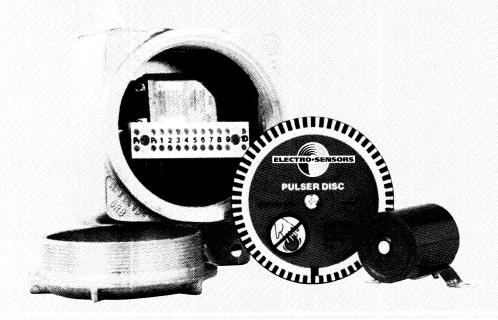
# **Shaft Speed Switch**

ELECTRO-SENSORS R100/R5000, R100SP/R5000SP



## Features:

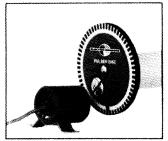
- ► Easy Installation
- ► Dust, Dirt, Grease Proof
- ► Cast Aluminum Housing, FM, UL, CSA Rated
- ► Fail-Safe Wiring
- ► Optional Explosion-Proof Sensor
- ► Optional Split Collar Pulser Wrap

The R100/R5000 Shaft Speed Switch and R100SP/R5000SP set-point slow down switch are rotation monitoring systems. These complete systems are ideal for detecting the unwanted slow down or stoppage of process equipment. The systems are commonly applied to: drive trains, power driven components, tail pulleys, screw conveyors, exhaust fans, crushers, etc. In the event of rotational failure, such as broken drives, belt slippage, overloads, clogs and jams, the DPDT control relay can be used to provide equipment shutdown and/or alarm. This helps to prevent equipment damage, product waste and excess downtime. Electro-Sensors switches are the simple way to detect problems and trouble early.

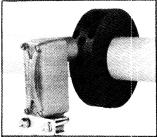
# Principle of operation

While the monitored shaft is rotating, the pulser disc or wrap mounted on the shaft generates a control signal which is picked up by the sensor. A shielded cable carries the signal to the remote heavy duty relay housing.

The Double-pole double-throw (DPDT) relay contacts, rated for 10 amps at 115Vac, resistive, can be used for controlling motors and/or alarms.



**Transducer and Pulser Disc** 



Optional Explosion-Proof Transducer and Pulser Wrap

When the shaft stops rotating or drops below the gross set-point on the SP models, the control signal deenergizes the relay. The switch is fail-safe; any malfunction during operation will de-energize the control circuit.

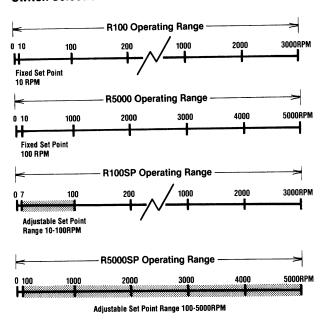
# **Pulser disc**

The end of the shaft to be monitored must be center drilled to a depth of ½" with a No. 21 drill and tapped for 10-32UNF. After applying Loctite® or a similar adhesive on the threads to keep the pulser disc tight, the pulser disc should be attached, decal side out with a 10-32UNF machine screw.

#### Pulser wrap (optional)

When the wrap is shipped, four allen-head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the halves around the shaft and screw together so the wrap fits the shaft tightly. Wraps are custom made to fit a specific diameter.

# **Switch Selection Table**



#### Switch Selection Guide

Refer to the Switch Selection Table to determine which model is appropriate for your application and speed range.

#### Sensing head installation

The standard sensing head is shown in figure 1. Optional heavy duty sensing head is shown in figure 2. Both heads are mounted the same distance from the pulser disc or pulser wrap as specified in the Sensing Head Distance Table. Complete dimensions for mounting the heads are on the last page of this sheet. Ten feet of shielded cable is the standard length for both

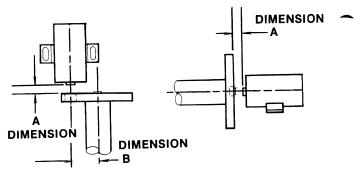
Operation of the R100 and R5000 is affected by the distance between the sensing head and the magnets, shown as dimension "A" in figure 1 with the disc and in figure 2 with the wrap. The table below gives the best operating distance for dimension "A" based on the speed of the shaft to be monitored.

Note that the pulser disc supplied with the R100/R100SP switches has 16 magnetic poles and the R5000/R5000SP switches are equipped with an 8 magnetic pole disc. This is to provide the appropriate number of pulses per revolution for your operating speed range. If the shaft speed is not known, it should be checked with a hand held tachometer.

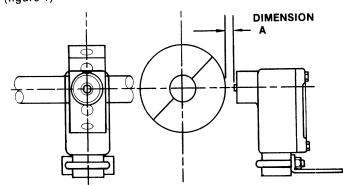
# Sensing Head Distance Table

Contains and an arrangement of the contains and arrangement of the contains and arrangement of the contains and arrangement of the contains are arrangement of					DIMEN-
MODEL NO.	DISC	WRAP*	SHAFT RPM	DIMEN- SION "A"	SION "B"
R100	4" disc with	wrap	10-50	1/8"	1 3/4"
R100	16 magnets	with magnets	50-3000	3/16"	1 3/4"
R5000	2 1/2" disc	wrap	100-2000	1/4"	7/8"
R5000	with 8 magnets	with magnets	2000-5000	1/2"	7/8"

The number of magnets varies with the outside diameter of the wrap.



Sensing head and disc (figure 1)



Sensing head and wrap (figure 2)

#### Mounting the switch housing

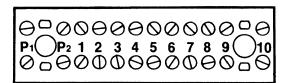
The housing can be mounted either horizontally or vertically with two 1/4" bolts. Keeping the housing entries away from water and making the terminal strip inside accessible should be considered in locating and positioning the housing.

Ten feet shielded cable is supplied. However the switch housing can be remoted up to 1500 feet from the sensing head. The shielded cable can be included with other wiring in conduit. The conduit entrance is tapped 3/4" NPT.

#### Wiring connections

The sensing head is connected to the terminal block by attaching the black lead to terminal 7, the clear lead to terminal 8, and the shield to terminal 9. Apply 115Vac power to the terminal block by connecting the hot lead to terminal P1 and the neutral lead to terminal P2.

#### Terminal block designations



P1 Hot 115Vac Input P2 Neutral

- 1 NC contact
- 2 NO contact
- 3 Common contact
- 4 NC cotact

- 5 NO contact
- 6 Common contact
- 7 Black
- 8 Clear
- 9 Shield
- Sensing Head Connection







#### Set point adjustment R100/R5000

Models R100/R5000 are Shaft Speed Switches and cannot be set point adjusted.

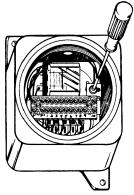
# Set point adjustment R100SP/R5000SP

It is important to complete the installation of the pulser disc or wrap and the sensing head with the correct distance "A" before adjusting the set point.

The unit has been shipped to you with the circuit potentiometer set for zero speed (turned all the way counterclockwise). It is a single-turn potentiometer; turning it clockwise will make the device trip at speeds above zero. (See figure 3.)

For a visual indication of when the unit trips, use an ohmmeter on the X1 range connected across terminal 5 and terminal 6 of TB1. When the trip location is found, turn the potentiometer back, counterclockwise, about ¼ turn. This will set the unit to trip when the shaft speed is reduced. Turning the potentiometer further counterclockwise will make the unit less sensitive to a slowdown speed. Once adjusted, the unit is now ready for final wiring to motor control and/or alarm circuits.

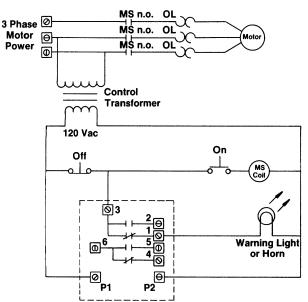
Set point adjustment of R100SP/ R5000SP models only. (figure 3.)



# Wiring Diagrams

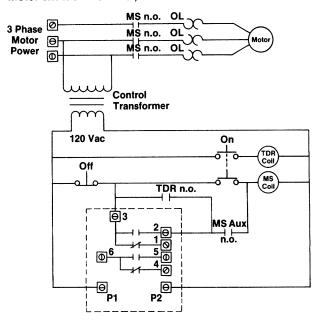
These are typical wiring diagrams. Other circuits may be used and some equipment may require different wiring.

# Alarm only circuit



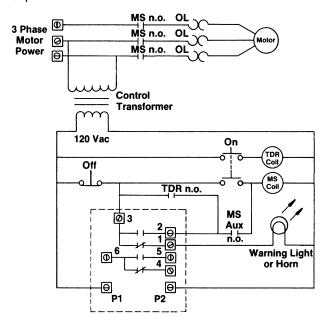
Heavy Duty Shaft Speed Switch, R100/R5000/R100SP/R5000SP

#### Motor shutdown control, no alarm



#### Motor shutdown control, with alarm

This is a typical wiring diagram using the maximum capabilities of the R100/R5000/R100SP/R5000SP.



#### WARNING

During a stopped condition, even a slight movement of the shaft or magnetic 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 accidentally, ALWAYS USE PROPER LOCK-OUT – TAG-OUT PROCEDURES.

#### Wiring Diagram Key

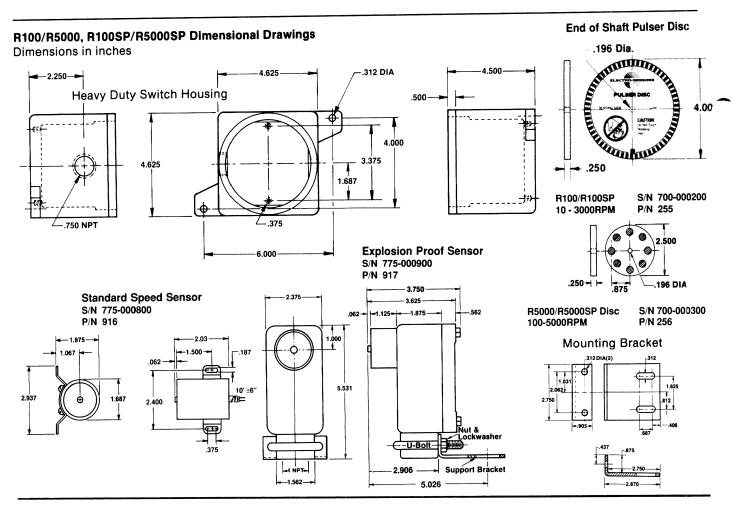
MS Motor Starter (not supplied)

**OL** Overload contacts

n.o. Normally open (relay is in a de-energized state).

TDR Time Delay "OFF" Relay (not supplied)

If the shaft being monitored comes up to speed slowly a **TDR** can be used so the operator will not have to hold the START button in.



### R100/R5000, R100SP/R5000SP Specifications

Power Required	115Vac, 60Hz
Nominal Current Draw	20mA
Peak Current Draw	32mA
Electrical Connections	Terminal Strip
Housing and Cover	Cast Aluminum

Housing and Cover . . . . Cast Aluminum, C.S.A. approved. U.L. rated: Class I Group C.D.

Class II Group E,F,G. Class III

Set Point Accuracy ..... ±20%

Set Point Adjustment\* ... 1 turn potentiometer

Set Point Relay ..... DPDT isolated, 10 amp,

115Vac resistive

Mounting Bolt Holes
Pulser Disc 4" diameter (R100) 16 magnet poles
2.5" diameter (R5000) 8 magnet poles

Sensing Head ...... Machined PVC (explosion proof optional)

Optional)

Sensing Cable ....... 2 Wire, Shielded, 10' Supplied

Spare Parts List	Part No.	Model No.
Pulser Disc (R100, R100SP)	700-000200	255
Pulser Disc (R5000, R5000SP)	700-000300	256
Standard Sensing Head	775-000800	916
Explosion Proof Sensing Head	775-000900	917
2 Conductor Cable	610-000100	213
Water Proof Gasket for XP		
Sensing Head	295-000500	-
XP Switch Housing w/Cover	305-000600	-
Water Proof Gasket for XP		
Switch Housing	295-000200	-
Internal Electronics (R100)	862-000200	250
Internal Electronics (R5000) .	863-000200	251
Internal Electronics (R100SP)	862-000300	250SP
Internal Electronics (R5000SP)	863-000400	251SP
Pulser Wraps	Consult	Factory

Specifications Subject to Change Without Notice

Electro-Sensors, Inc.
www.electro-sensors.com
6111 Blue Circle Drive • Minnetonka, MN • 55343 USA

APPLICATION
SPECIALIST

1-800-328-6170

IN MINNESOTA: 952/930-0100

Distributed by:

<sup>\*</sup> Applies to Adjustable Set Point (SP) Models Only.