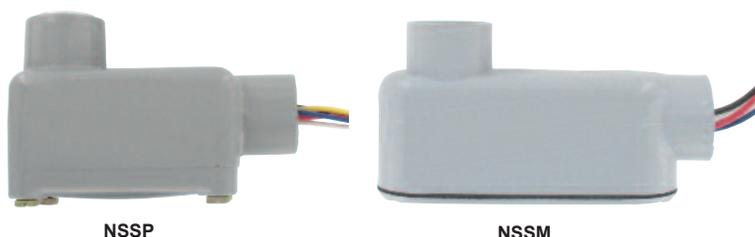


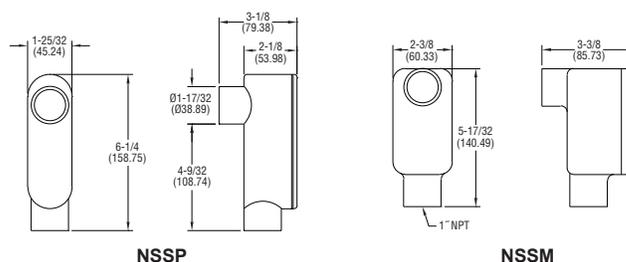
Series NSS Non-Contact Speed Switch

Specifications - Installation and Operating Instructions



NSSP

NSSM



NSSP

NSSM

The Series NSS are self-contained rotation monitoring systems that are ideal for detecting the unwanted slowdown of process equipment. These systems bring efficiency and safety to your operations by preventing machine damage, product waste and costly downtime. The non-contact speed switch is commonly used to monitor drive trains, power-driven components, crushers, exhaust fans, screw conveyors, or tail pulleys on belt conveyors and elevators. The standard system includes either an NSSM-series or an NSSP-series switch and a pulsar DISC.

Miniature speed switches contain a sensor and switching electronics in either a heavy duty, explosion-proof cast aluminum housing (NSSM series) or a chemical/corrosion resistant PVC housing (NSSP series). Each switch is used with a shaft-end mounted pulsar DISC (or optional split collar pulsar wrap) which generates an alternating magnetic field that is picked up by the speed switch. The switch decodes this frequency signal to determine shaft speed and compares this to the pre-adjusted set point, easily calibrated via a single-turn potentiometer. In the event of rotational failure, such as a broken drive, belt slippage, product overloads or clogs, the relay can be used to provide an alarm or equipment shutdown, assuring machine protection and process integrity. The miniature speed switch series is fail-safe; any malfunction during operation will de-energize the control circuit.

The primary difference between the NSSM/P and NSSP/P is the set point range. The actual operating speed of the monitored shaft is not the critical factor when selecting which model use, it is the desired set point speed at which the relay is to energize and de-energize. The NSSM-A and NSSP-A can be adjusted to trip from 10 to 100 rpm. The NSSM-B and NSSP-B can be adjusted to trip from 100 to 5,000 rpm.

Principle of Operation:

The NSS-Series Switches contain a sensor and switching electronics within the same housing. A pulsar disc, or an optional pulsar 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 de-energizes. The relay has Form C Dry contacts rated at 5 amps 115 Vac resistive, so the NSSM may be used for switching motors and/or alarms.

Pulsar 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 10-32 UNF. After applying Loctite® or a similar adhesive on the threads to keep the pulsar disc tight, the pulsar disc should be attached, decal side out, with the supplied 10-32 UNF machine screw and lock washer.

SPECIFICATIONS

Temperature Limits: Operating -40 to 140°F (-40 to 60°C).

Enclosure: Cast aluminum. (NSSM); Polyvinylchloride (PVC) (NSSP).

Enclosure Rating: NSSM: Class I, Group D; Class II, Groups E, F, G; Class III. NSSP: NEMA 4X.

Switch Type: SPDT.

Electrical Rating: 5A @ 115 VAC.

Electrical Connections: Terminal block.

Conduit Connections: 1" female NPT.

Power Requirements: 115 VAC, 60 Hz standard.

Input Signal Type: NPN Open Collector.

Set Point Adjustment: Single turn (270°) Potentiometer.

Gap Distance: 3/8" ± 1/8".

Pulsar Wrap (optional)

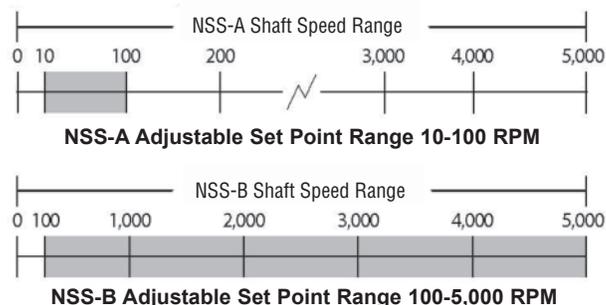
Pulsar Wraps are custom manufactured to fit the shaft they will be mounted on. When the wrap is shipped, four allen-head cap screws hold the two halves of the wrap together. These screws must be removed so that the wrap is in two halves. Place the halves around the shaft, reinsert the screws and torque them to 8 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 NSSM/P and the NSSP/P 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 de-energizes.

The NSSM/P can be adjusted to trip from 10 rpm to 100 rpm. The NSSP/P can be adjusted to trip from 100 rpm to 5000 rpm.

Switch Selection Table:



PROXIMITY CONTROLS

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Sensing Surface Gap Distance Table:

(See Figures 1 and 2, below)

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

Note: The pulsar disc supplied with the NSSM/P switch is 4 inches in diameter, and the NSSM/P disc is 2-1/2 inches in diameter.

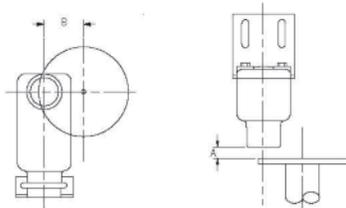


Figure 1: Speed Switch with DISCA

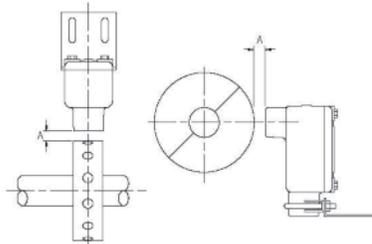


Figure 2: Speed Switch with optional pulsar wrap

Set Point Adjustment:

Complete the installation of the pulsar 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 1/4-turn, which will energize the relay. With this setting, the NSS 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

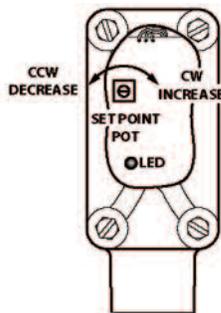
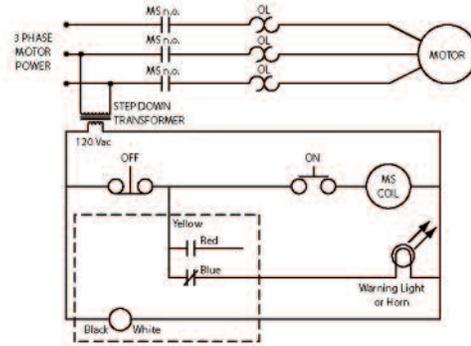


Figure 3: Set Point Adjustment

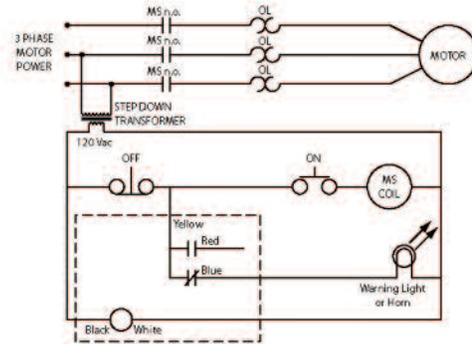
Wiring Diagrams:

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

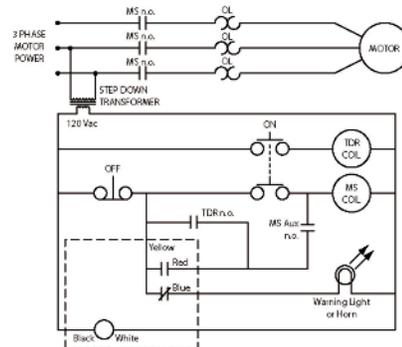
Alarm only Circuit



Motor Shutdown Control without Alarm



Motor Shutdown with Alarm



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 diagrams. This situation could cause equipment damage or PERSONAL INJURY! To prevent starting the motor accidentally, ALWAYS USE PROPER LOCK OUT - TAG OUT PROCEDURES.