



Practical solutions...at every level!

# SafePoint® "Truly" Fail-Safe Rotary Paddle Bin Monitor

## FEATURES & ADVANTAGES

- ▼ **Self-validating, "truly" fail-safe** means that sensor output relays revert to a safe state upon both power loss and if an internal failure of the sensor itself is detected.
- ▼ **Patented magnetic sensing technology** using Hall-Effect/magnetics (instead of optics) for maximum immunity to dust ingress into enclosure.
- ▼ **External status LED** for local indication that is viewable through wide angle lens indicating both sensing and diagnostic status (not available for Haz Loc version).
- ▼ **Motor shut-off feature** maximizes sensor life.
- ▼ **DC voltage model** uses a brushless AC motor with a voltage converter circuit to provide long motor life. See Bulletin #226A for more information.
- ▼ **Ordinary location and Hazardous location** models are available.
- ▼ **Rugged powder coated cast aluminum housing with twist on/off cover** provides easy and ample wiring access.



(Paddle ordered separately)

### Practical Tip

SafePoint's independent "sense" and "fault" outputs can be wired in series to simplify wiring while still providing "true" fail-safe performance.

## PRINCIPLE OF OPERATION

The SafePoint® rotary paddle bin monitor is fundamentally a torque detector which provides an output switched condition when the resistance of the material surrounding the paddle is greater than the drive mechanism used to rotate the paddle. In addition, the SafePoint integrates "self-validation" fail-safe mechanisms which continuously test the health of its internal operation thereby assuring operator of sensor's ability to provide reliable level detection.

The rotary paddle bin monitor is installed to a vessel wall with a paddle protruding into vessel. A low-power, low-speed synchronous motor drives a paddle which rotates freely in the absence of material. When the paddle rotation is impeded by the presence of material, the motor internally shifts a magnet in proximity to electronics. This engages a relay whose outputs are made available for customer connection to a control system. A moment later, the bin monitor switches off the motor to prolong its life. When the material level drops below the paddle, a spring returns the motor and corresponding magnet to its original position, and the electronics re-energize the motor, re-establishes paddle rotation, and returns relay to its normal non-actuated status.

The "self-validation" fail-safe capability is achieved through continuously monitoring the rotation of a magnetic disk that is located between the paddle and all other operating mechanisms (including the clutch, motor and all electronics). If the electronics ever detects that lack of rotation of this magnetic disk when no material is present, then the FAULT relay will change state indicating a sensor failure of some sort.

Sensitivity of the rotary paddle bin monitor is determined by the number of paddle vanes (single, 2-vane, 3-vane, etc) and the spring tension setting within the sensor.

## PRACTICAL APPLICATIONS

- ▼ A practical choice for critical high level sensing where an over-fill situation caused by an undetected sensor failure would be catastrophic.
- ▼ For applications when sensors that are not affected by electrical properties of target materials, such as dielectric, are preferred.
- ▼ Reliable sensing of materials as light as 5 lbs/ft<sup>3</sup> (80kg/m<sup>3</sup>) with proper mounting location & proper paddle selection.
- ▼ Typical applications include, but are not limited to: Grains, Feeds, Silica Sand, Rocks, Pellets, Wood, Calcium Dust, Rubber, Metals, Re grind, Coal, Peanuts, Malt, Clays, Resin, Limestone, Foundry Sand, Pre-Mix Ingredients, Rawhide, Sawdust and more.

For more detailed information, please contact a Monitor representative or visit Monitor's website at [http://www.monitortech.com/product\\_p\\_fails.shtml](http://www.monitortech.com/product_p_fails.shtml)

## OPTIONS

- ▼ Hazardous location approvals for gases and dust available.
- ▼ Choice of paddle accessories for reliable material detection and application-specific material detection containing varying points / distances. (Please refer to Bulletin #216H for paddle selection guide.)
- ▼ High temperature unit available.
- ▼ Variety of extensions, guards, couplings and mounting plates are available to meet specific process condition requirements.



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

▼ Pipe extension models: 144" (3.65m) maximum length.

▼ Field adjustable cable extensions: 78" (2m) maximum length.





## SPECIFICATIONS

More product specifications can be found on Monitor's Web site.

<b>Power Requirements:</b>	115 VAC (+/- 15%); 9 VA; 50/60 Hz; 230 VAC (+/- 15%); 9 VA; 50/60 Hz 24 VAC/DC (+/- 15%); 11 VA	<b>Housing:</b>	Die cast aluminum, powder coated NEMA 4 / ENCLOSURE TYPE 4, IP66
<b>Internal Bin Temperature:</b>	Standard Unit: to 250°F (121°C) Hi-Temp. Unit: 250 to 500°F (121 to 260°C) without air-cooling to 750°F (400°C) with air-cooling [0.5 psig / 2.14 CFM]	<b>Listings / Approvals:</b>	CSA <sub>US/IC</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 c T 85°C ExtD A20/A21 T 85°C (Ta -40°C to +65°C) IP6x IEC Ex: DIP A21 IP6X T <sub>A</sub> 100°C -40°C to +65°C CE Mark
<b>Ambient Operating Temp.:</b>	-40°F to +150°F (-40°C to +65°C) ext. amb.	<b>Material of Construction:</b>	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
<b>Conduit Connection:</b>	Two (2) 3/4" NPT (for 1-1/4 NPT mounts) Two (2) M20 (for 1-1/2 BSPT mounts)		
<b>Outputs:</b>	Material Sense: One SPDT; 5A @ 250 VAC, 30 VDC max Unit Status (Fault): One SPDT; 5A @ 250 VAC, 30 VDC max		
<b>Maximum Pressure:</b>	30 PSI (2 bar) maximum		
<b>Sensitivity:</b>	5 lbs/ft <sup>3</sup> (80 kg/m <sup>3</sup> ) min. material density (when using large 3-vane paddle)		
<b>Mounting Connection:</b>	1-1/4" NPT or 1-1/2" BSPT		
<b>Shipping Weight-Approx.:</b>	7 lbs (3.18 kg) - with optional paddle		
<b>Shipping Dimensions:</b>	9L x 9W x 12H" (229 x 229 x 305mm)		

## ORDERING INFORMATION

SafePoint™ Fail-Safe Rotary Paddle Bin Monitor			
Select	Operating Voltage	Select	Process Connection
1	115 VAC	1	1-1/4" NPT
2	230 VAC	2	1-1/2" BSPT <sup>2</sup>
3	24 VDC/AC	Select	Approvals
		1	Ordinary locations CSA <sub>US/IC</sub> ; CE
		2	Hazardous locations CSA <sub>US/IC</sub> (North America) <sup>1</sup>
		3	Hazardous locations ATEX/IECEx <sup>1</sup>
		Select	Temperature Style
		1	Hi-temp, CS <sup>2</sup>
		2	Hi-temp, SS <sup>2</sup>
		Blank	None
<b>1 - 8</b>	<b>5</b>	<b>X</b>	<b>X - X X</b>
			<b>Order Number</b>

### NOTES:

- External lights are not available with hazardous location approvals.
- 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. (See I&O Bulletin #214A.)

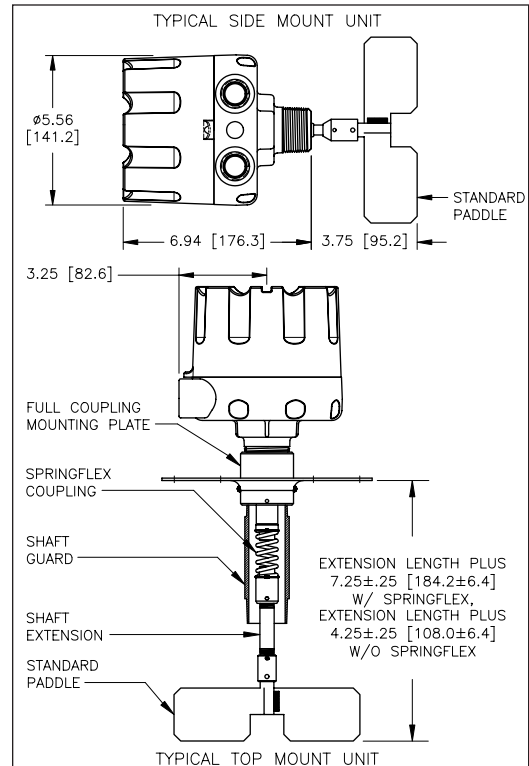
### ACCESSORIES:

Part #	Description	Part #	Description
<b>Mounting Plates:</b>			
1-0100	Mounting Plate, half coupling, CS, for R 1-1/2" (BSPT 1-1/2")	1-3335	Spring flex
1-0115	Mounting Plate, full coupling, CS, for R 1-1/2" (BSPT 1-1/2")	<b>Paddles:</b>	
1-0101	Mounting Plate, half coupling, CS, for 1-1/4" NPT	1-4145	Paddle, 1-vane insertable
1-0102	Mounting Plate, full coupling, CS, for 1-1/4" NPT	1-4146	Paddle, 3-vane standard
1-0112	Mounting Plate, half coupling, SS, for 1-1/4" NPT	1-4141	Paddle, 3-vane large
1-0113	Mounting Plate, full coupling, SS, for 1-1/4" NPT	1-4193	Paddle, 1-vane scimitar
1-3316	Mounting Plate, heavy duty alum., for 1-1/4" NPT	1-4135	Paddle, 2-vane
		1-4156	Paddle, 4-vane
		1-4144	Paddle, 1-vane triangular
		1-4137	Paddle, ex-flex belt
		1-4161	Paddle, 2-vane collapsible
<b>Solid Shaft Extensions:</b>			
1-1175-1-#*	1/4" Pipe, SCH-40, Galvanized	<b>Cable Extension:</b>	
1-1175-2-#*	1/4" Pipe, SCH-40, 304 SS	1-1176-2-78	Flexible Extension
		(304 SS, 78" (2m) Length - Can be modified in the field for a shorter length.)	
<b>Shaft Guards:</b>			
1-1174-1-#*	1-1/4" Pipe, SCH-40, Galvanized	* # = Extension and guard lengths - not to exceed 144 inches (3.6 m) in length. Contact factory for more details.	
1-1174-2-#*	1-1/4" Pipe, SCH-40, 304 SS		

Information on this sheet is subject to change without notice.

## MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



**ISO 9001:2008 Certified**

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