

This Manual Covers Lycoming Specific Ignition System Installation

Disclaimer

These products do not conform to any recognized set of standards or certifications for aviation applications.

This ECU is not waterproof and will not function as designed if moisture invades the enclosure or power/ ground connections are interrupted.

Failure of this unit may result in a complete loss of engine power.

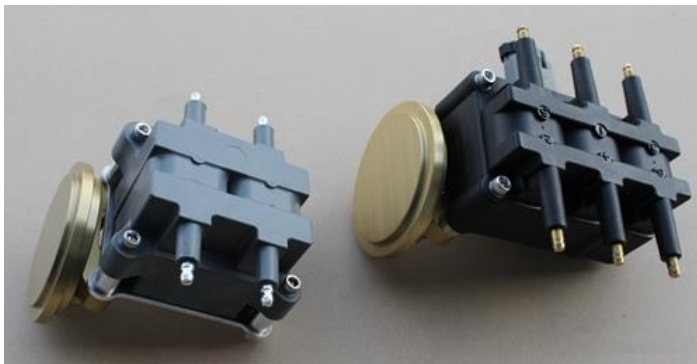
Use of these products on amateur built/ experimental aircraft is at the discretion of the buyer who accepts full responsibility for any consequences resulting from its use. Since Racetech Inc. cannot control the installation, programming, application environment or use of its products, we accept no responsibility for damage, loss or personal injury resulting from the use of SDS products. **By using SDS products, the user understands and accepts this.**

If any user does not agree to this disclaimer, they may return the system/ parts in new condition for a full refund.



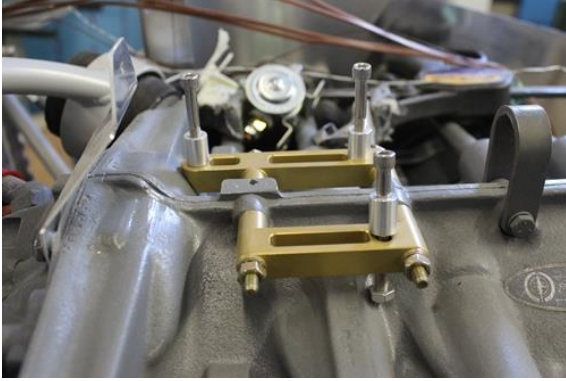
Coil Pack(s)

Most aviation systems will come with either a gray four cylinder coil pack or black six cylinder coil pack. The grey ones have integral drive transistors, the black ones use an external drive module bolted to the coil mount. These are fired in a waste spark configuration, which means two plugs are fired at the same time. One plug is fired on compression, the other on exhaust when no mixture is present. Both types may be engine mounted in any orientation. We offer several mounting brackets for Lycoming applications and flat type bases for firewall mounting.

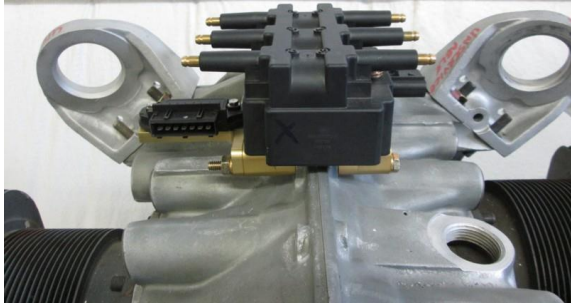


4 and 6 cylinder coil packs with rear mag mounts

Important! If you're replacing the left magneto, be sure to remove the drive gear, coupler and bearing on some models from the case before installing the SDS mag covers or coil mounts. Use a thin layer of RTV on the mag covers before tightening the nuts.



4 cylinder top case coil pack mount



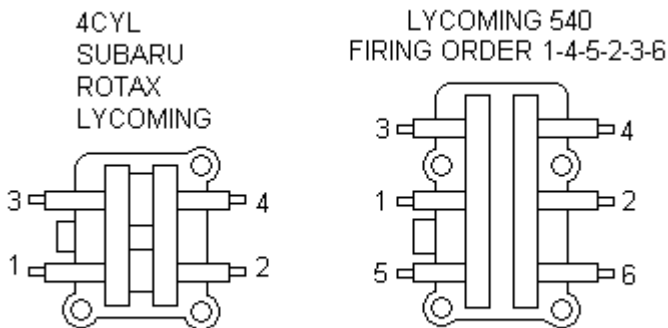
6 cylinder top case coil pack mount

Coil pack upper case through bolts torqued to 75 inch/ lbs.

Plug Wires, Boots and Terminals

We can supply MSD 8.5mm Superconductor wires, MSD plug/coil boots and MSD terminals to properly fit your coil packs. If you don't use these components, be sure to always use quality EMI/ Magnetic Suppression wires. **Never use solid core, non-suppression wires with SDS. You must always use resistor type plugs as well.** Keep the wires away from exhaust pipes or anything which could chaff through the insulation. Be sure to properly crimp the terminals as shown here: <https://www.youtube.com/watch?v=8kQDSlpKrCw> and see the file at the end of this manual. Make your longest wire first and add 1 inch in case the insulation pulls away some of the conductor with it when stripped. Lubricate the terminal and ID of boots with glycerin based hand sanitizer before trying to slide boot over terminal. We recommend you purchase MSD crimping tool PN 35051 or if you have a similar crimper, you can buy just the jaw set PN 2048. This does an excellent job.

If you are running twin coil packs, you should run a plug wire from each coil pack to each plug on a cylinder. This provides maximum redundancy in the event that one coil pack fails.



Plug Wire Connections to Coil Packs

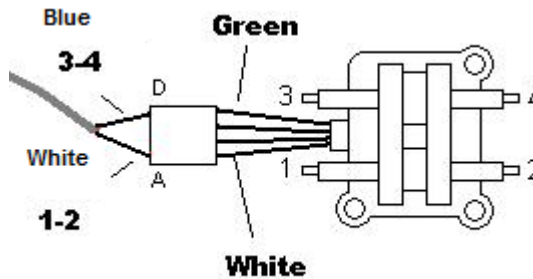
SDS MAIN HARNESS IGNITION SIGNAL WIRE CONNECTIONS TO IGNITION DRIVER MODULE.



ORANGE PIN7
 WHITE PIN5
 BLUE PIN2

BE SURE TO GROUND THE MIDDLE BLACK WIRE COMING OUT OF THE MODULE PIN4.

6 Cylinder Module Wiring



4 Cylinder coil pack wiring

18 to 14mm Plug Adapters

We provide brass adapters to convert Lycoming 18mm plug threads over to 14mm in order to utilize less expensive automotive type plugs. We can also supply NGK or Denso plugs. You may use a light coating of anti-seize compound on the threads. Install the copper washers over the adapter threads and torque the adapters in place to 300 inch/lbs. Install the spark plugs into the adapters and torque to 215 inch/lbs.



Short reach



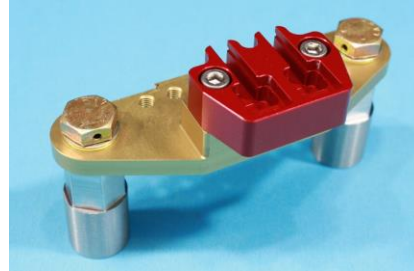
Long reach

Hall Effect Sensor and Mounts

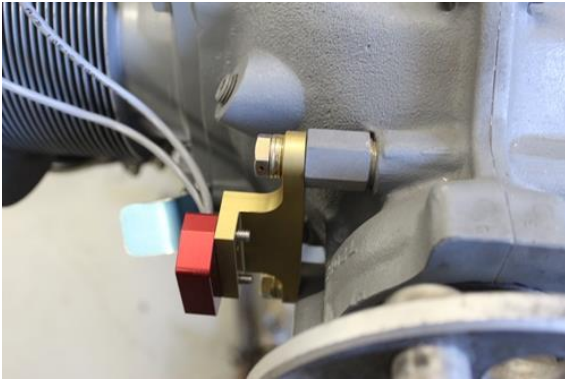
We provide CNC'd Hall sensor mounts for 4 and 6 cylinder Lycomings using the 8 7/16 ID flywheel. These bolt to the front most case bolts on the right side of the case. Torque case nuts to 300 in/ lbs.



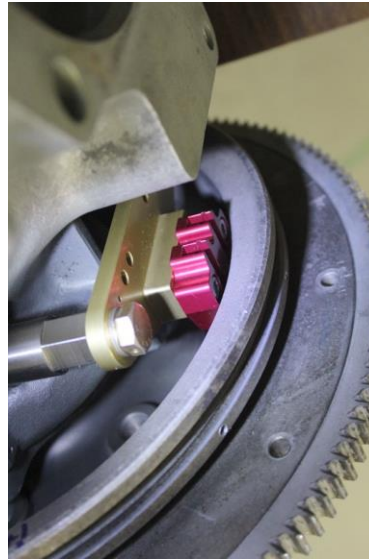
Narrow mount for engines with 3.25 inch bolt spacing



Wide mount for 3.50 inch spacing



Narrow mount on case



Wide mount on case with flywheel

The hall sensors are offered in a single or dual setup for single or dual ECUs. The mounts can accept either type. The mounts have multiple 10-32 threaded holes to attach cable protection shields if users are concerned about a thrown or broken belt damaging the Hall sensor cables.

Optional Advance Switch

Your EM-5 F can be configured for an advance switch which will add a programmed amount of advance whenever pin 13 (blue wire) sees 12V. This is useful if you run LOP to achieve maximum cylinder pressure for best power and economy or if you run 2 different fuel octanes, say 91 Mogas and 100LL. If you want to use this feature, connect 12V through a small toggle switch to the blue wire. You can configure the input as shown below, using the +1 or -1 buttons.:

PIN 13 INPUT
IGN ADV SWITCH

To set the amount of advance, call up the window below and use the +1/-1 buttons to select the amount of advance you want added to the programmed values when you energize the switch.



IGN ADV SWITCH
5°

For octane selection, you'd leave the switch energized to run 100LL and off (less total advance) to run 91 Mogas.

Warning: Put this item on your checklist when increasing power and coming into the pattern. Forgetting the position of the switch while in the advance setting could cause detonation and engine damage in some cases.

Pin 13 Input LOP Operation

This feature allows quick and efficient Lean of Peak operation with regards to both fueling and ignition timing. This input can be configured several different ways. When 12V is applied to the blue pin 13 input wire, it will activate certain code depending on what you select in the windows shown below. Default is to advance timing only (set this amount in IGN ADV window) and is used to recover the most energy possible from the fuel when running LOP (Fuel DISABLED). You may also select ENABLED, which will simultaneously lean the mixture the amount you program in the LEAN WITH IGN SWITCH window. This amount can be adjusted up to -65%.



LEAN WITH IGN SWITCH DISABLED LEAN WITH IGN SWITCH ENABLED LEAN WITH IGN SWITCH - 5%

If we run best power mixture at 12 to 1 AFR for climb and wish to run LOP in cruise, we'd set MAP and rpm with the throttle and prop control. From previous flights, we've determined from the engine monitor EGT/ AFR meter and mixture knob that we like to run at about 16.5 AFR LOP. This required going 37% lean with the mixture knob. We can now program -37% into the LEAN WITH IGN SWITCH window. Now we can quickly go LOP just by throwing the toggle switch without touching the mixture knob. This feature should only be used once you're familiar with your engine and typically cruise at or near the same MAP/ RPM power settings.

MSD INSTALLATION INSTRUCTIONS

Dual Crimp Terminal Installation

ONLINE PRODUCT REGISTRATION: Register your MSD product online and you'll be entered in our monthly 8.5mm Super Conductor Spark Plug Wire give-away! Registering your product will help if there is ever a warranty issue with your product and helps the MSD R&D team create new products that you ask for! Go to www.msperformance.com/registration.

The terminals supplied feature a new Dual Crimp Terminal. The benefits of the new wire terminal is that the conductor has its own crimp to the terminal so it does not need to be bent over and pressed between the terminal and the sleeve of the plug wire. Following is a new crimp procedure for the Dual Crimp Terminal.

1. Strip approximately 1/4" of sleeving from the wire. When using the Mini-Stripper-Crimper, **do not** push the wire all the way into the tool to strip it. **Note:** Use extreme care not to damage the conductor.
2. Follow the standard instructions to crimp the terminal to the sleeve of the wire. **Do not** use the Mini-Crimper to crimp the conductor.
3. Position the conductor between the "conductor tabs" of the terminal. Using needle nose pliers, push the tabs towards each other so they firmly grip the conductor. Make sure the conductor does not squeeze out as you apply pressure to the tabs.

