

# SERIES 86 PROBES FOR TOP OF TANK MOUNTING

## - DRY GRANULATED SOLIDS AND POWDERS -

### ADVANTAGES

- Heavy duty strong cables are reliable
- Gland to cable connection is actually stronger than the cable itself
- Insulators and supports are fiber filled Delrin® for long life
- Secondary seal of Teflon® prevents moisture and condensation from causing false switching
- Bare S.S. sensing rods and cables resist abrasion and corrosion
- Proven reliability in all kinds of solids applications

These sensing probes are mounted on top of the tank or silo with the cable hanging down inside. Weights are required on the bottom when strong air currents are present. The insertion should be limited to 6 feet when high velocity air currents, such as at a cyclone, are present. Otherwise the flexible cable, with or without a weight, can be whipped about by the air flow and may cause erratic operation and maintenance problems. The glands are sealed against moisture and water. The materials are all stainless steel.

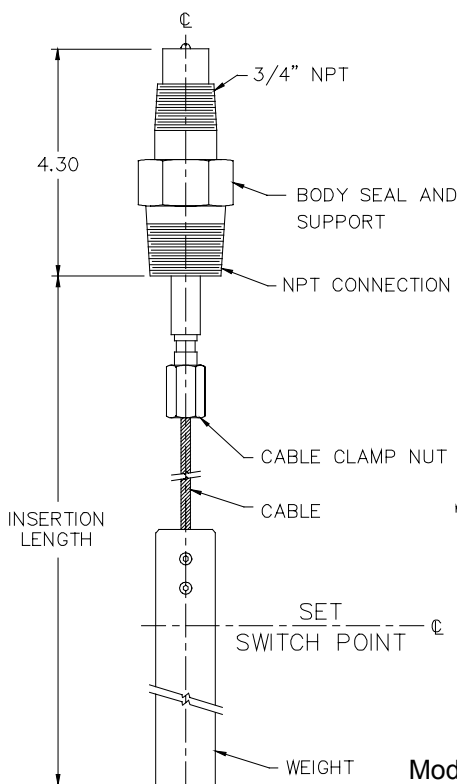
**Model P87** Is a general duty probe with a 0.125"Ø cable only (no weight). It is intended for service where rolling or side-to-side movement of the process solids occurs. Applications include cement load out bins, flour bins, bottom centerline takeout pellet hoppers, etc.

**Model P87W** Is a general duty probe with a 0.125"Ø cable and bottom weight. It is intended for services such as plastic pellets, grain, etc. The switchpoint is set at the midpoint of the weight (0.88"Ø x 12" long).

**Model P88** Is a heavy duty probe with a 0.19"Ø cable and bottom weight. The weight (1.00"Ø x 12" long) is intended for service in heavy granules, and similar small chunk material. Services such as Taconite, marble chips, and the like are reliably sensed.

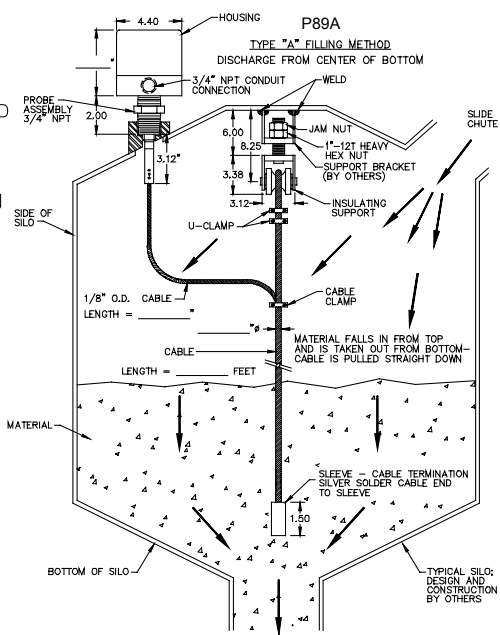
Service Temperature: C/F if over 260°F (125°C)

### P89 DIMENSIONS AND INSTALLATION DETAIL

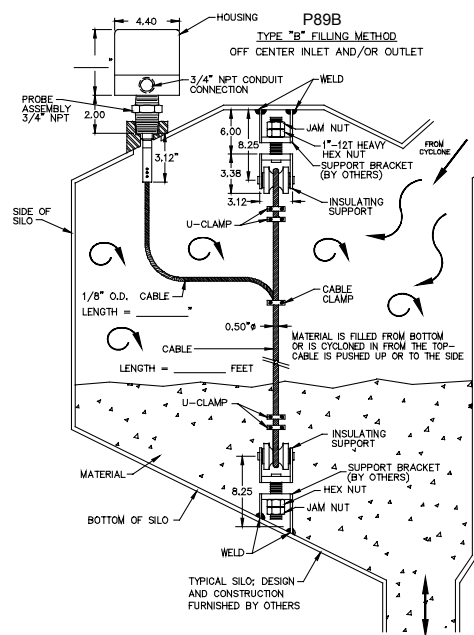


Models P87 and P88

DESIGNED AND BUILT  
IN THE USA BY DELTA  
CONTROLS

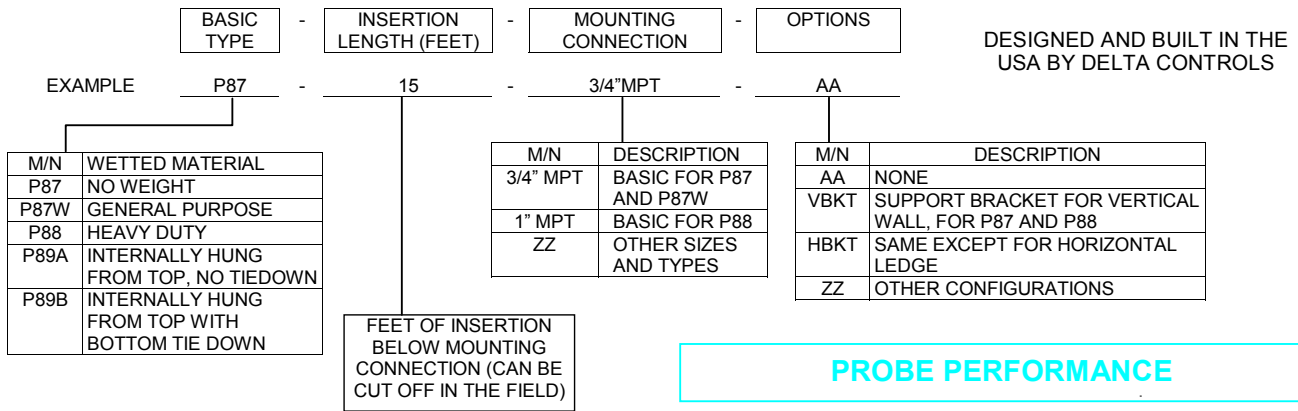


**Model P89A** Is a heavy duty cable probe which is hung from an internal to the tank support. The lower end is free to move and follow the flow of the material. Multiple switch points or a 4-20 mA signal are common output signals.



**Model P89B** Is a heavy duty cable probe which is hung from an internal to the tank support and is also tied off to a similar support at the bottom of the tank. This unit is required when the material flow is substantial in the horizontal direction. Significant horizontal movement can cause measurement errors and can even short a probe out against the wall if the bottom end is not secured in place.

## MODEL NUMBERING SYSTEM



### MAXIMUM ELEVATION OF MATERIAL

The vertically mounting sensing probes can withstand heavy, but not unlimited loads, without breaking the supporting cable. The loading on a covered cable is a function of the density of the process material, location of the probe, and the depth of coverage. Delta Controls has simplified this complex relationship into a simple and easy to use equation. The resultant is a term called "Weight Factor" or "WF". A "WF" value has been derived for each probe model. The maximum allowable coverage is easily determined by dividing the "weight factor" by the bulk density of the process material, as follows:

"WF" is the Bulk Density (LBS/FT<sup>3</sup>) = maximum allowable feet of coverage

$$\text{Maximum Coverage (feet)} = \frac{\text{"WF"}}{\text{LBS/FT}^3}$$

Example: Plastic pellets, 31 LBS/FT<sup>3</sup>

Using a Model P87W sensing probe

$$\text{Max Coverage} = \frac{1230}{31} = 40 \text{ Feet of pellets}$$

M/N	P87	P87W	P88	P89A	P89B
"WF"	2,240	1,230	2,060	6,500	5,800

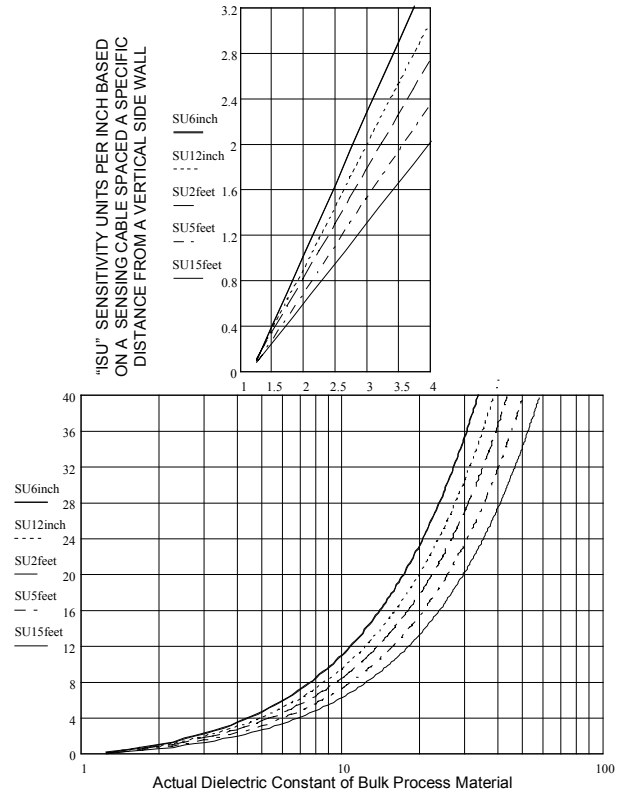
### TRUE DIELECTRIC CONSTANT

DcS = Dielectric constant of the solid

DcT = True dielectric constant of the ground bulk material

$$\text{DcT} = (\text{DcS} - 1.0) \times \left( \frac{\text{Bulk Density}}{\text{Solid Density}} \right) + 1.0$$

### PROBE PERFORMANCE



Determine "ISU"; Sensing unit change due to the sensing probe being covered by 1 inch of process material. Read "ISU" from above graph(s):

(1) To determine minimum switching differential (103,105):  
 "SSU" =  $\frac{2.0}{\text{ISU of probe}}$

(2) To determine minimum range for 4-20 mADC output signal (use "graph for cable"):

Min "QSU": 170 = 250 SU; 171 = 160 SU; 172 = 80 SU

Base sensing units: Determining "BSU" is not normally required for Series 86 probes because the total values are inherently low. The electronic module ranges are adequate to cover any expected application.

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