



PROCESS CONTROL SYSTEMS, INC.

327 LAKE HAZELTINE DRIVE, CHASKA, MN 55318

952-361-3026
(Fax) 952-368-4129

800-328-0738

MAXIGARD™



A4000B and A4000C ROTATION DETECTOR

Introduction

The MAXIGARD A4000B and A4000C Rotation Detectors are fail safe devices designed to monitor the rotational direction of a shaft.

Principle of Operation

When the monitored shaft (with the magnet disc or optional magnet wrap attached) is rotating, magnets mounted in the disc or wrap pass in front of the sensing head, generating a signal. This signal is not impaired by build-up dust or any other foreign material on the magnet disc or sensing head. The signal is processed through an electronic circuit and energizes a relay. The relay has (2) SPST contacts (NO/NC). These contacts can be used to control, indicate, or alarm. The A4000 series is designed so that when the rotation of the monitored shaft changes from the pre-selected rotation mode, the relay will switch indicating an alarm condition.

Components

THE A4000B and A4000C ROTATION DETECTOR INCLUDES:

- MAGNET DISC (8 MAGNETS)
- MOUNTING BRACKET
- CIRCUIT WITH 5 AMP SPDT RELAY
- SENSING HEAD
- 10' CABLE
- NEMA 4 ENCLOSURE

CALL TOLL FREE  800-328-0738

www.maxigard.com

E-mail: techsupport@maxigard.com

SECTION 1 - MECHANICAL

1.0 Magnet Disc

- 1.1 The end of the shaft to be monitored should be square to prevent excessive disc wobble.
- 1.2 Center drill and tap the shaft end. (Suggested #21 drill and #10-32NF tap). Bolt the magnet disc to the end of the shaft. Use "Loc-tite" to keep the bolt and disc tight on the shaft.
(see figure 1A or 1B, page 3).

2.0 Magnet Wrap (optional)

- 2.1 Separate the two halves of the magnet wrap by loosening the cap screws holding the two halves together.
- 2.2 Place both halves of the magnet wrap around the shaft. Re-insert and tighten the cap screws making sure the wrap is square to the shaft.
(see figure 2A or 2B, page 3).

NOTE

There will be a slight gap between the two halves after tightening. This gap will not affect the generated signal.

3.0 Mounting the Sensing Head

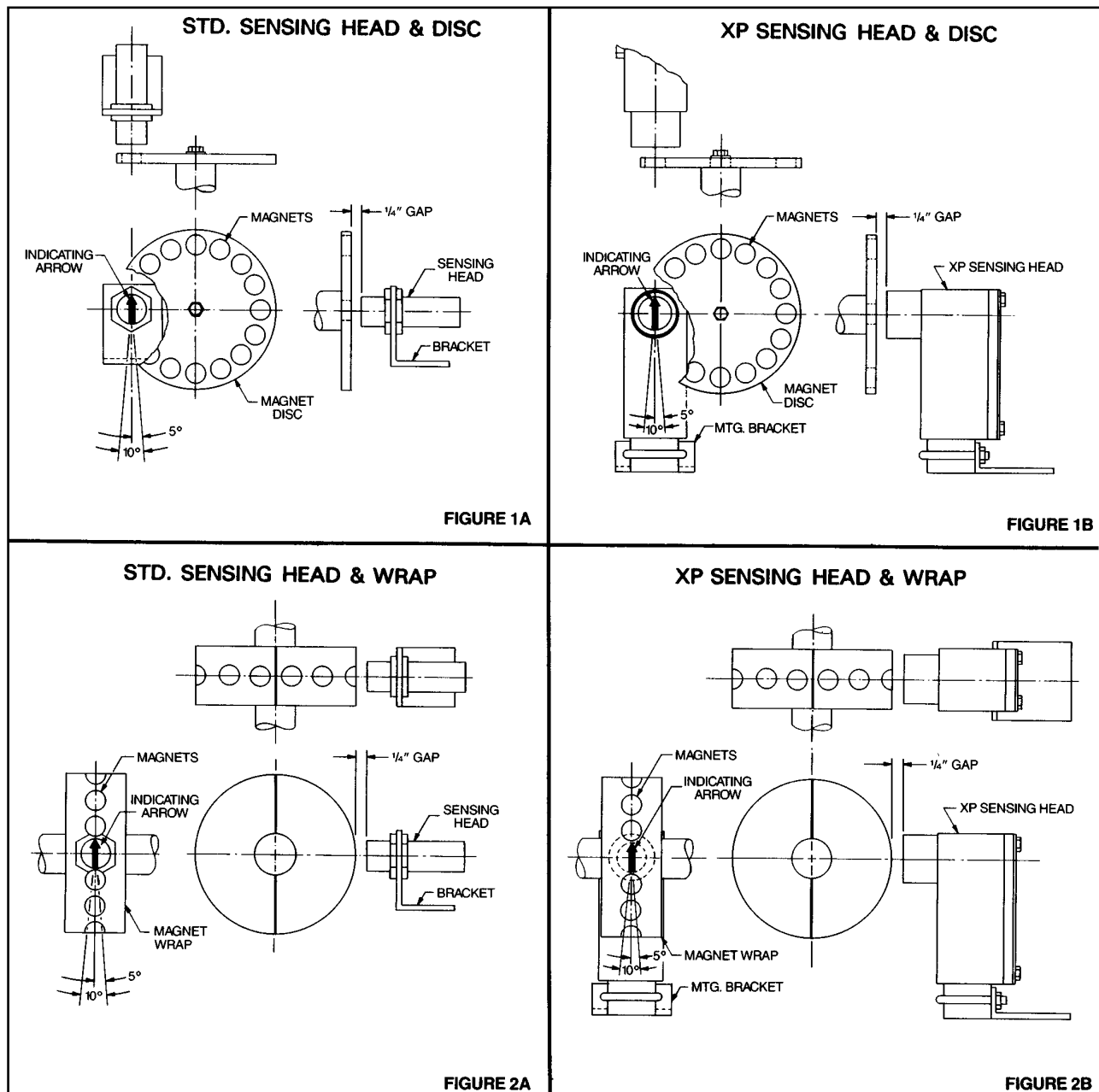
NOTE

For purpose of instruction, C.W. rotation is considered to be with the direction of the sensing head indicating arrow.

- 3.1 Place the sensing head so that it's centered directly in front of the magnets in the magnet disc or optional magnet wrap.
(see figure 1A or 1B, page 3).
- 3.1.1 The gap setting between the sensor and magnet disc or optional magnet wrap should be approximately 1/4" to 1/2".
- 3.2 Magnet Disc
- 3.2.1 The arrow on the face of the sensing head must be perpendicular to the rotational travel of the magnet disc.
(see figure 1A & 1B, page 3)

3.3 Magnet Wrap (optional)

- 3.3.1** The arrow on the face of the sensing head must be perpendicular to the monitored shaft.
(see figure 2A or 2B, page 3)
- 3.3.2** If the indicating arrow is pointing in the direction of the shaft rotation, sensing head set up is complete.
- 3.3.3** If the shaft rotation is counter to the indicating arrow, change the directional selector pins.
(see figure 6, page 8)



3.4 Green LED Indicating Light

3.4.1 Locate the Green LED light on the main circuit board. This LED is used to indicate that the A4000 circuit is receiving pulses from the sensing head.
(see figure 6, page 8 and figure 7, page 9)

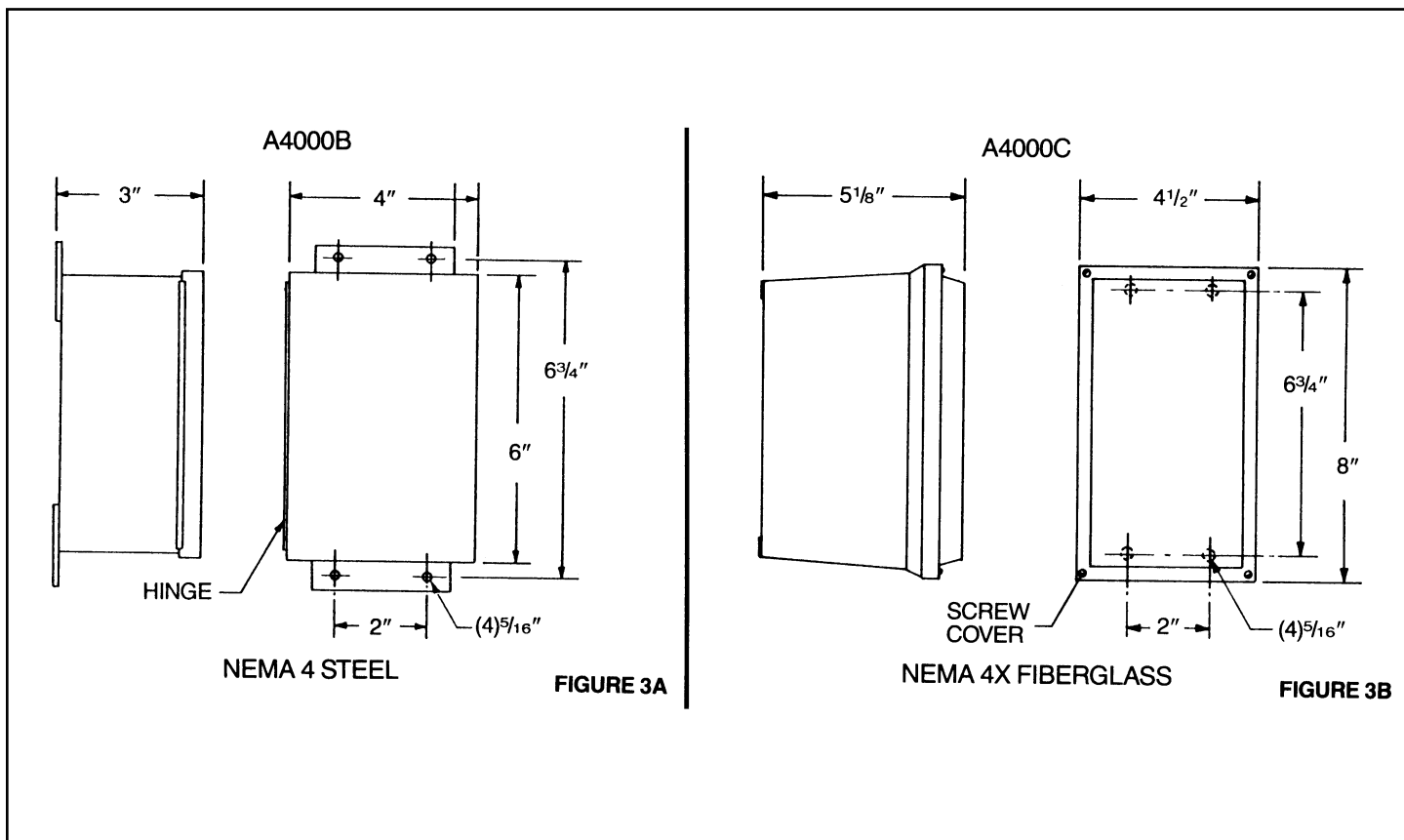
3.4.2 Once the magnet disc or magnet wrap and sensing head have been installed and wired, apply 115 VAC power to the A4000 switch and run the monitored machine.

3.4.3 The Green LED light should be flashing, if not, check the sensing head alignment, gap setting, and the sensing head wiring. The flashing LED indicates the A4000 circuit is receiving pulses.

4.0 Rotation Detector Enclosure

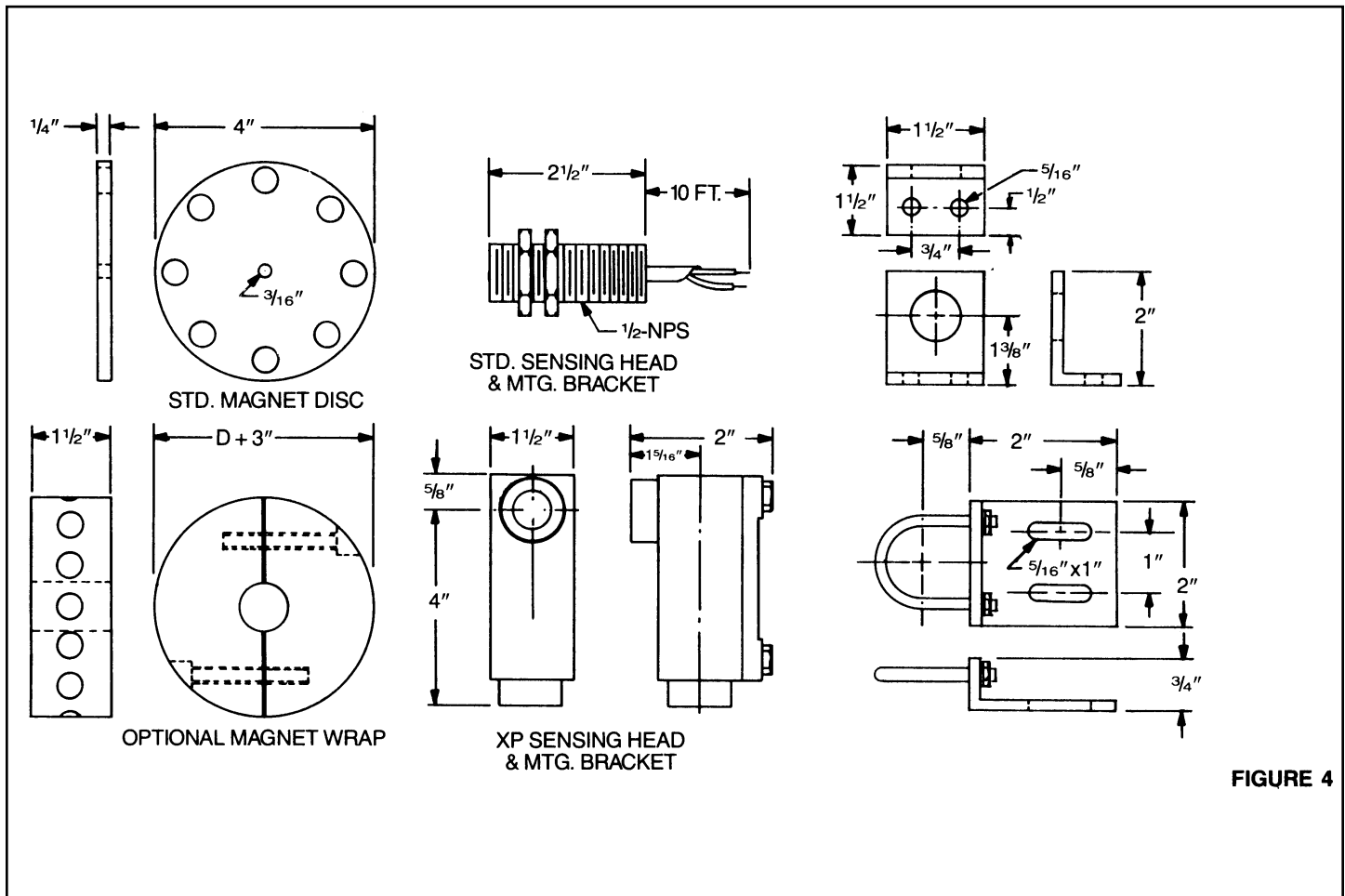
4.1 A4000B is UL/CSA listed and rated NEMA 4, dust tight, oil tight and water tight, steel construction, suitable for indoor and outdoor use.
(see figure 3A, page 4)

4.2 A4000C is UL/CSA listed and rated NEMA 4X, dust tight, oil tight and water tight, fiberglass construction, highly corrosion resistant.
(see figure 3B, page 4)



CAUTION

To prevent circuit board damage, remove the circuit boards from the enclosures before punching or drilling conduit holes. Be sure to remove all metal chips and debris.

**FIGURE 4****5.0 Wiring and Energizing****5.1 Sensing Head**

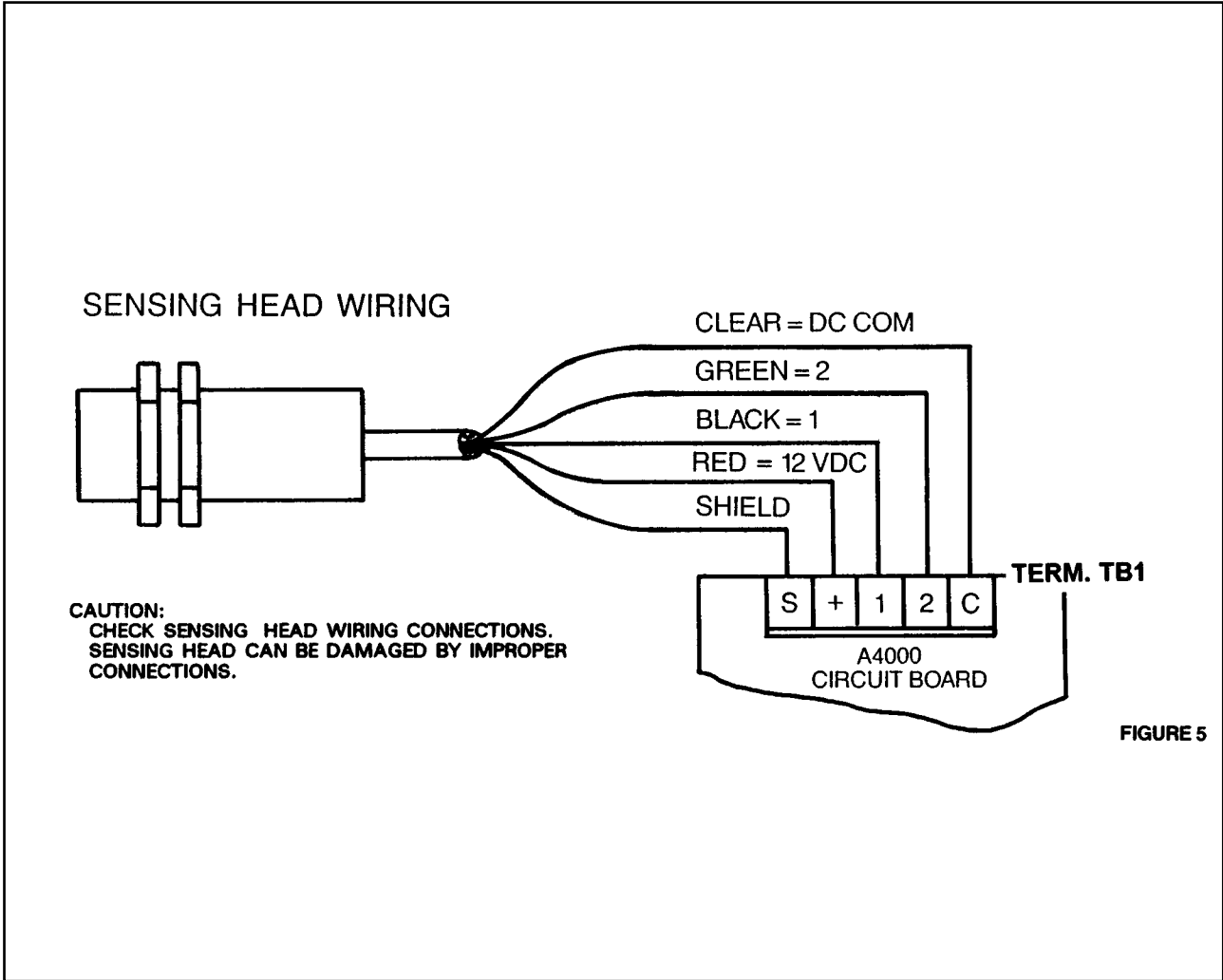
- 5.1.1** Connect sensing head cable leads to terminal block TB1.
(see figure 5, page 6)

CAUTION

Check sensing head wiring to terminal block, sensing head can be damaged by improper wire connections.

- 5.1.2** The sensing head comes standard with 10' of cable. Additional cable can be added up to 1,000 ft. Maintain continuity, and make good splices.

NOTE
 Sensing head cable, use "Belden" #8771 or equal. Cable should not be run in same conduit as power lines. Maximum distance of cable run, 1,000'.



6.0 Rotation Direction Selection

NOTE
 If "Bi-directional Relay" option is in place - proceed to Section 7.0, if not, proceed as follows.
 (see figure 7, page 9)

6.1 Rotation Selector Pins

6.1.1 The rotation selector pin jumper is factory set for C.W. rotation as normal.
(see figure 6, page 8)

6.1.2 To change to a C.C.W. rotation mode, re-position the selector pin jumper as shown in the detail. Use a needle nose plier to gently pull up on the jumper and re-position.
(see figure 6, page 8)

6.2 Relay Output Wiring

6.2.1 The (N.O.) contact will be held closed during correct rotation.

6.2.2 The (N.C.) contact will be held open during correct rotation.

6.2.3 The two commons can be externally wired together to create a Form C set of contacts. The contacts are rated 5 amps @ 120 VAC.

6.3 Sequence of Operation

NOTE

Assuming the selector pin jumper is set for C.W. rotation, the following will occur under normal operating conditions.

6.3.1 The relay will be energized during normal C.W. rotation.

6.3.2 The relay will de-energize when the shaft stops rotating.

6.3.3 When the shaft stops rotating and comes to a complete stop, there will be a (5) second delay before the relay de-energizes.

6.3.4 The relay will remain de-energized should the shaft start turning in a C.C.W. direction.

6.3.5 The converse of 6.3.1 and 6.3.2 will happen if the selector pin jumper is set for C.C.W. rotation.

7.0 Bi-directional Dual Relay Outputs (optional)

Relays are SPST - 5 amp @ 120 VAC.

7.1 Relay (No.1) Operating Status (located on main circuit board)

7.1.1 Relay is (N.C.) when shaft is rotating C.W., RED LED light is on, located on main circuit board.

(see figure 7, page 9)

7.1.2 Relay is (N.O.) when shaft is at zero speed, or rotating C.C.W., RED LED light is off, located on main circuit board.

(see figure 7, page 9)

7.2 Relay (No. 2) Operating Status (located on auxiliary circuit board)

7.2.1 Relay is (N.C.) when shaft is rotating C.C.W., Amber LED is on, located on the auxiliary circuit board.

(see figure 7, page 9)

7.2.2 Relay is (N.O.) when shaft is rotating C.W., Amber LED is off, located on the auxiliary circuit board.

(see figure 7, page 9)

7.2.3 Both relays will be (N.O.) when the monitored shaft is at zero speed.

7.2.4 There will be a (5) second delay of the relay mode change when the monitored shaft comes to zero speed.

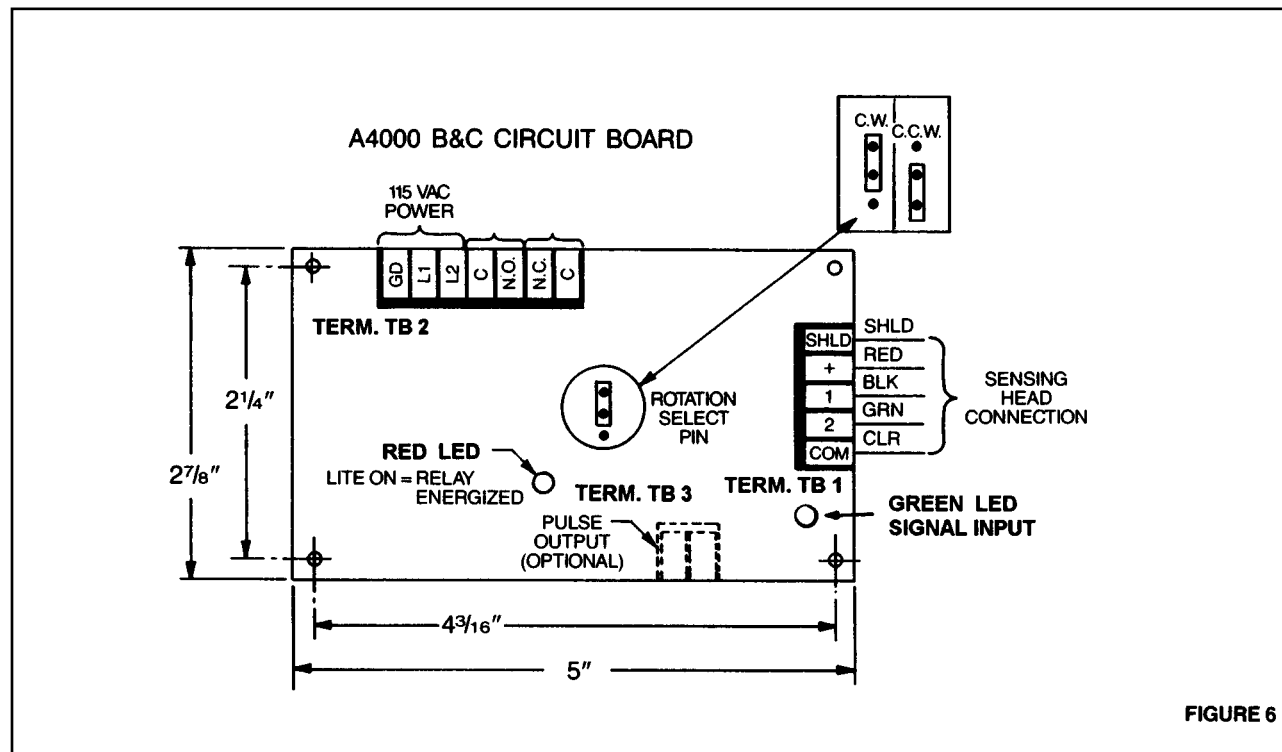


FIGURE 6

8.0 Optional Pulse Output

8.1 Pulse output interface. Terminal block TB3. (see figure 6, page 8)

NOTE

In most cases the A4000 with the optional pulse output has been customer specified and factory set for either a Sinking or Sourcing pulse output. Check instrument and the A4000 for the proper set up.

8.2 Sinking Pulse

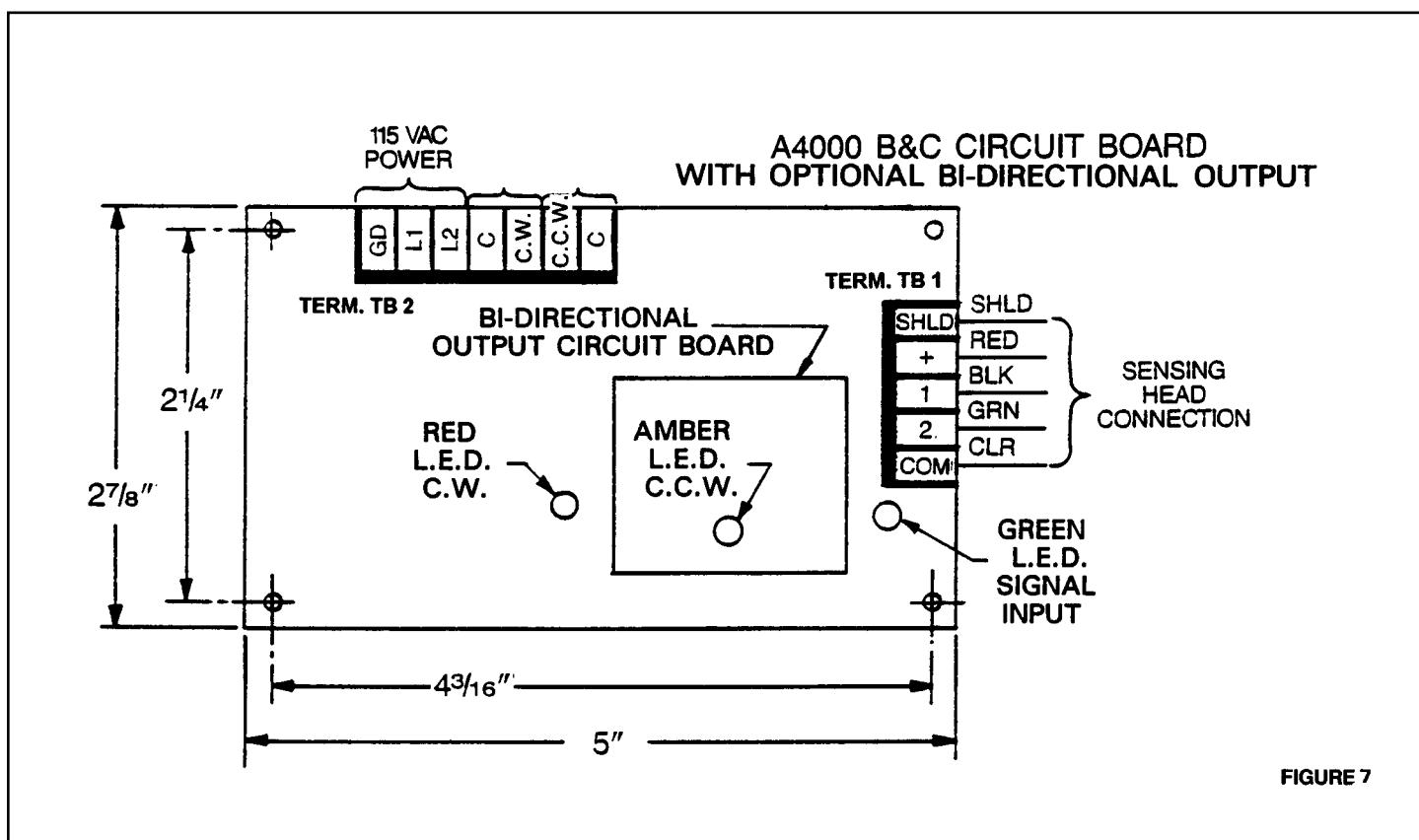
8.2.1 The (+) term. of terminal block TB3 is tied to high and switches low.

8.2.2 The (--) term. of terminal block TB3 is the common, and will remain low or at -0- volts.

8.3 Sourcing Pulse

8.3.1 The (+) term. of terminal block TB3 will remain high or at 12 VDC.

8.3.2 The (--) term. of terminal block TB3 is tied to low and will switch high.



TYPICAL ROTATION DETECTOR CIRCUITS A4000

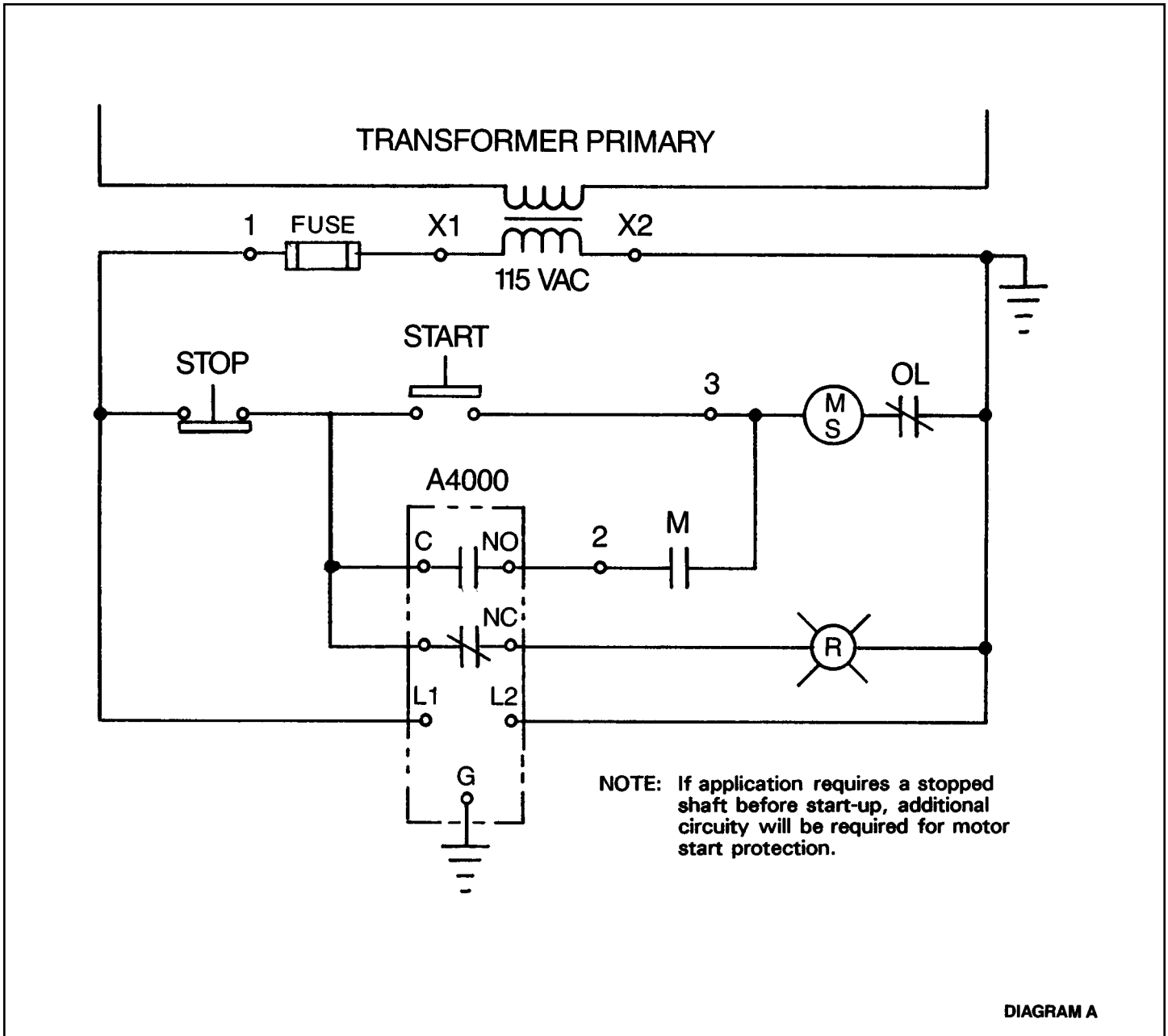


DIAGRAM A

Circuit requires correct shaft rotation to hold the motor starter on. Also, the circuit provides a warning light or horn to indicate incorrect shaft rotation or a stopped condition. If rotation direction reverses during operation, the motor starter will drop out and the warning light or horn comes on.

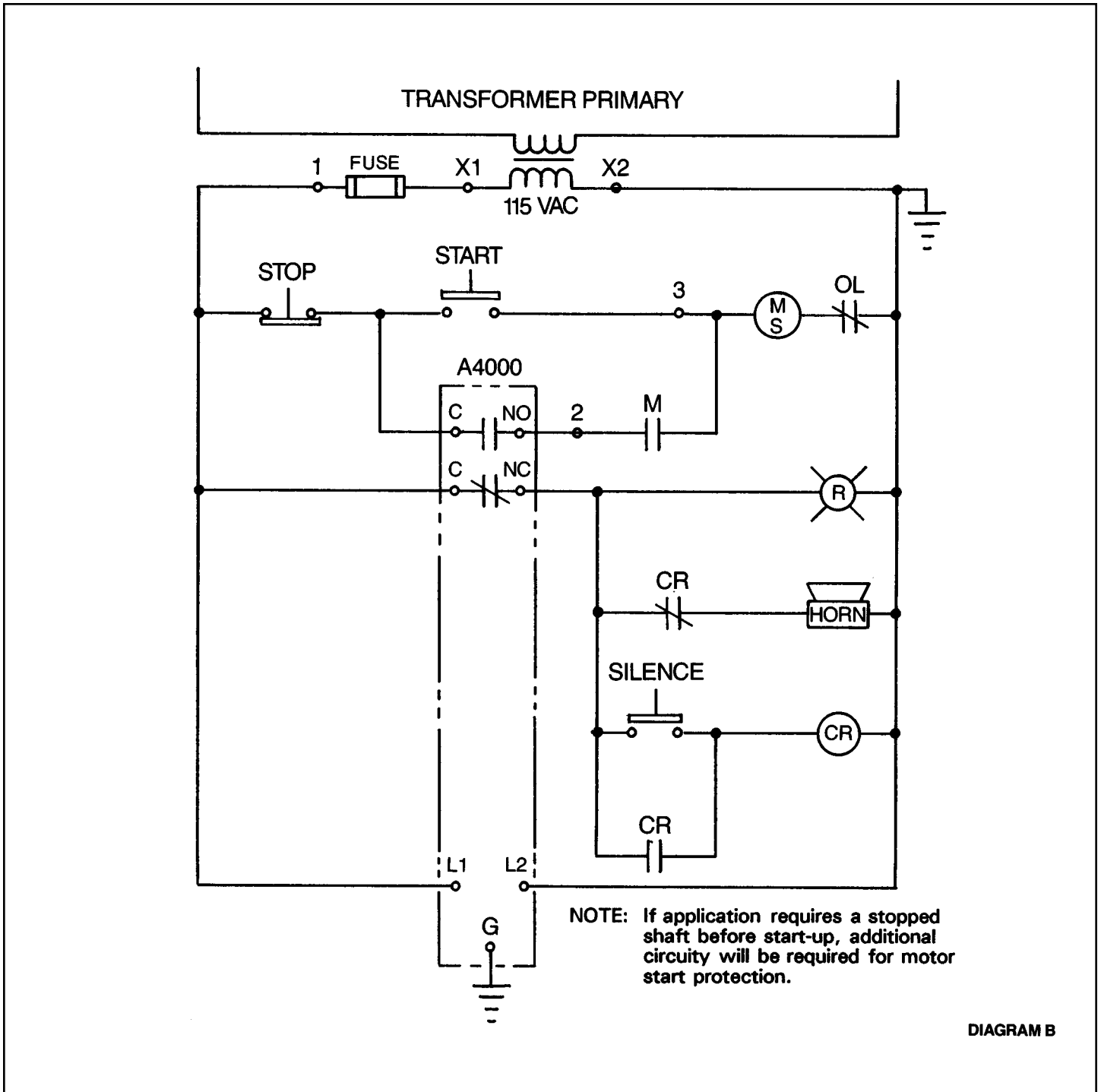


DIAGRAM B

Circuit provides isolated contacts to use with an alarm or PLC input, and requires correct shaft rotation to hold motor starter on. If rotation direction reverses during operation, motor starter will drop out and the alarm light and horn will come on. Horn can be silenced with silence push button.

A4000 BI-DIRECTIONAL COUNTER SUPPLEMENT

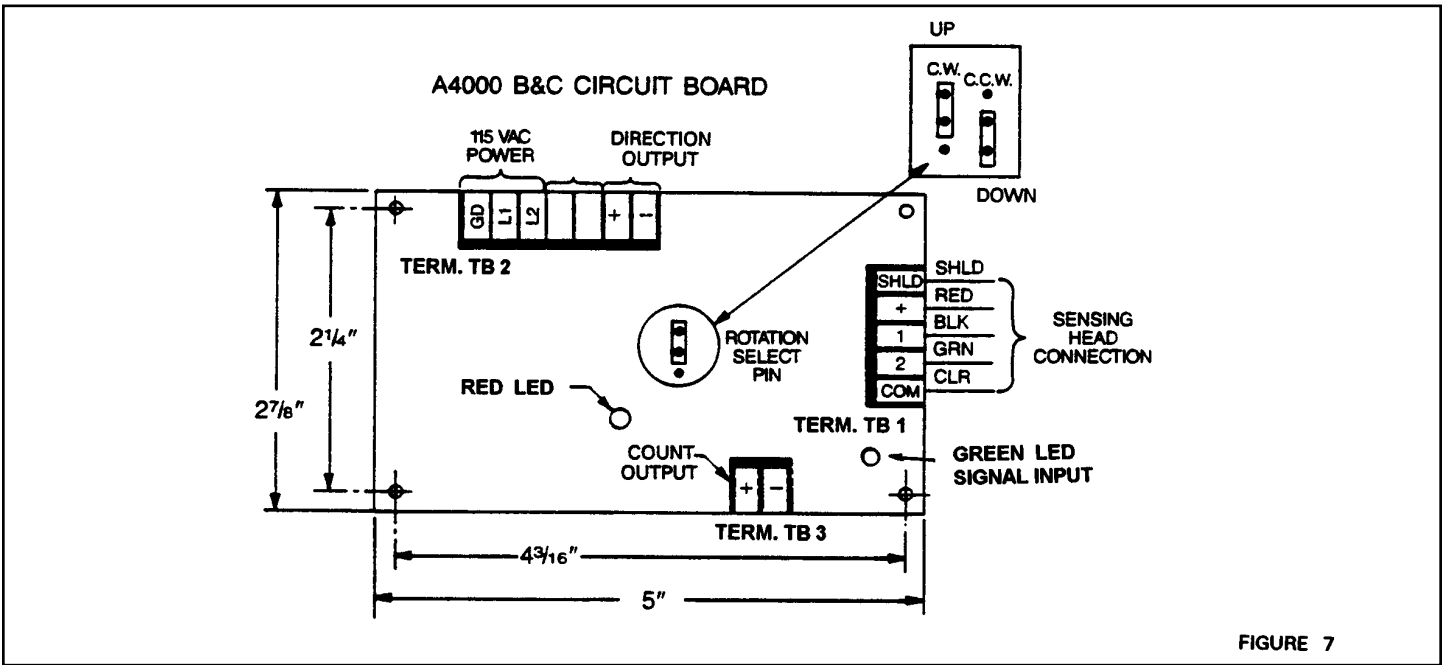


FIGURE 7

9.0 Bi-directional Counter Output (option)

- 9.1 The selector pin is factory set in the UP position, (C.W.) and will increment, count up when the shaft is rotating C.W., LED light will be on.
(see figure 7, page 12)
- 9.2 To count down, change the selector pin to the DOWN position, (C.C.W.) and will de-increment, count down when the shaft is rotation C.W, LED light will be off.
(see figure 7, page 12)
- 9.3 The up/down select pin instructs the counter to count up in either the C.W. or C.C.W. setting for A4000 circuit board and counter.
(see figure 8, page 12)

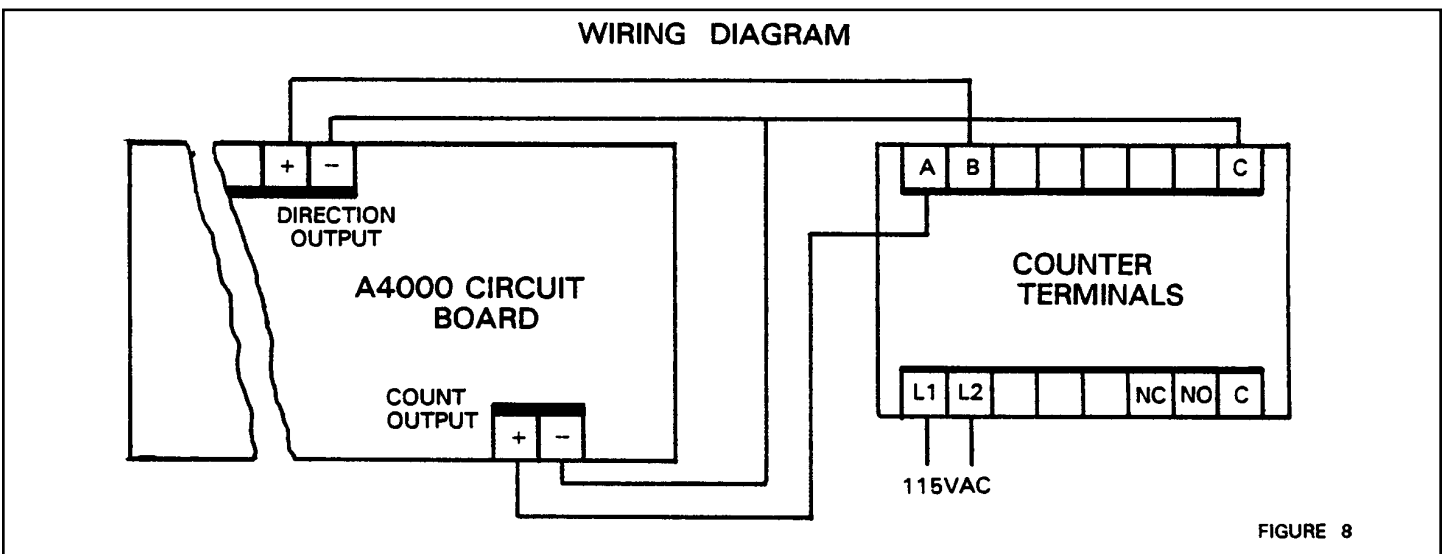


FIGURE 8

SPARE PARTS LIST

Part No.	Description
1463	Sensing Head w/10' cable (std) aluminum
1134	Mounting bracket (std) aluminum
1460	Sensing Head w/10' cable (XP)
1480	Magnet Disc (8) Magnets
1461	Sensor Cable 4 wire
1458	A4000B/A4000C Circuit Board
1394	Mounting bracket w/jam nuts - PVC
1481	Magnet Disc - PVC (8) Magnets
1482	Bi-directional relay board (Factory Installed)

LIMITED WARRANTY

Process Control Systems, Inc. will repair or replace, at their option, F.O.B. factory, any part or unit which proves to be defective in material or workmanship within five years of purchase date, provided that part of the unit was installed and operated as recommended, to be established by examination of the part or unit at the factory. Goods returned under warranty must be shipped prepaid to the factory and accompanied by the serial number, description of defect, order number and date of purchase.

This warranty shall not apply to any Maxigard™ product which shall have been repaired or altered outside of the Process Control Systems factory or has been subject to misuse, negligence or accident.

Process Control Systems, Inc. warrants its products, but not their application, and shall not be liable for any incidental or consequential damages incurred through the use or loss of use of a Process Control Systems product. No representatives or other person is authorized or permitted to make any warranty or assume for this company any liability not strictly in accordance with this guarantee.

There is no further warranty either expressed or implied beyond that set forth herein.