

# R.F. PROBE

## TYPE P21 HIGH GAIN, TUBULAR GROUND FOR LOW DIELECTRIC LIQUIDS

### ADVANTAGES

- High inherent gain sensitivity
- Allows full scale calibration over a very small level change
- Insensitive to surface turbulence
- Output signal is linear to liquid depth
- Calibration can be done outside the vessel
- Only a small 1" NPT process connection required
- Use for sensing light hydrocarbons and materials with low dielectric constants
- Linear output in irregular tanks
- Built in ground reference for plastic & lined tanks

### APPLICATION

This probe is equipped with a wrap around concentric ground sheath. It has high inherent gain sensitivity and is useful on materials having low dielectric constant, such as benzene and other light hydrocarbons.

The linear ground sheath also allows it to be used with transmitters in horizontal cylindrical tanks and other containers having non-linear sidewalls. It also allows the electronic module (transmitter or switch) to be calibrated outside the vessel. This is done by turning the probe upside down, filling the tubular sheath with process liquid to the desired coverage depth, and adjusting the electronics unit at each liquid depth appropriate to the model configuration.

### SPECIFICATIONS

**Process Working pressure @ 100 °F (38°C):** 1500 PSIG (100 BAR).

**Process Temperature:** -460 to +450°F (-273 to +230°C).

**Materials:** 316 SS and PTFE are basic; other metals are optional.

**Process connections:** 1" MPT is minimum; any larger threaded or flanged connection is optional

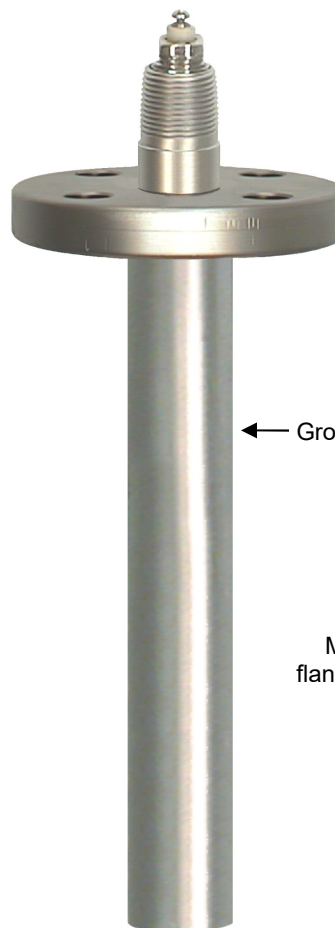
**Ground sheath:** metal tube, welded to the gland body. Sensing probe centering guides are provided.

**Electronic module:** works with all models

**Maximum insertion:** 20 feet (6 meters)

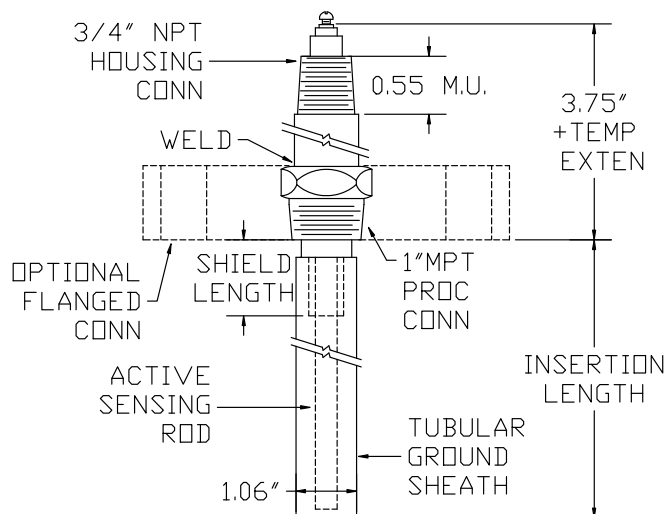
**Bottom support bracket:** may be required when insertion is over 60 inches and the liquid is agitated or turbulent.

**Double Block and Vent Seals:** optional for toxic and hazardous services



← Ground Reference Sheath

Model P21 Probe with  
flanged process connection



**Delta Controls**  
CORPORATION

# MODEL NUMBERING SYSTEM

BASIC TYPE	INSERTION LENGTH	EXTENSIONS & SHIELDS	PROCESS CONNECTION	OPTIONS
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MODEL EXAMPLE    P21Y   -   48.0"   -   3.0"T   -   1"MPTY   -   AA

FOR PROBE

BASIC TYPE	
M/N	WETTED MATERIAL
P21Y	316 S.S.
P21G	HASTELLOLOY® "C"
Both equipped with Teflon® seals and jacket	

PROCESS CONNECTION	
M/N*	DESCRIPTION
1" MPTY	1" MALE NPT; ANSI
1.5"/150RS	1 1/2"/150# R.F. FLANGE, ANSI STANDARD
ZZ	OTHER STANDARDS

INSERTION LENGTH	
M/N	DESCRIPTION
*	INSERTION
REPLACE "*" WITH INCHES	

EXTENSIONS & SHIELDS			
M/N	DESCRIPTION	N/C	N/C
AA	NONE		
*T	TEMPERATURE EXTENSION		
*S	INACTIVE SHIELD		
REPLACE * WITH INCHES REQUIRED			

OPTIONS	
M/N	DESCRIPTION
AA	NONE
ZZ	SPECIAL DELIVERY CONFIGURATIONS
HEAD HOUSING REQUIRED FOR REMOTE ELECTRONICS SELECT PH4, PH7, OR PH7T	
PH4	4X HEAD HOUSING FOR REMOTE ELECTRONICS
PH7	7X ALUMINUM HEAD HOUSING FOR REMOTE ELECTRONICS
PH7T	7X 304SS HEAD HOUSING FOR REMOTE ELECTRONICS

Designed and Built in the USA by Delta Controls

PROBE TEMPERATURE EXTENSION LENGTH	LIMIT WITH INTEGRAL ELECTRONICS MODULE	REMOTED ELECTRONICS "PE" CABLE
0	-40 to +200°F	-60 to +200°F
3" (75mm)	-50 to +255°F	-80 to +225°F
6" (150mm)	-60 to +325°F	-100 to +285°F
9" (230mm)	-70 to +450°F	-120 to +350°F

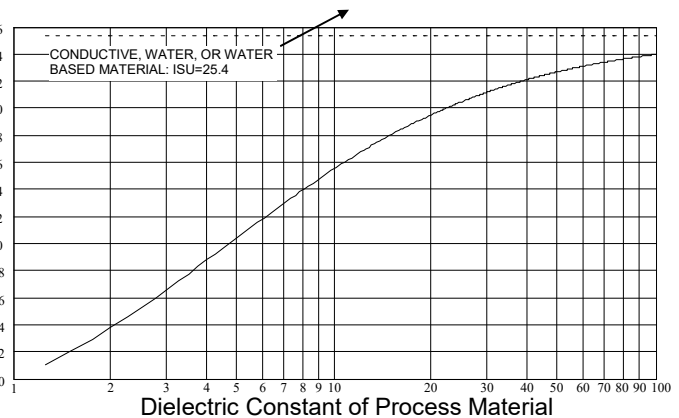
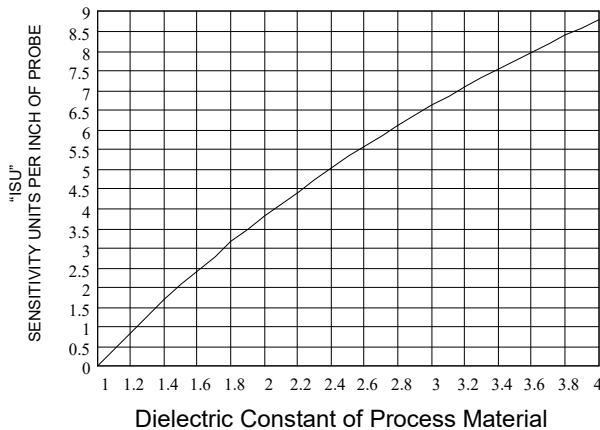
BASED ON AN INSULATED VESSEL OR GOOD HEAT DEFLECTOR

## ESTIMATING PROBE PERFORMANCE

**STEP # 1** Determine "BSU", which is the total Sensing Unit equivalent when no material is covering the sensing probe.

- (A) BASIC "SU" DUE TO SEAL/BODY = 137.0
  - (B) INCHES SENSING PROBE INSERTION X 5.5 = \_\_\_\_\_
  - (C) INCHES INACTIVE SHIELD X 31 = \_\_\_\_\_
  - (D) INCHES TEMPERATURE EXTENSION X 31 = \_\_\_\_\_
  - (E) INCHES CABLE FOR REMOTED MODULE X 4.5 = \_\_\_\_\_
- "BSU" TOTAL = \_\_\_\_\_

**STEP # 2** Determine "ISU", which is the quantity of Sensing Unit change caused by a 1 inch change in the elevation of the process material covering the sensing probe, "ISU" = Read from the graph below



**STEP # 3** INSERT "BSU" AND "ISU" (DETERMINED ABOVE) INTO THE FORMULAS SHOWN IN APPLICATION NOTE # PROB-198; "FORMULAS FOR MODELING AND PERFORMANCE TESTING". VERIFY THAT THE SELECTED PROBE AND ELECTRONICS MODULE WILL MEET THE REQUIREMENTS OF THE APPLICATION AND PROVIDE THE EXPECTED RESULTS.



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