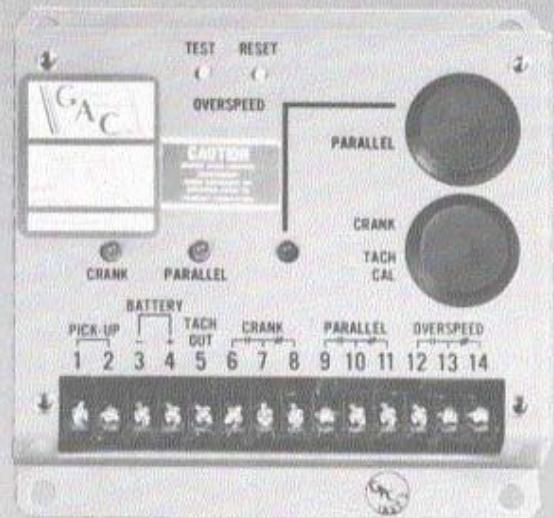
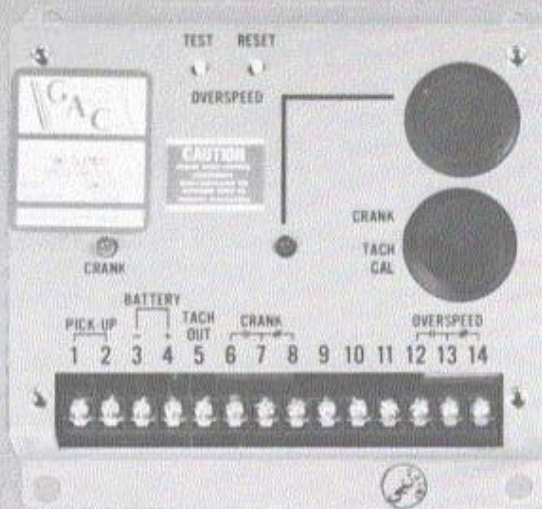




ENGINE GOVERNING SYSTEMS

SSW SERIES



ONE, TWO & THREE ELEMENT SPEED SWITCHES

INCLUDES: SSW674
SSW675
SSW676



GOVERNORS AMERICA CORP. • 720 Silver St. • Agawam, MA 01001-2907, USA

SSW SERIES ONE, TWO & THREE ELEMENT SPEED SWITCHES

PRODUCT
TECHNICAL
INFORMATION

PTI 4010

MARCH 1999
MPC

INTRODUCTION

The Governors America Corporation SSW674, SSW675 and SSW676 are respectively one, two and three element electronic speed switches. They are powered by a DC battery supply and receive engine speed information from a magnetic speed sensor.

speed, or general auxiliary contacts. The single element SSW674 has a wide range of adjustment and can be used for any one of these three functions.

Both the SSW675 and SSW676 sense and signal a low speed setting (CRANK termination), and a high speed setting (OVERSPEED). The SSW676 has a third mid speed setting that can be used for several purposes such as paralleling indication, under-

All speed elements activate discrete, internal relay contacts and LED indicators. The overspeed section of the SSW675 and SSW676 include TEST and RESET switches. An output voltage proportional to engine speed is provided to operate an external tachometer.

SPECIFICATIONS

PERFORMANCE

Input Impedance	Greater than 5K ohms
Response Time	Less than 50 msec
CRANK Termination Set Point Range (SSW675 and SSW676)	300 to 2300 Hz
Set Point Repeatability	5% above 1000 Hz over temperature range
Reset	Automatic or remove power
PARALLEL Set Point Range (SSW676 only)	1600 to 7200 Hz
Set Point Repeatability	1% above 2000 Hz over temperature range
Reset	Automatic at 6% below set point
OVERSPEED Set Point Range (SSW675 and SSW676)	2300 to 10000 Hz
Set Point Repeatability	1% over temperature range
Reset	RESET button or remove power
Test	Lowers set speed by 10%
Tachometer Signal (SSW674 only 0 to 20 mA)	0 to 1 mA (0 to 20 mA units are available)
Set Point Range (SSW674 only)	200 to 10000 Hz
Relay Contact Ratings	5 Amps

POWER INPUT

Supply	10 to 32 Vdc (Reverse voltage protected)
Polarity	Negative Ground, Case Isolated
Power Consumption	300 ma
Magnetic Speed Sensor Signal	0.25 to 120 Vac RMS

ENVIRONMENTAL

Ambient Operating Temperature Range	-40° to +180° F (-40° to +80° C)
Relative Humidity	up to 95%
All Surface Finishes	Fungus proof and corrosion resistant

RELIABILITY

Vibration	5G @ 20 - 500 Hz
Testing	Functionally Tested

PHYSICAL

Dimensions	see Diagram 1 or 2
Weight	SSW674 0.6 lbs. (0.3 kg) SSW675 & SSW676 1.2 lbs. (0.54 kg)
Mounting	Any position

DESCRIPTION

The SSW Series Speed Switches require DC power and an input speed signal to operate. Engine speed information for the speed switch is usually received from a magnetic speed sensor. Any other signal generating device may be used provided the frequency is proportional to engine speed and meets the input voltage and frequency range specifications.

The speed sensor is typically mounted in close proximity to an engine driven ferrous gear, usually the engine ring gear. As the teeth of the gear pass the magnetic sensor, an AC signal is produced whose frequency is proportional to engine speed.

An amplitude of 0.25 to 120 V RMS is required to allow the speed switch to function within its design specifications. A typical signal of 5 to 10 V RMS is recommended. The speed signal is applied to the PICK-UP terminals as shown in Diagram 1 or 2.

Sharing the magnetic speed sensor with the speed control is permitted provided the signal level meets the specification. Loss of the magnetic speed sensor signal must cause the speed control unit to shut off the engine. All speed switch functions cease when the speed sensor signal is removed.

As engine speed increases, the frequency of the speed sensor signal also increases. As each set point is reached and passed, the corresponding internal relay changes state and its LED illuminates. Each speed setting is independently adjustable with its own 25 turn potentiometer.

On the SSW675 and SSW676, the CRANK speed element latches when its set point has been exceeded. This function can be made to be self resetting, see Adjustment section. The OVERSPEED element latches until the RESET button is pushed or power is removed from the unit. On the SSW676, the PARALLEL element will reset itself after the engine speed has decreased to a level 6% below the PARALLEL set point.

On the SSW675 and SSW676, the TEST button lowers the OVERSPEED set point and confirms the proper operation of this safety feature.

An analog tachometer output signal, from 0 to 1 mA, is available. Adjustment of the output requires a calibrated oscillator or comparison with a standard tachometer on the engine.

WARNING

Speed switches are intended to operate engine speed protection devices. The quality and reliability of the user selected protection devices must be considered to adequately protect equipment and personnel.

APPLICATION AND INSTALLATION INFORMATION

The speed switch is rugged enough to be placed in a control cabinet or engine mounted enclosure with other dedicated control equipment. If water, mist, or condensation is to come in contact with the speed switch, it should be mounted vertically. This will allow any fluid to drain away from the unit.

Extreme heat should be avoided.

The unit is factory set for 24V operation.

SSW674

12V systems require a jumper wire connection between Terminals 4 and 5. See Diagram 2.

SSW675 and SSW676

12V systems require a soldered wire jumper between posts E4 and E5.

32V systems require a soldered wire jumper between posts E4 and E6.

Posts E4, E5, and E6 are accessible through the top cover adjustment hole. See Diagram 1.

WIRING

When wiring the speed switch into the engine protection control system, proper wire sizes must be used. The speed switch relay contacts are rated for a maximum current of 5 amps. All other connections have less than 1 amp current flow each.

The speed switch can be wired as illustrated in Diagram 1 or 2.

The magnetic speed sensor connections **MUST BE TWISTED AND/OR SHIELDED** for their entire length. The speed sensor cable shield must only be connected to Terminal 2 on the SSW675 and SSW676, or Terminal 8 on the SSW674. The shield should be insulated to insure that no other part of it comes into contact with engine ground, otherwise stray signals may be introduced into the speed switch.

When the engine is stopped, adjust the gap between the magnetic speed sensor and the ring gear teeth. The gap should not be smaller than 0.020 in. (0.45 mm). Usually, backing out the speed sensor 3/4 turn after touching the ring gear tooth will result in a satisfactory gap. The magnetic speed sensor voltage should be at least 1 V RMS while cranking. During operation, 5 to 10 V RMS is recommended.

Connect the BATTERY supply following the Wiring Diagram being careful to observe polarity.

ADJUSTMENTS

All elements are factory set at the maximum setting. Counterclockwise adjustment will lower the set point.

The tachometer output is factory set at its minimum setting, full CCW. Turning the adjustment CW increases the current output.

CRANK TERMINATION (SSW675 and SSW676)

The unit is factory set for manual reset. To reinitiate engine cranking, battery power must be removed and then reapplied.

Crank the engine and simultaneously turn the CRANK adjustment slowly counterclockwise until the proper crank termination speed is reached. When the cranking termination set point is reached, the green CRANK LED will illuminate.

The unit is factory set for manual rest. To reinitiate engine cranking, battery power must be removed and then reapplied.

Automatic reset when the engine speed falls below the cranking termination set point can be selected by removing the 82 Kohm resistor located between posts E1 and E2 on the circuit board. See Diagram 1.

PARALLEL/AUXILIARY (SSW676 ONLY)

Raise the engine speed to the desired mid speed set point. Turn the PARALLEL adjustment counterclockwise until the parallel relay energizes and the green PARALLEL LED illuminates. The parallel relay will automatically reset when the engine speed falls to 6% below the set point.

OVERSPEED (SSW675 or SSW676)

Raise the engine speed to 10% below the desired overspeed set point. Press and hold the OVERSPEED TEST button on the top of the unit. This lowers the overspeed setting by 10%.

Turn the OVERSPEED adjustment counterclockwise until the overspeed relay energizes and the red OVERSPEED LED illuminates.

Reset the overspeed relay by pressing the RESET button. Allow the engine to stop, then remove battery power from the unit.

Readjust the engine speed to the normal operating speed with the governor speed control.

SSW674 ADJUSTMENT

The range of adjustment of the overspeed set point is from 200 to 10,000 Hz. For settings below 2,500 Hz., solder a jumper wire between the two posts located below the adjustments and to the right.

- A. Raise the engine speed to the desired overspeed alarm point.
- B. Turn the speed adjustment counterclockwise until the relay energizes and the red overspeed LED lights.
- C. Lower the engine speed to the normal operating speed.

The SSW674 is shipped from the factory configured so that the internal relay latches when the set speed is reached. Power must be removed from the unit to reset the relay.

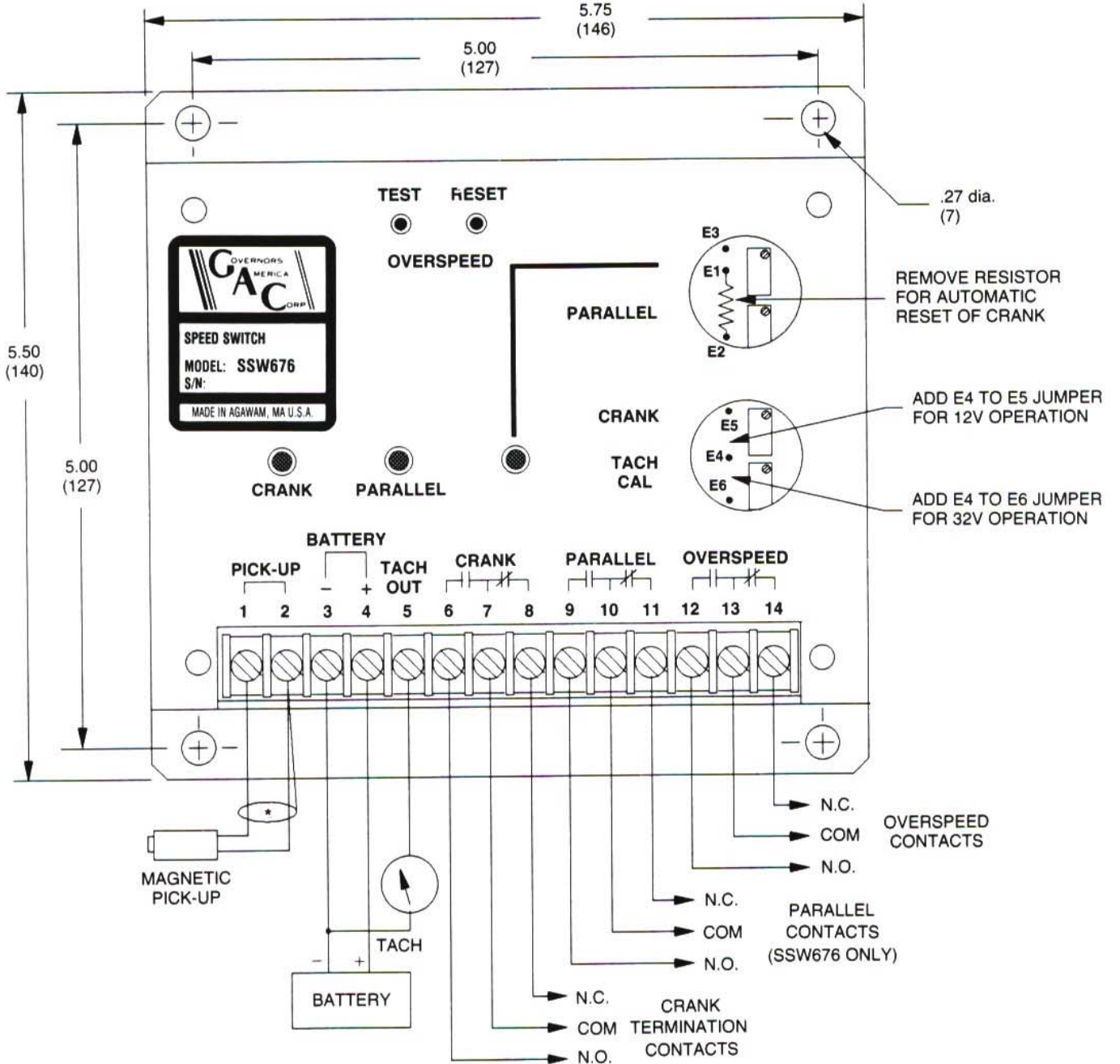
If an automatic reset (nonlatching relay) is desired, cut the jumper wire between the two posts located below the adjustments and to the left. With the jumper removed, the SSW674 relay will reset when the engine speed falls below the set speed.

It is recommended that each speed switch setting be checked periodically when maintenance is being performed on the engine. The overspeed set point can be tested by pressing the TEST button.

DIAGRAM 1

SSW675 & SSW676
WIRING DIAGRAM AND OUTLINE

Dimensions in inches(mm)



*If Wire Leads Are Longer Than 3 Meters (10 ft.) A Shielded Cable Should Be Used. Ground Shield At One End Only.

WARNING
Speed switches are intended to operate engine protection devices. The quality and reliability of the user selected protection devices must be considered to adequately protect equipment and personnel.

TACHOMETER OUTPUT

The analog tachometer output signal varies proportionally with engine speed. The range of adjustment is 0 – 1 mA from the SSW675/676 and 0 to 20 mA from the SSW674.

Rotate the TACH CAL adjustment clockwise to increase the current, and counter clockwise to decrease the current. Adjust until the speed reading corresponds to a standard tachometer. Stop the engine and adjust the tachometer zero point if necessary. Recheck the maximum setting. If a meter movement less than 1 mA is used, a fixed series resistor is required.

TROUBLESHOOTING

Remove the tachometer connections.

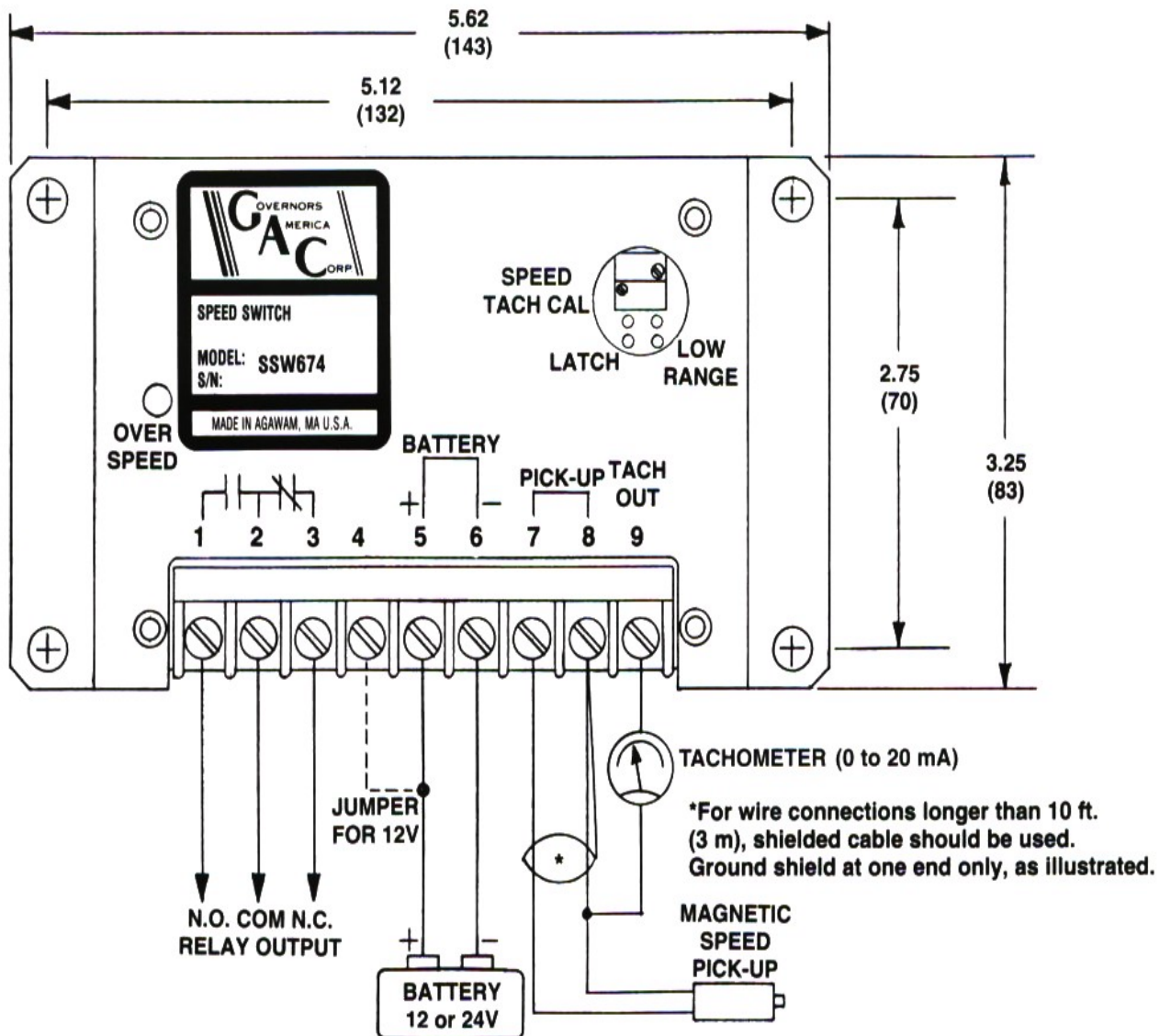
Apply DC power and an input speed signal to the speed switch. Measure the voltage on the TACH OUT Terminal as the speed input frequency is varied. An increase in frequency should cause a voltage increase.

If the voltage is proportional to frequency, check the wiring to the relays.

If the voltage is not proportional to frequency, check the output of the magnetic speed sensor.

If the speed sensor is operating, and the relays are wired correctly, the unit is defective.

DIAGRAM 2 **SSW674** **WIRING DIAGRAM AND OUTLINE** Dimensions in inches(mm)



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