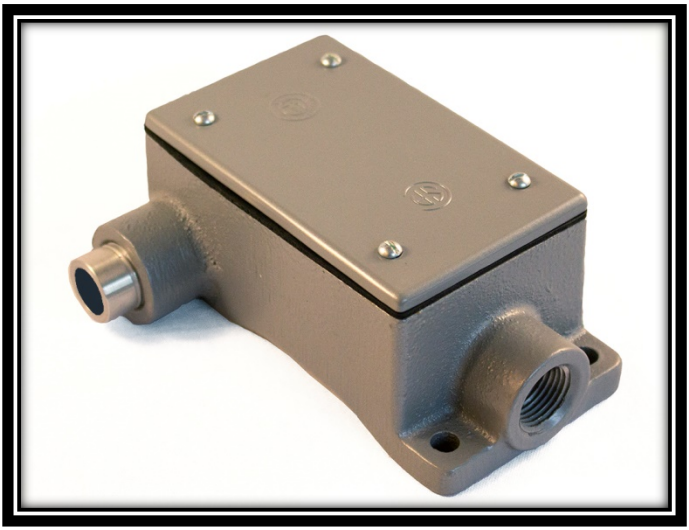
User Manual



Model ZS12
Zero Speed Switch

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Table of Contents

The User Manual must be referred to for correct installation. Failure to comply with the User Manual shall void all warranties and liabilities.

Overview

The Phares Electric Model ZS12 Zero Speed Switch is self-contained and includes sensor, control circuitry and switching relay. No additional control boxes are needed.

Use the ZS12 for over speed, under speed, and zero speed applications.

The ZS12 is particularly useful in applications where environmental conditions prohibit the use of certain electronics. It is housed in a cast aluminum enclosure with a gasketed cover. The ZS12 is suitable for outdoor use, wash-down areas, and dirty environments. The aluminum enclosure features a ½" NPT threaded opening for conduits fittings, providing a clean installation.

It has a replaceable sensor, which is included with the unit. The sensor has ½" NPT threads which conveniently mount to the ZS12 Zero Speed Switch. The sensor can be extended from the ZS12 if mounting space is limited. Use ½" conduit between the sensor and ZS12 Zero Speed Switch for a clean installation.

Detail

The Phares Electric Model ZS12 Zero Speed Switch System consists of the ZS12 Zero Speed Switch Module and Sensor Target. No additional control boxes needed.

The Sensor Target can be a magnet, bolt head, key stock, gear tooth, etc.

The ZS12 Zero Speed Switch Module uses frequency input to determine the presence of motion or the lack thereof. When motion is either detected or reaches set point, the relay energizes and the relay output changes state. It remains in this state until either under speed or zero speed condition occurs, depending upon the application.

The ZS12 Zero Speed Switch Module has 3 diagnostic LED's. These LED's indicate Power, Pulses from Sensor input signal, and Relay status. LED's are labeled Power, Pulse, and Relay. There is a trim pot which is used for adjusting the set point.

The ZS12 Zero Speed Switch Module supplies 12 VDC to the Sensor. The Sensor can be 2 or 3 wire, sourcing (PNP) or sinking (NPN) signal. The ZS12 utilizes universal sensor input technology. Sensor type is automatically detected and enabled via the ZS12.

Detail (continued)

Fixed Setpoint Option

The Relay Setpoint Adjustment can be disabled at the factory prior to assembly for applications requiring a Fixed Relay Setpoint.

Relay Latch Option

The Relay Latch is a factory preset time delay allowing speed at the point of measure time to ramp up to relay trip point. It is factory preset per order and once set, cannot be changed. With the Relay Latch feature enabled, the ZS09P Zero Speed Switch Sensor relay will energize as soon as the first sensor target marker is detected and remain energized until speed at point of measure reaches setpoint. The ZS09P Zero Speed Switch Sensor relay will remain energized until speed falls below relay trip point or motion ceases. If speed at point of measure does not ramp up to relay trip point within allotted time, the relay will de-energize and remain de-energized until speed reaches setpoint. Once the relay latch delay time has expired, the relay latch is disabled until power is cycled to the ZS09P Zero Speed Switch Sensor unless a factory preset Relay Latch auto reset is enabled. The Relay Latch is reset at power up.

Relay Lockout Option

The Relay Lockout is a factory preset feature which locks the relay off once under speed or zero speed condition occurs. Normal operation is reset once power to the ZS12 Zero Speed Switch is cycled.

Setup

1. Mount the Sensor and Sensor Target.

2. Connect wires to the ZS12 Zero Speed Switch Module.

WIRING NOTES:
The "G" and "Shd" terminals are not connected to any circuit nor to each other. These should be wired to Earth Ground if used for grounding and/or shielding purposes.

WARNING:
For maximum safety, properly Ground the aluminum case.

3. When wiring is complete, apply power to the ZS12 Zero Speed Switch Module. The Power LED should illuminate. Two seconds later, the Pulse LED should illuminate.

4. Rotate Sensor Target and check the Pulse LED. It should blink each time a marker on the Sensor Target passes the Sensor indicating motion.

If the Pulse LED does not blink:

a) Check the gap between Sensor and Sensor Target.

b) Make sure the Sensor is properly aligned with the Sensor Target.

c) Make sure the Sensor is wired correctly.

5. When the shaft on which the Sensor Target is mounted rotates at or above operating speed, the Relay LED will illuminate indicating the Relay has energized and changed state. The Relay will remain in this state until speed either drops below set point or motion stops. At either point the Relay de-energizes returning to its normal state and the Relay LED turns off.

6. If the Relay LED does not illuminate at the desired speed levels, adjust the trim pot. The trim pot is a 10 turn precision pot which does not have stops. Turning the trim pot counterclockwise will lower the set point to a slower RPM setting; turning it clockwise will raise the set point to a faster RPM setting.

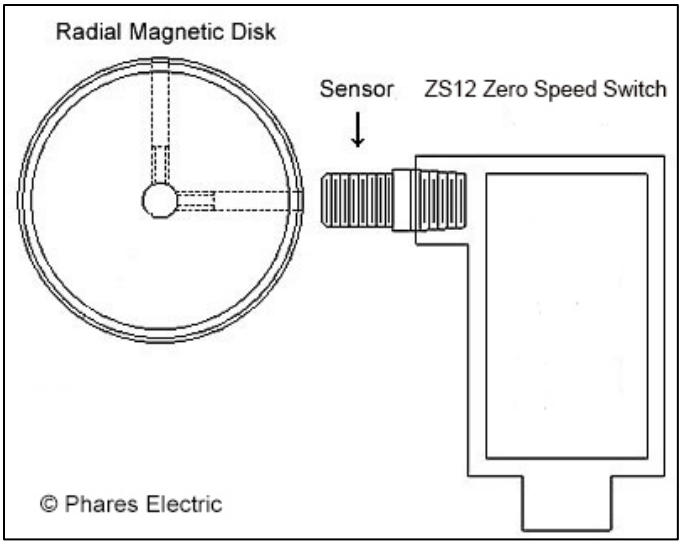
Setup (continued)

7. The ZS12 Zero Speed Switch Module has an internal non-replaceable 1/2 amp fuse for circuit protection.
8. A 5 Amp external fuse is recommended to help protect the ZS12 relay contacts from possible overload. Wire the fuse in-line to the Relay "Com" terminal.

9. Installing the Hall Effect Sensor for magnetic targets for Part Numbers ZS12-AM or ZS12-DM.

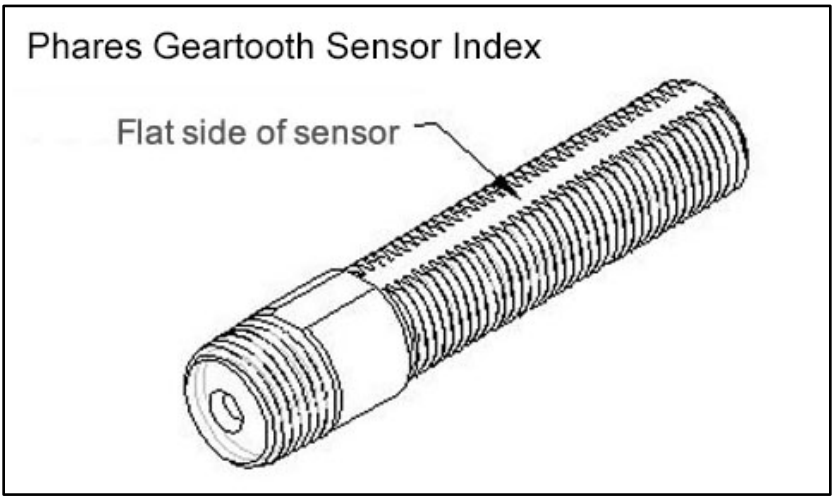
Table 1. Phares Electric Hall Effect Sensor Wiring

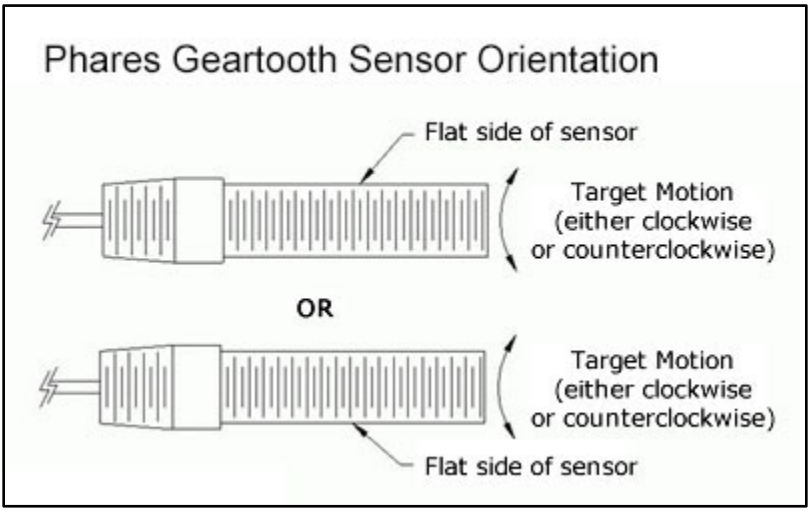
Wire Color	Function
Red	+
Black	-
White	Signal



Setup (continued)

10. Installing the Geartooth Sensor for ferrous targets for Part Numbers ZS12-AF or ZS12-DF.





Setup (continued)

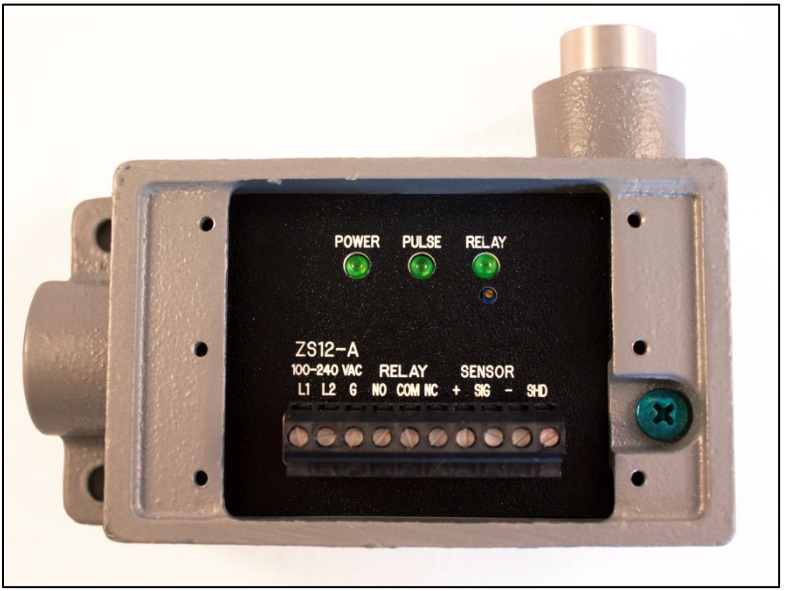


Figure 4. Indicators and Terminal Block (ZS12-A Shown)

Disclaimer

The ZS12 Zero Speed Switch Module is not rated UL or otherwise.

Not for use in applications in locations classified as hazardous.

This ZS12 Zero Speed Switch Module is not intended for safety critical applications. Users of this Phares Electric product in such applications assume all risks of such use and shall indemnify Phares Electric against all damages, including attorney's fees and costs, resulting from such use.

The cast aluminum enclosure cover contains the following warning from the manufacturer. This refers to the enclosure cover only.

WARNING:
This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Warranty

All products are thoroughly tested before shipping. If a product is found to be defective within 30 days from the date of purchase, not the date of installation, we will repair or replace the unit. The defective unit must be received and tested at Phares Electric before a replacement is shipped. If a replacement is needed before the defective unit arrives at Phares Electric, the replacement will be charged to your credit card, or invoiced to your Net30 Account. A credit will be issued once the unit is received at Phares Electric and deemed defective upon inspection and testing. Please call us for return shipping instructions.

The warranty is void if the unit is physically damaged from abuse or misuse, or if the unit shows evidence of excessive current, heat, moisture, vibration, or operating conditions outside of design limits or unauthorized modification.

The above constitutes the sole and exclusive warranty provided by Phares Electric. In no event shall Phares Electric, or its agents, be liable for any damages, whether direct, indirect, consequential, punitive or otherwise, arising out of any product or service provided or arranged by Phares Electric.

Specifications

Power Requirements
(Please see product label for supply voltage)
100-240 VAC, 50/60 Hz (for Part No. ZS12-A)
9-36 VDC, 50/60 Hz (for Part No.ZS12-D)

Current Draw
50 mA

Circuit Protection
Internal ½ amp fuse, non-replaceable

Input Signal
12VDC, 3 wire, sourcing (PNP) or sinking (NPN)

Dimensions (in inches)
3-1/16" Wide x 3-1/4" High* x 2-1/2" Deep
*including DIN Rail Mount and Terminal Block

Relay
Output:
SPDT Form 'C' dry relay contact (N.O/N.C.)

Contact Rating:
5 A at 120 VAC; 5 A at 30 VDC

Maximum switching frequency:
1,800 operations/hr (under rated load)

Life expectancy:
Mechanical 10,000,000 operations min. (at 1,800 operations/hr)
Electrical 100,000 operations min. (at 1,800 operations/hr)

Part Number Chart
ZS12- Y Z

Y – Input Voltage	Z – Target Material
A: 120 VAC	M: Magnetic
D: 6-24 VDC	F: Ferrous (such as geartooth, bolt head, or keystock)

Troubleshooting

Line No.	Description	Causes
1.	Power LED does not light with power applied.	• Confirm appropriate voltage is across “L1” and “L2” terminals • Remove power and wires to "L1" and "L2" terminals. Check continuity across "L1" and "L2" terminals. If there is no continuity, the internal fuse is blown and ZS12 Zero Speed Switch Module needs to be replaced.
2.	Pulse LED does not blink.	• Confirm that the Sensor is wired correctly to the ZS12 Zero Speed Switch Module. • Check the gap between the Sensor and the Sensor Target. The Sensor may not be able to detect the Sensor Target if there is too large of a gap. • Check Sensor alignment with Sensor Target. If out of alignment, the Sensor might not be able to detect the markers on the Sensor Target. • Check the Sensor "+" and "-" terminals. There should be 12 VDC across the terminals. • Sensor may be the wrong type or defective.

Troubleshooting (continued)

Line No.	Description	Causes
3.	Relay LED does not light.	• Confirm that the Pulse LED is blinking. At high speeds it may appear to be lit continuously because it is blinking very fast. Slow the speed until it can be determined that the Pulse LED is actually blinking. • If Pulse LED is blinking: Speed is below set point. Adjust trim pot. Turning the trim pot counterclockwise will lower the set point to a slower RPM setting and turning it clockwise will raise the set point to a faster RPM setting. • If Pulse LED is steady regardless of speed, then the sensor may be wired incorrectly, the wrong type of sensor or be defective.

Contact Information

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