Tachometers and Tach/Hourmeters – AT and ATH Series

Features

- 4000 RPM – 0 to 100,000 hours
- Sensing from Magnetic Sensor, Battery Charging Alternator or Ignition Signal
- High Visibility Analog Readout
- Air Core Movement
- Easy Calibration through Dip Switches
- Through Dial Lighting
- Powered by 11-28 VDC Battery Available

*Products covered by this bulletin comply with European Council electromagnetic compatibility directive 2004/108/EC, except as noted.

The AT Series tachometers are rugged, transistorized instruments with solid-state circuitry for indication of engine RPM. They are equipped with a bracket for mounting into a standard 3- 3/8 in. (86 mm) dash mounting hole. A full 270° sweep of the pointer gives an accurate indication on a large easy–to–read scale and the dial can be illuminated for night reading. The ATH Series models are also equipped with hourmeter to record the elapsed running time of an engine.
Models available for Alternator, Magnetic Sensor or Ignition signal. These instruments are designed to function from pulses generated by an alternator with 4, 8, 12, 14, or 16 poles on the rotor (3 - 40 PPR). The pulses can also be obtained from the ring gear of an engine by means of an electromagnetic sensor (magnetic pickup). Murphy's magnetic sensor driven models are designed to function with flywheels having anywhere from 50 to 304 teeth. Ignition signal model available for 2 - 10 cylinder, 4 cycle spark-ignited engines. All models are for negative ground, positive ground or isolated electrical systems and are protected against reverse polarity hookup.
All models are powered by a 11-28 VDC battery and are reverse polarity protected.

Series Models

ATS Series Magnetic Sensor Signal Tach
50-304 flywheel teeth*11-28 VDC, 3333 Hz to 20.27 kHz @ 4000 RPM

ATHS Series Magnetic Sensor Signal Tachometer/Hourmeter
50-304 flywheel teeth* 11-28 VDC, 3333 Hz to 20.27 kHz @ 4000 RPM

ATA Series Alternator Signal Tachometer
3-40 pulses*/engine revolution 12 VDC, 200 Hz to 2667 Hz @ 4000 RPM

ATHA Series Alternator Signal Tachometer/Hourmeter
3-40 pulses*/engine revolution 12 VDC, 200 Hz to 2667 Hz @ 4000 RPM

ATHI Series Ignition Signal Tachometer/Hourmeter
2 - 10 cylinder, 4 cycle engines, 66.7 Hz to 333.3 Hz @ 4000 RPM

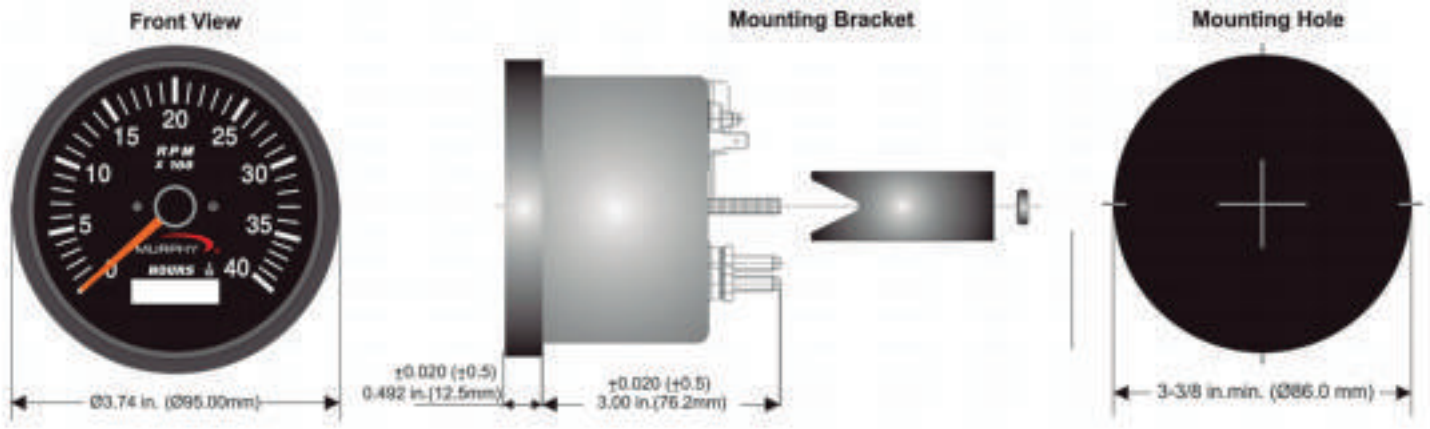
* To determine pulses per engine revolution, work the formulas on the back page and use the pulses per revolution number to determine if the tachometer can be used for your application.

Bezel Styles

Applications

These tachometers are specially designed for use on truck, marine, industrial, or stationary engines.

Dimensions



Specifications

Magnetic Sensor Driven Models

Power Input: 11-28VDC (70mA – 120mA except lamp load)
Backlight: 3.4W T-10 wedge base bulb
RPM Input Signal Voltage: 1.5Vrms minimum
Accuracy: Tachometer: +2% full scale
Hourmeter: +0.01% hours, +1 count
Temperature Range: -40oC to +82oC (no permanent damage shall occur)
Dial (Face Plate): 270o sweep with white numerals (over black background)
Bezel: 304 stainless steel for bright and IS 513 E.E.E. CRCA steel for black
Scale: 0-4000RPM
Case Material: Plastic
Hourmeter Range: 99999.9 hours in 0.1 increments.

Alternator Driven and Ignition Driven Models

Power Input: 11-28VDC (70mA-120mA except lamp load)
Backlight: 3.4W T-10 wedge base bulb
RPM Input Signal Voltage: V low: 0.5V max, V high: 8.0V min.
Accuracy: Tachometer: +2% full scale
Hourmeter: +0.01% hours, +1 count
Temperature Range: -40oC to +82oC (no permanent damage shall occur)
Dial (Face Plate): 270o sweep with white numerals (over black background)
Bezel: 304 stainless steel for bright and IS 513 E.E.E. CRCA steel for black
Scale: 0-4000RPM
Case Material: Plastic
Hourmeter Range: 99999.9 hours in 0.1 increments.

How to Order

Order the Tachometer or Tachometer/Hourmeter by model number.

Magnetic Sensor Tachometer 4000 RPM; 50 - 304 flywheel teeth 11-28 VDC

Model #	Designation
ATS-40	Bright Stainless Steel Bezel
ATS-40-A	Black Stainless Steel Bezel
ATS-40-B SAE	Bright Stainless Steel Bezel
ATS-40-C SAE	Stainless Steel Bezel

Magnetic Sensor Tach/Hourmeter 4000 RPM; 50-304 flywheel teeth 11-28 VDC
ATHS-40 Bright Stainless Steel Bezel
ATHS-40-A Black Stainless Steel Bezel
ATHS-40-B SAE Bright Stainless Steel Bezel
ATHS-40-C SAE Black Stainless Steel Bezel

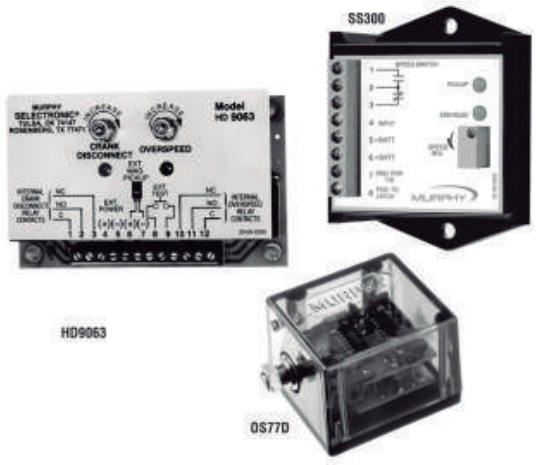
Alternator Signal Tachometer 4000 RPM; 3 - 40 pulses/rev 11-28 VDC
ATA-40 Bright Stainless Steel Bezel
ATA-40-A Black Stainless Steel Bezel
ATA-40-B SAE Bright Stainless Steel Bezel

Alternator Signal Tach/Hourmeter 4000 RPM; 3 - 40 pulses/rev 11-28 VDC
ATHA-40 Bright Stainless Steel Bezel
ATHA-40-A Black Stainless Steel Bezel
ATHA-40-B SAE Bright Stainless Steel Bezel
ATHA-40-C SAE Black Stainless Steel Bezel

Ignition Signal Tach/Hourmeter 4000 RPM; 1-5 pulses/engine rev
ATHI-40-A Black Stainless Steel Bezel

Electronic Speed Switches

HD9063 Series, OS77D Series and SS300 Series



Features

- Models for Overspeed, Crank Termination, or Crank Termination and Overspeed
- Solid State Construction
- Compact Design
- Field Adjustable Set Points
- High Noise Immunity
- Powered by 11-28 VDC Battery Available

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.

Applications

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

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

Select 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.

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

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

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

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.

For 2-cycle

$$\text{Set Point Frequency in Hz} = \frac{\text{No. of Cylinders x RPM Set Point}}{60}$$

For 4-cycle

$$\text{Set Point Frequency in Hz} = \frac{\frac{\text{RPM x No. of Cylinders}}{2}}{60}$$

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

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 pre-set limit.
Speed sensitive pull-in/drop-out. Engage or disengage PTO's, 4-wheel drives, other switch points, etc. according to speed of engine 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 insure 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 Number	Distributor Ignition	Magnetic Pickup	Alternator	Voltage	
				12	24
SS300 (std. model)		✖		✖	✖
SS300-LF (low frequency)	✖		✖	✖	✖
SS300-AD (adjustable differential)		✖		✖	✖
SS300-AD-LF (low frq. & Adjst. diff.)	✖		✖	✖	✖

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

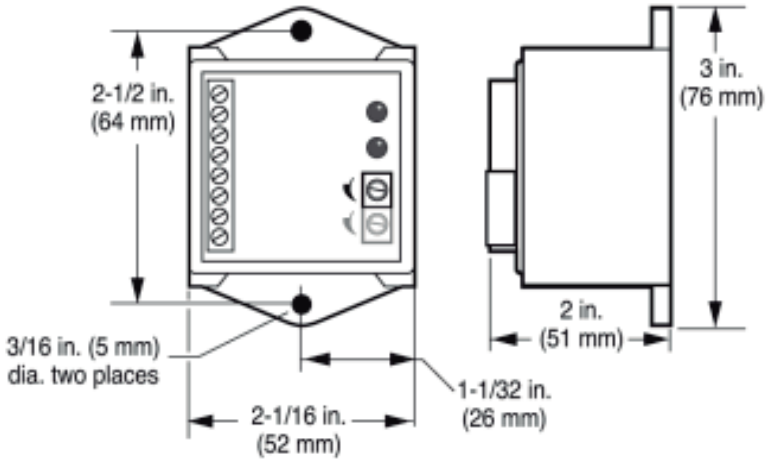
Frequency Range in Hz	Model Number
25-2000	SS300-LF; SS300-AD-LF
625-9000	SS300-AD; SS300

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



How to Order

To order, specify the model number and voltage (see **Table 1**, above).
Example: SS300-LF-12
Shipping Weight (all models): 0.24 lb. (108 g).
Shipping Dimensions (all models): 8 x 4 x 4-1/2 in. (203 x 102 x 114 mm).

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. LED's 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% below actual overspeed set point.

Application

Crank disconnect/overspeed model is typically used to disconnect the starter on automatic start engine applications and to shutdown 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

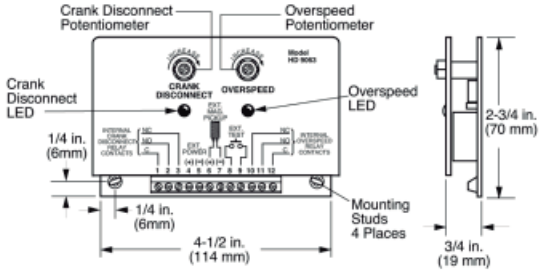
Power Supply: Voltage: 8-30 VDC.
Maximum Current: 150 mA.
Frequency Signal: (Voltage, Magnetic Pickup Signal Models):
- Minimum: 0.35 Vrms.
- Maximum: 60 Vrms.

Maximum Current, Magnetic Pickup Signal Models: 4.8 µA.
Adjustment Range, Magnetic Pickup Signal Models:
- HD9063 Model
  - Crank Disconnect: 250-6,000 Hz
  - Overspeed: 1,100-10,000 Hz.

Reset Differential, Magnetic Pickup Signal Models
- HD9063 Model
  - Crank Disconnect: Dropout 160 Hz ± 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



How to Order

Specify model numbers below:
HD9063: Two set points; PC board mounting; crank disconnect and overspeed.
Shipping Weight (all models): 2 lbs. (0.90 Kg).
Shipping Dimensions (all models): 10 x 9 x 6 in. (254 x 229 x 152 mm).

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 shutdown circuit on engine overspeed.
Operate PTO's or drive circuits. Engage or disengage engine PTO, 4-wheel drives, or other control circuits according to RPM monitored.
Disconnect engine cranking when engine starts.

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

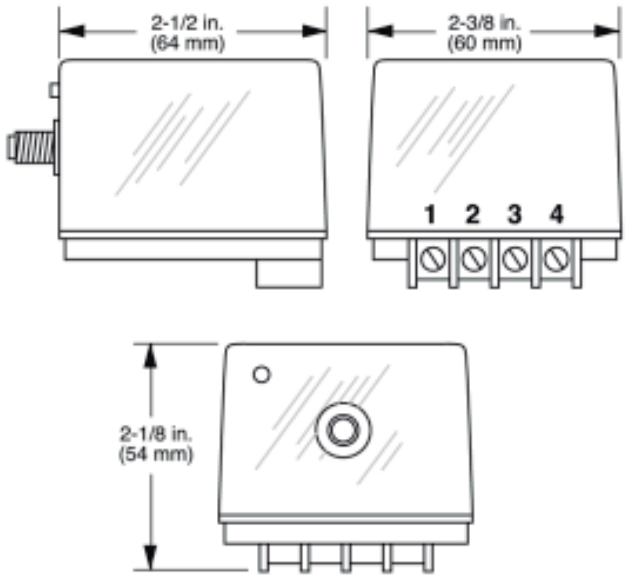
Voltage, Distributor Ignition Models
- Minimum: 6 Vrms
- Maximum: 30 Vrms

Maximum Current, Magnetic Pickup Signal Models: 0.12 mA
Maximum 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

Specify model numbers below:
OS77D-900NTO: Normally Open; 1000—10,000 Hz, magnetic sensor input.
OS77I-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.

NOTE: See "Specifications" for individual model specifications

Shipping Weight (all models): 1 lb. (0.45 Kg)
Shipping Dimensions (all models): 8 x 4 x 4-1/2 in. (203 x 102 x 114 mm)

Selectronic® Digital Tachometer – MT90 Model

Features

- ±1 RPM Accuracy
- Easy Calibration
- Clear-Read LCD Display
- Back Light for Night Viewing (Battery Powered models)
- Input Source Can Be a Magnetic Pickup or Engine Alternator
- Power Supplied by Magnetic Pickup or 12, 24, or 32 VDC Battery System

The Murphy Selectronic MT90 digital tachometer offers high accuracy and dependability resulting from use of a quartz crystal time based and digital, solid-state electronics.
Tachometer power is supplied by either a Murphy magnetic pickup, mounted at the flywheel ring-gear of an engine, or by a 12, 24 or 32 volt DC battery system.
RPM data is supplied by either a Murphy magnetic pickup or by the alternator in your battery charging circuit. The MT90 tachometer also has back-lighting for easy readings in low lit areas; this lighting requires a battery power source.

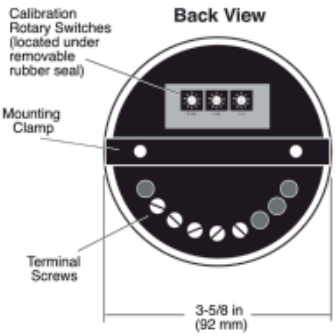
RPM Calibration

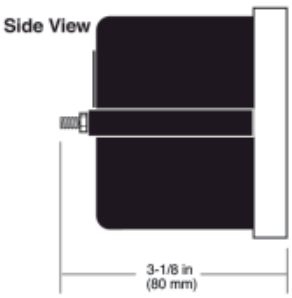
The MT90 is calibrated to engine RPM by setting a series of calibration rotary switches on the back of the tachometer. The proper switch sequence for the engine is determined by (1) the number of ring gear teeth for the magnetic pickup, or (2) by the ratio of alternator to engine pulley diameter, and the number of poles of the alternator.

RPM Calibration

Typical applications include: Generators, Compressors, Industrial Engines, Oil Field Equipment, Marine Vessels, Vehicles, Farm Equipment, and Construction Equipment.

Dimensions





Magnetic Pickups

Pickup Models	Total Length	Threaded Length	Thread Size
MP3298*	3 in. (76 mm)	3 in. (76 mm)	5/8-18 UNF
MP7906†	3 in. (76 mm)	3 in. (76 mm)	3/4-16 UNF
MP7905‡	4-1/2 in. (114 mm)	4-1/2 in. (114 mm)	3/4-16 UNF

* Replaces 20-01-0080 and MP100. Lead wire hookup (12 in. [305 mm]).
† Replaces 20-01-0081. Lead wire hookup (12 in. [305 mm]).
‡ Replaces 20-01-0082. Lead wire hookup (12 in. [305 mm]).

Specifications

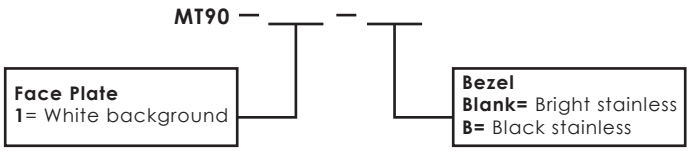
Signal Input Voltage:4 to 35 Vrms from a magnetic pickup or alternator.*
Pulses per Revolution: 3 to 999.
Power Requirements:
• Pickup Power: 4-35Vrms*.
• Battery Power:8-40 VDC (12, 24, 32 volt).
Current:
• Tach back-light Off, 4mA @ 40 VDC.
• Tach back-light On, 25 mA @ 40 VDC.

* See "Special Note" for Magnetic Pickup Powered MT90 applications

Case: 1018 polycarbonate/polyester blend.
Lens: Polycarbonate.
Bezel: #430 Stainless Steel.
Display: LCD, 4-digit, seven segment.
Operating Temperature: -4 to 158°F (-20 to 70°C).
Storage Temperature: -13 to 185°F (-25 to 85°C).
Mounting Hole: 3-7/16in. (87 mm).
Shipping Weight: 14 oz. (0.4 kg).
Shipping Dimensions: 5-1/2 x 5-1/2 x 5-1/2in. (140 x 140 x 140 mm)

How to Order

To order a MT90 for your application, use the diagram below.



To order a magnetic pickup, specify model number. Example: **MP3298**

Digital Tachometer and Hourmeter
With Adjustable Overspeed Set Point – Model MTH6

Features

- Tachometer and Hourmeter With Overspeed Shutdown or Alarm Switch
- 3-1/2 Inches (89 mm) Diameter Dial
- Reads RPM Data from a Magnetic Pickup or Battery Charging Alternator
- Powered by 8 to 40 VDC
- Large 5-Digit LCD Display
- Maintains Hours Count When Power Is Lost
- Front Panel Programming
- Hours Can Be Reset to Zero

This microprocessor-based digital tachometer and hourmeter with a built-in overspeed switch is highly accurate and dependable. It measures speed and running hours and can give an alarm or shut down the engine on overspeed.
The MTH6 case is polycarbonate, and its dial measures 3-1/2 in. (89 mm) in diameter.
RPM data for the tachometer and overspeed switch is supplied by a magnetic pickup or battery charging alternator. The magnetic pickup is installed into the flywheel housing of an internal combustion engine. The starter ring gear acts upon the magnetic pickup to generate a voltage pulse each time a gear tooth passes the end of the sensor.

RPM Calibration

- Industrial Engines
- Generators
- Compressors
- Oil Field Equipment
- Marine Engines
- Vehicles
- Farm Equipment
- Construction Equipment

Basic Operation

During normal operation, the MTH6 displays RPM. Its five-digit, liquid crystal display is updated every second. When the MTH6 is displaying hours and a speed signal is present, the far left digit and decimal point will flash indicating the hourmeter is operating.
The overspeed set point and running hours can be viewed by manipulating three membrane switches located on the MTH6 front panel. When the overspeed set point is met an LED, also located on the front panel, lights.

Specifications

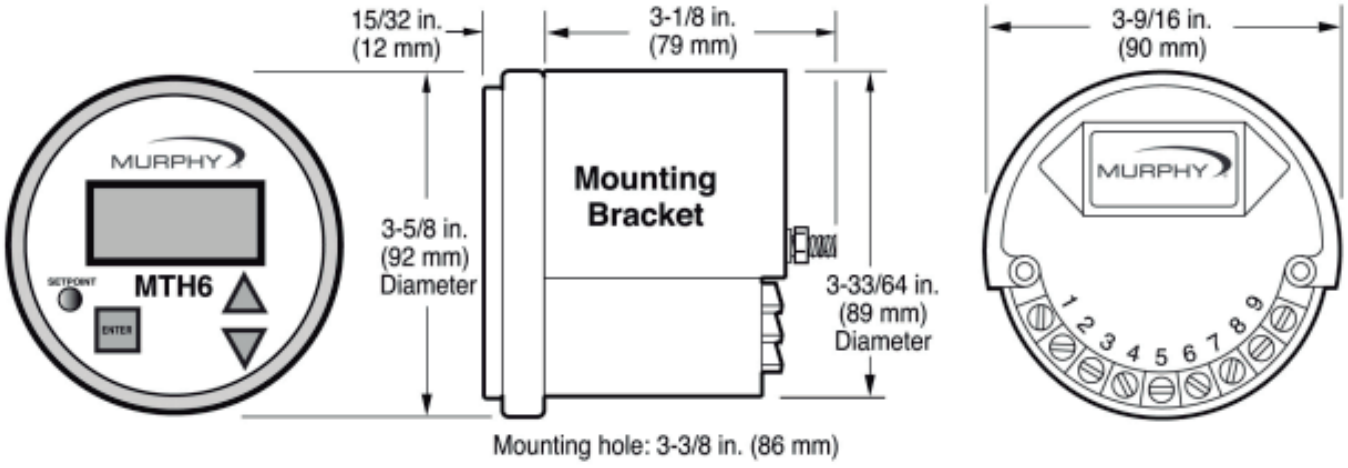
Power Requirements: 8-40 VDC (12, 24 or 32 VDC systems).
Maximum Current:
12 VDC: 0.011 A, backlight Off;
0.025 A, backlight On.
24 VDC: 0.008 A, backlight Off;
0. 015 A, backlight On.
32 VDC: 0.007 A, backlight Off;
0. 010 A, backlight On.
Operating Temperature: -4°to 158°F (-20°to 70°C).
Storage Temperature: -40°to 185°F(-40°to 85°C).
Case: 1018 Polycarbonate/Polyester blend.
Mounting Hole Dim.: 3-3/8 in. (86 mm) Dia.
Speed Input: 4.5 Vrms minimum.
Overspeed Switch Rating: 2 A, 50 VDC.
Overspeed Range: 0 to 9000 RPM.
Pulses per Revolution: 4 to 255.
Tachometer Range: 0 to 65,535 RPM.
Tachometer Accuracy: ±1% of the display reading or -2 RPM whichever is greater.
Input Frequency Range: 25 Hz to 20 kHz.
Hourmeter Range: 0 to 99999 hrs.
Hourmeter Resolution: ±0.1 Hour up to 9999.9; ±1 hour 10,000 and up.
Reset Hourmeter: Apply temporary ground to terminal #5 to reset hours to zero.
Shipping Weight: 14 oz. (435 g).
Shipping Dimensions: 5-1/2 x 5-1/2 x 5-1/2 in. (140 x 140 x 140 mm).

MEREX

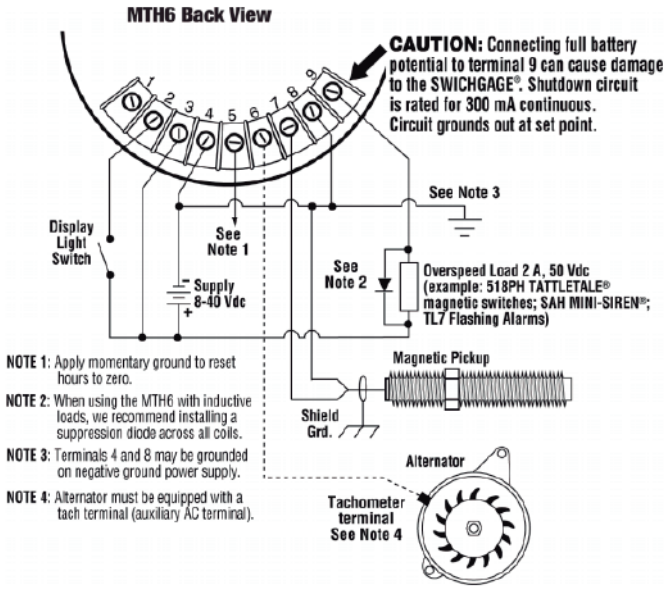
Easy-Calibration

The MTH6 calibration is simple. The operator enters the number of pulses per engine revolution and the overspeed set point value using the membrane-switches located on the front of the MTH6.

Dimensions



Typical Wiring Diagram



How to Order

Order by model designation.

MTH6 — ____ — ____

Face Plate
1= White background

Bezel
Blank= Bright stainless
A= Black stainless

Pulsation Dampener – PD8100 Series

Features

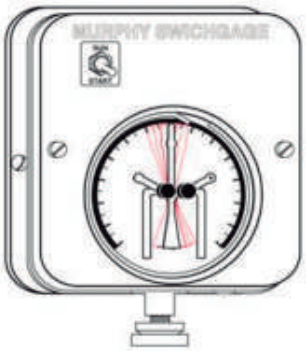
- Used On Controllers, Instruments and Recordersto Dampen Pressure Pulsation
- Eliminate Gage Pointer Flutter
- Aids In Providing More Accurate Pressure Indication
- Decreases Wear On Gage's Geared Movement

NOT INTENDED FOR USE AS A SHUTOFF VALVE

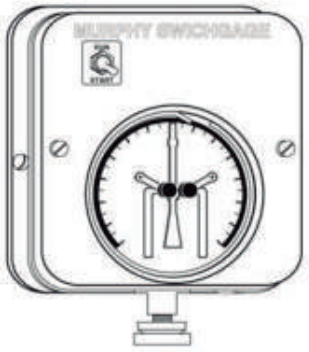
Description

The PD8100 Series eliminates pointer flutter on pressure indicating SWICHGAGE® devices which are subject to pulsating pressure from reciprocating pumps or compressors. It also allows a close setting of high and low contact points providing for more accurate pressure indication and control of equipment.
The PD8100 Series decreases wear on geared movements and increases the life of pressure indicating instruments by eliminating excessive gage strain and unnecessary movement.
A necessity which quickly pays for itself by protecting any pressure indicating and control instrument which is subject to pulsation.
PD8100 SERIES NOT FOR USE ON OXYGEN OR LIQUID OXYGEN APPLICATIONS.

Eliminate pointer flutter like this.



Make SWICHGAGE® instruments and recorders operate like this.



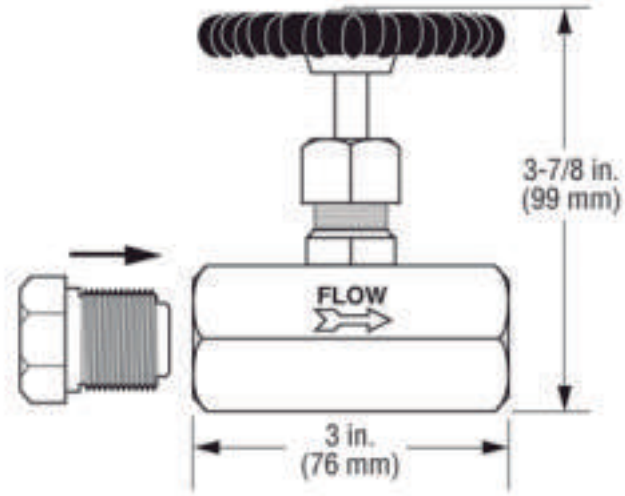
Quality built with a large diameter valve stem wheel for ease of adjustment with clearly printed operating instructions.
Machined from 1-3/8 in. (35 mm) hex bar stock. A two degree taper on valve and stem assure positive dampening. Available in brass, carbon steel, 303 stainless steel or 316 stainless steel to meet pressure and environmental requirements with either 1/2 NPT or 1/4 NPT inlet connections.

Specifications

See "How to Order" section for available inlet and outlet connections.

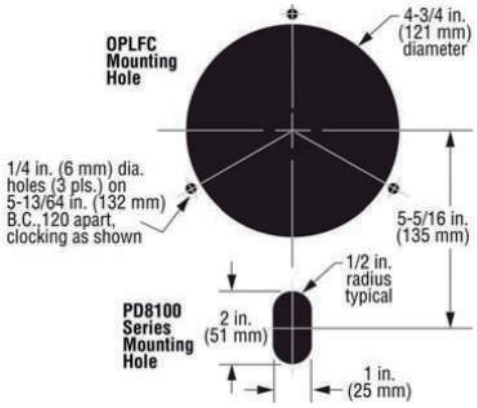
PD8183: All wetted parts are Brass. Rated to 3,000 psi (20.68 MPa) [206.80 bar].
PD8184: All wetted parts are Carbon steel. Rated to 5,000 psi (34.47 MPa) [344.70 bar].
PD8185: All wetted parts are 303 stainless steel. Rated to 10,000 psi (68.95 MPa) [689.50 bar].
PD8190: All wetted parts are 316 stainless steel. Rated to 10,000 psi (68.95 MPa) [689.50 bar]. Meets NACE standard MR- 01-75 for direct exposure to H2S.
Operating Temperature: -15 to 400°F (-26 to 204°C)
Shipping Weight (all models): 2 lbs.(0.9 kgs.)
Shipping Dimensions (all models): 4-3/4 x 4-3/4 x 3-1/4 in. (121 x 121 x 83 mm)

Dimensions



Mounting for the OPLFC Pressure SWICHGAGE® and PD8100 Series

The PD8100 Series pulsation dampener is mounted directly below the OPLFC



Precautions: Dope or use teflon tape on connection threads. Do not block the inlet orifice.

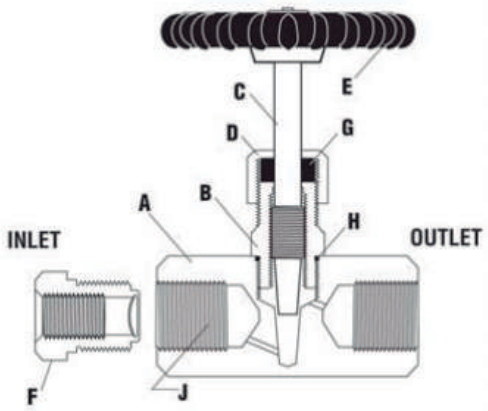
MURPHYMATIC® Compressor Panel

Shown at right, is a typical MURPHYMATIC® compressor panel featuring three Pulsation Dampeners and Murphy's OPLFC gages. The PD's are recommended for use on piston pumps and compressors to eliminate pointer contact flutter and gage wear.

Service Parts

DESCRIPTION (see drawing–right)	PD8183	PD8184	PD8185	PD8190
A. 1/2 NPT inlet x 1/4 NPT outlet*	65-05-0104	65-05-0210	65-05-0204	65-05-1136
1/2 NPT inlet x 1/2 NPT outlet*	65-05-0105	65-05-0212	65-05-0206	65-05-1135
B. Bonnet Fitting	65-05-0099	65-05-0209	65-05-0203	65-05-1139
C. Valve Stem	65-05-0175	65-05-0208	65-05-0202	65-05-1140
D. Packing Nut	65-05-0098	65-05-0211	65-05-0205	65-05-1137
E. Hand Wheel (with 10-32 nut)	55-00-0179	55-00-0179	55-00-0179	55-00-0179
F. Strainer Bushing Assembly†	55-00-0174	55-00-0173	55-00-0175	55-00-0206
G. Molded Packing Gland	00-00-0936	00-00-0936	00-00-0936	00-00-0936
H. 'O' Ring Bonnet Seal	00-00-0302	00-00-0302	00-00-0302	00-00-0302
J. Stainless Steel Mesh Filter**	65-05-0214	65-05-0214	65-05-0214	65-05-0214

†Provided only for units with 1/4 NPT inlet.
*For 1/4 NPT inlet use with strainer bushing assembly.
**Provided in units with 1/2 NPT inlet.



How to Order

PD8185 — 1/4 x1/4

Base Model
PD8183
PD8184
PD8185
PD8190

Connection Size
1/4 x 1/4 = 1/4 NPT intel x 1/4 NPT outlet
1/4 x 1/2 = 1/4 NPT intel x 1/2 NPT outlet
1/2 x 1/2 = 1/2 NPT intel x 1/2 NPT outlet
1/2 x 1/4 = 1/2 NPT intel x 1/4 NPT outlet

Digital Tachometer and Hourmeter with Adjustable Overspeed Trip Point – SHD30 and SHD30-45 Models

* When installed per Murphy Drawing 20-08-0258

Features

- Normally Open and Normally Closed Overspeed Alarm or Shutdown Switch (Standard)
- RPM Data and Power Supplied by Magnetic Pickup or Capacitor Discharge (CD) Ignition
- Accurate to ±0.5% of Display Reading
- Hours Can Be Preset and Reset to Zero
- Approved for Class I, Division 2, Groups C & D Hazardous Areas

The SHD30 and SHD30-45 are microprocessor based tachometers with hourmeter and an overspeed trip point. The trip point can be connected as either a form "c" relay output or as a normally open SCR output for alarm or shutdown on overspeed.
The SHD30 features a panel-mounting design, plastic enclosure that is 5-1/16 (129 mm) long and 4-1/4 in. (108 mm) high.
The SHD30-45 has the same enclosure, but it also has a backplate with studs to mount like a SHD-45, OPLFC.
The SHD30 models power and RPM data are supplied by either a magnetic pickup or a capacitor discharge (CD) ignition. The hourmeter is adjustable to a preset time and resettable to zero. Should power be lost, on-board batteries maintain the run hours display and allow for resetting the overspeed relay output.

Basic Operation

When a tach signal is present the SHD30 models display rpm. When a tach signal is not present, the display is blank unless the Read Hours membrane key, on the faceplate is pressed and held.
The five-digit, liquid crystal display is updated every second. The run hours, overspeed set point and current pulses per engine revolution can be displayed by manipulating the membrane switches. Run hours can be displayed even after power is lost. The run hours display can be configured to alternate with the RPM display.

Applications

- Gas Compressors
- Oil Field Equipment
- Industrial Engines
- Generators

Easy-to-Calibrate

The SHD30 models calibration is done by entering the number of pulses per engine revolution using the Pulses per Revolution and Overspeed Setpoint membrane keys, on the faceplate. The number of pulses is determined by the number of cylinders, cycles and ignition features. It is also determined by the number of ring gear teeth of the engine's flywheel on a magnetic pickup system.
Presetting and resetting running hours is done from the back and front of the SHD30 models.

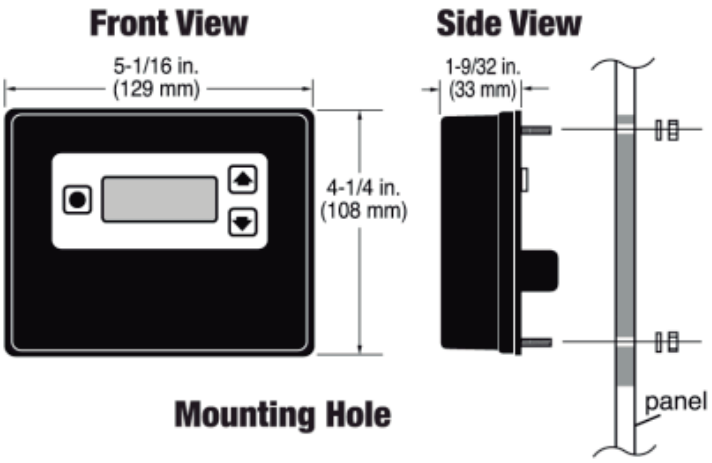
Specifications

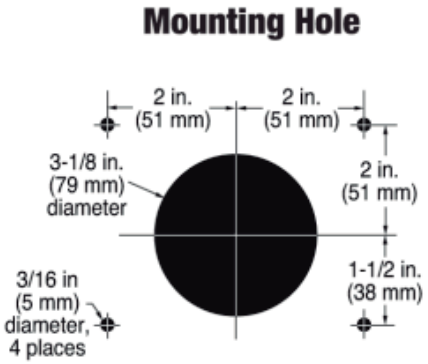
Power input:
CD ignition: 90 to 350 VDC.
150 µA typical @ 90 VDC;
300 µA @ 350 VDC.
Magnetic Pickup: 5 to 120 Vrms.
325 µA typical @ 5 Vrms, 100 Hz;
450 µA typical @ 5 Vrms, 1 kHz;
1 mA typical @ 5 Vrms, 5 kHz;
2 mA typical @ 5 Vrms, 10 kHz;
15 mW max. @ 5 Vrms, 10 kHz;
2.8 W max. @ 120 Vrms, 10 kHz.
Backup Batteries: 2 replaceable, long life Lithium batteries, Panasonic CR2032 or equivalent, 3 V, 220 mAh power. Shelf life expectancy 10 years.
Operating Temperature: -4° to 158°F (-20° to 70°C).
Storage Temperature: -40° to 300°F (-40° to 150°C).
Case Material: Plastic.

Ignition Frequency Range: 3 to 666 Hz.
Magnetic Pickup Frequency Range: 1 to 10 kHz.
Overspeed Output:
Connected to S.C.R. (Silicon Controlled Rectifier) terminals: 0.5 A, 350 VDC continuous.
Connected to Form "C" Relay terminals:
Relay Contact, 0.5 A, 30 VDC, 125 VAC resistive.
Tachometer Accuracy: ±0.5% of the display reading or ±1 RPM whichever is greater.
Hourmeter Range: 0 to 65535 hrs.
Hourmeter Accuracy: ±15 minutes per year.
Laboratory Approvals: CSA (Canadian Standards Association) approved for Class I, Division 2, Groups C & D hazardous areas.
Shipping Weight: 1 lb (0.5 kg).
Shipping Dimensions: 9-1/4 x 8-1/4 x 5-1/4 in. (235 x 210 x 133 mm).

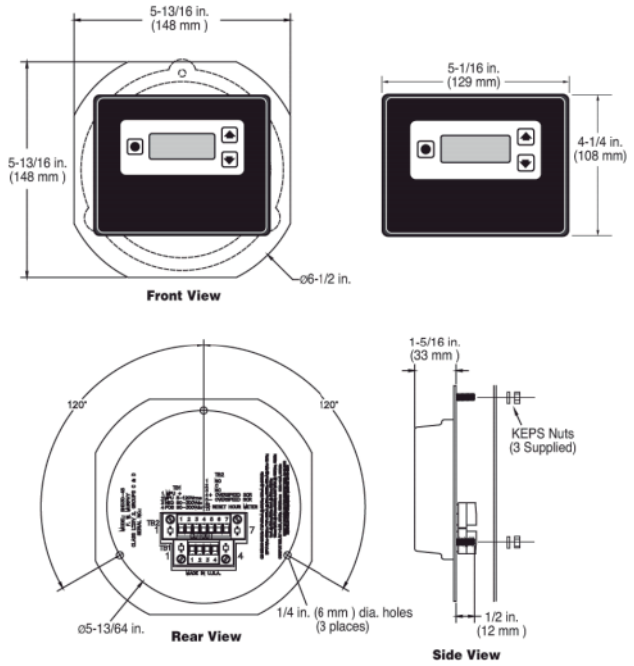
Dimensions

SHD-30

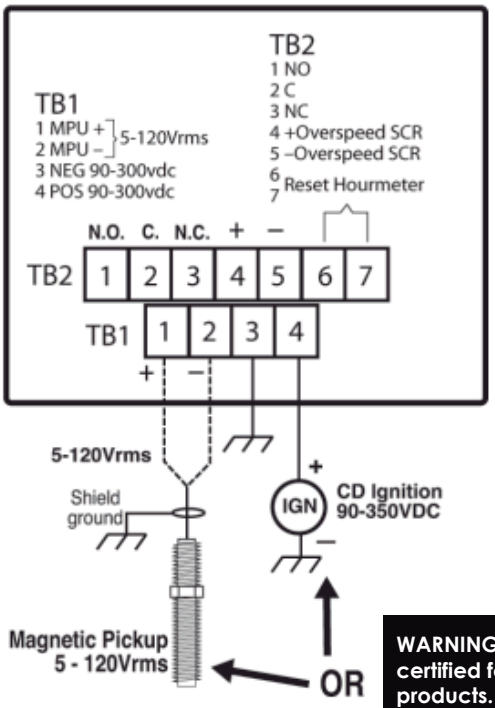




SHD-30-45



Typical Wiring Diagram



How to Order

Specify model number:
SHD30 = Tach/hourmeter w/overspeed
SHD30-45 = Tach/hourmeter w/overspeed to mount like SHD45 or OPLFC
00-00-9389 = Panasonic CR2032 or equivalent backup battery (2 required)

WARNING: In hazardous areas the overspeed relay contact is certified for use ONLY with Murphy non-incendive or intrinsically safe products.
In non-hazardous areas overspeed relay contact may be used to switch electromechanical Tattletale® or Magnetic Switches that do not exceed the relay contact rating: 1 A, 30 VDC; 0.3 A, 110 VDC; 0.5 A, 125 VAC. However, the preferred output to switch electromechanical Tattletale® or Magnetic Switches is the N.O. SCR.

Refer to 00-02-0288-IOM for more details.

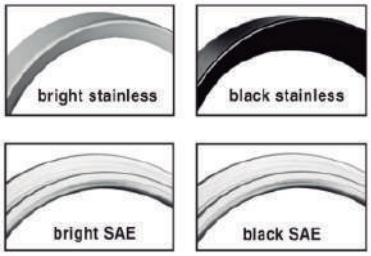
Hourmeters – TM Series

Features

- Normally Open and Normally Closed Overspeed Alarm or Shutdown Switch (Standard)
- RPM Data and Power Supplied by Magnetic Pickup or Capacitor Discharge (CD) Ignition
- Accurate to ±0.5% of Display Reading
- Hours Can Be Preset and Reset to Zero
- Approved for Class I, Division 2, Groups C & D Hazardous Areas

* Products covered by this bulletin conform with comply with European Council electromagnetic compatibility directive 89/336/EEC, except as noted. The CE mark does not apply to the TM612 and TM624 models.

The TM Series hourmeters record the operating time of vehicles or powered equipment. They are electromechanical and have a quartz base time counter that insures accuracy (better than ±0.02% over the entire range). They can record up to 99,999.9 hours (9,999.9 for TM612/624) and include an automatic recycle to zero hours feature. The TM Series models have a shock-proof and tamperproof, totally sealed case made of an engineered plastic. These small, light weight time meters are rugged and durable. They are the answer to applications requiring a low DC power, reliable hourmeter.
The TM612/624 model includes a 3-hole mounting shock ring for extreme-shock protection.



Basic Models

6-Digits Hourmeters

Model	Bezel Type
TM4592	Bright Stainless Steel Bezel
TM4593	Black Stainless Steel Bezel
TM4594	SAE Bright Stainless Steel Bezel
TM4595	SAE Stainless Steel Black Bezel

5-Digits Hourmeter with Shock Ring Mounting

TM612/624	3-Hole Mount, Black Bezel

Applications

These hourmeters can be used on any engine where operating time needs to be recorded. All it requires is a DC power source (refer to Specifications, below).

Outstanding Features

- Solid-State Electronic Drive Circuit
- Quartz-Crystal for Accurate Timing
- Quiet Operation–Permanently Lubricated
- High-Impact, Tamperproof Plastic Case
- Sealed Against Moisture and Dirt
- Indicates Operating Time in Hours and Tenths
- No Battery Back Up Required
- Made in the U.S.A.

Specifications

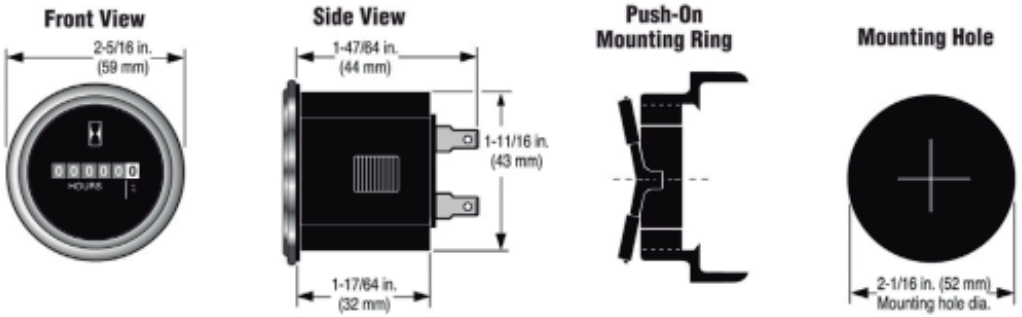
Power Input: 12 to 24 VDC
Power Consumption: Less than 0.03 W @ 12 VDC; 0.4 W @ 24 VDC.
Accuracy: ±0.02% over entire range.
Temperature Range: -40°F to 185°F (-40°C to +85°C).
Dial (Face Plate): White numerals (over black background).
Time Scale:
TM4592-95 models: 6-digits 99,999.9 hours;
TM612/624 models: 5-digits 9,999.9 hours.
Automatic recycle to zero.
Vibration Resistance: Withstands 10 to 75 Hz@ 1 to 8 G's.
Case Material: Plastic.

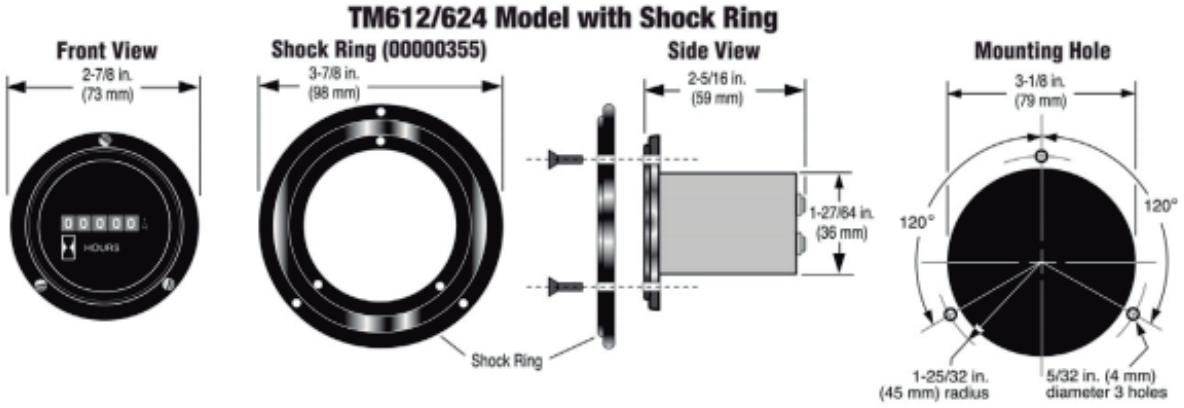
Bezel: Stainless Steel.
Terminations: 1/4 in. (6 mm) male blade terminals.
TM4592/4595 Shipping Weight: 5 ozs. (140 g).
Shipping Dimensions: 3-1/8 x 3 x 3 in. (79 x 76 x 76 mm) approximately.

TM612/624 Shipping Weight: 8 ozs. (230 g).
TM612/624 Shipping Dimensions: 5 x 5 x 3-1/4 in. (127 x 127 x 83 mm) approximately.

MEREX

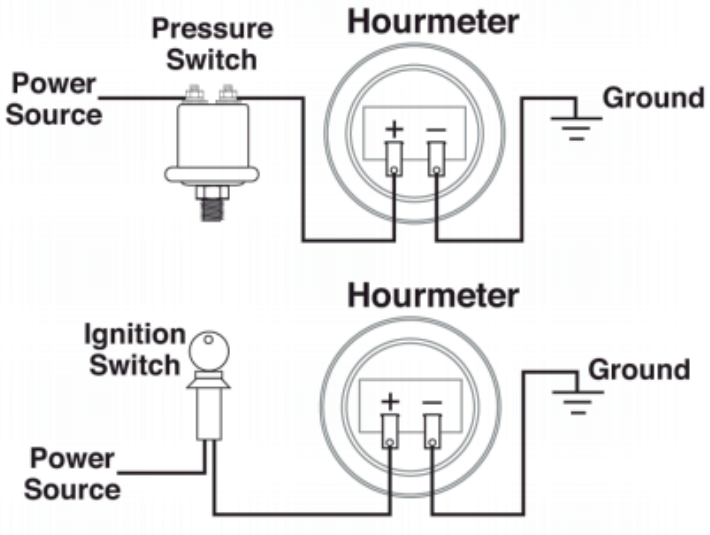
Dimensions





Typical Wiring Diagrams

WARNING: Turn the power source OFF before wiring.



How to Order

Example: **TM4592**

Model Designation

Model	Description
TM4592	6-digits w/Bright Stainless Steel Bezel
TM4593	6-digits w/Black Stainless Steel Bezel
TM4594	6-digits w/SAE Bright Stainless Steel Bezel
TM4595	6-digits w/SAE Stainless Steel Black Bezel
TM612/624	5-digits w/Shock Ring Mount Black Bezel
00000355	Shock Ring only for TM612/624

Shock and Vibration Switch – VS2 Series

* Selected Configurations are Third Party Listed

Features

- Designed to Detect Shock/Vibration in 3-Planes of Motion
- Fully Adjustable
- Includes Magnetic Latching Feature
- Manual or Electric Reset

The VS2 Series switches are shock sensitive mechanisms for shutdown of engine or electric motor powered equipment. These switches use a magnetic latch to ensure reliable operation. Explosion-proof "EX" models for hazardous locations are available.

Applications

Ideal for use on engines, pumps, compressors, heat exchangers and pumping units, the VS2 Series can be used anywhere shutdown protection from damaging shock/vibration is desired. Switches are field adjustable to sensitivity required in each application.

Specifications

VS2 and VS2C
Case: Environmental Protection: Ingress protected to IP54 (when mounted on a horizontal surface with drain holes down). Suitable for non-hazardous areas.
VS2C: C-clamp mount, includes 45 ft. (13.7 m) 2-conductor cable, and 5 cable clamps
Contacts: SPDT-double make leaf contacts, 3A @ 240 VAC; 10A @120 VAC; 10A @ 32 VDC
Shipping Weight:
VS2: 2 lb 8 oz. (1.1 kg)
VS2C: 7 lb (3.2 kg)
Shipping Dimensions:
VS2: 8-1/4 x 9-1/4 x 5 in. (210 x 235 x 127 mm)
VS2C: 12 x 7 x 5-1/2 in. (305 x 178 x 140 mm)

VS2EX
Case: Base mount, explosion-proof aluminum alloy housing; meets IP54 specifications; Class I, Division 1, Groups C & D; UL and CSA listed
Certification: CSA, UL
Snap-switches: 2-SPDT snap-switches; 5A @ 480 VAC;* 2A resistive, 1A inductive, up to 30 VDC
Normal Operating Temperature: -40°F to 185°F (-40°C to 85°C)
Shipping Weight: 4 lb 8 oz. (2 kg)
Shipping Dimensions: 8-1/4 x 9-1/4 x 5 in. (210 x 235 x 127 mm)

VS2EXR
Case: Same as VS2EX
Certification: CSA, UL
Snap-switch: 1-SPDT snap-switch and reset coil; 5A @ 480 VAC;* 2A resistive, 1A inductive, up to 30 VDC
Remote Reset: 115 VAC or 24 VDC (specify)
Shipping Weight: 5 lb 8 oz. (2.2 kg)
Shipping Dimensions: 8-1/4 x 9-1/4 x 5 in. (210 x 235 x 127 mm)

VS2EXRB
Case: Explosion-proof aluminum alloy housing; rated Class I, Division 1, Group B hazardous areas
Certification: No third party certification
Snap-switch: 1-SPDT snap-switch with reset coil (option available for 2-SPDT switches); 5A @ 480 VAC; 2A resistive, 1A inductive, up to 30 VDC
Remote Reset: 115 VAC or 24 VDC (specify)
Shipping Weight: 17 lb 8 oz. (7.9 kg)
Shipping Dimensions: 12 x 12 x 10 in. (305 x 305 x 254 mm)

Basic Operation

Pushing the reset button moves the tripping latch into a magnetically held position. A shock/vibration will move the magnet beyond this holding position, thus freeing the spring loaded tripping latch to transfer the contacts and shutdown the machinery (see dimensional diagrams in the following pages for visual representation of parts).

Remote Reset Option (VS2EXR and VS2EXRB)

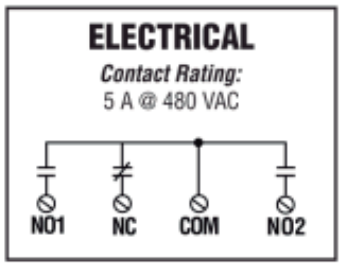
The remote reset option includes a built-in electric solenoid which allows reset of tripped unit from a remote location. Available for 115 VAC or 24 VDC.

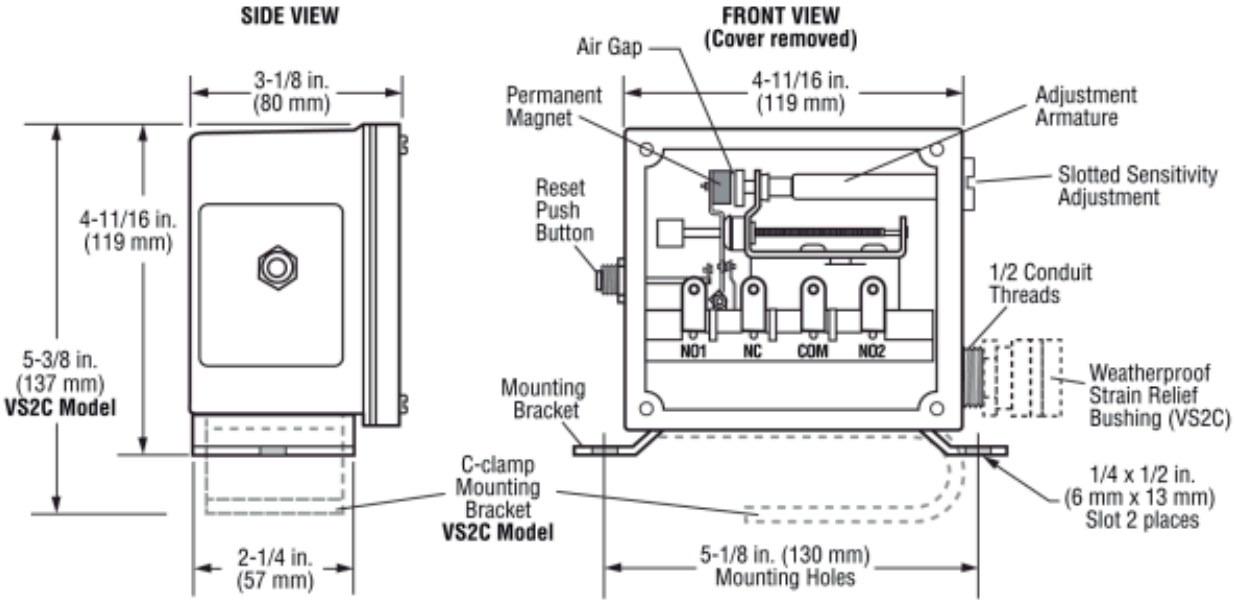
Dimensions

Environmental Protection: Ingress protected to IP54 (when mounted on a horizontal surface with drain holes down).

VS2 and VS2C

The VS2 and VS2C are designed for use in non-hazardous locations. They have leaf type SPDT, double make contacts that can be used for shutdown and/or alarm. They have a slotted sensitivity adjustment located on the side of the case (see drawing below).

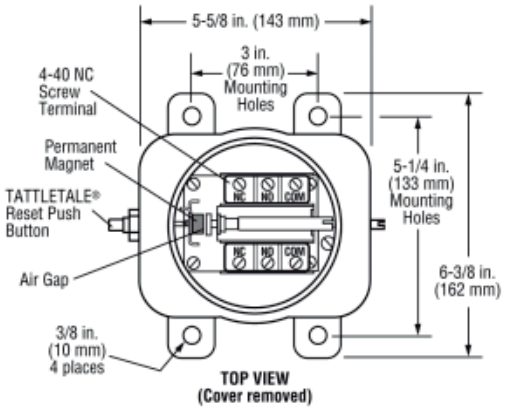


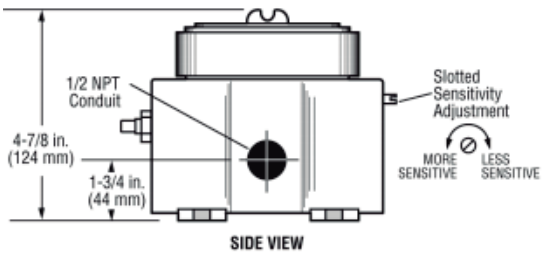


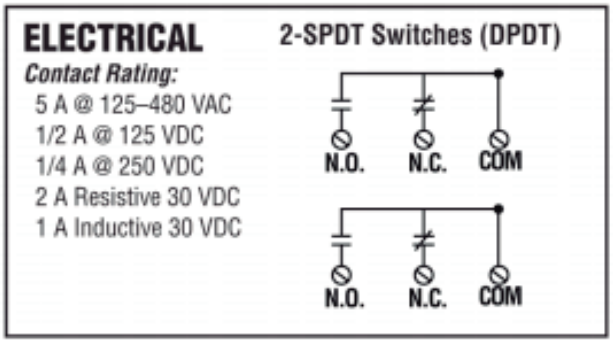
VS2EX

- IP54 Specifications
- Snap-switch Contacts
- TATTLETALE® Reset Button

Model VS2EX is housed in an explosion-proof enclosure with threaded cover. This enclosure is CSA and UL listed for Class I, Division 1, Groups C & D hazardous locations. In place of the leaf type contacts, 2-SPDT snap-switches are used in this model. Sensitivity is externally adjustable and, when tripped, the VS2EX gives a TATTLTALE® indication on the reset button. It is constructed to meet IP54 specifications.







VS2EXR

- Remote Reset Feature
- IP54 Specifications
- Snap-switch Contacts
- TATTLETALE® Reset Button

Model VS2EXR features an electric remote reset feature in addition to the TATTLETALE® reset button. The VS2EXR uses only one SPDT snap-switch and is CSA and UL listed for Class I, Division 1, Groups C & D hazardous locations. It is constructed to meet IP54 specifications.

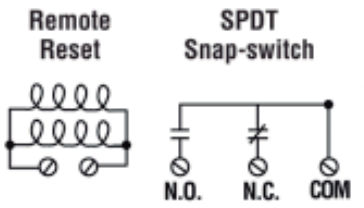
ELECTRICAL

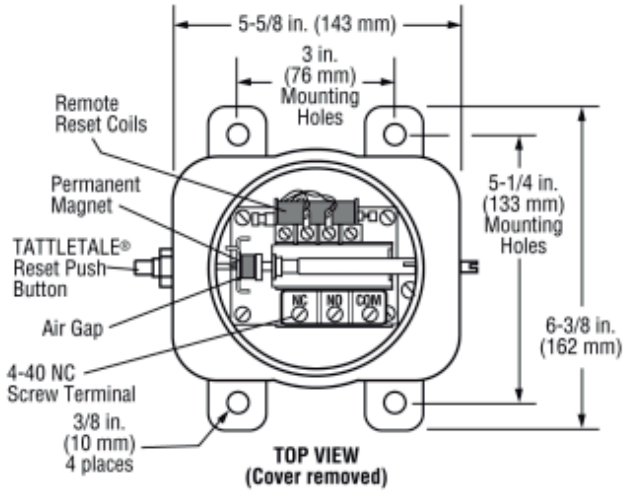
Contact Rating:

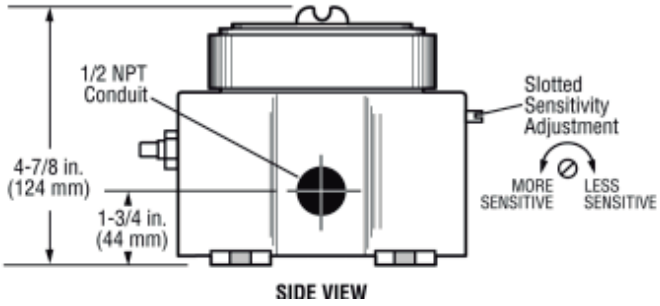
5 A @ 125–480 VAC
1/2 A @ 125 VDC
1/4 A @ 250 VDC
2 A Resistive 30 VDC
1 A Inductive 30 VDC

Remote Reset Rating:

115 VAC or 24 VDC (Specify)
350 mA AC/DC







VS2EXRB

- For Group B Locations
- Snap-switch Contacts
- DPDT Feature Optional

Model VS2EXRB is constructed for use in Class I, Division 1, Group B, hazardous locations. It has, as standard, a SPDT snap-switch and an electric remote reset. Option is available for DPDT snap-switch

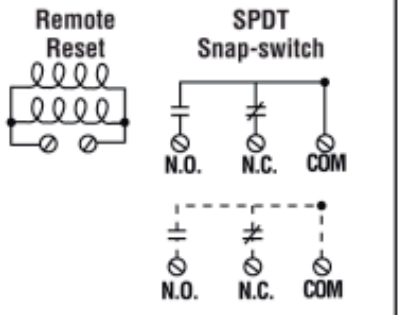
ELECTRICAL

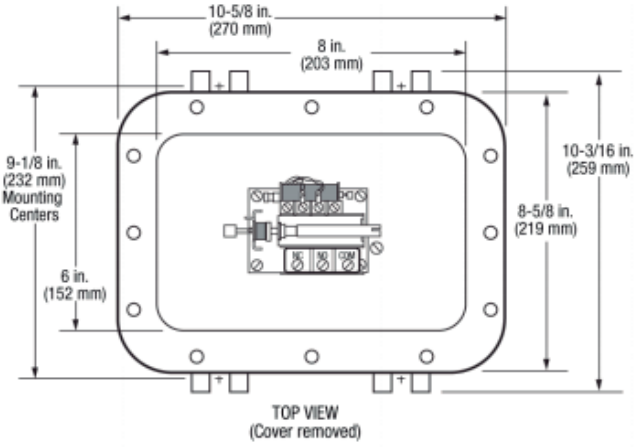
Contact Rating:

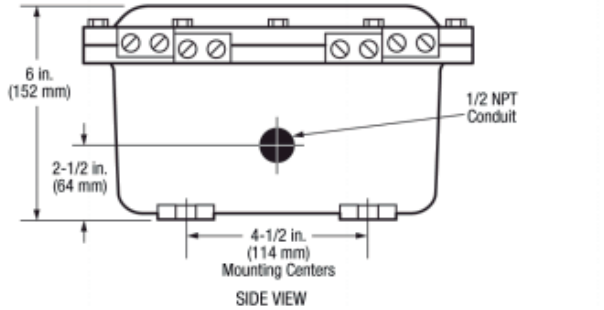
5 A @ 125–480 VAC
1/2 A @ 125 VDC
1/4 A @ 250 VDC
2 A Resistive 30 VDC
1 A Inductive 30 VDC

Remote Reset Rating:

115 VAC or 24 VDC (Specify)
350 mA AC/DC







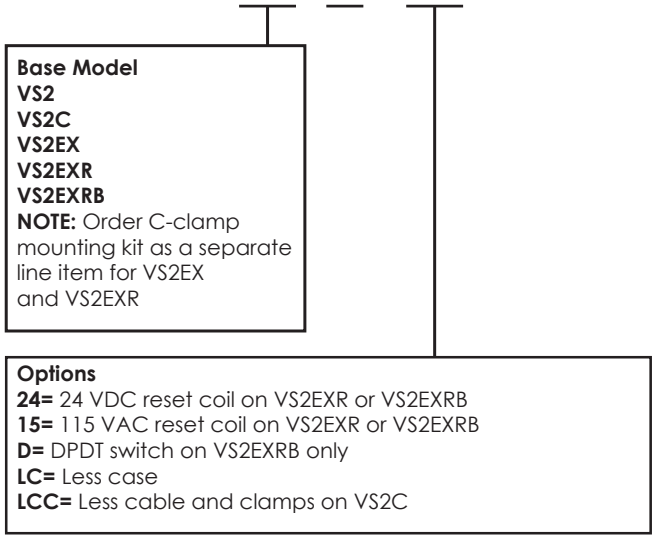
Service Parts

When ordering service parts, specify both part number and description in listing below.
PART NO. DESCRIPTION
VS2 and VS2C
20-00-0030 Movement assembly
20-00-0031 Glass and gasket assembly
20-00-0032 Reset push button assembly
20-05-0021 Mounting clamp (VS2C)
20-00-0261 Cable clamp assembly (1 each) (VS2C)
20-05-0465 2-Conductor electrical cable, 45 feet (13.7 meters) (VS2C)
20-00-0137 5 clamps and 45 feet (13.7 meters) of cable (VS2C)
VS2EX
20-01-0091 Movement assembly
20-05-0087 Cover
00-00-0309 Cover gasket
20-01-0090 Snap-switch and insulator kit (1 switch per kit) prior to September 1, 1995.*
20-00-0288 Snap-switch and insulator kit (1 switch per kit) for models manufactured on September 1, 1995 or later.*
20-00-0289 C-clamp conversion mounting kit
VS2EXR
20-00-0262 Movement assembly
20-05-0087 Cover
00-00-0309 Cover gasket
20-01-0090 Snap-switch and insulator kit (1 switch per kit) prior to September 1, 1995.*
20-00-0288 Snap-switch and insulator kit (1 switch per kit) for models manufactured on September 1, 1995 or later.*
20-00-0049 Reset solenoid assembly (115 VAC)
20-00-0234 Reset solenoid assembly (24 VDC)
20-00-0289 C-clamp conversion mounting kit
VS2EXRB
20-01-0090 Snap-switch and insulator kit (1 switch per kit) prior to September 1, 1995.*
20-00-0288 Snap-switch and insulator kit (1 switch per kit) for models manufactured on September 1, 1995 or later.*
20-00-0057 Inside snap-switch and insulator kit (1 switch per kit) for model VS2EXRB-D prior to September 1, 1995.*
20-00-0058 Outside snap-switch and insulator kit (1 switch per kit) for model VS2EXRB-D prior to September 1, 1995.*
20-00-0287 Inside snap-switch and insulator kit (1 switch per kit) for model VS2EXRB-D manufactured on September 1, 1995 or later.*
20-00-0290 Outside snap-switch and insulator kit (1 switch per kit) for model VS2EXRB-D manufactured on September 1, 1995 or later.*
20-05-0077 Adjustment shaft
20-00-0262 Movement assembly
20-00-0049 Reset solenoid assembly (115 VAC)
20-00-0234 Reset solenoid assembly (24 VDC)

*Models with date 0895 and before use old switch. Dated 0995 after, use straight snap-switch arm, no rollers

How to Order

To order your VS2 Series model use the diagram below.
Part number example: **VS2EXR-24**



Shock and Vibration Control Switch – VS94 Model

Features

- NEMA 4X/IP66 Enclosure (CSA Types 4 & 12)
- Protects Your Equipment from Excessive Shock or Vibration
- Fine Adjustment to Precisely Select the Degree of Sensitivity
- Reset from a Remote Location (Optional)
- Time Delay to Override Trip Operation at Start-up (Optional)
- Space Heater to Prevent Moisture Condensation Inside the Unit (Optional)

VS94 Series is an electro-mechanical device designed to protect equipment from damaging shock or vibration. This sensitive mechanism can detect excessive shock or vibration and shutdown the equipment before further damage occurs. A set of contacts is held in a latched position through a magnetic latch mechanism. As the level of shock or vibration increases an inertia mass exerts force against the latch arm and forces it away from the magnetic latch causing the latch arm to separate and to operate the contacts. Sensitivity is obtained by adjusting the amount of air gap between the magnet and latch arm plate.
The VS94 Series is housed in a NEMA 4/4X glass filled polyester enclosure and has a base mount. It is for applications in non-hazardous locations.
VS94 models are rated up to 480 VAC. (See the How to Order section on back page for models and options available.)

Applications

Applications for the VS94 include all stationary types of machinery or equipment where excessive shock/vibration can be damaging or poses a threat to normal operations such as in:

- Cooling fans
- Engines
- Pump jacks
- Compressors
- Pumps
- Rotating and Reciprocating Machinery

Features

- Electromechanical Design
- Detects Shock or Vibration in Three Planes of Motion
- NEMA 4/4X (CSA types 4 and 12) Weather-proof Enclosure
- Reliable Magnetic Latch Feature
- Micro Fine, Easy-to-Adjust Sensitivity Adjustment
- Manual Reset (Standard)
- Remote Reset (Optional)
- Adjustable Start-up Time Delay (Optional)
- Space Heater Circuit to Prevent Housing Moisture Condensation (Optional)
- Two (2) versatile SPDT snap-switches rated up to 480 VAC.

Options

Remote Reset
This option of the VS94 includes a built-in electric solenoid which allows reset of tripped unit from a remote location. Available for 115 VAC or 24 VDC.

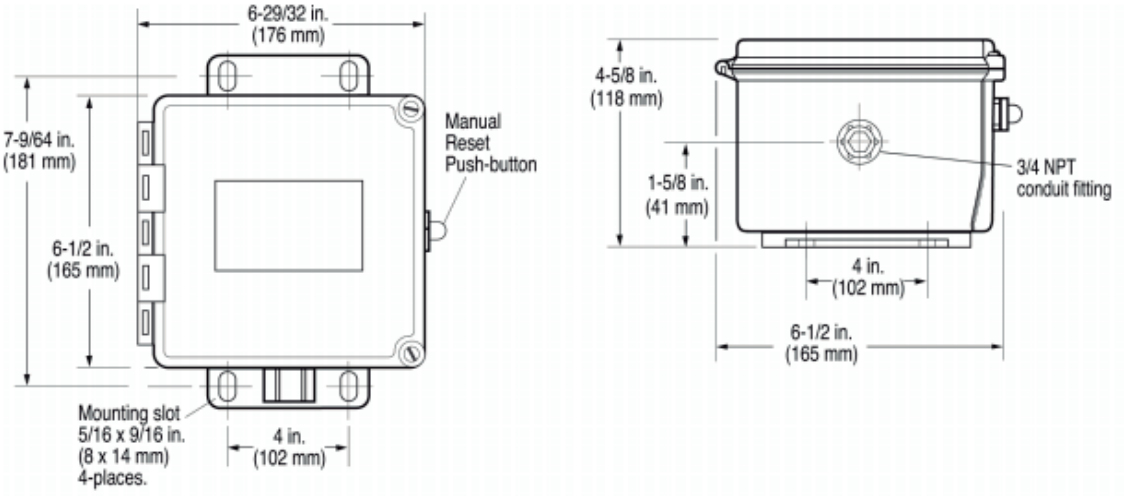
Time Delay
Overrides trip operation on start-up. The time delay option is field-adjustable from 5 seconds up to 6-1/2 minutes with an easy-to-adjust 20-turn potentiometer. Available for 115 VAC or 24 VDC.

Space Heater
This optional circuit prevents moisture condensation inside the VS94 housing.

MEREX

Dimensions

VS94 Series Models



Specifications

Case: Polyester fiberglass reinforced; NEMA type 4X; IP66; CSA types 4 and 12.
Conduit Fitting: 3/4 NPT conduit fitting connection.
Normal Operating Ambient Temperature: 0 to 140°F (-18 to 60°C).
Snap-switches: 2-SPDT snap acting switches; 5A @ 480 VAC; 2A resistive, 1A inductive, up to 30 VDC.
Range adjustment: 0 - 7 G's; 0 - 100 Hz /0.100 in. displacement.
Space Heater (optional):

Option	Operating Current
H15	.023 A @ 115 VAC
H24	.12 A @ 24 VDC

Remote Reset (optional):

Option	Operating Current
R15	.17 A @ 115 VAC
R24	.36 A @ 24 VDC

Time Delay (optional):

Option	Operating Current	Standby Current
T15	.360 A @ 115 VAC	.01 A @ 115 VAC
T24	1.15 A @ 24 VDC	.01 A @ 24 VDC

Time Delay/Remote Reset: Adjustable 20-turn potentiometer from 5 seconds to 6-1/2 minutes (15 seconds per turn approximately).
Shipping Weight: 4.35 lb. (2 kg.)
Shipping Dimensions: 9 x 8 x 4-11/16 in. (229 x 203 x 119 mm)

How to Order

To order your VS94 model use the diagram below.

VS94

Space Heater
Blank= No Space Heater
H15= 115 VAC
H24= 24 VDC

Remote Reset
Blank= No Remote Reset
R15= 115 VAC
R24= 24 VDC

Remote Reset
Blank= No Remote Reset
T15= 115 VAC
T24= 24 VDC