

# Shaft-Trak™

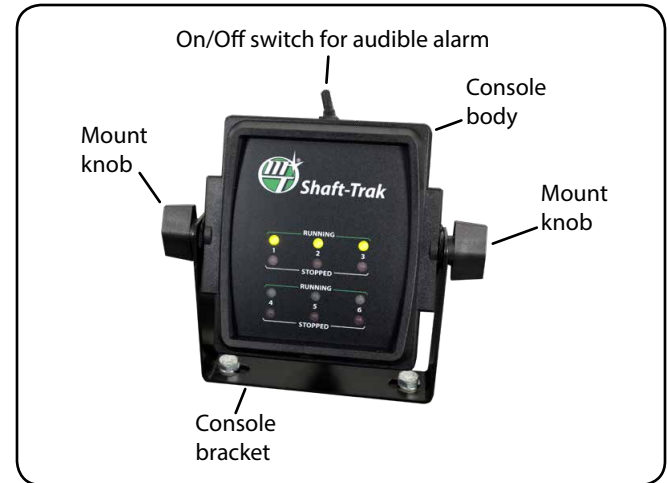
## Low RPM Version

### Shaft & Bin Monitor System



## OVERVIEW

The Shaft-Trak™ is a Go/NoGo monitor and senses that rotation less than 5 RPM is a stopped or "NoGo" condition and rotation greater than 5 RPM is an active or "GO" condition. Each shaft or bin is monitored independently of the others. A GREEN LED light indicates that the respective shaft rotation or bin level is acceptable. When monitored shaft RPM falls below the minimum of 5 RPM or the level of product in a bin drops below the bin sensor level, the RED LED will flash and an audible alarm will sound (audible alarm is switchable). After 45 seconds, the RED LED and alarm will turn off. The system is designed to be used with either the standard Micro-Trak sensor (black housing) or the Micro-Trak gear tooth sensor (red housing). Bin level sensors are infrared optical type.



## INSTALLING CONSOLE

### Console/Bracket - See Illustration 1

Select a mounting location that is convenient to reach and highly visible to the operator. **DO NOT INSTALL IN A POSITION THAT OBSTRUCTS THE VIEW OF THE ROAD OR WORK AREA.** Avoid locations that expose the console to direct sunlight, high temperature, strong chemicals or rain. Place the mounting bracket in selected location, mark holes, drill 1/4" (7mm) holes and mount bracket with bolts, lockwashers and nuts provided. (Use self-tapping screws if not practical to use bolts.) See Illustration 2.

Place rubber washers on carriage bolts and push the bolts through the bracket holes from the inside out. Loosely attach the mount knobs onto the bolts. Place console over carriage bolt heads and tighten knobs to secure the console. See Illustration 3. The console bracket can be mounted on either a horizontal or vertical surface. See Illustration 4.

Illustration 1

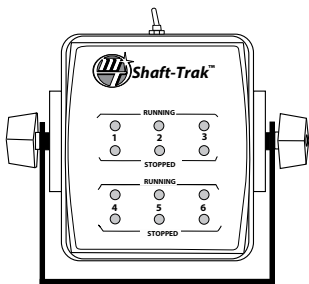


Illustration 2

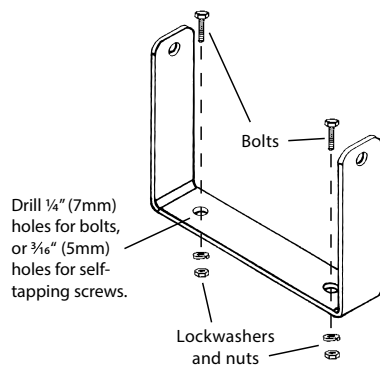


Illustration 3

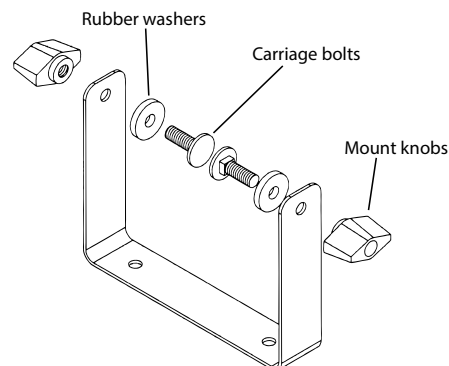
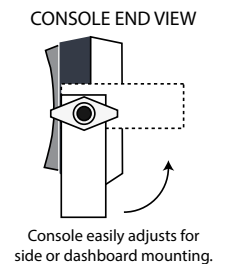


Illustration 4



### INSTALLING SHAFT SENSORS

Locate the following parts

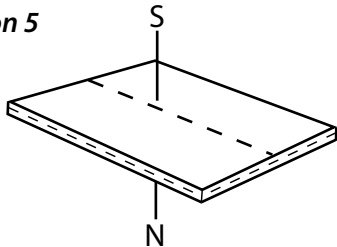
• Shaft sensor cable (black housing) • Magnets • Cable ties  
(Your unit may have factory-installed magnets and/or sensors, the following illustrations may not apply)

Mount magnet with SOUTH pole (dashed line) facing tip of sensor. Some installations may require more than one magnet per shaft. The magnets provided by Micro-Trak are marked with a dashed line on the SOUTH pole side of the magnet.

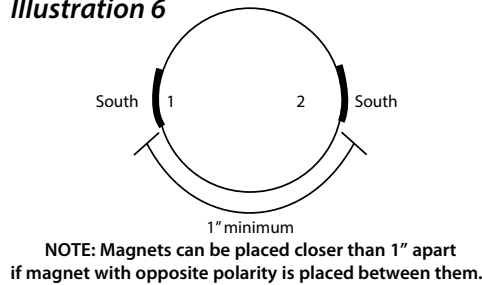
**See Illustration 5.**

INSTALLATION: For proper operation, the magnets must be evenly spaced around the shaft. The magnets must be at least 1" apart. **See Illustration 6.**

*Illustration 5*



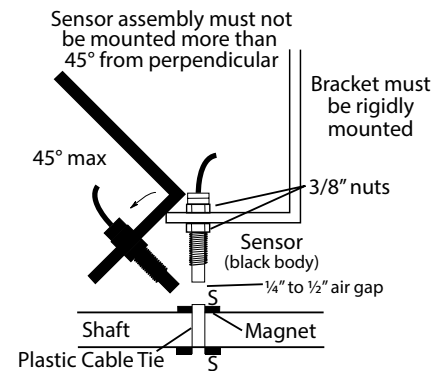
*Illustration 6*



**NOTE:** magnets may be attached with a cable tie or adhered with epoxy or other high quality adhesive. When using adhesive, thoroughly clean the area of dirt and oil. Use of cable ties or other mechanical attachment is highly recommended.

Mount the shaft sensor directly over the path of the rotating magnets. For the shaft sensor to operate properly, the spacing between the magnets and the tip of the sensor must always remain constant. Before permanently mounting any parts, verify that the mounting location will meet the specs. **See Illustration 7.** Note that magnets can be closer than 1" apart only if another magnet with opposite polarity is mounted between each of the south-faced magnets. **NOTE: Observe magnet polarities.**



*Illustration 7*



### USING BIN LEVEL SENSORS

Either row of sensor indicators - 1-3 and/or 4-6 can be operated in either shaft sensing mode or bin level sensing mode. To enable Bin Level sensing, simply insert included magnet in lower molded pocket on side of plastic console case - **see Illustration 8 below**. Peel off protective paper from the 2-sided tape and press firmly to secure. It is critical that the SOUTH pole side with dashed line faces the console body. Installation instructions for the bin level sensors (P/N 50226) are included with the Bin Level Sensor Kit - P/N 01544.

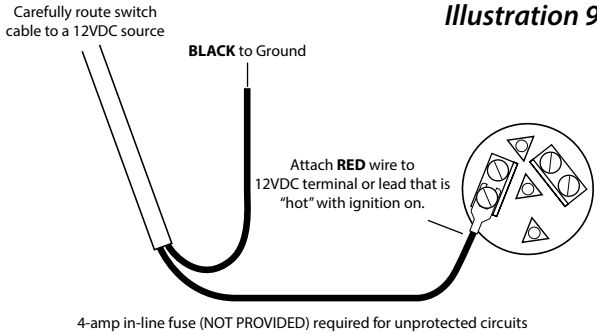
*Illustration 8*

	<p><b>Sensors 1, 2, and 3</b></p> <p>Insert magnet here to enable bin indication on sensors <b>1, 2, and 3</b>. The dashed side of the magnet <u>must</u> face the console body.</p>	<p><b>Sensors 4, 5, and 6</b></p> <p>Insert magnet here to enable bin indication on sensors <b>4, 5, and 6</b>. The dashed side of the magnet <u>must</u> face the console body.</p>	
------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------

### Electrical Installation

Shaft-Trak™ must be connected to a 12-volt DC negative ground electrical system. Using your test light, locate a terminal or wire connected to your ignition switch which is “hot” when the ignition is turned on and “dead” when the ignition is off. A 12V outlet adapter may be used if desired.

Locate the power cable on the main wiring harness. **See Illustration 9.** Connect the RED wire to the contact point you have located. (A 4-amp in-line fuse is required for unprotected circuits.) Attach the BLACK wire (ground) to a screw or bolt on the equipment frame. Be sure there is clean metal-to-metal contact. The terminal connectors have been supplied for your convenience. You may wish to substitute other types of connectors or make a direct solder connection. In routing cable to console, avoid areas where the cable may be subjected to abrasion or excessive heat.



### OPERATION

No calibration or set-up is required.

The Shaft-Trak™ console constantly monitors all of the shaft and bin sensors independently. If shaft rotation is greater than minimum RPM, or a bin level senses product, Shaft-Trak™ will indicate with a green LED for that particular sensor.

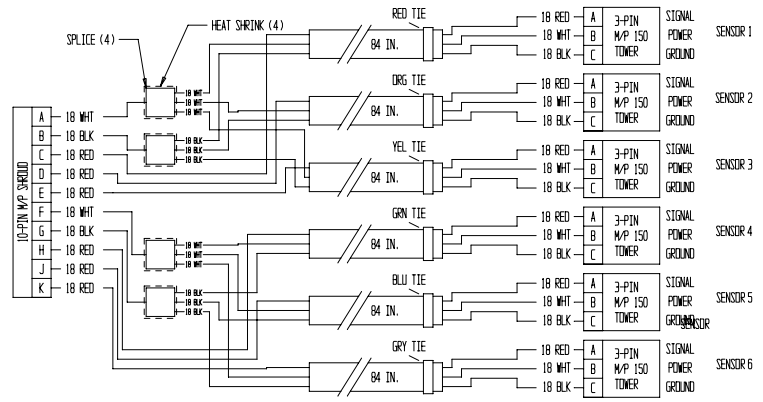
Each time power to the Shaft-Trak™ is turned on, all of the red lights will flash for approximately one minute, or until any or all bin levels are okay or shafts have exceeded 5 RPM (if only using one magnet). If a particular shaft exceeds the minimum RPM, its corresponding green light will turn on and the red light will turn off. If bin levels are okay, the green bin level indicators will turn on immediately. If any shaft does NOT reach the minimum RPM within one minute of power-up, or if a bin is empty, both lights for that sensor will turn off. This avoids unnecessary lights flashing if a sensor channel is not being used.

If a lower minimum RPM is needed, simply add magnets, per **Table 1**.

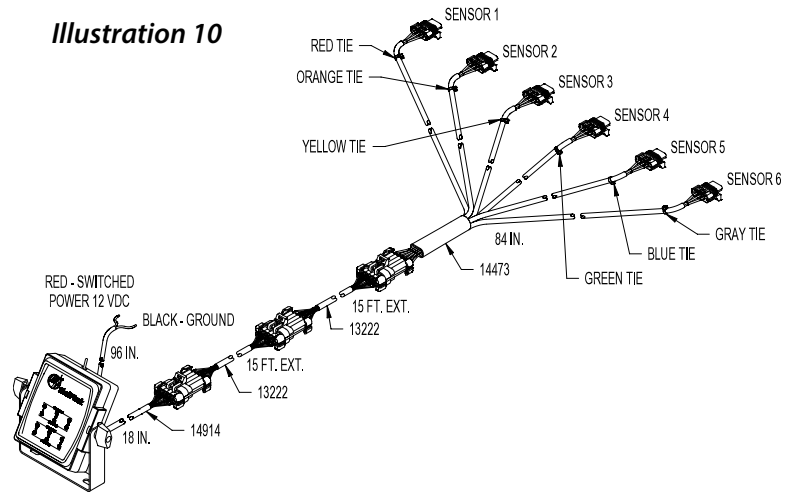
If the shaft RPM of any of the active (green lights on) shafts drops below 5 RPM (one magnet), or a bin level is low, the corresponding red light will flash to alert the operator that the shaft has effectively stopped or the bin is empty. The audible alarm will also sound (if enabled). The red light will continue to flash as long as the shaft RPM or the bin level is low, (for a maximum of one minute). If the shaft RPM remains below the minimum RPM, or the bin level remains low, at the end of the one minute period, it will turn both lights off until that shaft rotates at more than the minimum RPM again - or until the bin has been filled.

### Sensor Harness

See schematic (below and system drawing - **Illustration 10** below). The branch cable P/N 14473 is color-coded with cable ties to match shaft or bin sensors with corresponding indicators on console.



**Illustration 10**



**Table 1**

Number of Magnets	Approximate Min RPM	Number of Magnets	Approximate Min RPM
1	5	4	1.25
2	2.5	5	1
3	1.67	6	.83

### TROUBLESHOOTING COMPONENTS

**CONSOLE:** Make sure the console is in the desired mode (Shaft or Bin). Either set of 3 inputs (1-3 or 4-6) can be operated in either SHAFT mode or BIN mode by inserting or removing magnets as shown on page 2.

It is easy to tell which mode each set of inputs is operating in when the console is turned on: if a set of inputs is set up for BIN mode and all sensors are disconnected, all of the GREEN lights will light. If set up for SHAFT mode, and all sensors are disconnected, all of the RED lights will flash.

**HARNESS:** The harness can be checked using an ohmmeter or continuity tester. The main wiring diagram shows the pin out of all connectors.

**ELECTRICAL INTERFERENCE:** Erratic operation of the system may be the result of electrical interference from ignition wires or inductive loads (electrical clutch, fan solenoid, etc.) Always try to route wires as far away from suspect areas as possible. If problems occur, you may need to relocate the console and/or wiring harness, or install a noise suppressor.

**POWER:** Check power source with a test light. If there is no power, trace cable toward battery looking for breaks. Also check any fuses or circuit breakers that supply power to the console.

**ACCESSORY POWER:** The shaft/bin cables have an accessory power wire. Check for 12 volts between B (white) and C (black) of the 3 pin connectors. If power is not present, make sure the accessory power wire is not open or shorted to ground or to another wire. If this wire has a problem the console may exhibit erratic behavior or not function at all.

**SHAFT SENSORS:** Improper connection or voltage could damage sensors. The Micro-Trak standard sensor (black housing) works similar to a reed switch, but requires power in order to function. The internal circuit "closes" when near the south pole (dashed side) of a magnet and is otherwise "open".

Ground pin C (black) and connect 12 volts to pin B (white) of the sensor cable. Connect the positive lead (red) of an ohmmeter or continuity tester to pin A (red) and the negative lead (black) of the ohmmeter or continuity tester to pin C (black) of the sensor cable.

Holding the tip of the sensor up to the south pole (dashed side) of a magnet should result in a very low resistance (around 300 ohms). Taking the sensor away from the magnet should result in a very high resistance (infinite).

This troubleshooting procedure can also be used for the Micro-Trak gear tooth sensor (red housing) with the following change; use a piece of ferrous metal, like a screwdriver tip, to test the sensor. The gear tooth sensor has an internal magnet to activate the sensing circuit.

**BIN LEVEL SENSORS:** Ground pin C (black) and connect clean 12 volts to pin B (green) of the sensor cable. Connect the positive lead (red) of an ohmmeter or continuity tester to pin A (red) and the negative lead (black) of the ohmmeter or continuity tester to pin C of the bin level sensor cable.

If the Bin Level Sensor is "blocked", the output will show high (infinite) resistance, and if the sensor is "unblocked" the result will be low (300-500 ohm) resistance. Make sure the back of the sensor is covered by the black foam pad; if light enters from the back of the sensor, it will not "see" blockage. Use your hand or other solid object to block both "eyes" on the sensor and the resistance should go high.

**CONSOLE INPUTS:** If there is no response from any of the following tests, refer to the main wiring diagram on the previous page to locate the next connector in line toward the console and repeat the test at that connector. If there is a response at that connector, the problem may be in the cable between the two connectors (or the connectors themselves).

**SHAFT INPUT:** Disconnect the shaft sensor from the extension harness. Check for 12 volts between pins B (white) and C (black) of the extension harness. Using a clip lead or other jumper wire (such as a per clip bent in a "U"), rapidly short together pins A (red) and C (black) of the 3-pin connector. The corresponding green light on the console should light.

**BIN INPUT:** Disconnect the bin sensor from the main harness. The corresponding green light on the console will light. Check for 12 volts between pins B (white) and C (black) of the sensor cable being tested. Using a clip lead or other jumper wire (paper clip bent in a "U"), short together pins A (red) and C (black) of the 3-pin connector. The green light will turn off and the corresponding red light will flash for one minute or until the short is removed.

### REPLACEMENT PARTS LIST FOR SHAFT-TRAK

<u>Part Number</u>	<u>Description</u>
01544	Bin Level Sensor Kit
13181	Console Mount Kit, Base
13221	Cable, 10' 10-pin M/P (optional)
13222	Cable, 15' 10-pin M/P (2)
13223	Cable, 20' 10-Pin M/P (optional)
13224	Cable, 25' 10-pin M/P (optional)
13205	Cable, 5' 3-pin M/P Extension (optional)
13206	Cable, 10' 3-pin M/P Extension (optional)
13207	Cable, 15' 3-pin M/P Extension (optional)
13208	Cable, 20' 3-pin M/P Extension (optional)
14471	Molded Shaft Sensor w/ 5' cable
14473	Shaft-Trak 6-sensor Branch Cable, 7'
14914	Console, Shaft-Trak Low RPM