

# **ROTARY PADDLE BIN MONITOR**

- ▼ *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*



**MODELS**  
KA & KAX



*“SETTING THE STANDARD FOR SUPPLIER EXCELLENCE”*

**BULLETIN**  
**213**  
**MODELS**  
**KA & KAX**  
**ROTARY PADDLE**  
**BIN MONITOR**

- ▼ **Twist On/Off Cover - No More Bolts!**
- ▼ **Motor Shuts Off When Paddle Is Impeded**
  - ▼ **Significantly Extends Motor Life**
  - ▼ **Reduces Maintenance Costs**
- ▼ **Improved Wiring Access - 2 Conduit Entrances**
- ▼ **Competitive Price Makes Monitor Your Best Value**
- ▼ **Sealed Bearings Last Longer**
- ▼ **Hazardous Location Approvals Available**
- ▼ **Standard Units Rated to 300°F (149°C)**
- ▼ **Hi-Temp Models Rated to 750°F (399°C)**

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.

**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



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.

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.

**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<sup>3</sup> (160 kg/m<sup>3</sup>) and for low and intermediate level indication for materials over 5 lb/ft<sup>3</sup> (80 kg/m<sup>3</sup>). 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.

**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      |                       |



## 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
- ▼ 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)

## 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.



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

## 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. Available DC motor is 24 VDC and 12 VDC. DC motors have a significantly shorter life than AC motors, and are therefore recommended for low level applications only and have a limited warranty.

### 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

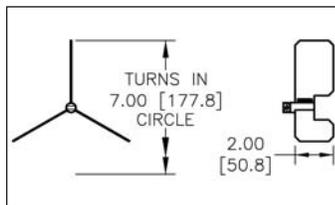
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

### 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.

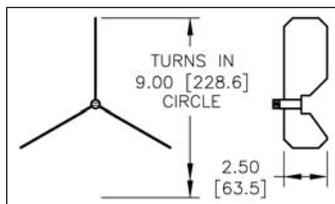
#### 1.) Standard Stainless Steel Three Vane Paddle:

The most popular of all paddles. For use with average weight materials. P/N 1-4146



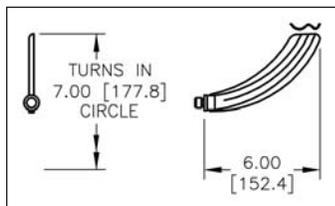
#### 2.) Large Stainless Steel Three Vane Paddle:

Provides accurate level control for lightweight materials. P/N 1-4141



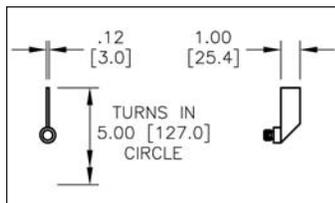
#### 3.) Insertable\* Stainless Steel, Scimitar Single Vane Paddle:

Provides low and high level control for light to average weight materials. P/N 1-4193



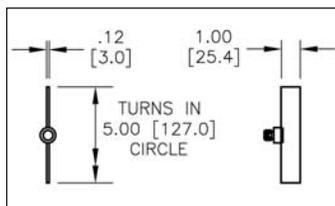
#### 4.) Insertable\*, Stainless Steel Single Vane Paddle:

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



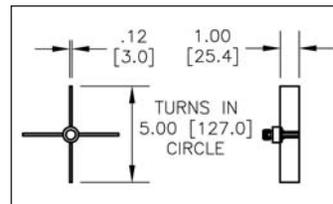
#### 5.) Stainless Steel, Two Vane Paddle:

Provides low and high level control for heavy materials under 1-1/2 inch (40 mm) in diameter. P/N 1-4135



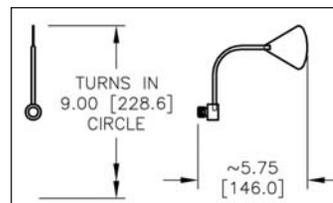
#### 6.) Stainless Steel Four Vane Paddle:

For use with average to heavy weight materials in low and high level control installations. P/N 1-4156



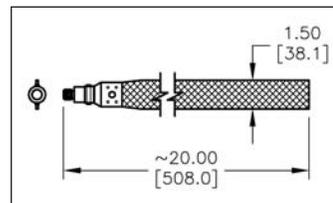
#### 7.) Stainless Steel Triangular Arc Single Vane Paddle:

Provides low and high level control for light to average weight materials. P/N 1-4144



#### 8.) Ex-Flex Three-Ply 20 inch (508 mm) Belt Vane Paddle:

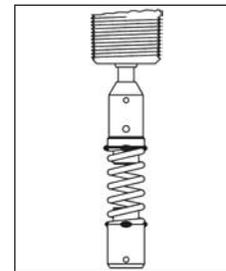
Provides low and high level control for heavy materials over 2 inch (50 mm) in diameter. Top mount only. P/N 1-4137



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

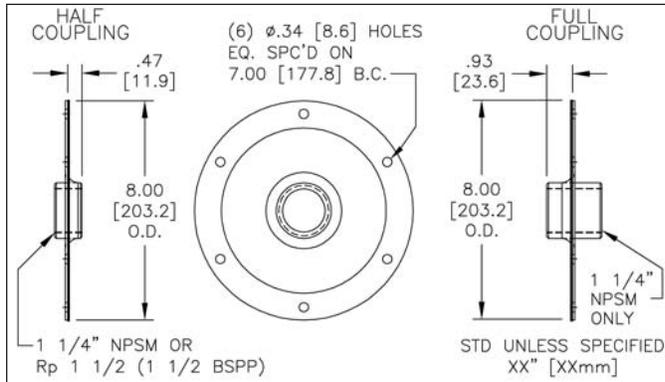
Mounting plates allow the paddle units to be mounted from the outside of a vessel to curved or flat surfaces. All mounting plates featured below mount via six bolts.

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.

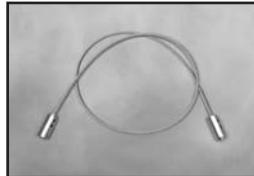
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



**3.) K-Flange Aluminum Mounting Plate:** For flat surfaces or thin walled vessels where extra strength is required. Ideal for semi-corrosive environments, including outdoors. 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 eliminates the need for a mounting plate, extension guard and flexible coupling.



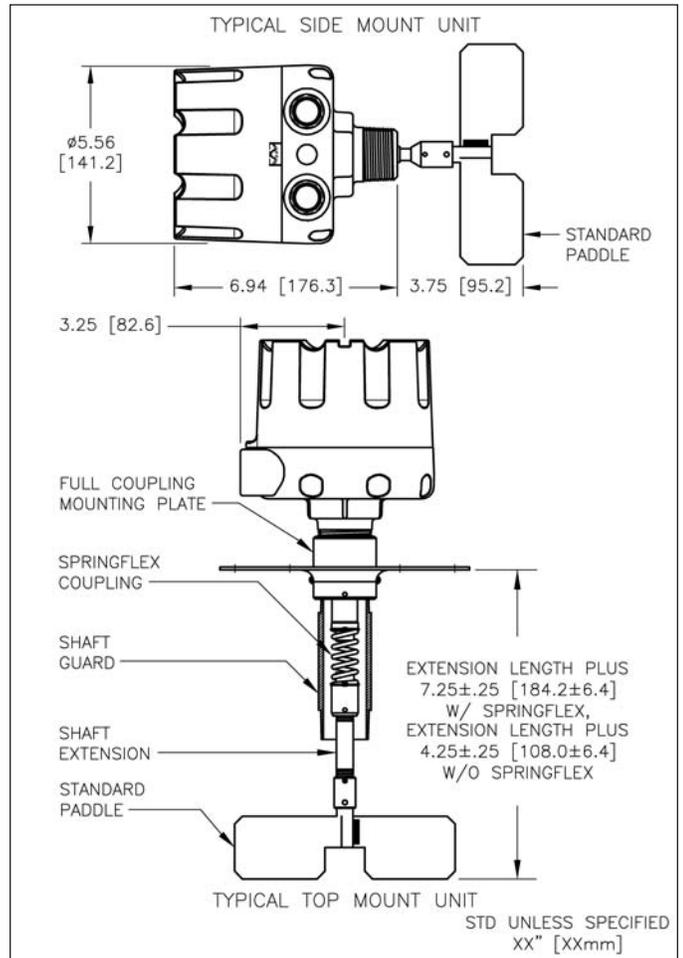
Flexible Cable Extension

### SHAFT GUARDS

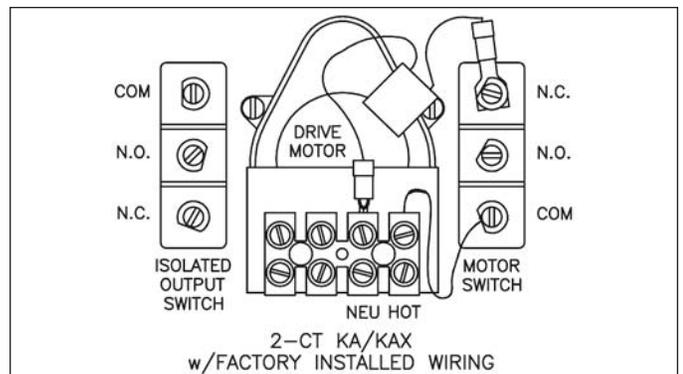
Shaft guards are recommended for use with solid shaft extensions to limit the movement caused by side loading that would otherwise damage the working components of the paddle unit. Shaft guards should be the same length as the extension and should always be used when the extension meets or exceeds 18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

## MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



## WIRING DIAGRAM



# BULLETIN 213 MODELS KA & KAX

## ORDERING INFORMATION

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### MODEL TYPE

3 = KA  
4 = KAX

### MOTOR VOLTAGE

0 = 115VAC  
1 = 240VAC  
3 = 24VDC  
4 = 12VDC  
8 = 24VAC  
9 = 48VAC

### APPROVALS

1 = UL/CSA/CE  
2 = ATEX/IECex<sup>1</sup>

### TEMPERATURE STYLE

1 = Hi-temp, CS<sup>2</sup>  
2 = Hi-temp, SS<sup>2</sup>  
Blank, none

### CIRCUIT CONFIGURATIONS/PROCESS CONNECTION

0 = 1 circuit (1 SPDT)/1-1/4" NPT  
1 = 2 circuits (2 SPDT)/1-1/4" NPT  
2 = 3 circuits (1 SPDT, 1 DPDT)/1-1/4" NPT  
5 = 1 circuit (1 SPDT)/1-1/2" BSPT<sup>2</sup>  
6 = 2 circuits (2 SPDT)/1-1/2" BSPT<sup>2</sup>  
7 = 3 circuits (1 SPDT, 1 DPDT)/1-1/2" BSPT<sup>2</sup>

#### Note:

- 1 Available with Model KAX only.  
2 1-1/2" BSPT process connection is not available with high temperature style selection. A mounting plate is furnished for the process connection on all high temperature units.

### 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, Stainless Steel

#### Shaft Guards:

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

#### Mounting Plates

1-0100 Mounting plate with 1-1/2" BSPP half coupling, CS  
1-0101 Mounting plate with 1-1/4" NPT half coupling, CS  
1-0102 Mounting plate with 1-1/4" NPT full coupling, CS  
1-0112 Mounting plate with 1-1/4" NPT half coupling, SS  
1-0113 Mounting plate with 1-1/4" NPT full coupling, SS  
1-3316 Mounting plate, heavy duty alum. with 1-1/4" NPT

\* # = Extension and guard lengths (not to exceed 144 inches (3.6 m) in length)

## SPECIFICATIONS

**Power Requirements:** 115 VAC, 50/60 Hz; 230 VAC, 50/60 Hz; 24 VAC, 48 VAC 50/60 Hz; 12 VDC, 24 VDC  
**Power Consumption:** 4W max.  
**Operating Temperature:** -57°F (-49°C) to +200°F (+93°C) ext. amb.; to +300°F (+149°C) internal bin temperature to +750°F (+399°C) internal bin temperature  
**Hi-Temp Unit :**  
**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:**  
1-Circuit Configuration - One SPDT 15A @ 250 VAC  
2-Circuit Configuration - Two SPDT 15A @ 250 VAC ea.  
3-Circuit Configuration - One SPDT 15A @ 250 VAC  
One DPDT 10A @ 250 VAC  
**Maximum Pressure:** 30 PSI (2 bar) maximum  
**Sensitivity:** 5 lb./ft<sup>3</sup> (80 kg/m<sup>3</sup>) minimum material density (when using large 3-vane paddle)  
Die cast aluminum, NEMA 4, IP66  
**Housing:**  
**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

### 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  II 1/2 D T 100°C  
IECex DIP A21 T<sub>A</sub> 100°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 (DC motors are warranted for six (6) months 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.



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