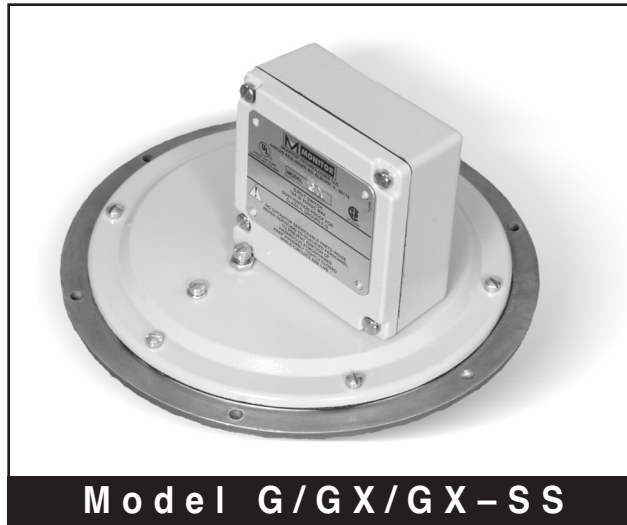


BULLETIN 624

INSTALLATION & OPERATION

Binatrol[®] Diaphragm Bin Monitors



Thank you for purchasing a quality product manufactured by Monitor Technologies LLC. We realize that you do have a choice of vendors when procuring diaphragm bin level monitors and we sincerely appreciate your business!



This manual contains the information necessary to ensure a safe and successful installation. Please read and comply with the section on page 4 of this manual pertaining to SAFETY. Doing so will ensure proper operation of the equipment and the safety of all personnel.



Before discarding shipping container, please inspect it thoroughly and verify that all parts ordered are accounted for. Sometimes smaller parts become stuck under carton flaps and other packaging materials.

In the event that information contained herein does not completely satisfy your requirements or answer your questions, you may contact Technical Support on our website www.monitortech.com, by telephone at 800-766-6486 (630-365-9403), or by fax at 630-365-5646. If your diaphragm switch ever requires service either in or out of warranty, please contact us and obtain an RMA number prior to shipping the unit to us.



www.monitortech.com

PRE-INSTALLATION CONSIDERATIONS

Choosing a Location (See Figure 1)

1) Mounting considerations - Select a location where the surface of the wall is as flat as possible. Diaphragm bin monitors can be mounted directly to bins with a diameter greater than 12 feet (3.6 m). Smaller diameter vessels will require special fabrication of an adapter or stacking of additional gaskets to permit flat mounting. Position the unit at a point where incoming material will reach and cover the entire diaphragm in its normal flow, and when receding, will flow away from the diaphragm in an even manner. Avoid mounting the unit on a floor surface where residual material may keep the bin monitor in a "sensed" condition. Mounting on the top surface of a chute is acceptable assuming material will physically contact the diaphragm when detection is required. This is typically done for "plugged chute" detection applications.

2) Pressurized applications - The diaphragm bin monitor is designed to operate in atmospheric pressure applications. Vessels which are pressurized may cause false signaling and therefore should be avoided.

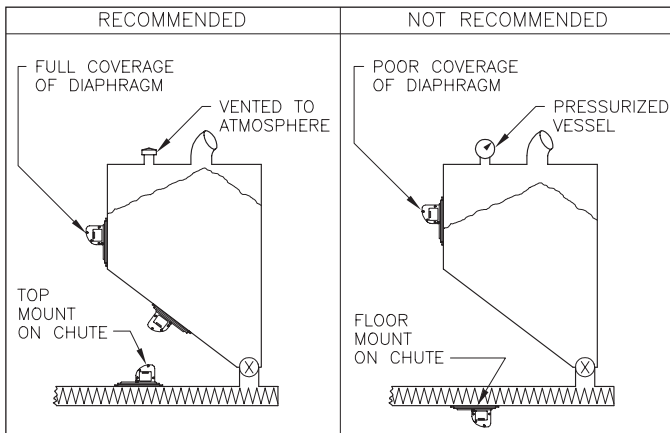


Figure 1

MECHANICAL INSTALLATION

Side Mount/Top Mount (See Figure 2)

1) Internal and external vessel access - After selecting an appropriate mounting location, cut a 7 inch (178 mm) diameter hole in the bin wall. Using the diaphragm bin monitor as a template, place the unit in the hole with the switchcase in the uppermost position. This position maximizes sensing. Mark the location of the six mounting holes. Remove the bin monitor and drill six 7/32 inch (6 mm) diameter holes. Place the mounting gasket between the bin monitor and vessel wall and firmly mount the bin monitor in place with #10 bolts and nuts.

2) External vessel access only - After selecting mounting location, cut a 7 inch (178 mm) diameter hole in the bin wall. Using the diaphragm bin monitor as a template, place the unit in the hole with the switchcase in the uppermost position. Mark the location of the six mounting holes. Remove the bin monitor and drill six 7/32 inch (6 mm) diameter holes. Remove the diaphragm back plate from the mounting base plate/diaphragm by removing the six screws equally spaced around the unit's circumference. Remove the retaining ring and diaphragm from the mounting base plate. Place the mounting gasket between the mounting base plate and vessel wall and firmly mount the bin monitor in place with #10 bolts and nuts. Access to the internal vessel wall will be possible

from the external since the diaphragm was removed. Reassemble diaphragm and mounting base plate. (See "Maintenance")

3) Optional Hycar® Diaphragm Cover (See Figure 3) -

If the optional Hycar® diaphragm cover is being used, please see Figure 3 for an installation diagram.

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS

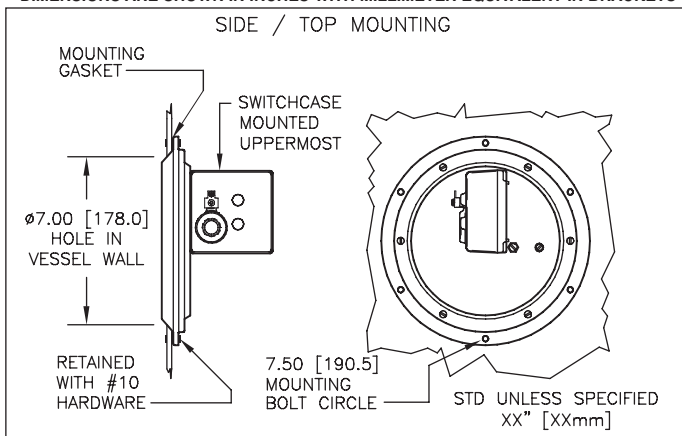


Figure 2

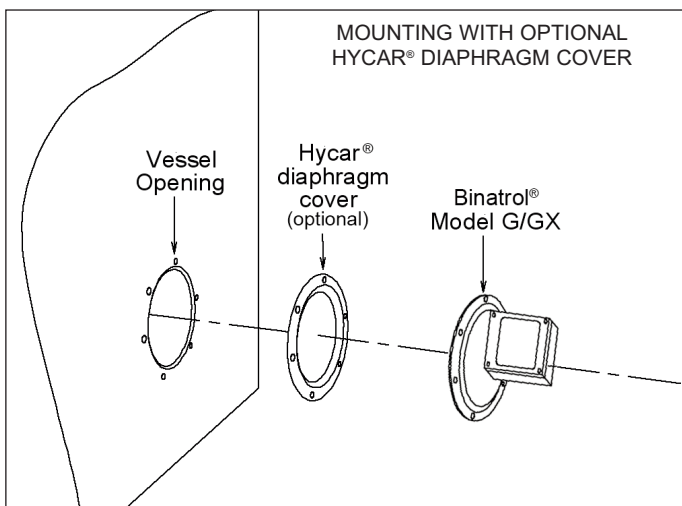


Figure 3

ELECTRICAL INSTALLATION

1) ⚠ Hazardous Location Precautions - Observe the regulations listed in the National Electrical Code regarding equipment in hazardous locations. In particular, insure power is disconnected whenever the cover is removed, insure the cover and case mating surfaces are not damaged, and upon completion, ensure cover screws are secure and that no gasketing or sealer has been used between the cover and case surfaces.

2) Output Contacts (See Figure 4 on next page) - Route wires through the 1/2" NPT conduit entrance. No power is required to operate the diaphragm bin monitor. All electrical installation is done directly to the terminals of the output switch. The switch terminals are designated with "COM" (common), NC (normally closed), NO (normally open). When the diaphragm is not sensing material, the switch is in the normal condition (i.e. NC contact is closed to COM, and NO contact is open to COM). However, when the diaphragm senses material, the switch is opposite from normal condition (i.e. NC contact is open to COM, and NO contact is closed to COM). Be sure to comply with all electrical specifications listed within this bulletin.

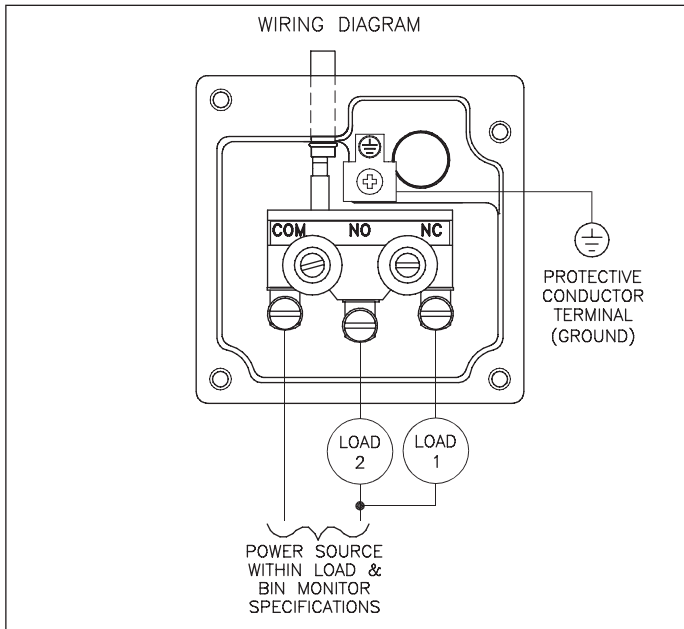


Figure 4

CALIBRATION

Sensitivity Adjustment

All diaphragm bin monitors are shipped from the factory preset at mid-range sensitivity. Nearly all applications will be satisfied with this setting. Adjust the sensitivity screw only when the initial operation of the unit is unacceptable.

- 1) **Increased sensitivity** - When sensing light materials it may be necessary to increase overall sensitivity by rotating the sensitivity adjustment screw counter-clockwise. The sensitivity will be only affected within the first two turns from the preset location. Excessively increasing sensitivity will result in the unit remaining in the "sensed" condition. Use nut to secure screw setting.
- 2) **Decreased sensitivity** - When sensing heavy materials or materials which have a tendency to stick or build up on the diaphragm, it may be necessary to decrease overall sensitivity by rotating the sensitivity adjustment screw clockwise. The sensitivity will only be affected within the first four turns from the preset location. Excessively decreasing sensitivity will result in the unit remaining in the "non-sensed" condition. Use nut to secure screw setting.

TROUBLESHOOTING

PROBLEM: Unit never senses material.

CAUSE/SOLUTION:

- 1) Verify that the diaphragm bin monitor is mounted with the switch case uppermost. Reposition if necessary.
- 2) Verify material covers the entire diaphragm. Permit the material to completely cover the diaphragm before indication is given. In light material applications, the material may have to raise above the diaphragm level before detection.
- 3) Verify sensitivity adjustment. Increase sensitivity by rotating adjustment counter-clockwise.
- 4) Verify pressure plate position. Position pressure plate closer to the diaphragm by rotating pressure plate adjustment screw and nut clockwise. See "Maintenance".

- 5) Verify type of switch used. When sensing extremely light materials, an extra-sensitive switch may be required. Change switch if necessary.

PROBLEM: Unit always indicates material is sensed.

CAUSE/SOLUTION:

- 1) Verify that the diaphragm bin monitor is mounted with the switch case uppermost. Reorient switch case position if necessary
- 2) Verify condition of the diaphragm. Replace diaphragm if pitted, dented or torn. Clean internals where lever assembly is mounted.
- 3) Verify material is completely falling away from diaphragm face. Clean surface if necessary. If problem persists, consider use of Teflon® diaphragm.
- 4) Verify sensitivity adjustment. Decrease sensitivity by rotating adjustment clockwise.
- 5) Verify pressure plate position. Position pressure plate further from diaphragm by rotating pressure plate adjustment screw counter-clockwise. See "Maintenance".
- 6) Verify type of switch used. When sensing heavy materials an extra-sensitive switch should not be used. Change switch if necessary.

MAINTENANCE

Pressure Plate Adjustment (See Figure 5 on next page)

- 1) Remove the diaphragm back plate by removing the six screws equally spaced around the units circumference. (The actual diaphragm and mounting base plate will remain in place.)
- 2) Locate the pressure plate adjustment screw and nut connected to the lever arm assembly. Loosen the nut. Extend a 3/32" Allen wrench through the pressure plate and adjust the adjustment screw in or out until the pressure plate is parallel with the back plate.
- 3) Test operation by pressing pressure plate. The switch must actuate before the pressure plate contacts the overpressure stops. Readjust setscrew accordingly.
- 4) Re-tighten nut and reattach back plate to the mounting base plate ensuring the gasket is reinstalled in original position. Tighten screws equally in a cross pattern for even gasket compression.

Diaphragm Replacement (See Figure 5 on next page)

- 1) Remove the diaphragm back plate by removing the six screws equally spaced around the units circumference. (The actual diaphragm and mounting base plate will remain in place.)
- 2) On the portion remaining on the vessel wall, remove the internal retaining ring. Remove diaphragm.
- 3) Coat surface of retaining ring with a small amount of gasket cement. Center retaining ring over new diaphragm and press. The cement will hold diaphragm in place while the retaining ring is being refastened to the mounting base plate. (On GX-SS models, install o-ring between diaphragm and retaining ring. Gasket cement should not be used.)
- 4) Reattach retaining ring and diaphragm to mounting base plate. For proper operation minimize any wrinkling of the diaphragm.
- 5) Reattach back plate to the mounting base plate. Tighten screws equally in a cross pattern for even gasket compression. Test operation and make adjustment to pressure plate

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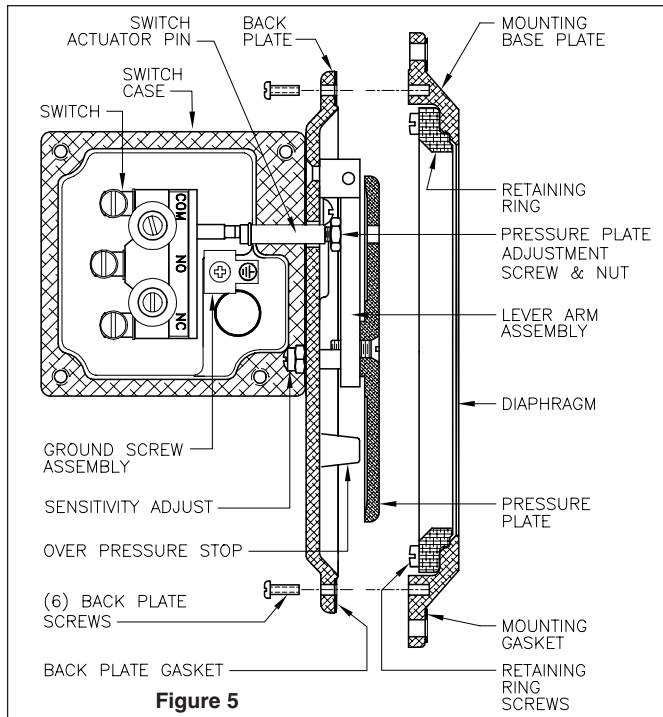


Figure 5

SAFETY

⚠ Electrical Shock Caution

All diaphragm bin monitors may be configured to “switch” HIGH VOLTAGE depending on the application. Extreme care shall be taken if the unit’s cover is removed and live electrical terminations are exposed. To avoid shock, do not contact exposed electrical connections. Each unit is provided with “protective ground” connections which shall be terminated to earth ground potential. These terminals shall be used to prevent shock hazard in the unlikely event of internal insulation breakdown. **External Grounding Lug** Ⓧ: This termination is a supplemental bonding connection used where local authorities permit or require such a connection.

⚠ Hazardous Location Caution

Models GX and GX-SS are “approved” for use in certain Hazardous Locations (see “Specifications”). These products shall only be used in applications covered by these ratings or those considered non-hazardous. Failure to comply could result in catastrophic damage to personnel and property. The following must be maintained to assure safe operation

- 1) **Enclosure integrity:** The dimensions of the enclosure, cover or switch actuator pin shall not be altered.
- 2) **Maintenance:** Removal of the cover to conduct maintenance while power is yet supplied does not meet hazardous location requirements. If done, it is at the sole risk of the customer.

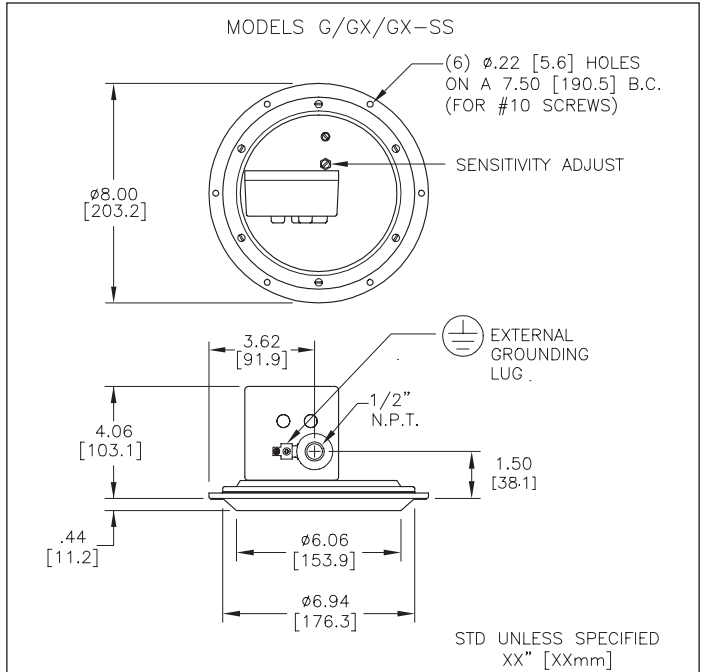
WARRANTY

Monitor Technologies LLC warrants each diaphragm bin monitor 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 reserves the right to change the design and/or specifications without prior notice.


MECHANICALS

DIMENSIONS ARE SHOWN IN INCHES WITH MILLIMETER EQUIVALENT IN BRACKETS



STD UNLESS SPECIFIED
XX" [XXmm]

SPECIFICATIONS

Power Requirements:	None
Output:	SPDT dry contact, 15A @ 250VAC max
Sensitivity:	
GX-SS:	20 lb/ft ³ (320 kg/m ³) min material density
Standard Switch:	15 lb/ft ³ (240 kg/m ³) min material density
Extra-Sensitive Switch:	10 lb/ft ³ (160 kg/m ³) min material density
Enclosure:	Die cast aluminum, powder coated
Enclosure Protection:	NEMA 4/ENCLOSURE TYPE 4, IP66 (Model G only); IP65 (Model GX and GX-SS)
Mounting Connection:	Flange with 7.5" (190.5mm) bolt circle
Pressure Rating:	Atmospheric pressure only
Wire Entry:	1/2" NPT
Diaphragm Material:	Neoprene, reinforced Teflon®, or 321SS (GX-SS only)
Operating Temperature:	
G/GX w/neoprene:	-40° to 180° F (-40° to 82° C)
G/GX w/Teflon®:	-40° to 250° F (-40° to 121° C)
GX-SS:	-40° to 250° F (-40° to 121° C)
Weight:	
G, GX, GX-SS:	3.25 lb (1.47 kg)
Approvals:	
G:	CSA US/C ordinary locations, CE
GX, GX-SS:	UL and CSA Class II, Groups F,G
All:	 CHINA RoHS 2

Teflon® is a registered trademark of DuPont Chemical Co.
HYCAR® is a registered trademark of Lubrizol Advanced Materials, Inc.

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