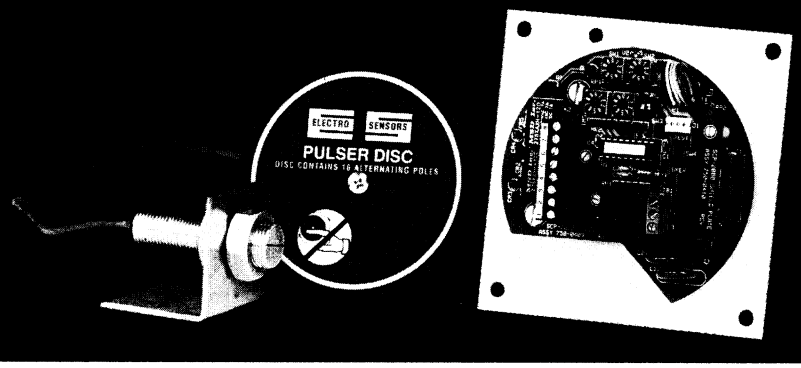
Remote Speed Switch

ELECTRO SENSORS Model REM-1000/2000 Series



Features:

- **Calibration Does Not Require Power**
- **1-100 and 10-1000rpm Set Point Ranges – Higher Speed Ranges Available**
- **ETL® Approved to UL® 508 Standard**
- **Completely Field Adjustable**
- **Fail-Safe Operation in Overspeed or Underspeed Mode**
- **Single or Double Set Point Protection**
- **Optional Enclosures Available**

Description:

The REM-Series Switches are complete systems that provide one or two adjustable set points, while monitoring a single rotating shaft. The REM-Series System is an efficient way to continuously track proper machine RPM, and provide a relay output upon detection of an unwanted change in speed or stoppage of the monitored shaft.

Principle of Operation:

The REM-Series Switch is supplied with a shaft mounted magnetic disc or wrap which generates an alternating magnetic field that is picked up by the non-contact sensor. The sensor transmits this speed signal as a digital pulse (frequency) to the switch via a 3-conductor shielded cable. The REM Switch decodes this frequency signal to determine shaft speed, and compares this to its adjusted set point(s). The relay output(s) can then be used for alarm and/or shutdown, assuring optimum machine protection and process integrity.

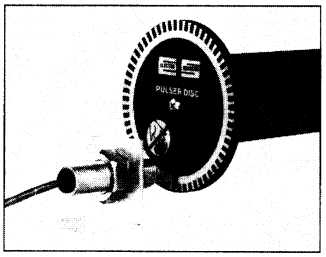
A unique feature of the REM-Series Switch is the ability to mount the switch at a distance from the sensor. This is useful for installation where plant electrical controls are centrally located in a control cabinet. Consult Electro-Sensors, Inc. for information on enclosures if needed.

Installation:

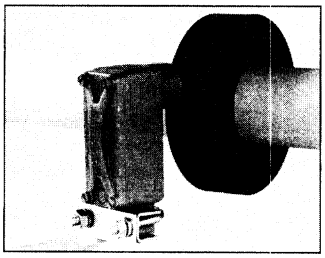
The REM-Series Switch System includes the chassis mounted switch, a non-contact Hall-Effect sensor and a magnetic disc or optional pulser wrap. The Model 906 sensor is designed for standard service. An optional explosion-proof sensor Model 907, is available for hazardous locations. The sensor is connected to a 3-position terminal on the top board of the REM-Series Switch (diagram 1). The following table shows color code connections for the sensors.

Sensor Connection Table:

Terminal	Description	Sensor Model-Standard 906-907	Sensor Model-Optional 930-931-932-933-1101-1102
1	Supply	Red	Red
2	Signal	Black	Clear
3	Ground	Clear/Shield	Black/Shield



Sensor and Pulser Disc



Explosion Proof Sensor and Pulser Wrap

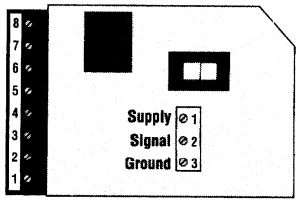
Pulser Disc:

To mount the Pulser Disc, center drill the monitored shaft to a depth of 1/2 inch with a No. 21 drill and tap it for a 10-32UNF screw. Apply Loctite™, or a similiar adhesive on the screw threads to keep the pulser disc tight. Attach the disc, decal side out, with the 10-32UNF machine screw, provided. Pulser Discs can be used with all Electro-Sensors, Inc. sensors.

Pulser Wrap (optional):

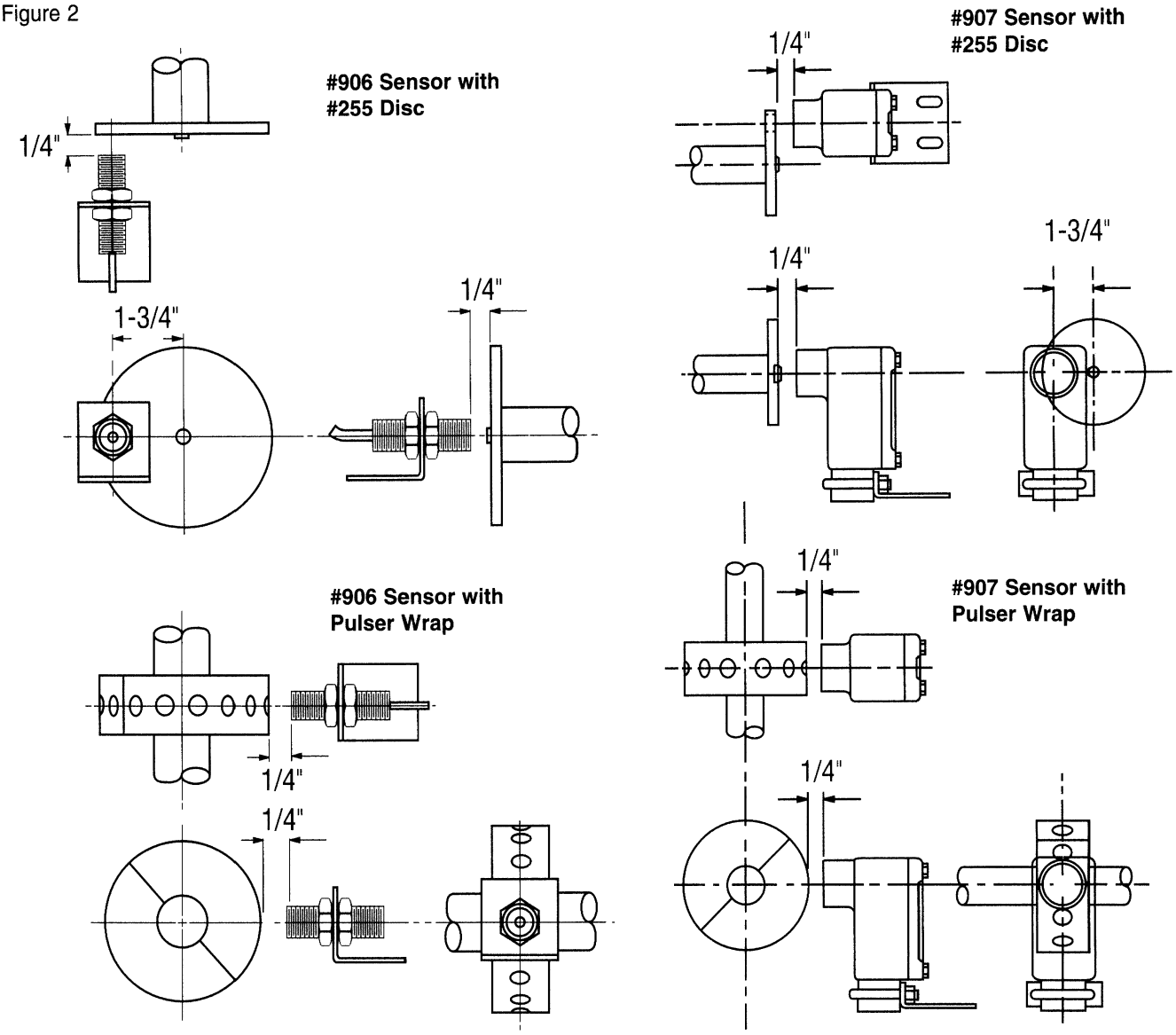
Pulser wraps are custom manufactured to fit the specific diameter of the shaft on which they will be mounted. To mount the wrap, remove the 4 Allen-head cap screws holding the halves of the wrap together, place the halves around the shaft, and reinsert the screws. Tighten the screws to 8ft lbs. Pulser Wraps can be used with all Electro-Sensors, Inc. sensors.

Diagram 1. REM Board Connections:



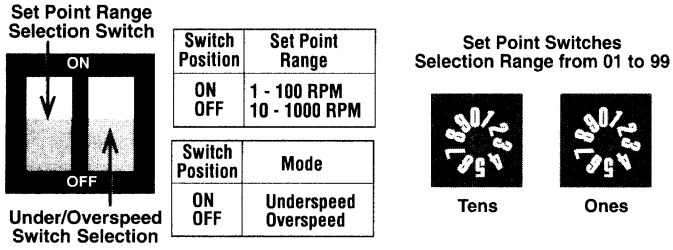
NOTE: *the REM1000/2000 accepts NPN Open Collector Sensor Inputs. The Supply Voltage is +12Vdc.*

Sensor Alignment
Figure 2



REM-1000 Calibration:

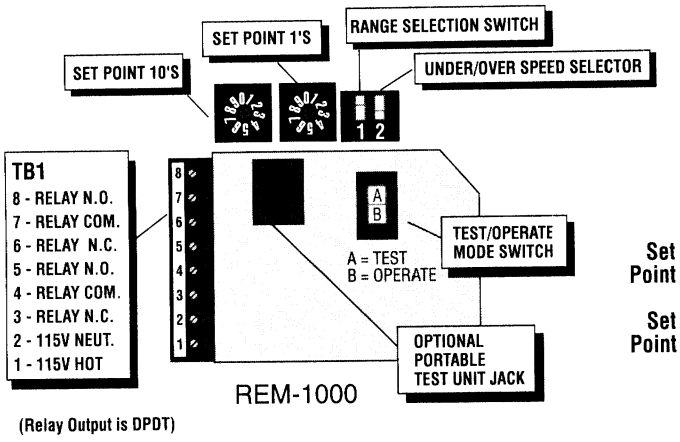
REM Switch Locations
Figure 3

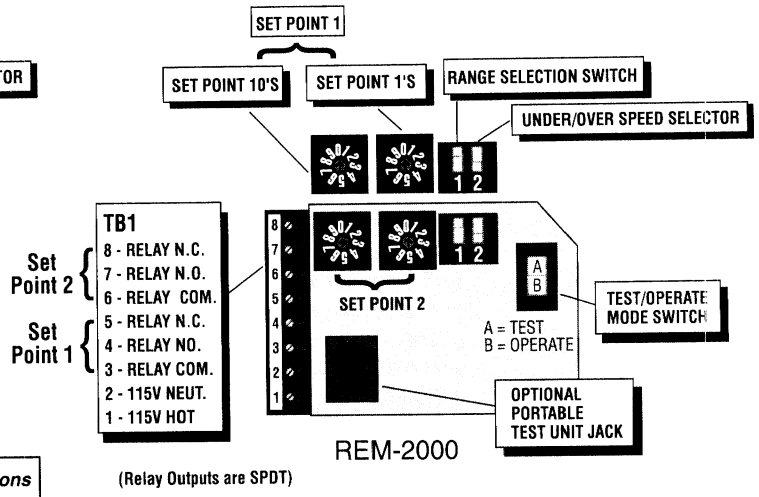


There are 3 steps to calibrating the REM-1000:

1. Determine whether the relay should de-energize when the shaft speed drops below the set point speed (Under Speed Operation), or when the shaft speed goes above the set point speed (Over Speed Operation). Use the Over/Under Speed Selection Switch to place the REM-1000 in the desired mode (see Figure 3, for switch position).
2. If the set point will be set to trip the relay at a speed below 100rpm, set the Set Point Range Selection Switch to the 1-100rpm range. If the set point will be set to trip the relay at a speed that is above 100rpm and below 1000rpm, select the 10-1000rpm range.
3. Set the Rotary Set Point switches to the desired set point speed. The switches can be set at any number from 01 to 99. For example: If the RPM Range Selection Switch is set in the 1-100rpm Range and the desired set point speed is 50rpm, the Set Point Switches should be set to 50. In the 10 to 1000rpm range, the set point is 10 times the switch setting. (i.e. a switch setting of 80 results in a set point of 800rpm).

NOTE: *Calibration should be done with power to the REM-1000 turned OFF. If a change is made to the calibration while power is ON (Not Recommended), cycle power to the unit. This will store the new set point.*





IMPORTANT: Note the Difference in Relay Terminal Connections between the REM-1000 and REM-2000

Start Delay:

A 10-second Start Delay is built into the REM-Series Switches. In Under Speed Mode, the Start Delay holds the relay(s) in an energized state for 10 seconds, allowing the monitored shaft to reach a speed above the set points(s) before monitoring begins. The Start Delay begins when power is applied to the REM-Series Switch.

Signal Loss Protection:

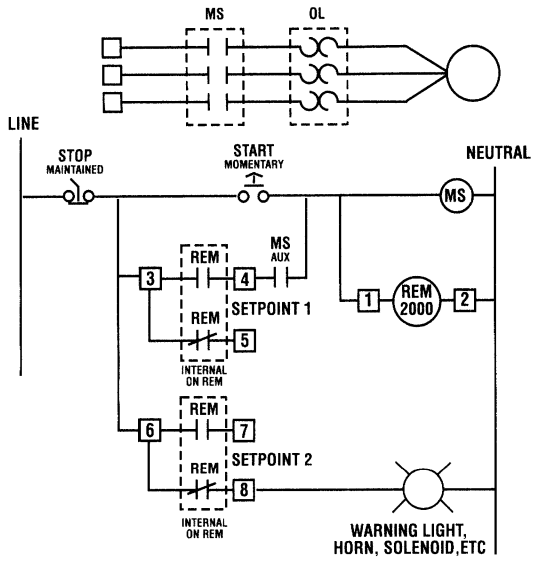
In Under Speed Mode, a loss of the sensor signal will be detected immediately, and the relay will de-energize. In Over Speed Mode, the loss of signal is detected and the REM-Series Switch will wait 30-seconds for the signal to resume, preventing unwanted signal loss shutdown when monitoring a very slow speed shaft. After the 30-second interval has elapsed with no incoming signal, the relay is de-energized.

Special Options:

Special options are available from the factory to modify the standard functions of the REM-Series Switches. Options include: Increased or Decreased Start Delay Interval; No Start Delay, Reduced or Enlarged Set Point Hysteresis, and Signal loss Protection Inactivation in Over Speed Mode.

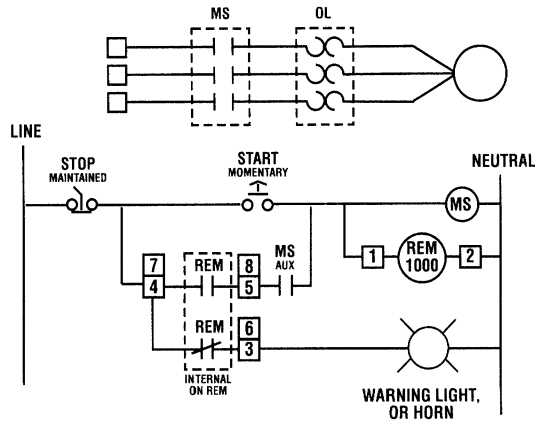
Typical Wiring Diagrams:
REM-2000 Motor Shutdown with Alarm

Figure 4.



This Wiring Configuration Will Disable the Alarm on a Stop Command

REM-1000 Motor Shutdown with Alarm



This Wiring Configuration Will Disable the Alarm on a Stop Command. To Maintain the Alarm, Replace the Maintained Stop Switch with a Momentary Normally Closed Switch.

Wiring Diagram Key

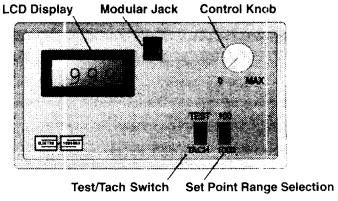
MS Motor Starter (Not Supplied)
OL Overload Contacts
N.O. Normally Open (Relay is in De-Energized State).

WARNING

During a stopped condition, even a slight movement of the shaft magnet disc could energize the control relay and start the motor if the Motor Starter Auxiliary Normally Open Contact (MS Aux N.O.) is not wired in series as shown in these typical wiring diagrams. This situation could cause equipment damage or PERSONAL INJURY! To prevent starting the motor accidently, ALWAYS USE PROPER LOCK-OUT/TAG-OUT PROCEDURES.

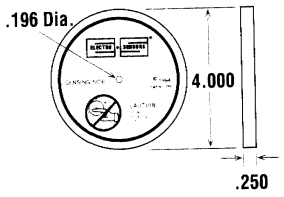
Model PTU1000
Optional Test Unit

The PTU-1000 Test Unit can be used with the REM Switch to verify shaft speed, or to simulate any unwanted condition for test purposes.

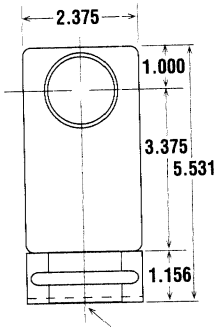


Electro-Sensors, Inc. Remote Speed Switch, Model REM-1000/2000

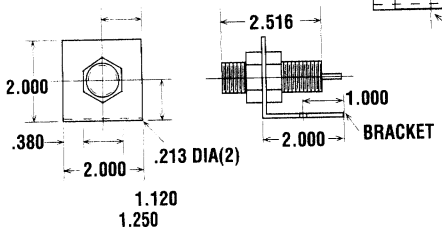
End of Shaft Mount Pulser Disc
Part No. 255
Stock No. 700-000200

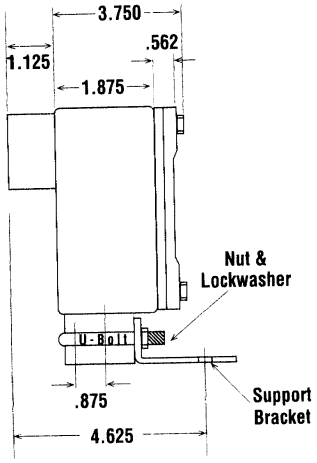


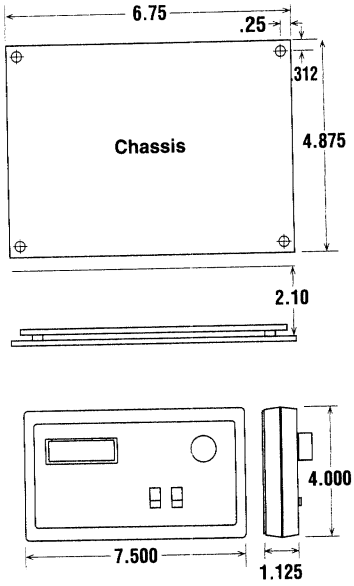
Explosion Proof Sensing Head - Optional
P/N 907
Stock No. 775-000600



Digital Sensing Head
P/N 906
Stock No. 775-000500







PTU-1000 Portable Test Unit

Specifications:

Electrical Approval . . . . . UL® Standard 508, Industrial Control Equipment by ETL®.

Power:

Voltage	115Vac ±10Vac Standard, 230Vac Optional
Frequency	50-60Hz
Wattage	1.1VA

Input Signal:

Type	Open Collector/Logic
Amplitude	5V Pull-Up, 4.7K Ohms
Impedence	220 Ohms to 15V
Maximum Frequency	2666.6Hz
Minimum Pulse Width	1msec.

Set Point Data:

Number Available	One or Two
Actuation State	Under or Over Speed
RPM Range	1-100rpm, 10-1000rpm
Adjustment	Rotary Switches (1 tens and 1 ones digit).
Set Point accuracy	0.005% @ bottom of range 0.25% @ mid range 0.5% @ top range
Hysteresis	6%
Relay Contact Rating	Isolated, 5A 115Vac Resistive
Contact Arrangement	REM-1000: One Form C, D.P.D.T REM-2000: Two Form C, S.P.D.T.

Physical/Envirnomental:

Electrical Connections	8-Position Terminal Block
Operating Temperature	-40°C to 60°C*
Storage Temperature	-65°C to 125°C
Mounting	Chassis

Sensor:

Material (Transducer Body)	Aluminum
Material (Mounting Bracket)	Steel
Thread Size (Std. Transducer)	3/4-16UNF
Output Type	Open Collector, Current Sinking 20mA Max.
Signal Cable	3-Conductor Shielded, 10ft Supplied
Maximum Cable length	500 Feet
Operating Temperature	-40° to 60°C*
Sensing Distance between Transducer and Pulser Disc	1/16inch to 1/4inch

Optional Explosion-Proof Sensor:

Housing and Cover	Cast Aluminum, C.S.A. Approved U.L. Rated: Class I Group D; Class II Group E, F, G; Class III

Pulser Disc:

Material	Nylon 12 (with ferrite material) Aluminum (optional)
Dimensions	4inch Diameter x 1/4inch thick
Operating Temperature	-40°C to 60°C*
Maximum Speed	Consult Factory

Pulser Wrap (optional):

Material	PVC (standard), Aluminum (optional)
Operating Temperature	-40°C to 60°C*
Maximum Speed	Consult Factory

REM-1000/2000 Spare Parts List:

	Stock No	Part No.
Standard Sensor	775-000500	906
Explosion Proof Sensor	775-000600	907
4-inch Diameter Pulser Disc	700-000200	255
Aluminum 4-inch Diameter Disc	700-001500	255-A
Optional Pulser Wrap	Consult Factory	
REM-1000 Internal Electronics	Consult Factory	
REM-2000 Internal Electronics	Consult Factory	
Optional Enclosure NEMA 4X	305-004700	
Optional Enclosure NEMA 12	287-00300	

Specifications Subject to Change Without Notice.

CALL TOLL FREE FOR MORE INFORMATION

ELECTRO • SENSORS **Electro-Sensors® Inc.**

6111 Blue Circle Drive • Minnetonka, MN • 55343 USA

1-800-328-6170

IN MINNESOTA: 612/941-8171

FAX. NO. 612/930-0130