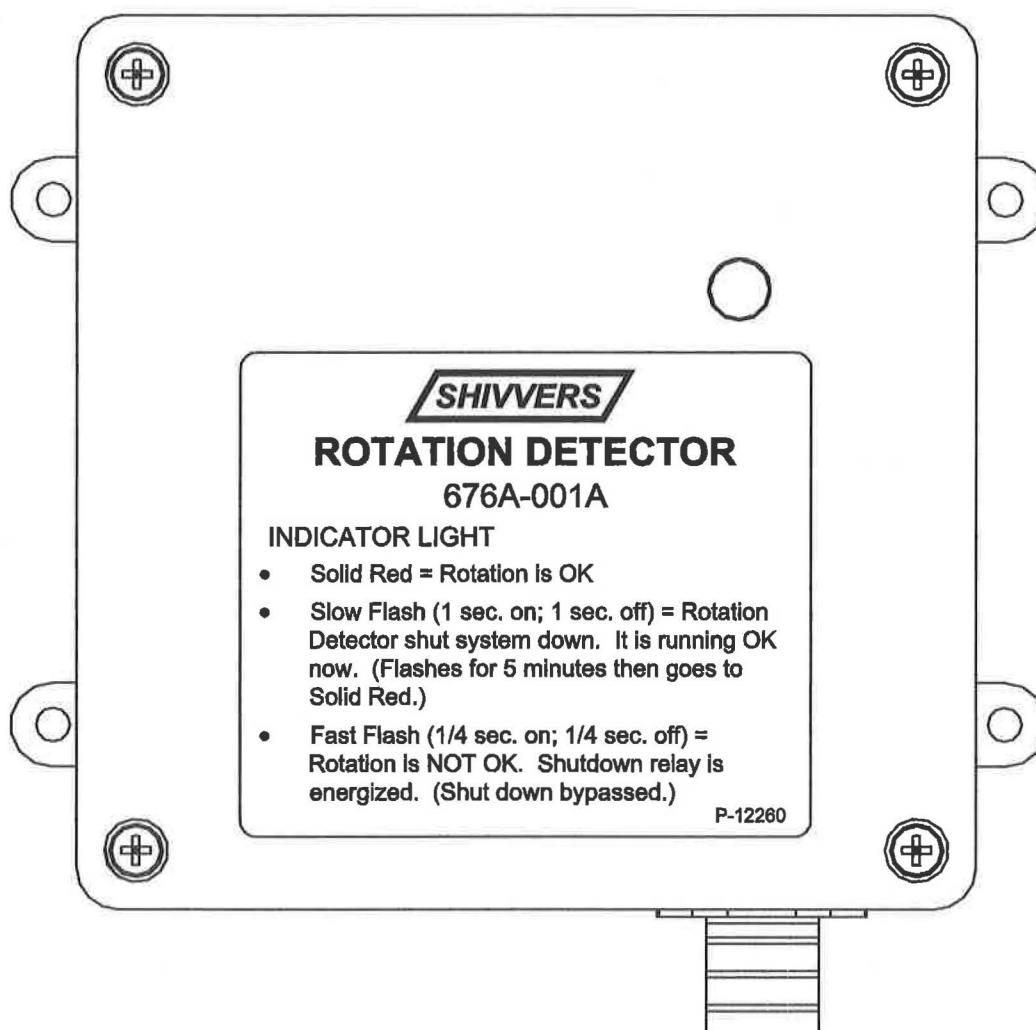


ROTATION DETECTOR

676A-001A

INSTALLATION & OPERATING INSTRUCTIONS



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P-12264

9/12/14

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INTRODUCTION

The 676A-001A Rotation Detector will monitor any rotating shaft or pulley and will activate a relay if the rotation speed is outside the pre-programmed limits. It is normally installed and wired to start monitoring when a motor is started. If the sensor does not pick up a signal from a magnet mounted on the equipment, a relay will be activated which will shut the motor down. A 1 or 2 second selectable time delay is used to prevent nuisance shutdowns. The motor must be wired so that it will not restart when the Rotation Detector relay re-closes. It is very easy to install the Rotation Detector with a Compudry Command Center.

A unique feature of the Shivers Rotation Detector is that it will flash the indicator light for 5 minutes if the Rotation Detector shut the equipment off. This saves valuable time when troubleshooting why the system was shut down.

Mounting bracket kits are available for common Shivers auger configurations. Many times one of these kits can be modified for use in other applications. If enough requests are received, other mounting configurations may be made available in the future. Contact your dealer or the Shivers factory for more information.

- 676B-001A** Mounting Kit for Shivers Horizontal Unload with enclosed belt shield, 6 or 8 inch.
- 676C-001A** Mounting Kit for Shivers Horizontal Unload with open back belt shield, 6 or 8 inch.
- 676D-001A** Mounting Kit for Shivers Continuous Flow or Auxiliary Auger, 6 inch.
- 676E-001A** Latching Relay Kit for Systems using a control box without start/stop switches, such as a Shivers Deluxe Circutrol.
- 676F-001A** Mounting Kit for Shivers Continuous Flow or Auxiliary Auger, 4 inch.
- 676G-001A** Mounting Kit for Dri-Flo Horizontal Unload and 8" Transfer Auger Power Head.

SAFETY

The installer of this equipment must assume the responsibility for his own safety, and that of those working around him. He must also make sure that the equipment is installed as shown in this manual.

If any items covered in this manual are not completely understood, or there is a concern with the safety of this product, contact Shivvers at the address shown on the front page.



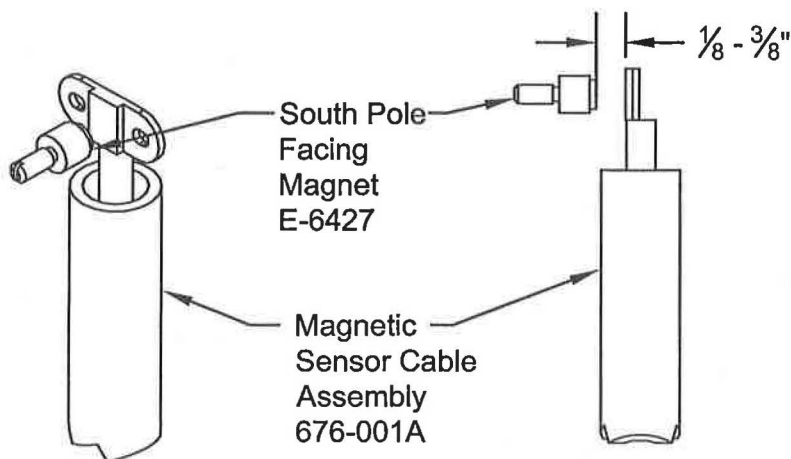
**TAKE NOTE ANYTIME THIS SYMBOL APPEARS.
YOUR SAFETY, AND THAT OF PERSONS AROUND
YOU, IS AT STAKE.**

ALL ELECTRICAL WIRING SHALL BE INSTALLED IN COMPLIANCE WITH THE LATEST EDITION OF THE ANSI/NFPA STANDARD 70, NATIONAL ELECTRICAL CODE, AS A MINIMUM REQUIREMENT, AND IN COMPLIANCE WITH LOCAL WIRING CODES AS APPLICABLE.

WIRING MUST BE DONE BY A COMPETENT ELECTRICIAN. A LICENSED ELECTRICIAN IS RECOMMENDED, AND MUST BE USED WHEN REQUIRED BY LOCAL OR STATE STATUTES.

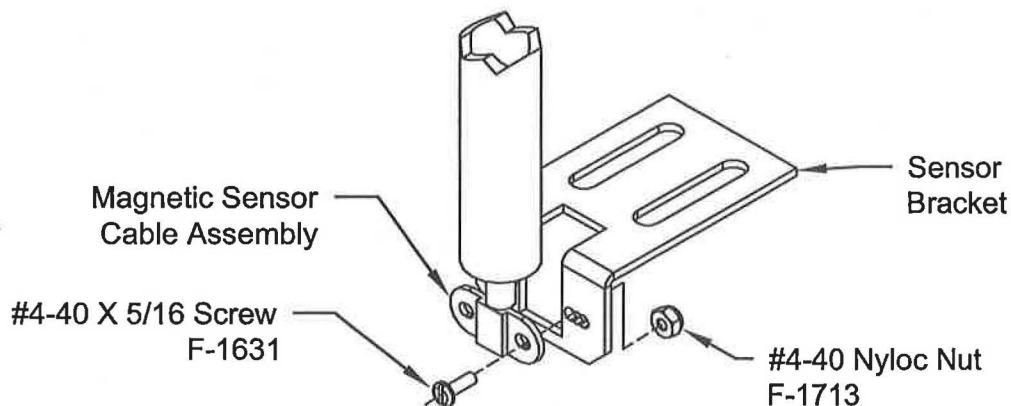
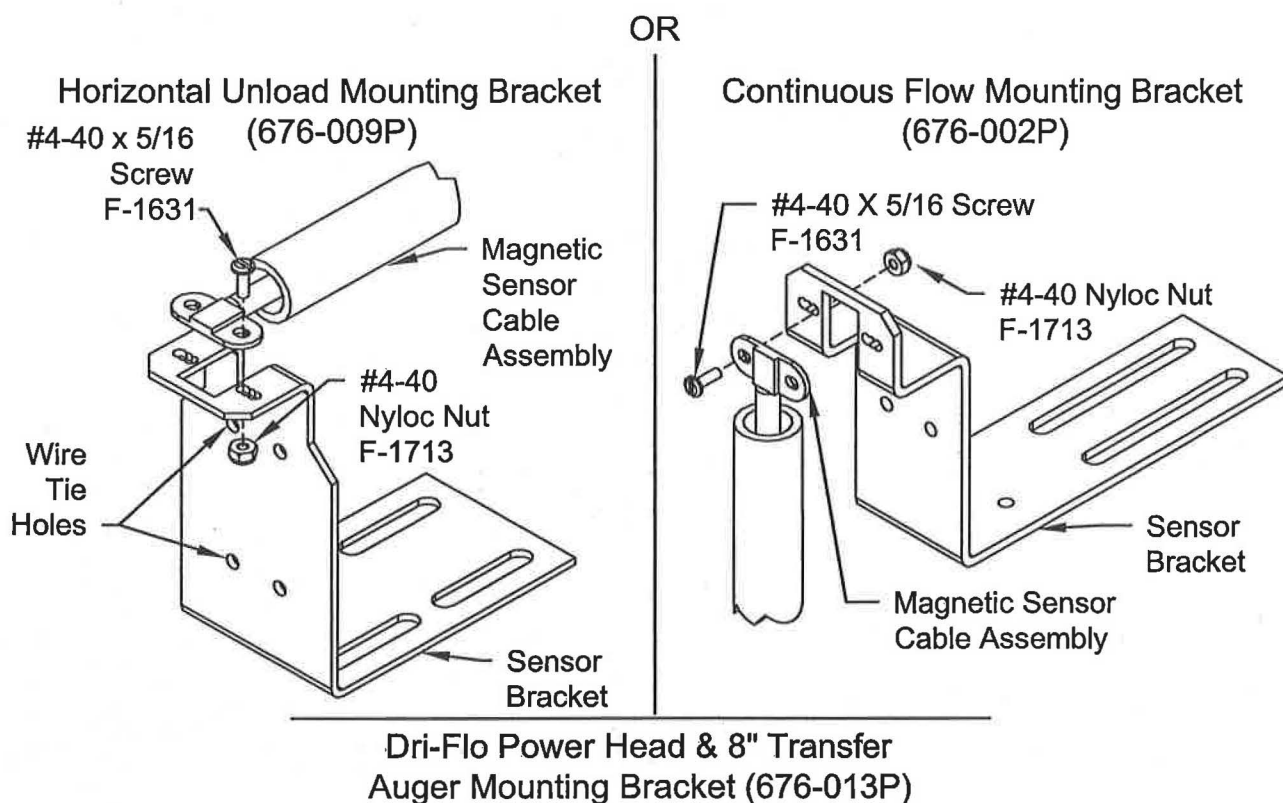
SENSOR AND MAGNET ORIENTATION

The magnetic sensor must be mounted so the supplied south pole facing magnet passes across the face of the sensor as shown below.



PREPARING FOR INSTALLATION

- Step 1. Remove 676-001A magnetic sensor cable assembly from 676A-001A box and the sensor bracket from the mounting kit provided for your application.
- Step 2. Using (2) #4-40 X 5/16 screws (F-1631) and (2) #4-40 nyloc nuts (F-1713) from hardware sack 676-010A found in the 676A-001A box, attach the magnetic sensor cable assembly to the sensor bracket, as shown below.



- Step 3. (2) Black wire ties (E-6428), from the hardware sack labeled 676-010A, can be used to hold the magnetic sensor cable snug against the bracket, for the top two configurations.

INSTALLING WITH 676B-001A SHIVERS HORIZONTAL UNLOAD WITH ENCLOSED BELT SHIELD

(Go to the next section for other mountings.)



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

Step 1. Remove belt shield cover. Mark a hole $\frac{1}{2}$ " from the top of the belt shield side and 1" from the edge. See Figure 1 for hole placement.

Step 2. Locate the rotation detector box assembly, and (4) #8-32 machine screws and (4) #8-32 nyloc nuts from the rotation detector kit. Use hardware to mount the rotation detector box to the box mounting bracket. See Figure 2.

Step 3. Using (2) #12 X 1" self drilling screws (F-1121) from the mounting kit box, mount the box mounting bracket. (Note: Box mounting bracket should be flush with the top of the belt shield side.) Make sure belt shield cover will open completely without hitting bracket.

Step 4. Locate the sensor bracket with magnetic sensor cable attached and (2) #12 X 1" self drilling screws from mounting kit. Attach the sensor bracket $\frac{1}{2}$ " from the bend in the belt shield and as close to the pulley as possible. See Figure 3 for correct placement. The magnetic sensor needs to be about $\frac{7}{16}$ " away from the pulley spokes.

FIGURE 1

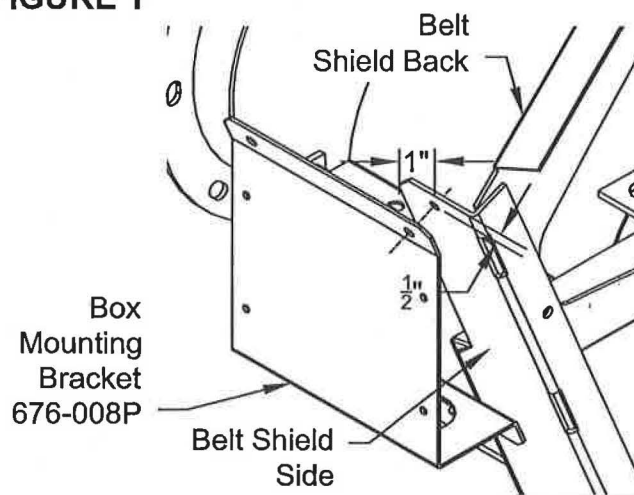


FIGURE 2

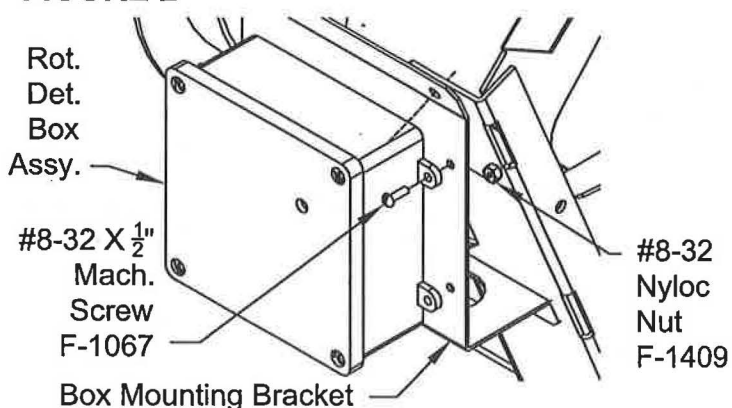
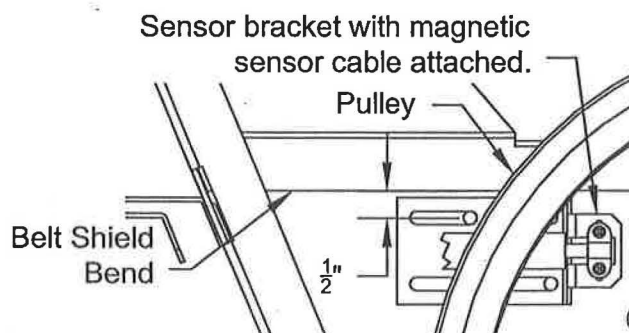


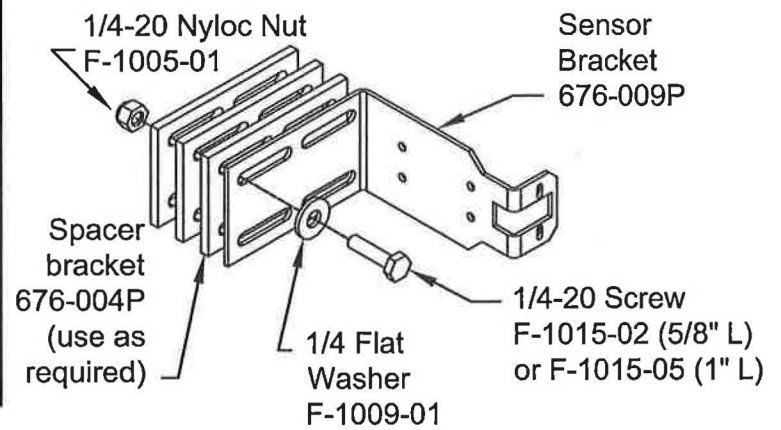
FIGURE 3



There are (3) spacer brackets included in the mounting kit to space the sensor bracket, as necessary.

Skip to page 13 for mounting the magnet.

FIGURE 4



INSTALLING WITH 676C-001A SHIVERS HORIZONTAL UNLOAD WITH OPEN BACK BELT SHIELD

(Go to the next section for other mountings.)



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

NOTE: The belt shield may need to be removed to install this bracket. It is not shown for illustration purposes.

Step 1. Locate the open belt shield bracket, and (2) 1/2" nyloc nuts in the mounting kit.

Step 2. Attach the open belt shield bracket to (2) bolts from the transition head. See Figure 1.

Step 3. Locate the rotation detector box assembly, and (4) #8-32 machine screws and (4) #8-32 nyloc nuts from the rotation detector kit. Use hardware to mount the rotation detector box to the open belt shield bracket. See Figure 2.

Step 4. Locate the sensor bracket with magnetic sensor cable attached and (2) 1/4-20 screws (F-1015-02 or F-1015-05), (2) 1/4" flat washers (F-1009-01), and (2) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit. Two different length screws are provided. The length used will depend on the amount of spacer brackets used. Attach the sensor bracket. See Figure 3 for correct placement. The magnetic sensor needs to be about 7/16" away from the pulley spokes.

FIGURE 1

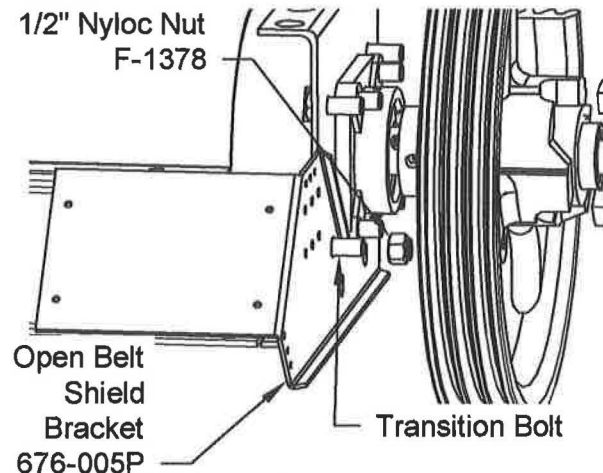


FIGURE 2

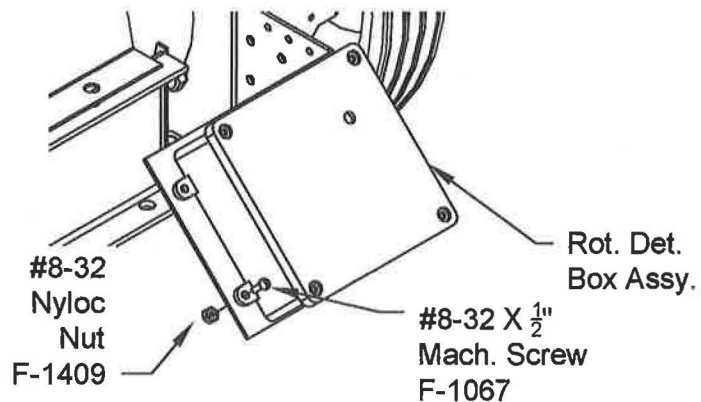
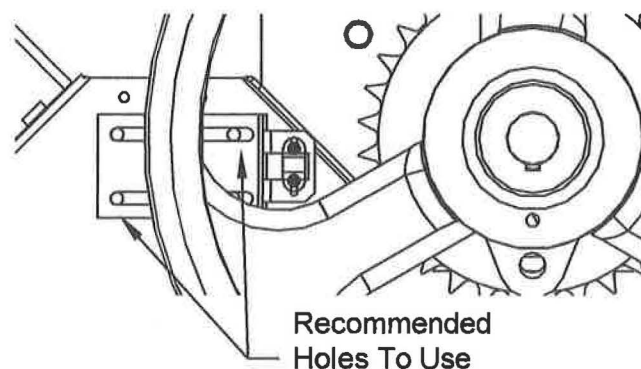


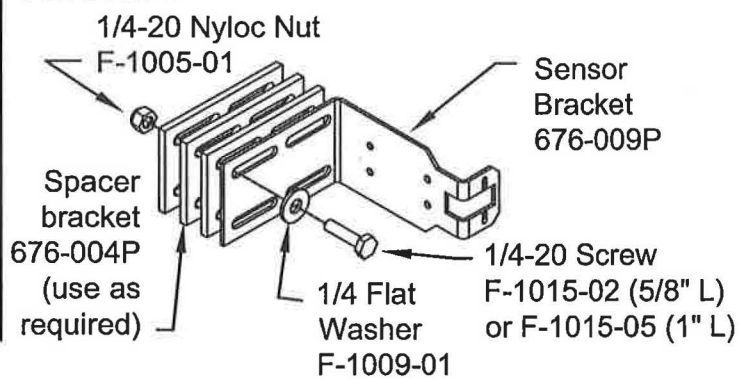
FIGURE 3



There are (3) spacer brackets included in the mounting kit to space the sensor bracket, as necessary.

Skip to page 13 for mounting the magnet.

FIGURE 4



INSTALLING WITH 676D-001A SHIVERS CONTINUOUS FLOW OR AUXILIARY AUGER, 6 INCH

(Go to next section for other mountings.)



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

NOTE: Belt shield may need to be removed to install this bracket. It is not shown for illustration purposes only.

Step 1. Locate the control box mount, (4) 3/8-16 x 7/8" bolts (F-1558), and (4) 3/8-16 nyloc nuts (F-1239) from the mounting kit.

Step 2. Remove (2) nuts and (2) bolts from the front motor mount plate, as shown in Figure 1, and replace with (2) 3/8-16 nyloc nuts and (2) 3/8-16 X 7/8 bolts. For added support, it may be necessary to drill the other two holes out through the control mount box. Hardware is supplied for this option.

Step 3. Locate the rotation detector box assembly, and (4) #8-32 machine screws (F-1067) and (4) #8-32 nyloc nuts (F-1409) from the rotation detector kit. Use hardware to mount the rotation detector box to the box mounting bracket. See Figure 2.

Step 4. Locate the sensor bracket with magnetic sensor cable attached and (2) 1/4-20 screws (F-1015-02), (2) 1/4" flat washers (F-1009-01), and (2) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit.

FIGURE 1

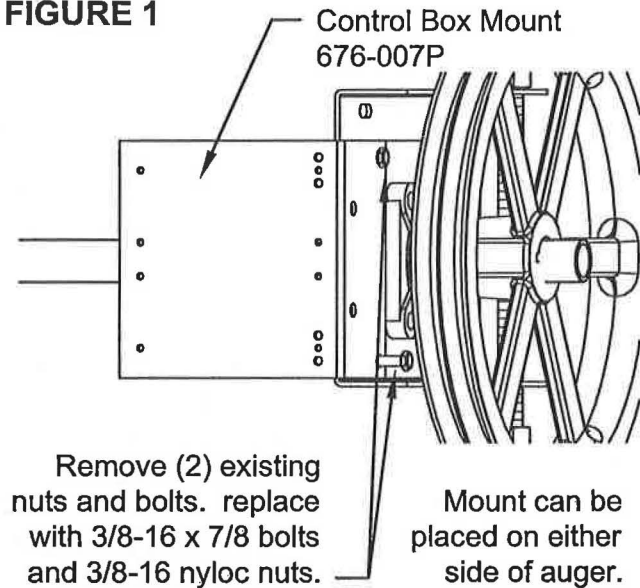
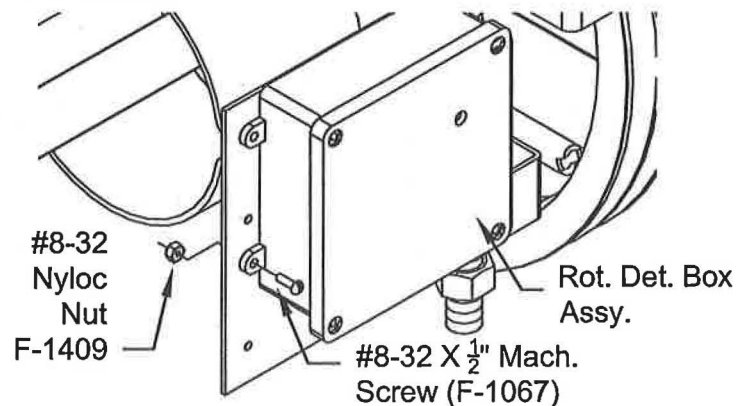


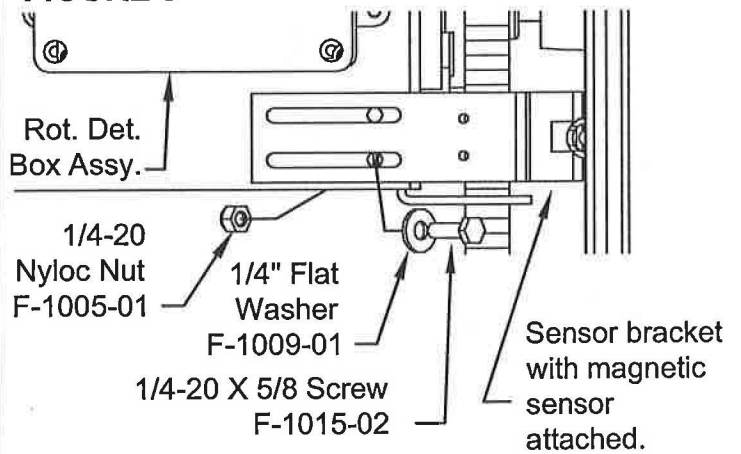
FIGURE 2



Attach the sensor bracket. See Figure 3 for correct placement. The magnetic sensor needs to be about 7/16" away from the pulley spokes.

Skip to page 13 for mounting the magnet.

FIGURE 3



INSTALLING WITH 676F-001A SHIVERS CONTINUOUS FLOW OR AUXILIARY AUGER, 4 INCH



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

NOTE: Belt shield may need to be removed to install this bracket. It is not shown for illustration purposes only.

Step 1. Locate the control box mount, (2) 3/8-16 x 7/8" bolts (F-1558), and (2) 3/8-16 nyloc nuts (F-1239) from the mounting kit.

Step 2. Drill the two holes out through the control mount box for mounting, as shown in Figure 1, and install with (2) 3/8-16 nyloc nuts and (2) 3/8-16 X 7/8 bolts.

Step 3. Locate the rotation detector box assembly, and (4) #8-32 machine screws (F-1067) and (4) #8-32 nyloc nuts (F-1409) from the rotation detector kit. Use hardware to mount the rotation detector box to the box mounting bracket. See Figure 2.

Step 4. Locate the sensor bracket with magnetic sensor cable attached and (2) 1/4-20 screws (F-1015-02), (2) 1/4" flat washers (F-1009-01), and (2) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit. Attach the sensor bracket. See Figure 3 for correct placement. The magnetic sensor needs to be about 7/16" away from the pulley spokes.

Skip to page 13 for mounting the magnet.

FIGURE 1

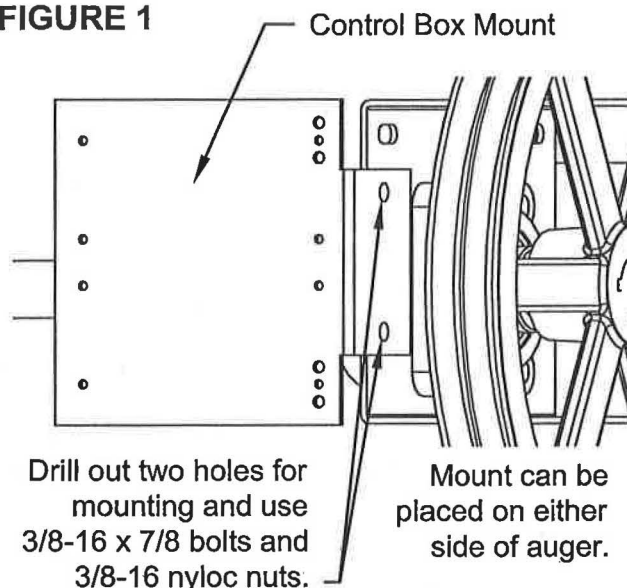


FIGURE 2

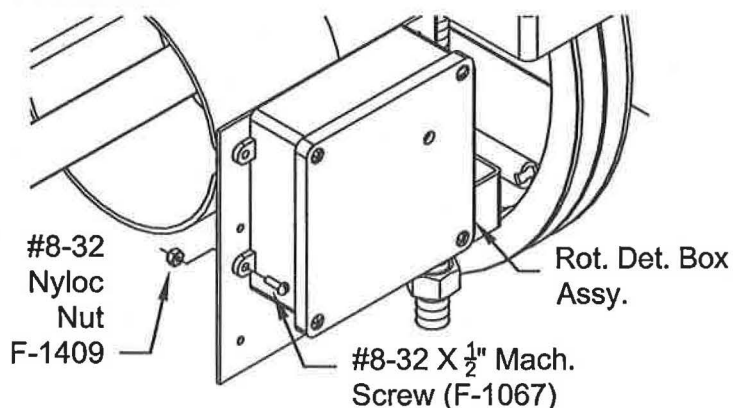
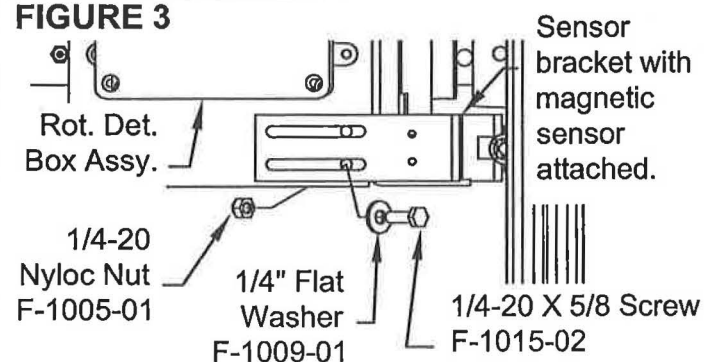


FIGURE 3



INSTALLING WITH 676G-001A

SHIVVERS DRI-FLO HORIZONTAL UNLOAD OR TRANSFER AUGER, 8 INCH

! DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

NOTE: Belt shield cover may need to be removed to install this bracket. It is not shown for illustration purposes only.

**FOR USE WITH 8" DRI-FLO
HORIZONTAL UNLOAD** (See next
page for 8" Transfer Auger or Jumpster
with a Shivvers Power Head.)

Step 1. Locate the rotation detector box assembly, and (4) #8-32 machine screws (F-1067) from the rotation detector kit. (NOTE: #8-32 nyloc nuts (F-1409) will not be used). Use hardware to mount the rotation detector box to the horizontal unload transition. See Figure 1.

Step 2. Locate the sensor bracket with magnetic sensor cable attached and (2) 1/4-20 screws (F-1015-02), (4) 1/4" flat washers (F-1009-01), and (2) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit. Attach the sensor bracket to the belt shield back. See Figure 2 for correct placement. The magnetic sensor needs to be about 7/16" away from the pulley spokes.

Step 3. The safety side shield has a knock-out slot to allow the sensor cable to pass through to the outside of the belt shield back. Use as needed. See Figure 3.

Skip to page 13 for mounting the magnet.

FIGURE 1

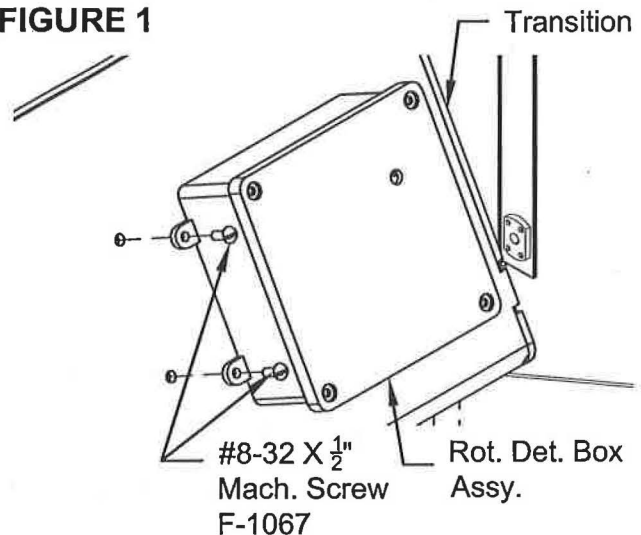


FIGURE 2

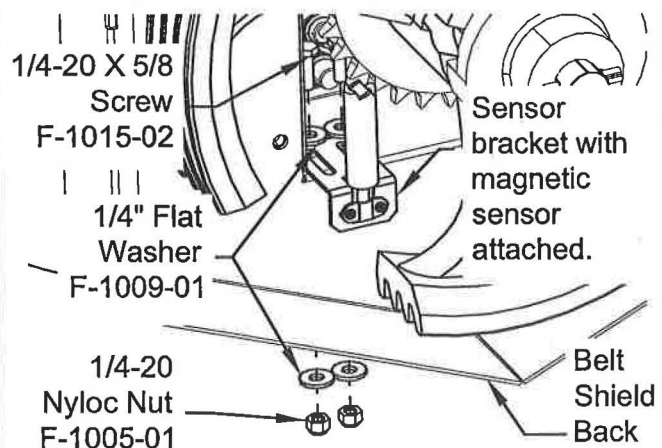
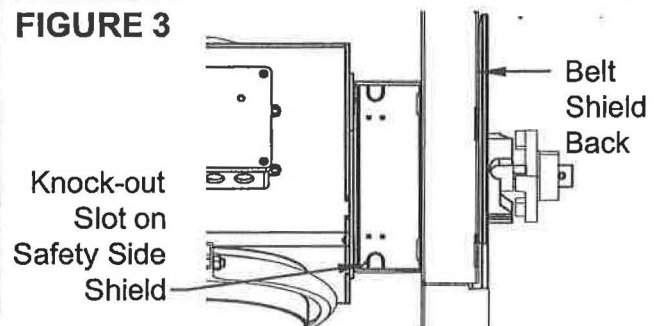


FIGURE 3



INSTALLING WITH 676G-001A SHIVERS DRI-FLO HORIZONTAL UNLOAD OR TRANSFER AUGER, 8 INCH



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

NOTE: Belt shield cover may need to be removed to install this bracket. It is not shown for illustration purposes only.

FOR USE WITH 8" TRANSFER AUGER OR JUMPSTER.

Step 1. Locate the rotation detector box assembly, and (4) #8-32 machine screws (F-1067) from the rotation detector kit. (NOTE: #8-32 nyloc nuts (F-1409) will not be used). Use hardware to mount the rotation detector box to the Power Head. See Figure 1.

Step 2. Locate the sensor bracket with magnetic sensor cable attached and (2) 1/4-20 screws (F-1015-02), (4) 1/4" flat washers (F-1009-01), and (2) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit. Attach the sensor bracket to the belt shield back. See Figure 2 for correct placement. (NOTE: Pulley not shown for clarity of mounting.) The magnetic sensor needs to be about 7/16" away from the pulley spokes.

FIGURE 1

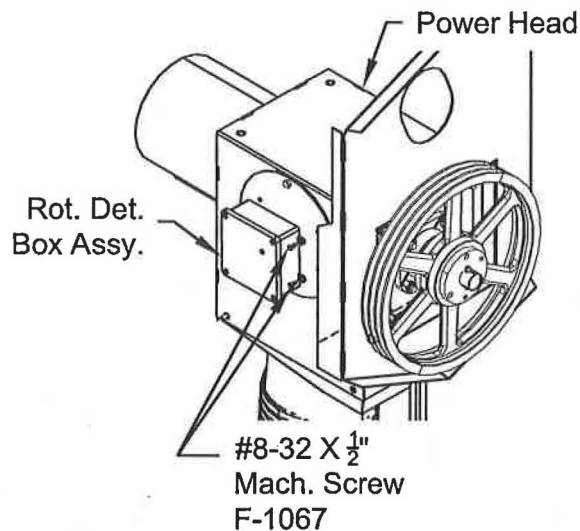
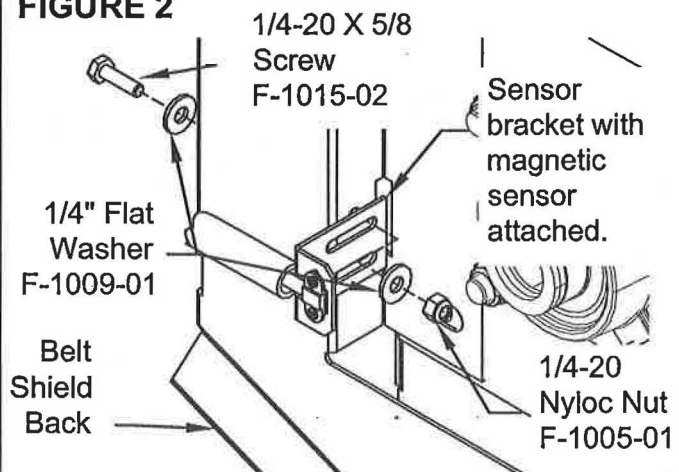


FIGURE 2



INSTALLING WITH 676I-001A

SHIVERS DRI-FLO HORIZONTAL UNLOAD, OR TRANSFER AUGER, WITH QUICK RELEASE POWERHEAD



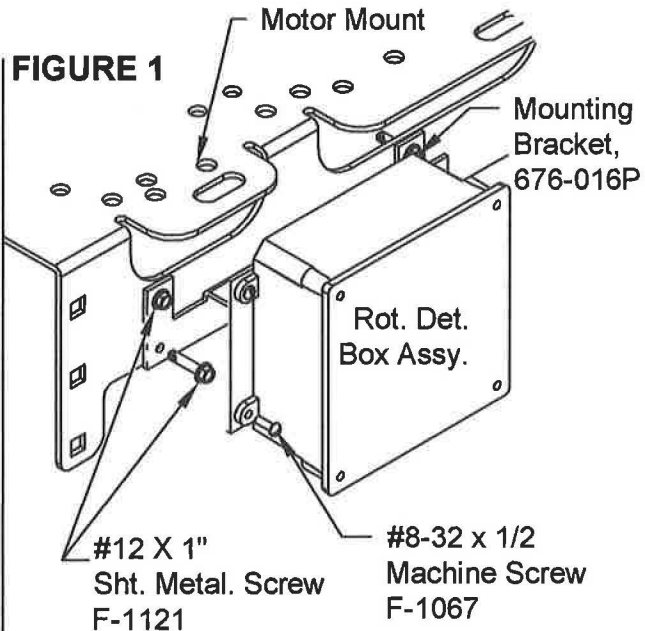
DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

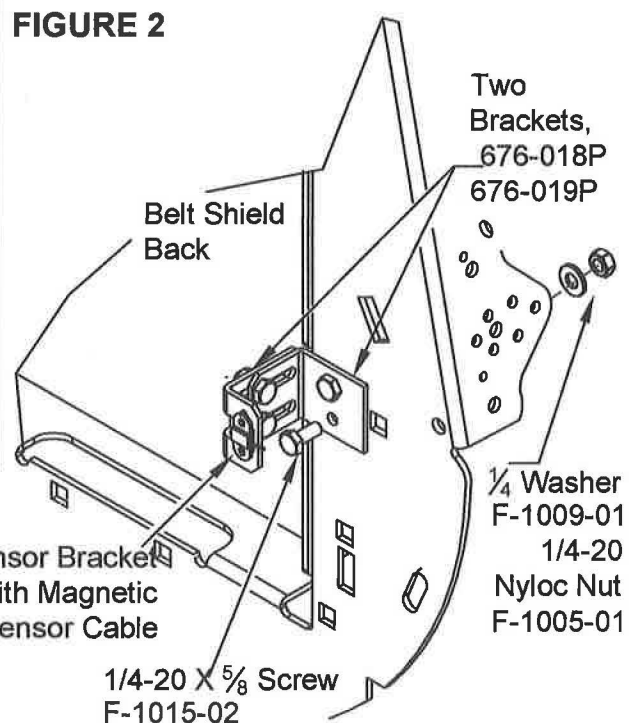
NOTE: Belt shield cover should not need to be removed to install this bracket. It is not shown for illustration purposes only.

FOR USE WITH 8" TRANSFER AUGER OR JUMPSTER.

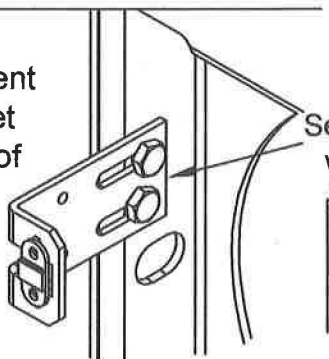
Step 1. Locate the rotation detector box assembly, and (4) #8-32 machine screws (F-1067) from the rotation detector kit. (NOTE: #8-32 nyloc nuts (F-1409) will not be used). Use hardware to mount the rotation detector box to the bracket. Fasten bracket to motor mount using (3 or 4) #12 x 1" Sheet metal Screws (F-1121) See Figure 1.



Step 2. Locate the sensor bracket with magnetic sensor cable attached and (4) 1/4-20 screws (F-1015-02), (4) 1/4" flat washers (F-1009-01), and (4) 1/4-20 nyloc nuts (F-1005-01) from the mounting kit. Attach the sensor bracket to the belt shield back. See Figure 2 for correct placement. (NOTE: Pulley not shown for clarity of mounting.) The magnetic sensor needs to be about 7/16" away from the pulley spokes.



Alternate placement
for Sensor Bracket
fastened on side of
bearing plate or
frame channel.
Use 676-017P.



MOUNTING THE MAGNET



DANGER

**MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.**

Step 1. Locate 676-011A, magnet hardware sack in the rotation detector kit.

Step 2. To determine the location to mount the magnet, slowly rotate the pulley until one of the spokes passes over the magnetic sensor. Mark one edge of the pulley spoke where the center of the magnetic sensor hits. Rotate to the other edge of the same pulley spoke and mark where the center of the magnetic sensor hits. Draw an arc from one mark to the other and drill a hole at the midpoint of the arc. See Figure 1. Drill the hole using a #29 (.1360) or 9/64 (.140) drill bit. Tap the hole using 8-32 tap. Lubricate hole before tapping, especially on aluminum pulleys.

Step 3. Screw the magnet along with a #8 lock washer into the tapped hole. (4) #8 flat washers are provided as spacers to achieve a gap no less than 1/8" and no more than 3/8" between the magnet and the magnetic sensor.

FIGURE 1

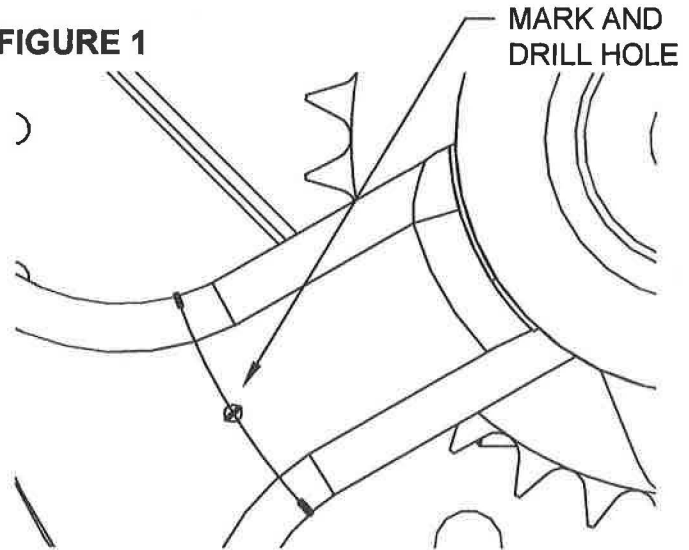


FIGURE 2 (Backside View)

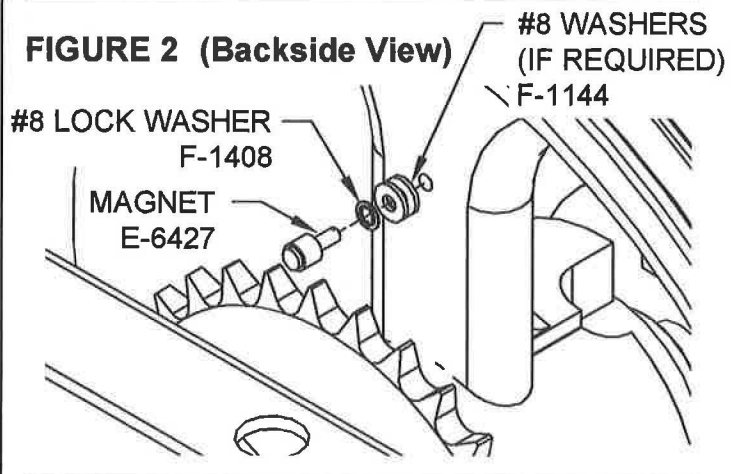
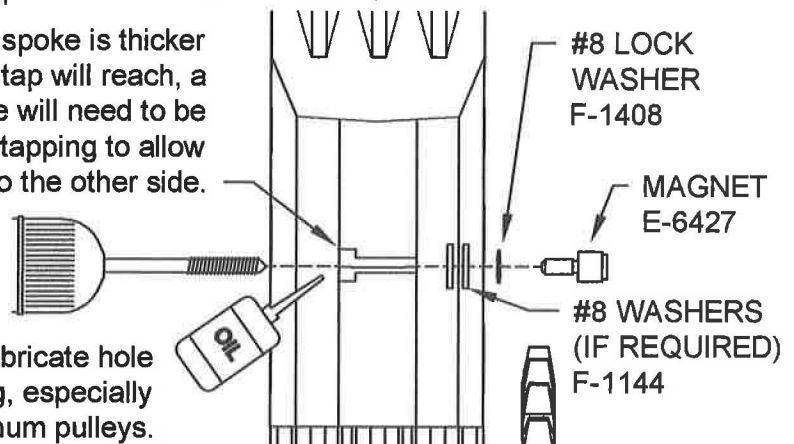


FIGURE 3 (Side View)

If the pulley spoke is thicker than the tap will reach, a counterbore will need to be drilled before tapping to allow full reach to the other side.

NOTE: Lubricate hole before tapping, especially with aluminum pulleys.



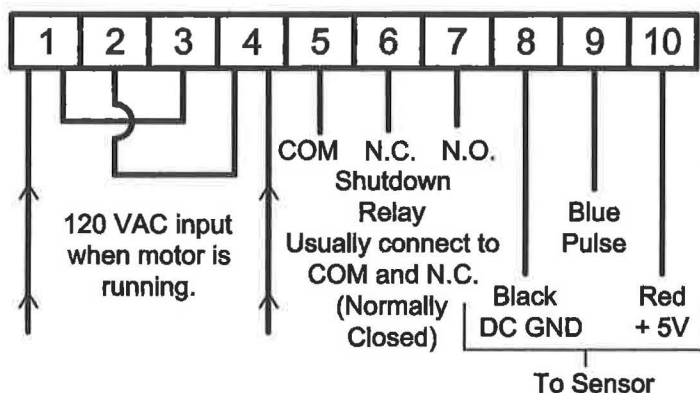
WIRING ROTATION DETECTOR



DANGER

MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.

Rotation Detector Terminal Strip for 120 VAC Input

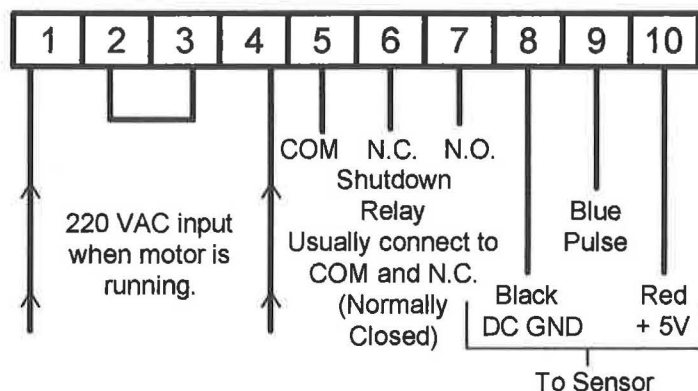


Step 1. Route conduit from the magnetic sensor bracket to the Rotation Detector control box, using wire ties to keep conduit away from moving parts.

Step 2. Wire the black, blue, and red wires from the sensor bracket to terminals 8, 9, and 10, respectively. (See wiring diagram above.)

Step 3. Wire as shown in the drawing above for 120 VAC input when the motor is running. When wiring for 220 VAC input, wire as shown below.

Rotation Detector Terminal Strip for 220 VAC Input



Usually a connection is made between the COM (terminal #5) and N.C. (normally closed) (terminal #6) terminals to shut the motor down if rotation is not within range. The optional 676E-001A Latching Relay Kit may be required for some control panels.

See next section for wiring to CompuDry Command Center.

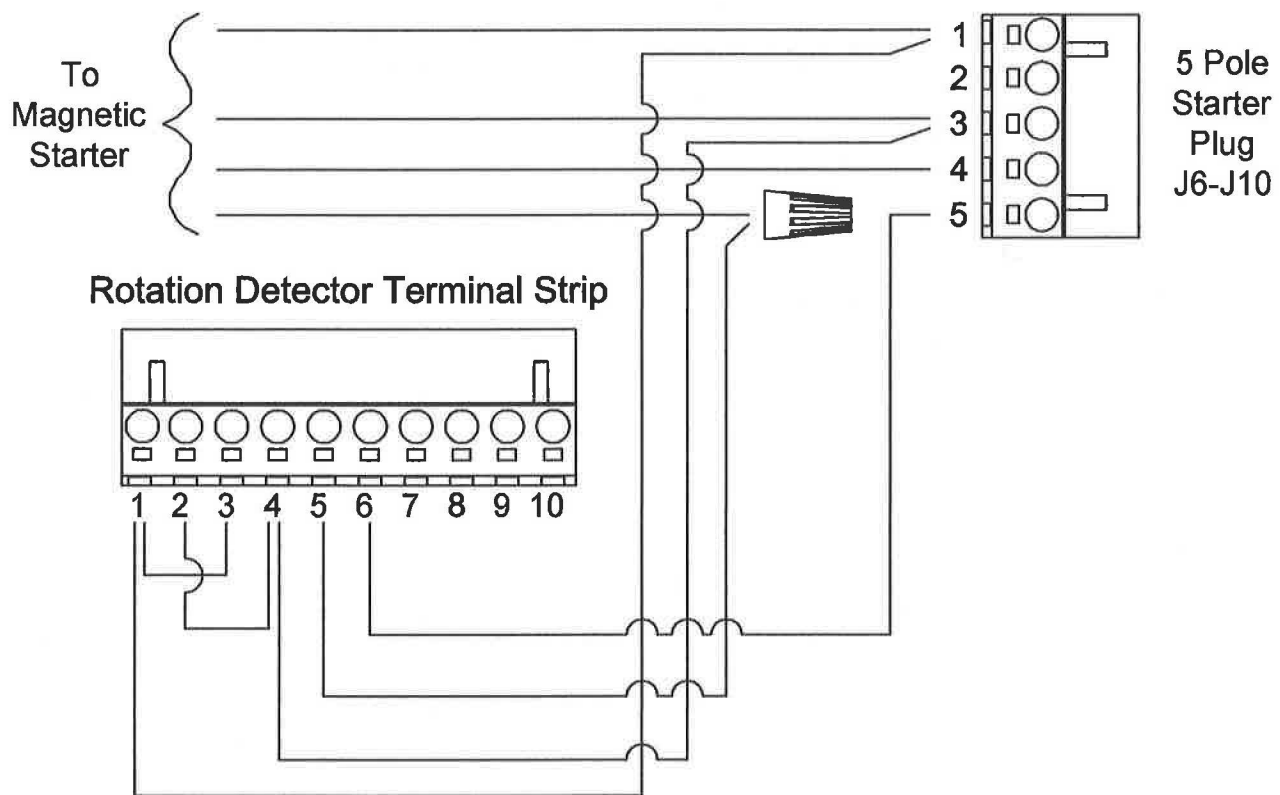
WIRING ROTATION DETECTOR TO COMPUDRY COMMAND CENTER



DANGER

MAKE SURE ALL POWER IS
DISCONNECTED AND LOCKED OFF.

Pull 4 wires through the conduit from the Command Center to the Rotation Detector Box. For whichever 5 pole magnetic starter plug that controls the motor the Rotation Detector box is connected to:



Step 1. Wire from terminal #1 of the 5 pole plug to terminal #1 of the Rotation Detector terminal strip.

Step 2. Wire a white wire from terminal #3 of the 5 pole plug to terminal #4 of the Rotation Detector terminal strip.

Step 3. Take the wire out of terminal #5 of the 5 pole plug. Wire nut this wire to a wire going to terminal #5 of the Rotation Detector terminal strip.

Step 4. Wire from terminal #5 of the 5 pole plug to terminal #6 of the Rotation Detector terminal strip.

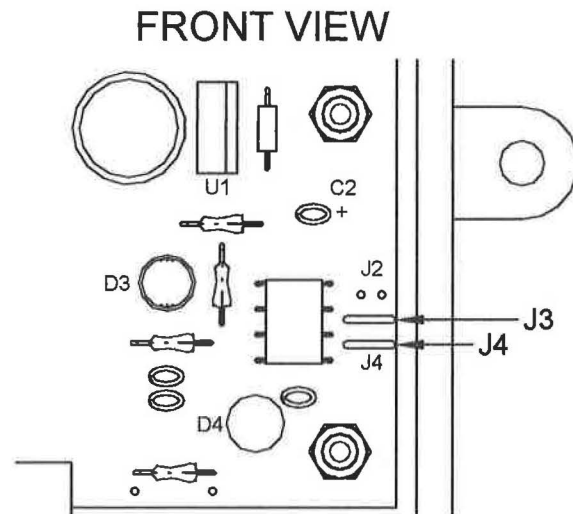
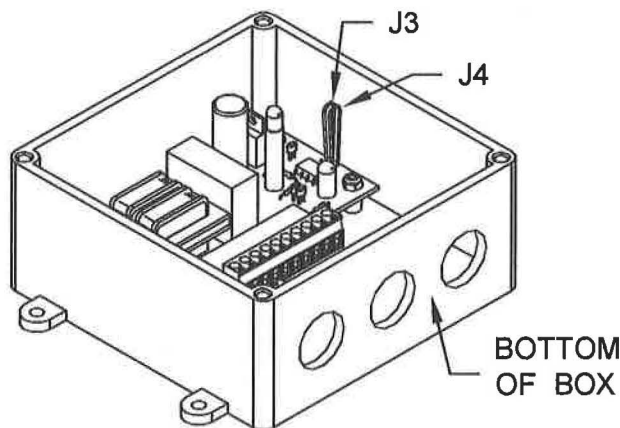
SPEED AND SHUTDOWN DELAY CONFIGURATION

SPEED CONFIGURATION

As shipped the Rotation Detector will monitor speeds between approximately 90 RPM to 720 RPM. Higher RPMs are not recommended because the pulse width gets too narrow for reliable detection. For lower RPMs, either multiple magnets may be attached to the shaft or pulley being monitored, or the J4 jumper may be cut, allowing the rotation detector to monitor speeds between approximately 40 RPM to 180 RPM.

SHUTDOWN CONFIGURATION

As shipped, the Rotation Detector will determine the number of pulses received in one second and if outside the allowable range, it will sample for another second before shutting down. If the J3 jumper is cut, the Rotation Detector won't try the second time, so it will shut down within one (1) second if the number of pulses received is outside the allowable range. Make sure the device being monitored will normally come up to speed within one (1) second before cutting J3.



J3	J4	MIN RPM	MAX RPM	SHUTDOWN TIME
INTACT	INTACT	90	750	2 SEC
INTACT	CUT	40	200	2 SEC
CUT	INTACT	120	720	1 SEC
CUT	CUT	65	180	1 SEC

Allow at least 20% variation in above RPMs due to manufacturing tolerances and temperature extremes.

TEST PROCEDURE

Testing the Rotation Detector will depend on how it is wired. It may be as easy as shutting off the circuit breaker to the motor being monitored, then trying to turn the motor on. The Rotation Detector will not detect any pulses and will shut the control circuit off.

Other ways to test the Rotation Detector include: removing the belts; unwiring the blue pulse wire from terminal #9 of the Rotation Detector; or moving the sensor/magnet so the Rotation Detector doesn't receive pulses.

