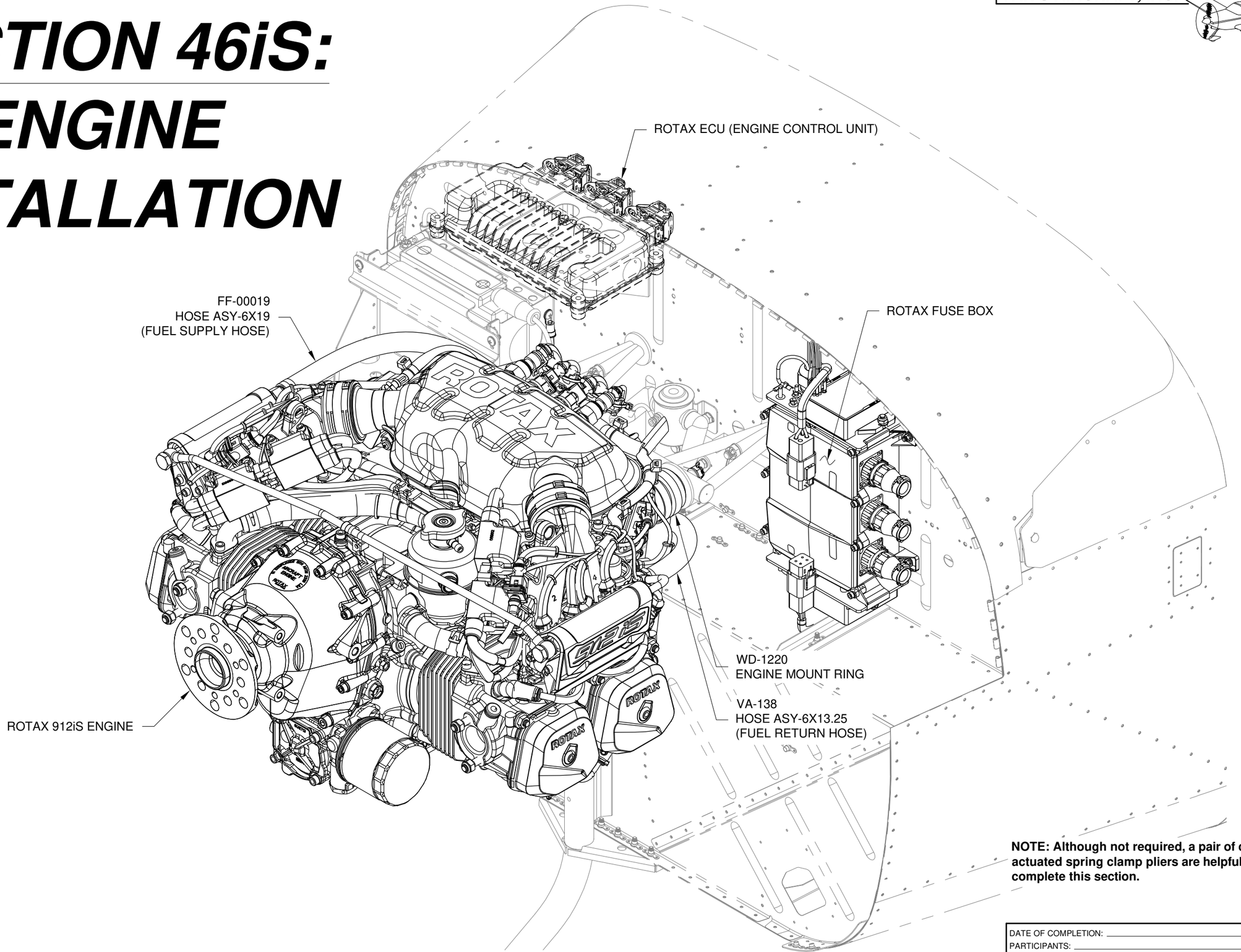
SECTION 46iS: ENGINE INSTALLATION



NOTE: Although not required, a pair of cable actuated spring clamp pliers are helpful to complete this section.

DATE OF COMPLETION: _____
PARTICIPANTS: _____

WARNING: Torque values specified by ROTAX supersede all values given in this section. Torque values must be strictly followed. Have torque wrenches calibrated before use.

NOTE: Keep track of hardware locations by reattaching the hardware as parts are removed. Consult the ROTAX 912iS Illustrated Parts Catalog if there is any question about the proper hardware to use.

NOTE: Several figures in this section were borrowed from the ROTAX 912iS Heavy Maintenance Manual or Illustrated Parts Catalog, always refer to the latest documentation for the engine available on flyrotax.com.

Step 1: Set the ROTAX 912iS Engine on a steady work surface at a convenient height. Take pictures of the systems/components at various angles and retain for your own reference. Continue taking pictures as parts are removed.

Step 2: Check the clocking of the water inlet elbow. If necessary, remove and reposition the elbow to match what is shown in Figure 1.

NOTE: Have a pan and rags ready to catch any residual coolant when disconnecting the coolant hoses.

Step 3: Use pliers, or equivalent, to squeeze open the spring clamps and move them forward along the lower left and lower right coolant hoses. Disconnect the lower left and lower right coolant hoses from the water pump. See Figure 1.

Step 4: Remove the preformed radiator outlet hose from the left side of the engine and retain for later modification in Section 50iS/U. See Figure 2.

Step 5: On the left aft side of the engine airbox, lift the latches, unplug and remove the CPS_1* and CPS_2* connectors from the aluminum bracket (usually the lower two connectors). Note which wire and connector are marked with yellow (this will avoid confusion when reconnecting). See Items 1 and 2 in the detail view of Figure 2.

*CPS = Crankshaft Position Sensor

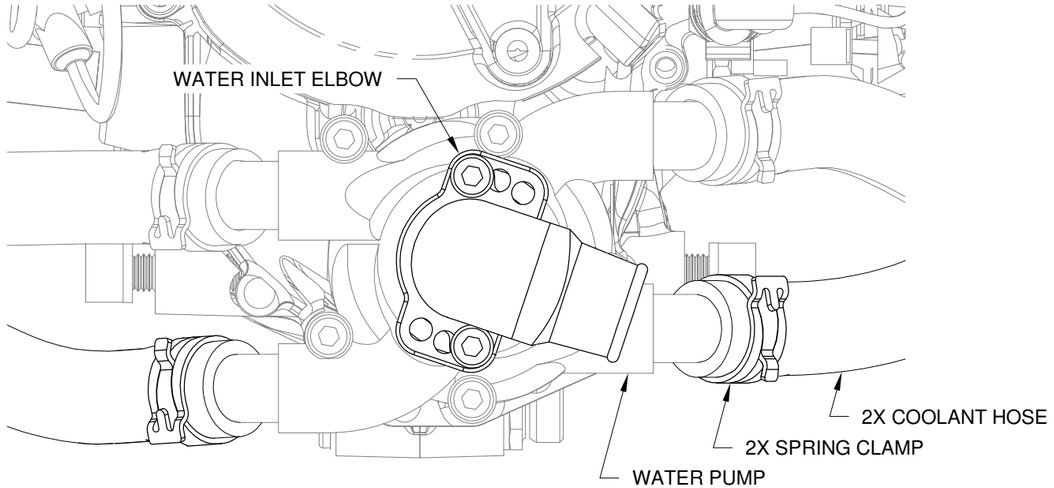


FIGURE 1: WATER INLET ELBOW CLOCKING
(AFT VIEW LOOKING FORWARD)

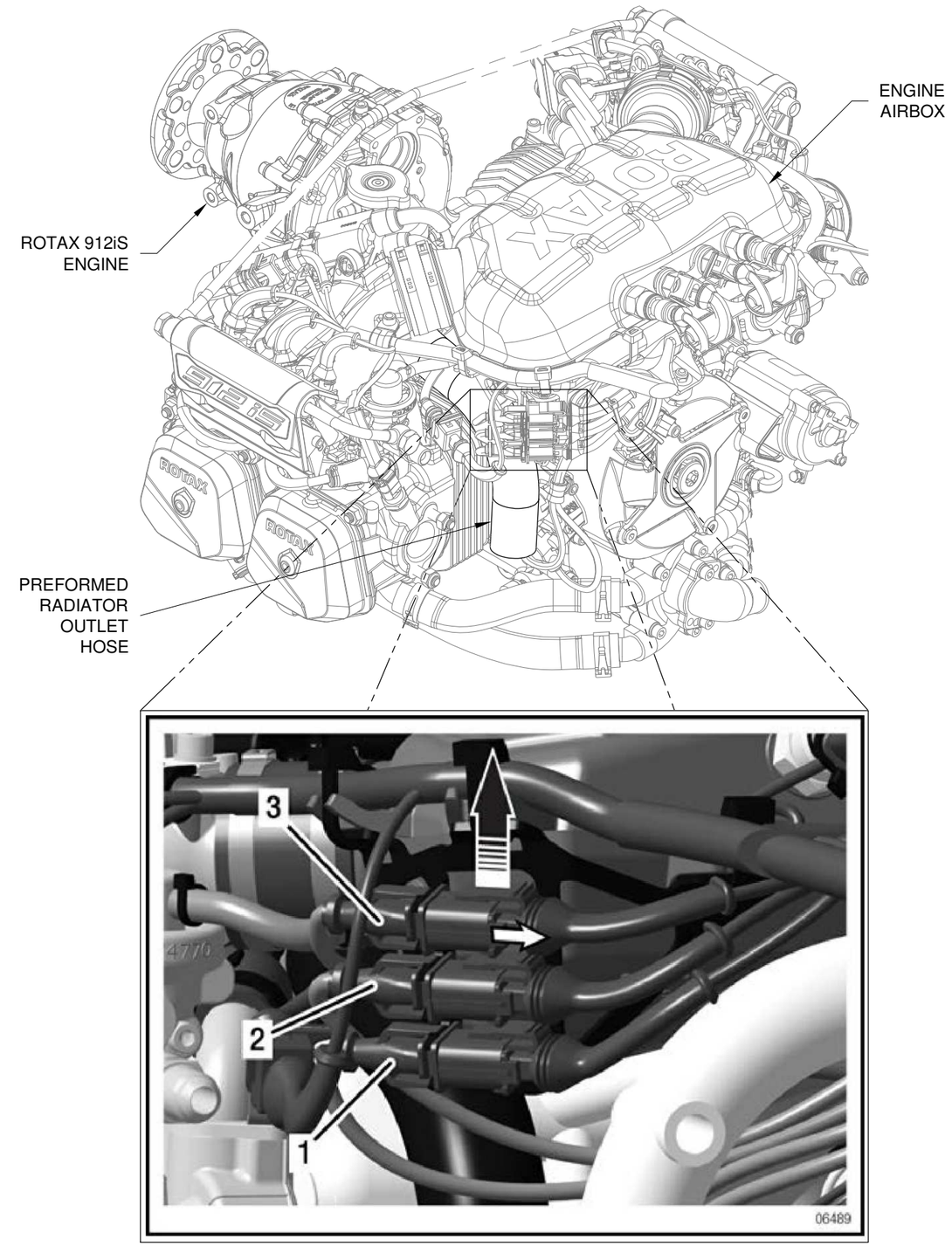


FIGURE 2: PREFORMED RADIATOR OUTLET HOSE & CPS CONNECTORS

Step 1: Connect the VA-138 and FF-00019 to the elbow fittings as shown in Figure 1.

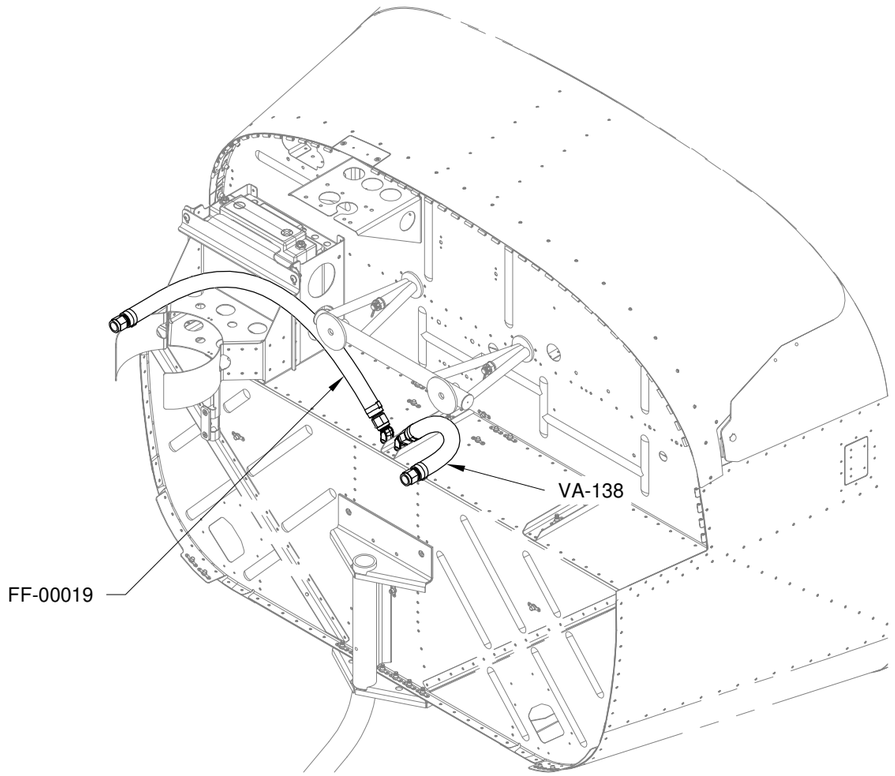


FIGURE 1: CONNECT FUEL HOSES TO FUSELAGE

Step 2: Apply masking tape to the inside surfaces of the WD-1220 to prevent damage to the powder coating. See Figure 2.

Step 3: Remove the powder coating from the mating surfaces of the four WD-1220 bushings as shown in the detail view of Figure 2.

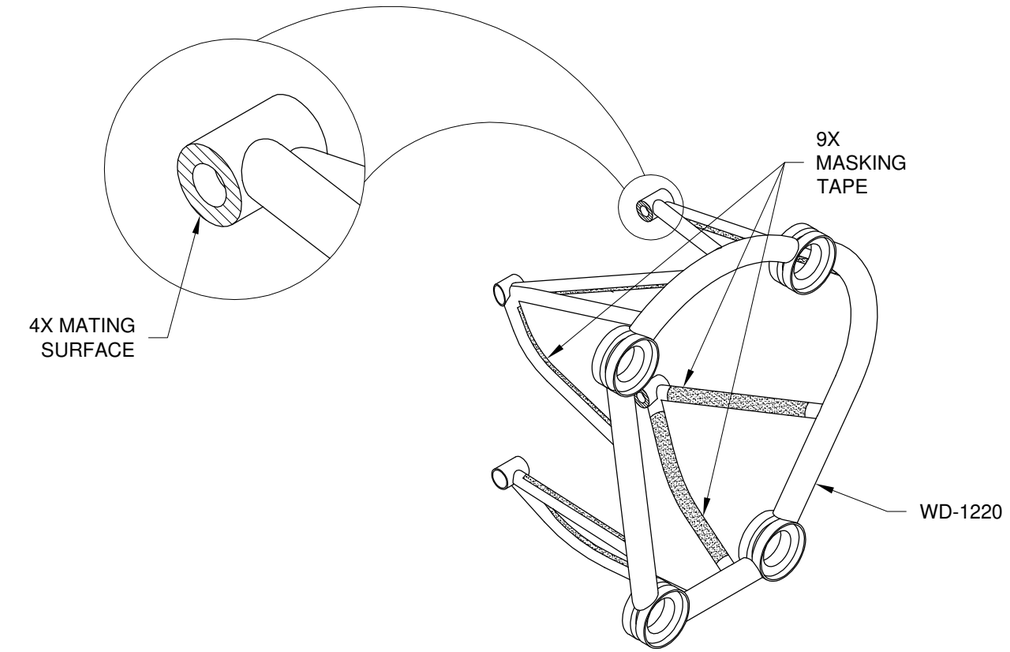


FIGURE 2: PROTECT THE ENGINE MOUNT RING

Step 1: Remove any engine mount screws from the ROTAX 912iS Engine crankcase. See Figure 1.

NOTE: Be careful not to damage any of the water pump coolant tubes during installation of the WD-1220.

Step 2: Hook the WD-1220 over the lower right water pump coolant tube, then pivot the WD-1220 over the lower left coolant tube.

Step 3: Attach the WD-1220 to the ROTAX 912iS Engine as shown in Figure 1. Start all four screws until several threads are engaged on each screw. Snug down the right side screws. **DO NOT** final torque the screws just yet.

Check the left side for a gap between the WD-1220 and the engine. If the gap is more than half the thickness of an NAS1149F0632P washer, add washers as shown in Figure 1 to fill the gap.

Step 4: Final torque all four WD-1220 screws to the value given in the ROTAX Heavy Maintenance Manual (Chapter 71-00-00) for installation of the engine suspension frame.

Step 5: Remove the masking tape from the WD-1220.

Step 6: Reconnect the lower coolant hoses to the water pump and return the spring clamps to their original locations. See Figure 1 on Page 46iS-02.

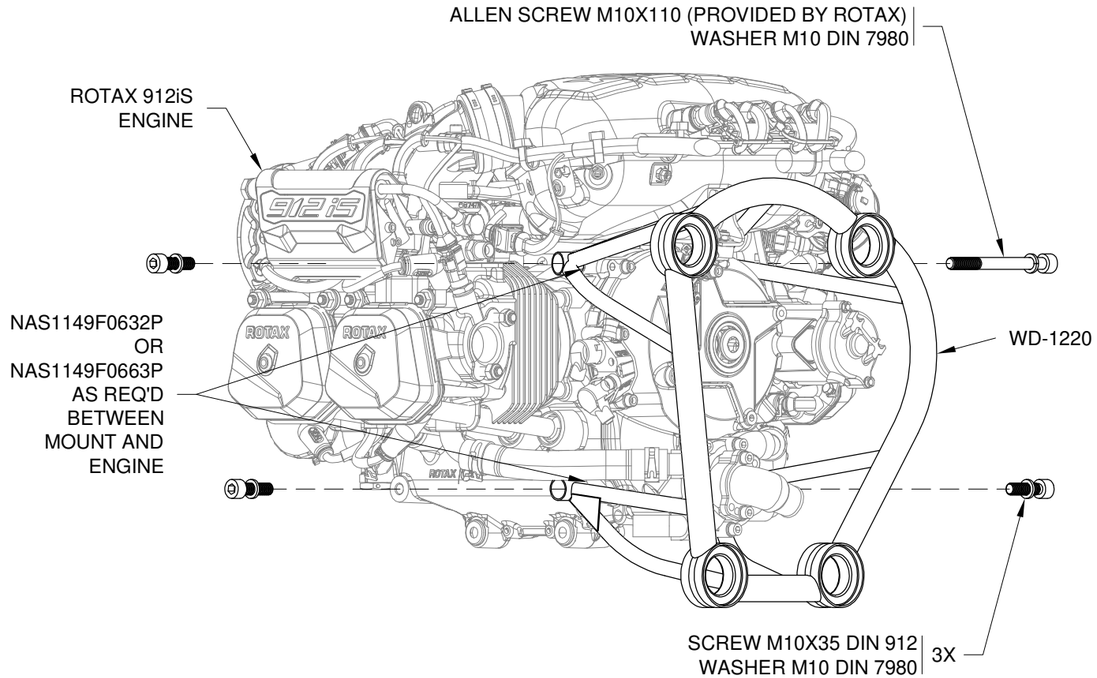


FIGURE 1: ATTACH ENGINE MOUNT RING

Step 7: On the left aft side of the engine airbox, route the disconnected CPS wires up through the WD-1220, around the aluminum bracket, and between the lower two right-hand connector bodies. See Figure 2.

Step 8: Reconnect the CPS wires. Ensure that the CPS connector marked with yellow is connected to the wire marked with yellow. Reinsert the connector bodies into the aluminum bracket. See the detail view of Figure 2 on Page 46iS-02 as well as Figure 2 on this page.

Step 9: Tie-wrap the three left-hand connector wires to the bottom of the aluminum bracket as shown in Figure 2.

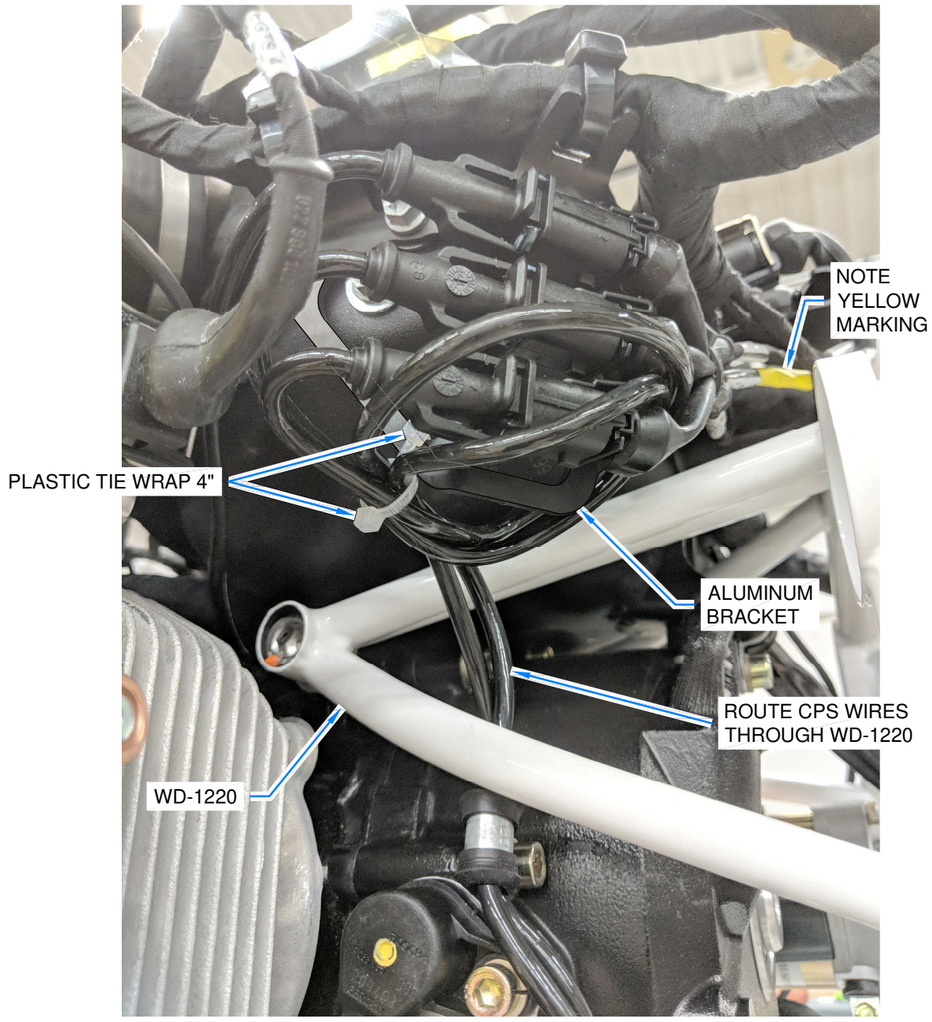


FIGURE 2: ROUTE & SECURE CPS WIRES

Step 1: Apply an upward force to the nose wheel to ensure that the upper flange of the WD-1201-1 is held firmly against the firewall bottom. One way to accomplish this is to lift the tail upward so that the nose wheel presses against the ground.

Step 2: Temporarily secure the right side of the WD-1201-1 upper flange to the firewall bottom as shown in Figure 1. Only use the AN3 hardware and bushing if the AN5 hardware doesn't fit. If using the AN3 bolt, trim 0.10 inches off BUSHING-AL.197X.313X.438 (supplied in the kit) to make BUSHING-AL.197X.313X.100.

Step 3: Using the hole in the left side of the WD-1201-1 upper flange as a guide, final-drill the corresponding hole in the fuselage. See Figure 1.

Step 4: Temporarily secure the left side of the WD-1201-1 upper flange to the firewall bottom using the hardware shown in Figure 1. Remove the bolt and nut from the right side.

Step 5: Repeat Step 3 for the right side.

Step 6: Remove the WD-1201-1 from the fuselage and deburr all of the holes.

Step 7: Reinstall the WD-1201-1 and insert two bolts from the aft side as in Step 4.

Step 8: Hoist the engine using the suspension points on the left and right intake manifolds. See Items 1 in Figure 2. The ROTAX Engine Lift Set Assembly (ROTAX part number 876040) can be used as an aid. Refer to ROTAX Heavy Maintenance Manual (Chapter 71-00-00).

Step 9: Attach the WD-1220 to the fuselage with the lower two bolts followed by the upper two bolts as shown in Figure 3.

Begin to tighten the nuts in a diagonal pattern until the WD-1220 is secure. Lower the hoist slightly and then final torque the nuts in a diagonal pattern.

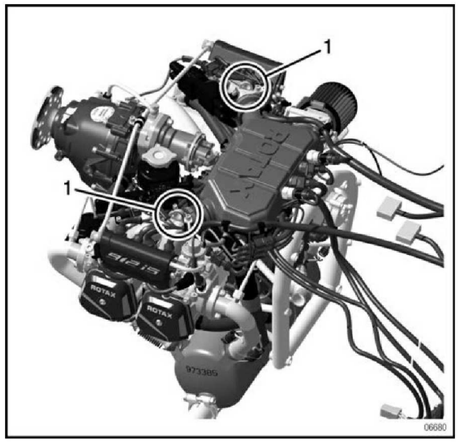


FIGURE 2: SUSPENSION POINTS

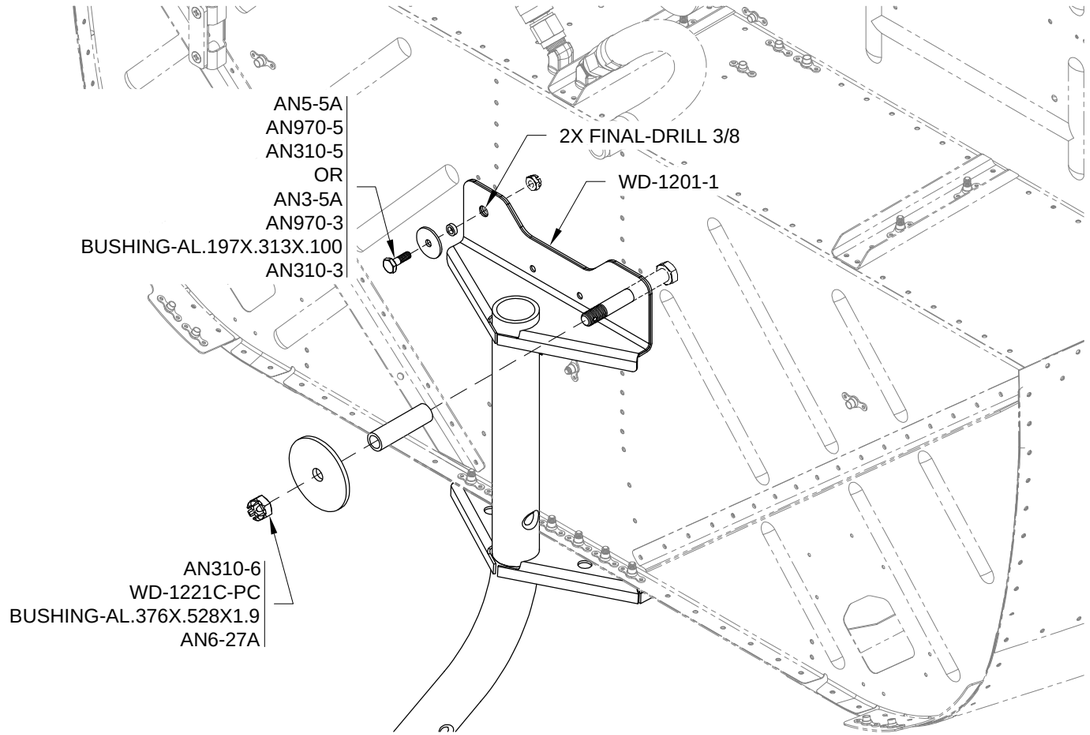


FIGURE 1: FINAL-DRILL NOSE GEAR FLANGE

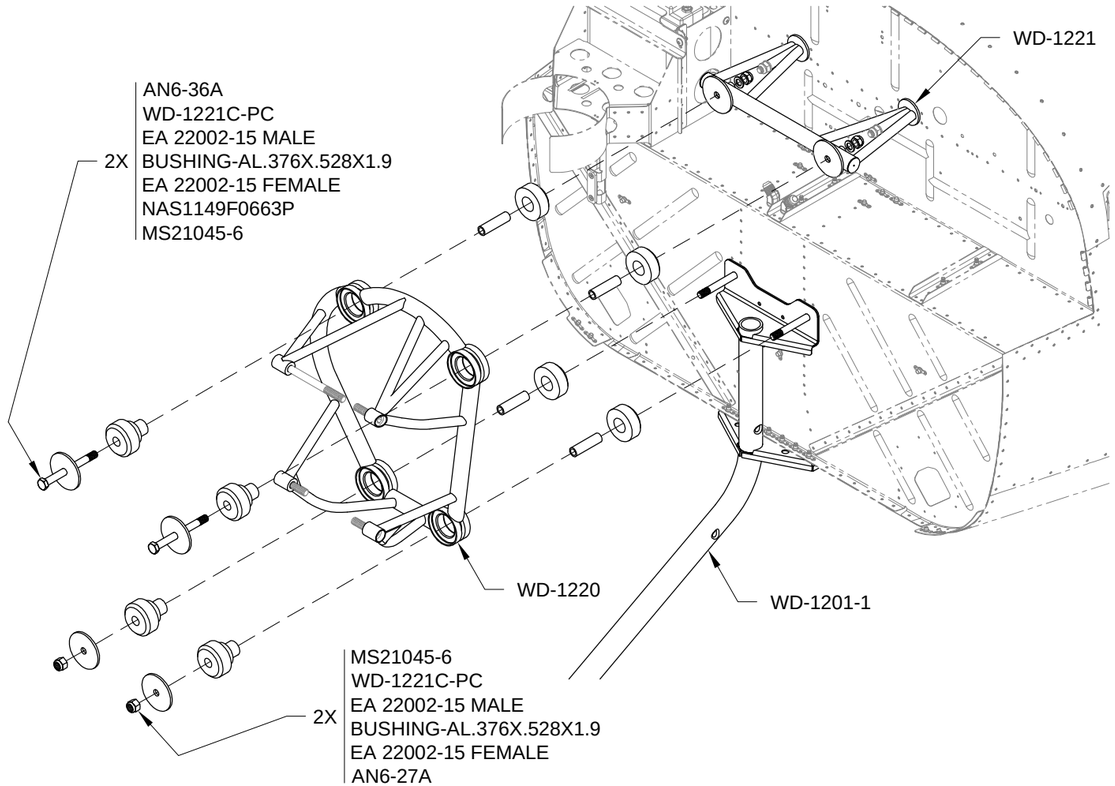


FIGURE 3: ATTACH ENGINE TO FUSELAGE
(ENGINE NOT SHOWN)

Step 1: Connect the VA-138 and FF-00019 to the engine as shown in Figure 1.

Step 2: On the left side of the engine only, insert the FF-00125-1 between the Ignition Coils and the engine. Safety wire the FF-00125-1 to the Expansion Tank neck and to the #2 cylinder preformed coolant hose. See Figures 2, 3, and 4.

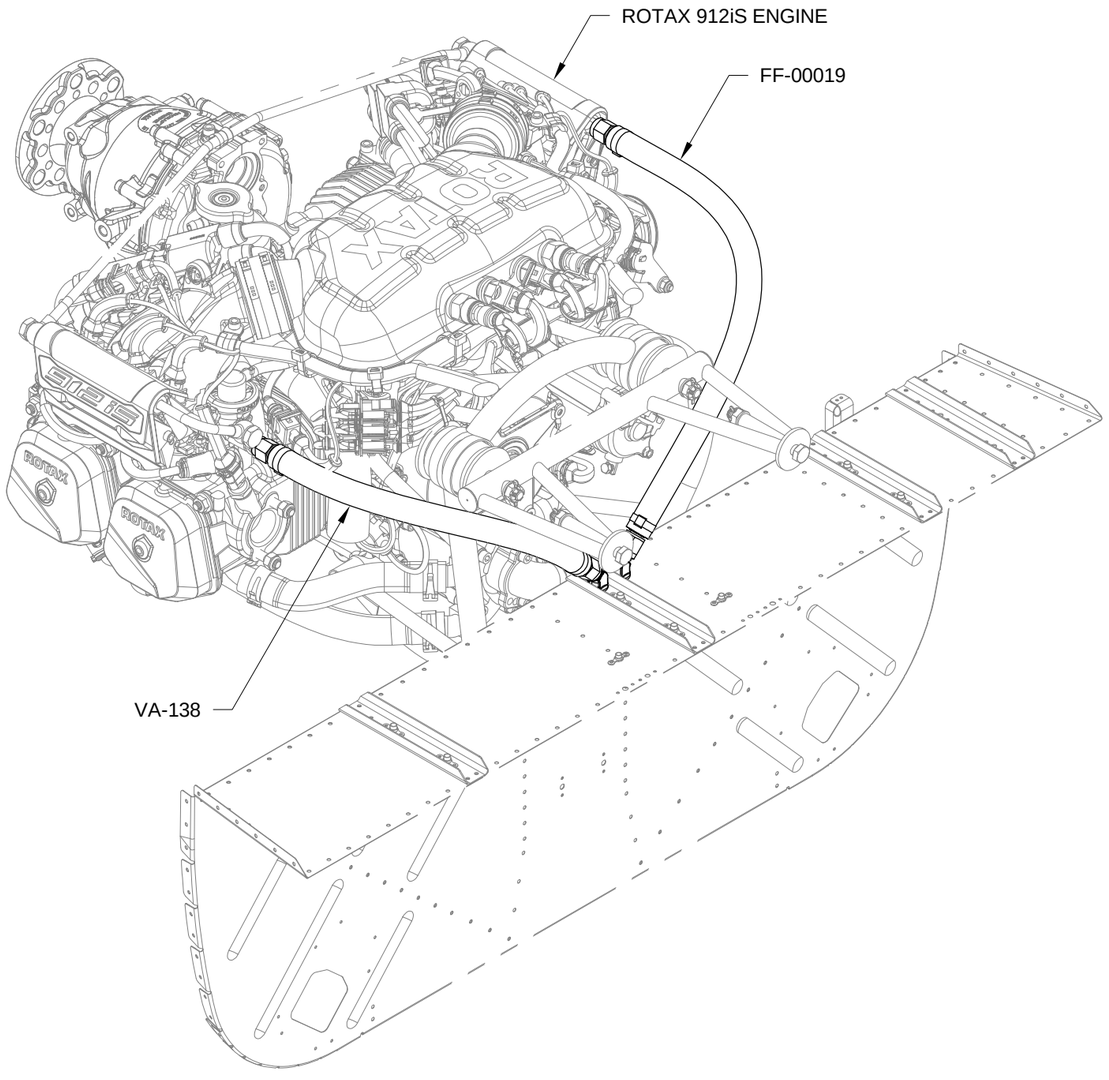


FIGURE 1: CONNECT FUEL HOSES TO ENGINE

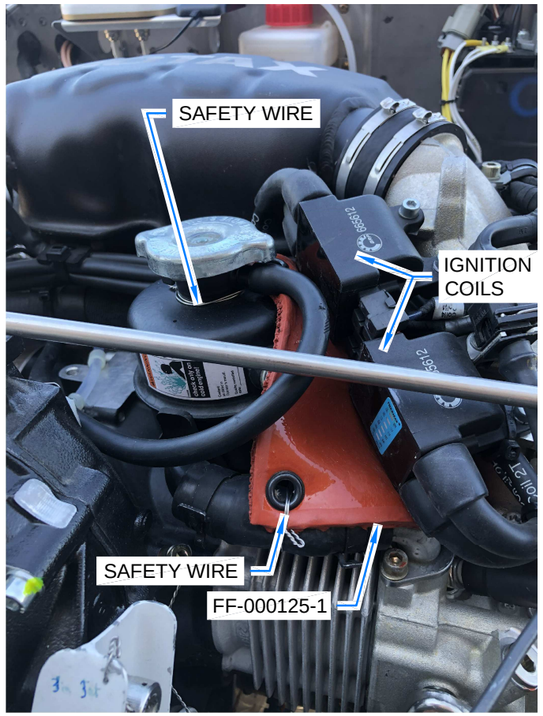


FIGURE 2: IGNITION COILS FIRE SLEEVE
(TOP VIEW LOOKING DOWN/AFT)

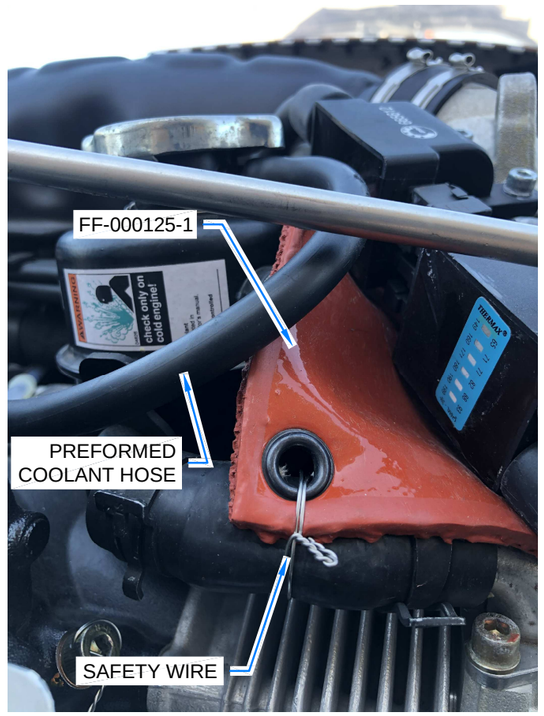


FIGURE 3: COOLANT HOSE SAFETY WIRE
(FRONT VIEW LOOKING AFT)

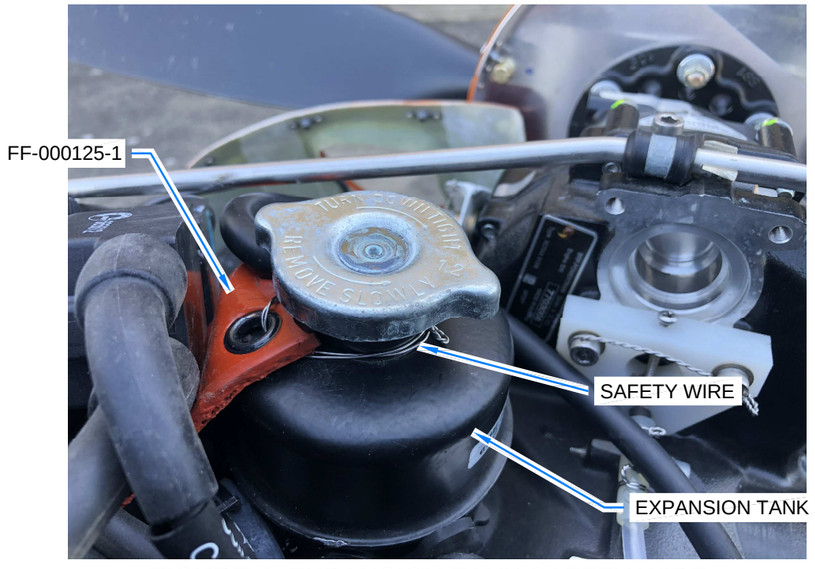


FIGURE 4: EXPANSION TANK SAFETY WIRE
(AFT VIEW LOOKING FORWARD)

Step 1: Locate and cut the end of the "Gnd Starter Rel" wire from the bundle of "Regulator A" ground terminals (Item 22 in Figure 1). Apply heat shrink to the end of the cut wire.

Step 2: Attach all "Regulator A" ground terminals to the ground studs at the bottom of the ROTAX Fuse Box as shown in Figure 2.

Step 3: Temporarily hold the ROTAX Fuse Box against the firewall as shown in Figure 3. If necessary, enlarge the mouning holes in the F-1201A by drilling #11. Hand-tighten the nuts.

The fuse box will be permanently attached to the firewall after installation and routing of the avionics.

Step 4: Install the Rotax 931 110 Sealing Rings into the grooves of the fuse box sockets per the Rotax 912iS Installation Manual Section 76-00-00, then route the "Fuse Box Lane A" (X1) and "Fuse Box Lane B" (X2) cables (Items 4 and 5 in Figure 1) aft from the engine airbox and plug them into the bottom two sockets on the right side of the ROTAX Fuse Box as shown in Figure 3.

Step 5: Route the "Generator A" (black connector) and "Generator B" (grey connector) power supply cables aft from the engine generator and plug them into the corresponding connectors on the ROTAX Fuse Box as shown in Figures 2 and 3.

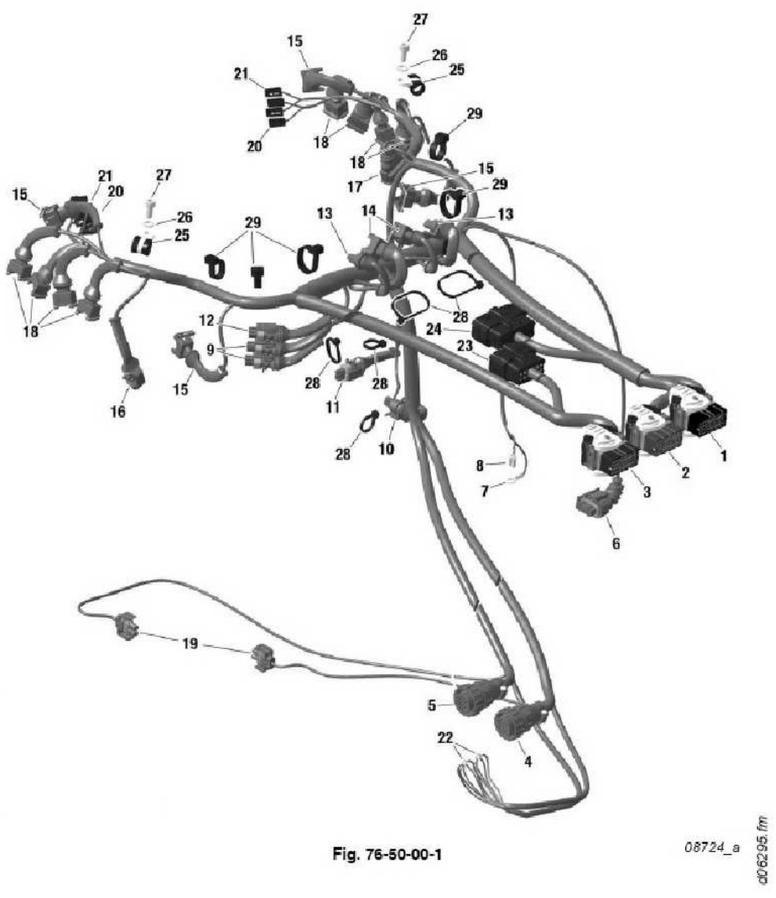


FIGURE 1: ROTAX ENGINE WIRING HARNESS

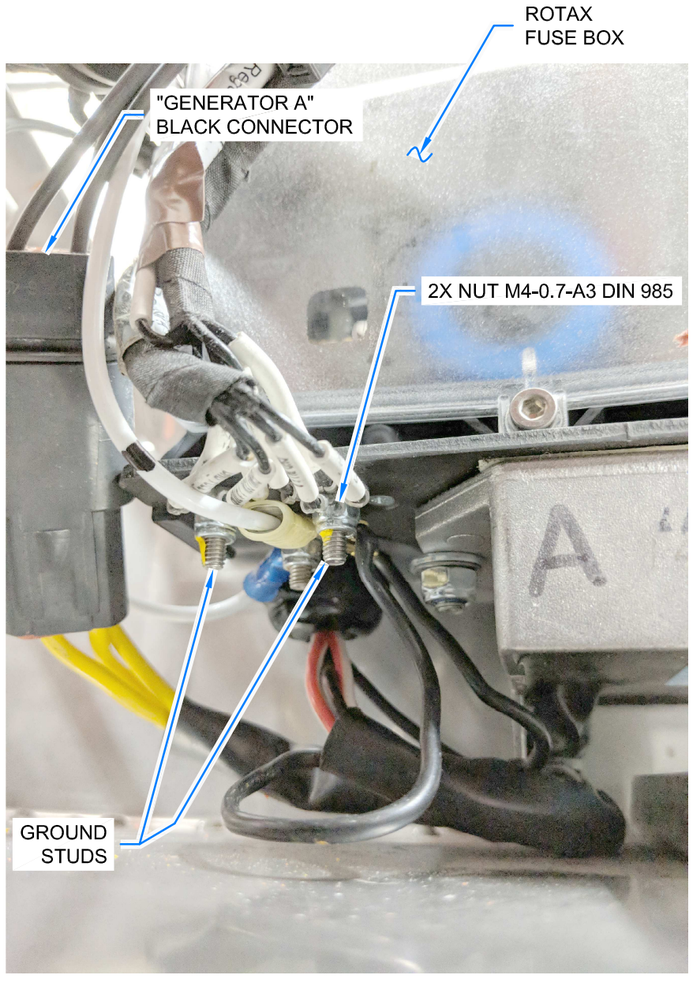


FIGURE 2: FUSE BOX GROUND STUDS

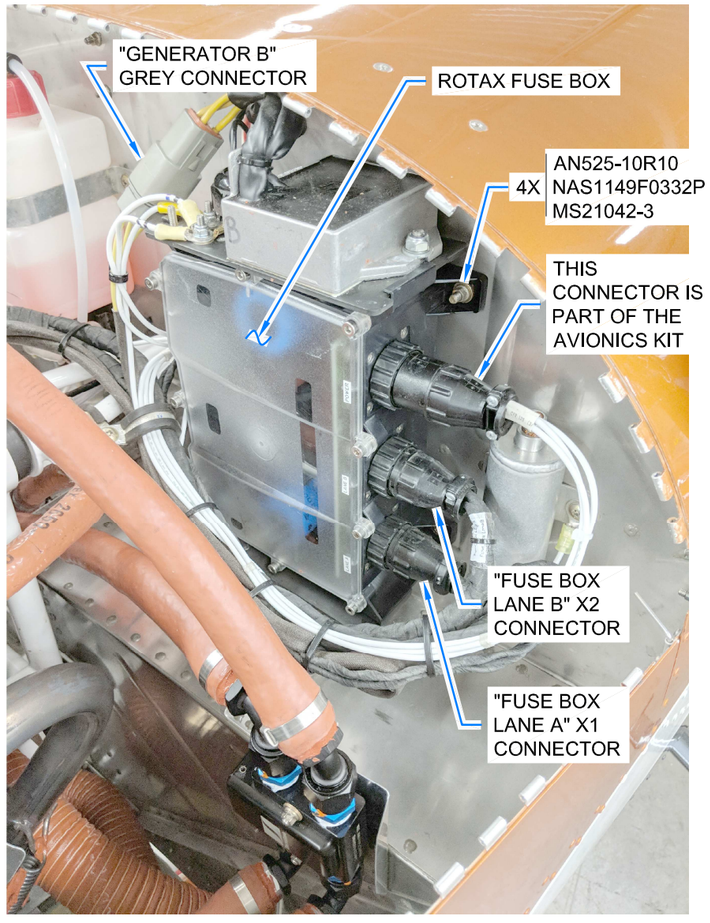


FIGURE 3: ROTAX FUSE BOX

Step 1: If required, final-drill #12 the four ROTAX ECU attach holes in the F-01202B-1 as shown in Figure 1.

Step 2: Attach the ROTAX ECU to the F-01202B-1 in accordance with the ROTAX Installation Manual (Chapter 76-00-00). See Figure 1.

Step 3: Route the "ECU Lane A1", "ECU Lane A2", and "ECU Lane B" connectors (Items 1, 2, and 3 in Figure 1 on the previous page) aft from the left and right sides of the engine through the right side firewall penetration and plug the connectors into the ROTAX ECU as shown in Figures 1, 2, and 3. **DO NOT** lock the cam mechanisms on the ECU connectors until cable routing has been finalized.

ECU connector cam mechanisms are cycle-limited items that can only undergo 20 connections/disconnections. Make entries in the aircraft logbook to keep track of connection cycles.

Step 4: Secure the two ECU cables to the WD-1221 with the cushioned clamps as shown in Figure 3. Fabricate the bushing from BUSHING-AL.197X.313.X.968 (i.e. AT6-058X5/16).

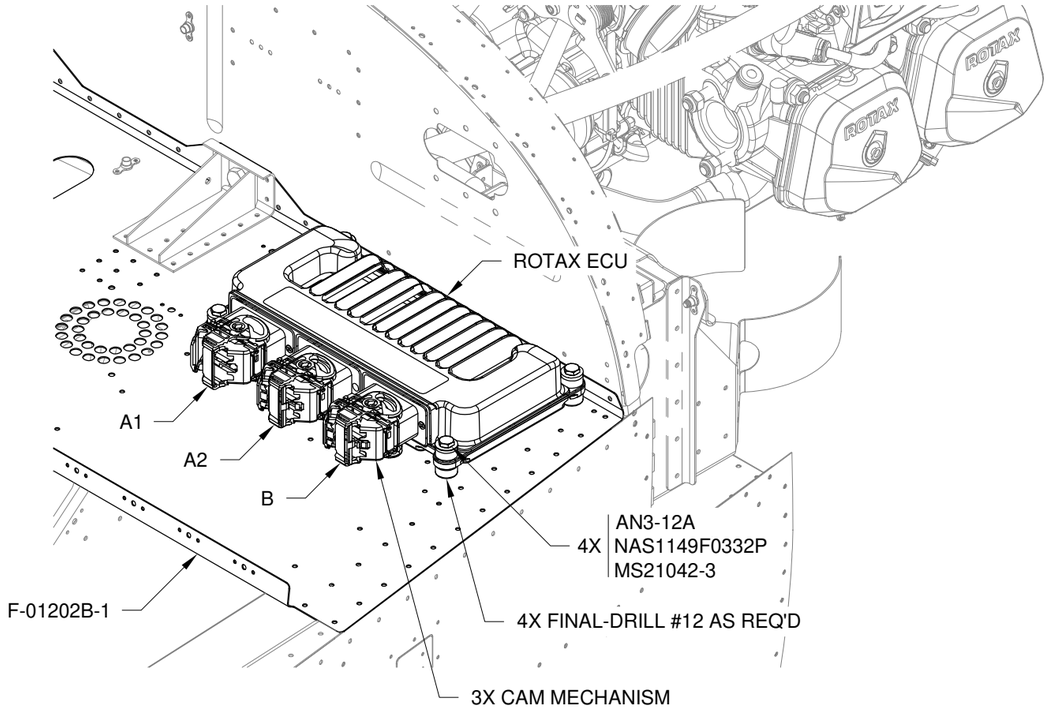


FIGURE 1: ENGINE CONTROL UNIT (ECU) INSTALLATION

GROMMETS AND PENETRATION BLOCK OFF WILL BE INSTALLED AFTER INSTALLATION AND ROUTING OF AVIONICS

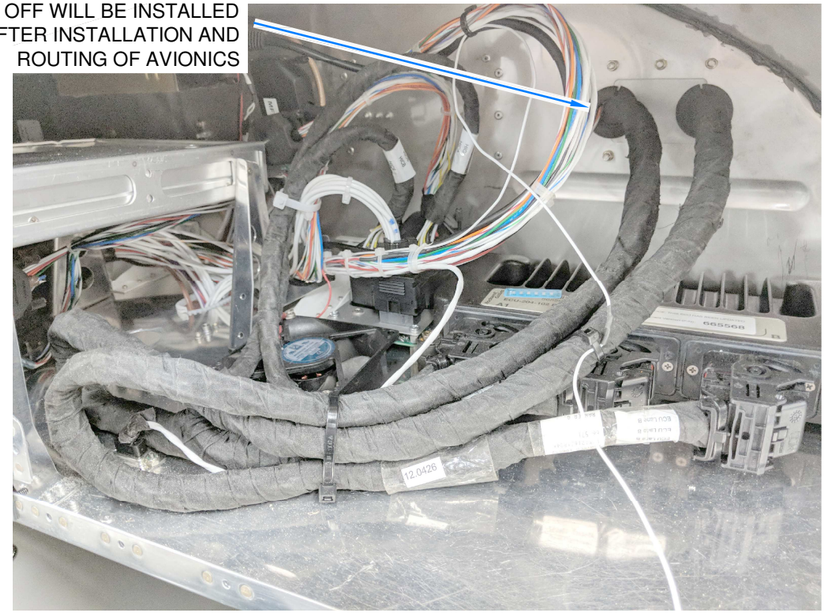


FIGURE 2: ECU CABLE ROUTING - FIREWALL AFT
(SOME ITEMS SHOWN ARE NOT YET INSTALLED)

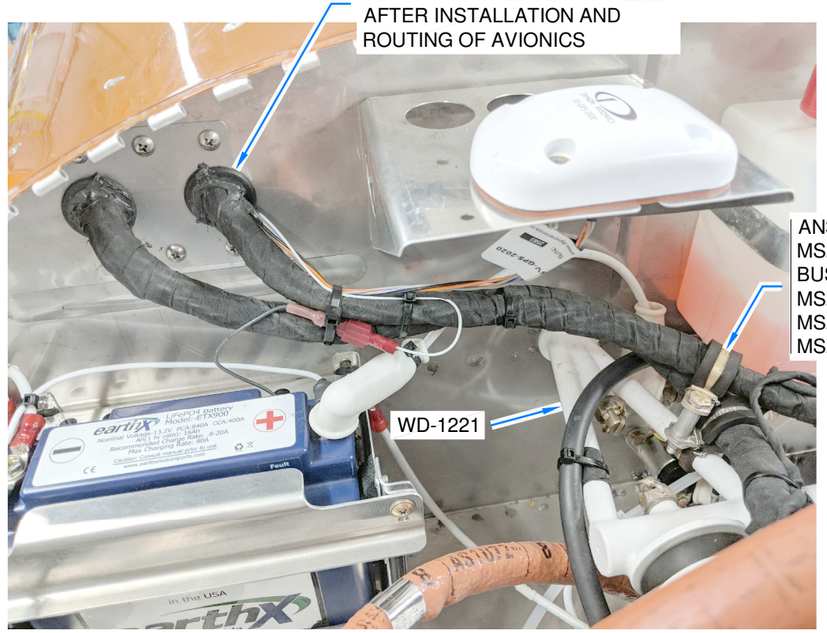


FIGURE 3: ECU CABLE ROUTING - FIREWALL FORWARD
(SOME ITEMS SHOWN ARE NOT YET INSTALLED)

CAUTION: Before connecting the WH-P158, verify that the battery negative terminal is disconnected.

Step 1: Connect the WH-P158 to the ROTAX Electric Starter and ROTAX Starter Relay as shown in Figures 1 and 2. The smaller diameter ring terminal attaches to the electric starter. Refer to the ROTAX Installation Manual (Chapter 80-00-00).

Step 2: Connect the WH-P151-1 to the aft side of the ROTAX 912iS Engine (i.e. the engine generator) as shown in Figures 1 and 2.

Step 3: Locate the "Starter Relay" harness coming from the right aft side of the airbox.

Cut "Gnd Starter Rel" wire where it exits the wrap (Item 7 in Figure 1 on Page 46iS-07). Do not leave extra length as shown in Figure 3. Apply heat shrink.

Step 4: Connect the spade terminal of the white "Conn Starter Rel SW" wire (Item 8 in Figure 1 on Page 46iS-07) to the lower center terminal on the ROTAX Starter Relay as shown in Figure 3.

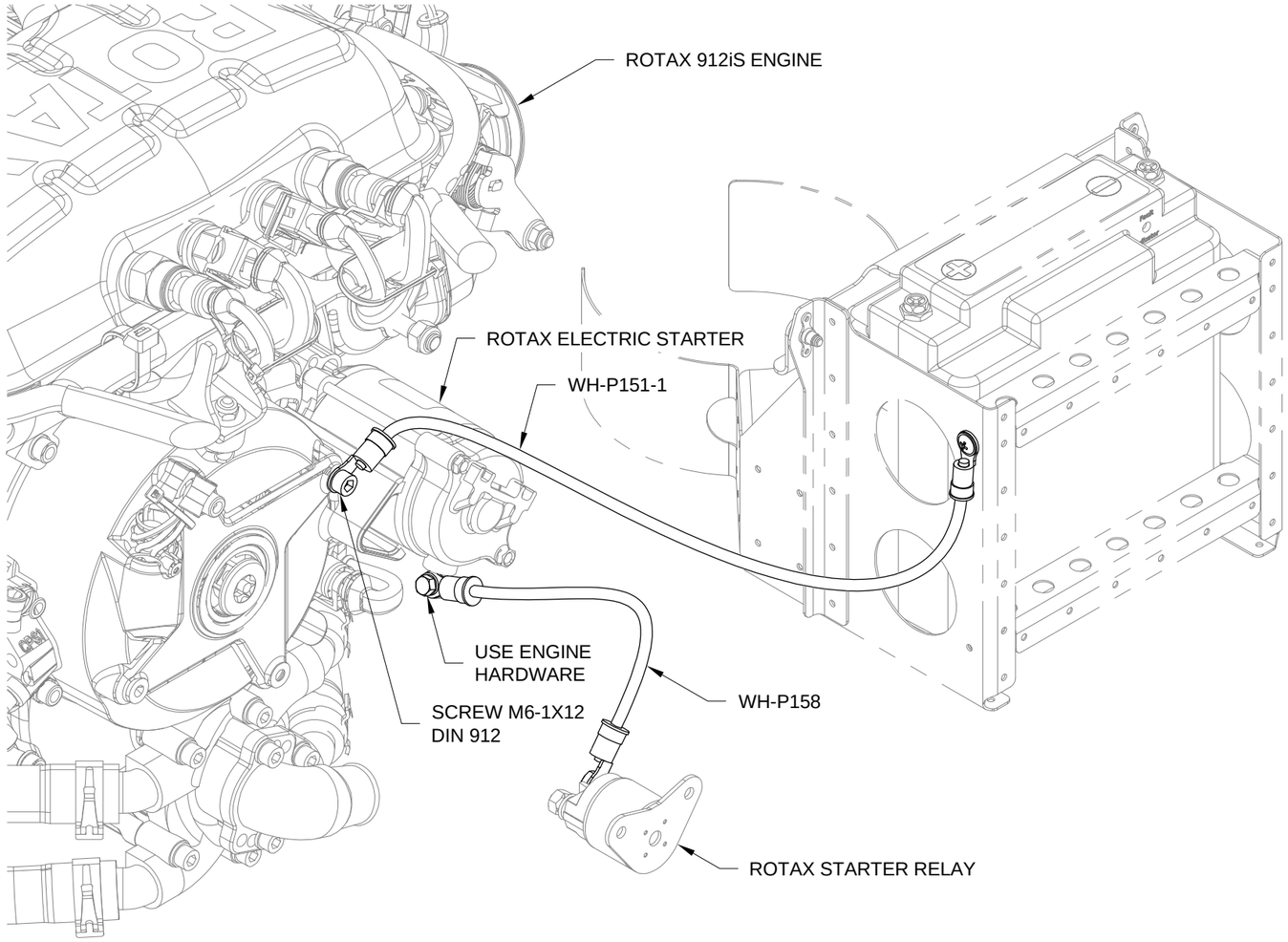


FIGURE 1: CONNECTING THE STARTER & GROUNDING THE ENGINE

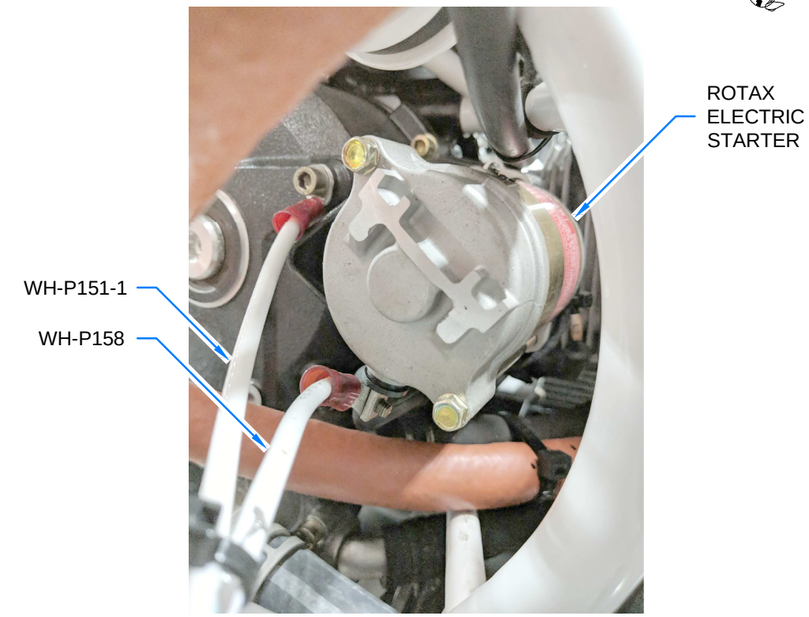


FIGURE 2: ROTAX ELECTRIC STARTER

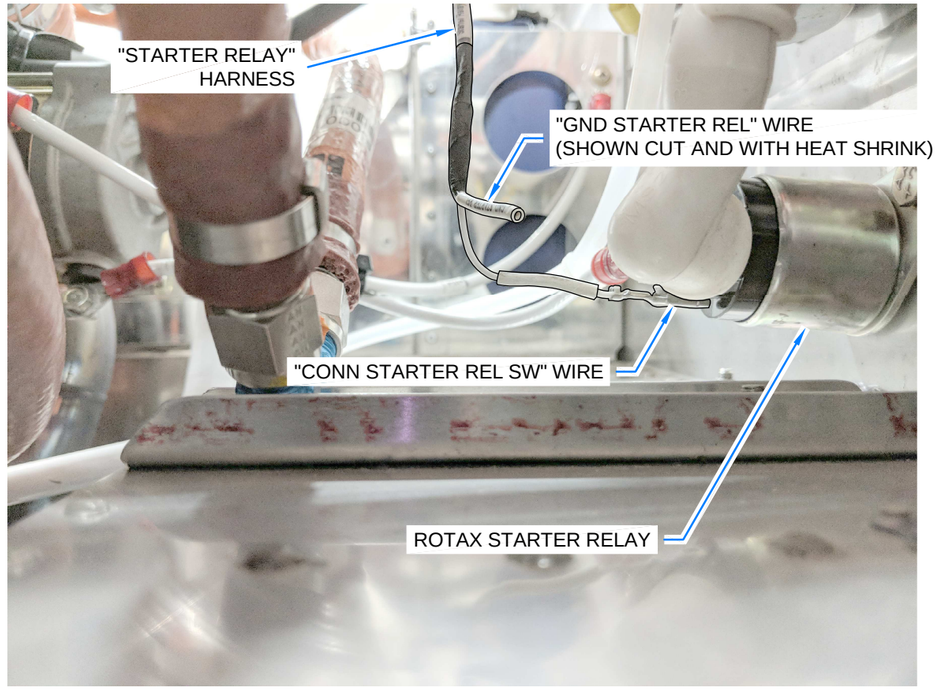


FIGURE 3: ROTAX STARTER RELAY

NOTE: Removal of the Seal Pins in Step 1 is to prevent interference with interfacing avionic components. The Seal Pins, as well as the connector ports they occupied, will not be used.

Step 1: Locate the "HIC B" connector (item 24 in Figure 1 on Page 46iS-07). Use a pair of needle-nose pliers to twist and pull the two Seal Pins out of the connector housing as shown in Figure 1.

If the Seal Pin breaks off inside the connector housing, the remaining fragment can be pushed out from the mating side of the connector using a small scribe or pick.

END OF SECTION.

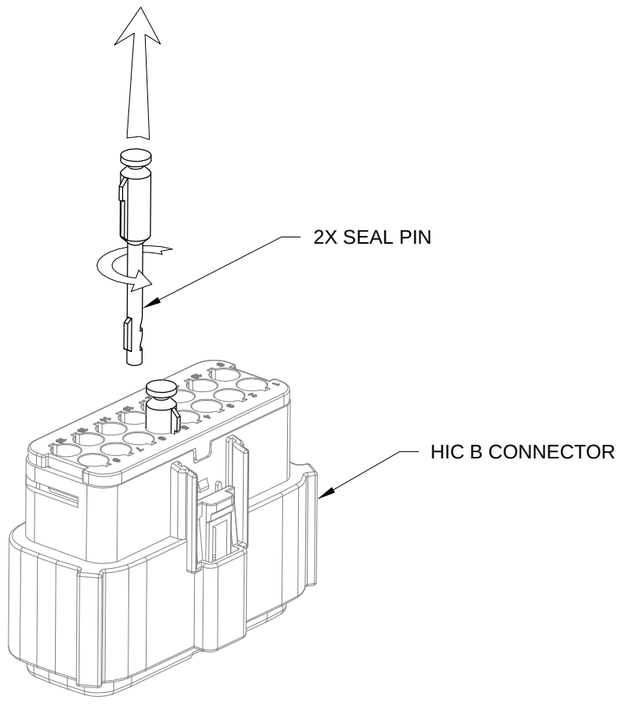


FIGURE 1: REMOVING SEAL PINS
(WIRES NOT SHOWN FOR CLARITY)

Step 1: Safety wire the magnetic plug to the crankshaft plug screw as shown in Figures 1 and 2.

Step 2: Safety wire the oil pressure regulator plug to the hole in the engine pump housing as shown in Figures 3 and 4. The plug is number "1" in Figure 3.

Step 3: Safety wire the oil tank drain plug to the hole in the fitting as shown in Figure 5. Note that oil tank is not yet installed on the aircraft.

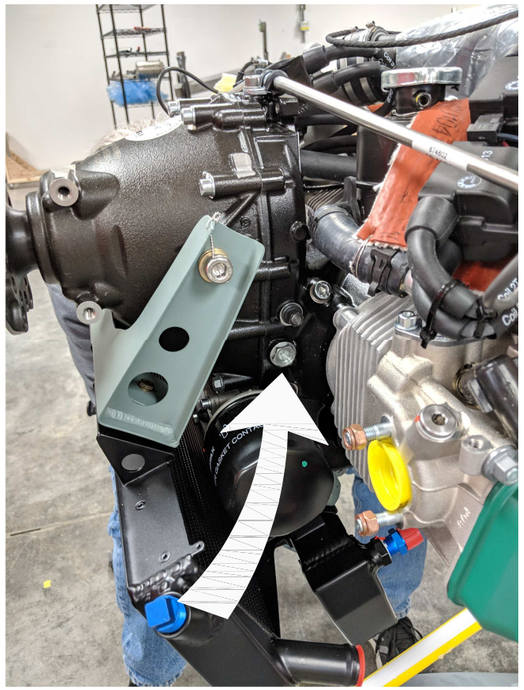


FIGURE 1: MAGNETIC PLUG LOCATION

FIGURE 2: SAFETY WIRE MAGNETIC PLUG

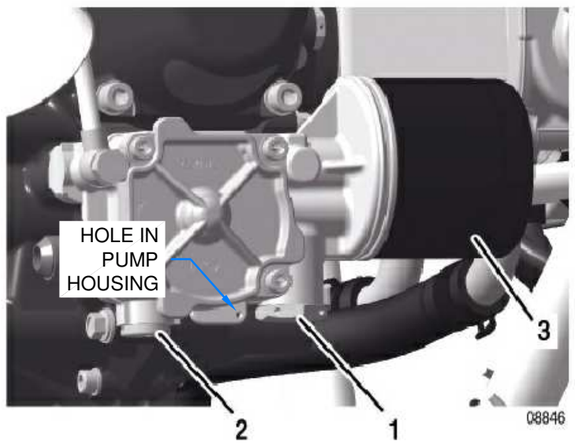


FIGURE 3: OIL PRESSURE REGULATOR PLUG LOCATION

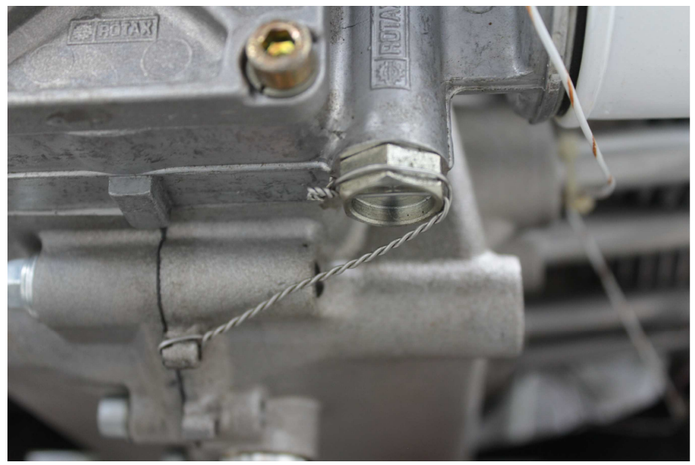


FIGURE 4: SAFETY WIRE OIL PRESSURE REGULATOR PLUG
(912ULS SHOWN, SIMILAR FOR 912iS EXCEPT HOLE IN ENGINE PUMP HOUSING)

FIGURE 5: SAFETY WIRE OIL TANK DRAIN PLUG

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