Introduction

This supplement describes the installation of an alternate pulse source (vs. direct magneto connection) for input to the FMONITOR tachometer. The Hall effect tachometer sensor detects a magnetic pulse generated by a permanent magnet attached to a rotating shaft. Every time the magnet passes by the sensor, an electrical pulse is generated for the FMONITOR.

This alternate method of tachometer pulse pickup is used when: 1) a gear reduction unit is used and propeller rpm vs. engine rpm is desired; 2) an electronic ignition system without a one/two pulse per revolution output; 3) a mixed magneto/electronic system is used and a loss of rpm during ignition system check is undesirable; 4) etc.

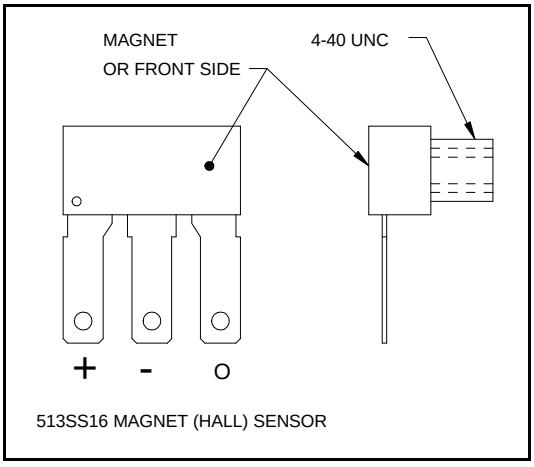

Figure 1 Microswitch Hall effect magnetic sensor. Note polarity - 'O' is for output.

Hall Effect Tach Sensor and Magnet

The Microswitch 513SS16 magnetic sensor supplied by RMI is a small integrated circuit with three electrical leads and a threaded mounting stud as shown in Figure 1.

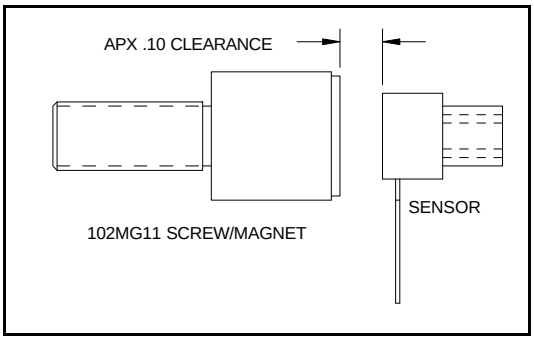

Figure 2 Mounting distance for activation magnet and sensor.

Note that the face of the sensor that should be nearest the activating magnet is opposite the mounting stud.

Depending on your installation, a suitable mounting bracket is needed for the #4-40 screw to position the sensor as shown in Figure 2. The distance between the sensor face and the magnet is not critical, so allowing for adjustment of the activation distance is not necessary.

If necessary, the screw portion of the magnet may be cut off… or other magnets may be used that are of sufficient strength to activate the sensor. If you use a different magnet, be sure to face the south pole of the magnet towards the sensor face. You can experimentally determine the best side of another magnet to use. With the sensor connected to the FMONITOR, connect a voltmeter to the ground lead and the output lead of the sensor. With no magnet near, the voltmeter will read about 5 volts. As the magnet nears enough to active the sensor, the voltage will drop to near zero. Experiment to determine the proper side and distance of the magnet.

Necessary Hardware Changes

The use of the Hall effect sensor requires that the magneto (tachometer) circuit of the FMONITOR be altered to properly power and read the sensor. There is a section of the assembly manual that has drawings and directions on how to perform the alteration. Hopefully, you had planned on using this sensor during assembly and the changes are already made. Schematic sheet 4 of 5 also shows the necessary changes, although not in as much detail as the assembly manual.

Necessary Programming Changes

All FMONITORs with EPROM (software) version 309 or smaller are expecting two pulses per revolution from magnetos. With the Hall sensor installed, the EPROM must be changed to a 'HALL' version that works with only one pulse per revolution or the tachometer will read double speed.

If you have EPROM (software) version 310 or larger, you can program the FMONITOR for either one or two pulses per revolution. See details in the PROGRAMMING EXTRA FEATURES section of the operation manual.

Wiring the Sensor

Connections between the Hall sensor and the FMONITOR are shown in Figure 3. Use shielded cable with the shield connected to pin 17/18 of the FMONITOR. You may use a single shielded twisted pair by using the shield as a ground wire that connects to '-' on the sensor and 17/18 on the FMONITOR.

If you have an older FMONITOR with a serial number between 100 and 199, a different sensor is required and wiring is slightly different. Call RMI for information on wiring/software changes that are different and where to purchase the proper Hall sensor.

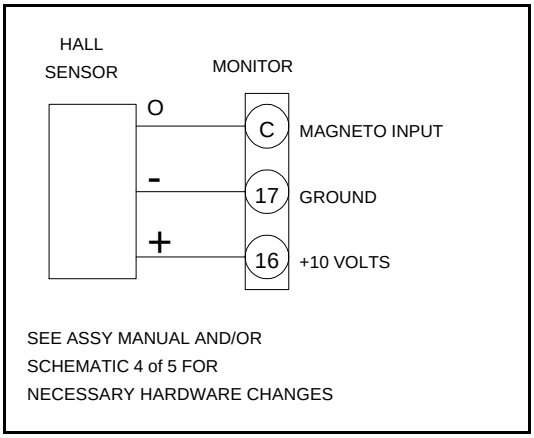

Figure 3 Wiring the Hall sensor to the FMONITOR.

Installing the Sensor

It is best to test the sensor out before doing the final mounting to the aircraft engine. Connect all three wires to the sensor and make sure the FMONITOR power is on. First make sure the minus connection (ground) is connected to aircraft ground by measuring the resistance between the minus wire and ground. It should read less than one ohm.

Then check that the plus lead reads about 10 volts.

Finally, the output lead should read about 5 volts. Bring the magnet closet to the activation face of the sensor and the output wire voltage should drop to about zero volts. If so, every thing is working ok. You will not be able to activate the sensor fast enough by hand to see any indication of operation on the FMONITOR display… start/crank the engine for that.

The sensor is small and requires reasonable handling to prevent damage. When mounting, use a small spot of Loctite or similar rather than excess torque to keep the sensor in place.