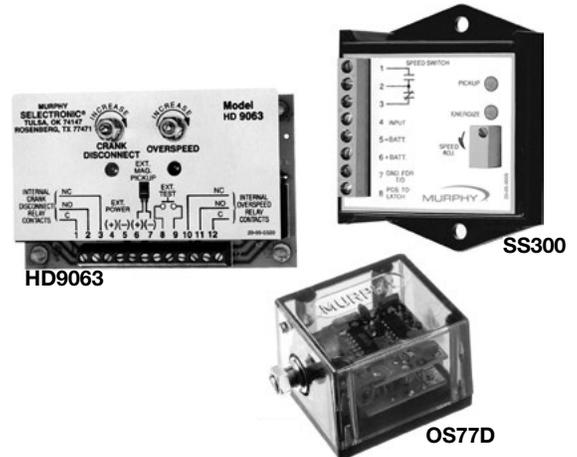


# Electronic Speed Switches

## HD9063, OS77D and SS300 Series

Murphy Electronic Speed Switches are available in various configurations to cover a wide variety of applications. These compact devices receive their input signal from various sources depending upon the particular speed switch model and application. They are available in single or dual switch point models, and the switch point(s) are field adjustable.

Models are available in self-contained enclosures and as PC-board design for inclusion in your control cabinet. All Murphy speed switches are designed to operate in harsh environments and have high electrical noise immunity.



### Series Models Available

**SS300 Series:** Single set point speed switch with SPDT relay dry contact output.

**OS77D Series:** Single set point speed sensing module with a transistor output.

**HD9063 Series:** Dual set point speed switch in a PC board configuration and relay outputs.

### Selecting a Speed Switch

In selecting the best Speed Switch for your application, the following factors should be considered:

- **Number of Switch Points**  
How many switch points are needed to perform the speed switching function you require?
- **Available Signal Sources**  
The signal source must provide a minimum frequency and a minimum, but less than maximum, voltage as required by the selected speed switch.
- **What Is the Frequency Output of the Signal Source?**  
The following signal sources can be used with most Murphy Electronic Speed Switches.  
Note: they may additionally provide the signal and/or power source for some Murphy Tachometer/Tachswich™ instruments.

**Magnetic Sensor:** The sensor is usually mounted through the flywheel housing so that the sensor tip is in close proximity to the ring gear teeth. Output voltage is dependent upon the amount of the gap between the sensor tip and the gear tooth.

$$\text{Set Point Frequency in Hz} = \frac{\text{No. Gear Teeth} \times \text{RPM Set Point}}{60}$$

**Alternator Output:** Most industrial engine alternators have an auxiliary or tachometer tap. This tap can provide the signal source for speed switches and tachometers.

$$\text{Set Point Frequency in Hz} = \frac{\text{Pulley Ratio} \times \text{No. of Alternator Poles} \times \text{RPM Set Point}}{120}$$

**Ignition Output:** This battery ignition signal is commonly used on gasoline and natural gas fueled type engines. The tap is usually located either on the distributor or on the ignition coil. The ignition can be breaker point type or all electronic.

$$\text{For 2 Cycle: Set Point Frequency in Hz} = \frac{\text{No. of Cylinders} \times \text{RPM Set Point}}{60}$$

$$\text{For 4 Cycle: Set Point Frequency in Hz} = \frac{\text{No. of Cylinders} \times \text{RPM Set Point}}{120}$$

**Signal Generators:** Add-on signal generators produce a voltage and frequency output. Match this output to the requirements of the speed switch selected.

### Applications

Murphy speed switches applications include operating alarms and equipment shutdown. They are ideal for disconnecting starter cranking on auto start systems or overspeed switching:

- Generators
- Compressors
- Industrial Engines
- Pumps
- Vehicles
- Farm Equipment

# SS300 Series

The SS300 Series are single set point speed switches with SPDT relay dry contact output. The trip point is set by a potentiometer. An LED indicates when the signal source is present. A second LED turns on when the trip point is reached. See Table 1 for available models and requirements. An optional time delay is on board to delay operation of the relay for 2-6 seconds after the set point has been reached.

The SS300 Series speed switch is intended for installation within a weatherproof enclosure to protect it from rain, dust, etc.

## Application

**Overspeed shutdown.** Shuts down the engine if RPM exceeds the preset limit.

**Speed sensitive pull-in/drop-out.** Engage or disengage PTOs, four-wheel drives, other switch points, etc. according to the engine speed being monitored.

**Engine and transmission alarms/shutdowns.** Oil pressure in some engines and transmissions varies widely between running and idle speeds. The SS300 Series can select between two pressure switch set points according to speed of the engine or transmission and thus give maximum protection to the equipment while at operating RPM and eliminate nuisance alarms when at idle.

**Adjustable differential model.** The AD can be adjusted to change the speed range over which the pull-in and drop-out differential of the relay will operate. A typical application is to ensure that engine speed is above a minimum RPM before applying a load but allows a drop in speed of several hundred RPM without disconnecting the load.

Table 1: Models Available and Input Signal

Model No.	Distributor Ignition	Magnetic Pickup	Alternator	Voltage	
				12	24
SS300 (std. model)		X		X	X
SS300-LF (low frequency)	X		X	X	X
SS300-AD (adjustable differential)		X		X	X
SS300-AD-LF (low frq. & Adjst. diff.)	X		X	X	X

## Specifications

### Power Requirements:

12 VDC (9-16 VDC)

24 VDC (18-30 VDC)

### Frequency Signal:

#### Voltage (all models):

Minimum Input Voltage Signal: 4.5 Vrms

Maximum Input Voltage Signal: 50 Vrms

Maximum Current	12V	24V
Pull In	46 mA	46 mA
Pickup Only	10.5 mA	16 mA

Frequency Range in Hz	Model Number
25-2000	SS300-LF, SS300-AD-LF
625-9000	SS300-AD, SS300

### Reset Differential Magnetic Pickup Signal Models:

Standard Models: 2 Hz Differential

AD Models (Adjustable Differential): 650-8900 Hz Adjustable

### Reset Differential Alternator Models:

LF Models (Low Frequency): 2 Hz Differential

AD-LF Models (Adjustable Differential Low Frequency): 50-1900 Hz

Adjustable

**Output:** Relay contact, SPDT, resistive load, 6 A, 30 VDC

**Time Delay:** When terminal 7 is grounded, the relay operation is delayed for 2-6 seconds after RPM set point is reached.

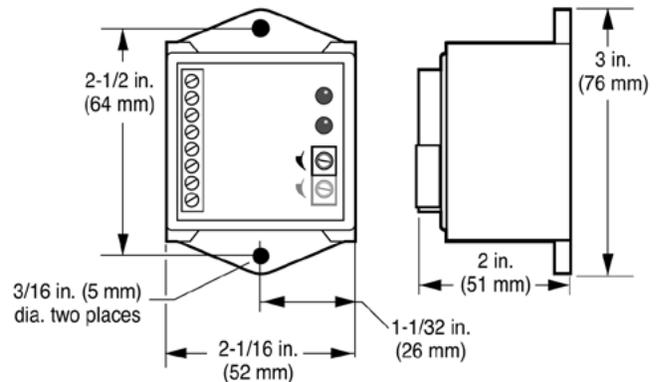
**Adjustment:** 20-turn potentiometer(s)

**Temperature Range:** -4° to 185°F (-20° to 85°C)

**Relative Humidity:** 0 to 95% Non-condensing

**Case:** Black, ABS plastic

## Dimensions



## HD9063 Series

The HD9063 Series is a unitized two set point speed switch with SPDT relay outputs. HD9063 is a PC-board configuration with standoffs for mounting in a control panel or cabinet.

The HD9063 provides crank disconnect and overspeed functions. Trip points can be field adjusted on all models. LEDs next to the set point potentiometers indicate that the trip point has been reached and the relay(s) have operated. An overspeed test circuit is built-in. It will actuate the output relay at a point 10 percent below the actual overspeed set point.

### Application

Crank disconnect/overspeed are functions where the HD9063 is used to disconnect the starter on automatic start engine applications and to shut down the engine if an overspeed situation occurs. Re-engagement of the starter is inhibited until RPM returns virtually to zero. Typical applications include: standby generator sets, pumps and compressors.

## Specifications

**Power Supply:** Voltage: 8-30 VDC

**Maximum Current:** 150 mA

**Frequency Signal: (Voltage, Magnetic Pickup Signal Models):**

Minimum: 0.35 Vrms

Maximum: 60 Vrms

**Maximum Signal:** 4.8  $\mu$ A

**Adjustment Range:**

Crank Disconnect: 250-6,000 Hz

Overspeed: 1,100-10,000 Hz

**Reset Differential, Magnetic Pickup Signal Models**

Crank Disconnect: Dropout 160 Hz  $\pm$  5%

Overspeed: 200 Hz Differential

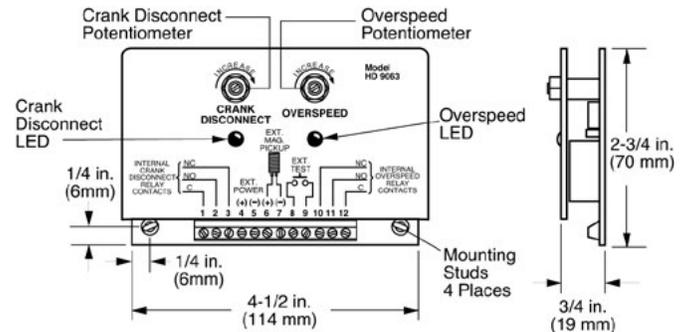
**Output:** Relay Contact, SPDT, Resistive Load: (2) 5 A 30 VDC

**Adjustment:** (2) 270°-turn potentiometer

**Temperature Range:** 14° to 158°F (-10° to 70°C)

## Mounting Dimensions / Wiring

### HD9063



## OS77D Series

The OS77D Series single set point speed switch is a compact all-electronic speed sensing module. It can be panel mounted via its trip set point potentiometer. It is field adjustable and gives a transistor output when tripped. Relay models available.

Models are available with Normally Open or Normally Closed circuit and with or without re-crank feature, which inhibits starter re-engagement until the engine speed is near zero RPM.

### Application

Overspeed shutdown. Activates engine shut-down circuit on engine overspeed.

Operate PTOs or drive circuits. Engage or disengage engine PTO, four-wheel drives or other control circuits according to RPM monitored.

Disconnect engine cranking when engine starts.



OS77D

## Specifications

**Power Supply:** Voltage: 7-28 VDC

**Maximum Current:** 100 mA

**Frequency Signal:**

**Voltage, Magnetic Pickup Signal Models**

Minimum: 1.2 Vrms

Maximum: 30 Vrms

**Voltage, Distributor Ignition Models**

Minimum: 6 Vrms

Maximum: 30 Vrms

**Maximum Signal Current, Magnetic Pickup Signal Models:**

0.12 mA

**Maximum Signal Current, Distributor Ignition Models:** 0.12 mA

**Adjustment Range, Magnetic Pickup Signal Models:**

1000-10,000 Hz

**Adjustment Range, Distributor Ignition Models:** 40-400 Hz

**Reset Differential, Magnetic Pickup Signal Models**

Non-recrank model: 10 Hz Differential

Recrank model: dropout 54 Hz

**Reset Differential, Distributor Ignition Models**

Non-recrank model: 10 Hz Differential

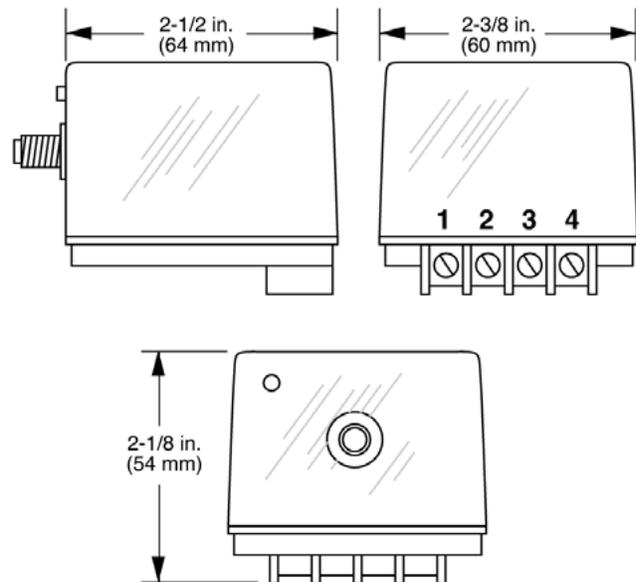
Recrank model: Dropout 2.4 Hz

**Output:** Transistor Sink to Ground Resistive Load: 2 A, 28 VDC

**Adjustment:** 270°-turn potentiometer

**Temperature Range:** -13° to 185°F (-25° to 85°C)

## Dimensions



## How to Order

Part Number	Model and Description	Notes
Specify Model Number and Voltage	SS300 Series	See Table 1
Specify Model Number	HD9063 Series	Two set points, PC board mounting, crank disconnect and overspeed
	OS77D-900NTO	Normally Open; 1000- 10,000 Hz, magnetic sensor input
	OS771-040NTO	Normally Open; 40-400 Hz, distributor ignition input
	OS77D-900NTC	Normally Closed; 1000-10,000 Hz, magnetic sensor input
	OS77D-900RTC	Normally Closed; 1000-10,000 Hz, max. with recrank feature