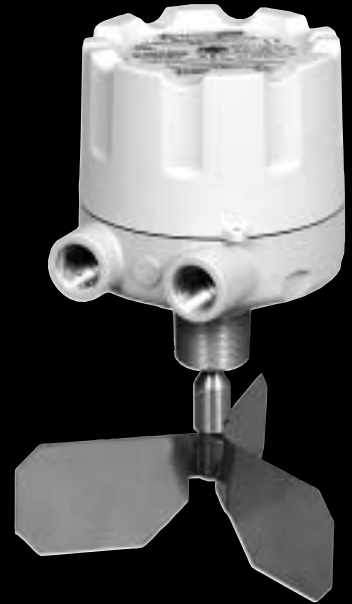


# SafePoint®

## ***“TRUE” FAIL-SAFE ROTARY PADDLE BIN MONITOR***

- ▼ *Industry-First Magnetic Sensing (Patent Pending)*
- ▼ *Unique Housing Design*
- ▼ *Microcontroller-based Reliability*
- ▼ *Material Sense and Fault Outputs*
- ▼ *Choice of Process Connections & Accessories*
- ▼ *Hazardous Location Approvals Available*



**SafePoint®**



*“SETTING THE STANDARD FOR SUPPLIER EXCELLENCE”*

# BULLETIN 253 SafePoint® "TRUE" FAIL-SAFE ROTARY PADDLE BIN MONITOR

- ▼ **Reliable Magnetic Sensing Technology (Patent Pending)**
- ▼ **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**

The **SafePoint**® fail-safe bin monitor is the state-of-the-art in rotary paddle technology. Utilizing patent-pending magnetic sensing technology and a unique housing design, the **SafePoint** bin monitor is the most reliable, technician-friendly, rugged and economical truly fail-safe rotary paddle point level control sensor of its kind.

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

While the **SafePoint** bin monitor is an evolution in rotary paddle technology, it continues to use tried-and-true Monitor 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.

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



## PRINCIPLE OF OPERATION

The operation of the **SafePoint**® rotary paddle bin monitor uses Monitor's magnetic sensing technology to detect both material presence and operational status of the unit. This method is simple and more reliable than that used by other brands. 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 (patent pending). 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 (patent pending). Use of these magnetic sensing techniques eliminates problems that may occur with fouling of the optical systems used by other brands.

The built-in microcontroller performs self-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 indicating that an error condition exists. Monitoring the state of both the SENSE and FAULT relays provides the most flexibility for control and fail-safe monitoring.

## APPLICATIONS

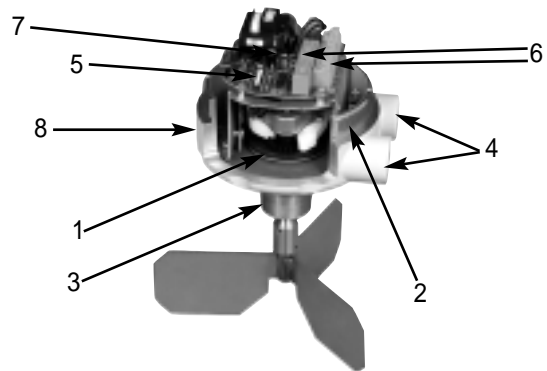
The rugged and reliable fail-safe design of the **SafePoint**<sup>®</sup> bin monitor makes it the best choice for critical level control applications. The unit is compatible with many granular, pelletized and powder bulk applications. It can be utilized for high level indication of materials over 10 lb/ft<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>). The **SafePoint** bin level monitor can be installed almost anywhere dry bulk materials are stored including bins, hoppers, silos and tanks.

### 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 | ▼ Ingredients  |
| ▼ Rawhide | ▼ Sawdust      | ▼ Cement       |

## FEATURES

- ▼ <sup>1</sup>"TRUE" Fail-Safe operation detects electrical and mechanical status essential for critical applications
- ▼ <sup>1</sup>Use of magnetic sensing technology ensures reliable operation even in dusty environments where optical-based units may exhibit problems
- ▼ <sup>2</sup>Twist on/off cover for convenient and easy access – No bolts to lose or hold
- ▼ <sup>3</sup>1-1/4" NPT or 1-1/2" BSPT process connections
- ▼ <sup>4</sup>Two conduit connections provides easy wiring access (M20 cable glands provided with Ordinary Location units with BSPT process connection)
- ▼ <sup>5</sup>Microcontroller-based electronics ensures consistent and reliable operation
- ▼ <sup>6</sup>Independent SPDT relays for material sense and fault outputs provides for flexible control wiring
- ▼ <sup>7</sup>Indicating light (ordinary locations only) provides local visual indication of operating status
- ▼ <sup>8</sup>Cast aluminum housing with rugged powder coat finish can be used in a wide range of applications
- ▼ High Temperature version available (up to 750°F/399°C)



## AVAILABLE CONFIGURATIONS

### MOTOR VOLTAGES

The **SafePoint**<sup>®</sup> fail-safe rotary paddle bin monitor is available in forms to serve most power requirements. Available forms include 115VAC, 230VAC and 24VAC/DC.

### LOCAL VISUAL STATUS INDICATION

The **SafePoint** bin monitor incorporates a red and green LED to indicate material sense and unit status. A red LED illuminates when material presence is detected. A green LED illuminates when material is not present. The green LED will flash during initialization immediately following power-up. The red LED will flash during a failure mode. This indication can be viewed without removing the cover (units supplied for general purpose ordinary electrical locations only).



### APPROVALS/LABELING

The **SafePoint** bin monitors are available approved to CSA (CSA<sub>US/C</sub> for North American use) and ATEX/IECex requirements. Approvals for either general purpose, dust-ignition-proof and/or explosion-proof hazardous area locations can be provided. In addition, all units carry the CE mark. Refer to "Specifications" for details.

### HIGH TEMPERATURE UNIT

The **SafePoint** high temperature model incorporates all the standard features of the **SafePoint** bin monitor, but can be used in applications where internal 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. Refer to "Ordering Information" for applicable part numbers.



## ACCESSORIES

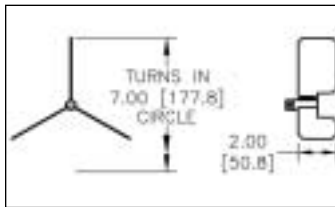
DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

### 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.

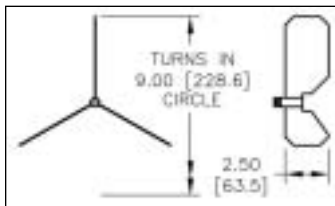
#### 1.) Standard Stainless Steel Three Vane Paddle:

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



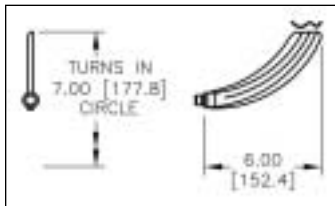
#### 2.) Large Stainless Steel Three Vane Paddle:

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



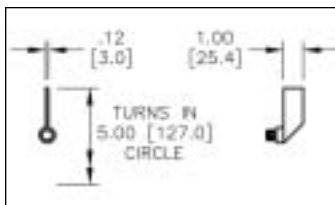
#### 3.) Insertable\* Stainless Steel, Scimitar Single Vane Paddle:

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



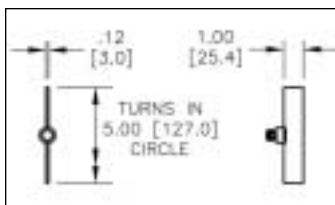
#### 4.) Insertable\*, Stainless Steel Single Vane Paddle:

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



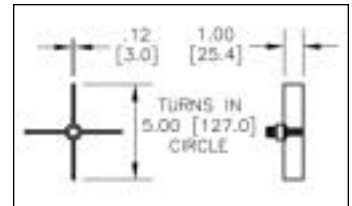
#### 5.) Stainless Steel, Two Vane Paddle:

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



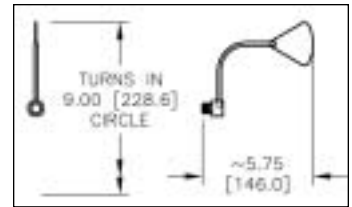
#### 6.) Stainless Steel Four Vane Paddle:

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



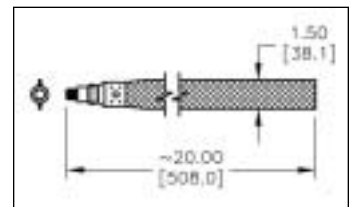
#### 7.) Stainless Steel Triangular Arc Single Vane Paddle:

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:

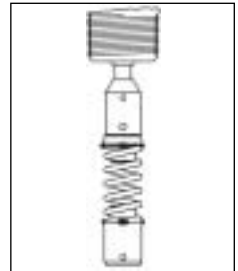
Provides low and high level control for heavy materials over 2 inch (50 mm) in diameter. Top mount only. P/N 1-4137



\*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



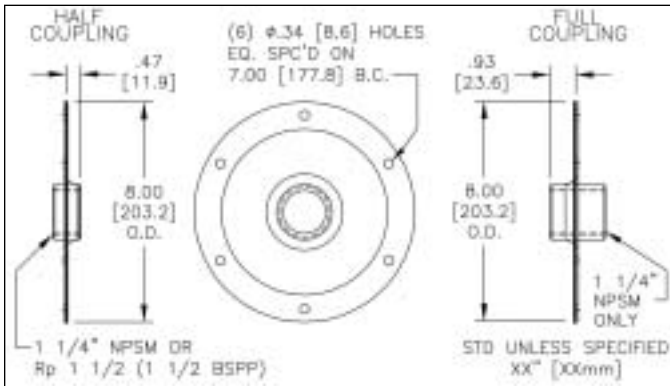
### MOUNTING PLATES

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.



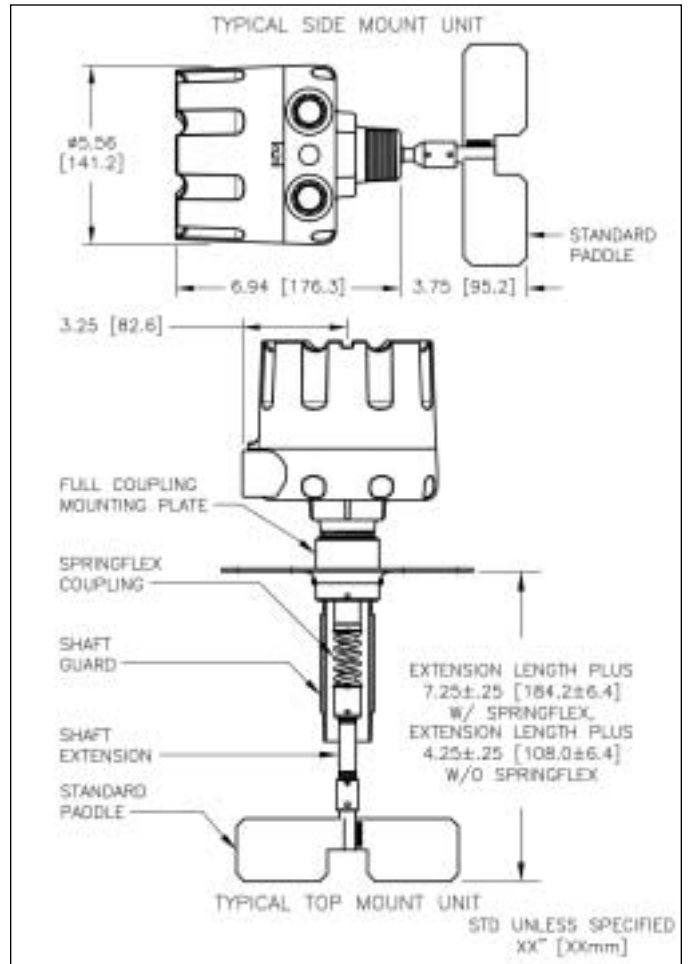
Flexible Cable Extension

### SHAFT GUARDS

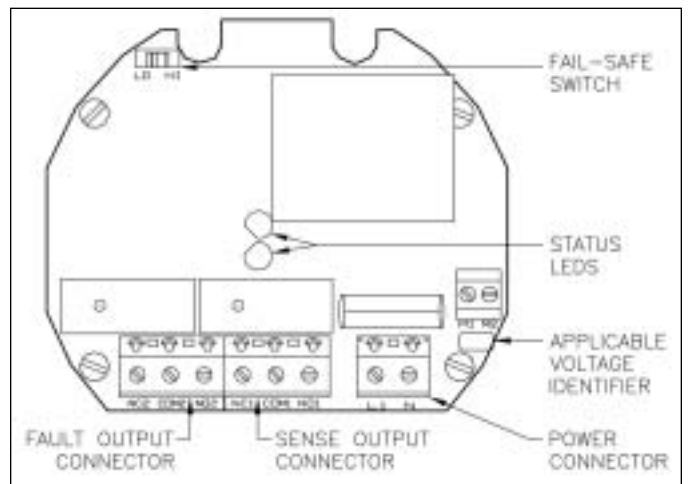
Shaft guards are recommended for use with solid shaft extensions to limit the movement caused by side loading that would otherwise damage the working components of the paddle unit. Shaft guards should be the same length as the extension and should always be used when the extension meets or exceeds 18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

## MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



## WIRING DIAGRAM



# BULLETIN 253 SafePoint®

## ORDERING INFORMATION

1 - 8 5 X X - X X

### MOTOR VOLTAGE

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

### PROCESS CONNECTION

1 = 1-1/4" NPT  
2 = 1-1/2" BSPT<sup>1</sup>

### TEMP STYLE

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

### APPROVALS

1 = Ordinary locations, CSA<sub>US/C</sub>, CE  
2 = Hazardous locations CSA<sub>US/C</sub> (North America)<sup>2</sup>  
3 = Hazardous locations ATEX/IECEx<sup>2</sup>

### Note:

1 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.  
2 External lights are not available with hazardous location approvals.

## 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" BSP 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

### General:

Power Requirements: 115 VAC (+/- 15%); 9 VA; 50/60 Hz  
230 VAC (+/- 15%); 9 VA; 50/60 Hz  
24 VAC/DC (+/- 15%); 11 VA

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: to +750°F (+399°C)

### 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 @ 277 VAC, 30 VDC max

Unit Status (Fault): One SPDT; 5A @ 277 VAC, 30 VDC max

### Maximum Pressure:

30 PSI (2 bar)

### Sensitivity:

5 lb./ft<sup>3</sup> (80 kg/m<sup>3</sup>) 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, 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 1/4" diameter

### Listings/Approvals:

CSA<sub>US/C</sub>: Ordinary Locations; Class I, Div. 1&2, Groups C, D; Class II, Div. 1&2, Groups E, F, G  
ATEX II 1/2 D T 85°C  
IECEx DIP B20 T<sub>A</sub> 85°C  
CE Mark

\*Influenced by mounting, material thermal conductivity and ambient temp.

U.S. Patent Pending

## 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.



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