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MAXIGARD™

Ultra-gap™

B3000 SERIES TACHOMETER
ANALOG OR DIGITAL DISPLAY

Introduction

The MAXIGARD B3000 is designed to primarily monitor very slow speeds, (0-5 RPM) or very high speeds, (5000-10,000 RPM), however, the B3000 can be used to monitor any speed range. The B3000 Tachometer is precision built from quality materials and is completely tested to insure proper function, long life and trouble free operation.

Principle of Operation

While the monitored shaft (with magnet disc or optional wrap attached) is rotating, magnets mounted in the disc or wrap pass in front of the sensing head, generating pulses. These pulses are sent to the tachometer circuitry, where the pulses are stored in a sample and hold circuit. The stored pulses after a pre-determined time base are sent to the display. This action is called “The Sample and Hold Update”.

Components

THE B3000 TACHOMETER PACKAGE INCLUDES:

- 4” MAGNET DISC (OTHER OPTIONAL TARGETS AVAILABLE)
- SENSING HEAD WITH 10’ OF CABLE
- MOUNTING BRACKET
- CALIBRATION CIRCUIT
- ANALOG DISPLAY METER

DIGITAL METERS, 4/20 mA OUTPUT, ENCLOSURES ARE AVAILABLE AS OPTIONS.

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, 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 1B, page 3).

NOTE

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

SENSING METHOD

SENSING HEAD AND DISC

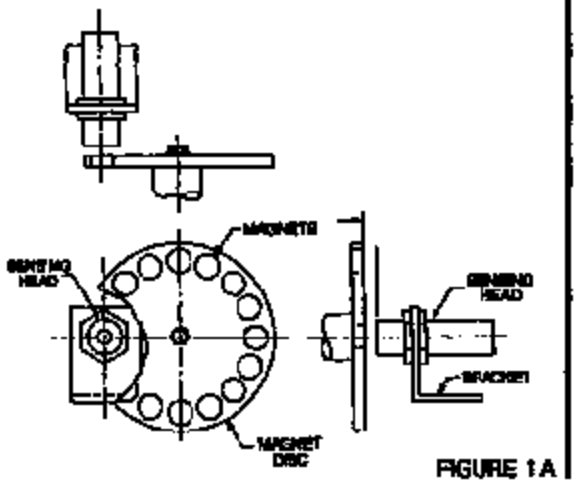


FIGURE 1A

SENSING HEAD WITH OPTION WRAP

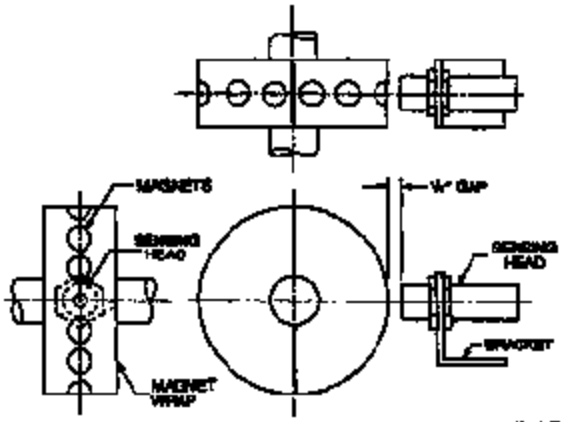


FIGURE 1B

DIMENSIONAL DATA

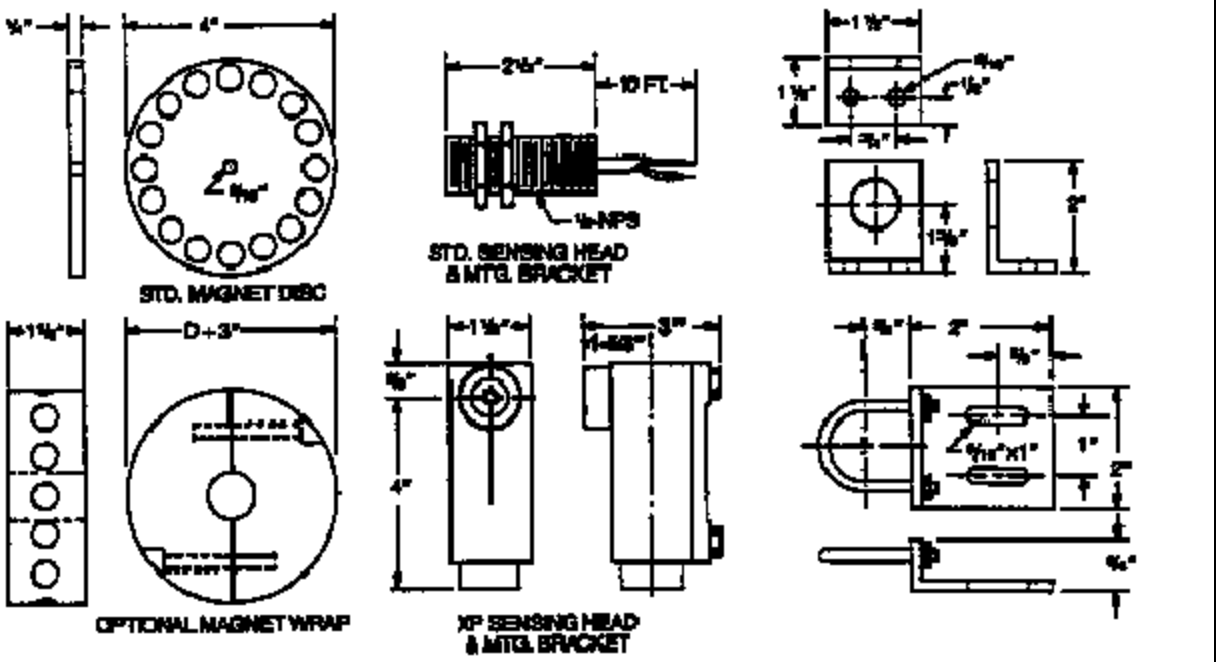


FIGURE 2

3.0 Mounting the Sensing Head

3.1 Place the sensing head so the sensor is centered directly in front of the magnets of the disc or optional wrap.
(see figure 1A & 1B, page 3).

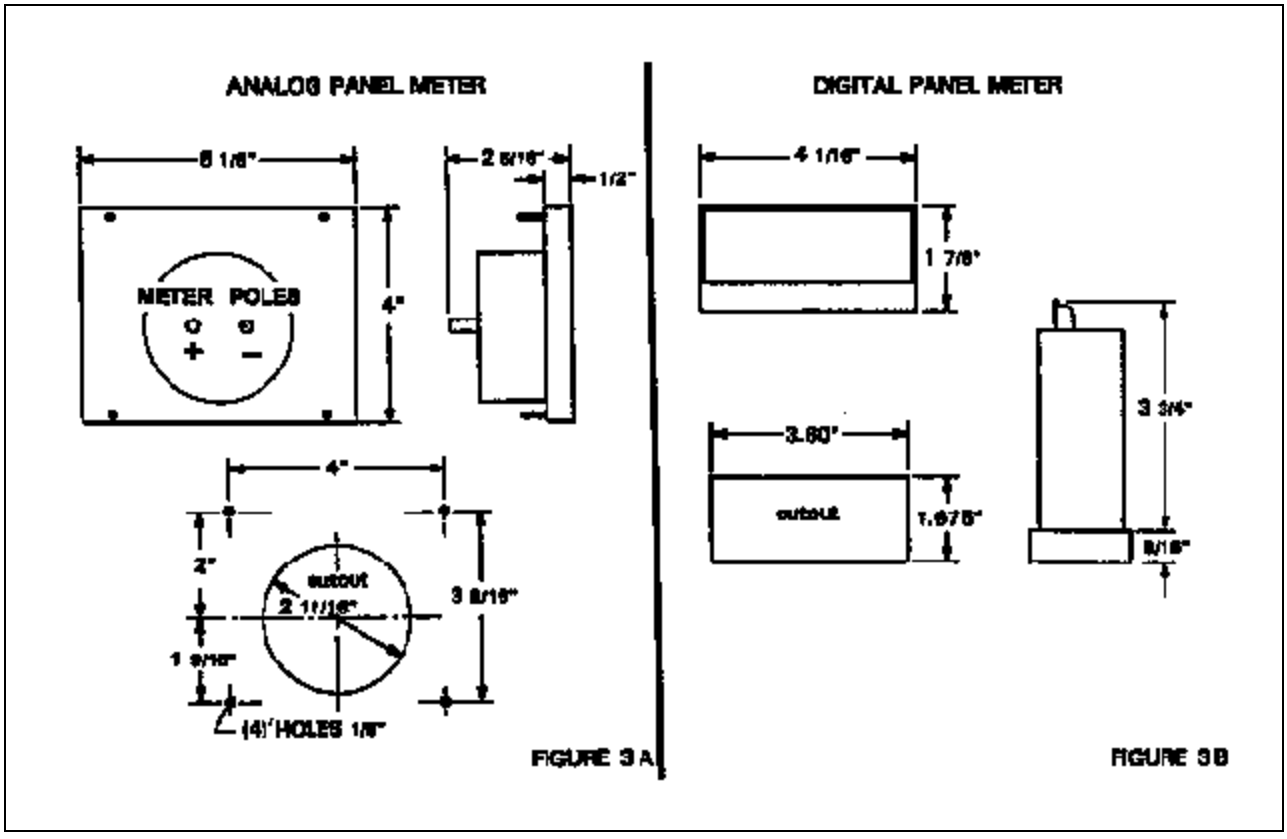
3.2 The gap setting between the sensor and magnet disc should be approximately 1/8” - 3/8”.

3.3 The sensing head comes standard with 10’ of cable. If additional cable length is required, be sure to maintain continuity.

4.0 Meter Installation

4.1 Cut meter cutout and drill mounting holes according to the layout dimensions.
(see figure 3A and 3B, page 4)

4.2 Install meter horizontally and use hardware provided to secure meter to panel.



SECTION 2 - FIELD WIRING

5.0 Wiring and Energizing

5.1 Sensing Head

5.1.1 Connect sensing head cable leads to terminal block TB1, located on the circuit board.
(see figure 4, page 5)

5.1.2 The sensing head comes standard with 10' of cable. Additional cable can be added up to 1000'. 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, 1000'.

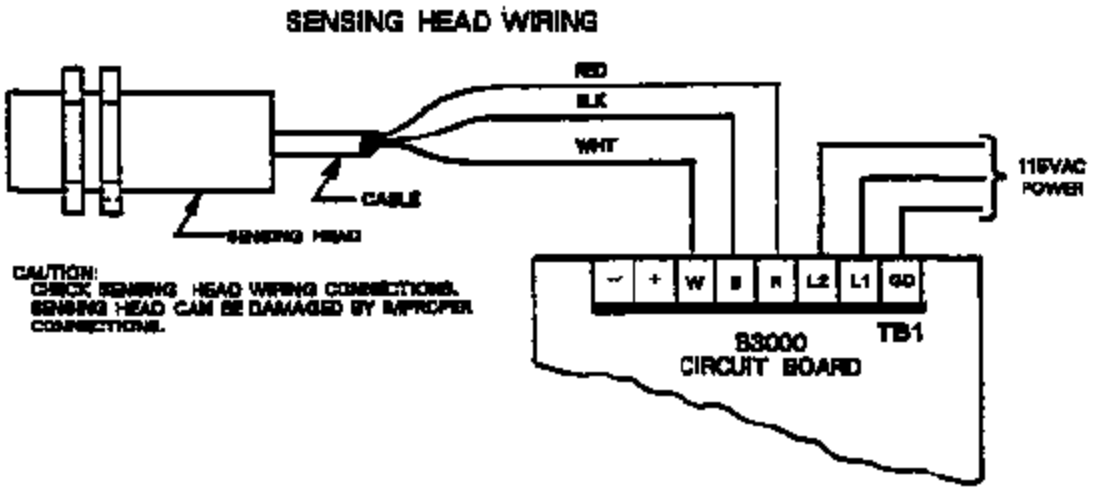


FIGURE 4

5.2 Meter (Analog)

5.2.1 Remove shunt wire from between meter poles located on the back side of meter.

5.2.2 Make meter wire connections between terminal block TB1 and the (+) and (--) poles located on the back of the meter.
(see figure 5, page 6 and figure 3A, page 4)

5.3 Calibrating the Tachometer Circuit Board

5.3.1 Connect 115 VAC power to terminals L1 and L2 of terminal block TB1. (see figure 5, page 6)

WARNING
Be sure line voltage is off before connecting power.

5.3.2 Check sensing head installation and gap setting. (see figure 1A and 1B, page 3)

WARNING
Proceed with caution, 115 VAC is present and could result in an electrical shock injury or death.

CAUTION
Beware of moving machinery, could result in accidental injury.

5.3.3 Start the monitored machine and run at the normal high operating speed and apply 115 VAC to the calibration circuit board.

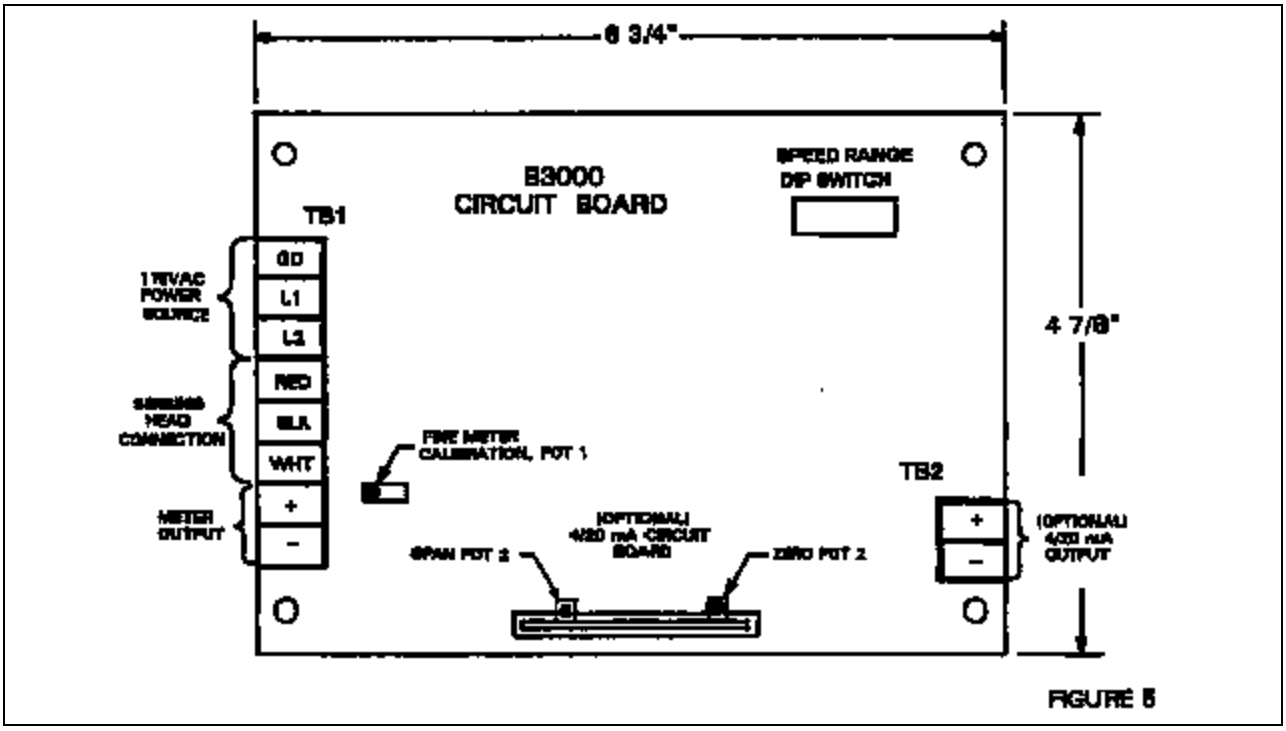


FIGURE 5

5.4 Dip Switch Setting "Sample and Hold Up Date Time"

5.4.1 Select the speed range chart that represent your operating speed range, (0-50 RPM range or 50-10,000 RPM range).
(see figure 6, page 7 and figure 7, page 8)

5.4.2 Locate the Speed Range Dip Switch on the calibration circuit board.
(see figure 5, page 6)

5.4.3 Set the dip switches to match your general speed range. Low range or High Range.
(see figure 6, page 7 and figure 7, page 8)

NOTE

1. Switches 5 & 8 will always be ***on*** for the LOW range.
2. Switches 6 & 8 will always be ***on*** for the HIGH range.
3. Switch 7 will always be ***off*** for BOTH ranges.

5.4.4 Select the dip switch setting that allow for the most steady meter reading. See example 1, page 8, low speed range and see example 2, page 9, high speed range.

5.4.5 Make final meter calibration by adjusting POT P1, located on the circuit board. C.W . or C.C.W. to increase or decrease the meter reading.
(see figure 5, page 6)

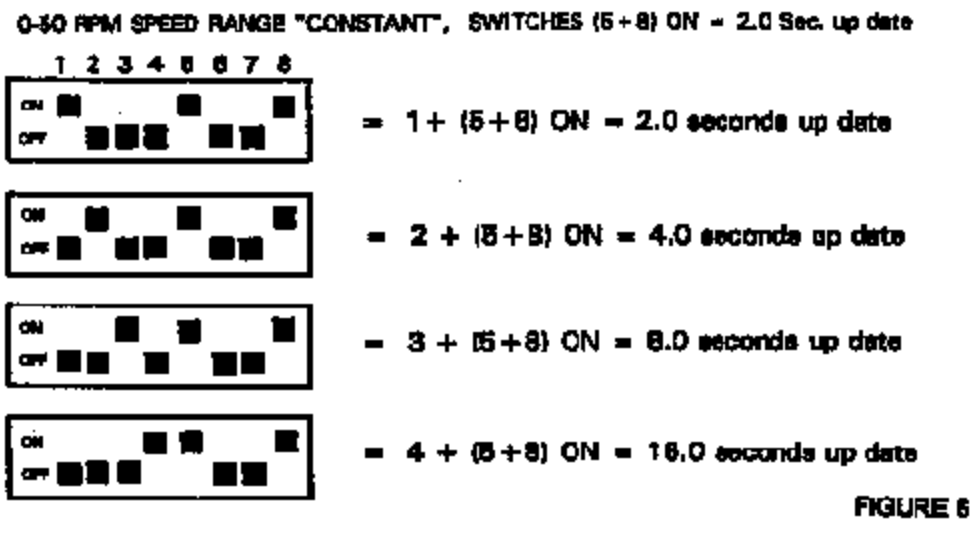


FIGURE 6

5.4.6 Other up date times are available by different combinations of dip switch settings.

EXAMPLE: LOW SPEED RANGE (0 - 50 RPM)

SWITCHES

= 1+3+(5+8) ON = 10 sec. up date

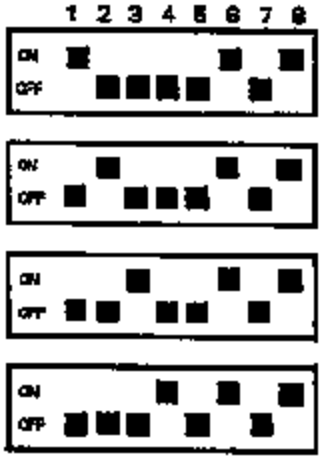
= 1+2+3+4+(5+8) ON = 30 sec. up date

NOTE

1. Switches 5 & 8 are always ***on*** for the LOW speed range, 0-50 RPM.
2. Switch 7 is always ***off***.
3. Try different switch combinations for the most steady meter reading - the longer the up date time, the steadier the reading.

5.4.7 Make final meter calibration by adjusting POT P1.
(see figure 5, page 6)

7500-20,000 RPM SPEED RANGE "CONSTANT", SWITCHES (6+8) ON = .13 Sec. up date



= 1+(6+8) ON = .13 seconds up date

= 2+(6+8) ON = .26 seconds up date

= 3+(6+8) ON = .52 seconds up date

= 4+(6+8) ON = 1.04 seconds up date

FIGURE 7

5.4.8 Other up date times are available by different combinations dip switch settings.

EXAMPLE: HIGH SPEED RANGE (50 - 10,000 RPM)

SWITCHES

= 1+3+(6+8) ON = .65 sec. up date

= 1+2+3+4+(6+8) ON = 1.95 sec. up date

NOTE

1. Switches 6 & 8 are always ***on*** for the HIGH speed range. 50-10,000 RPM.
2. Switch 7 is always ***off***.
3. Try different switch combinations for the most steady meter reading - the longer the up date time, the steadier the reading.

5.4.7 Make final meter calibration by adjusting POT P1.
(see figure 5, page 6)

OPTIONAL

SIGNAL TRANSMITTER
4/20 mA OR 0-10 VDC OUTPUT

The Signal Transmitter has been calibrated and factory tested (as accurately as possible) to match your operating speeds and output requirements. However, final calibration will be required during installation and start up. This final calibration is made by adjusting the Zero and Span Pots., located on the Signal Transmitters plug-in circuit board. The Signal Transmitter will have the same up date time as the tachometer.
(see figure 8, page 10)

6.0 Signal Calibration 4/20 mA or 0-10 VDC Outputs

NOTE
Use a digital or analog voltmeter to calibrate the transmitter.

6.1 4/20 mA Output

6.1.1 Set the voltmeter on the millamp current scale adequate for 4/20 mA calibration.

6.1.2 Attach the voltmeter positive and negative leads to terminal block TB2. (see figure 5, page 6)

6.1.3 Apply power to the circuit board and monitor machine at -0- speed, adjust the Zero Pot P2, C.W. or C.C.W. until voltmeter reads 4 mA.

6.1.4 Power on and monitored machine running at full speed, adjust Span POT P3, C.W. or C.C.W. until voltmeter reads 20 mA.

6.2 0-10 VDC Output

6.2.1 Set voltmeter to the DC voltage range adequate for 0-10 VDC calibration.

6.2.2 Connect voltmeter leads to terminal block TB2. (see figure 5, page 6)

6.2.3 Apply power to the circuit board and monitor machine at -0- speed, adjust the Zero POT P2, C.W. or C.C.W. until voltmeter reads -0- volts.

6.2.4 Power on and monitored machine running at full speed, adjust Span POT P3, C.W. or C.C.W. until voltmeter reads 10 volts.

WARNING
Proceed with caution, 115 VAC is present and could result in electrical shock which may cause injury or death.

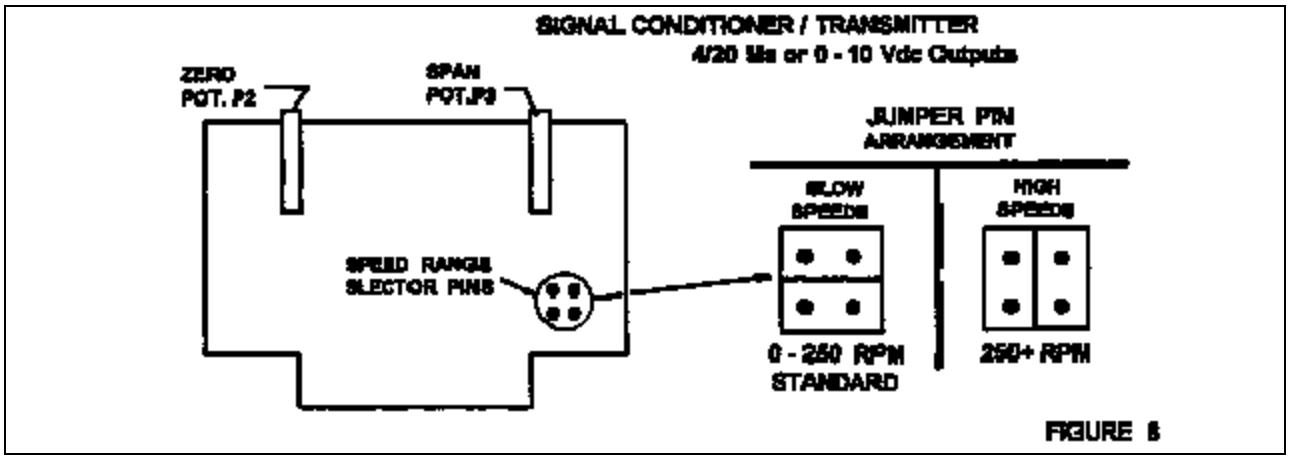


FIGURE 5

SPARE PARTS LIST

Part No.	Description
1323	Circuit Board, Calibration Card
1390	Sensing Head, W/10' of Cable, (Std) Hall Effect
1130	Mounting Bracket and Jam Nuts (Std)
1391	Sensing Head, W/10' Cable, (XP) Hall Effect
1134	Mounting Bracket (XP)
1136	Magnet Disc (4" Diameter)
1378	Magnet Disc (8" Diameter)
1177	Meter, Tachometer (Analog) Spec. Scale
1363	Meter, Tachometer (Analog) Single Set Point
1362	Meter, Tachometer (Analog) Dual Set Point
1324	Meter, Tachometer (Digital) 3 1/2, LED
1361	Meter, Tachometer (Digital) 4 1/2, LED
1157	Cable, Sensing Head, 3 W
1574	Circuit Board, 4/20 mA Card

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.