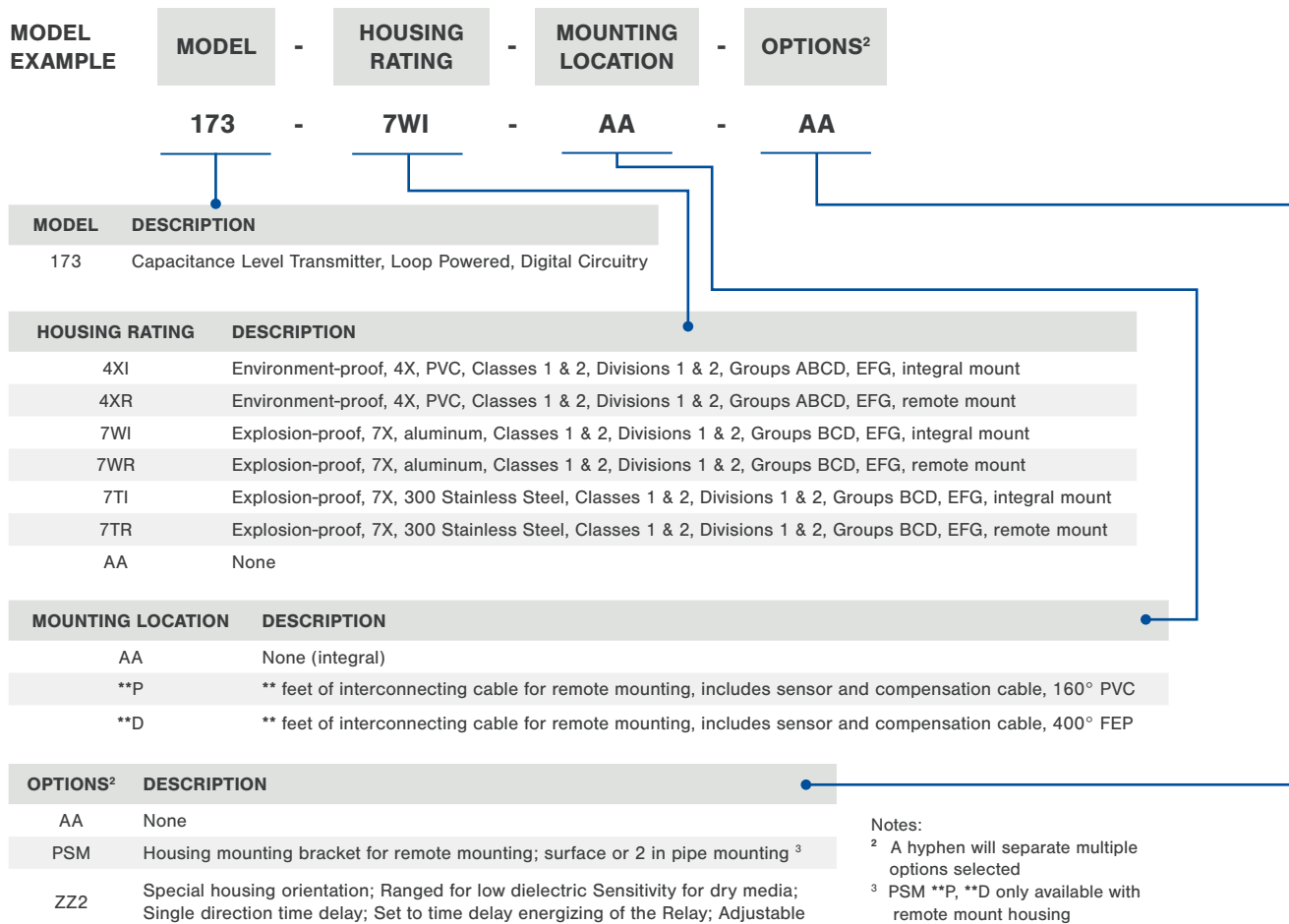
Model 173

Specifications

Level Span:	10 pF min
Range:	2000 pF max
Zero Suppression:	≤ 2000 pF
Output:	4-20 mA, 2-wire, loop powered, isolated ≤ 0 pt linearization
Loop Supply Voltage Range:	13 DCV to 35 DCV
Loop Impedance:	450 Ω at 24 V max 1000 Ω at 35 V max
Ambient Operating Temperature:	-20 °F to +175 °F (-29 °C to +79 °C)
Accuracy and Stability:	≤ 0.2% of full scale (limited to 0.2 pF)
Temperature Effect:	0 °F to +150 °F (-18 °C to 67 °C) < 0.2 in (water)
Housing:	4X hose-proof; 6 submersible; Class 1, Division 1, Groups BCD, EFG explosion-proof optional
Housing Material:	Aluminum, PVC, stainless steel HART® Protocol
Certifications:	
Housing Option:	Third Party Listed by CSA NRTL/C (USA and Canada) Class I, Groups B, C and D; Class II, Groups E, F and G; Class III; Encl 4X



Model Numbering System



REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

Model P21 • Capacitance Probe, Tubular Ground

Features

- High inherent gain sensitivity
- Allows full scale calibration over a modest level change
- Insensitive to surface turbulence
- Output signal is linear to liquid depth
- Calibration can be done outside the vessel
- Use for sensing light hydrocarbons and materials with low dielectric constants
- Linear output in irregular tanks
- Built-in ground reference for plastic and lined tanks

Description

The Delta Controls **Model P21** Capacitance Probe has **high intrinsic gain**. It is equipped with a wrap around concentric ground reference sheath which acts as a ground reference when used in plastic and lined tanks. The linear ground sheath allows it to be used with transmitters in horizontal cylindrical tanks and other containers with nonlinear sidewalls.

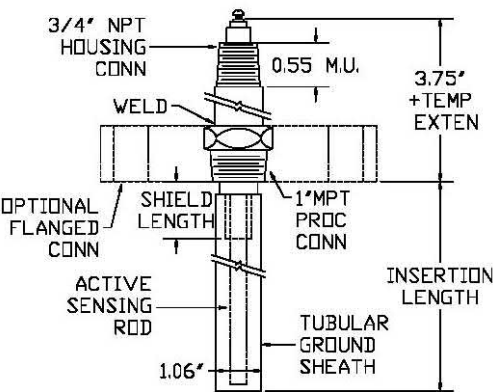
The P21 requires only a small, one inch National Pipe Thread (NPT) process connection. It has high inherent gain sensitivity and is useful on materials having low dielectric constants, such as **light hydrocarbons**. It allows full scale calibration over a modest level change and calibration can be done outside the vessel.



Model P21

Specifications

Working Pressure:	+1500 psig (+103.4 bar)
Working Temperature:	-460 °F to +450 °F (-273 °C to +232 °C)
Insertion Length:	≤ 20 ft (6 m)
Process Connection:	1 in MPT minimum
Threaded:	1.0 in to 2.0 in
Flange:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, Hastelloy® C-276, PTFE, carbon steel
Ground Sheath:	Stainless steel (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
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P21Y - *. * - AA - 1" MPT - AA

MODEL	DESCRIPTION
P21Y	Capacitance Probe, Tubular Ground, 316 Stainless Steel
P21G	Capacitance Probe, Tubular Ground, Hastelloy C-276

INSERTION LENGTH	DESCRIPTION
*. *	*. * in of insertion (20 ft max)

SHIELD & EXTENSION	DESCRIPTION
AA	None
T*	* in temperature extension
I*	* in inactive shield

PROCESS CONNECTION	DESCRIPTION
	Refer to page 94 for M/N
	MPT sizes 1 in minimum
	Flange sizes 1.5 in to 4 in, Classes 150, 300, 600

OPTIONS ²	DESCRIPTION
AA	None
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing

Notes:
² A hyphen will separate multiple options selected

- REQUIRED ORDERING INFORMATION:**
- Detailed model number
 - Tag or nameplate detail (if required)
 - Documentation & testing packages (if required, refer to Additional Resources)

- APPLICATION DETAILS:**
- Process fluid or material name
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure

Features

- For high temperature and high pressure services
- High inherent gain sensitivity
- Allows full scale calibration over a modest change and narrow ranges
- Works with liquids carrying entrained solids low dielectric constant
- Insensitive to surface turbulence
- Built-in ground reference improves sensitivity
- Linear output signal in irregular tanks
- Allows calibration to be done outside the vessel
- Resists flowing currents, waves and vortices

Description

The Delta Controls **Model P25** Capacitance Probe is intended for high temperature and pressure chemical processing as well as steam and slurry applications. It also greatly **resistants corrosion** and is equipped with **triple sealing** for utmost safety and reliability.

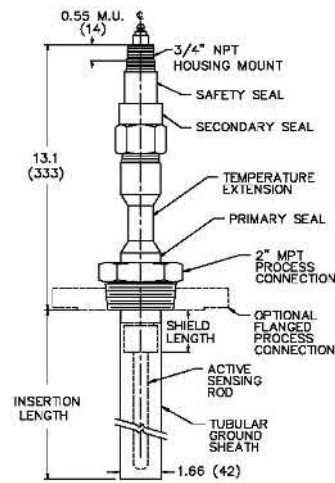
The P25 is fitted with a wrap-around tubular ground reference which allows **full scale range calibration** over just a few inches of conductive liquid. The ground tube is relatively large and provides an open bore. It can be used when the liquid is highly turbulent or carries entrained solids. The open bore also allows **fast response speed** and resists plugging. The tubular ground reference sheath produces a linear output signal when used in horizontal cylinders or other tanks with nonlinear sidewalls. The electronic module/probe combo **can be calibrated outside the vessel** for convenience, safety, and without varying the process liquid level.



Model P25

Specifications

Working Pressure:	≤ +650 psig (+44.8 bar)
Working Temperature:	≤ +750 °F (+399 °C)
Insertion Length:	≤ 10 ft (3 m)
Process Connection:	2.0 MPT minimum
Threaded:	2.0 in
Flange:	≥ 2.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel
Ground Sheath:	316 Stainless Steel (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P25Y	-	**. *	-	AA	-	2" MPT	-	AA
MODEL	DESCRIPTION								
P25Y	Capacitance Probe, High Temperature and Pressure Service, Tubular Ground; 316 Stainless Steel								
INSERTION LENGTH	DESCRIPTION								
**. *	**. * in of insertion (120 in max)								
SHIELD & EXTENSION	DESCRIPTION								
AA	None								
T*	* in temperature extension								
I*	* in inactive shield								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT size 2 in minimum								
	Flange sizes ≥ 2 in, Class 150								
OPTIONS²	DESCRIPTION								
AA	None								
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Model P26

• Capacitance Probe, High Temperature and Pressure Service,
Slotted Tubular Ground for Interface Service

Features

- For high temperature and high pressure services
- Slotted ground reference provides accuracy in interface service
- High inherent gain sensitivity
- Allows full scale calibration over a modest level change and narrow ranges
- Works with liquids carrying entrained solids and low dielectric constant
- Insensitive to surface turbulence
- Built-in ground reference improves sensitivity
- Linear output signal in irregular tanks
- Allows calibration to be done outside the vessel
- Strong and resists flowing currents, waves, vortices

Description

The Delta Controls **Model P26** Capacitance Probe is intended for high temperature/pressure chemical processing and steam/slurry applications. It is also greatly resistant to corrosion and is equipped with triple sealing for utmost **safety** and **reliability**.

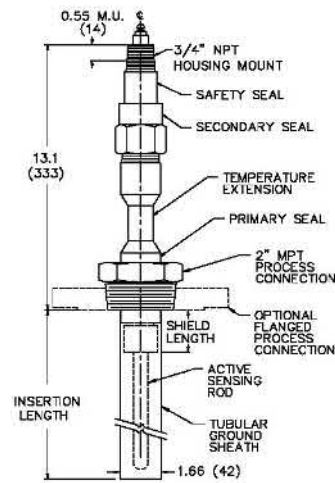
The P26 has vertical slots milled into the tubular ground reference. These slots are offset and overlapping so that the interface liquids are always **free to flow** in or out. This is a necessity when used for interface service. The interface transition zone must be kept close to the sensing rod by a solid tube wall.



Model P26

Specifications

Working Pressure:	≤ +650 psig (+44.8 bar)
Working Temperature:	≤ +750 °F (+399 °C)
Insertion Length:	≤ 10 ft (3 m)
Process Connection:	2.0 MPT minimum
Threaded:	2.0 in
Flange:	≥ 2.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel
Ground Sheath:	316 Stainless Steel (slotted) (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
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P26Y - *** - T6 - 2\"MPT - AA

MODEL	DESCRIPTION
P26Y	Capacitance Probe, High Temperature and Pressure Service, Slotted Tubular Ground for Interface Service; 316 Stainless Steel

INSERTION LENGTH	DESCRIPTION
***	*** in of insertion (120 in max)

SHIELD & EXTENSION	DESCRIPTION
AA	None
T*	* in temperature extension
I*	* in inactive shield

PROCESS CONNECTION	DESCRIPTION
	Refer to page 94 for M/N
	MPT size 2 in minimum
	Flange sizes 2 in to 4 in, Classes 150, 300, 600

OPTIONS ²	DESCRIPTION
AA	None
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P31 • Capacitance Probe, External Cage, Vertical

Features

- Inherent high gain sensitivity
- Can be calibrated, tested, or inspected without disturbing a continuous process
- Avoids problems due to turbulence and splashing
- Works in highly corrosive service
- Full scale 4-20 mA output signal change achievable over a few inches of level change

Description

The Delta Controls **Model P31** Capacitance Probe is primarily used in the chemical, petrochemical, refining, and other continuous process industries. This probe design can be **tested, calibrated, and maintained** without shutting down or disturbing the process. Common applications include heating fluid, interface position, tower bottoms, water knockout traps, etc.

The P31 is equipped with an external cage to the process vessel or tank. This cage is a vertical **cylindrical pressure vessel** containing the probe. Block valves are normally installed by the user between the cage connection ports and the process vessel or tank. This isolates the instrument from the **process pressure**, or partially full tank, for testing and calibration purposes without blow down or draining the process.

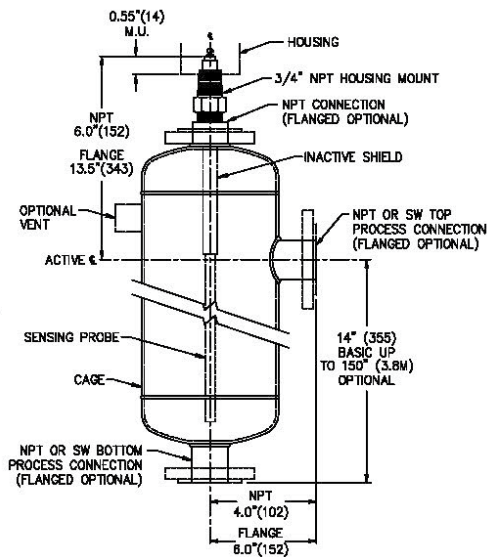
The P31 cage serves as the **ground reference** for the sensing rod. A signal linear to the liquid level or an interface position is generated for alarm or signal transmission outputs.

Image to Come

Model P31

Specifications

Working Pressure:	+650 psig (+44.8 bar)
Working Temperature:	≤ +750 °F (+399 °C)
Insertion Length:	10 ft (3 m)
Process Connection Orientation:	Side/Bottom, Side/Side, Side/Side/Drain
Process Connection Spacing:	14.0 in to 150.0 in
Process Connection Threaded:	1.0 in to 2.0 in
Process Connection Flange:	1.0 in to 2.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	Carbon steel, blended alumina ceramic, PTFE (other materials available)
Other:	Optional Drain (0.75 in NPT)



Model Numbering System

MODEL EXAMPLE	MODEL	-	PROCESS CONNECTION SPACING	-	PROCESS CONNECTION	-	TEMPERATURE EXTENSION	-	OPTIONS
	P31DS	-	14	-	SB/1"MPTS	-	AA	-	AA
	MODEL DESCRIPTION P31DS Capacitance Probe, External Cage, Vertical, PTFE Insulated P31DY Capacitance Probe, External Cage, Vertical, Ceramic Insulated								
	PROCESS CONNECTION SPACING DESCRIPTION 14 14 in basic insertion **.* **.* in custom insertion (120 in max)								
	PROCESS CONNECTION DESCRIPTION SB/1"MPTS Side/Bottom, 1 in MPT, carbon steel SB/1"SWS Side/Bottom, 1 in socket weld, carbon steel SB/1"150RS Side/Bottom, 1 in Class 150 raised face flange, carbon steel SB/2"150RS Side/Bottom, 2 in Class 150 raised face flange, carbon steel SS/1"MPTS Side/Side, 1 in MPT, carbon steel SS/1"SWS Side/Side, 1 in socket weld, carbon steel SS/1"150RS Side/Side, 1 in Class 150 raised face flange, carbon steel SS/2"150RS Side/Side, 2 in Class 150 raised face flange, carbon steel SSD/1"MPTS Side/Side Plus 0.75 in bottom drain, 1 in MPT, carbon steel SSD/1"SWS Side/Side Plus 0.75 bottom drain, 1 in socket weld, carbon steel SSD/1"150RS Side/Side Plus 0.75 bottom drain, 1 in Class 150 raised face flange, carbon steel SSD/2"150RS Side/Side Plus 0.75 bottom drain, 2 in Class 150 raised face flange, carbon steel								
	TEMPERATURE EXTENSION DESCRIPTION AA None T* * in temperature extension								
	OPTIONS DESCRIPTION AA None								

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

*Upper and lower materials required for interface service

Model P51 • Capacitance Probe, Solid Rod, General Purpose Use

Features

- General purpose probe for most applications
- Simple construction and easily installed
- PTFE insulation allows operation in conductive or nonconductive liquids at high temperatures
- Highly reliable clamped seal
- Open design resists material deposition and is easy to clean
- Easy to install vertically or horizontally
- Can be used in most slurry and entrained solids applications



Model P51

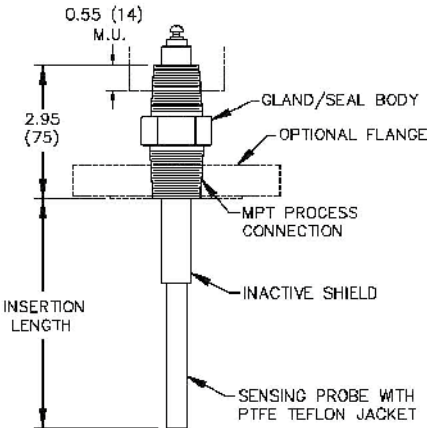
Description

The Delta Controls **Model P51** Capacitance Probe is a general purpose sensor. The sensing rod is jacketed in thick extruded and welded PTFE. There are no thin coatings or glued joints to fail. The P51 is intended for use in services with **higher mechanical stress**, such as agitated tanks, services requiring long unsupported sensing rods, mixers, etc.

The sealing gland is **extremely reliable**, sealing in process materials such as steam, hydrogen cyanide, gasoline, chlorine, liquid oxygen, chocolate, and wastewater. The gland follower **seals reside inside the body** of a solid exterior. There are no screwed together joints in the gland which can inadvertently be turned, causing leaks, environmental spills, and toxic discharges. The **gland body** may be made of alternative metal or industrial plastics for highly corrosive service.

Specifications

Working Pressure:	+1500 psig (+103.4 bar)
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)
Insertion Length:	≤ 20 ft (6 m)
Process Connection:	0.75 in MPT minimum
Threaded:	0.75 in to 2.0 in
Tri Clamp:	1.5 in to 2.0 in
Flange:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel
Ground Sheath:	316 Stainless Steel (other materials available)
Other:	Optional wall mount support bracket



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P51Y	-	**.*	-	AA	-	3/4"MPTY	-	AA
	MODEL DESCRIPTION P51Y Capacitance Probe, Solid Rod, General Purpose Use, 316 Stainless Steel INSERTION LENGTH DESCRIPTION **.*/. in of insertion (240 in max) SHIELD & EXTENSION DESCRIPTION AA None T* * in temperature extension I* * in inactive shield PROCESS CONNECTION DESCRIPTION Refer to page 94 for M/N MPT size 0.75 in minimum Flange sizes 1.5 in to 4 in, Classes 150, 300, 600 Tri clamp sizes 1.5 in, 2 in OPTIONS² DESCRIPTION AA None BP Bent probe, angle and insertion depth for bend required VR Vacuum retainer PH4 Probe head housing with terminals for use with remote mounted electronics unit, 4X housing PH7 Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P52 • Capacitance Probe, Heavy-Duty

Features

- Heavy-duty purpose probe for more demanding applications
- Simple construction and easily installed
- PTFE insulation allows operation in conductive or nonconductive liquids at high temperatures
- Highly reliable clamped seal
- Open design resists material deposition and is easy to clean
- Easy to install vertically or horizontally
- Can be used in many slurry and entrained solids applications

Description

The Delta Controls **Model P52** Capacitance Probe is a heavy-duty sensor. The sensing rod is jacketed in thick extruded and welded PTFE. There are no thin coatings or glued joints to fail. The P52 is intended for use in services with **higher mechanical stress**, such as agitated tanks, services requiring long unsupported sensing rods, mixers, etc.

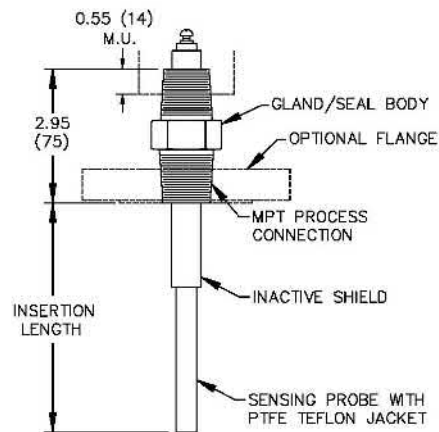
The sensing rod sealing gland is **extremely reliable**, sealing in such process materials as steam, hydrogen cyanide, gasoline, chlorine, liquid oxygen, chocolate, and wastewater. The gland follower **seals reside inside the body of a solid exterior**. There are no screwed together joints in the gland which can inadvertently be turned, causing leaks, environmental spills, and toxic discharges. The **gland body** may be made of exotic metal or industrial plastics for highly corrosive service.



Model P52

Specifications

Working Pressure:	+1500 psig (+103.4 bar)
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)
Insertion Length:	≤ 20 ft (6 m)
Process Connection:	1.5 in MPT minimum
Threaded:	1.5 in to 2.0 in
Tri Clamp:	1.5 in to 2.0 in
Flange:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel (other materials available)
Other:	Optional factory bent probe available to custom specifications, Optional vacuum service configuration



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P52Y	-	***	-	AA	-	1" MPT	-	AA
MODEL	DESCRIPTION								
P52Y	Capacitance Probe, Heavy Duty, 316 Stainless Steel								
INSERTION LENGTH	DESCRIPTION								
***	*** in of insertion (240 in max)								
SHIELD & EXTENSION	DESCRIPTION								
AA	None								
T*	* in temperature extension								
I*	* in inactive shield								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT size 1 in, 1.5 in, 2 in								
	Flange sizes 1.5 in to 4 in, Classes 150, 300, 600								
	Tri clamp sizes 1.5 in, 2 in								
OPTIONS²	DESCRIPTION								
AA	None								
BP	Bent probe, angle and insertion depth for bend required								
VR	Vacuum retainer								
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P53 • Capacitance Probe, Pressurized Vessel Insertion/Removal

Features

- Inspect, test, or service without shutting down or depressurizing the process
- Remove or insert 'up-from-the-bottom' or 'in-from-the-side' sensor without draining a tank
- Simple, direct inserted design useful for many common applications
- PTFE insulation allows operation on conductive or nonconductive materials
- High pressure PTFE seal is reliable, and corrosion proof
- Open design is easy to clean and resists material collection and deposition
- Easily installed in any orientation: vertically down or up, horizontal, or at an angle

Description

The Delta Controls **Model P53** Capacitance Probe is intended for applications where it would be impractical, or impossible, to depressurize or drain the process system for **inspection** and **testing** of the probe instrument. Such processes include oil refineries, gas cycle plants, large storage tanks, and toxic materials.

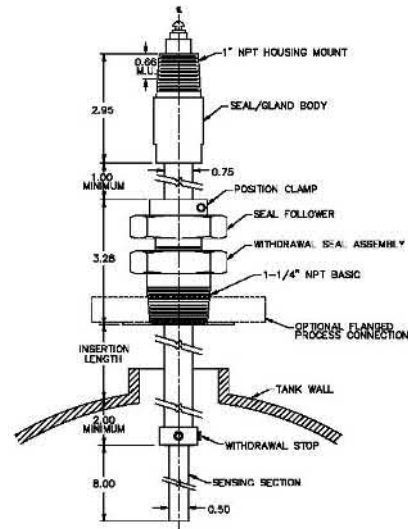
The **gland body** is effectively elongated by the addition of a polished, seamless tube coaxially mounted over part of the sensing probe. A second sealing gland with PTFE seals is installed on the outside of the tube. A **block valve** on the vessel shuts off the tank liquid. The second gland is screwed into the block valve and **tightened to prevent leaks**. The valve is then opened and the P53 is pushed in through the valve until the active portion of the sensing rod is inside the vessel. A mechanical **clamp locks the probe** in position until a need to remove it occurs. The gland follower seal design has been **reliably used for more than 30 years**. The PTFE insulation jacket is a welded heavy extrusion and not a thin coating or merely glued in place.



Model P53

Specifications

Working Pressure:	-15 psig to +50 psig (-1.03 bar to +3.4 bar)
Working Temperature:	-460 °F to +400 °F (-273 °C to 204 °C)
Insertion Length:	≤ 20 ft (6 m)
Process Connection:	1.25 in MPT minimum
Threaded:	1.25 in
Flange:	1.5 in minimum
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel (other materials available)
Other:	Optional block valve



P53 Shown Top Mounted

Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	TUBE LENGTH	-	PROCESS CONNECTION	-	OPTIONS ²
	P53Y	-	***	-	***	-	2"150RS	-	AA
MODEL	DESCRIPTION								
P53Y	Capacitance Probe, Pressurized Vessel Insertion/Removal, 316 Stainless Steel								
INSERTION LENGTH	DESCRIPTION								
***	*** in of insertion (240 in)								
TUBE LENGTH	DESCRIPTION								
***	*** in tube length								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT size 1.25 in minimum								
	Flange size 1.5 in, Class 150 minimum								
OPTIONS²	DESCRIPTION								
AA	None								
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Model P55 • Capacitance Probe, High Temperature and Pressure

Features

- Ceramic primary seals and insulators
- Multiple sealing produces maximum reliability, safety, and long service life
- Alumina probe jacket withstands abrasion from slurries and entrained solids
- Can be used for steam condensate drainage under maximum service conditions

Description

The Delta Controls **Model P55** Capacitance Probe utilizes RF **admittance technology** for high pressure and temperature applications which can replace nuclear gamma ray sensors and solid mechanical displacers in many applications. Using the P55 **avoids difficulty** due to large size, high purchase costs, and high installation costs.

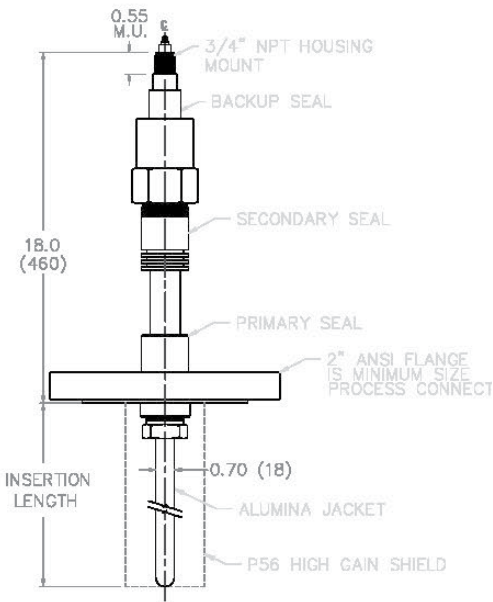
The P55 can be installed in high pressure and temperature fatty acid reactors, steam condensate knockouts, coal gasification, and similarly difficult applications. The ceramic materials are **extremely strong**. Delta Controls has developed packaging that **protects the units** from inadvertent damage while being transported or stored.



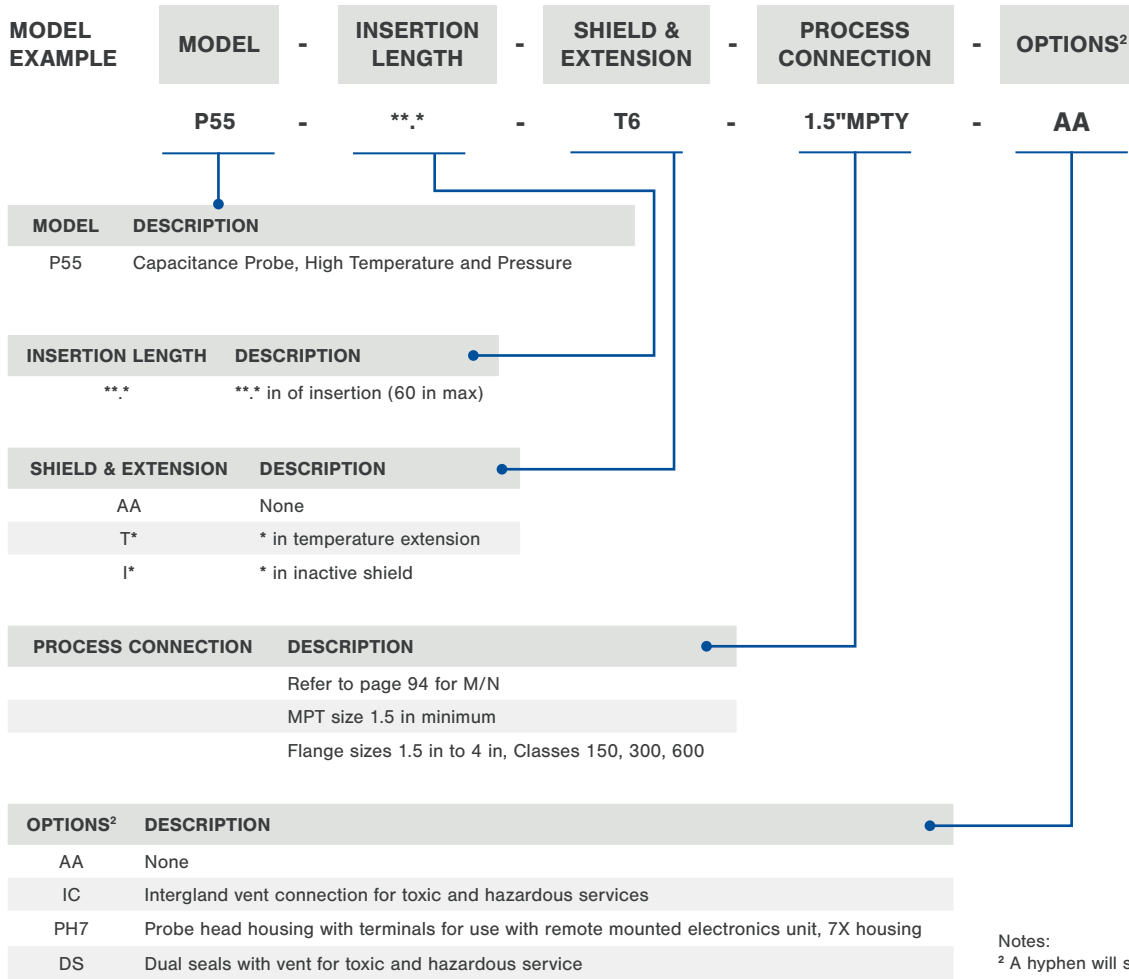
Model P55

Specifications

Working Pressure:	≤ +2500 psig (+172.4 bar)
Working Temperature:	+1000 °F (+538 °C)
Insertion Length:	≤ 60 in (1.52 m)
Process Connection:	1.5 in MPT minimum
Threaded:	1.5 in to 2.0 in
Flange:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, carbon steel, blended alumina ceramic (other materials available)
Other:	Optional intergland vent connection for lethal or toxic service



Model Numbering System



REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P56 • Capacitance Probe, High Temperature and Pressure, Tubular Ground

Features

-  Ceramic primary seals and insulators
-  Multiple sealing produces maximum reliability and safety as well as a long service life
-  Alumina probe jacket withstands abrasion from slurries and entrained solids
-  Can be used for steam condensate drainage under maximum service conditions
-  Ground sheath provides measurement accuracy in low dielectric media

Description

The Delta Controls **Model P56** Capacitance Probe utilizes RF admittance technology for high pressure and temperature applications. The concentric ground sheath provides a ground reference for sensing low dielectric materials. The probe can **replace** nuclear gamma ray sensors and solid mechanical displacers in many applications. Using a probe **avoids difficulty** due to large size, high purchase costs and high installation costs.

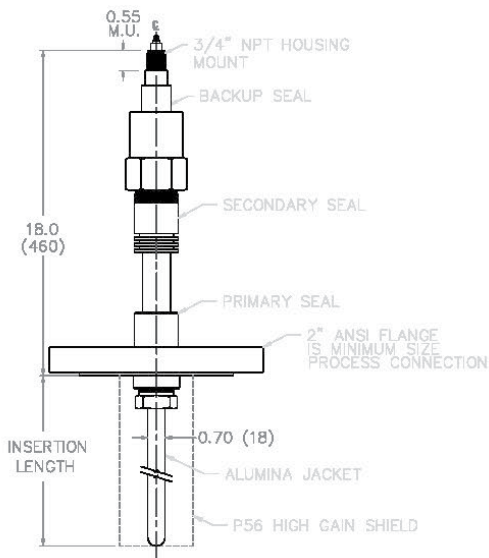
The P56 can be installed in high pressure / temperature fatty acid reactors, steam condensate knockouts, coal gassification, and similar difficult applications. The ceramic materials used are **extremely strong**. Delta Controls has developed packaging that **protects the units** from inadvertent damage while being transported or stored.



Model P56

Specifications

Working Pressure:	≤ +2500 psig (+172.4 bar)
Working Temperature:	+1000 °F (+538 °C)
Insertion Length:	≤ 60 in (1.52 m)
Process Connection:	1.5 in MPT minimum
Threaded:	1.5 in to 2.0 in
Flange:	1.5 in minimum
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, carbon steel, blended alumina ceramic
Ground Sheath:	316 Stainless steel (other materials available)
Other:	Optional intergland vent connection for lethal or toxic service



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P56	-	***	-	AA	-	1.5MPTY	-	AA
MODEL	DESCRIPTION								
P56	Capacitance Probe, High Temperature and Pressure, Tubular Ground								
INSERTION LENGTH	DESCRIPTION								
***	*** in of insertion (60 in max)								
SHIELD & EXTENSION	DESCRIPTION								
AA	None								
T*	* in temperature extension								
I*	* in inactive shield								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT size 1.5 in minimum								
	Flange size 1.5 in minimum, Class 150								
OPTIONS ²	DESCRIPTION								
AA	None								
IC	Intergrland vent connection for toxic and hazardous services								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, TX housing								
DS	Dual seals with vent for toxic and hazardous service								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Model P57 • Capacitance Probe, Parallel Ground

Features

- Direct insertion, open construction
- 👍 Rod parallel to sensing probe provides linear ground reference and increases sensitivity
- ⚡ PTFE sensing rod jacket allows operation in conductive or nonconductive liquids
- 🛡️ Reliable high pressure PTFE seal
- 🌊 Can be used to measure liquids with entrained solids in most applications
- ☠️ Works in highly corrosive applications

Description

The Delta Controls **Model P57** Capacitance Probe is commonly used in tanks made of reinforced plastics or metal tanks lined with rubber, glass, or plastic which do not contain the ground reference plane required by a RF admittance instrument. The P57 has a ground rod mounted parallel to the insulated sensing probe, which provides the required **ground reference**.

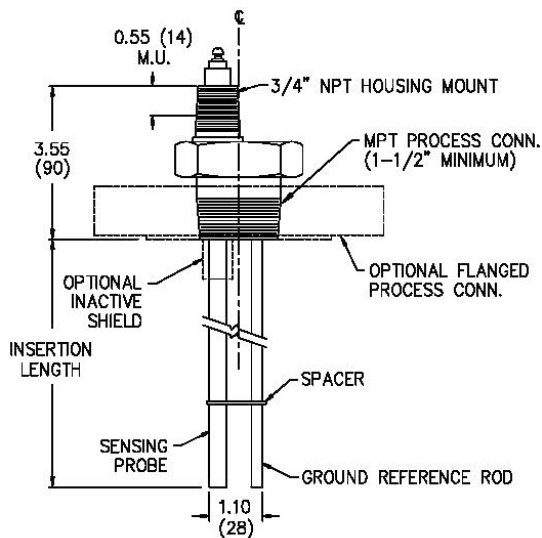
The P57 **stability bar(s)** steadies the sensing probe and ground rod position when the **insertion length is long**. The probe is widely used on water treating chemicals, stored fuel oil, day tanks, oil/water interface, and processed food oils. The open design allows it to be **used in many applications**, even when solids are entrained in the liquid.



Model P57

Specifications

Working Pressure:	≤ +1500 psig (+103.4 bar)
Working Temperature:	-460 °F to +450 °F (-273 °C to +232 °C)
Insertion Length:	≤ 20 ft (6 m)
Process Connection:	1.5 in MPT minimum
Threaded:	1.5 in to 2.0 in
Flanged:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, Hastelloy® C-276, PTFE, carbon steel
Ground Rod:	316 Stainless Steel, Hastelloy® C-276 (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P57Y	-	***	-	AA	-	1.5"MPTY	-	AA
MODEL	DESCRIPTION								
P57Y	Capacitance Probe, Parallel Ground Reference, 316 Stainless Steel								
P57G	Capacitance Probe, Parallel Ground Reference, Hastelloy C-276								
INSERTION LENGTH	DESCRIPTION								
***	*** in of insertion (240 in max)								
SHIELD & EXTENSION	DESCRIPTION								
AA	None								
T*	* in temperature extension								
I*	* in inactive shield								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT sizes 1.5 in minimum								
	Flange sizes 1.5 in to 4 in, Classes 150, 300, 600								
OPTIONS ²	DESCRIPTION								
AA	None								
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources))

APPLICATION DETAILS:

- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P61 • Capacitance Probe, Sanitary Service

Features

- ✓ Natural PVDF or polypropylene comes in contact with process fluids
- 🔧 Simple open construction is easily cleaned manually in place, or by steam
- ✦ General purpose sanitary applications
- 👍 Suitable for pharmaceutical, dairies and food processing, cosmetic and printing services
- 🌊 Suitable for use with most slurry and entrained solids applications
- 🛡️ 316 Stainless Steel backed Tri Clamp flange
- 🔧 Metal clamps hold full pressure seal
- ⚡ Works with conductive and nonconductive liquids

Description

The Delta Controls **Model P61** Capacitance Probe is designed for sanitary or no metallic ion service which require **superior cleanliness** and **high reliability**. The wetted surfaces are composed entirely of virgin, **natural PVDF**. These surfaces have been welded together into a single piece without joints, crevices, or cracks.

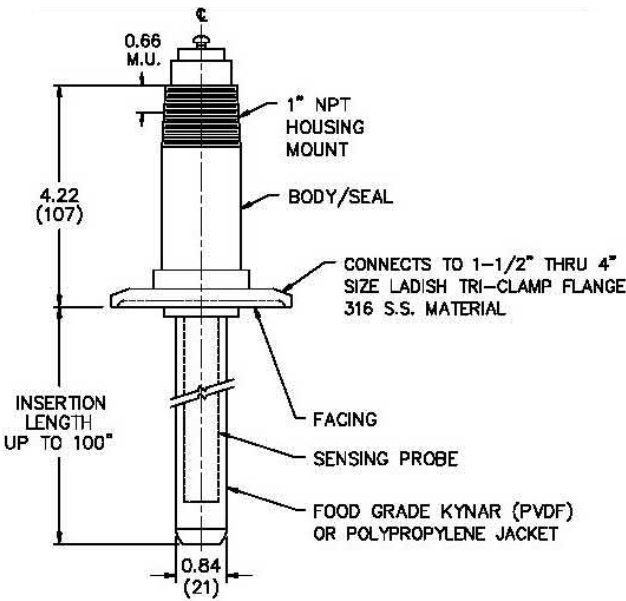
The P61 finished unit is flame-polished for the utmost **smoothness** and **cleanability**. The plastic flange facing has a 316 Stainless Steel backing plate for increased **strength and reliability**. The basic sanitary flange mates with a Tri Clamp tubing size flange.



Model P61

Specifications

Working Pressure:	≤ +500 psig (34.5 bar)
Working Temperature:	-40 °F to +300 °F (-40 °C to +149 °C)
Insertion Length:	≤ 8 ft (3.5 m)
Process Connection:	1.5 in Tri Clamp minimum
Tri Clamp:	1.5 in to 3.0 in Tri Clamp
Available Wetted Materials:	Kynar® PVDF, polypropylene (other materials available)



Model Numbering System

MODEL
EXAMPLE

MODEL

-

INSERTION
LENGTH

-

PROCESS
CONNECTION

-

OPTIONS²

P61K

-

-

1.5"TCY

-

AA

MODEL	DESCRIPTION
P61K	Capacitance Probe, Sanitary Service, Kynar®
P61P	Capacitance Probe, Sanitary Service, Polypropylene

INSERTION LENGTH	DESCRIPTION
***	*** in of insertion (96 in max)

PROCESS CONNECTION	DESCRIPTION
1.5"TCY	Refer to page 94 for M/N Tri Clamp sizes 1.5 in minimum

OPTIONS ²	DESCRIPTION
AA	None
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing

Notes:
² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

*Upper and lower materials required for interface service

Model P62 • Capacitance Probe, Sanitary Service, Tubular Ground

Features

- ✓ Natural PVDF and polished 316 Stainless Steel comes in contact with process fluids
- ↔ Concentric ground reference tube provides a linear output in horizontal cylindrical tanks
- ↔ Used where agitation causes problems
- ✦ Easily cleaned manually, in-place, or by steaming
- 🛡 Basic process connection mates with Tri Clamp sanitary flange
- 🧪 Suitable for pharmaceutical industry service
- ⚡ Works with conductive liquids
- 🔧 Suitable for ultralow dielectric liquids such as wax, grease, and pure oils
- 📏 Can be used to measure interface position

Description

The Delta Controls **Model P62** Capacitance Probe is equipped with a concentric ground reference tube. The inner portion is connected to the reference tube using a Tri Clamp sanitary flange. The inner unit is **easily removed** from the outer ground reference tube for cleaning or inspection. The ground reference tube is mounted to the process vessel by a second tube with a Tri Clamp sanitary flange. It can be left in place while the inner portion is withdrawn. The reference portion can then be **removed** as required.

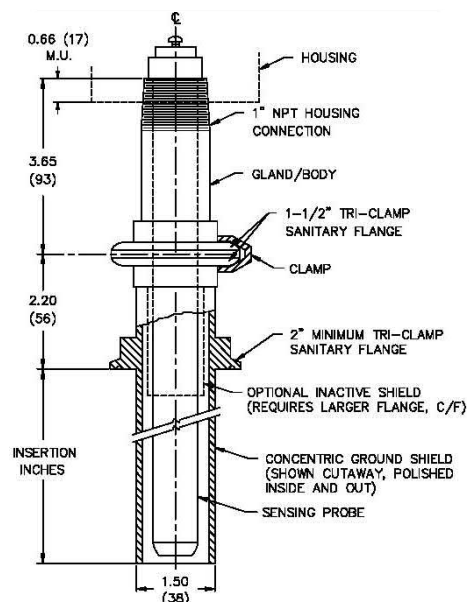
The P62's PVDF sensing rod and seal jacket is a welded part without any joints, cracks, or crevices. The finished unit is flame-polished for the utmost in **smoothness** and **cleanability**. The ground reference tube is made of 316 Stainless Steel and is polished both internally and externally. The integral ground reference allows the P62 to be used in plastic tanks and in lined tanks which do not provide the necessary parallel ground reference.



Model P62

Specifications

Working Pressure:	≤ +500 psig (+34.5 bar)
Working Temperature:	-40 °F to +300 °F (-40 °C to +149 °C)
Insertion Length:	≤ 4 ft (1.2 m)
Process Connection:	2.0 in Tri Clamp min
Tri Clamp:	2.0 in to 3.0 in
Available Wetted Materials:	316 Stainless Steel, Kynar® PVDF
Ground Sheath:	316 Stainless Steel (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	PROCESS CONNECTION	-	OPTIONS ²
	P62K	-	***	-	2"TCY	-	AA
MODEL	DESCRIPTION						
P62K	Capacitance Probe, Sanitary Service, Tubular Ground, Kynar®						
INSERTION LENGTH	DESCRIPTION						
***	*** in of insertion (4 ft max)						
PROCESS CONNECTION	DESCRIPTION						
	Refer to page 94 for M/N						
	Tri clamp sizes 2 in, 2.5 in, 3 in						
OPTIONS ²	DESCRIPTION						
AA	None						
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing						
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing						

Notes:
² A hyphen will separate multiple options selected

- REQUIRED ORDERING INFORMATION:
- Detailed model number
 - Tag or nameplate detail (if required)
 - Documentation & testing packages (if required, refer to Additional Resources)

- APPLICATION DETAILS:
- Process fluid or material name
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure

Model P66 • Capacitance Probe, Sanitary Service, Metal Ion Free Service

Features

- ✔ Virgin polypropylene or Kynar® PVDF comes in contact with the process fluid
- 🛡️ Thick plastic jacketing is welded in place
- ⬆️ No cracks, joints, or crevices to collect contaminants
- 📡 Suitable for fluids used in silicon chip and electronics manufacturing
- ☠️ For extremely corrosive industrial processes such as hydrofluoric acid plants, pickling lines, and plating solutions
- 🔥 Plastic surfaces are flame smoothed for the best available surface

Description

The Delta Controls **Model P66** Capacitance Probe uses all plastic wetted parts. It is designed for **use in processes** and **storage tanks** where the possibility of contamination is prohibited. Process examples include injectable solutions, pharmaceutical dilution fluids, heavy water for research, electronic chipmaking, and high quality plating systems.

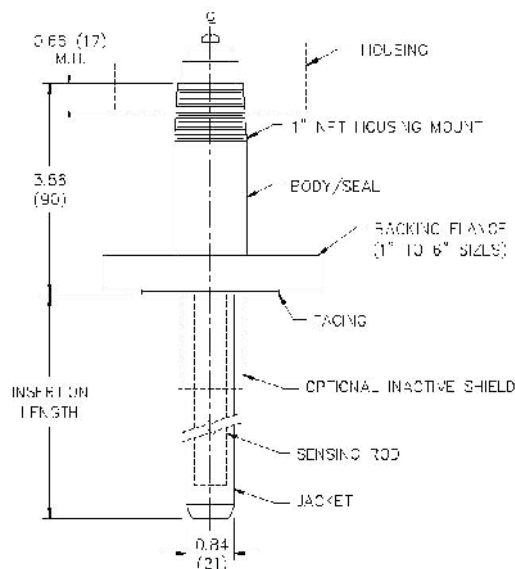
The P66 is also commonly used in industrial process systems which are extremely corrosive. **Kynar® PVDF is highly inert** and unaffected by almost all strong acids and bases below a temperature of +275 °F (+135 °C). Applications include hydrofluoric acid level, refinery hydroformers, bromine condensers, chlorine generation cells, radioactive processes, and wastes.



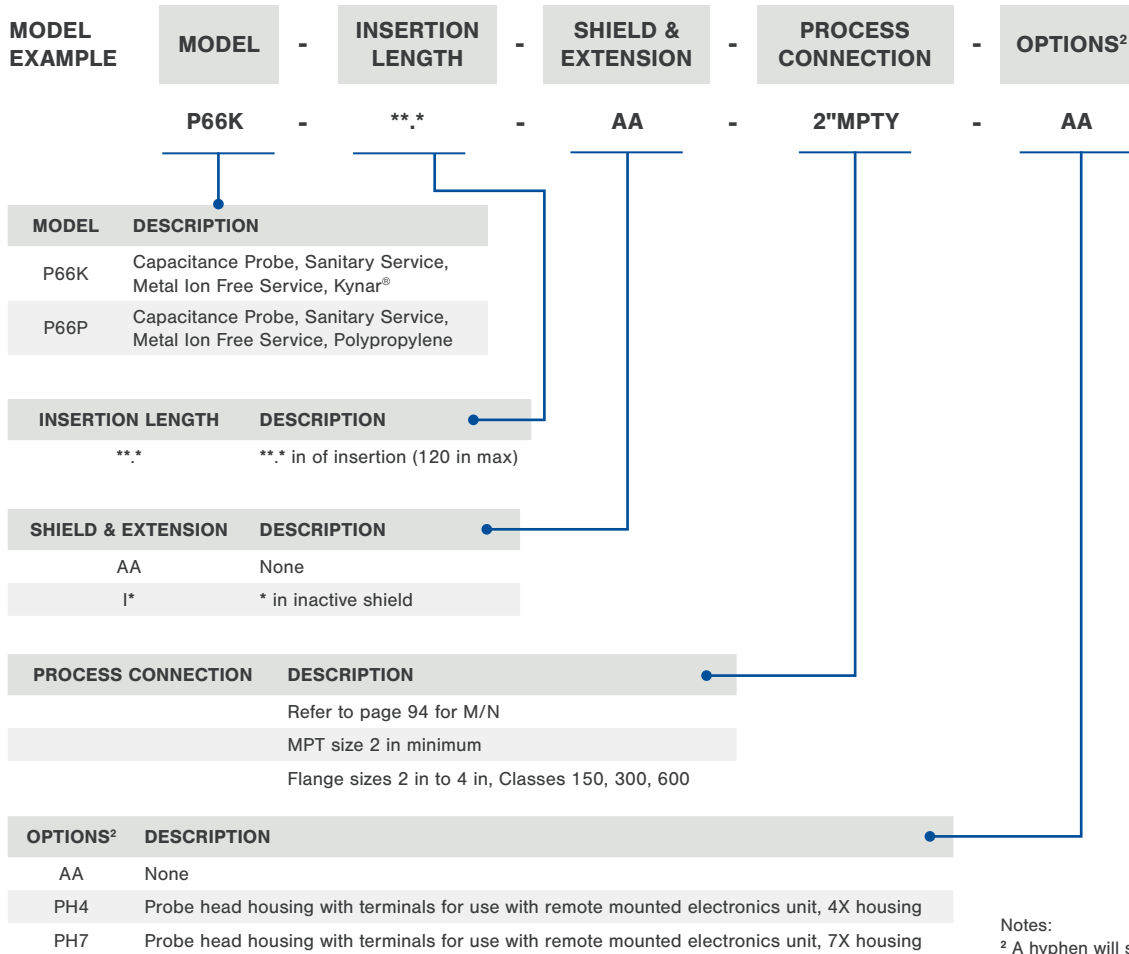
Model P66

Specifications

Working Pressure:	-15 psig to +300 psig (-1.0 bar to +20.7 bar)
Working Temperature:	-40 °F to +300 °F (-40 °C to +149 °C)
Insertion Length:	≤ 10 ft (3 m)
Process Connection:	2.0 in minimum
Threaded:	2.0 in to 3.0 in
Flanged:	2.0 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	Kynar® PVDF, Polypropylene, carbon steel (other materials available)



Model Numbering System



REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

*Upper and lower materials required for interface service

Model P68 • Capacitance Probe, Sanitary Service, Metal Ion Free Service, Parallel Ground

Features

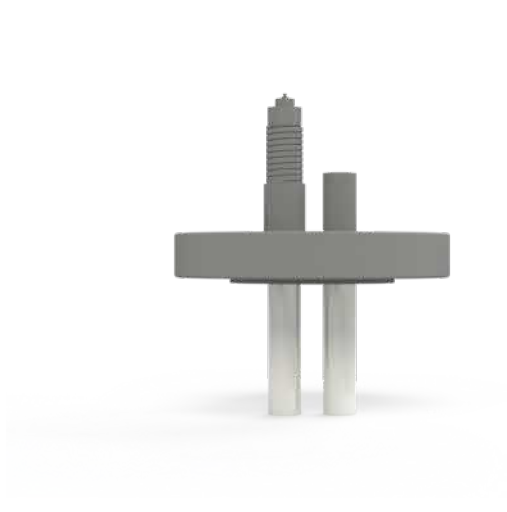
- ✔ Virgin polypropylene or natural PVDF comes into contact with the process fluids
- 🛡 Thick plastic jacketing is welded in place
- ✦ No cracks, joints, or crevices to collect contaminants
- 📖 Suitable for fluids used in silicon chip and electronics manufacturing
- ☠ Use in industrial processes which are extremely corrosive such as hydrofluoric acid plants, pickling lines, and plating solutions
- 💧 Plastic surfaces are flame smoothed for the best available surface

Description

The Delta Controls **Model P68** Capacitance Probe has all plastic wetted parts. It is designed for **use in processes** and **storage tanks** where the possibility of contamination is prohibited. Process examples include etchants, high purity plating solutions, and ferric chloride.

The P68 is also commonly used in industrial process systems which are extremely corrosive. **Kynar® PVDF is highly inert** and unaffected by almost all strong acids and bases below a temperature of 275 °F (135 °C). Applications include hydrofluoric acid level, refinery hydroformers, bromine condensers, chlorine generation cells, and radioactive wastes.

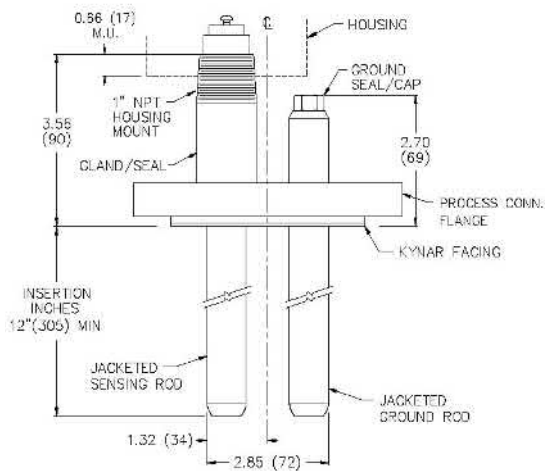
The P68 is a heavy-duty rugged sensing probe with jacketed ground reference rod and provides **high reliability** in difficult applications.



Model P68

Specifications

Working Pressure:	-15 psig to +300 psig (-1.03 bar to +20.7 bar)
Working Temperature:	-40 °F to +300 °F (-40 °C to +159 °C)
Insertion Length:	≤ 6 ft (2 m)
Process Connection:	3.0 in minimum
Threaded:	3.0 in
Flanged:	3.0 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	Kynar® PVDF, Polypropylene, carbon steel
Ground Rod:	Kynar® PVDF, Polypropylene (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P68K	-	***	-	AA	-	2" MPT	-	AA
MODELDESCRIPTION P68KCapacitance Probe, Sanitary Service, Metal Ion Free Service, Parallel Ground, Kynar® P68PCapacitance Probe, Sanitary Service, Metal Ion Free Service, Parallel Ground, Polypropylene									
INSERTION LENGTHDESCRIPTION ***** in of insertion (72 in max)									
SHIELD & EXTENSIONDESCRIPTION AANone I*in inactive shield									
PROCESS CONNECTIONDESCRIPTION Refer to page 94 for M/N MPT size 3 in minimum Flange sizes 2 in to 4 in, Classes 150, 300, 600									
OPTIONS²DESCRIPTION AANone PH4Probe head housing with terminals for use with remote mounted electronics unit, 4X housing PH7Probe head housing with terminals for use with remote mounted electronics unit, 7X housing									

Notes:
² A hyphen will separate multiple options selected

- REQUIRED ORDERING INFORMATION:**
- Detailed model number
 - Tag or nameplate detail (if required)
 - Documentation & testing packages (if required, refer to Additional Resources)

- APPLICATION DETAILS:**
- Process fluid or material name*
 - Process fluid or material dielectric constant
 - Maximum process temperature
 - Maximum process pressure
- *Upper and lower materials required for interface service

Model P71 • Capacitance Probe, Flexible Cable

Features

-  Cable may be coiled for easy handling
-  Easily installed in tall tanks
-  May be installed in indoor tanks with low headroom
-  PTFE insulation allows operation in conductive or nonconductive liquids at high temperatures
-  Corrosion resistant PTFE seals and jacket
-  Suitable for high pressures

Description

The Delta Controls **Model P71** Capacitance Probe Cable is jacketed with **PTFE insulating material**. The bottom cable fitting is electrically isolated from the cable.

The P71 is primarily **intended for liquid and interface measurement service**. Some applications requiring these attributes include damp wood chips and pulpstock chests.

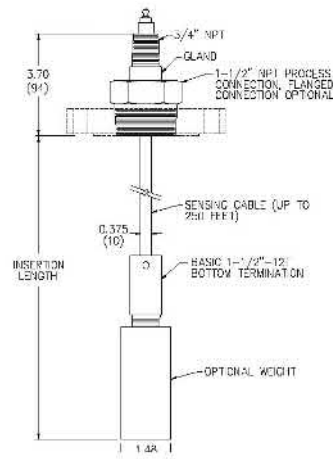
The probe should be located away from the vessel centerline by less than one quarter of the vessel's diameter. The cable is provided with a bolt thread for direct attachment to the bottom of the tank. It may also be equipped with a lower weight, using gravity to keep it straight. The cable **must be vertical** and taut after installation. A simple bottom weight is the preferred method in calm, still storage tanks. **A pipe stilling well** should be used in conjunction with the weight when the liquid is agitated or where strong flowing currents are present. Fastening the lower cable termination to the bottom of an agitated tank **is required** when a stilling well cannot be installed or in applications where the stilling well **may plug with deposits**.



Model P71

Specifications

Working Pressure:	+1500 psig (103.4 bar) at +100 °F (38 °C)
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)
Temperature Extension Required:	< -20 °F (-29 °C) or > +175 °F (+79 °C)
Insertion Length:	≤ 250 ft (75 m)
Process Connection:	1 in MPT minimum
Threaded:	1.0 in to 2.0 in
Tri Clamp:	2.0 to 3.0 in
Flanged:	1.5 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P71Y	-	***	-	AA	-	2"150RS	-	AA
MODEL	DESCRIPTION								
P71Y	Capacitance Probe, Flexible Cable, 316 Stainless Steel								
INSERTION LENGTH	DESCRIPTION								
***	*** in of insertion (3000 in max)								
SHIELD & EXTENSION	DESCRIPTION								
AA	None								
T*	* in temperature extension								
I*	* in inactive shield								
PROCESS CONNECTION	DESCRIPTION								
	Refer to page 94 for M/N								
	MPT size 1 in minimum								
	Flange sizes 1.5 in to 4 in, Classes 150, 300, 600								
	Tri clamp sizes 2 in, 3 in								
OPTIONS²	DESCRIPTION								
AA	None								
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing								
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing								
WT	1.5 in O.D. weight on bottom termination								

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

*Upper and lower materials required for interface service

Model P72 • Capacitance Probe, Flexible Cable, Parallel Ground

Features

-  Cable may be coiled for easy handling
-  Easily installed in tall tanks
-  May be installed in indoor tanks with low headroom
-  PTFE insulation allows operation in conductive, or nonconductive liquids at high temperatures
-  Corrosion resistant PTFE seals and jacket
-  Suitable for high pressures and temperatures

Description

The Delta Controls Model P72 Capacitance Probe is commonly used in tanks made of reinforced plastics or metal tanks lined with rubber, glass, or plastic which do not contain the ground reference plane required by an RF admittance instrument. Model P72 should generally be used when the level change is less than ten feet, the tank diameter is greater than eight feet, or the measured liquid has a dielectric constant of less than 3.5 units. Low dielectric liquids include fuel oil, gasoline, benzene, and liquefied petroleum gases.

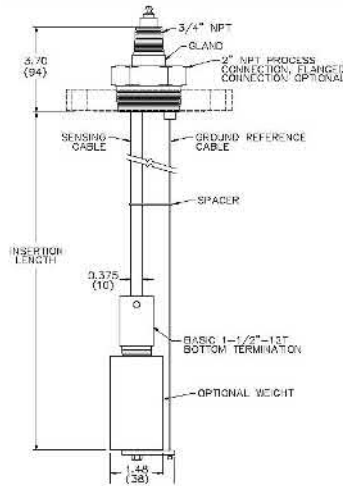
P72 is also used in tanks with sizeable or nonlinear side walls, as well as when indoor tanks have limited headspace. Most applications require the optional bottom weight (option WT) to keep the cable taut.



Model P72

Specifications

Working Pressure:	+1500 psig (103.4 bar) at +100 °F (38 °C)
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)
Temperature Extension Required:	< -20 °F (-29 °C) or > +175 °F (+79 °C)
Insertion Length:	≤ 250 ft (75 m)
Process Connection:	2.0 in MPT minimum
Threaded:	2.0 in
Tri Clamp:	2.0 in to 3.0 in
Flanged:	2 in to 4.0 in
Flange Rating:	≤ 600 lb
Available Wetted Materials:	316 Stainless Steel, PTFE, carbon steel (other materials available)



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	SHIELD & EXTENSION	-	PROCESS CONNECTION	-	OPTIONS ²
	P72Y	-	***	-	AA	-	2"150RS	-	AA

MODEL	DESCRIPTION
P72Y	Capacitance Probe, Flexible Cable, 316 Stainless Steel

INSERTION LENGTH	DESCRIPTION
***	*** in of insertion (3000 in max)

SHIELD & EXTENSION	DESCRIPTION
AA	None
T*	* in temperature extension
I*	* in inactive shield

PROCESS CONNECTION	DESCRIPTION
	Refer to page 94 for M/N
	MPT size 2 in
	Flange sizes 2 in to 4 in, Classes 150, 300, 600
	Tri clamp sizes 2 in, 3 in

OPTIONS ²	DESCRIPTION
AA	None
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing
WT	1.5 in outside diameter weight on bottom termination

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Model P80 Series 1 • Capacitance Probe, Rigid Rod, Dry Granulated Solids and Powders

Features

-  Full length concentric rod/insulator/body design withstands heavy loads and resists bending
-  Secondary PTFE seal prevents failures and false alarms due to moisture and condensation
-  For alarm or high/low control action
-  Can be installed in tiled or concrete silos
-  Heavy-duty, proven reliability
-  Suitable for many chunk solid applications
-  Easy model selection when using picofarad calculations to accurately forecast service results

Description

The side-mounted Delta Controls **Model P80 Series 1** Capacitance Probes feature a full length concentric rod/insulator/body design to withstand heavy loads and resist bending. The secondary PTFE seal **prevents failures and false alarms** due to moisture and condensation, or high/low control action.

The probes are rigid and rod-type for dry powders and granular solids. The sensing rod has a through-the-gland design for maximum strength and is resistant to bending. The glands are sealed against water and moisture. The sensing rod and body are 300 Stainless Steel. The insulator is Delrin® and the seal is PTFE.

The P80 Series are heavy-duty with proven reliability in tiled or concrete silos. The weight factor and picofarad calculations should be used to model probe results.

Model P81 is a general-duty side inserted probe. The probe may be covered by 26 feet of sand or 65 feet of grain.

Model P82 Is a medium-duty, rugged, side inserted probe. The probe may be covered with up to 55 feet of sand or 130 feet of grain.

Model P83 Is a heavy-duty, side-inserted probe for more demanding applications. The probe may be covered with up to 75 feet of sand or 180 feet of grain and will withstand small to medium size chunk solids.

Model P84 is an extreme-duty side-inserted probe for the toughest of applications. The probe may be covered with up to 150 feet of sand or 375 feet of grain and can withstand larger chunk size solids.



Model P80 Series 1 (P81)

Specifications

Type:	Side Mount				
Working Pressure:	+1500 psig (+103.4 bar) at +100 °F (38 °C)				
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)				
Bulk Density:	3150 lb/ft³ to 14 900 lb/ft³				
Insertion Length:	Custom				
Process Connection:	0.75 in NPT minimum				
Threaded:	0.75 in to 1.25 in				
Available Wetted Materials:	316 Stainless Steel, PTFE				
	MPT	"H"	"S"	O.D.	NPT
P81	0.75 in	3.0 (76)	1.0 (25)	0.37 (9)	0.75 in
P82	0.75 in	3.0 (76)	1.5 (38)	0.50 (13)	0.75 in
P83	1 in	3.1 (79)	2.0 (51)	0.625 (16)	1 in
P84	1.25 in	3.7 (94)	2.0 (51)	0.875 (22)	1 in

Maximum Allowable Elevation of Material

The horizontal sensing probe can withstand heavy loads without bending or failing. The loading on a probe is a function of the material's density. How deeply the sensing probe is covered, and the probe rod size and location. Delta Controls has simplified this complex relationship into a simple and easy to use equation. A "Weight Factor" value has been derived for each model. The maximum amount of coverage is easily determined by dividing the weight factor by the bulk density of the process material as follows:

$$\frac{\text{Weight Factor}}{\text{Bulk Density (lb/ft}^3\text{)}} = \text{Maximum Allowable Feet of Coverage}$$
$$\text{Maximum Coverage} = \frac{\text{Weight Factor}}{\text{lb/ft}^3} = \text{Height of Material in Feet}$$

Weight Factors

P81	P82	P83	P84
3,150	6,590	8,880	14,900

EXAMPLE: Using a Model P82 sensing probe for 48 lb/ft³ of whole kernel corn

$$\text{Maximum Coverage} = \frac{6590}{48} = 137 \text{ ft (42 m)}$$

Model Numbering System

MODEL
EXAMPLE

MODEL

-

PROCESS
CONNECTION

-

OPTIONS²

P81

-

3/4" MPT

-

AA

MODEL	DESCRIPTION
P81	Capacitance Probe, Rigid Rod, Dry Granulated Solids and Powders, General-duty
P82	Capacitance Probe, Rigid Rod, Dry Granulated Solids and Powders, Medium-duty
P83	Capacitance Probe, Rigid Rod, Dry Granulated Solids and Powders, Heavy-duty
P84	Capacitance Probe, Rigid Rod, Dry Granulated Solids and Powders, Extreme-duty

PROCESS CONNECTION	DESCRIPTION	AVAILABLE TYPES
0.75 MPT	0.75 in MPT, 316 Stainless Steel	P81, P82
1 in MPT	1 in MPT, 316 Stainless Steel	P83
1.25 in MPT	1.25 in MPT, 316 Stainless Steel	P84

OPTIONS ²	DESCRIPTION
AA	None
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Features

-  Strong, highly reliable and heavy-duty cables
-  Durable gland to cable connection
-  Fiber filled Delrin® insulators and support for longterm reliability
-  Secondary seal of PTFE prevents moisture and condensation from causing false switching
-  Bare stainless steel sensing rods and cables resist abrasion and corrosion
-  Proven reliability in wide-ranging solids applications

Description

The top-mounted Delta Controls **P80 Series 2** Capacitance Probes are top-mounted on a tank or silo with a cable hanging inside the vessel. Bottom weights are required when strong air currents are present. The insertion should be limited to 6 feet when high velocity air currents are present. The glands are **sealed against moisture and water**. All materials are 316 Stainless Steel.

Model P87 and **Model P87W** are general-duty probes with a 0.125 inch diameter (3 mm) cable without a weight. It is intended for service where roiling or side-to-side movement of the process solids occur. Applications include cement load out bins, flour bins, bottom centerline takeout pellet hoppers, etc. **Model P87W** has a weighted bottom to provide cable stability.

Model P88 is a heavy-duty probe with a 0.19 inch diameter (5 mm) cable and a bottom weight for service in heavy granules and similar small chunk. Taconite, marble chips, and other similar materials are reliably sensed.

Model P89A is a heavy-duty cable probe which is hung from an internal to the tank support. The lower end is free to move and follow the flow of material. **Model P89B** has an additional tie-off at the tank's bottom and is recommended when there is substantial horizontal material flow. Multiple switch points or a 4-20 mA signal are common output signals. Used for service in tall cement silos, etc.



Model P80 Series 2

Specifications

Type:	Top Mount
Working Pressure:	+1500 psig (+103.4 bar) at +100 °F (+38 °C)
Working Temperature:	-460 °F to +400 °F (-273 °C to +204 °C)
Bulk Density:	1230 lb/ft³ to 6500 lb/ft³
Insertion Length:	Custom
Process Connection:	0.75 in NPT minimum
Threaded:	0.75 in to 1.0 in
Available Wetted Materials:	316 Stainless Steel

Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	PROCESS CONNECTION	-	OPTIONS ²
------------------	-------	---	---------------------	---	-----------------------	---	----------------------

P87

3/4"MPTY

AA

MODEL	DESCRIPTION
P87	Capacitance Probe, Flexible Cable, Dry Granulated Solids and Powders, General-duty
P87W	Capacitance Probe, Flexible Cable, Dry Granulated Solids and Powders, General-duty, Weighted
P88	Capacitance Probe, Flexible Cable, Dry Granulated Solids and Powders, Heavy-duty
P89A	Capacitance Probe, Flexible Cable, Dry Granulated Solids and Powders, Heavy-duty, Internal Mount
P89B	Capacitance Probe, Flexible Cable, Dry Granulated Solids and Powders, Heavy-duty, Internal Mount with Support

INSERTION LENGTH	DESCRIPTION
***	*** ft of insertion

PROCESS CONNECTION	DESCRIPTION	AVAILABLE TYPES
3/4"MPTY	0.75 MPT, 316 Stainless Steel	P87, P87W
1"MPTY	1 in MPT, 316 Stainless Steel	P88, P89A, P89B

OPTIONS ²	DESCRIPTION
AA	None
VBKT	Cable clamp support arm for vertical mounting, carbon steel
HBKT	Cable clamp support arm for horizontal mounting, carbon steel
PH4	Probe head housing with terminals for use with remote mounted electronics unit, 4X housing
PH7	Probe head housing with terminals for use with remote mounted electronics unit, 7X housing

Notes:

² A hyphen will separate multiple options selected

REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

Application Details:

- Process fluid or material name
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

Model P91 • Capacitance Probe, Floating Probe for Oil Skimmer

Features

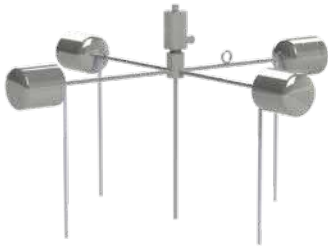
- Measures 2 inches to 36 inches (50 mm to 900 mm) of oil floating on water
- Supports oil or water total elevation change up to 50 ft (15 mm)
- Works on large tank tramp oil collectors
- Works well with fresh or salt water
- Entire transmitter may be submerged to 50 feet (15 meter)
- For highly corrosive and offshore applications, 316 Stainless Steel electronic housings are optional
- Optional Hastelloy® C-276
- Unaffected by foam, bubbles, and froth
- Functions well with lip type rotatable skimmers

Description

The Delta Controls **Model P91** Capacitance Probe floats on the top surface of oil in a skimmer basin or separation vessel. A **vertical sensing rod**, with parallel ground reference rods, is supported by outrigger floats. The sensing rod goes through the floating oil and into the water.

The P91 measures the distance from the top of the oil to the interface between the water and the floating oil. This measurement is then converted into a 4-20 mA direct current signal equivalent to the thickness of oil present. Optionally, an on/off differential control signal can be produced to **control a drainage pump or skimmer trough**.

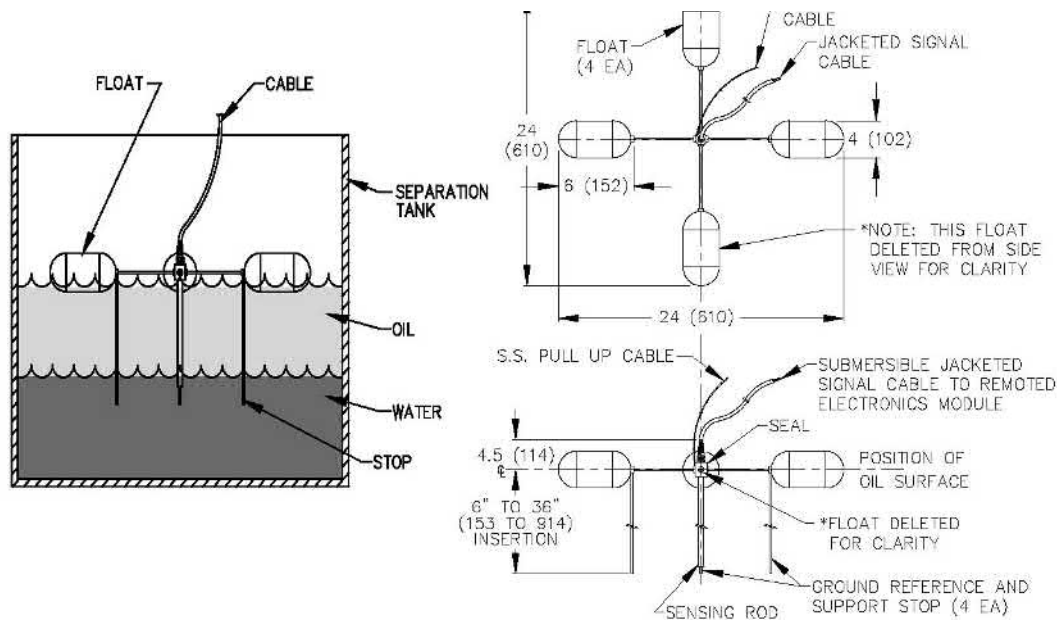
The interconnection allows pull up for testing and maintenance as well as acting as a tether in large pond applications. The P91 is typically used in petroleum refineries, machinery manufacturing plants, oil field salt water disposal companies, and similar industrial operating companies.



Model P91

Specifications

Electronic Module:	Remote from sensor
Range:	≤ 6 in to ≤ 36 in (150 mm to 900 mm)
Specific Gravity (Oil):	0.70 min
Attachment Cable:	0.0625 in 316 Stainless Steel
Interconnection:	Oil resistant
Rubber Tubular Jacket over Signal Cable:	≤ 60 ft (20 m)
Available Wetted Materials:	316 Stainless Steel, PTFE
Floats and Frame Support:	316 Stainless Steel
Sensing Rod Jacket and Seals:	PTFE extruded and welded



Model Numbering System

MODEL EXAMPLE	MODEL	-	INSERTION LENGTH	-	CABLE LENGTH	-	OPTIONS
	P91Y	-	***	-	***	-	AA
MODELDESCRIPTION P91YCapacitance Probe, Floating Probe for Oil Skimmer, 316 Stainless Steel							
INSERTION LENGTHDESCRIPTION ***in of insertion (1 in to 36 in)							
CABLE LENGTHDESCRIPTION ***in of rubber outer jacketed cable (720 in max)							
OPTIONSDESCRIPTION AANone HPPressurized tank modification							

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REQUIRED ORDERING INFORMATION:

- Detailed model number
- Tag or nameplate detail (if required)
- Documentation & testing packages (if required, refer to Additional Resources)

APPLICATION DETAILS:

- Process fluid or material name*
- Process fluid or material dielectric constant
- Maximum process temperature
- Maximum process pressure

*Upper and lower materials required for interface service