Zero Speed Switch Sensor, ZS09R

Features

- Self-contained unit incorporates sensor and relay
- Isolated outputs with 1/4 Amp switching capacity
- Operating voltages: 6-24VDC or 120VAC
- Senses magnetic or ferrous targets
- Use outdoors or in wash down areas
- Adjustable setpoint
- Diagnostic indicators
- Not rotation direction sensitive
- Relay latch option

Benefits

- Prevents equipment damage and material spoilage
- Prevents multiple conveyor "domino effect" stalled condition
- Over speed, under speed or zero speed sensing
- Prompt alert for stalled, over speed or zero speed conditions
- Easy interface to existing systems
- Reliable and effective

Overview

The ZS09R Zero Speed Switch Sensor is a self-contained device that combines sensor and switch for use in over speed, under speed, and zero speed applications. It senses magnetic and high iron content targets. Outputs are isolated and can be easily integrated with any controller or existing system. It is about the size of a prox switch, but incorporates intelligent speed sensing circuitry not found in simple on/off devices. Use the ZS09R Zero Speed Switch Sensor for switching logic inputs (PLC, DCS, etc.), or a single "Ice Cube" Relay (pilot duty only).

Operation

When motion is either detected or reaches setpoint (depending upon application), the relay output changes state. It remains in this state until under speed or zero speed condition occurs (depending upon application).
Specifications

**Power Requirements:**
Part No. ZS09R-120: 120VAC, 20mA, 50/60Hz  
Part No. ZS09R-D: 6-24VDC, 50mA

**Fuse:**
Internal 1/2 Amp non-replaceable fuse

**Relay Output: (specify when ordering)**
SPDT Form 'C' dry relay contact (Normally Open/Closed)  
SPST Normally Open  
SPST Normally Closed

**Contact ratings:**
120VAC, 1/4 Amp pilot duty  
Vibration resistance: G - max. 10-2000Hz  
Shock Resistance: G - max. 11ms, 1/2 sine

**Operating Frequency:**
Hall Effect and Inductive (Geartooth): 0.02Hz - 10kHz  
Hall Effect Only: 0.02Hz - 25kHz

**Sensing Distance (Gap):**
1/16" to 1/8" using Geartooth Wheel, Bolt Head, Key Stock, etc.  
1/8" to 1/4" using Magnetic Disk.  
1/8" to 5/8" using Magnet or Magnetic Disk.  
(Magnetic target sensing distance based on Phares Electronics Magnetic Disks and magnet types).

**Minimum Geartooth Sizes:**
1/8" geartooth length, width, depth and gap.

**Geartooth Material:**
High ferrous (iron) content.

**Operating Temperature:**
-40°F to 140°F

**Weight:**
4 oz.

**Cable:**
4 ft., 6 conductor, 22 AWG, unshielded  
(Custom cable lengths available.)
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Dimensions (in inches)

![Dimensions Diagram](image)

Figure 1. Dimensions of ZS09R Zero Speed Switch Sensor

Wiring Connections

![Wiring Diagram](image)

Figure 2. Zero Speed Switch Sensor wiring connections. There are LED indicators for Relay and Pulse. The Setpoint Adjust is a 12-turn trim pot that can be used to adjust the relay setpoint in the field. The default Adjustable Relay Trip Range is 1-100 RPM for zero speed applications.

**ZS09R Part Numbers**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Input Voltage</th>
<th>Relay Output</th>
<th>Contact Rating</th>
<th>Load Type</th>
<th>Speed Switch Type</th>
<th>Setpoint</th>
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<tbody>
<tr>
<td>ZS09R1-D</td>
<td>6-24 VDC</td>
<td>N.O./N.C.</td>
<td>.25 A</td>
<td>Logic Input (PLC, DCS, etc.), Single &quot;Ice Cube&quot; Relay, i.e., Pilot Duty</td>
<td>Self-Contained Sensor</td>
<td>Adjustable or Fixed Setpoint</td>
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<td>ZS09R2-D</td>
<td>6-24 VDC</td>
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<td>ZS09R3-D</td>
<td>6-24 VDC</td>
<td>N.C.</td>
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<tr>
<td>ZS09R1-120</td>
<td>120 VAC</td>
<td>N.O./N.C.</td>
<td>.25 A</td>
<td>Logic Input (PLC, DCS, etc.), Single &quot;Ice Cube&quot; Relay, i.e., Pilot Duty</td>
<td>Self-Contained Sensor</td>
<td>Adjustable or Fixed Setpoint</td>
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<tr>
<td>ZS09R2-120</td>
<td>120 VAC</td>
<td>N.O.</td>
<td>.25 A</td>
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<tr>
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<td>120 VAC</td>
<td>N.C.</td>
<td>.25 A</td>
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Zero Speed Switch Sensor, ZS09R

Accessories

**Sensor Targets**

<table>
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<th>Axial</th>
<th>Radial</th>
<th>Radial</th>
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<tbody>
<tr>
<td><img src="image" alt="Axial Target Diagram" /></td>
<td><img src="image" alt="Radial Target Diagram 1" /></td>
<td><img src="image" alt="Radial Target Diagram 2" /></td>
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</tbody>
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Figure 3. Zero Speed Switch Systems consisting of Zero Speed Switch Sensor and sensing target wheel.

The ZS09R Zero Speed Switch Sensor needs a target for sensing and measuring speed. Sensor targets are sold separately.

Suitable targets are:
- Magnetic Disk
- Split Coupling
- Geartooth wheel, bolt head or key stock with high ferrous (iron) content

**Terminal Strip Assembly Box**

![Terminal Strip Assembly Diagram](image)

Figure 4. Zero Speed Switch system with Terminal Strip Assembly (TSA) Box.

The TSA Box can be used to terminate sensor wiring for applications that require long cable runs. It can provide quick and convenient mounting for Phares Electronics’ sensors.

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