

TrueCap[®]

MODEL MK-2e RF CAPACITANCE POINT LEVEL SENSOR

- ▼ *Reliable Sensing of Bulk Solids, Liquids and Slurries*
- ▼ *High Sensitivity of 0.5pf for Low Dielectric Materials*
- ▼ *Automatic Material Build-Up Immunity*
- ▼ *Wide Variety of Probe Versions*



TrueCap[®]



“SETTING THE STANDARD FOR SUPPLIER EXCELLENCE”

BULLETIN 463

TrueCap®

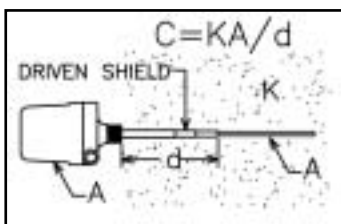
MODEL MK-2e RF CAPACITANCE LEVEL SENSORS

- ▼ **High 0.5pf Sensitivity Ensures Reliability with a Wide Range of Materials**
- ▼ **Pro-Active Driven Shield Technology Eliminates False Signals from Material Build-Up**
- ▼ **High Intensity LED Provides Visible Indication of Material Presence/Absence and Power-On**
- ▼ **Standard, Stub, Solid Rod Extensions, Cable Extension and Pipe Extension Versions Provide Versatility**

TrueCap® RF capacitance sensors offer cost-effective point level monitoring with reliability you can count on. The **TrueCap** Model MK-2e product line provides you with the most affordable solution for your application. All **TrueCap** Model MK-2e probes are designed to provide a high level of sensitivity, stability and durability for powder and bulk solids applications, as well as liquid and slurry applications.

PRINCIPLE OF OPERATION

A radio frequency is applied to the probe and is continually analyzed to determine the influence caused by the surrounding environment. As material contacts the probe, the radio frequency shifts indicating an increase in capacitance (C). The active probe of the unit and the vessel's wall make up the two plates (A=area) of a capacitor which are separated by a fixed distance (d). The probe's insulator and surrounding air provide the dielectric material (with dielectric constant "K"). As the air (K=1.0) is displaced with any other material (K > 1.0), the capacitance effect (C) is enhanced, thereby changing the application's impedance. This influence is measured within the circuitry and compared to a reference established by the sensitivity setting. The setting determines how much influence must be present before the output changes.



The driven shield section of the **TrueCap** Model MK-2e probe enable the circuitry to ignore product build-up on the probe that would otherwise cause false sensing. The driven shield is acti-

TrueCap® Model MK-2e monitoring latex paint.



vated with the same radio frequency potential as the sensing probe. Since current can not flow between identical potentials, the driven shield blocks current flow from the active probe to the vessel wall through the material build-up, thereby eliminating the sensing of the material build-up.

APPLICATIONS

TrueCap® Model MK-2e RF capacitance point level sensors are versatile devices providing high and low level readings in bins, silos, tanks, hoppers, and other vessels. The MK-2e's superior sensitivity range allows users to properly adjust units to meet the needs of a wide variety of applications. Whether your application is for a powder, liquid, granular solid, or viscous material, the **TrueCap** Model MK-2e offers the right solution.

TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO:

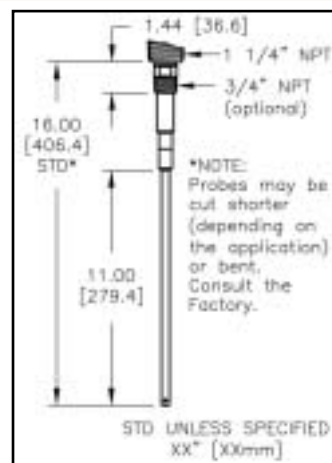
- | | | |
|-------------------|--------------|--------------------|
| ▼ Chemicals | ▼ Plastics | ▼ Pellets |
| ▼ Feed/Grain | ▼ Rubber | ▼ Pharmaceuticals |
| ▼ Liquids | ▼ Wastewater | ▼ Sand |
| ▼ Cement | ▼ Slurries | ▼ Food Ingredients |
| ▼ Powders | ▼ Coal | ▼ Paint & Coatings |
| ▼ Granular Solids | ▼ Oils | ▼ Paper Pulp |

PROBE VARIATIONS

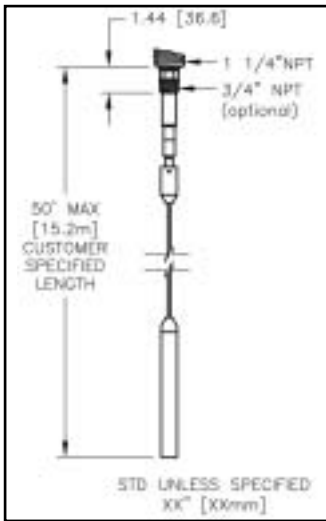
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

STANDARD PROBE

The most commonly used probe variation, the standard probe performs reliably in many different applications.



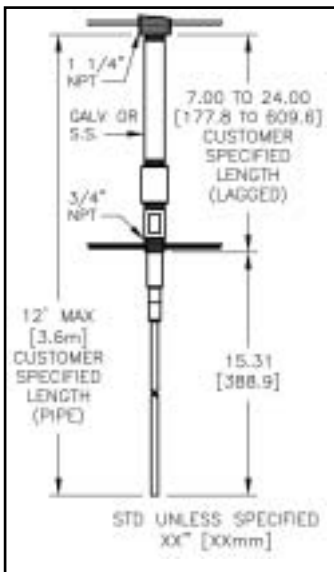
CABLE EXTENSION PROBE



The cable extension probe can extend the sensing point up to 50 feet (15 m) beneath the mounting point. It should be noted that the build-up immunity, however, is not extended with the cable version. Use the pipe extension probe in those applications requiring build-up immunity.



PIPE EXTENSION/LAGGED HOUSING

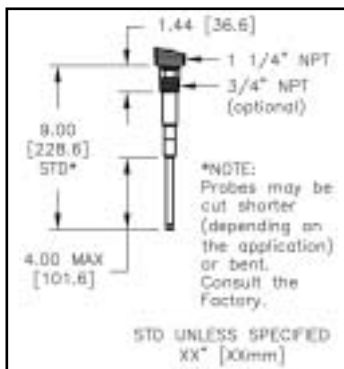
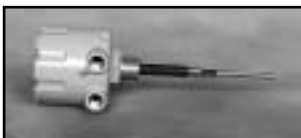


The pipe extension probe extends the sensing point and build-up immunity up to 12 feet (3.6 m) down into the bin. The lagged housing version "Lags" the housing up to 24 inches (610 mm) away from the mounting point for high temperature applications and/or vessels with external insulation.



STUB PROBE

Usually used in tight spaces, or in applications with heavy material, the stub probe is a shorter version of the standard probe.



MK-2e OPTIONS

FOOD GRADE PROBE



Most probe variations are available with nylon insulators for food grade applications. Food grade probes are usually outfitted with the stainless steel connection.

S. S. CONNECTION

A 3/4" NPT 316 stainless steel mounting connection for applications requiring material compatibility enhances the effectiveness in food grade or corrosive applications.



EXTERNAL INDICATOR LIGHTS

A high intensity external LED indicator light on the external surface of the housing provides proof of operation and output status information. The light changes from green to red when material is present.



SPLIT ARCHITECTURE

For applications involving high temperatures or vibrations, the probe and electronics are housed in separate enclosures mounted twelve feet (3.6 m) apart or more depending on the application, therefore removing the electronics from the stressful conditions. All calibration, sensitivity, and test functions are carried out at the remote electronics.



ACCESSORIES

MOUNTING PLATES

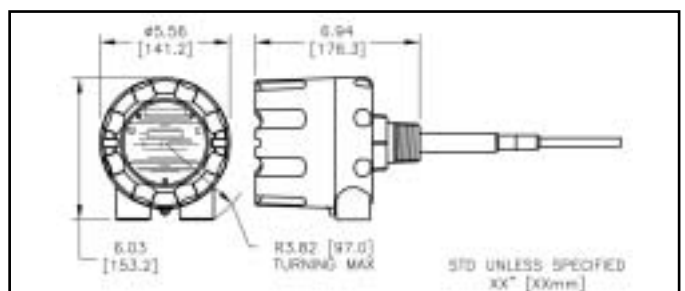
Painted carbon steel or stainless steel mounting plates eliminate the need to weld a mounting coupling to the vessel.

PROBE EXTENSIONS

Rigid probe extensions with solid or flexible couplings easily extend the sensing point to a desired distance from any top-mounted **TrueCap** probe.

HOUSING MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



ORDERING INFORMATION

RF CAPACITANCE INTEGRAL SENSORS

11 - 84 X X - X X X

ELECTRONICS TYPE

1 = Standard ¹

APPROVALS

2 = Ordinary

PROBE TYPE

1 = Standard - Ryton®
2 = Food Grade - Nylon
3 = Stub - Ryton®²
4 = Stub - Nylon²
6 = Cable Ext - Nylon

OPERATING VOLTAGE

1 = 115 VAC
2 = 230 VAC
3 = 24 VDC

PROBE CONNECTION

1 = 1-1/4" NPT Alum.
2 = 1-1/4" & 3/4" SS^{3,4}
3 = Pipe ext/Galv^{3,4}
4 = Pipe ext/SS^{3,4}
5 = Lagged/Galv⁵
6 = Lagged/SS⁵

SPLIT ARCHITECTURE REMOTE ELECTRONICS ⁷

11 - 86 X 0 - X X 0

ELECTRONICS TYPE

1 = Standard ¹

APPROVALS

2 = Ordinary

OPERATING VOLTAGE

1 = 115 VAC
2 = 230 VAC

REMOTE PROBES ⁷

11 - 88 0 X - X 0 X

PROBE TYPE

1 = Standard - Ryton®
2 = Food Grade - Nylon
3 = Stub - Ryton®²
4 = Stub - Nylon²
6 = Cable Ext - Nylon

APPROVALS

2 = Ordinary

PROBE CONNECTION

1 = 1-1/4" NPT Alum.
2 = 1-1/4" & 3/4" SS^{3,4}
3 = Pipe ext/Galv^{3,4}
4 = Pipe ext/SS^{3,4}

Cable Assembly 11-1015 Cable Assembly, 12ft. (3.6 m) 22awg Co-ax/
18awg Wire. Consult factory for longer lengths

Consult factory for available configurations. Not all combinations are offered.

- Standard electronics feature manual calibration only.
- Minimum allowable insertion length of stub to be specified according to application. Consult factory.
- Overall insertion length for pipe extension to be specified by customer. Max: 12 feet (3.6 m)
- For pipe extension probes with overall length exceeding 6 1/2 feet (2.0 m), the unit must be shipped by truck.
- Overall length to be specified as 7" to 24" (178 to 610 mm).
- Lagged length to be specified as 7" to 24" (178 to 610 mm).
- Remote Electronics and Remote Probe must be purchased together w/11-1015 Cable Assembly

Ryton® - Trademark of Phillips Chemical Co.
Teflon® - Trademark of DuPont Chemical Co.

SPECIFICATIONS

Power:	115VAC (± 15%); 2.5VA; 50/60Hz / 230VAC (± 15%); 2.5VA; 50/60Hz / 24VDC (± 15%); 3W (N/A on Split-Architecture Remote Electronics)
Ambient Op Temp:	-40° F (-40° C) to +150° F (+65° C)
*Internal Bin Temp:	To +176° F (+80° C) w/alum. mount (<104° F (40° C) ambient) To +400° F (+204° C) w/SS mount (<122° F (50° C) ambient)
Output Relay:	SPDT, 5A @ 250VAC, 30VDC maximum
External Indicators:	Red and green LEDs indicating power and operating mode (N/A on Split-Architecture Units)
Sensitivity:	Multi-turn potentiometer adjustment 0.5pf to 150 pf
Stability:	±0.015pf per degree F (0.027pf per degree C) @ 0.5pf setting
Time Delay:	0.25 to 15 sec delay-to-activate, adjustable 0.25 sec delay-to-deactivate, fixed
Fail-Safe:	Switch selectable - HI/LO
Build-up Immunity:	Protected via driven shield to 150 ohm load
Enclosure:	Cast alum screw-on cover, beige polyester powder coat, NEMA 4 IP66
Conduit Connection:	Two (2) 3/4" NPT connections
Approvals:	Ordinary Locations, CE Mark
Standard/Food Grade Probe	
Mounting:	1-1/4" NPT alum, or combo 3/4" NPT 316SS and 1-1/4" NPT alum
Probe material:	3/8in(9.5mm) dia. 316SS probe & guard, Ryton® & Nylon insulators
Probe length:	16in(406mm) from alum mounting
Temp. (probe only):	Ryton® +450° F (+232° C) max; Nylon +300° F (+148° C) max
Pressure:	50 psi(3.5 bar) max (1-1/4 NPT alum) 150 psi(10 bar) max (3/4 NPT SS)
Stub Probe	
Mounting:	1-1/4" NPT alum, or combo 3/4" NPT 316SS and 1-1/4" NPT alum
Probe material:	3/8in(9.5mm) dia. 316SS probe & guard, Ryton® & Nylon insulators
Probe length:	Cut to customer specification; application dependent
Temp. (probe only):	Ryton® +450° F (+232° C) max; Nylon +300° F (+148° C) max
Pressure:	50 psi(3.5 bar) max (1-1/4 NPT alum) 150 psi(10 bar) max (3/4 NPT SS)
Cable Extension Probe	
Mounting:	1-1/4" NPT alum, or combo 3/4" NPT 316SS and 1-1/4" NPT alum
Probe material:	1/8in(9.5mm) diameter 316 SS Teflon® jkt'd cable, Nylon insulator
Cable length:	Customer specified up to 50' overall insertion from alum mtg
Temp. (probe only):	+300° F (+148° C) max
Pressure:	50 psi(3.5 bar) max (1-1/4 NPT alum) 150 psi(10 bar) max (3/4 NPT SS)
Pipe Extension Probe	
Mounting:	1-1/4" NPT alum
Lag material:	Galvanized or 316SS
Pipe ext length:	Customer specified up to 144in (3.6m) overall insertion
Interface to:	Standard or Food Grade (See applicable specs)
Lagged Housing Version	
Mounting:	3/4" NPT 316SS
Lag material:	Galvanized or 316SS
Lag length:	Customer specified from 7 to 24 in (178 to 610 mm)
Interface to:	Standard Probe only (See applicable specs)
Split Architecture	
Mounting:	7.5" x 5.0" Mounting Plates
Elec. Enclosure:	Cast Aluminum, screw-on cover, polyester powder coat
Cable:	12 ft (3.6m), 22 awg co-ax / 18 awg wire
Max Bin Temp:	Ryton® probe: 450° F (+232° C); Nylon: 300° F (+148° C)

*Influenced by mounting, material thermal conductivity and ambient temperature.

WARRANTY

Monitor Technologies LLC warrants each TrueCap® RF capacitance sensor it manufactures to be free from defects in material and workmanship under normal use and service for two (2) years from the date of purchase. The purchaser must notify Monitor of any defects within the warranty period, return the product intact, and prepay transportation charges. The obligation of Monitor Technologies LLC under this warranty is limited to repair or replacement at its factory. This warranty does not apply to any product which is repaired or altered outside of Monitor Technologies' factory, or which has been subject to misuse, negligence, accident, incorrect wiring by others, or improper installation.



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