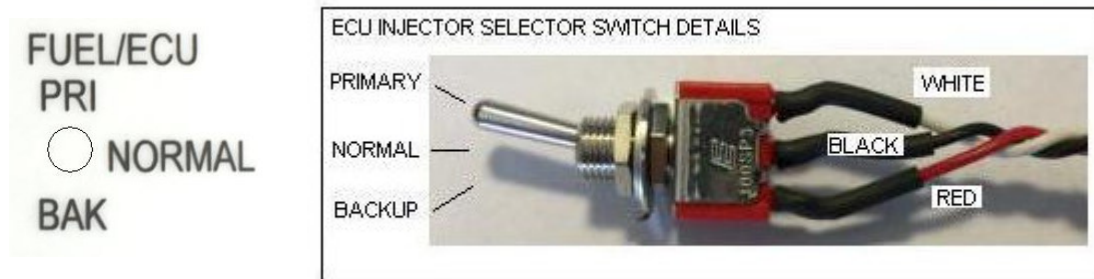


SDS EM-5 6 Cylinder Dual ECU Supplement Mar. 15/19

This supplement outlines some of the wiring, sensor and operational differences between dual ECU 6 cylinder systems, and other SDS aviation systems.

Task Sharing- Injector Outputs/ ECU Selector Switch

The 6 cylinder dual system has a 3 position ECU selector switch to switch fuel injector control between each ecu board or to both ecu boards.



The 3 switch positions operate in the following ways:

NORMAL position: The Primary and Backup ecu are each controlling 3 injector outputs. This provides the ability to trim fuel mixture in each cylinder using the SDS programmer trim screens.

PRIMARY position: Makes the injector relay box switch all 6 injectors over to the Primary ecu board. This disconnects the Backup ecu fuel injector outputs from the injectors.

BACKUP position: Makes the injector relay box switch all 6 injectors over to the Backup ecu board. This disconnects the Primary ecu fuel injector outputs from the injectors.

In the PRIMARY or BACKUP position, each working ECU will continue to fire one set of plugs and all 6 injectors in pairs (1-4, 2-5 and 3-6), rather than individually as they do with the switch in the BOTH position.

In the event you have a rough running engine or suspect an ecu or sensor problem move the switch to Primary or Backup to see if the engine runs smoother. This would indicate there is a problem with one ecu or its sensors.

Note that this switch does NOT control which ignition coil pack is running since both coil packs run all the time. Coil packs can only be controlled or shut off via their 12 volt power source.

If running in Primary or Backup positions its best to switch OFF your LOP(Lean of Peak) switch. Also depending on Cyl trim settings you may need to richen the mixture with the mixture knob, since trim settings from cylinders would be applied to other cylinders due to pairing of injector outputs.

Sensor Pairings, Sharing and Mixture Knob

Since each ECU board is controlling only part of the ignition and fuel components, we also have a separate intake air temp (IAT) sensor and CHT sensor for each ECU so that each ECU is correcting the AFR for starting, warmup and IAT equally. Unlike 4 cylinder systems, we also share the TPS signal with both ECUs. As such, if you lose power or ground on the primary ECU, you will also lose the TPS function on the backup since they only share the signal wires, not power and ground wires. The TPS is non-critical for flight, you'll just have slightly slower throttle response to rapid throttle opening.



The single mixture knob affects either or both ECUs via a special relay box as shown in the photos below. The knob plugs into the connector on the right side of the photo (knob). Primary and backup ECU knob harnesses plug into the two left most connectors. You must connect the long yellow wire to switched 12V. The blue and brown wires connect as shown to the right injector relay box connector as shown in Fig. 2



Fig. 2

Blue and brown wires from mixture knob box snap into pins 7 and 8 (upper right)

Be aware that if you lose one ECU, you must manually switch the ECU Selector Switch over to the functioning Primary or Backup ECU to have proper running on all 6 injectors and to have mixture knob control. When on the Primary or Backup ECU, only one set of spark plugs will be firing.

The single orange wire on the backup main harness should be connected to the TPS signal wire (white, pin 3).

You can crimp a short piece of wire into the TPS signal pin and make another connection which can be more easily disconnected with the white connectors and pins provided.

Cylinder Trim Differences

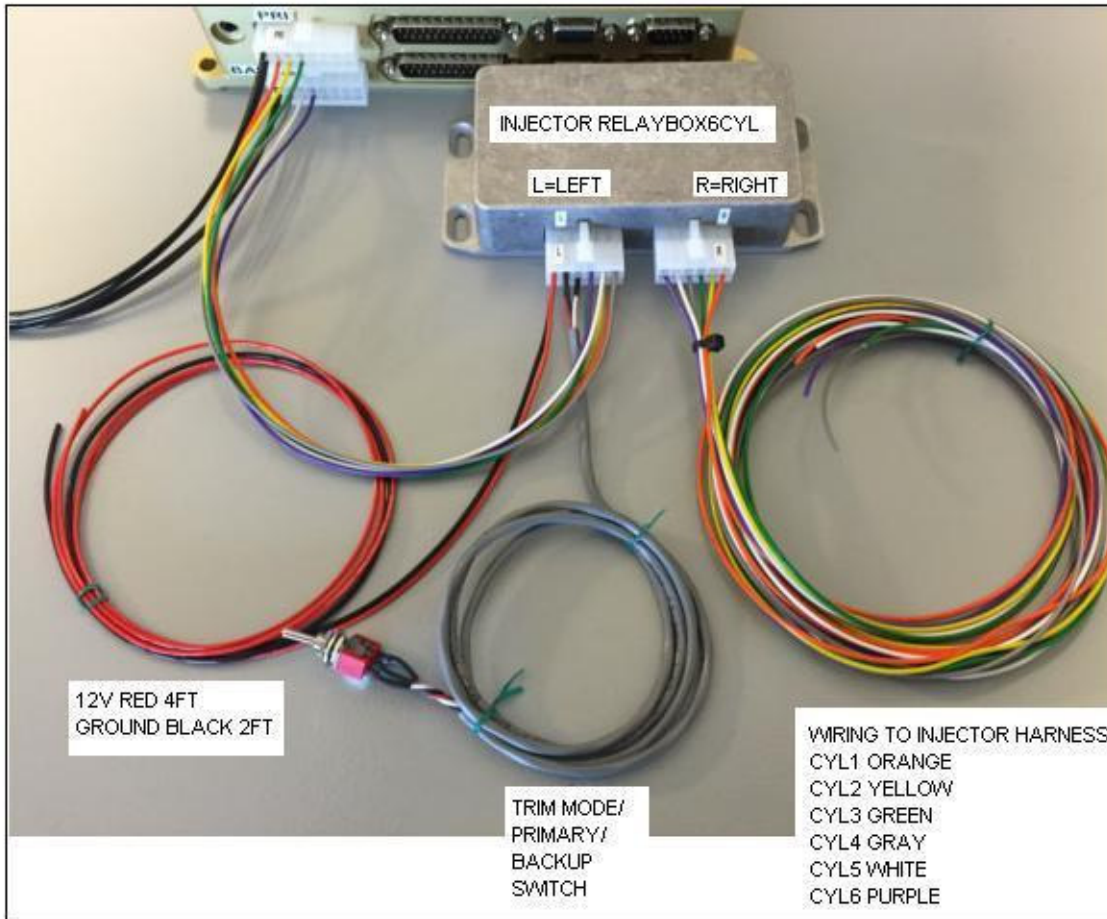
On 4 cylinder dual systems, each board runs the injectors and one set of spark plugs. Individual fuel trim is usually only done on the primary ECU. On dual 6 cylinder systems, to trim cylinders, you must toggle between ECUs with the programmer select switch, trimming cylinders 1, 2 and 3 with the primary ECU and cylinders 4,5 and 6 with the backup ECU. When Programming the trim values, be sure to have the ECU selector switch in the BOTH position.

Testing ECUs and Normal Running

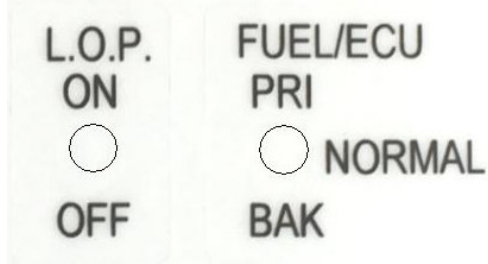
You can test the function of each ECU on the ground by running the engine at idle and running the ECU select switch from TRIM to PRIMARY to BACKUP and then back to TRIM. All normal running in flight should be with the ECU switch in the BOTH position. We don't recommend you switch the ECUs to Primary or Backup in flight unless the engine stops or runs rough.

Injector Relay Wiring

See the photos below for the relay box and ECU selection switch wiring. Figs. 3 and 4



Switch Functions



It's very important to understand the function of the 3 SDS toggle switches:

LOP switch- This activates the preset leaning amount and ignition advance feature.

Programmer Select Switch- This allows you to access either ECU for programming, viewing Gauge modes or trimming fuel. It DOES NOT switch ECU function.

Fuel ECU Select Switch- This switches control of the fuel injectors ONLY. It does not switch the ignition systems in any way.