





### **ROTO-BIN-DICATOR**<sup>®</sup>

point level control

# **APPLICATIONS:** The Roto-Bin-Dicator<sup>®</sup> point level control eliminates bin overflow, empty bins, clogged conveyors, choked elevators and resultant damage and waste. For chemical, food, mining, plastics, ceramic and other industries.

# **OPERATION:** Operation centers around a low torque slow speed synchronous motor. Absence of dry material allows the motor to turn the paddle. Presence of dry material tends to stall the paddle and the motor. The resultant torque actuates a snap-action switch(es) which in turn controls audible and visual signals and/or start and stop machinery such as conveyors, elevators, feeders, etc. Mounts on top or side of bin.

### 1. General

- A. Material must flow freely both to and from the paddle and shaft.
- B. The paddle and shaft must be kept out of the direct flow of bulk materials while the bin is being filled. Protective shields or an offset mounting procedure may be required.



### 2. High Level Controls

A. Top-of-bin mounting is recommended. The length of the shaft may be extended in the field to suit the application. Protective shaft guards are necessary on shaft extensions of 12" or more. Lenaths in excess of 20' are common. The shaft guard should be adequately braced in most installations where the shaft lengths are 2' or longer. Top mounting usually provides a more positive highlevel signal on light materials, easier installation and removal, simple adjustment of shaft length, ease and economy of wiring, and minimal damage from vibration. It also permits use of multiflex paddles which are recommended for large-lump materials.

**B.** The paddle must be located low enough to insure complete coverage of the paddle when the product angle of repose is at its maximum.

### 3. Low or Intermediate Level Controls

- A. Side-of-bin mounting is customary, but top-of-bin mounting in small and medium size bins is sometimes advantageous.
- **B.** Protective shields are recommended if heavy product surges are anticipated at the paddle.

### **Application Considerations**

### 1. Corrosion

- A. All in-bin metal components are stainless steel.
- B. Solid stainless steel shafts may be used in place of neoprene covered flexible shafts.

### 2. Temperatures - High and Low

- A. Units with a neoprene flexible shaft can withstand material temperatures to 160° F (71° C).
- B. Units with solid shafts or the silicone flexible shaft can be used with material temperatures above 160° F (71° C) as long as temperatures within the switch housing do not exceed 200° F (93° C).
- **C.** All units are operational to -30° F (-34.4° C). Power must be maintained to the synchronous motor since the motor is a source of heat within the housing.

### 3. Moisture

- The shaft seal will protect the internal drive shaft and bearings from moisture up to 30 psi.
- **B.** Moisture affects flow characteristics of materials and promotes adhesion to bin sides. Therefore, mount controls from the top of the bin, extending the paddle down to a free flowing area. Stainless steel, multi-flex paddles are recommended for many moist, non-free flowing materials.

### 4. Fine Powders

Large, four vane paddles are recommended for fine

powders. The high level control for very light materials (less than 30 lbs. per cu. ft.), or highly fluidized powders should make use of a vertical shaft mounting and large paddles.

### 5. Large Lump Materials

- A. The neoprene multi-flex paddle will withstand great amounts of abuse common to applications involving large or lump materials. Multi-flex paddles are used only with a vertical shaft mounting technique, and those with neoprene belting must be located close to the bin wall.
- **B.** If a horizontal shaft mounting is necessary, it is recommended that the control be equipped with a flexible shaft to absorb shock loads. The exposed flexible shaft and paddle should have a field-erected, protected baffle.

### 6. Pressure / Vacuum Applications

- A. The shaft seal on the Roto-Bin-Dicator® is rated for up to 30 psi vessel pressures at 1/2 micron particle sizes to prevent material from reaching the shaft bearings. This is particularly important for pneumatic material conveying systems.
- **B.** For vacuum applications, the shaft seal is rated for 7.3 psi negative. Higher vacuums require the use of a conduit seal fitting and appropriate sealing compound on the cover gasket.

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Units with 240V Motors

/50/60

Units with 120V Motors

### How to Order

Versatile Roto-Bin-Dicator® controls are recommended for the majority of dry material level control applications. Here is a general guide to selection:

		One switch		Two switch		One switch		Two switch		
			Weather-	Explosion-	Weather-	Explosion-	Weather-	Explosion-	Weather-	Explosion-
	2" x 7"-+ - 6 5/8"-++- 5 7/8"-+	Molded Neoprene flexible shaft. Large 4-vane paddle. <b>Type 1:</b> For most applications with temperatures below 160° F (71° C). For materials weighing less than 30 lbs./cu.ft.	R-H-1	RX-H-1	RA-H-1	RXA-H-1	RB-H-1	RXB-H-1	RC-H-1	RXC-H-1
	1-1/2" x 5"→ - 6-5/8"→ + - 6-5/8"→ + - 5-7/8"→	Molded Neoprene flexible shaft. Standard 4-vane paddle. <b>Type 2</b> :For most applications with temperatures below 160° F (71° C). For materials weighing less than 30 lbs./cu. ft. to 75 lbs./cu. ft	R-H-2	RX-H-2	RA-H-2	RXA-H-2	RB-H-2	RXB-H-2	RC-H-2	RXC-H-2
Mounting Side of Bin with mounting plate	2-7/8 <sup>•</sup>	Single vane paddle. <b>Type 3:</b> For heavy (approx. 75 Ibs./cu. ft. or more), medium-size materials (sand, gravel, etc).	R-H-3	RX-H-3	RA-H-3	RXA-H-3	RB-H-3	RXB-H-3	RC-H-3	RXC-H-3
High, Intermediate and Low Level		Single vane paddle - insertable thru 1 1/4" mounting coupling. <b>Type 3i:</b> Curved 9" diameter for materials weighing over 20 lbs/cu. ff. No mounting plate included	R-H-3i	RX-H-3i	RA-H-3i	RXA-H-3i	RB-H-3i	RXB-H-3i	RC-H-3i	RXC-H-3i
	1-1/2° x 5°-→ 3-3/4°  → →  → 5-7/8°-→	Standard 4-vane paddle. <b>Type 4:</b> Common configuration for most materials, where short shaft is preferred.	R-H-4	RX-H-4	RA-H-4	RXA-H-4	RB-H-4	RXB-H-4	RC-H-4	RXC-H-4
	2* x 7*	Large 4-vane paddle. <b>Type 5:</b> Same as type 4 except large paddle for materials weigh- ing less than 30 lbs./cu. ft.	R-H-5	RX-H-5	RA-H-5	RXA-H-5	RB-H-5	RXB-H-5	RC-H-5	RXC-H-5
Mounting	TYPE 6 TYPE 7 TYPE 8	Shaft coupling to receive shaft extension. Standard 4-vane paddle. <b>Type 6:</b> Common configuration for most top-mounted applica- tions.	R-H-6	RX-H-6	RA-H-6	RXA-H-6	RB-H-6	RXB-H-6	RC-H-6	RXC-H-6
Top of Bin with mounting plate to receive shaft quard	6-1/2* 6-1/2*	Shaft coupling to receive shaft extension. Large 4-vane paddle. <b>Type 7:</b> Same as type 6 except large H-371 paddle for light or aerated materials less than 30 lbs./cu. ft.	R-H-7	RX-H-7	RA-H-7	RXA-H-7	RB-H-7	RXB-H-7	RC-H-7	RXC-H-7
(Preferred high-level mounting)		Shaft coupling to receive shaft extension. Neoprene or stainless steel multiflex paddle. <b>Type 8:</b> For heavy, large lump mate- rials. Control should be located so product pins paddle to bin wall. H-374 long, stainless steel multiflex paddle for heavy and/or sticky mate- rials. Both paddles approx. 50 lbs./cu. ft. or more.	R-H-8	RX-H-8	RA-H-8	RXA-H-8	RB-H-8	RXB-H-8	RC-H-8	RXC-H-8

#### **IMPORTANT:**

### Consult factory on applications where housing ambient temperature is above 200° F (93° C).

Shaft extensions and guards are available in galvanized, T-303 stainless steel, and T-316 stainless steel.

The Roto-Bin-Dicator® is also available with the Super-Safe-Plus option. Ask for brochure LAR180103 for more details.

#### Specify Options —

- A. Stainless steel mounting plate in place of mild steel.
- B. Addition of flexible shaft to top-of-bin types.
- C. Paddles, motor, mounting plates and flex-shafts are available individually.

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### Construction Specifications:

#### A. Housing and Cover:

Standard: Dust-tight and weatherproof (NEMA 4X,5) polyester-coated aluminum castings. Optional: Explosion-proof (NEMA 7,9) polyester-coated aluminum castings. Optional: stainless steel castings.

#### B. Drive Shaft Assembly:

Precision machined shaft with two shielded ball bearings.

#### C. Shaft Seal:

Teflon<sup>®</sup>/Viton<sup>®</sup> Lip Seal rated 1/2 Micron at 30 psi at 400° F (204° C) even though the unit itself is only rated to 200° F (93° C) (without external cooling).



#### D. Motor:

Continuous stalled

condition will not affect this synchronous motor. Motor rating: 4 watts, 120 VAC ± 10% 50/60 Hz, 1 rpm. Heat generated by the motor's continuous running eliminates the moisture common to changing ambient temperatures and tropical climates, preventing internal corrosion and unit failure. CONDUIT CONNECTION: drilled and tapped for 3/4" NPT pipe conduit.

#### E. Mounting Plate:

8" outside diameter with 1-1/4" NPT pipe thread coupling. Standard: painted mild steel. Optional: 302 stainless steel with custom formed coupling that shield the casting hub from exposure to the interior of the bin.

#### F. Rigid Shaft and Paddle:

Metal parts of all designs are of 304 stainless steel. Machined, unthreaded and pre-drilled connections permit field interchangeability without need for any power tools.

#### G. Flex Shaft:

Strong, flexible shaft will not take permanent set due to frequent or severe flexing. The flexible shaft is available in either neoprene, 160° F (71°C) or silicone, 400° F (204°C) coatings.

### Mounting Plate Dimensions:



#### DETAILS COMMON FOR ALL TYPES

#### Shipping Weight:

Aluminum Housing, 10 lbs. Stainless Steel Housing, 16 lbs.

#### **Electrical Specifications:**

Specific applications determine the electrical requirements which are a prime consideration in the selection of models. See "How to Order" on page 2 Single-pole, double-throw; rating 20 amp. 125, 250 or 480 VAC; resistive load 1 HP @ 125 VAC. 2 HP @ 250 VAC. May be wired for single-throw operation normally open or normally closed.

### Approval: UL, CSA, ATEX

Association. The

weather-proof

non-hazardous

atmospheres. The

atmospheres, Class 1,

II, Groups E,F, and G.

explosion-proof models are listed for use in hazardous

Groups C and D; and Class

Consult factory for model code listing and rating.

All Roto-Bin-Dicator® controls are listed by Underwriter's Laboratories, Inc. and Canadian Standards



HAZARDOUS LOCATIONS AS DEFINED BY THE NATIONAL ELECTRICAL CODE HANDBOOK ...

The degree of hazard is normally



indicated by a three-part designation: "Class-, Division-, and Group-" Class 1, Division 1, Group A denotes the most severely and continually hazardous condition.

### Bindicator offers a complete range of Level and Material Handling Controls



A venture **REMENT** Product Line 150 Venture Boulevard - Spartanburg, SC 29306 Tel: (800) 778-9242 • (864) 574-8060 Fax: (864) 574-8063 E-mail: sales@bindicator.com www.bindicator.com

For information, specifications, installation instructions and engineering help with any Bindicator product, contact Bindicator or your local authorized representative.





### VERSATILE ENOUGH TO BECOME YOUR GLOBAL STANDARD

The Roto-Bin-Dicator is the most universal of all level sensing technologies and is the most popular level switch used in dry bulk materials. The Roto-Bin-Dicator is a rotating paddle type, bulk material level sensor offered with a wide variety of paddle options for unequaled application versatility. It is easy to install and requires no special tools or calibration.

### **FEATURES AND BENEFITS**

- A simple, mechanical mechanism means no calibration is required for quick installation
- Long-lasting, sealed motor keeps maintenance and replacement costs low
- Extensive Paddle Options to adapt to a variety of applications
- Frame designed to enable connection flexibility Imperial or Metric conduit entry options Process Fitting can be made to fit any connection

### **SPECIFICATIONS**

#### FUNCTIONAL

Power Requirements	24/120/240 VAC; 50/60 Hz, 24 VDC			
Power Consumption	5 watts			
Motor	1 rpm			
Fail-Safe Circuitry	Low level fail safe			
Switch Rating	General Purpose: SPDT 20A @ 125/250/480 VAC. Pilot Duty: 345 VA, 115 VAC; 690 VA, 230 VAC			
Process Temperature	-20° to 302° F (-29° to 150° C) Standard Up to 500° F (Up to 260° C) with Extension 3 and Lag			
PHYSICAL				
Drive Shaft Assembly	Precision machined shaft with two shielded ball bearings			
Shaft Seal	Teflon°/Viton° Lipseal rated 1/2 micron @ 30 psi (2.1 kg/cm2) @ 400° F (204° C)			
Housing and Cover	Type 4X/IP66 polyester coated aluminum casting			
Mounting Plate	8" outside diameter with 1 <sup>1</sup> /4" NPT pipe threaded coupling; standard polyester coated mild steel; optional 304 stainless steel; H-19 Half Coupling; H-192 Full Coupling			
Conduit Entry	3/4" NPT or M20 x 1.5			
Rigid Shaft and Paddle	Metal parts of all designs are 316 stainless steel			
Flex Shaft	Available in neoprene, 155° F (68° C) or silicone, 400° F (204° C) coatings			
Shipping Weight	Aluminum housing 10 lbs (4.5 kg) Stainless steel housing 16 lbs (7.3 kg)			

NOTE. Consult Factory where the housing temperature will be above 200° F (93° C). Shaft extensions and guards are available in galvanized or 316 SS. The Roto-Bin-Dicator\* is also available with the Super-Safe-Plus option.

### **ROTO-BIN-DICATOR - ORIGINAL - PART ONE**



### **ROTO-BIN-DICATOR - ORIGINAL - PART TWO**



- 8. Lag not available with process fitting X1 or X2, and if used with Extension, the maximum total length is 48 in. (122 cm)
- 9. Maximum extension length is 180 in. (4.6 m), minimum length is 3 in. (7.6 cm); leave blank if not used.
- 10. Maximum lag length is 24 inches, minimum length 1 in. (2.5 cm); leave blank if not used
- 11. EPDM Flat gasket is included for Process Fittings with straight threads.
- 12. X2 Process Fitting and Stainless Steel Housing Finish can only be ordered together.
- 13. M2 and N2 Process Fitting only available with C, D, E, F and G Paddles.

### Original Roto-Bin-Dicator\*

#### **Housing Dimensions**



#### Standard 4-Vane Paddle

#### Large 4-Vane Paddle





Single Vane Paddle 30° Cut







### **AGENCY APPROVALS**

#### UL (US and Canada)

- Ordinary Location, Type 4X; IP66
- Hazardous Locations, Type 4X
   Explosion Proof, Class I, Div 1, Groups C, D
   Dust Ignition Proof, Class II, Div 1, Groups E, F, G

#### CE

- Electromagnetic Compatibility Directive
- Low Voltage Directive

### Collapsible Paddle







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# Roto-Bin-Dicator® PRO

Actively Protecting Inventory

Roto-Bin-Dicator<sup>®</sup> PRO is the most advanced paddle wheel level indicator in the bulk solid industry. While others have claimed "True" fail-safe operation, Roto-Bin-Dicator PRO is the only product that performs self-diagnostics and differentiates between faults BOTH in and out of material, actively protecting valuable inventory.

## Roto-Bin-Dicator<sup>®</sup> PRO ACTIVELY PROTECTING INVENTORY

The Roto-Bin-Dicator® PRO paddle wheel is unique in the bulk solid industry with its

### ability to DETECT FAULTS WHILE THE PADDLE IS IN MATERIAL.

It is a true failsafe device that is able to perform complete selfdiagnostics in and out of material, compared to

other devices that only provide diagnostics when the paddle is out of material. To truly know if your level device is working, regardless of whether or not the paddle is in material, the Roto-Bin-Dicator® PRO is the only choice.

Self-diagnostics are standard and not only detect faults, but **DIFFERENTIATE BETWEEN FAULTS.** By providing distinct flash codes, downtime is minimized and the Roto-Bin-Dicator PRO model provides an added level of confidence against costly overfills and outages. No other paddle wheel in the industry has this functionality.

Already a versatile product, the Roto-Bin-Dicator PRO meets the requirements of a **GREATER RANGE OF APPLICATIONS** with 3 sensitivity settings, a breadth of paddle choices and universal power. Sensitivity settings combined with different paddles allow the same unit to be used with a variety of materials. Universal input power and polarity detection allow for flexibility with different input voltages and prevent costly damage from miswiring.

### FRAME -

Two sizes of conduit entry ports available, <sup>3</sup>4" NPT or M20x1.5

### PROCESS FITTING-

Various sizes available as NPT, BSP or Tri-Clamp. Fittings can be customized.

### TEST FOB

For that extra bit of confidence, check the functionality of the device without removing the cover, regardless of the paddle being in or out of material.

### SELF-DIAGNOSTICS

Whether the paddle is in **or** out of material, PRO does a self-check for faults. If a fault is detected, PRO will differentiate and let you know which of the following has occurred:

- Supply Voltage Fault
- Gear train Failure
- Motor Not Connected
- Motor Failure
- Electronics Fault

Temperature

Electronics

Range

### **GENUINE FAIL-SAFE**

The PRO model provides an alarm relay that can be configured for high or low level fail-safe, and a separate auxiliary relay for self-diagnostics that operate when the paddle is in or out of material; giving you confidence that your system is functioning properly.

### MOTOR PAUSE:

For applications where the material level seldom changes, motor function is suspended after prolonged periods where no change in material level has been detected to save power and extend the life of the unit. Motor pause is an optional setting.

### SENSITIVITY SETTINGS

The motor torque can be adjusted +/- 30% to match materials of varying bulk densities.

### TIME DELAY

Set when a delay in the activation and deactivation of the alarm relay is required. Four settings available, up to a 25 second delay.

# **Mounting Considerations**

The Roto-Bin-Dicator® PRO can be installed in many different orientations and environments. **Horizontal or Vertical:** Units can be positioned horizontally or vertically in a tank to better reach the level detection point. Multiple units can be installed in a single tank if various levels wish to be detected.

**Mounting Plate:** Due to the size of some of the paddles, a mounting plate may be required to attach the unit correctly to the tank. It may also be used to insert the PRO into a larger pre-existing opening in the tank.

**Extension:** Most often used with vertically mounted units, a pipe extension can be added to the paddle in order to position it further into the tank and reach the required point for level detection. For smaller materials that tend to pack into the hollow pipe, a lip seal can be incorporated to protect from clogging.

Lag: Used for high temperature applications, the distance between the housing and the process fitting is lengthened with pipe in order to move the electronics away from high process temperatures.

High Level



Lag & Extensions

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### **Paddle Matrix**

Description

Material

Dimensions

Model

H 320

 Insertion Length
 Application Considerations

 3.75 in.
 Med. weight material - max. particle size of 3/4 in.

 (10 cm)
 Med. pellets

	. runo		(4 x 13 cm)	(10 cm)	(plastic pellets)
H-371	4-vane	Stainless Steel	2 x 7in. (5 x 18 cm)	3.75 in. (10 cm)	Lighter weight material - maximum particle size of 3/4 in. (plastic pellets)
H-373	Multiflex	Neoprene	1.5 x 24 in. (4 x 61 cm)	26.5 in. (67 cm)	Very heavy large particle size (rock, coal), vertical mounting only
H-374	Multiflex	Stainless Steel	1.5 x 17 in. (4 x 43 cm)	22 in. (65 cm)	Very heavy large particle size (rock, coal) for higher temperatures, vertical mounting only
H-379	Curved Banana	Stainless Steel	4.56 x 7.5 in. (12 x 19 cm)	8.25 in. (21 cm)	Low to medium weight materials - maximum particle size 1/4 in. (carbon black, powders, wood chips)
H-372A	1-Vane with 30° Cut	Stainless Steel	1 x 2.88 in. (3 x 7 cm)	3.75 in. (9.5 cm)	Typically side-mount; heavy material - maximum particle size 1 in. (sand, cement)
H-380	2-vane collapsible	Stainless Steel	Closed: 5 x 8.75 in. (13 x 22 cm) Open: 7.5 x 1.22 in. (19 x 3cm)	5.94 in. (15 cm)	Low to medium weight material, highly aerated - maximum particle size 1/4 in. (carbon black, powders, wood chips)

H-373 H-374 H-379 H-371 H-380 H-370 H-372-A FOR BEST RESULTS ALSO CONSIDER: • Mounting plate and a shaft guard are recommended for vertical mounted units • Units in mass flow materials should include a flex shaft coupling and/or dog house • The larger the surface area of the paddle, 150 Venture Boulevard, the more material can be detected Spartanburg, SC 29306 Phone: 800.778.9242 Fax: 864.574.8063

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2015 All rights reserved. All data subject to change without notice. LAR180514 Rev B Check out the Bindicator website to watch a video of Roto PRO's breakthrough technology in action.



VISIT WWW.INFO.BINDICATOR.COM/PRO7 FOR MORE INFORMATION