PCS
PROCESS CONTROL SYSTEMS

PROCESS CONTROL SYSTEMS, INC.

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MAXIGARD™

Altra•gap™

CM3000
SIGNAL TRANSMITTER

Introduction

The MAXIGARD CM3000 is designed to convert shaft speed into a 4/20 mA or 0-10 VDC analog output signal.

Principle of Operation

The Maxigard CM3000 Signal Transmitter is supplied with a non contact sensor and a magnetic target. The speed signal generated by the sensor and magnetic target is converted in the transmitter circuit to a 4-20 mA or 0-10 VDC analog output. The sensor signal is not impaired by misalignment, buildup of dust, dirt, moisture or any other foreign material on the magnetic target or sensor.

Components

THE CM3000 SYSTEM INCLUDES:

- 4" MAGNET DISC (OTHER OPTIONAL TARGETS AVAILABLE)

- SENSOR WITH 10' OF CABLE

- MOUNTING BRACKET

- TRANSMITTER CIRCUIT

- MOUNTING/WIRING SOCKET

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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 & 1C, page 3).
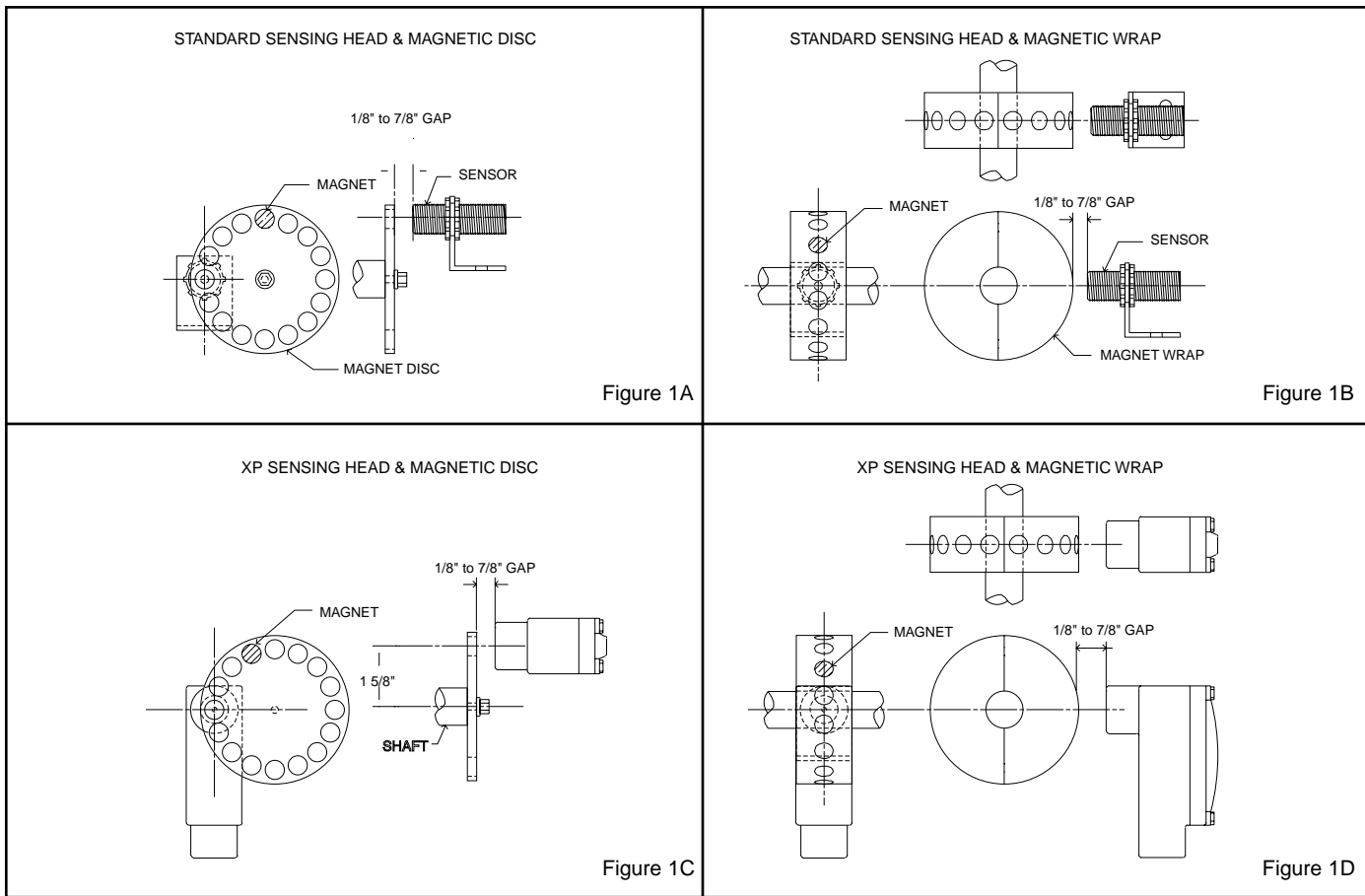
2.0   Magnet Wrap (optional)

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 & 1D, page 3).

> **NOTE**
> There will be a slight gap between the two halves after tightening. This gap will not affect the generated signal.
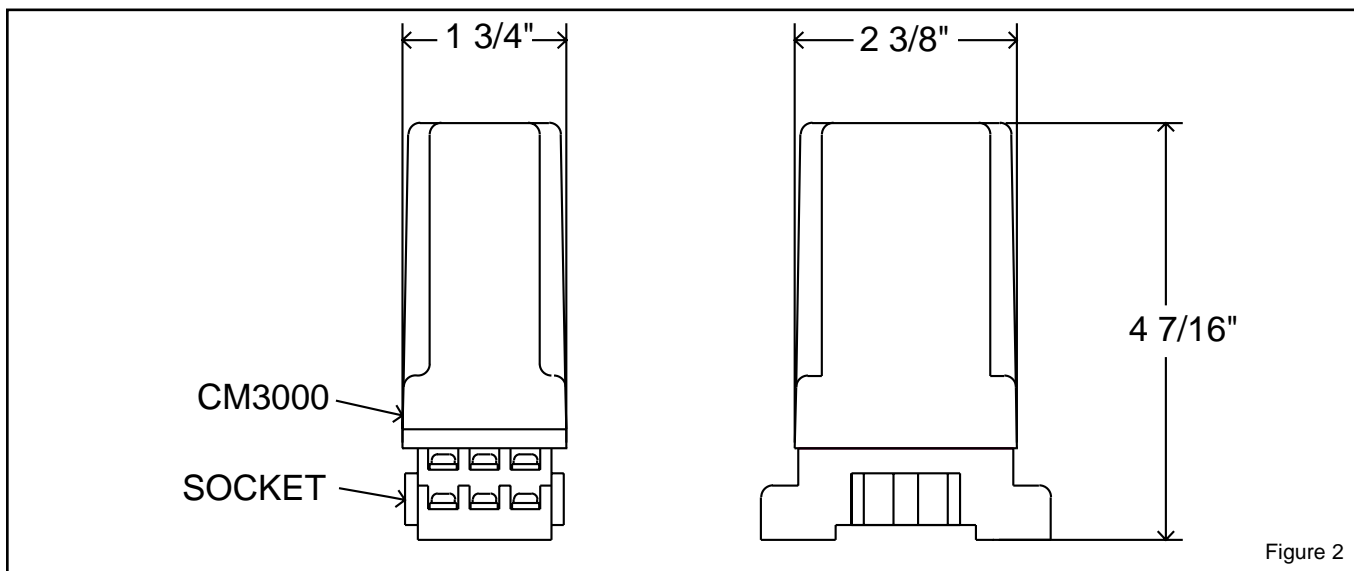
3.0   Mounting the Sensing Head

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

3.2   The gap setting between the sensor and magnet disc should be approximately 1/8" - 7/8".

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STANDARD SENSING HEAD & MAGNETIC DISC

1/8" to 7/8" GAP

MAGNET

SENSOR

MAGNET DISC

Figure 1A

STANDARD SENSING HEAD & MAGNETIC WRAP

MAGNET

1/8" to 7/8" GAP

SENSOR

MAGNET WRAP

Figure 1B

XP SENSING HEAD & MAGNETIC DISC

1/8" to 7/8" GAP

MAGNET

1 5/8"

SHAFT

Figure 1C

XP SENSING HEAD & MAGNETIC WRAP

MAGNET

1/8" to 7/8" GAP

Figure 1D

4.0 Transmitter Mounting

4.1 The CM3000 is supplied with an eleven pin socket designed for back panel or din rail mounting in an electrical enclosure.
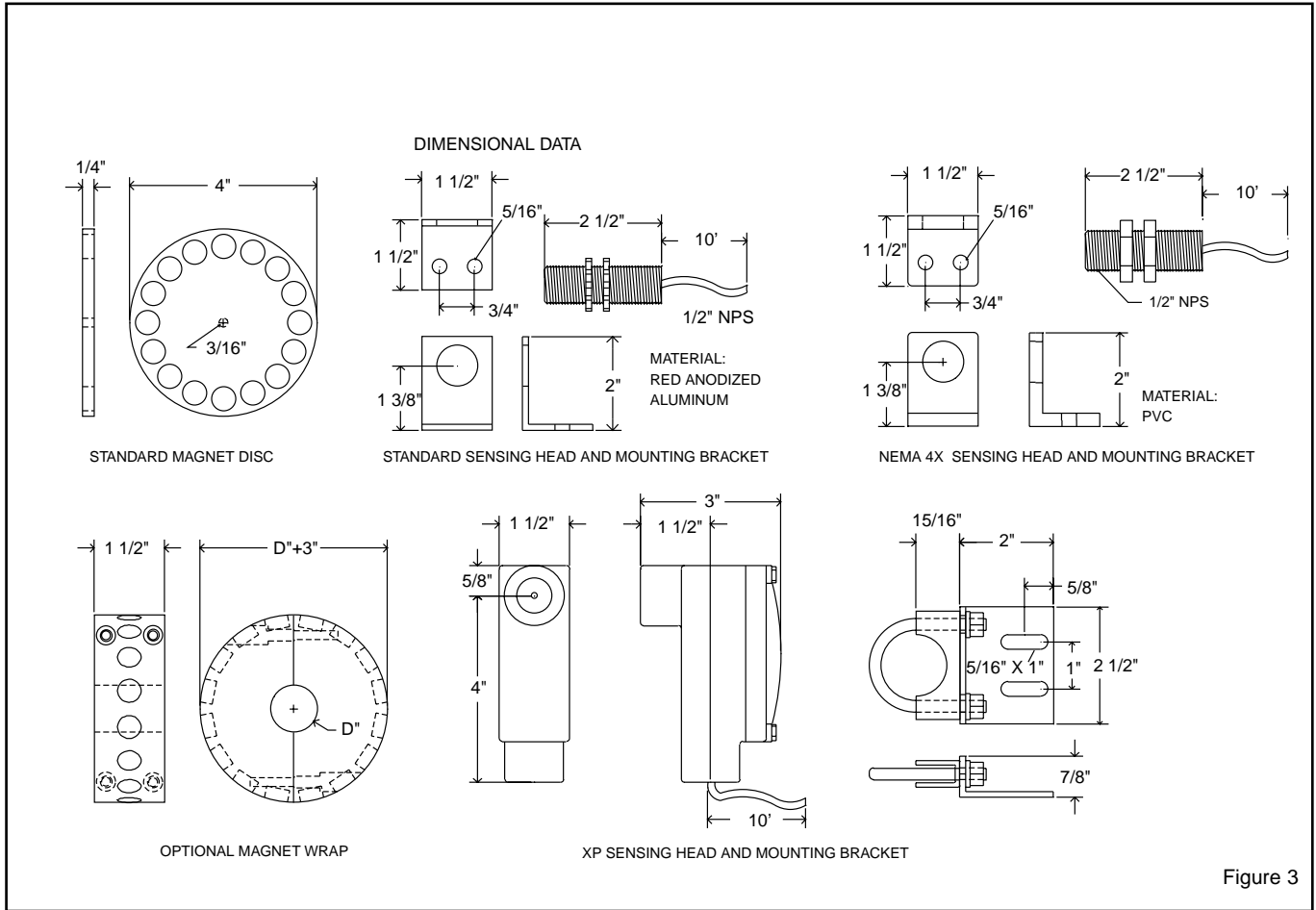(see figure 2, page 3)

1 3/4"

2 3/8"

4 7/16"

CM3000

SOCKET

Figure 2

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DIMENSIONAL DATA

1/4" 4"

3/16"

STANDARD MAGNET DISC

1 1/2"
1 1/2"
5/16"
3/4"
2 1/2"
10'
1/2" NPS

1 3/8"
2"

MATERIAL:
RED ANODIZED
ALUMINUM

STANDARD SENSING HEAD AND MOUNTING BRACKET

1 1/2"
1 1/2"
5/16"
3/4"
2 1/2"
10'
1/2" NPS

1 3/8"
2"

MATERIAL:
PVC

NEMA 4X SENSING HEAD AND MOUNTING BRACKET

1 1/2"
D"+3"
D"

OPTIONAL MAGNET WRAP

1 1/2"
5/8"
3"
1 1/2"
4"
10'

15/16"
2"
5/8"
5/16" X 1"
1"
2 1/2"
7/8"

XP SENSING HEAD AND MOUNTING BRACKET

Figure 3

SECTION 2 - FIELD WIRING

5.0   Sensor Wiring

5.1   Connect the sensing head cable to screw terminals 2 & 5, located on the CM3000 transmitter socket.
(see figure 4, page 5)

5.2   The sensor comes standard with 10' of cable. Additional cable can be added as required. Be sure to maintain continuity. Wrap the splice with the foil shield and electrical tape.
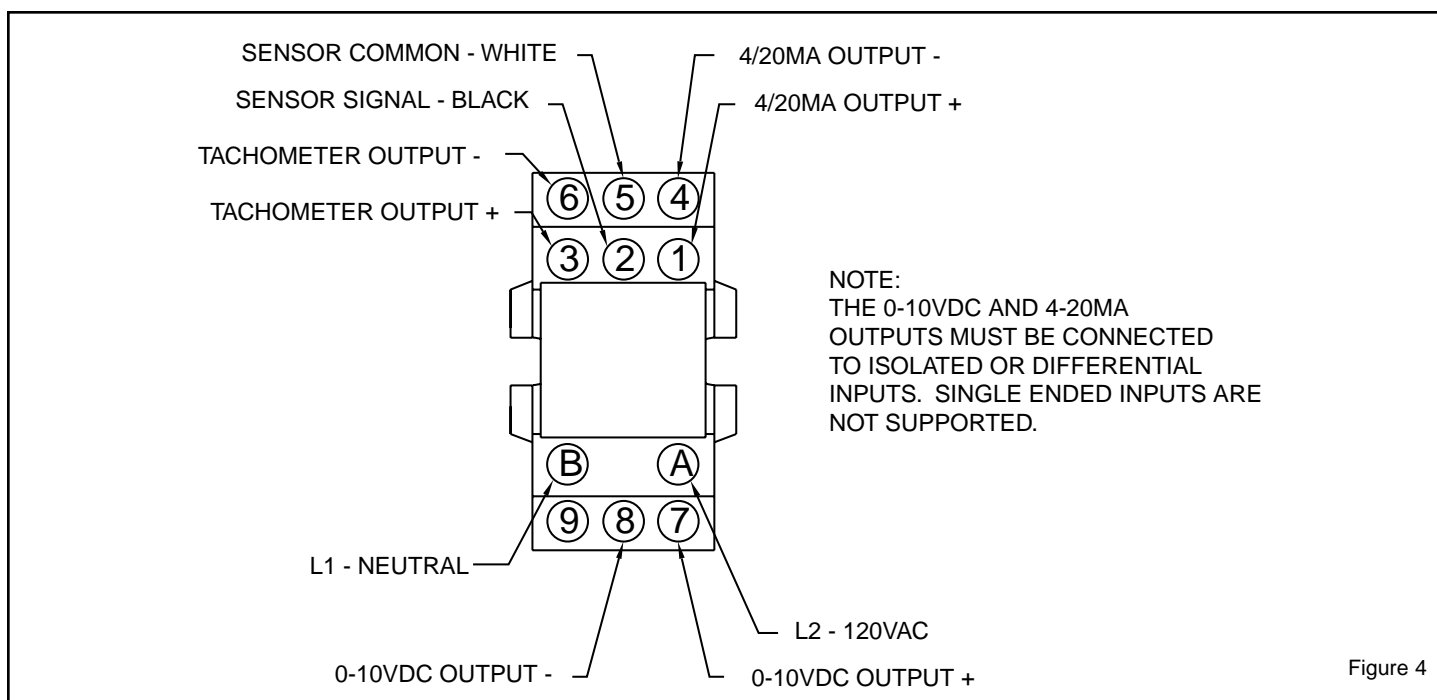
SENSING HEAD CABLE
Use "Belden" #8761 or equal. Cable should not be run in the same conduit as power wires. Maximum distance of cable run 10,000'. Make good splice connections and check continuity.

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6.0   Wiring power to the CM3000 Signal Transmitter

> **WARNING**
> Be sure line voltage is off before wiring and connecting power to transmitter socket.

6.1   Wire 120 VAC directly to screw terminals B L1 and A L2 located on the signal transmitter socket. The green LED light will be on when power is applied.
(see figure 4, page 5)

SENSOR COMMON - WHITE
SENSOR SIGNAL - BLACK
TACHOMETER OUTPUT -
TACHOMETER OUTPUT +
4/20MA OUTPUT -
4/20MA OUTPUT +

NOTE:
THE 0-10VDC AND 4-20MA OUTPUTS MUST BE CONNECTED TO ISOLATED OR DIFFERENTIAL INPUTS. SINGLE ENDED INPUTS ARE NOT SUPPORTED.

L1 - NEUTRAL
L2 - 120VAC
0-10VDC OUTPUT -
0-10VDC OUTPUT +

Figure 4

7.0   Speed Range Selection

7.1   Set dip switch (SW 1) located on the top of the transmitter module, for the monitored shaft operating speed range.
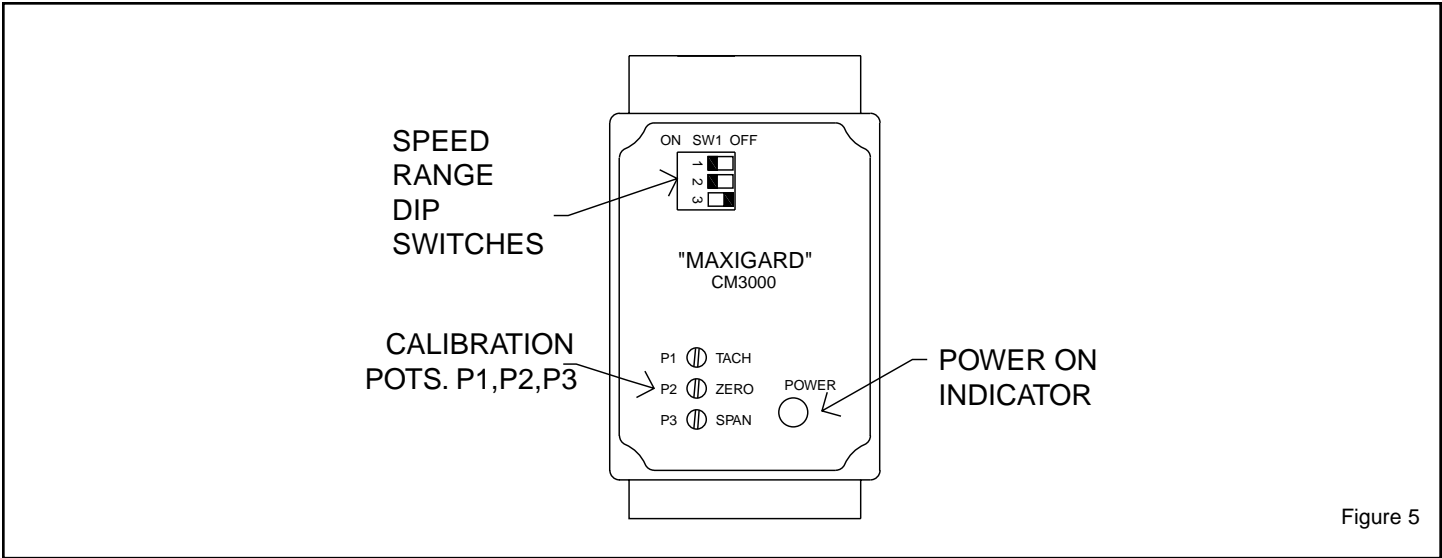(see figure 5, page 6)

Figure 5

8.0 Output Signal Calibration (4/20 mA or 0-10 VDC)

8.1 The CM3000 Signal Transmitter has been factory calibrated and tested for a 4/20 mA signal output unless otherwise specified. Final calibration will be required at start up. This calibration is made by adjusting Zero POT P2 and Span POT P3.

> **NOTE**
> Calibration POTS are sensitive to adjustment and require a light touch. POT P1 is for the optional tachometer calibration only and does not require adjustment unless system employs a tachometer.
> (see section 10, page 8 for calibration)
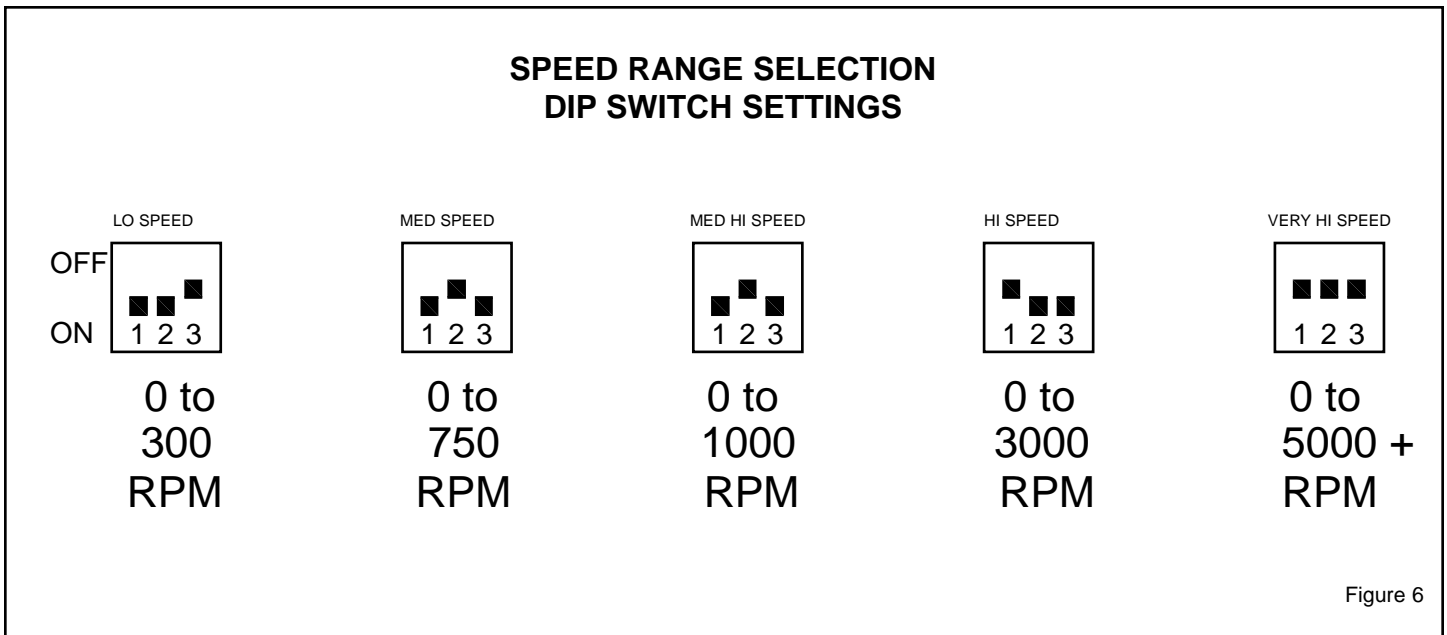
9.0 4/20 mA Output Signal

> **NOTE**
> Use an analog or digital voltmeter per these instructions to calibrate output signal.
>
> **WARNING**
> Users input circuit must be isolated type

9.1 Set the voltmeter to the milli-amp scale adequate for 4/20 mA calibration.

9.2 Connect the voltmeter positive and negative leads to the transmitter socket screw terminals, 1 (+) and 4 (--).
(see figure 4, page 5)

9.3 Attach the magnet disc and mount the sensing head per section 1.0 and 2.0. Connect the sensing head wires per section 5.0.

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9.4 Energize the CM3000 signal transmitter with 120 VAC.
(see section 5.2)

9.5 With power on and monitored machine at -0- speed, adjust the Zero POT P2, located on the top of the transmitter module, (C.W. or C.C.W.) until voltmeter reads 4 mA at zero machine speed.
(see figure 6, page 7)

9.6 With power on and monitored machine running at full speed, adjust the Span POT P3, located on the top of the transmitter module, (C.W. or C.C.W.) until voltmeter reads 20 mA at full speed.
(see figure 6, page 7)

SPEED RANGE SELECTION
DIP SWITCH SETTINGS

LO SPEED	MED SPEED	MED HI SPEED	HI SPEED	VERY HI SPEED
0 to 300 RPM	0 to 750 RPM	0 to 1000 RPM	0 to 3000 RPM	0 to 5000 + RPM

Figure 6

10.0   0-10 VDC Output Signal

NOTE
Use an analog or digital voltmeter per these instructions to calibrate output signal.

WARNING
Users signal common must be isolated for ground or AC neutral.

10.1 Set the voltmeter to the DC Voltage scale adequate for 0-10 VDC calibration.

10.2 Connect the voltmeter positive and negative leads to the transmitter socket screw terminals, 7 (+) and 8 (--).
(see figure 4, page 5)

10.3 Attach the magnet disc and mount the sensing head per section 1.0 and 2.0. Connect the sensing head wires per section 5.0.

10.4 Energize the CM3000 Signal transmitter with 120 VAC.
(see section 5.2)

10.5 With power on and monitored machine at -0- speed, adjust the Zero POT P2, located on the top of the transmitter module, (C.W. or C.C.W.) until voltmeter reads -0- VDC at zero speed.
(see figure 6, page 7)

10.6 With power on and monitored machine running at full speed, adjust the Span POT P3, located on the top of the transmitter module, (C.W. or C.C.W.) until voltmeter reads 10 VDC or to the output range required (0-1, 0-5 VDC) at full speed.
(see figure 6, page 7)

11.0   Optional Tachometer Calibration

11.1 Connect the display meter signal in negative and positive leads to screw terminals 3 (+) and 6 (--) located on the CM3000 Transmitter socket.
(see figure 4, page 5)

11.2 With power on and monitored machine running at full speed, adjust Tach POT P1, located on the top of the transmitter module, (C.W. or C.C.W.) until meter displays the machine operating speed.
(see figure 6, page 7)

SPARE PARTS LIST

Part No.	Description
1660	CM3000 Transmitter Module
1129	Sensing Head (Std) W/10' of Cable
1130	Mounting Bracket W/ Jam Nuts
1132	Sensing Head (XP) W/10' of Cable
1134	Mounting Bracket
1136	Magnet Disc 4" Diameter
1378	Magnet Disc 8" Diameter
1177	Meter, Tachometer, (Analog)
1324	Meter, Tachometer, (Digital)
1139	Sensing Head Cable

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.

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