

# M100 / M5000

## Principle of Operation:

The M-Series Switches contain a sensor and switching electronics within the same heavy-duty explosionproof housing. A pulser disc, or an optional pulser wrap, rotating in front of the sensing surface produces a control signal which increases with advancing shaft speed. When the control signal is above the set point setting, the control relay is energized. When the control signal drops below the set point setting, the relay deenergizes. The relay has Form C Dry contacts rated at 5 amps 115 Vac resistive, so the M100/M5000 may be used for switching motors and/or alarms.

## Pulser Disc:

The end of the shaft to be monitored must be center drilled to a depth of 1/2 -inch 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 the supplied 10-32UNF machine screw and lock washer.

## Pulser Wrap (optional)

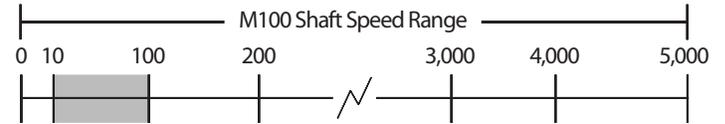
Pulser Wraps are custom manufactured to fit the shaft they will be mounted on. When the wrap is shipped, four allen-head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the halves around the shaft, reinsert the screws and torque them to 5 foot pounds.

## Switch Selection Guide:

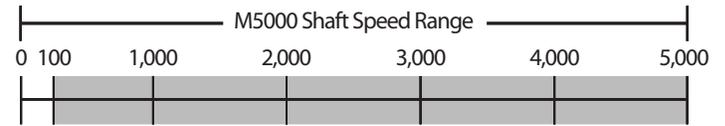
Refer to the Switch Selection Table, to determine which model is appropriate for your application. The primary difference between the M100 and the M5000 is the set point range. The actual operating speed of the monitored shaft can range from 10 to 5000 rpm with either switch. The main criteria for selecting a speed switch is the speed at which the relay energizes and deenergizes.

The M100 can be adjusted to trip from 10 rpm to 100 rpm. The M5000 can be adjusted to trip from 100 rpm to 5000rpm. For further help in selecting a switch appropriate to a specific application, consult an Electro-Sensors, Inc. Application Specialist.

## Switch Selection Table:



M100 Adjustable Set Point Range 10-100 RPM



M5000 Adjustable Set Point Range 100-5000 RPM

## Sensing Surface Gap Distance Table:

(Seeing Figures 1 and 2, below)

Model No.	Dimension "A" (inches)	Dimension "B" (inches)
M100	1/4" ± 1/8"	1-3/4"
M5000	1/4" ± 1/8"	7/8"

**Note:** The pulser disc supplied with the M100 switch is 4 inches in diameter, and the M5000 disc is 2-1/2 inches in diameter.

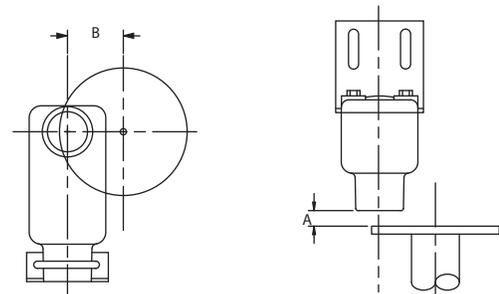


Figure 1: Speed Switch with 255 Pulser Disc

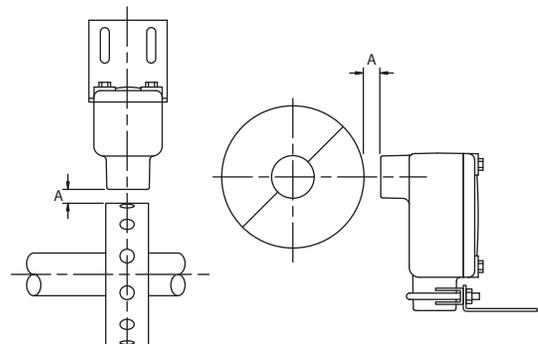


Figure 2: Speed Switch with Optional Pulser Wrap

## Set Point Adjustment:

Complete the installation of the pulser disc wrap and the speed switch with the correct gap distance “A” before adjusting the set point. The unit is shipped with the circuit potentiometer set for its lowest set point speed (turned all the way counterclockwise). The potentiometer is a single-turn type; turning it will make the device trip at speeds above the lowest setting (See fig. 3).

## Calibration:

Remove the back cover of the speed switch. Apply 115 Vac power to the speed switch on the black and white leads. With the shaft turning at normal operating speed, turn the potentiometer clockwise until the relay deenergizes. Turn the potentiometer counterclockwise ¼-turn, which will energize the relay. With this setting, the M-Series Switch will deenergize its relay when the shaft speed slows below normal operating speed. Turning the potentiometer further counterclockwise will make the unit less sensitive to a slowdown in speed. The green LED is illuminated when the relay is energized.

Lead Wire Color Code	
Black	115 Vac
White	115 Neutral
Yellow	Common Contact
Red	N.O. Contact
Blue	N.C. Contact

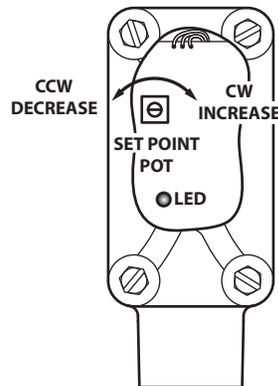


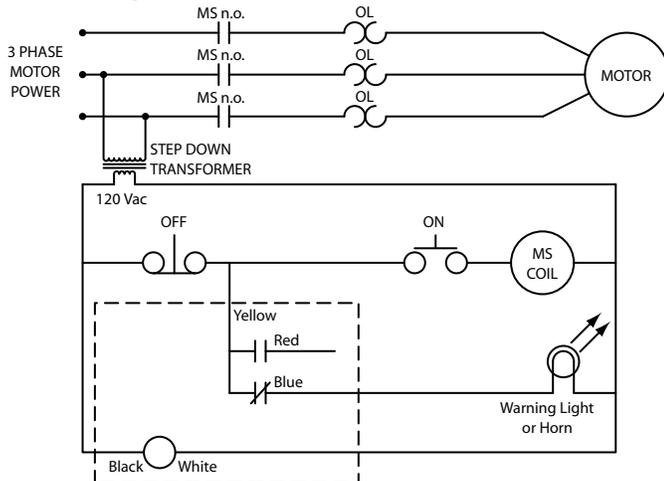
Figure 3: Set Point Adjustment

## Wiring Diagrams:

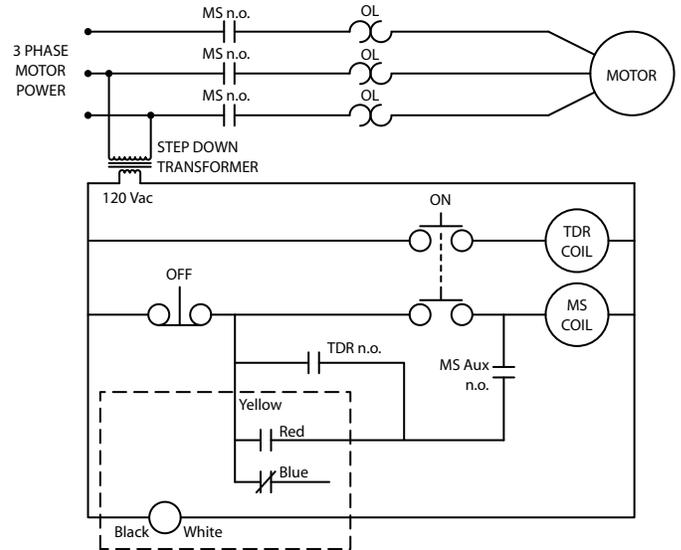
These are typical wiring diagrams. Other circuits may be used and some equipment may require different wiring.

### Alarm only Circuit

#### Miniature Speed Switch • M100/M5000

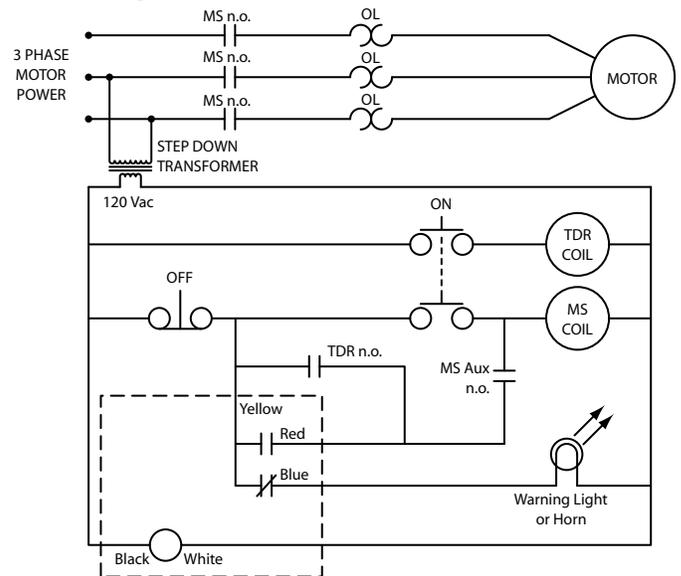


## Motor Shutdown Control without Alarm Miniature Speed Switch • M100/M5000



## Motor Shutdown with Alarm

### Miniature Speed Switch • M100/M5000



### Wiring Diagram Key

MS	Motor Starter (not supplied)
OL	Overload contacts
n.o.	Normally open (relay is in a deenergized 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.

### 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 Auxiliary Normally Open Contact (MS Aus 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

## Troubleshooting Guide:

Symptom: Relay will not energize	
Possible Causes:	Possible Solutions
AC power is not applied to the M100/M5000 correctly	See page 2, figure 3.
Switch is not aligned, or gapped properly.	See page 1, figures 1 and 2
The set point potentiometer is not turned fully counterclockwise	See page 2, Calibration
Shaft is not turning faster than the set point	Check actual RPM

## M100/M5000 Dimensional Drawings: Dimensions in Inches

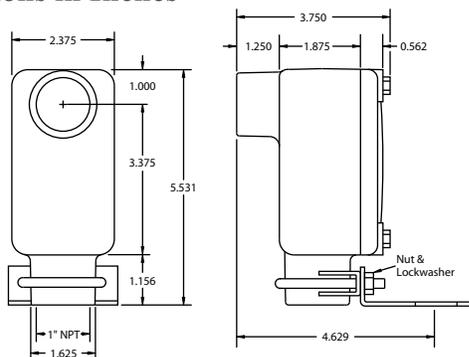


Figure 4: M100/M5000 dimensions

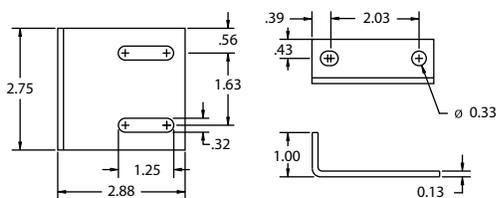


Figure 5: Mounting Bracket

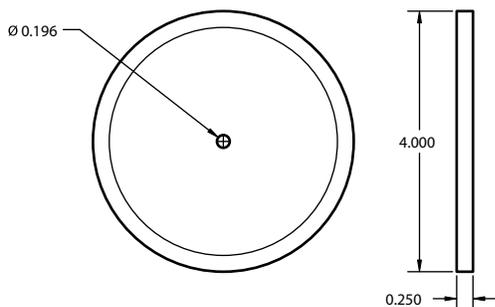


Figure 6: 255 Pulsar Disc (M100)

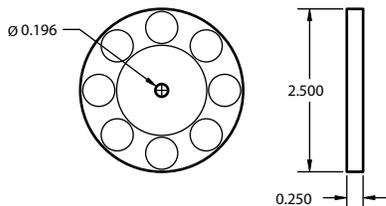


Figure 7: 256 Pulsar Disc (M5000)

## M100/M5000 General Specifications:

Electrical	Parameters
Input Power	115 Vac, 60Hz 4.6 VA
Set Point Relay	1 SPDT, isolated
Relay Contact Rating	5 Amp @ 30 Vdc, or 120 Vac resistive
Sensing Head	Integral
Electrical Connections	Hand Splice, 12-inch length
Set Point Range	M100: 10 to 100 RPM M5000: 100 to 5000 RPM
Set Point Accuracy	+/- 0.5%
Set Point Adjustment	1-turn potentiometer
Electronics	Approved by UL to: UL508, CSA No. 14-95

Physical/Environment	Parameters
 Class I, Div 1, Group D Class II Groups E, F, G UL File: E249019 	
Gasket (optional)*	Provided for waterproofing
Enclosure Dimensions	See Figure 4
Enclosure Material	Cast Aluminium
Operating Temperature	-40°C to +65°C
Storage Temperature	-65°C to +65°C
Shipping Weight	3 lbs
Mounting Bracket	Zinc Plated Steel

255 Pulsar Disc M100	Parameters **
Material	Nylon 12 Std, (opt; PVC, Alum, Stainless-Steel)
Dimensions	4-inch diameter x 1/4-inch thick
Operating Temperature	-40°C to +60°C** (Nylon, PVC)
Operating Temperature	-40°C to +150°C** (Alum, SS)

**Specifications Cont.**

256 Pulsar Disc M5000	Parameters **
Material	PVC Std, (opt; Alum, Stainless-Steel)
Dimensions	2.5-inch diameter x 1/4-inch thick
Operating Temperature	-40°C to +60°C** (PVC)
Operating Temperature	-40°C to +150°C** (Alum, SS)

Pulsar Wrap (optional)	Parameters **
Material	PVC Std. (opt; Aluminum or Stainless-Steel)
Operating Temperature	-40°C to +60°C** (PVC)
Operating Temperature	-40°C to +150°C** (Aluminum, SS)

Specifications are subject to change without notice.

\* Negates Explosionproof Rating

\*\* For details on Discs, Wraps and Sensors, consult factory or visit our website.

Spare Parts List	Stock No.	Part No.
Pulsar Disc (M100)	700-000200	255
Pulsar Disc (M5000)	700-000300	256
Internal Electronics (M100)	750-041300	951
Internal Electronics (M5000)	750-041310	952
Waterproofing Gasket*	295-000500	
Pulsar Wraps	Consult Factory	

**Optional Accessories:**

**DiscGuard**

DiscGuard can be easily added to existing M100/M5000 applications.

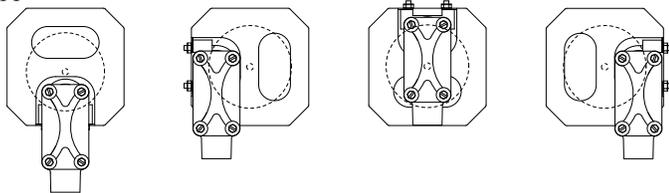


Figure 8: Various DiscGuard mounting positions

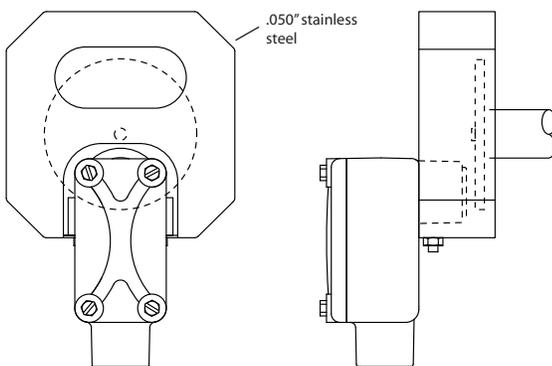
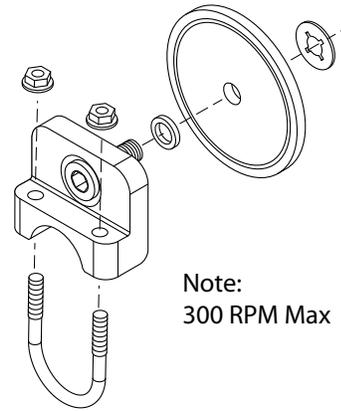


Figure 9: Optional DiscGuard

**EZ-Mount Bracket**



Note:  
300 RPM Max

Figure 10: Optional EZ-Mount bracket w/255-EZ Pulsar Disc

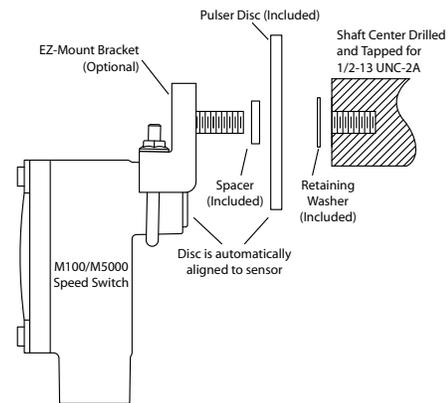


Figure 11: EZ-Mount bracket installation

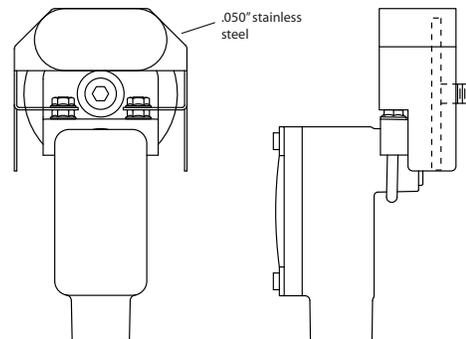


Figure 12: Optional DiscGuard for EZ-Mount Bracket