MONITOR

Practical solutions...at every level!

Missouri Filter & Process Equipment Co
MOFILCO-Quality, Value, Service
12025 Manchester Road, Suite 30G
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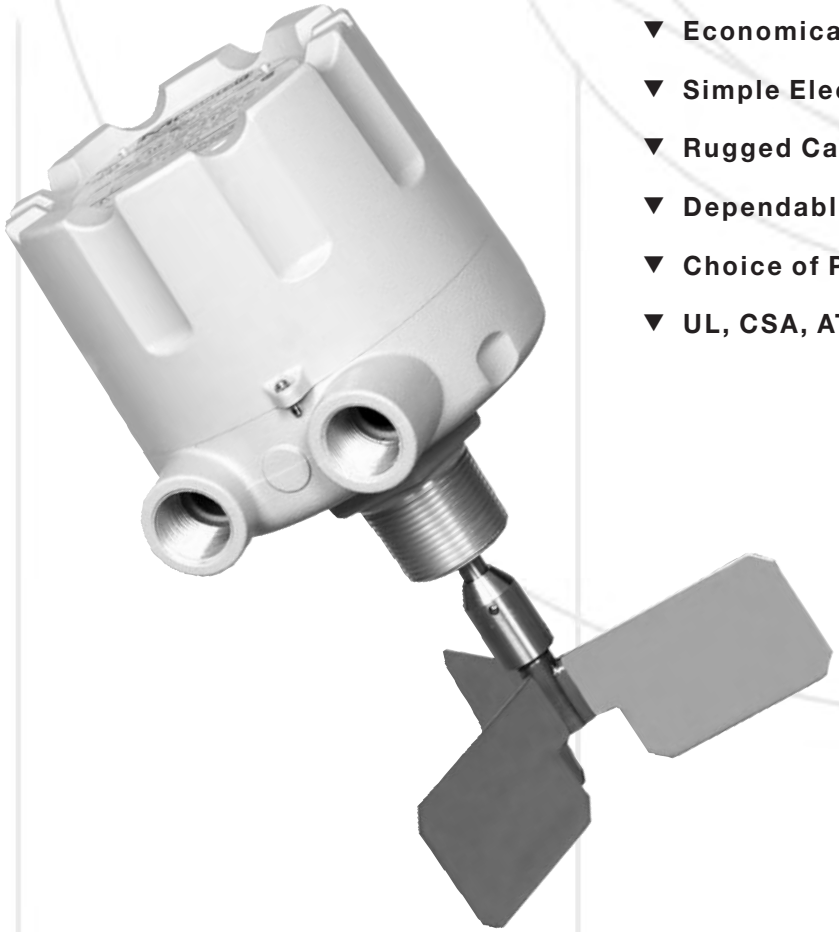
314-821-4321 www.mofilco.com
mofilco@mofilco.com

Rotary Paddle Bin Monitor
MODEL KA & KAX

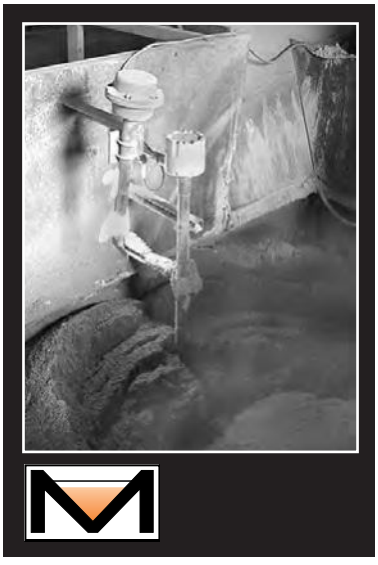


- Hassle-Free Housing Design - No Bolts!
- Industry Leading Motor Shut-off Feature
- Economical, Versatile Point Level Bin Monitor
- Simple Electro-Mechanical Operation
- Rugged Cast Aluminum Construction
- Dependable Design Reduces Component Wear
- Choice of Process Connections and Accessories
- UL, CSA, ATEX/IECex Approved

- **Twist On/Off Cover - No More Bolts!**
- **Motor Shuts Off When Paddle Is Impeded**
  - **Significantly Extends Motor Life**
  - **Reduces Maintenance Costs**
- **Wiring Access - 2 Conduit Entrances**
- **Competitive Price Makes Monitor Your Best Value**
- **Three Bearing Design With Sealed Bearings Last Longer**
- **Built-In Slip Clutch Extends Life**
- **Hazardous Location Approvals Available**
- **Unique Low Voltage DC Design Available**
- **Standard Units Rated To 300˚F (149˚C)**
- **Hi-Temp Models Rated To 750˚F (399˚C)**

Rotary Paddle Bin Monitor MODELS KA & KAX

Monitor's line of rotary paddle bin monitors consists of the most reliable, rugged and economical point level control sensors available for detection of dry bulk materials. These easy to install units are proven performers in a wide variety of bulk materials. Monitor's paddle units can be used to eliminate bin overflow, maintain a predetermined material level, indicate plugging of conveyors and pneumatic lines or provide any of a number of level control functions. Unlike many other available paddle units, Monitor's paddle level indicators incorporate a feature that automatically shuts off the motor of the unit when the paddle is in a stalled position, which both extends the life of the motor and minimizes maintenance.



A concrete manufacturing plant has installed a new Model KA unit in the pictured bin. This bin is filled with stone, but Model KAs are also being used in this facility with steamed sand, gravel and cement.

PRINCIPLE OF OPERATION

The operation of Monitor's paddle level control products is quite simple. The unit is installed through the wall of the vessel, so that the paddle protrudes inside the vessel. A small electric motor drives a paddle which rotates freely in the absence of material.

When the paddle is impeded by material, the motor rotates within the housing which triggers two switches. The first switch is a "dry" electrical contact closure that is available to control a process function or alarm circuit. The second switch cuts the power to the motor, preventing a locked rotor condition, thus extending motor life. This also activates the signaling device which is wired through that same motor switch. When the material level drops, the loaded stretched tension spring returns the motor to its original running position and the unit is reactivated.

TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO:

Feed	Silica Sand
Rocks	Pellets
Wood	Calcium Dust
Rubber	Metals
Regrind	Coal
Peanuts	Malt
Clays	Resin
Limestone	Grain
Foundry Sand	Pre-Mix Ingredients
Rawhide	Sawdust

APPLICATIONS

Monitor's rugged, reliable design make the paddle units compatible with many granular, pelletized and powder bulk applications. Monitor paddle units can be used for high level indication of materials over 10 lb/ft^3 (160 kg/m^3) and for low and intermediate level indication for materials over 5 lb/ft^3 (80 kg/m^3). Monitor paddle units can be installed almost anywhere dry bulk materials are stored, including bins, hoppers, silos and tanks. Monitor's KA unit is the most popular of our paddle bin monitors. This model is ideal for use in standard applications with a wide variety of materials. The KAX incorporates all the features of the KA model, but is specially designed to meet explosion-proof standards.

This installed KA unit is being used as a high-level alarm in a grain storage application.

FEATURES

- Complete motor shut-off prevents motor burnout and extends the life of the unit
- Twist on/off cover means no bolts to hold or lose - Hassle-free housing design
- UL, CSA and ATEX/IECex hazardous location approvals (KAX)
- 1-1/4" NPT or 1-1/2" BSPT process connection
- Two conduit connections provide easy wiring access (M20 cable glands provided with Model KA units with BSPT process connection)
- Built-in slip clutch protects motor and drive gears from excessive rotational forces
- Three bearing design with sealed bearings fully minimizes drive shaft loads and drag providing extended life
- Interchangeable paddle assemblies increase the paddle unit's versatility
- Built-in signal delay prevents false signaling
- Field adjustable sensitivity
- High operating temperature up to 300°F (149°C) (Hi-temp version up to 750°F (399°C))

AVAILABLE MODELS

Monitor's KA unit is the most popular of our paddle bin monitors. This model is ideal for use in standard applications with a wide variety of materials. The KAX incorporates all the features of the KA model, but is specially designed to meet hazardous location standards.

AVAILABLE CONFIGURATIONS

MOTOR VOLTAGES

Monitor offers several motor voltages to serve most power requirements. Available AC motors include 115 VAC, 230 VAC, 24 VAC and 48 VAC. Superior 12/24VDC design available uses low voltage AC motor for longer life in all applications.

OUTPUT CIRCUITS

Monitor paddle units are available with 1, 2 or 3 output contacts. The cost effective 1-circuit model utilizes the motor switch (SPDT) as the output contact, as long as the alarm device operates on the same voltage as the motor. The most popular 2-circuit design contains the motor SPDT switch and a second SPDT isolated switch for control outputs (See "Wiring Diagram"). The 3-circuit configuration provides the user with the SPDT motor switch and an isolated DPDT switch for control outputs.

PROCESS CONNECTIONS

Monitor offers a choice of either a 1-1/4" NPT or 1-1/2" BSPT process connection. Model KA units with the 1-1/2" BSPT connection also include M20 cable glands.

APPROVALS/LABELING

Monitor paddle units are available approved to UL, CSA and ATEX/IECEx requirements. Various models are approved for either general purpose, dust/ignition-proof and/or explosion-proof applications. In addition, all models carry the CE mark. See "Specifications" section for more details.

HIGH TEMPERATURE UNITS

Monitor's high temperature models incorporate all the standard features of the KA or KAX models, but can be used in applications where temperatures reach as high as 750°F (399°C). The hi-temp models incorporate a specially designed mounting plate, pipe extension with air purge connection, shaft extension, couplings and bushings. The high-temp assembly is available in either a carbon steel or stainless steel version. See "Ordering Information" for applicable part numbers.

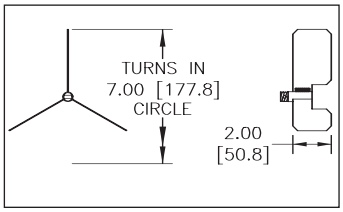
ACCESSORIES

PADDLE ASSEMBLIES

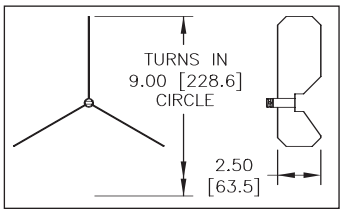
Monitor offers a variety of interchangeable paddle assemblies to meet the needs of a wide variety of applications. Different material densities, particle sizes and flow characteristics require specific paddles to provide optimum performance. See Monitor's Material Characteristic Guide for more detailed application recommendations.

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

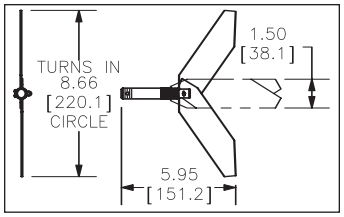
1.) Standard Stainless Steel Three Vane Paddle: The most popular of all paddles. For use with average weight materials.
P/N 1-4146



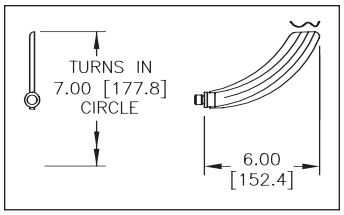
2.) Large Stainless Steel Three Vane Paddle: Provides accurate level control for lightweight materials.
P/N 1-4141



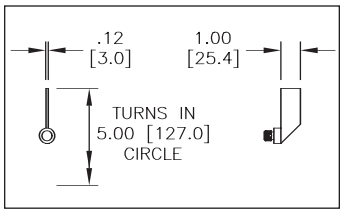
3.) Insertable*, Stainless Steel Two Vane Collapsible Paddle: Provides low and high level control for average weight materials.
P/N 1-4161



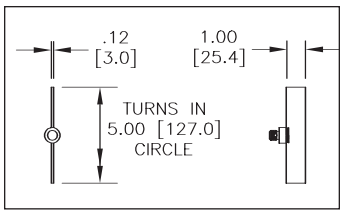
4.) Insertable*, Stainless Steel Scimitar Single Vane Paddle: Provides low and high level control for light to average weight materials.
P/N 1-4193



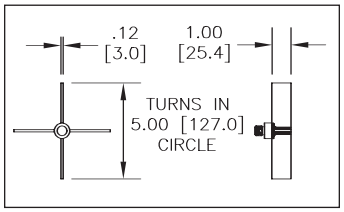
5.) Insertable*, Stainless Steel Single Vane Paddle: Provides low level control for average weight materials and low to high level control for heavy materials under 1-1/2 inch (40 mm) in diameter.
P/N 1-4145



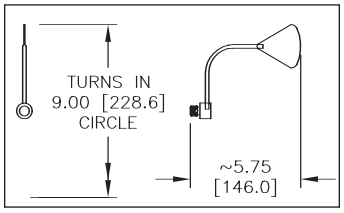
6.) Stainless Steel Two Vane Paddle: Provides low and high level control for heavy materials under 1-1/2 inch (40 mm) in diameter.
P/N 1-4135



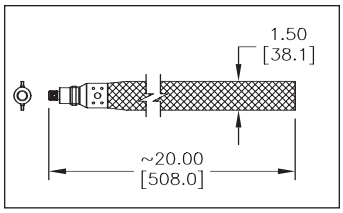
7.) Stainless Steel Four Vane Paddle: For use with average to heavy weight materials in low and high level control installations.
P/N 1-4156



8.) Stainless Steel Triangular Arc Single Vane Paddle: Provides low and high level control for light to average weight materials.
P/N 1-4144



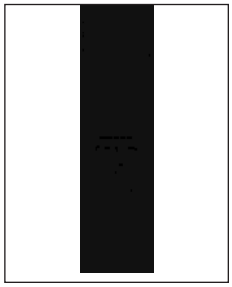
9.) Ex-Flex Three-Ply 20 inch (508 mm) Belt Paddle: Provides low and high level control for heavy materials over 2 inch (50 mm) in diameter. Top mount only. P/N 1-4137



** Insertable paddles eliminate the need for a mounting plate. P/N 1-4161 and P/N 1-4193 are insertable through either a half or full 1-1/4" or 1-1/2" coupling, that is welded to the bin wall. P/N 1-4145 is insertable through a half 1-1/4" or 1-1/2" coupling.*

FLEXIBLE COUPLING

The flexible coupling works to absorb heavy loads, side loads and loads caused by product surges, thus protecting the internal workings and extending the life of the paddle unit. A flexible coupling should be used with heavy materials and in top mount installations where a solid shaft extension is used. Monitor offers the following coupling option: Spring-Flex: P/N 1-3335



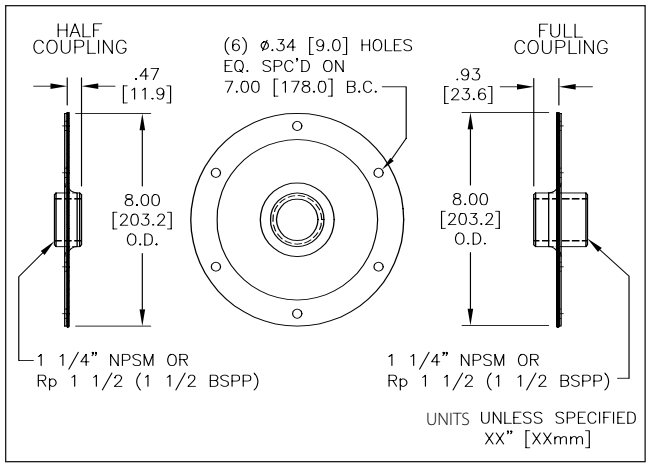
MOUNTING PLATES

Mounting plates allow the paddle units to be mounted from the outside of a vessel to curved or flat surfaces. All mounting plates featured below mount via six bolts.

1.) Half Coupling Mounting Plate:
For use in side mount installations. Available in powder coated carbon steel for general purpose applications and stainless steel for use in corrosive environments. Stainless Steel Plate: P/N 1-0112. Carbon Steel Plate: P/N 1-0101 for 1-1/4" NPT connection and P/N 1-0100 for 1-1/2" BSPT connection.

2.) Full Coupling Mounting Plate:
For use in top mount installations where a shaft extension and shaft guards are required. Available in powder coated carbon steel for general purpose applications and stainless steel for use in corrosive environments. Stainless Steel Plate: P/N 1-0113. Carbon Steel Plate: P/N 1-0102 for 1-1/4" NPT connection and P/N 1-0115 for 1-1/2" BSPT connection.

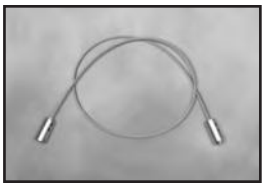
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



3.) K-Flange Aluminum Mounting Plate: For flat surfaces or thin walled vessels where extra strength is required. Ideal for semi-corrosive environments, including out doors. P/N 1-3316.

SHAFT EXTENSIONS

Many top mount installations require that the paddle extends into the vessel to a predetermined level. Solid shaft extensions are available in a variety of lengths up to 144 inches (3.6 m) to meet these demands. A flexible cable extension is also available. This 6.5 foot (2.0 m) flexible extension can be easily shortened in the field by the user. The use of the flexible cable extension for lengths greater than 3 feet (0.9m) requires the use of a guard to ensure proper activation of the rotary paddle bin monitor.



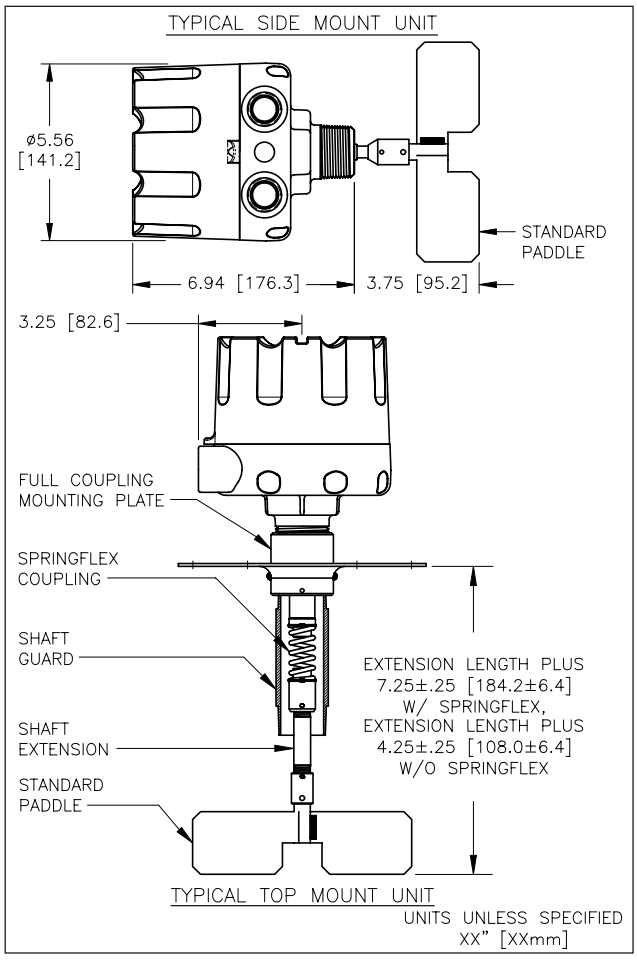
Flexible Cable Extension

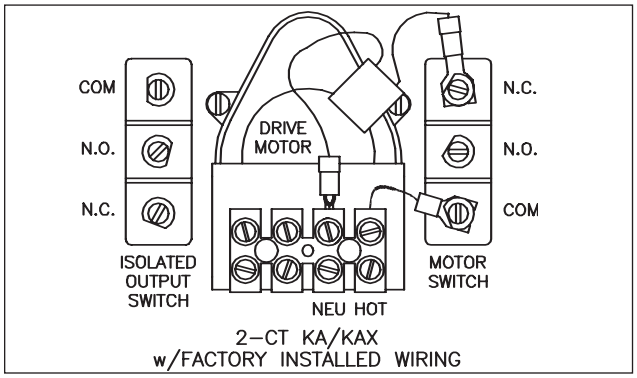
SHAFT GUARDS

Shaft guards are recommended for use with solid shaft extensions to limit the movement caused by side loading that would otherwise damage the working components of the paddle unit. Shaft guards should be the same length as the extension and should always be used when the extension meets or exceeds 18 inches (460 mm) in length.

MECHANICALS/WIRING DIAGRAM

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS





ORDERING INFORMATION

Model KA & KAX

1 - 8 X X X - X X

MODEL TYPE
3 = KA
4 = KAX

OPERATING VOLTAGE
0 = 115VAC
1 = 240VAC
3 = 12/24VDC
8 = 24VAC
9 = 48VAC

APPROVALS
1 = UL/CSA/CE
2 = ATEX/IECEx[1]

TEMPERATURE STYLE
1 = Hi-temp, CS[2]
2 = Hi-temp, SS[2]
Blank, none

CIRCUIT CONFIGURATIONS/PROCESS CONNECTION
1 = 2 circuits (2 SPDT)/1-1/4" NPT
2 = 3 circuits (1 SPDT, 1 DPDT)/1-1/4" NPT
6 = 2 circuits (2 SPDT)/1-1/2" BSPT[2]
7 = 3 circuits (1 SPDT, 1 DPDT)/1-1/2" BSPT[2]

Note:
1 Available with Model KAX only.
2 On all **high temperature configurations** a mounting plate (either #1-0102, CS or #1-0113, SS) is automatically furnished as **the** process connection. Threaded mounts are not available. 1-1/2" BSPT process connection is not available with high temperature style selection.

ACCESSORIES

Flexible Coupling

1-3335	Spring flex

Paddles
See "Accessories" section

Cable Extension
1-1176-2-78: Flexible extension, 304 SS, 78 inches (2 m) length (can be modified in the field for shorter length)

Solid Shaft Extensions:

1-1175-1-#*	1/4" Pipe, SCH-40, Galvanized
1-1175-2-#*	1/4" Pipe, SCH-40, 304 Stainless Steel

Shaft Guards:

1-1174-1-#*	1-1/4" Pipe, SCH-40, Galvanized
1-1174-2-#*	1-1/4" Pipe, SCH-40, 304 Stainless Steel

Mounting Plates

1-0100	Mounting plate, for R 1-1/2 (BSPT 1-1/2), half coupling, CS
1-0101	Mounting plate, for 1-1/4" NPT, half coupling, CS
1-0102	Mounting plate, for 1-1/4" NPT, full coupling, CS
1-0112	Mounting plate, for 1-1/4" NPT, half coupling, SS
1-0113	Mounting plate, for 1-1/4" NPT, full coupling, SS
1-0115	Mounting plate, for R 1-1/2 (BSPT 1-1/2), full coupling, CS
1-3316	Mounting plate, for 1-1/4" NPT, heavy duty alum.

* # = Extension and guard lengths - not to exceed 144 inches (3.6 m) in length. Maximum available single piece length is 72 inches (1.8 m). Contact factory for more details.

SPECIFICATIONS

Power Requirements:	115 VAC, 50/60 Hz; 230 VAC, 50/60 Hz; 24 VAC, 48 VAC 50/60 Hz; 12/24 VDC
Power Consumption:	4W max.
Ambient Operating Temperature:	-40°F (-40°C) to +200°F (+93°C) ext. amb.
Internal Bin Temperature:	
Standard Unit:	to 300°F (150°C)
Hi-Temp Unit:	300 to 500˚F (150 to 260˚C) without air-cooling 500 to 750˚F (260 to 400˚C) with air-cooling [0.5 psig / 2.14 CFM]
Conduit Connection:	Two (2) 3/4" NPT; M20 cable glands (Model KA units with 1-1/2" BSPT process connection only; Not on KAX units)
Outputs Contacts:	
2-Circuit Configuration -	Two SPDT 15A @ 250 VAC ea. max
3-Circuit Configuration -	One SPDT 15A @ 250 VAC max One DPDT 10A @ 250 VAC max
Maximum Pressure:	30 PSI (2 bar) maximum
Sensitivity:	5 lb./ft^3 (80 kg/m^3) minimum material density (when using large 3-vane paddle)
Housing:	Die cast aluminum, NEMA 4 / ENCLOSURE TYPE 4, IP66
Housing Finish:	Powder coating
Mounting Connection:	1-1/4" NPT or R 1-1/2 (BSPT 1-1/2)
Weight:	Approx. 8-1/2 lb. (3.9 kg)
Materials of construction/accessories:	
Flexible Coupling:	304 stainless steel
Mounting Plates:	Carbon steel or 304 stainless steel
All Paddles except Ex-Flex:	304 stainless steel
Ex-Flex Belt:	304 stainless steel coupling, rubber/fabric blend belt
Flexible Cable Extension:	304 stainless steel
Solid Shaft Extension/Guards:	Galvanized or 304 stainless steel
Shaft Seal:	Nitrile
Listings/Approvals:	
KA:	UL and CSA: Ordinary Locations
KAX:	UL and CSA: Class I, Div. 1 & 2, Groups C, D; Class II, Div. 1 & 2, Groups E, F, G ATEX: ⟨Ex⟩ II 1/2 D c T 100˚C ExtD A20/A21 T 100˚C (Ta -40˚C to +93˚C) IP6x IEC Ex: DIP A21 IP6X T_A 100˚C -40˚C to +93˚C
All Models:	CE Mark

WARRANTY

Monitor Technologies LLC warrants each rotary paddle bin indicator it manufactures to be free from defects in material and workmanship under normal use and service within two (2) years from the date of purchase. The purchaser must give notice of any defect to Monitor 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 shall not apply to any product which is repaired or altered outside of the Monitor Technologies LLC factory, or which has been subject to misuse, negligence, accident, incorrect wiring by others or improper installation. Monitor Technologies LLC reserves the right to change the design and/or specifications without prior notice.

44W320 Keslinger Road ▼ Elburn, IL 60119 ▼ 800-766-6486 ▼ 630-365-9403 ▼ Fax 630-365-5646
www.monitortech.com ▼ www.flexar.info ▼ www.monitortech.typepad.com ▼ monitor@monitortech.com

Scan this with a
smartphone QR-Code app
for more product details.

MONITOR

Practical solutions...at every level!

SafePoint® Self – Validating Rotary Paddle Bin Monitor

- The Leader In Self-Validating Point Level Monitors
- "Fail – Safe" PLUS
- Microcontroller-based Reliability
- Material Sense and Fault Outputs
- Choice of Process Connections & Accessories
- Hazardous Location Approvals Available

- **Self-Validating Eliminates Costs Associated With Unexpected Sensor Failures**
- **Industry-First Magnetic Sensing Technology (Patented)**
- **Monitor Sensor Health, Not Just System Power Failure – "Fail-Safe" PLUS**
- **Twist On/Off Cover – No More Bolts!**
- **Wiring Access - 2 Conduit Entrances**
- **Motor Shuts Off When Paddle Is Impeded**
  - **Significantly Extends Motor Life**
  - **Reduces Maintenance Costs**
- **Local Status Indicating Light on Most Models**
- **Standard Units Rated to 250˚F (121˚C)**
- **Hi-Temp Models Rated to 750˚F (399˚C)**
- **Hazardous Location Approval Available**

Imagine a bin level sensor that is more than just an indicator of the presence or absence of material. Picture technology that allows inteligent devices to indicate when something is wrong. Dream that a level sensor provides real-time information when the quality of the sensor function no longer allows it to operate as you expect. That is a "self-validating" bin level indicator. Now you can wake up, your dream has arrived. Costly overfilling and outages due to sensor failure can now be avoided!

The **SafePoint**® self-validating bin monitor is the state-of-the-art in rotary paddle technology. Going beyond traditional fail-safe sensor technology that only protects against power failure, the **SafePoint** bin monitor is the most reliable, rotary paddle point level control sensor available.

The **SafePoint** bin monitor provides the ultimate in performance wherever critical continuous operation must be ensured. Detection of both material presence and its own operational status is performed on a continuous basis.

An installed **SafePoint**® unit in an aggregate application.

The **SafePoint** level sensor monitors its electrical and mechanical operating condition. This, in conjunction with separate outputs for material sense and unit status (fault conditions) make the **SafePoint** a self-validating device.

PRINCIPLE OF OPERATION

While the **SafePoint** bin monitor is an evolution in rotary paddle technology, it continues to use tried-and-true operating techniques. Unlike many other available units, the **SafePoint** incorporates a feature that automatically shuts off its motor when the paddle is in a stalled condition. This extends the life of the unit and minimizes maintenance.

The operation of the **SafePoint**® rotary paddle bin monitor uses patented technology to detect material presence and operational status of the unit. The unit is installed through the wall of the vessel so that the paddle protrudes inside the vessel. A small electric motor drives the paddle, which rotates freely in the absence of material.

The rotation of the unit's shaft is continuously monitored by detection of a magnetized rotating disk. When the paddle is impeded by material, the shaft rotation stops. The motor rotates within the housing and magnetized sections of the motor mounting plate are detected. Use of these patented magnetic sensing techniques eliminates problems that occur with fouling of the optical systems used by other brands.

The built-in microcontroller performs self-validating diagnostics and monitors both shaft and motor mounting plate rotation. This allows the **SafePoint** to easily distinguish between material presence and any electrical and mechanical failure of the unit. When material presence is detected, the SENSE relay changes state and the drive motor is de-energized to extend motor life. This output is available to control a process function or alarm circuit. When the material level drops, a tension spring returns the drive motor to its original running condition and is reactivated.

A unit failure is detected by sensing a lack of shaft rotation while material presence has not been detected by rotation of the motor mounting plate. In a failure condition the independent FAULT relay will change state. Monitoring the state of both the SENSE and FAULT relays provides the most flexibility for control and monitoring that is beyond being just "fail-safe".

TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO:

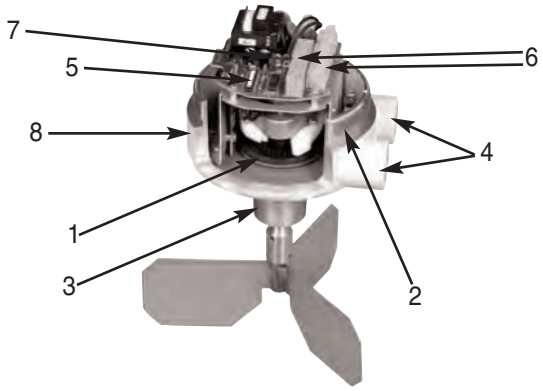
Feeds	Silica Sand	Pellets
Dust	Rubber	Metals
Regrind	Coal	Peanuts
Foundry Sand	Resin	Limestone
Grain	Cement	Sawdust

APPLICATIONS

The rugged and reliable design of the **SafePoint**® self-validating bin monitor makes it the best choice for critical level control applications. The unit is compatible with many granular, pelletized and powder bulk applications. It can be utilized for high level indication of materials over 10 lb/ft^3 (160 kg/m^3) and for low and intermediate level indication for materials over 5 lb/ft^3 (80 kg/m^3). The **SafePoint** bin level monitor can be installed almost anywhere dry bulk materials are stored including bins, hoppers, silos and tanks.

FEATURES

- Self-validating operation monitors electrical and mechanical status for critical applications-beyond "fail-safe"
- [1]Use of magnetic sensing technology ensures reliable operation even in dusty environments
- [2]Twist on/off cover for convenient and easy access – No bolts to lose or hold
- [3]1-1/4" NPT or 1-1/2" BSPT process connections
- [4]Two conduit connections provides easy wiring access
- [5]Microcontroller-based electronics ensures consistent and reliable operation
- [6]Independent SPDT relays for "sense" and "fault" outputs



- [7]Local Indication (ordinary locations only) of operating status
- [8]Cast aluminum housing with rugged powder coat finish

- High Temperature version available (up to 750˚F/399˚C)

AVAILABLE CONFIGURATIONS

MOTOR VOLTAGES

The **SafePoint**® fail-safe rotary paddle bin monitor is available in configurations to serve 115VAC, 230VAC and 24VAC/DC power requirements.

APPROVALS/LABELING

The **SafePoint** bin monitors are available approved to CSA$_{US/C}$ and ATEX/IECEx requirements. Approvals for either general purpose, dust-ignition-proof and/or explosion-proof hazardous area locations can be provided. All units carry the CE mark. Refer to "Specifications" for details.

HIGH TEMPERATURE UNIT

The **SafePoint** high temperature model incorporates the standard features of the **SafePoint** bin monitor, but can be used in applications where bin temperatures reach as high as 750˚F (399˚C). The hi-temp models incorporate a specially designed mounting plate, pipe extension with air purge connection (recommended for all high temperature applications; must be used for > 500˚F/260˚C), shaft extension, couplings and bushings. The high-temp assembly is available in either a carbon steel or stainless steel version.

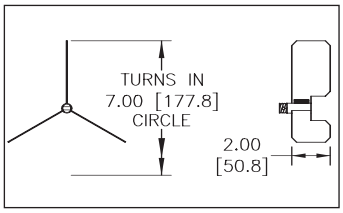
ACCESSORIES

Dimensions are shown in inches with millimeter equivalent in brackets

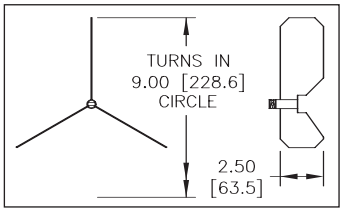
PADDLE ASSEMBLIES

Monitor offers a variety of interchangeable paddle assemblies to meet the needs of a wide variety of applications. Different material densities, particle sizes and flow characteristics require specific paddles to provide optimum performance. See Monitor's Paddle Selection Guide for more detailed application recommendations.

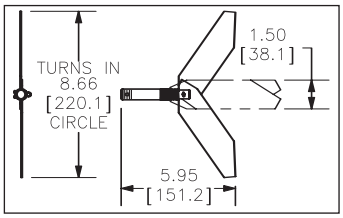
1.) Standard Stainless Steel Three Vane Paddle: The most popular of all paddles. For use with average weight materials.
P/N 1-4146



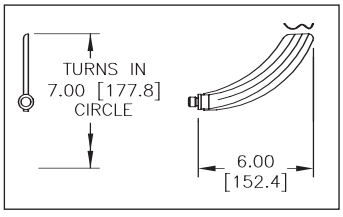
2.) Large Stainless Steel Three Vane Paddle: Provides accurate level control for lightweight materials.
P/N 1-4141



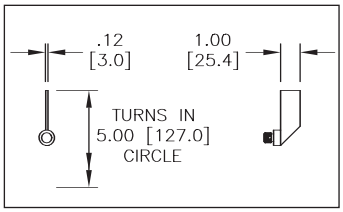
3.) Insertable*, Stainless Steel Two Vane Collapsible Paddle: Provides low and high level control for average weight materials.
P/N 1-4161



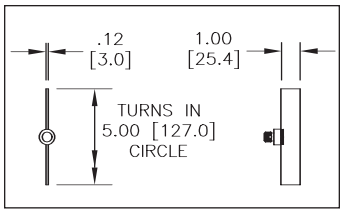
4.) Insertable*, Stainless Steel Scimitar Single Vane Paddle: Provides low and high level control for light to average weight materials.
P/N 1-4193



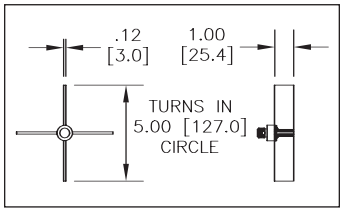
5.) Insertable*, Stainless Steel Single Vane Paddle: Provides low level control for average weight materials and low to high level control for heavy materials under 1-1/2 inch (40 mm) in diameter. P/N 1-4145



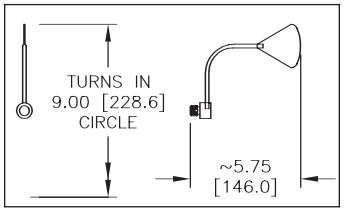
6.) Stainless Steel Two Vane Paddle: Provides low and high level control for heavy materials under 1-1/2 inch(40 mm) in diameter.
P/N 1-4135



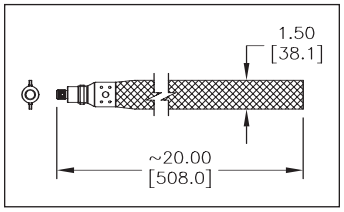
7.) Stainless Steel Four Vane Paddle: For use with average to heavy weight materials in low and high level control installations.
P/N 1-4156



8.) Stainless Steel Triangular Arc Single Vane Paddle: Provides low and high level control for light to average weight materials.
P/N 1-4144



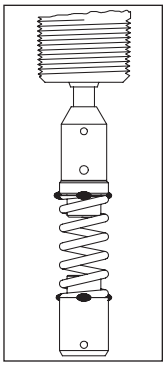
9.) Ex-Flex Three-Ply 20 inch (508 mm) Belt Vane Paddle: Provides low and high level control for heavy materials over 2 inch (50 mm) in diameter. Top mount only.
P/N 1-4137



Insertable paddles eliminate the need for a mounting plate. P/N 1-4161 and P/N 1-4193 are insertable through either a half or full 1-1/4" or 1-1/2" coupling, that is welded to the bin wall. P/N 1-4145 is insertable through a half 1-1/4" or 1-1/2" coupling.

FLEXIBLE COUPLING

The flexible coupling works to absorb heavy loads, side loads and loads caused by product surges, thus protecting the internal workings and extending the life of the paddle unit. A flexible coupling should be used with heavy materials and in top mount installations where a solid shaft extension is used. Monitor offers the following coupling option:
Spring-Flex: P/N 1-3335



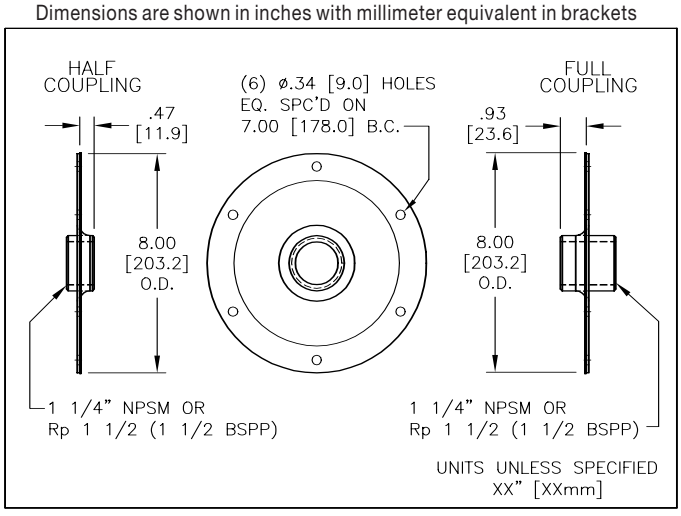
MOUNTING PLATES

Mounting plates allow the paddle units to be mounted from the outside of a vessel to curved or flat surfaces. All mounting plates featured below mount via six bolts.

1.) **Half Coupling Mounting Plate:** For use in side mount installations. Available in powder coated carbon steel for general purpose applications and stainless steel for use in corrosive environments.
Stainless Steel Plate: P/N 1-0112. Carbon Steel Plate: P/N 1-0101 for 1-1/4" NPT connection and P/N 1-0100 for 1-1/2" BSPT connection.

2.) **Full Coupling Mounting Plate:** For use in top mount installations where a shaft extension and shaft guards are required. Available in powder coated carbon steel for general purpose applications and stainless steel for use in corrosive environments.
Stainless Steel Plate: P/N 1-0113. Carbon Steel Plate: P/N 1-0102 for 1-1/4" NPT connection and P/N 1-0115 for 1-1/2" BSPT connection.

Dimensions are shown in inches with millimeter equivalent in brackets



3.) **K-Flange Aluminum Mounting Plate:** For flat surfaces or thin walled vessels where extra strength is required. Ideal for semi-corrosive environments, including out doors.
P/N 1-3316.

SHAFT EXTENSIONS

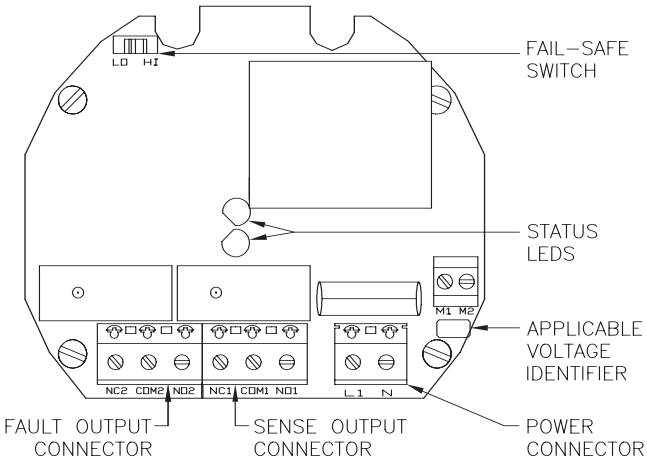
Many top mount installations require that the paddle extends into the vessel to a predetermined level. Solid shaft extensions are available in a variety of lengths up to 144 inches (3.6 m) to meet these demands. A flexible cable extension is also available. This 6.5 foot (2.0 m) flexible extension can be easily shortened in the field by the user. The use of the flexible cable extension for lengths greater than 3 feet (0.9m) requires the use of a guard to ensure proper activation of the rotary paddle bin monitor.

Flexible Cable Extension

SHAFT GUARDS

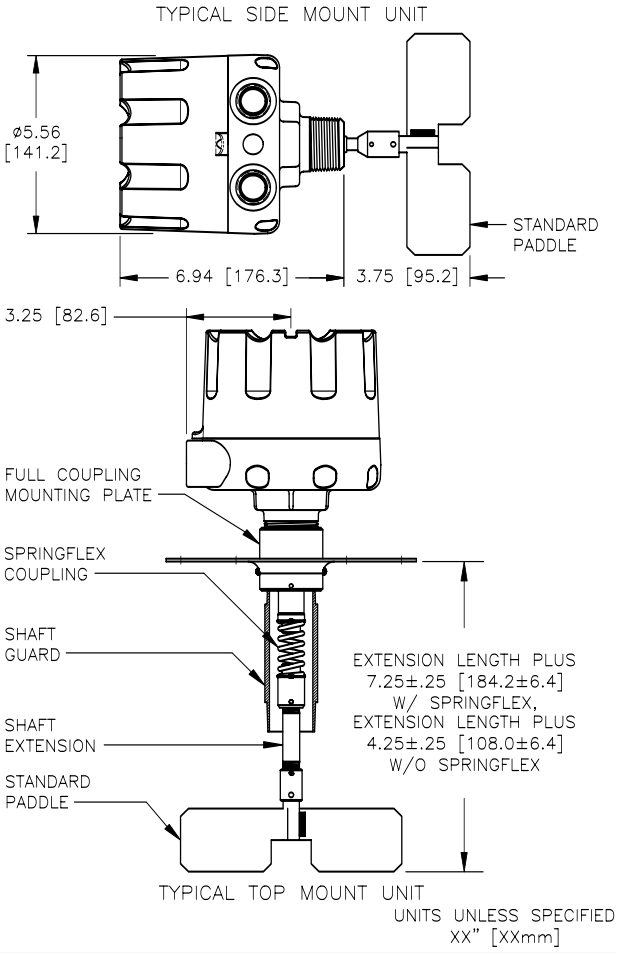
Shaft guards are recommended for use with solid shaft extensions to limit the movement caused by side loading that would otherwise damage the working components of the paddle unit. Shaft guards should be the same length as the extension and should always be used when the extension meets or exceeds 18 inches (460 mm) in length.

WIRING DIAGRAM



MECHANICALS

Dimensions are shown in inches with millimeter equivalent in brackets



ORDERING INFORMATION

1-85XX-XX

OPERATING VOLTAGE
1 = 115VAC
2 = 230VAC
3 = 24VAC/DC

PROCESS CONNECTION
1 = 1-1/4" NPT
2 = 1-1/2" BSPT[2]

APPROVALS
1 = Ordinary locations, $CSA_{US/C}$, CE
2 = Hazardous locations, $CSA_{US/C}$ (North America)[1]
3 = Hazardous locations, ATEX/IECEx[1]

TEMP STYLE
1 = Hi-temp, CS[2]
2 = Hi-temp, SS[2]
Blank, none

Note:
1 External lights are not available with hazardous location approvals.
2 On all **high temperature configurations** a mounting plate (either #1-0102, CS or #1-0113, SS) is automatically furnished as **the** process connection. Threaded mounts are not available. 1-1/2" BSPT process connection is not available with high temperature style selection.

ACCESSORIES

Flexible Coupling
1-3335 Spring flex

Paddles
See "Accessories" section

Cable Extension
1-1176-2-78: Flexible extension, 304 SS, 78 inches (2 m) length (can be modified in the field for shorter length)

Solid Shaft Extensions:
1-1175-1-#* 1/4" Pipe, SCH-40, Galvanized
1-1175-2-#* 1/4" Pipe, SCH-40, 304 Stainless Steel

Shaft Guards:
1-1174-1-#* 1-1/4" Pipe, SCH-40, Galvanized
1-1174-2-#* 1-1/4" Pipe, SCH-40, 304 Stainless Steel

Mounting Plates
1-0100 Mounting plate, for R 1-1/2 (BSPT 1-1/2), half coupling, CS
1-0101 Mounting plate, for 1-1/4" NPT, half coupling, CS
1-0102 Mounting plate, for 1-1/4" NPT, full coupling, CS
1-0112 Mounting plate, for 1-1/4" NPT, half coupling, SS
1-0113 Mounting plate, for 1-1/4" NPT, full coupling, SS
1-0115 Mounting plate, for R 1-1/2 (BSPT 1-1/2), full coupling, CS
1-3316 Mounting plate, for 1-1/4" NPT, heavy duty alum.

* # = Extension and guard lengths - not to exceed 144 inches (3.6 m) in length. Maximum available single piece length is 72 inches (1.8 m). Contact factory for more details.

SPECIFICATIONS

Power Requirements:	115 VAC (+/- 15%); 9 VA; 50/60 Hz 230 VAC (+/- 15%); 9 VA; 50/60 Hz 24 VAC/DC (+/- 15%); 11 VA
Altitude:	6562 ft (2000 m) max
Relative Humidity:	Suitable for outdoors
Installation Category:	II
Pollution Degree:	4 (Reduced to 2 via enclosure)
Ambient Operating Temp:	-40˚F (-40˚C) to +150˚F (+65˚C)
Internal Bin Temp:	
Standard Unit:	to 250˚F (121˚C)
Hi-Temp Unit:	250 to 500˚F (121 to 260˚C) without air-cooling 500 to 750˚F (260 to 400˚C) with air-cooling [0.5 psig / 2.14 CFM]
Conduit Connection:	Two(2) 3/4" NPT; M20 cable glands (Ordinary Location units with 1-1/2" BSPT process connection only; Not provided on Haz Loc units)
Outputs:	
Material Sense:	One SPDT; 5A @ 250 VAC, 30 VDC max
Unit Status (Fault):	One SPDT; 5A @ 250 VAC, 30 VDC max
Maximum Pressure:	30 PSI (2 bar)
Sensitivity:	5 lb./ft^3 (80 kg/m^3)minimum material density (when using large 3-vane paddle)
Indicators:	Red and green high intensity LEDs indicate material sense and unit status conditions (Ordinary Location unit only)
Housing:	Die cast alum, NEMA 4 / ENCLOSURE TYPE 4, IP66
Housing Finish:	Powder coating
Mounting Connection:	1-1/4" NPT or R 1-1/2 (BSPT 1-1/2)
Weight:	Approx. 8-1/2 lb. (3.9 kg)
Materials of construction/accessories:	
Flexible Couplings:	304 stainless steel
Mounting Plates:	Carbon steel or 304 stainless steel
All Paddles except Ex-Flex:	304 SS
Ex-Flex Belt:	304 SS coupling, rubber/fabric blend belt
Flexible Cable Extension:	304 SS
Listings/Approvals:	$CSA_{US/C}$: Ordinary Locations; Class I, Div. 1&2, Groups C, D; Class II, Div. 1&2, Groups E, F, G ATEX: Ⓔx II 1/2 D c T 85˚C ExtD A20/A21 T 85˚C (Ta -40˚C to +65˚C) IP6x IEC Ex: DIP A21 IP6X T_A 100˚C -40˚C to +65˚C CE Mark

U.S. Patent 6,696,965 B2

WARRANTY

Monitor Technologies LLC warrants each **SafePoint®** rotary paddle bin indicator it manufactures to be free from defects in material and workmanship under normal use and service within two (2) years from the date of purchase. The purchaser must give notice of any defect to Monitor 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 shall not apply to any product which is repaired or altered outside of the Monitor Technologies LLC factory, or which has been subject to misuse, negligence, accident, incorrect wiring by others or improper installation. Monitor Technologies LLC reserves the right to change the design and/or specifications without prior notice.

44W320 Keslinger Road ▼ Elburn, IL 60119 ▼ 800-766-6486 ▼ 630-365-9403 ▼ Fax 630-365-5646
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MONITOR

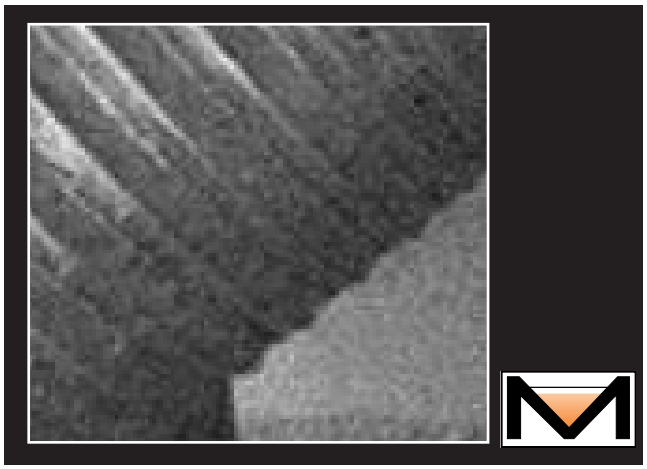
Practical solutions...at every level!

TrueCap® RF Capacitance Point Level Sensors

- Extensive Product Line for Bulk Solid Applications
- Superior Sensitivity of 0.5pF is Standard
- Maximum Reliability and Calibration Stability
- Automatic Material Build-Up Immunity
- Universal Power Supply Available
- Quick-Connect Process Connection Option
- Twist On/Off Cover
- Two-year Warranty
- Liquid and Slurry Applications

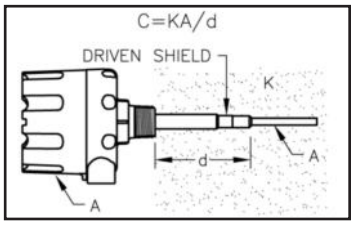
TrueCap® RF Capacitance Point Level Sensors

TrueCap® RF capacitance sensors offer cost-effective point level monitoring with reliability you can count on. Monitor's complete line, which features models MK-2 and MK-2e, provides you with the most affordable solution for your application. Monitor's RF capacitance 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. Monitor's two-year warranty stands behind every **TrueCap** sensor.



This Model MK-2e is monitoring the level of latex paint.

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 probe enables the circuitry to ignore product build-up on the probe that would otherwise cause false sensing. The driven shield is activated 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® RF capacitance point level sensors are versatile devices providing high and low level readings in bins, silos, tanks, hoppers, and other vessels. **TrueCap**'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** product line offers the right solution.

TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO:

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

MODEL SELECTION

Monitor offers the market an unmatched selection of RF Capacitance point level sensors. Several parameters should be considered when selecting the proper **TrueCap**® RF capacitance point level sensor.

EASE OF CALIBRATION

Many applications are well served by the manual calibration of the MK-2e, but only the MK-2 offers the extraordinary convenience of push-button calibration, sensitivity and self-test.

CALIBRATION LOCATION

Some applications place probes in locations which are difficult to access. The split architecture versions of both the MK-2 and MK-2e provide calibration 12 feet (3.7 m) or more away from the probe.

VARYING TEMPERATURES

It is important that the calibration of a probe remains stable during swings in the process and ambient temperatures. The MK-2 automatically adjusts its calibration to account for temperature changes providing maximum reliability.

CHANGING CONTENTS/CHARACERISTICS

TrueCap sensors can be calibrated to the material with the lowest dielectric constant (usually the driest material) in order to sense all products which could enter the bin. However, sometimes the need for re-calibration is unavoidable, making the MK-2 with push-button calibration and an available remote calibration module the best choice.

MK-2	MK-2e
Provides the highest performance and reliability over the widest range of applications	Designed to provide high performance and reliability with a lower cost
Wide assortment of probe types and options for versatility	Wide assortment of probe types and options for versatility
Suitable for dry solids, wet solids, liquids, viscous liquids, and slurries	Suitable for dry solids, wet solids, liquids, viscous liquids, and slurries
Hazardous Locations Approval Available	Hazardous Locations Approval Available
Internal bin temperatures up to 450°F (232°C) (Split-Architecture)	Internal bin temperatures up to 450°F (232°C) (Split-Architecture)
Split-Architecture to remote mount electronics	Split-Architecture to remote mount electronics
Immunity to product build-up on probe	Immunity to product build-up on probe
Unaffected by high vibration (Split-Architecture)	Unaffected by high vibration (Split-Architecture)
Tolerant of wide temperature fluctuations without recalibration	
Quick/Simple recalibration (push-button) to handle varying materials	
Universal Power Supply	

HEAVY MATERIALS & TIGHT AREAS
Some applications require compact, sturdy probes for heavy materials or confined spaces. The MK-2 and MK-2e offer a stub probe for extra durability for heavy products and a compact design for tight areas. Both models also use heavy duty 3/8 inch (9.5 mm) diameter probes.

SOLIDS
All **TrueCap** sensors can sense solid materials, but be careful to also look at all application parameters.

MATERIAL COATING/BUILD-UP
Many liquids, slurries and sticky bulk solids tend to cling to probes. Product build-up immunity through a driven shield design is a must. The MK-2 and MK-2e provide product build-up immunity and can typically be used with these materials.

HIGH VIBRATION
When locating sensors near vibrators, bin dischargers or other vibrating equipment, the split architecture version is recommended.

UNIVERSAL POWER SUPPLY
Minimizing the number of variations can maximize value for OEMs and product resellers. The MK-2 is the only **TrueCap** sensor that provides this capability.

NEED FOR VISUAL INDICATION
Both the MK-2 and the MK-2e are provided with a high intensity LED indicator on the housing (Ordinary location integral sensors only).

HAZARDOUS LOCATIONS
The MK-2 and MK-2e are available approved for Class I and Class II hazardous locations. See "Specifications" for details.

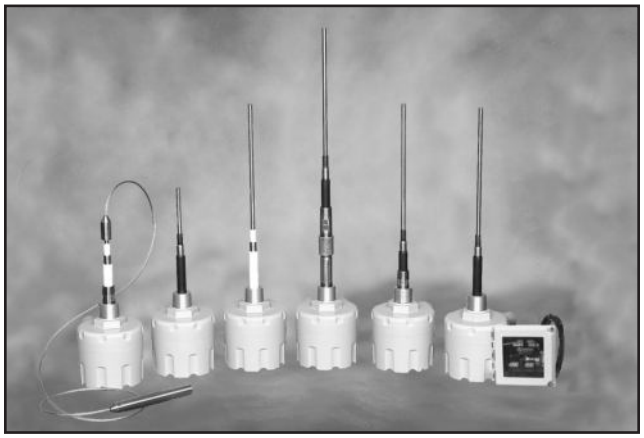
HIGH TEMPERATURE
For applications up to 450˚F, (232˚C) the MK-2 and MK-2e offer stainless steel mounting connections which act as thermal barriers and a split architecture version which completely removes the electronics from the process.

LARGE PARTICLES
Large particles can leave air gaps which could lead to inaccurate readings. However, smaller particles and fines usually fill in the gaps.

APPLICATION/PARAMETER	MK-2	MK-2e
Ease of Calibration	Best	Fair
Calibration Location	Best	Good
Varying Temperatures	Best	Good
Changing Contents/Characteristics	Best	Good
Heavy Materials & Tight Areas	Good	Good
Solids	Best	Good
Material Coating/Build-Up	Best	Good
High Vibration	Best	Best
Need for Visual Indication	Best	Best
Hazardous Locations	Best	Best
High Temperature	Good	Good
Large Particles	Good	Good

MODEL MK-2

The **TrueCap**® Model MK-2 RF capacitance point level sensor is a proven problem solver used to ensure maximum performance and reliability, minimizing downtime of operations.



MODEL MK-2 FEATURES

- Microcontroller based for maximum reliability & performance
- Push-button calibration, sensitivity selection & self-test
- Automatic temperature compensation for unmatched calibration stability
- Superior 0.5pF sensitivity ensures reliability
- Build-up immunity helps eliminate false signals
- High intensity LED indicating light (Ordinary location sensors only)
- Universal power supply minimizes versions
- Available hazardous locations approval with intrinsic safety

MODEL MK-2 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.

HAZARDOUS APPROVALS

Most MK-2 models are offered with explosion proof housings and intrinsically safe probes thereby meeting requirements for Class I and Class II environments. See “Specifications” for details.

SS CONNECTION

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

SPLIT ARCHITECTURE

For applications involving high temperature or vibration, the probe and electronics are housed in separate enclosures mounted 12 feet (3.6 m) apart or more depending on the application, thereby removing the electronics from the stressful conditions. All adjustments are performed at the remote electronics.

MODEL MK-2 ACCESSORIES

MOUNTING PLATES

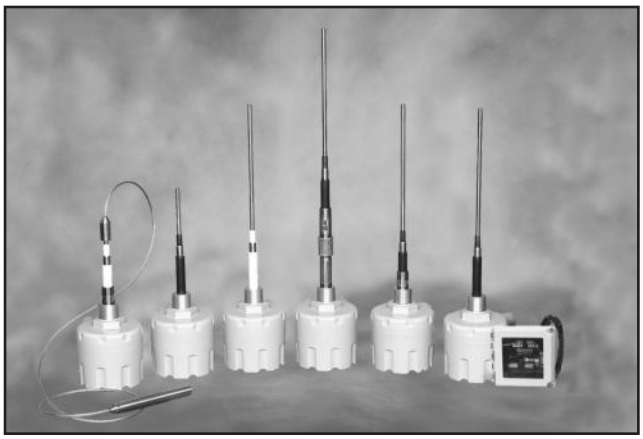
Painted carbon steel or stainless steel mounting plates eliminate the need to weld a mounting coupling to the vessel.

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.

MODEL MK-2e

The **TrueCap**® Model MK-2e RF capacitance point level sensor is a reliable sensor and is a standard for many OEMs and end users requiring versatility and lower cost.



MODEL MK-2e FEATURES

- Superior 0.5pF sensitivity ensures reliability
- Build-up immunity helps eliminate false signals
- High intensity LED indicating light (Ordinary location integral sensors only)
- Available hazardous locations approval with intrinsic safety
- Simple 2-step manual calibration
- Economical

MODEL 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.

HAZARDOUS APPROVALS

Most MK-2e models are offered with explosion proof housings and intrinsically safe probes thereby meeting requirements for Class I and Class II environments. See “Specifications” for details.

SS CONNECTION

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

SPLIT ARCHITECTURE

For applications involving high temperature or vibration, the probe and electronics are housed in separate enclosures mounted 12 feet (3.6 m) apart or more depending on the application, therefore removing the electronics from the stressful conditions. All adjustments are performed at the remote electronics.

MODEL MK-2e ACCESSORIES

MOUNTING PLATES

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

PROBE EXTENSIONS

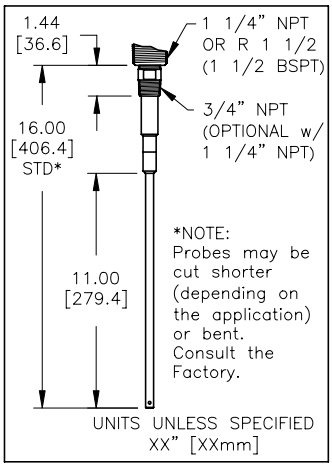
Rigid probe extensions with solid or flexible couplings easily extend the sensing point to a desired distance from any top-mounted **TrueCap**® probe.

MODEL MK-2 & MK-2e PROBE VARIATIONS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

STANDARD PROBE

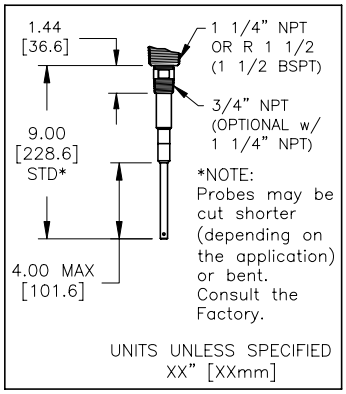
The most commonly used probe variation, the standard probe performs reliably in many different applications. The standard probe is available with either a 1-1/4" NPT, 1-1/2" BSPT* or 3/4" NPT process connection.



*Unit with 1-1/2" BSPT connection is provided with M20 cable glands.

STUB PROBE

Usually used in tight spaces, or in applications with heavy material, the stub probe is a shorter version of the standard probe. The stub probe is available with either a 1-1/4" NPT, 1-1/2" BSPT* or 3/4" NPT process connection.

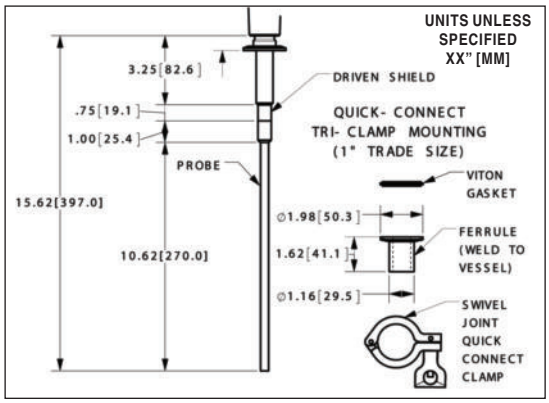


*Unit with 1-1/2" BSPT connection is provided with M20 cable glands.

QUICK-CONNECT TRI-CLAMP PROCESS CONNECTION*

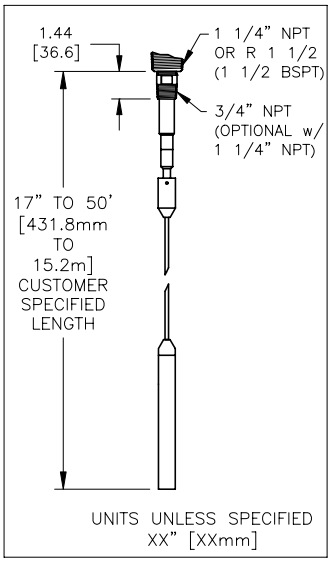
For quick connect and disconnect. Provides easy installation and easy removal of the **TrueCap**® unit for cleaning purposes. Affordable solution for general sanitation situations not requiring 3-A® Rating. No exposed threads. Available for Ryton® and Nylon (food grade) versions of the standard and stub probes. Ferrule, clamp and gasket for the tri-clamp unit are sold separately. Please see "Ordering Information" section.

*Accommodates both a 1" and 1-1/2" ferrule size.



CABLE EXTENSION PROBE

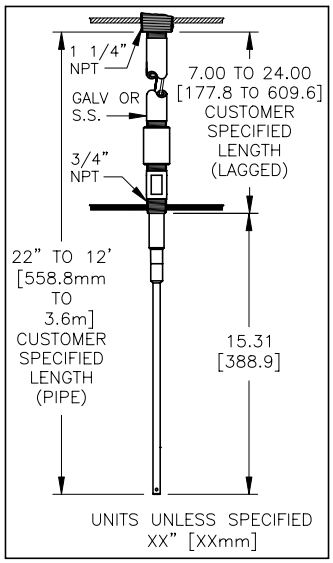
The cable extension probe can extend the sensing point up to 50 feet (15 m) beneath the mounting point. It should be noted that the build-up immunity, however, is not extended with the cable version. Use the pipe extension probe in those applications requiring build-up immunity. A 1-1/4" NPT, 1-1/2" BSPT* or 3/4" NPT process connection is available.



*Unit with 1-1/2" BSPT connection is provided with M20 cable glands.

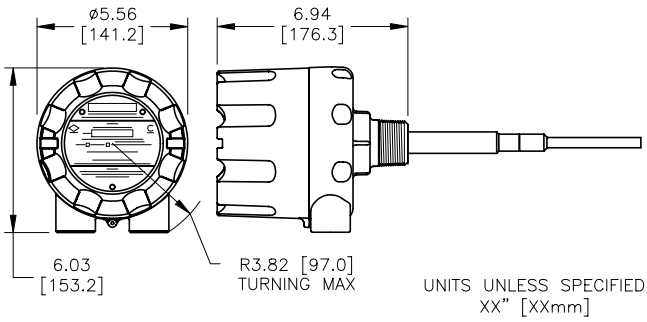
PIPE EXTENSION/LAGGED HOUSING

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.



MODEL MK-2 & MK-2e MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



MODEL MK-2 ORDERING INFORMATION

RF CAPACITANCE INTEGRAL SENSORS

11-	85	1	X	-	X	1	X

ELECTRONICS TYPE
1 = Standard[1&2]

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

APPROVALS[2,6&10]
1 = Hazardous
2 = Ordinary

OPERATING VOLTAGE
1 = Universal
48-240 VAC
24-48 VDC

PROBE CONNECTION
1 = 1-1/4'' NPT Alum.
2 = 1-1/4'' & 3/4'' SS
3 = Pipe ext/Galv[3,4&6]
4 = Pipe ext/SS[3&4]
5 = Lagged/Galv[5&6]
6 = Lagged/SS[5]
7 = 1-1/2" BSPT Alum[7]
8 = Tri-Clamp[10]

SPLIT ARCHITECTURE REMOTE ELECTRONICS[8]

11-	87	1	0	-	X	1	0

ELECTRONICS TYPE
1 = Standard[1&2]

APPROVALS
1 = Hazardous[2&9]
2 = Ordinary

OPERATING VOLTAGE
1 = Universal
48-240 VAC
24-48 VDC

REMOTE PROBES[8]

11-	88	0	X	-	X	0	X

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

APPROVALS[6,9&10]
1 = Hazardous
2 = Ordinary

PROBE CONNECTION
1 = 1-1/4'' NPT Alum.
2 = 1-1/4'' & 3/4'' SS
3 = Pipe ext/Galv[3,4&6]
4 = Pipe ext/SS[3&4]
7 = 1-1/2" BSPT Alum[7]
8 = Tri-Clamp[10]

ACCESSORIES:

11-1015 Cable Assembly, 12ft. 22awg Co-ax/18awg Wire
Consult factory for longer lengths
11-3017 Tri-Clamp, 304 SS
11-3007 Ferrule for Tri-Clamp, 316 SS, 1"
11-2007 Gasket for Tri-Clamp, White, Viton®

CONSULT FACTORY FOR AVAILABLE CONFIGURATIONS.
NOT ALL COMBINATIONS ARE OFFERED.

1 Features push-button calibration, sensitivity & test functions, and remote calibration capability.
2 External indicators on ordinary location units only.
3 Overall insertion length for pipe extension to be specified by customer. From 22" (559 mm) up to 12 ft (3.6 m) maximum.
4 For pipe extension probes with overall length exceeding 6-1/2ft (2m), the unit must be shipped by truck
5 Lagged length to be specified as 7 to 24 inches (178 to 610 mm).
6 Hazardous locations approval on units with Pipe Extension or Lagged Probes are available on the SS version ONLY. Hazardous locations approval is not available on the galvanized version. Consult specifications for all Hazardous locations approval ratings. Hazardous location units are NOT CE approved.
7 1-1/2" BSPT process connection is available with only the Standard, Food Grade, Stub and Cable Extension probes. Not available with 3/4" SS Combo, Pipe Extension or Lagged units.
8 Electronics assembly must be purchased with Remote Probe and 11-1015 Cable Assembly.
9 Remote Electronics with hazardous locations approval must be ordered with a Remote Probe with hazardous locations approval. Hazardous location units are NOT CE approved.
10 Ferrule, gasket and clamp for the tri-clamp unit are sold separately. Please see "Accessories" list. Tri-clamp option is not available for hazardous location versions.

REMOTE PROBES[7 & 8]

11-88 0 X-X 0 X

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

APPROVALS
2 = Ordinary

PROBE CONNECTION
1 = 1-1/4'' NPT Alum.
2 = 1-1/4'' & 3/4'' SS
3 = Pipe ext/Galv[1,2&5]
4 = Pipe ext/SS[1&2]
7 = 1-1/2" BSPT Alum[6]
8 = Tri-Clamp[9]

ACCESSORIES:

11-1015 Cable Assembly, 12ft. 22awg Co-ax/18awg Wire
Consult factory for longer lengths
11-3017 Tri-Clamp, 304 SS
11-3007 Ferrule for Tri-Clamp, 316 SS, 1"
11-2007 Gasket for Tri-Clamp, White, Viton®

MODEL MK-2e ORDERING INFORMATION

RF CAPACITANCE INTEGRAL SENSORS

11-84 X X-X X X

ELECTRONICS TYPE
1 = Standard

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

APPROVALS[4,5&9]
1 = Hazardous
2 = Ordinary

OPERATING VOLTAGE
1 = 115 VAC
2 = 230 VAC
3 = 24 VDC[4]

PROBE CONNECTION
1 = 1-1/4'' NPT Alum.
2 = 1-1/4'' & 3/4'' SS
3 = Pipe ext/Galv[1,2&5]
4 = Pipe ext/SS[1&2]
5 = Lagged/Galv[3&5]
6 = Lagged/SS[3]
7 = 1-1/2" BSPT Alum[6]
8 = Tri-Clamp[9]

SPLIT ARCHITECTURE REMOTE ELECTRONICS[7 & 8]

11-86 X 0-X X 0

ELECTRONICS TYPE
1 = Standard

APPROVALS
2 = Ordinary

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

CONSULT FACTORY FOR AVAILABLE CONFIGURATIONS.
NOT ALL COMBINATIONS ARE OFFERED.

1 Overall insertion length for pipe extension to be specified by customer. From 22" (559 mm)up to 12 ft (3.6 m) max.
2 For pipe extension probes with overall length exceeding 6-1/2ft (2m), the unit must be shipped by truck.
3 Lagged length to be specified as 7 to 24 inches (178 to 610 mm).
4 24VDC operating voltage selection is not available with hazardous locations unit.
5 Hazardous locations approval on units with Pipe Extension or Lagged Probes are available on the SS version ONLY. Hazardous locations approval is not available on the galvanized version. Consult specifications for all Hazardous locations approval ratings.
6 1-1/2" BSPT process connection is available with only the Standard, Food Grade, Stub and Cable Extension probes. Not available with 3/4" SS Combo, Pipe Extension or Lagged units.
7 Electronics assembly must be purchased with Remote Probe and 11-1015 Cable Assembly.
8 Remote Electronics & Probes for Model MK-2e not available with hazardous locations approvals. Only available for Model MK-2.
9 Ferrule, gasket and clamp for the tri-clamp unit are sold separately. Please see "Accessories" list. Tri-clamp option is not available for hazardous location versions.

PROBE SPECIFICATIONS

Standard/Food Grade Probe

Mounting:	1-1/4" NPT alum, R 1-1/2 (BSPT 1-1/2), or combo 3/4" NPT 316SS and 1-1/4" NPT alum
Probe Material:	3/8in(9.5mm) dia. 316SS probe & guard, Ryton® - Equivalent & 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 (alum connection); 150 psi(10 bar) max (3/4" NPT SS)

Probe Extensions

Soild Coupling Type:	T304SS
Flex. Coupling Type:	T302SS

Stub Probe

Mounting:	1-1/4" NPT alum, R 1-1/2 (BSPT 1-1/2), 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:	9" (229mm) from aluminum mounting
Temp (Probe Only):	Ryton® +450˚F (+232˚C) max; Nylon +300˚F (+148˚C) max
Pressure:	50 psi(3.5 bar) max (alum connection); 150 psi(10 bar) max (3/4 NPT SS)

Cable Extension Probe

Mounting:	1-1/4" NPT alum, R 1-1/2 (BSPT 1-1/2), or combo 3/4" NPT 316SS and 1-1/4" NPT alum
Probe Material:	1/8in(3.2mm) diameter 316 SS Teflon® jkt'd cable, Nylon insulator
Cable Length;	Customer specified from 17" (432 mm) up to 50 ft (15 m) overall insertion from aluminum mounting
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 from 22" (559 mm) 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

Elec. Enclosure:	Cast Aluminum, screw-on cover, polyester powder coat (HL MK-2 only); Fiberglass enclosure (OL)
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)

Quick-Connect Tri-Clamp Connection (Standard/Food Grade Probe or Stub Probe)

Connection Size:	Based on 1" and 1-1/2" Ferrule
Mounting Material:	
Fitting on Probe:	316 Stainless Steel
Ferrule:	316 Stainless Steel
Tri-Clamp:	304 Stainless Steel
Gasket:	Viton® (350˚F / 176˚C Max. Temp.)
Pressure:	50 psi (3.5 bar) max
Internal Bin Temp.:	To +350˚F (+176˚C) w/ available tri-clamp connection accesories and Viton® gasket

Ryton® - Trademark of Phillips Chemical Co.
Teflon® - Trademark of DuPont Chemical Co.
Viton® - Trademark of DuPont Performance Elastomers L.L.C.

MK-2 SPECIFICATIONS

Power:	48-240VAC ±10%, 3VA, 50/60Hz; 24-48VDC ±10%, 3W
Altitude:	6562ft (2000m) max
Installation Category:	II
Pollution Degree:	4 (reduced to 2 by enclosure) Suitable for indoor/outdoor use
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:	DPDT, 5A @ 250VAC, 30VDC maximum
Indicators:	"DET" yellow LED illuminates when material is sensed "OPR" red LED illuminates to indicate output switching "CAL" green LED illuminates to indicate proper calibration "SEN" bank of four LEDs indicate the sensitivity setting
External Indicators:	Red and green LEDs indicating power and operating mode(Ordinary location units only)
Sensitivity:	Switch selectable 0.5pf, 2.6pf, 8.3pf, 18.0pf
Stability:	±0.01pf per degree F (±0.018pf per degree C) @ 0.5pf setting
Time Delay:	0.25 to 15 sec single-turn adj. for delay to activate & delay to de-activate
Fail-Safe:	Switch selectable - HI/LO
Build-up Immunity:	Protected via driven shield to 150 ohm load
Enclosure:	Cast alum screw-on cover, polyester pwdr coat, NEMA 4, IP66
Conduit Connection:	Two (2) 3/4" NPT connections (M20 cable glands provided when 1-1/2" BSPT process connection is specified)
****Approvals:**	CSA_{US} CSA_{C} Ordinary Locations, CE Mark(Ordinary location only) CSA_{US} CSA_{C}: Class I Groups C &D, Exp. Proof & Intrinsically Safe CSA_{US} CSA_{C}: Class II Group E, F & G, Dust Ignition Proof & Intrinsically Safe

MK-2e SPECIFICATIONS

Power:	115VAC (±15%); 2.5VA; 50/60Hz / 230VAC (±15%); 2.5VA; 50/60Hz 24VDC (±15%); 3W (24VDC not available on Remote Elec or Haz Loc Approval)
Altitude:	6562 ft (2000 m) max
Installation Category:	II
Pollution Degree:	4 (reduced to 2 by enclosure) Suitable for indoor/outdoor use
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 (Ordinary location units only)
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, polyester pwdr coat, NEMA 4, IP66
Conduit Connection:	Two (2) 3/4" NPT connections (M20 cable glands provided when 1-1/2" BSPT process connection is specified)
****Approvals:**	CSA_{US} CSA_{C} Ordinary Locations, CE Mark(Ordinary location only) CSA_{US} CSA_{C}: Class I Groups C & D, Exp. Proof & Intrinsically Safe CSA_{US} CSA_{C}: Class II Group E, F & G, Dust Ignition Proof & Intrinsically Safe

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

** Hazardous location approvals on units with Pipe Extension or Lagged Probes with integral electronics/probe are $CSA_{US/C}$ Class II Group E, F & G (SS version ONLY. Hazardous location approvals are not available on the galvanized version). Hazardous location approvals for Split Architecture remote electronics are Class II, Groups E, F & G. Hazardous location approval not available on split archetecture version of model MK-2e. All probe versions, except the galvanized version of the pipe extension or lagged probe unit, are Class I Groups C & D, Class II Group E, F & G and Intrinsically Safe.

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.

44W320 Keslinger Road ▼ Elburn, IL 60119 ▼ 800-766-6486 ▼ 630-365-9403 ▼ Fax 630-365-5646
www.monitortech.com ▼ www.monitortech.typepad.com ▼ monitor@monitortech.com

MK-2

MK-2e

Scan these with a
smartphone QR-Code app
for more product details.

Information on this document is subject to change without notice.

MONITOR

"Setting The Standard For Supplier Excellence"

Proximity Switch
Model PAC-30U & PDC-30

- Solid State Operation
- 30mm Industry Standard Housing
- Available in AC or DC
- Easy Installation & Calibration
- 2-year Warranty

The models PAC-30U and PDC-30 proximity switches are solid state point level devices used to detect the absence or presence of bulk solids. The compact configuration makes this product ideal for tight spaces or low cost level detection. As material comes in contact with, or in close proximity to, the PAC-30U or PDC-30, an internal solid state switch is activated. The PAC-30U is AC operated (20-265 VAC) and is universal in that it is switch selectable for either normally open or normally closed operation. The PDC-30 is DC operated (10-40 VDC) and is available in either PNP or NPN configuration, each of which can be wired in either a normally open or normally closed operation mode.

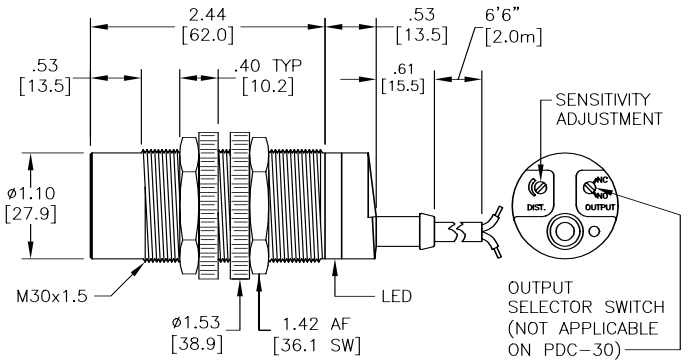
PRINCIPLE OF OPERATION

The PAC-30U and PDC-30 are RF capacitance-type level controls, which operate by detecting the electrical effect of the surrounding material such as air, plastic pellets or powders. A radio frequency is applied to the proximity switch sensing region and is continually analyzed to determine the influence of the surrounding environment. Since all materials have dielectric constants and conductance values that are different from that of air, the resultant impedance seen by the radio frequency changes whenever material approaches or contacts the sensing region. This influence is measured within the circuitry and compared with the reference point set by the sensitivity adjustment, which determines how much influence must be present before the output changes.

MECHANICALS

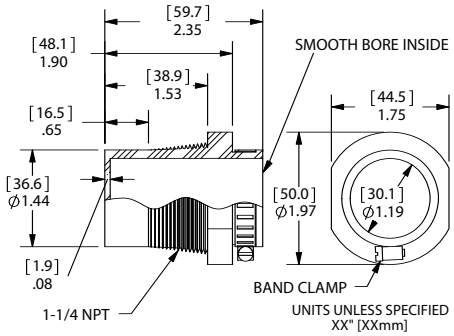
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

PAC–30U/PDC–30



UNITS UNLESS SPECIFIED
XX" [XXmm]

Mounting Well (Optional)



SPECIFICATIONS

Model PAC-30U

Housing:	Thermoplastic Polyester
Enclosure Protection:	IP67 (NEMA 4 equivalent)
Power Requirement:	20-265 VAC, 45-65 Hz
Mounting Thread Size:	M30 x 1.5
Sensing Distance:	4 to 25 mm adjustable
Indicator:	LED, yellow
Output:	Normally Closed or Normally Open, Switch Selectable
Leakage Current:	< 2.5 mA
Load Current:	10-500 mA
Frequency of Operating Cycle:	25 Hz
Operating Temperature:	-13˚ to 176˚ F (-25˚ to 80˚ C)
Max. Pressure:	1.4 psi
Max. Pressure (with mounting well):	125 psi
Electrical Connections:	Cable, 6ft (1.8m), 18-20 AWG
Approvals:	UL/CSA General Purpose; CE Mark

Model PDC-30

Housing:	Thermoplastic Polyester
Enclosure Protection:	IP67 (NEMA 4 equivalent)
Power Requirement:	10-40 VDC
Mounting Thread Size:	M30 x 1.5
Sensing Distance:	4 to 25 mm adjustable
Indicator:	LED, yellow
Output:	13-8231, NPN (sinking) 13-8241, PNP (sourcing)
Consumption:	< 10.0 mA
Load Current:	0-200 mA
Frequency of Operating Cycle:	100 Hz
Operating Temperature:	-13˚ to 176˚ F (-25˚ to 80˚ C)
Max. Pressure:	1.4 psi
Max. Pressure (with mounting well):	125 psi
Electrical Connections:	Cable, 6ft (1.8m), 18-20 AWG
Approvals:	CE Mark

ORDERING INFORMATION

13	-	8	X	X	1

OPERATING VOLTAGE
2 = PDC-30 (10-40 VDC)
3 = PAC-30U (20-265 VAC)

SWITCHING
3 = NPN (PDC-30 Only)
4 = PNP (PDC-30 Only)
5 = NO/NC Switchable (PAC-30U Only)

Sensor Mounting Well

13-2011 Mounting Well (Delrin®)
Pipe-Tapered Smooth-Bore, 1-1/4 x 11.5 NPT Outside Thread

WARRANTY

Monitor Technologies warrants each proximity switch it manufactures to be free from defects in material and workmanship under normal use and service within two (2) years from the date of purchase. The purchaser must give 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.

44W320 Keslinger Road ▼ P.O. Box 8048 ▼ Elburn, IL 60119-8048 ▼ 800-766-6486 ▼ 630-365-9403 ▼ Fax 630-365-5646
www.flexar.info ▼ www.monitortech.com ▼ www.monitortech.typepad.com ▼ monitor@monitortech.com