

SCP1000/2000

Description

The SCP-Series Presettable Machine Switches are complete systems for providing one or two individually adjustable relay set points, while monitoring a single rotating shaft. The SCP-Series Switches are ideal for applications where speed indication for alarm and shutdown purposes is critical for safe and efficient operation of your equipment. The SCP-Series are the “Installers Choice” for protecting bucket elevators, fans, airlocks, mixers, or virtually any rotating shaft, including overspeed sensing requirements.

The SCP-Series Speed Switches are offered with a single relay output (Model SCP-1000), or with a dual relay output (Model SCP-2000) as standard systems. While many applications require only one set point (SCP-1000), the SCP-2000 Double Set Point model can provide additional protection, such as bracketing the operating speed with one Overspeed and one Underspeed set point. Another control function, commonly used in the grain industry, employs both relays set in the Underspeed Mode. The first relay provides warning of a slowdown, and also permits interlock wiring to shut down auxiliary machinery. If the shaft continues to slow down and reaches the second set point speed, the primary process can be wired for shutdown to prevent equipment damage and product loss.

Both models feature visual set point adjustments for “dial in” ease and accuracy of set point settings. The SCP-Series Switches can be completely adjusted with the machinery at rest. There is no need to run the shaft. Precision digital circuitry provides high accuracy, repeatability, and reliability.

Shaft Monitoring:

The SCP-Series Switches have an internal Hall-Effect Sensor which is used to monitor a magnetic target, such as a Pulser Disc or the optional Pulser Wrap, mounted on the monitored shaft. As the Disc or Wrap rotates in front of the Hall-Effect Sensor, a digital signal proportional to the speed of the monitored shaft is produced. The signal is used by the unit's electronics to determine shaft speed and relay set point actuation.

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 max.

SCP-Series Installation

The SCP-Series Switches are supplied with a mounting bracket assembly. The speed switch must be installed so the center line of the magnets passes in front of the center portion of the sensing head as they rotate. When using the pulser disc, the center of the magnetized area of the disc, shown as dimension B in Figure 1, is 1-3/4 inches from the center hole of the disc.

The gap distance between the speed switch and the disc or wrap (dimension A in the diagrams) can be from 1/4-inch +/- 1/8-inch. The proper gap distance is achieved by adjusting the position of the SCP-Series Switches using the slots on the mounting bracket.

Sensing Head and Disc:

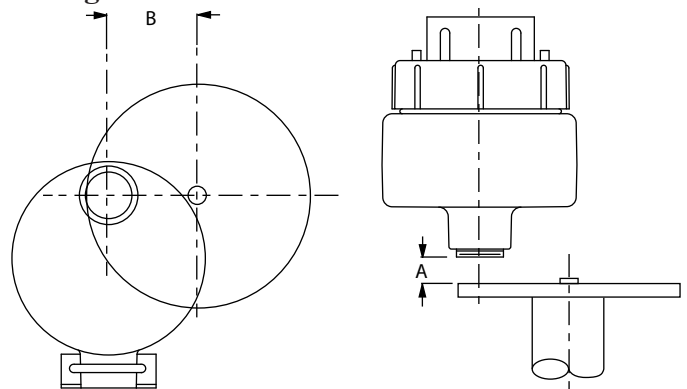


Figure 1

Sensing Head and Wrap:

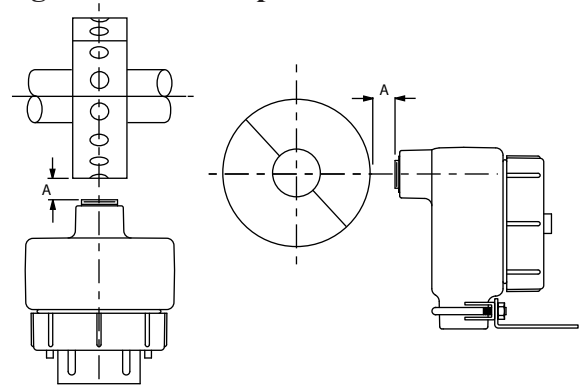


Figure 2

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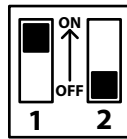
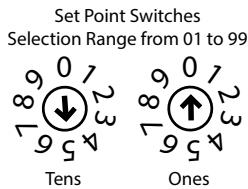
SCP-Series Calibration:

See Figure 3 for Switch Locations

Four Steps to Calibrating the SCP-Series Switches:

1. Determine your monitoring requirement. The Model SCP-1000 provides a single relay set point, while the Model SCP-2000 has two independent relay set points for Double Set Point Protection.
2. Determine whether the relay(s) should deenergize when the shaft speed drops below the set point speed (Underspeed Operation), or when the shaft speed goes above the set point speed (Over Speed Operation). Adjust the Under/Over Speed Operation Switch(es) to set the SCP-Series Switch in the desired Mode. (See the diagram below for the switch positions).
3. If the required relay trip point (set point speed) is below 99 RPM, set the Set Point Range Selection Switch to the 01-99 RPM range. If the relay trip set point is above 99 RPM and below 990 RPM, select the 10-990 range.
4. Set the corresponding rotary Set Point switches to the desired set point RPM. The switches can be set to any number from 01-99. A setting of 00 will read as though it was entered as 01.

Calibration Example: If the Set Point Range Selection Switch is set in the 1-99 RPM range, and the desired set point speed is 50 RPM, the Set Point switches should be set to 50. In the 10-990 RPM range, the set point is 10-times the switch setting (i.e. a switch setting of 50 results in a set point of 500 RPM).



Switch 1	Set point
ON	1 - 99 RPM
OFF	10 - 990 RPM

Switch 2	Mode
ON	Under Speed
OFF	Over Speed

Note: Calibration should be done with power to the SCP 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, and restart the 10-second start delay.

Signal Loss Protection

In Underspeed Mode, a loss of sensor signal will be detected immediately, and the relay(s) will de-energize. In Overspeed Mode, the loss of signal will be detected immediately, but the SCP-Series Switch will wait 30-seconds for the signal to resume. This prevents unwanted shutdown when monitoring very slow-moving shafts. After the 30-seconds have elapsed with no incoming signal, the relay(s) will de-energize.

Start Delay

A 10-second start delay is built into the SCP-Series switches. In Underspeed 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 point(s) before monitoring begins.

The start delay begins when power is applied to the SCP-Series Switch. If additional start delay time is required, an external time delay relay can be used, or consult the factory for more options.

Special Options

Special options are available from the factory to modify the standard functions of the SCP-Series Switches. Options include: Increased or Decreased Start Delay Interval, No Start Delay, Reduced or Enlarged Set Point Hysteresis, Set Point Over 990 RPM, Calibration in Percent of Speed, and Signal Loss Protection Inactivation in Overspeed Mode.

Wiring Connections SCP-1000

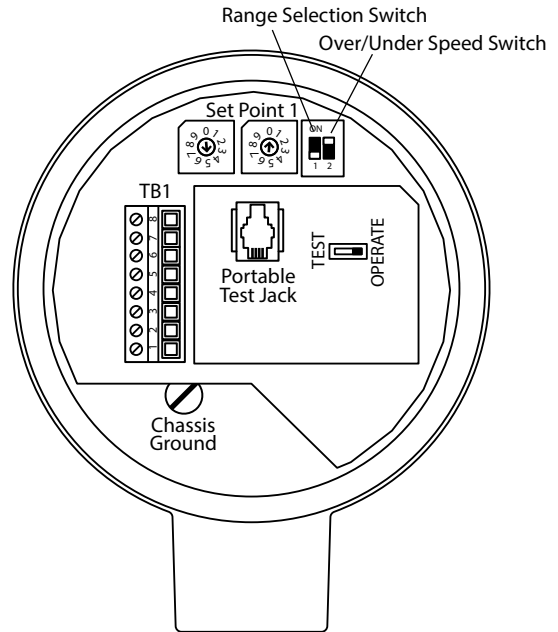


Figure 3a

SCP1000 TB1 Connections	
1	(Hot Vac) (+ Vdc)*
2	(Neut Vac) (- Vdc)*
3	Relay N.C.
4	Relay Common
5	Relay N.O.
6	Relay N.C.
7	Relay Common
8	Relay N.O.
Relay Output is a DPDT	

*For TB1-1 and TB1-2 note supply voltage on label

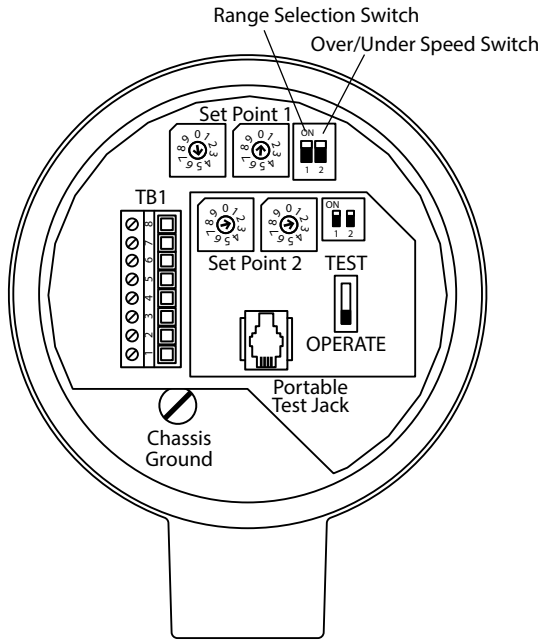


Figure 3b

SCP2000 TB1 Connections		
1	(Hot Vac) (+ Vdc)*	
2	(NeutVac) (- Vdc)*	
3	Relay Common	Set Point 1
4	Relay N.O.	
5	Relay N.C.	Set Point 2
6	Relay Common	
7	Relay N.O.	
8	Relay N.C.	
Relay Outputs are SPDT		

*For TB1-1 and TB1-2 note supply voltage on label

IMPORTANT: Note the difference in Relay Terminal Connections between the SCP-1000 and the SCP-2000

Model PTU-1000

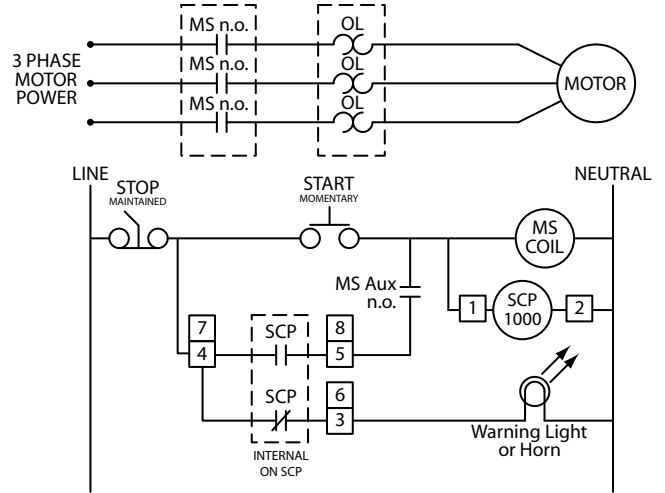
Optional Test Unit:

The PTU-1000 Test Unit can be used with the SCP Switch System to verify shaft speed, or to simulate any unwanted condition for test purposes. Consult factory for pricing and delivery

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.

SCP-1000

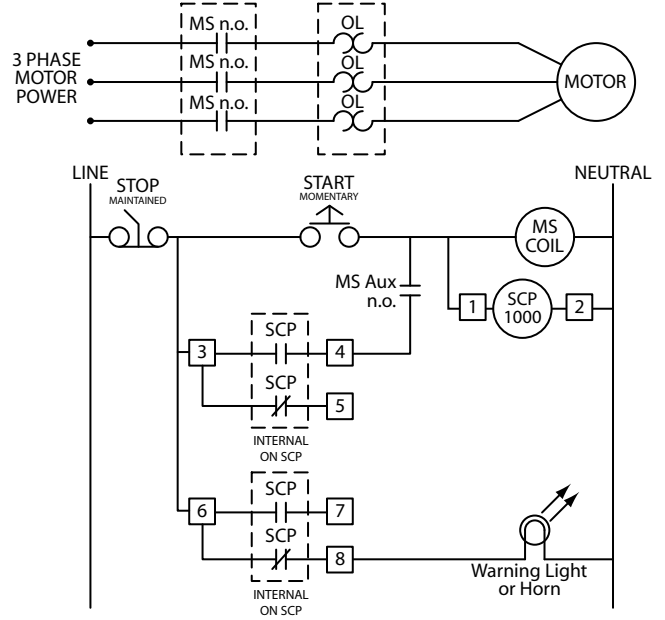
Motor Shutdown with Alarm



Note: 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.

SCP-2000

Motor Shutdown with Alarm



Note: This wiring configuration will disable the alarm on a stop command.

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 Auxilliary 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 PROCEDURES.**

SCP-Series Dimensional Drawings:
Dimensions in Inches

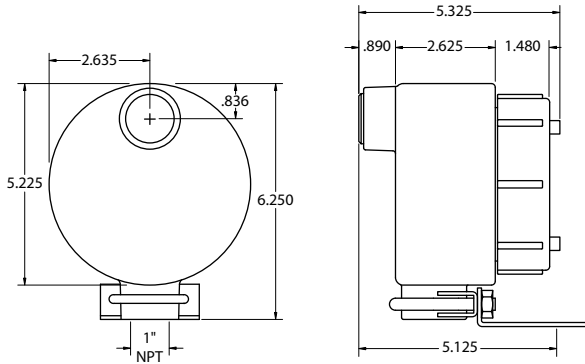


Figure 4

Mounting Bracket

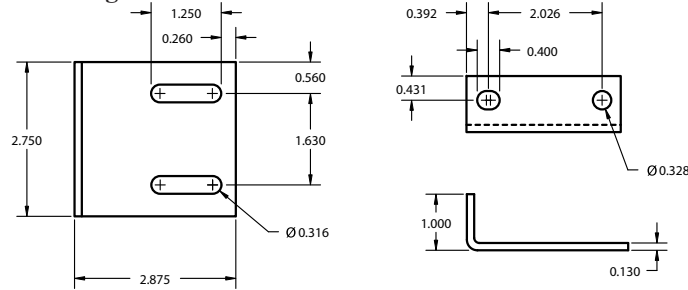


Figure 5

Pulser Disc

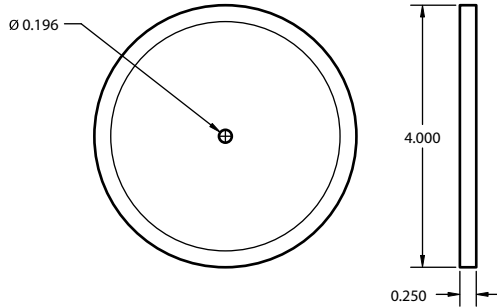


Figure 6

(Optional) PTU-1000

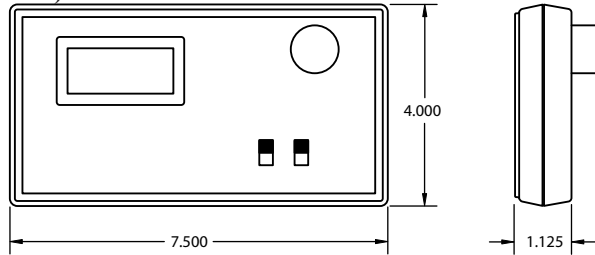


Figure 7

Specifications are subject to change without notice.

**For higher or lower temperature ranges, consult factory.*

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


SCP-Series speed switch specifications

Power	Parameters
Voltage	115 Vac +/- 10%, Standard (230 Vac, 12 & 24 Vdc Optional)
Frequency	50 - 60 Hz
Wattage	1.1 VA
Electrical Connections	8-Pos Removable Terminal Block

Input Signal	Parameters
Type	Open Collector Logic
Amplitude	5V Pull-up, 4.7K Ohms
Pull-Up	2200 Ohms to 15 V
Max. Frequency	266.66 Hz
Min. Pulse Width	750 µsec

Set Point Data	Parameters
Number Available	One or Two
Actuation	Overspeed or Underspeed
Adjustments	Rotary Switches (Tens and Ones digit)
Hysteresis	6%
Range	1 - 99 RPM, 10 - 990 RPM
Mode	Selectable - Over or Under
Accuracy	0.005% at Bottom of Range 0.25% at Midrange 0.5% at Top of Range

Relay Output Data	Parameters
Number Available	SCP-1000: 1 DPDT Form C SCP-2000: 2 SPDT Form C
Relay Contact Rating	5 Amp @ 30 Vdc, or 240 Vac resistive

Physical/Environment	Parameters
Housing and Cover	Cast Aluminium
 Class I, Div 1, Group C, D Class II, Div 1, Group E, F, G UL File: E249019	
Enclosure Dimensions	See Figure 4
Operating Temperature	-40°C to +65°C*
Shipping Weight	4 lbs

255 Pulser Disc (std.)	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)

Pulser 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)

Spare Parts List:	Stock No.	Part No.
4" Pulser Disc (Nylon)	700-000200	255
4" Pulser Disc (Alum)	700-001500	255-A
SCP-1000 Internal Electronics (115Vac)	750-039500	
SCP-2000 Internal Electronics (115Vac)	770-040100	
Waterproofing Gasket	295-000200	



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