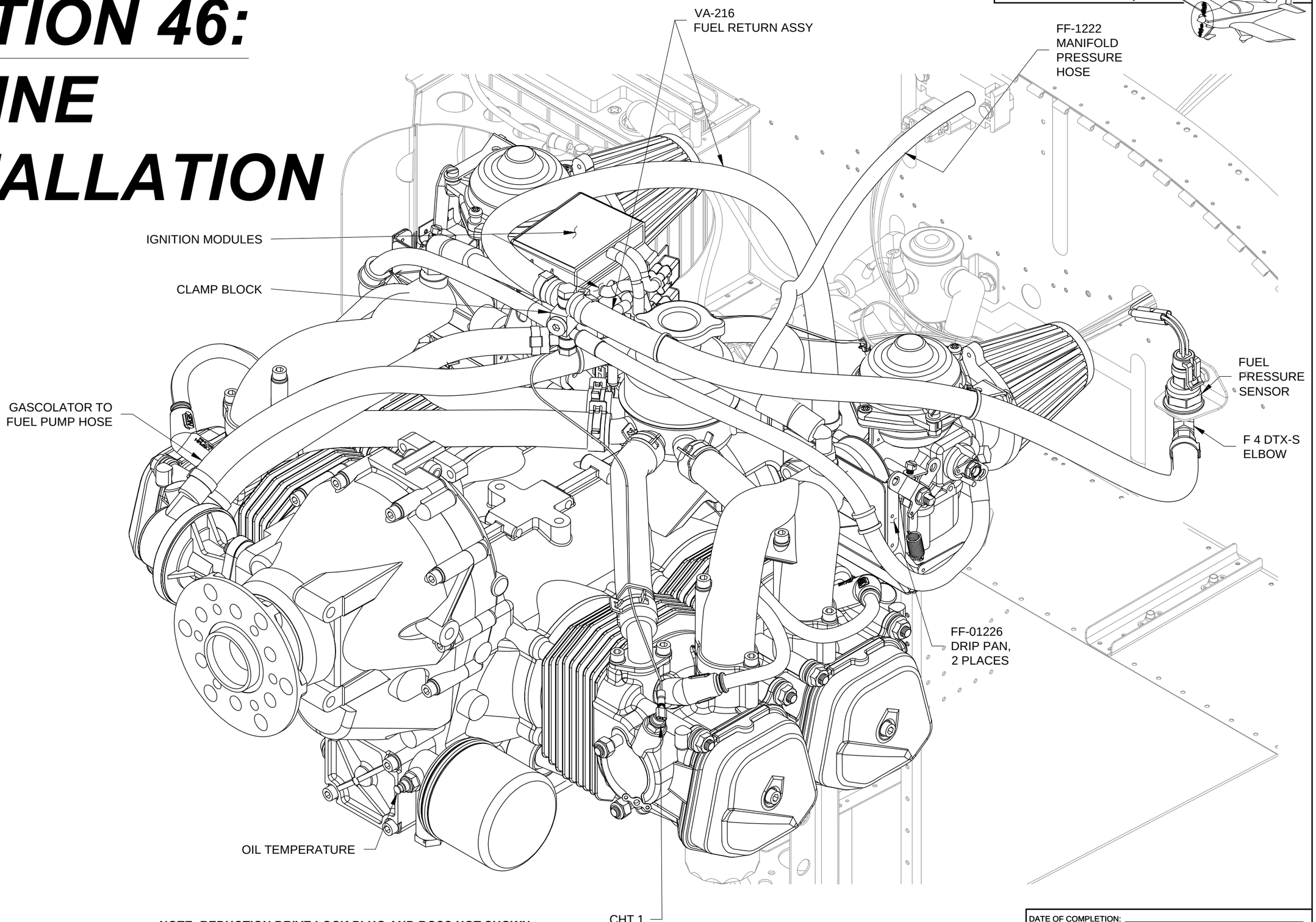
SECTION 46: ENGINE INSTALLATION



NOTE: REDUCTION DRIVE LOCK PLUG AND BOSS NOT SHOWN.

NOTES: Engine installation details that do not directly pertain to the particular step are shown for reference only. Some nonessential features may be omitted or are obsolete.

Keep track of hardware placement by reinserting it after removing each part. If there is any question about proper hardware consult the engine's Illustrated Parts Manual.

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

Step 1: Set the engine on a steady work surface at a convenient working height and take pictures of the systems and components at various angles for your own reference later. Continue taking pictures after removing parts that conceal other components.

Step 2: Check the water inlet elbow clocking. See Figure 1. If necessary remove, reposition and reinstall the elbow as shown.

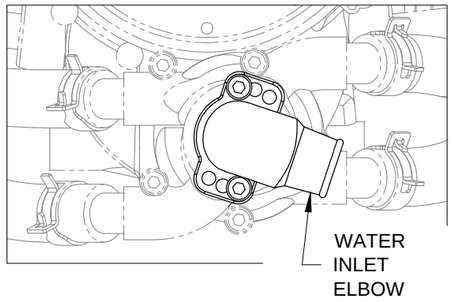


FIGURE 1:
WATER INLET ELBOW POSITION

Step 3: Mark the ignition harness electrical connectors for modules A1, B1, A2 and B2. See Figure 2.

Step 4: Remove the retaining screw from the small clamp at the rear of the ignition module and pull the harness free. See arrow in Figure 2.

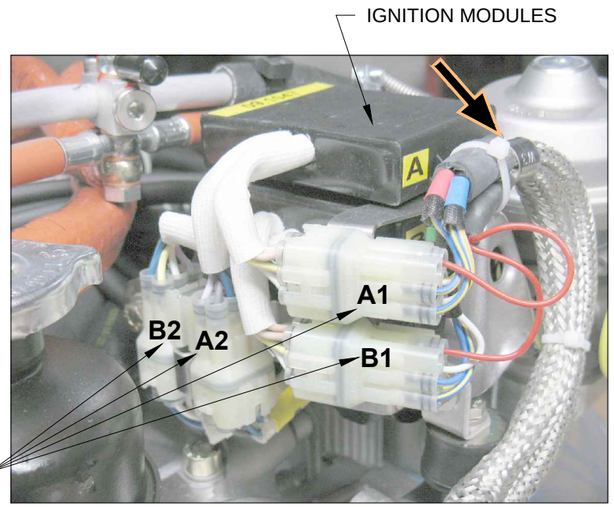


FIGURE 2:
MARK ELECTRICAL CONNECTORS;
REMOVE WIRING HARNESS

Step 5: Remove the A & B electrical connectors from the metal mounting bracket by gently prying the tab at the shielded harness end (arrow) toward the connector and slide them off the bracket. See Figure 3.

FIGURE 3:
REMOVE CONNECTORS

Step 6: Separate the two connector halves of the A & B connectors by gently prying the single tab as shown in Figure 4 and then pulling them apart.

CAUTION: Do not pry the tabs opposite each other on the connector.

Do not reconnect these connectors until directed to do so later in this section.

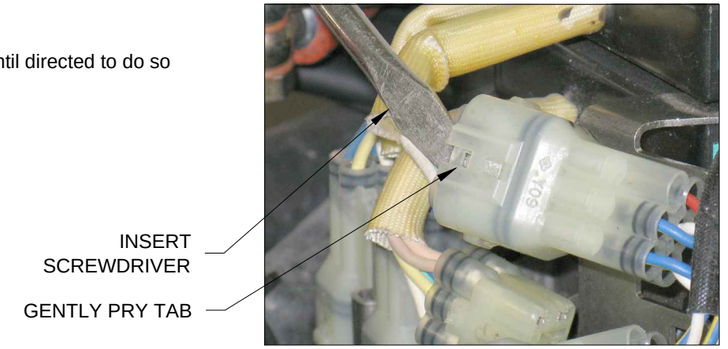


FIGURE 4: SEPARATING CONNECTOR HALVES

Step 7: Remove the two cushioned clamps and spacer by removing the allen screw from the inboard crank trigger coil. See Figure 5.

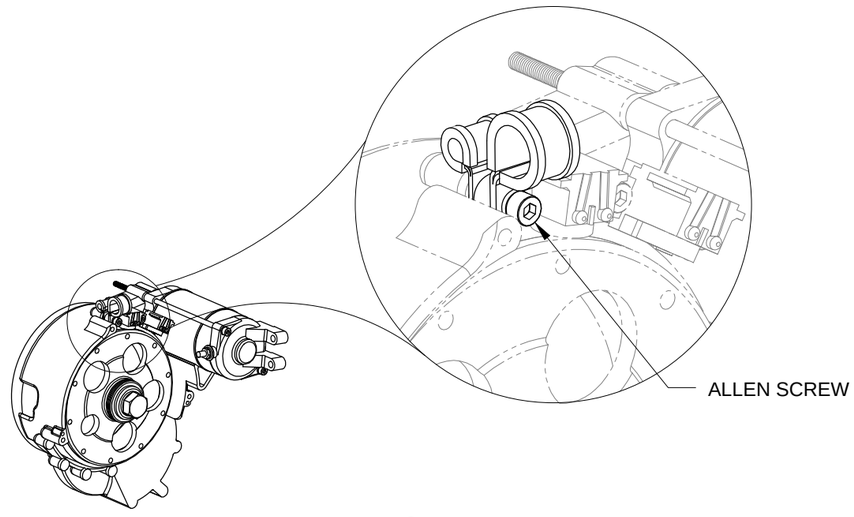


FIGURE 5: REMOVE SCREW

Step 1: Discard the small clamp, allen screw and spacer. Reattach the large clamp and wire harness with the hardware called out in Figure 1. Torque the allen screw to 55 in-lbs.

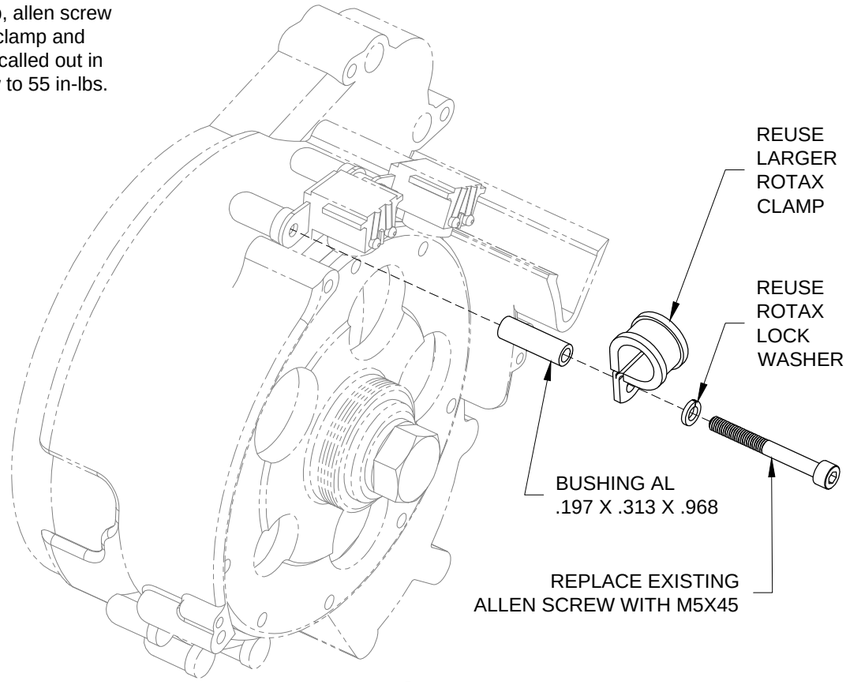


FIGURE 1:
REMOVE AND REPLACE HARDWARE
(WIRE HARNESS NOT SHOWN FOR CLARITY)

NOTE: When checking the trigger coil gap measure between the trigger coil and the trigger cam on the flywheel *not* the plastic ignition cover.

Step 2: Check for proper trigger coil clearance. The gap should be .012-.016. See Figure 2 arrow.

For more information see the ROTAX 912 AND 914 SERIES MAINTENANCE MANUAL (HEAVY MAINTENANCE). Search using keywords: trigger coil gap (with clamps).

If the gap needs to be adjusted it will be necessary to rotate the crankshaft. For directions on how to rotate the crankshaft see Step 3, otherwise skip to Step 5.

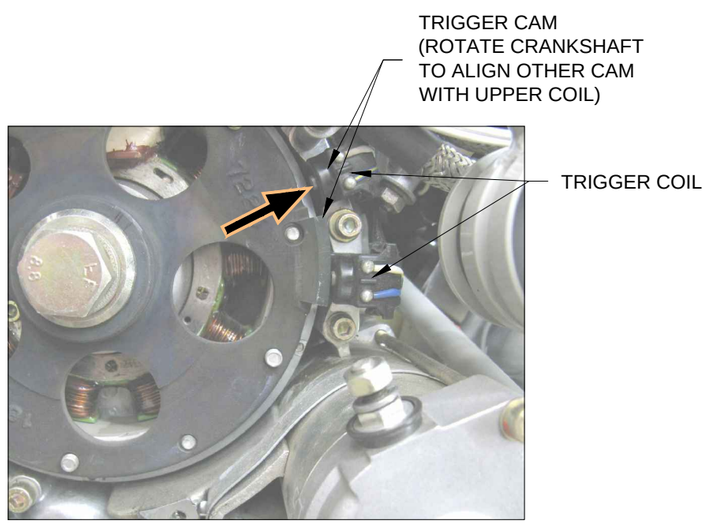


FIGURE 2:
CHECK TRIGGER COIL CLEARANCE
(IGNITION COVER NOT SHOWN FOR CLARITY)

NOTE: There are two trigger cams approximately 180 degrees apart and each aligns with only one of the coils on the flywheel. The crankshaft must be rotated in order to align the trigger cams with the coils on the flywheel. Removing one spark plug per cylinder will make rotating the crankshaft much easier.

Step 3: Insert two large bolts in holes clocked 180 degrees apart in the propeller flange. Place a large screwdriver or other lever between the bolts and slowly rotate the crankshaft.

Step 4: Temporarily install the spark plugs. Thread them in a few turns. They will be removed again in the Spinner and Propeller Section.

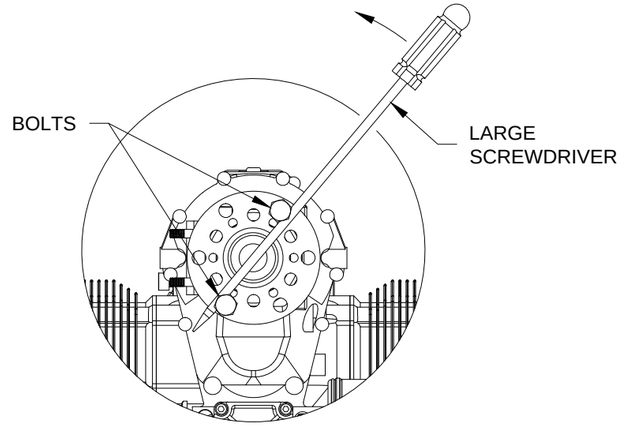


FIGURE 3: ROTATING CRANKSHAFT

Step 5: Unfasten the ignition module by removing the forward left-side mounting bolt. See Figure 4 arrows.

Remove the retaining nut from the bottom of the rubber isolator several inches aft and below the mounting bolt location then loosen the upper screw and pivot the elastomer assembly up and out of the way.

NOTE: The ignition modules should now be free to flex enough to allow for engine mount installation later in this section.

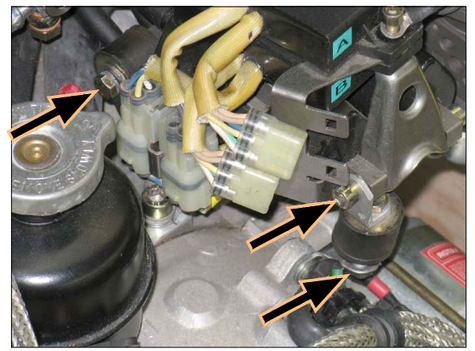


FIGURE 4: REMOVE IGNITION MODULE

NOTE: Letters in parentheses correspond to the same letters in the Figure. Note band clamp screw position prior to removal.

Step 1: Disconnect the damping spring (A) from the clamp bracket (B). See Figure 1. Loosen the band clamp (C). Remove the carburetor with a slight turning and swivel action. Remove the band clamp (C). Disconnect the fuel line clamp (D) from the intake manifold by removing the retaining nut.

Step 2: Repeat removal process for other carburetor, then secure carbs on top of engine to prevent damage during other processes.

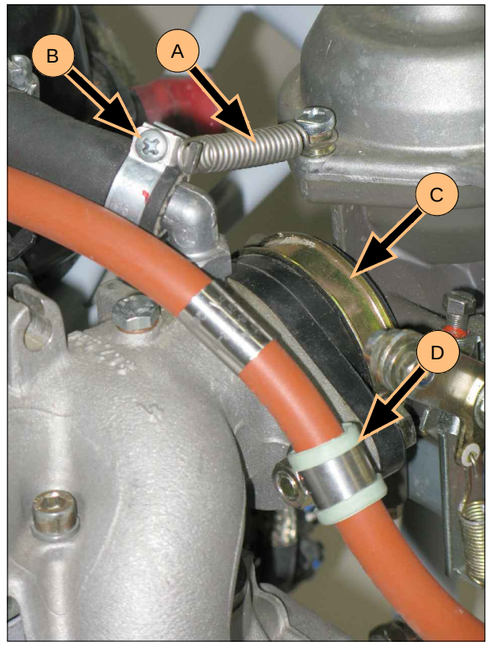


FIGURE 1: REMOVE CARBURETORS

Step 3: Mark the upper grounding lug on the starter. See Figures 2 and 3.

Cut off the lug with a hacksaw then file smooth the cut area on the starter. See Figure 4.

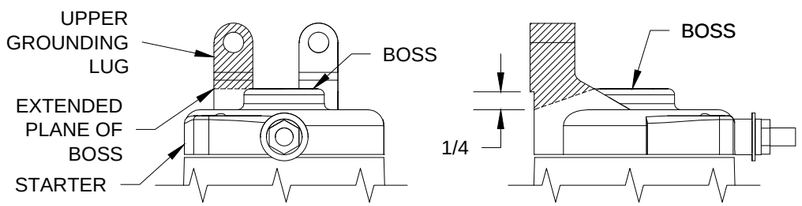


FIGURE 2: MARK STARTER LUG

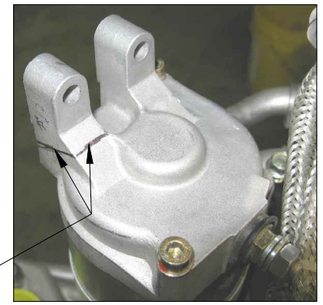


FIGURE 3: MARKED LUG

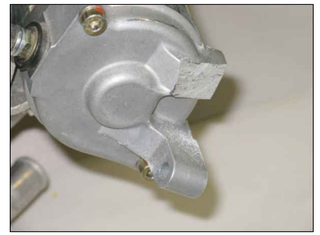


FIGURE 4: STARTER LUG REMOVED

Step 4: Tilt up the back of the engine then support with a 2x4 wood block or equivalent under the oil outlet fitting on the bottom of the case. See Figure 5.

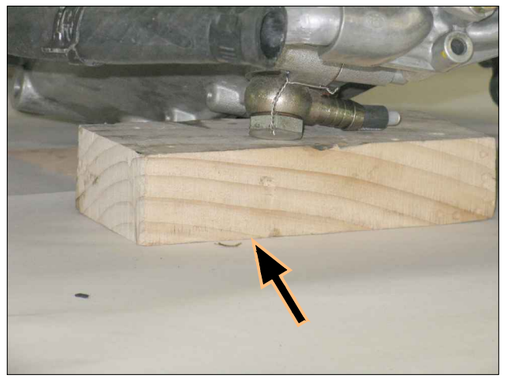


FIGURE 5: TILT UP ENGINE
(OBSOLETE FITTING SHOWN)

Step 5: Squeeze open the clamps with a large pair of pliers or similar, and move the four spring type clamps forward along the lower coolant hoses to allow the hoses to be removed from the water pump. See Figure 6.

Beware of the possibility of residual coolant and have a catch pan and rags on hand.

Pry/pull the hoses free.

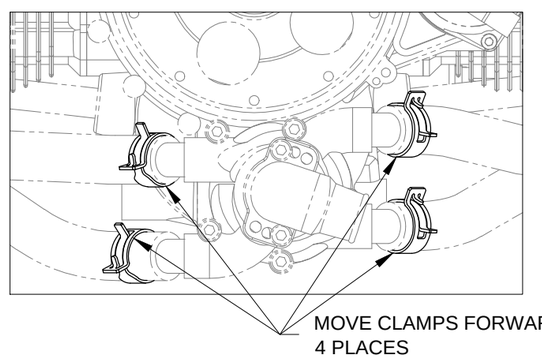


FIGURE 6: REMOVING LOWER COOLANT HOSES

Step 1: Remove the crankcase allen screw located above and aft of cylinder three as it will be used as an engine mounting point. See Figure 1.

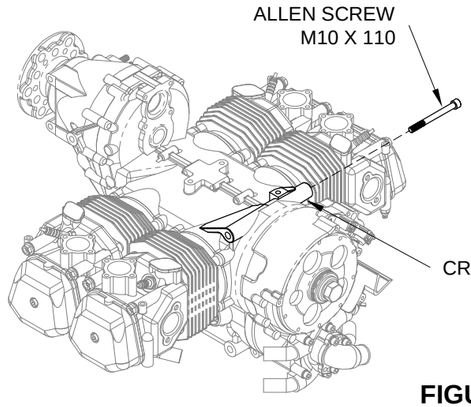


FIGURE 1:
REMOVE CRANKCASE THROUGH BOLT

Step 2: Apply masking tape to the inside surfaces of the WD-1220 Engine Mount Ring to prevent scraping the powder coat during installation. See Figure 2.

Remove the powder coating from the mating surface of the four engine mount bushings.

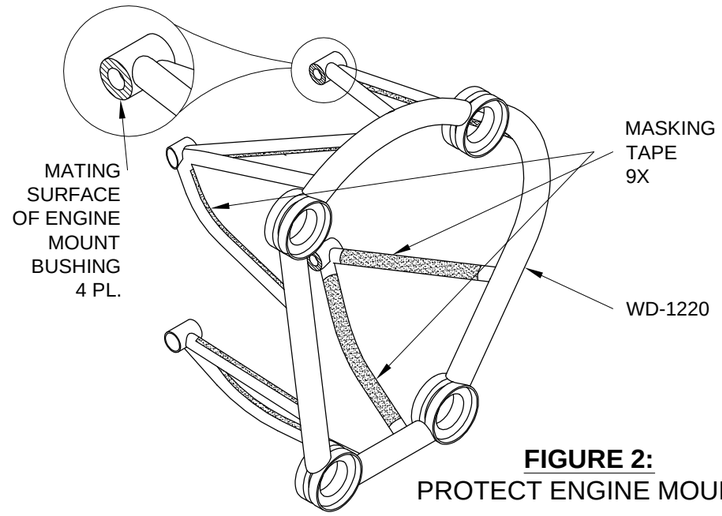


FIGURE 2:
PROTECT ENGINE MOUNT

Step 3: Fit the WD-1220 Engine Mount Ring to the engine. The engine mount ring will fit onto the engine without using force if the correct sequence is followed. It may be helpful to remove the clamp installed on Page 46-03, Figure 1.

Move the ignition module up and away from the engine then hook the upper right and lower right engine mount attach points over the starter and lower right water pump coolant tube. See Figure 3.

FIGURE 3: INSTALL ENGINE MOUNT: PART 1

Step 4: Rotate the bottom left side of the engine mount ring forward and over the lower left water pump coolant tube. This will be a tight fit, be careful not to damage the coolant tube! See Figure 4.

Pull the ignition wire harness through the upper right side as shown in Figure 5.

Rotate the top left of the engine mount forward so that the upper left engine attach point goes into position.

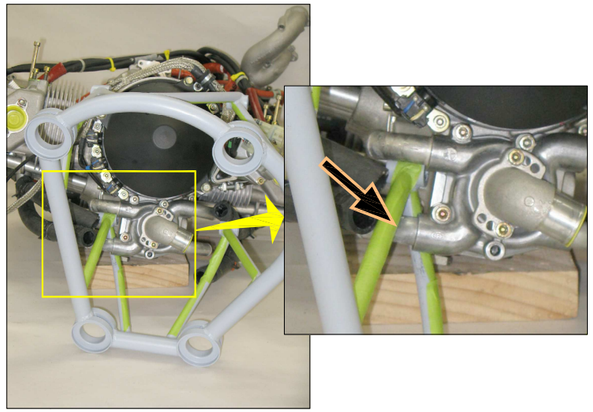


FIGURE 4:
INSTALL ENGINE MOUNT: PART 2

FIGURE 5:
INSTALL ENGINE MOUNT: PART 3

Step 5: Bolt the WD-1220 Engine Mount Ring to the right side of the engine using the hardware called out in Figure 6.

Check for a gap between the engine and the left engine mount lugs. If a gap exists more than half the thickness of a NAS1149F0632P washer, add NAS1149F0632P or NAS1149F0663P spacer washers to fill the gap. Bolt the left engine mount lugs to the engine using spacers as required.

Step 6: Torque the mount screws to the value given in the Rotax 912ULS Heavy Maintenance Manual (Chapter 71-00-00) for intallation of the engine suspension frame.

Remove the masking tape from the engine mount ring.

Step 7: Reinstall the four lower coolant hoses on the water pump and return the spring clamps to their proper locations.

Return the engine to a stable level position.

Step 8: Re-install the hardware removed on Page 2 Step 4.

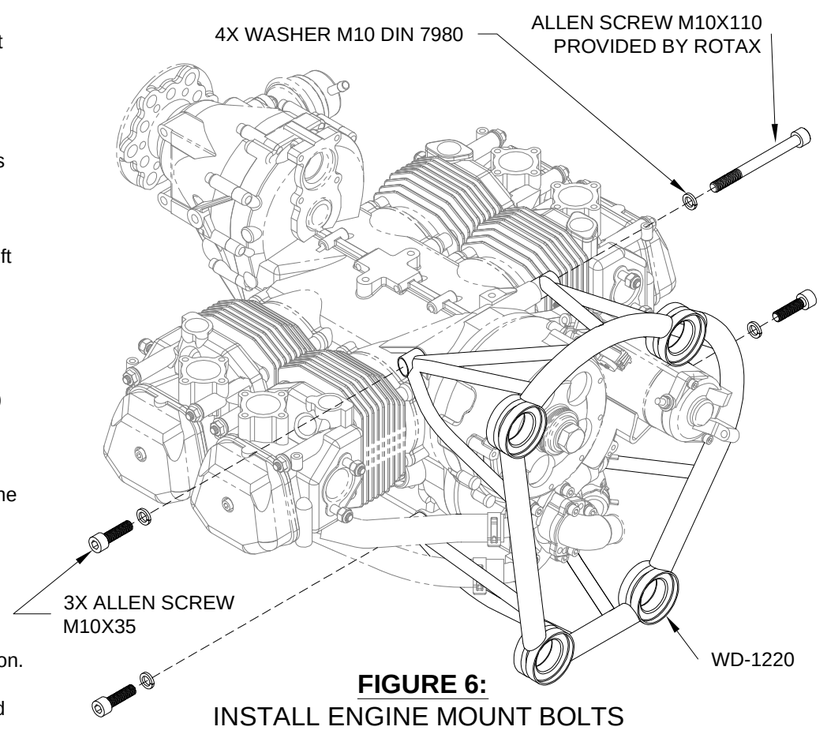


FIGURE 6:
INSTALL ENGINE MOUNT BOLTS

Step 1: For the Right Carburetor Drip Tray ONLY, trim the right upper flange of the FF-01226A Drip tray and F-01226B Right Drip Tray Stiffener as shown in Figure 1 & Figure 2.

For the Left Carburetor Drip Tray ONLY, trim the FF-01226B Right Drip Tray Stiffener as shown in Figure 1.

Deburr the FF-01226A Drip Tray, FF-01226B & C Drip Tray Stiffeners and FF-01226D Drip Tray Doubler.

Step 2: Cleco together the two Drip Trays and Match-Drill the #40 holes as shown in Figure 2.

Step 3: Machine countersink the single hole as called out in Figure 2 for both Drip Trays.

Step 4: Set the single AN426 rivet in both Drip Trays as shown in Figure 2. Place the manufactured head of the rivet flush on the outside of both drip trays and the shop head set as close to flush as possible on the interior.

Step 5: Rivet the Drip Trays together as shown in Figure 2.

Step 6: Bond the FF-1226D Drip Tray Doubler to the Drip Trays using fuel tank sealant as shown in Figure 2. Use a temporary 5/16 bolt in each hole to maintain alignment while clamping parts between small wood blocks. If any sealant squeezes out into the holes, wait until the sealant has cured, then peel it away.

Step 7: Seal the corners of the Drip Trays with fuel tank sealant as shown in Figure 2.

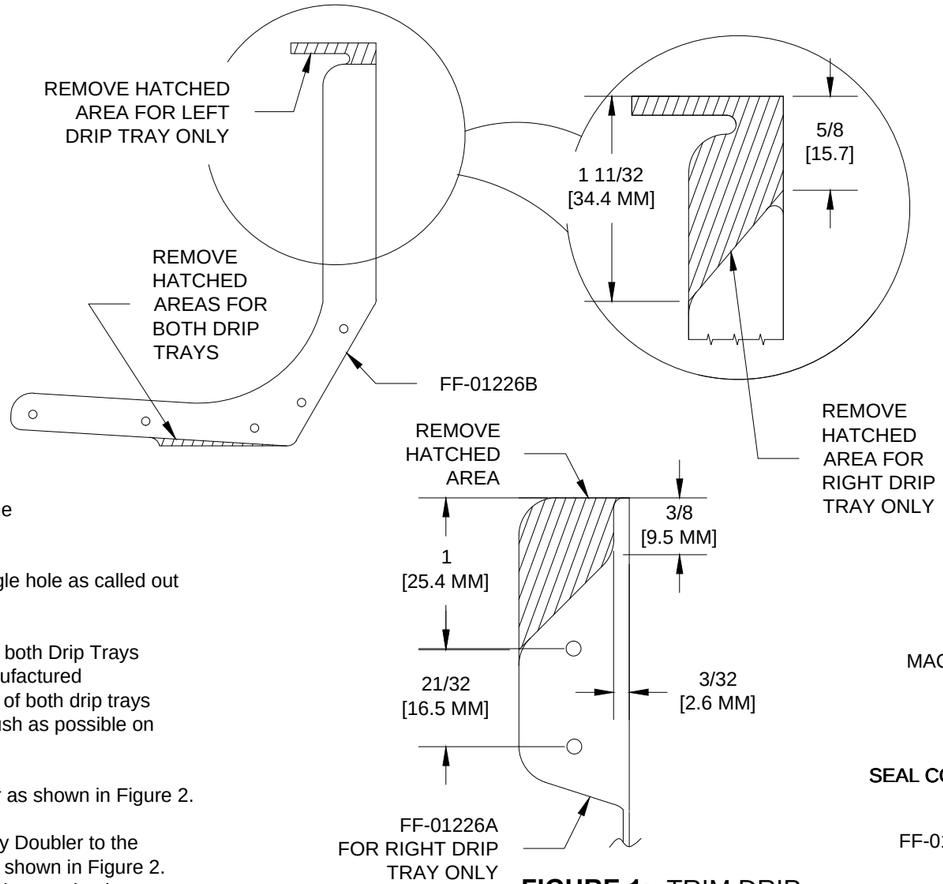


FIGURE 1: TRIM DRIP TRAY PARTS

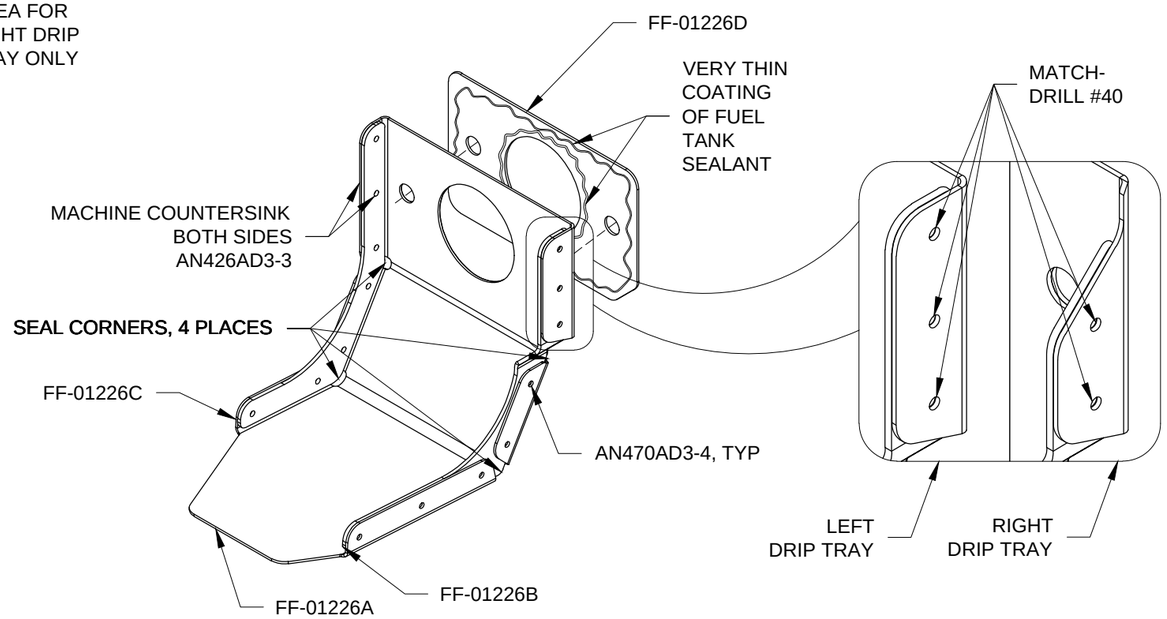


FIGURE 2: DRIP TRAY ASSEMBLY

NOTE: Letters in parentheses correspond to the same letters in the applicable Figures.

Step 1: Remove the two bolts securing the carburetor flange assembly to the intake manifold. See arrows in Figure 1.

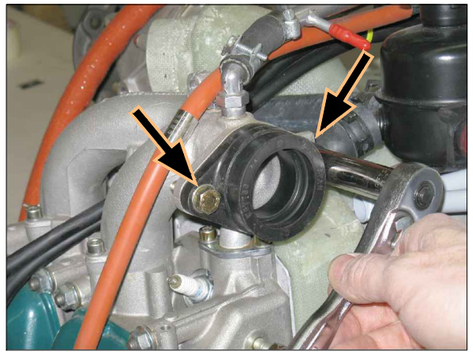


FIGURE 1: REMOVE CARBURETOR FLANGE ASSEMBLY

Step 2: Install the Drip Tray (E) between the intake manifold and the carburetor flange assembly as shown in Figure 2. Verify that the O-ring is still in place on the flange of the manifold. Install the longer bolt (F) to the outboard side. Use Loctite 221 and torque to 125 in-lbs.

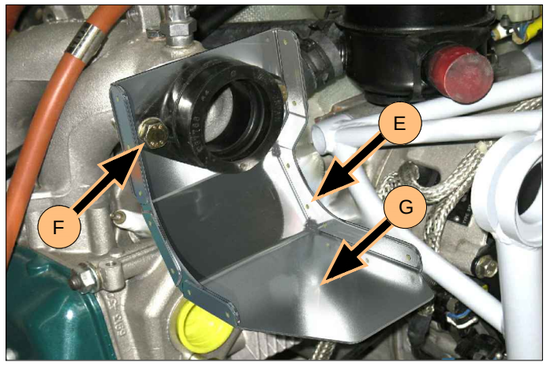


FIGURE 2: INSTALL DRIP PANS

Step 3: Fabricate FF-00124 Vibration Damper Hose from EA HOSE H173 rubber hose per Figure 3 dimensions.

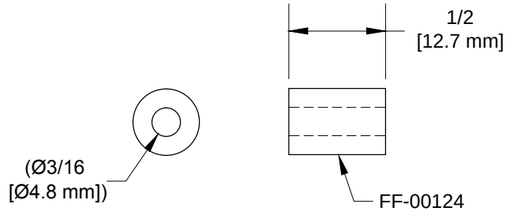


FIGURE 3: CUT VIBRATION DAMPER HOSE

Step 4: Install the band clamp (C) onto the carburetor flange assembly. See Figure 4. The clamp lugs and screw must be placed at the bottom or 6 o'clock position with the screw head facing outboard. Install the carburetor free of oil or grease. Tighten the band clamp against the spacer provided by Rotax which automatically sets the proper gap (.276 in. or 7mm) between the clamp lugs to prevent over tightening.

Connect the damping spring (A). Install the fuel line clamp (D).

Step 5: Check the FF-00124 Vibration Damper Hose for fit. Insertion under the carburetor should meet with slight resistance. If fit is good, apply fuel tank sealant to the Drip Tray at location (G) in Figure 2, and pot the lower end of the vibration damper hose into the sealant.

Repeat steps 1 through 5 for the right carburetor.

NOTE: If the screws to which the damping spring attaches were loosened see Rotax Heavy Maintenance Manual, Section 73-00-00 pages 51-52 (Fig 73-40) for more information.

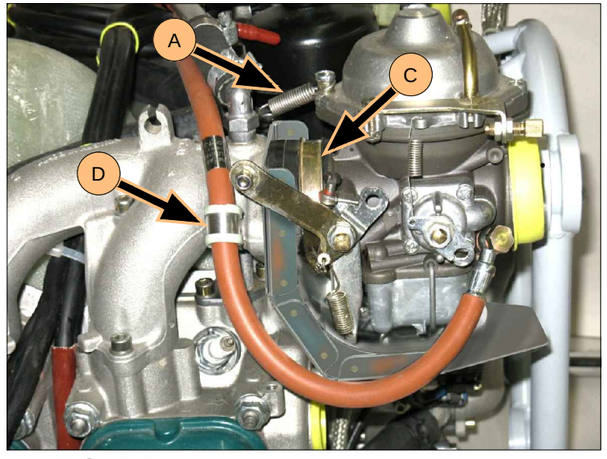


FIGURE 4: RE-INSTALL CARBURETORS

NOTE: When loosening or tightening the banjo bolts support the clamp block (fuel manifold) appropriately.

Step 6: Remove the two banjo bolts, copper rings and fuel hoses from the clamp block as shown in Figure 5. Remove the Hose Nipple 3/4 as shown in Figure 5. It will not be replaced but keep it in a safe place. Be prepared to catch falling copper gasket rings.

Step 7: Loosen the allen screw and rotate the clamp block 180 degrees on the compensating tube. Doing so will place the main port on the forward side of the compensating tube. If the main port shifted to one side slide the clamp block back along the axis of the compensating tube to even out slack in the Clamp Block To Carb Fuel Hose Assembly.

Step 8: Tighten the allen screw M5X16 to 55 in-lbs.

Step 9: Remove the pilot jet from the banjo bolt M8X1X17 as shown in Figure 5. It will not be used in this installation.

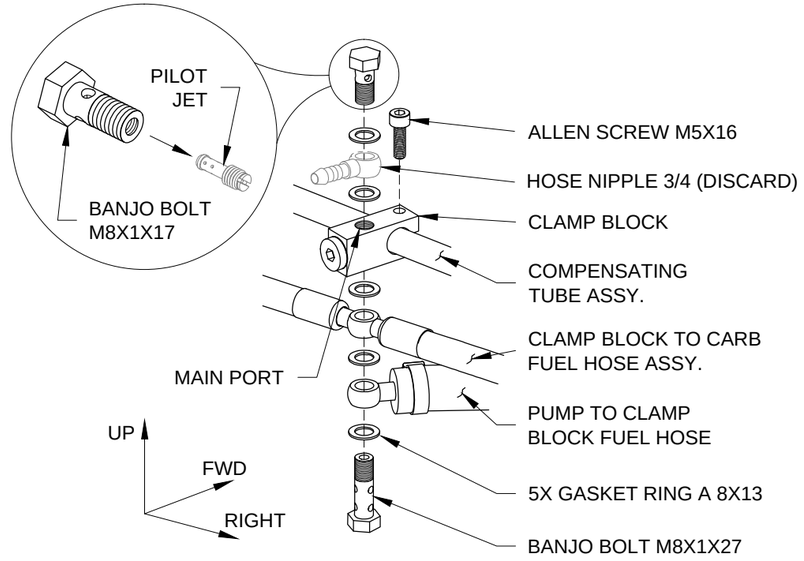


FIGURE 5: DISASSEMBLE CLAMP BLOCK

Step 10: Attach the Clamp Block To Carb Fuel Hose Assembly and the Pump To Clamp Block Fuel Hose. Torque the banjo bolt M8X1X27 to 90 in-lbs. Install the banjo bolt M8x1x17 finger tight for now to keep out debris.

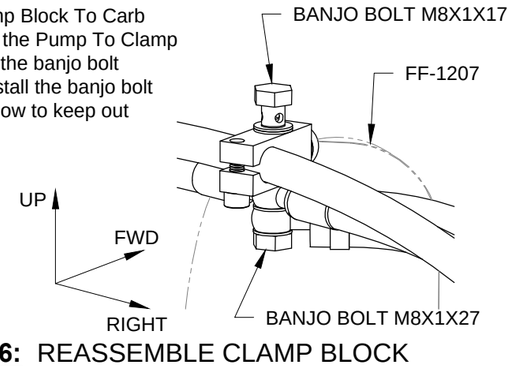


FIGURE 6: REASSEMBLE CLAMP BLOCK

Step 1: Preload the WD-1201-1 Nose Gear Leg upward at the wheel so that the upper flange of the nose gear assembly is held firmly against the F-1201C Firewall Bottom while drilling. Upward force under the tail will yield the same result.

Step 2: Clamp the right side of the WD-1201-1 to the F-1201C with an AN3 bolt to stabilize the assembly as shown in Figure 1. Trim 0.10 inches off BUSHING-AL.197X.313X.438 (supplied in the kit) to make BUSHING-AL.197X.313X.100.

Using the left-side hole in the gear leg as a guide, match-drill 5/16, then final-drill 3/8 through the WD-1201-1, F-1201C, and WD-1204 Engine Mount Brackets. See Figure 1. Deburr the hole.

Step 3: Insert an AN6 bolt through the left-side hole from inside the fuselage. From the front side of the firewall, slide one bushing and one washer over the bolt and tighten the nut to put clamping pressure on the left side of the WD-1201-1 as shown in Figure 1.

Remove the AN3 bolt from the right side, match-drill 5/16, then final-drill 3/8. Deburr. Insert one AN6 bolt into the right-side hole from inside the fuselage. Remove the nut, washer, and bushing from the left side. Leave the bolts in place.

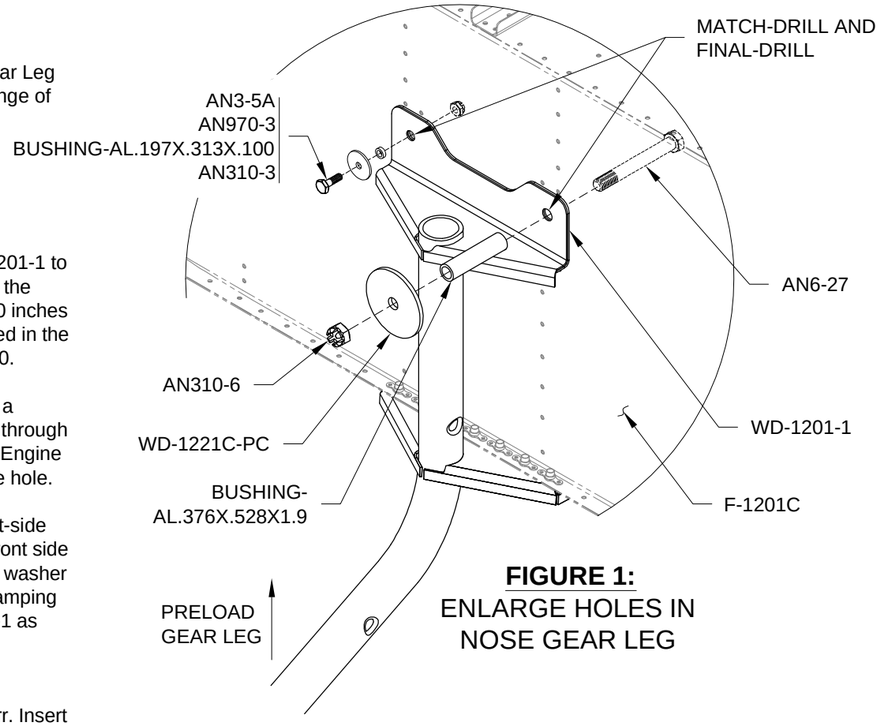


FIGURE 1:
ENLARGE HOLES IN NOSE GEAR LEG

NOTE: At this point the engine weighs about 160 lbs. No dedicated hoisting lug is provided.

Step 4: Attach nylon web slings or equivalent. Place one under the prop flange and the other at the center of the WD-1220 Engine Mount Ring top tube. See Figure 2.

If an engine hoist is not available consider suspending the engine from above using a hand operated winch or come-along and bring the fuselage to the engine.

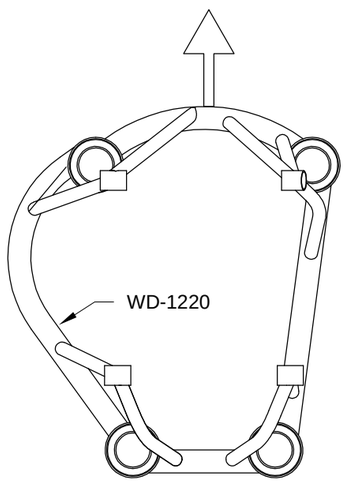


FIGURE 2:
HOISTING ENGINE
(ENGINE NOT SHOWN)

Step 5: Install the engine and WD-1220 Engine Mount Ring to the WD-1221 Engine Mount Standoff, F-1201C Firewall Bottom and WD-1204 Engine Mount Brackets using the hardware shown in Figure 3.

First install without fully tightening the lower two sets of hardware. Done this way the Engine Mount Standoff may be deflected vertically when aligning it to the upper engine mount ring attach bolts.

Tighten the nuts to 160-190 in-lbs. At 160 in-lbs check to see if the nut castellations align with hole in bolt. Tighten up to 190 in-lbs to align the nut castellations to the hole in the bolt.

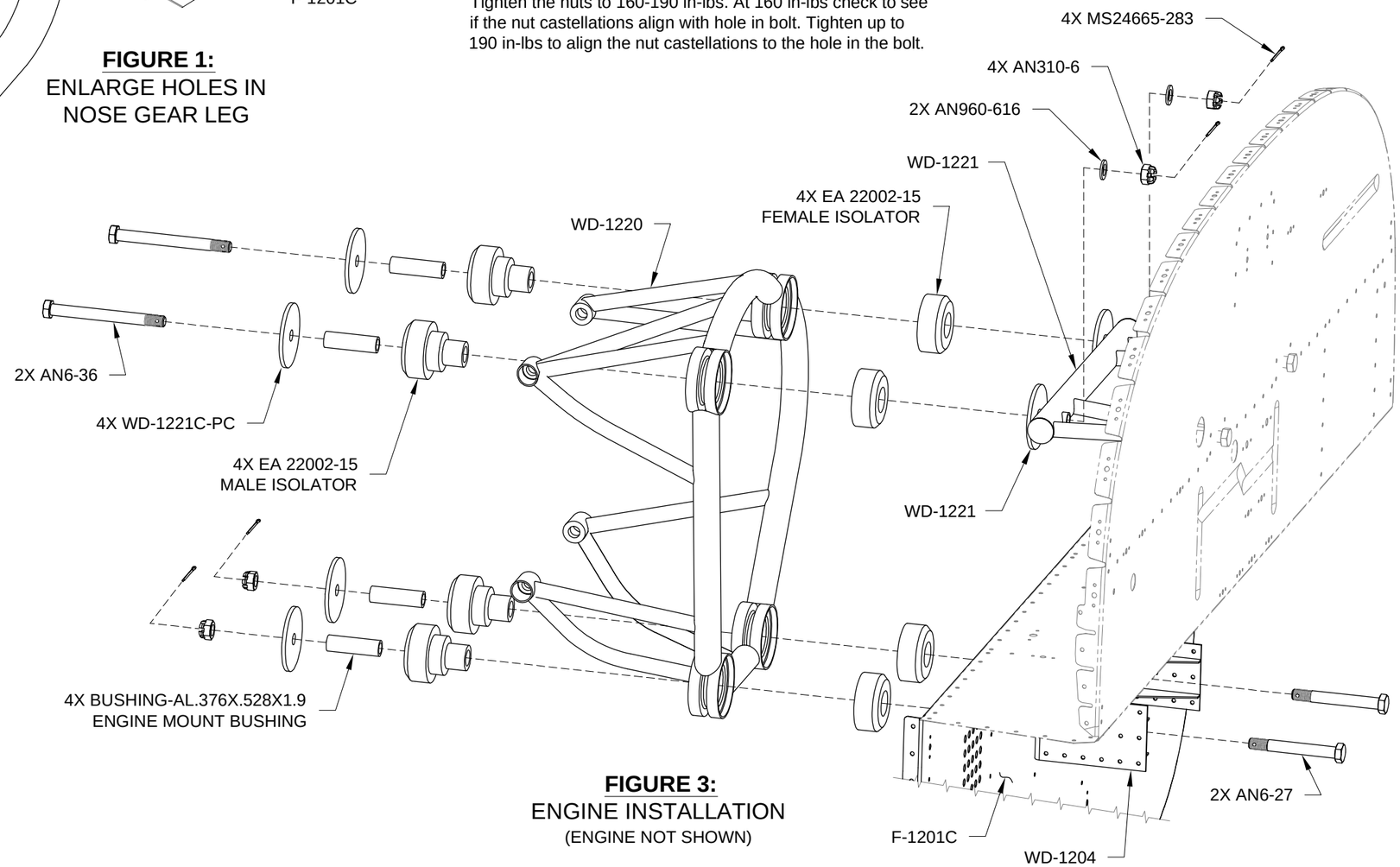


FIGURE 3:
ENGINE INSTALLATION
(ENGINE NOT SHOWN)

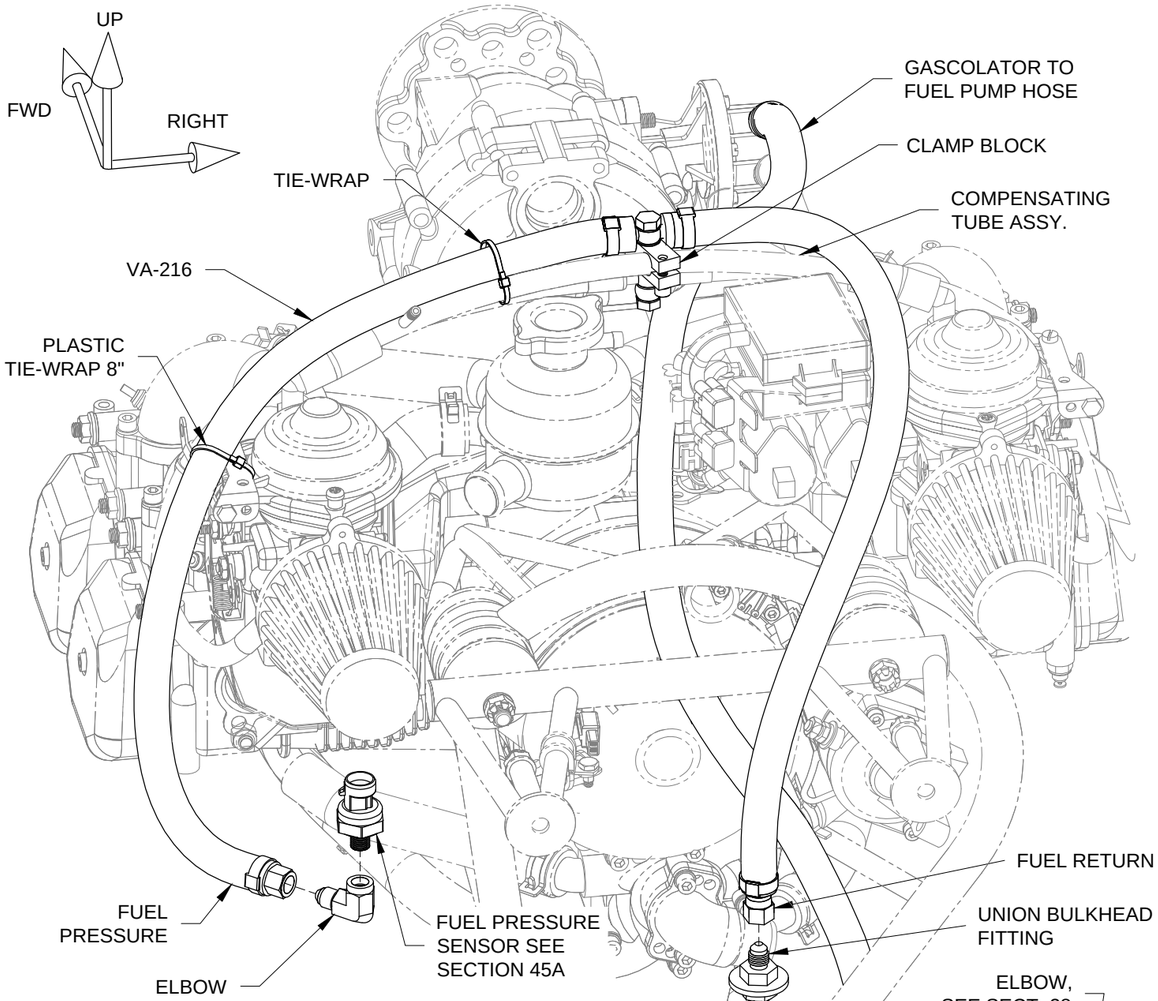


FIGURE 1: FUEL LINE ROUTING

Step 1: Route the attached Gascolator to Fuel Pump Hose beneath the clamp block. See Figure 1. Slip the Gascolator to Fuel Pump Hose beneath the WD-1220 Engine Mount Ring and to the left of the starter. Pass the hose through the triangular shaped support of the engine mount ring. Connect the end of the hose to the elbow on the gascolator.

WARNING: It is possible to install the VA-216 Fuel Return Assy. with the ends reversed which will result in low fuel pressure. DOUBLE CHECK TO VERIFY A PROPER INSTALLATION.

Step 2: Confirm that the VA-216 Fuel Return Assy was properly manufactured. Since there is no way to visually inspect the banjo fitting orientation use the following technique. Blow air into the end of the hose so that it comes out the banjo fitting. It should be more difficult to blow air through the fuel return side (the orifice side of the banjo fitting) than through the fuel pressure side. See Figure 1 Detail.

Position the VA-216 Fuel Return Assy so that the **short fuel return side runs from the clamp block to the union bulkhead fitting.**

NOTE: When loosening or tightening the banjo bolts support the clamp block (fuel manifold) appropriately.

Step 3: Attach the VA-216 Fuel Return Assy. to the clamp block using the Rotax hardware called out in Figure 2. See Figure 3 for completed assembly. Torque banjo bolt to 90 in-lbs.

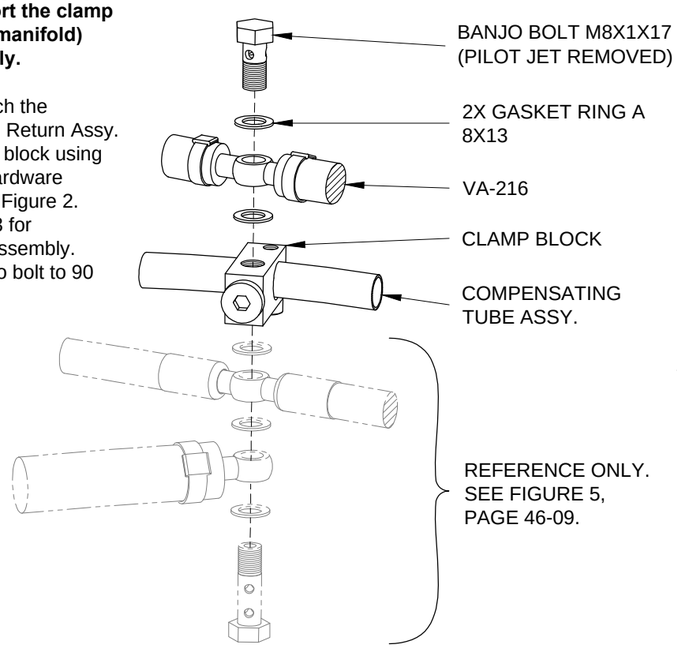


FIGURE 2: ATTACHING FUEL RETURN ASSY.

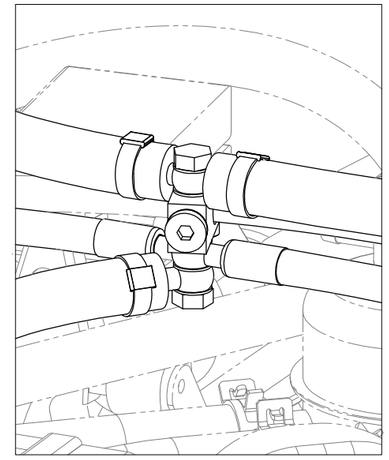


FIGURE 3: AS ASSEMBLED

Step 4: Attach the VA-216 Fuel Return Assy. to the union bulkhead fitting on the F-1201B Firewall Shelf. See Figure 4.

Step 5: Tie-wrap the VA-216 Fuel Return Assy. to the left carburetor and compensating tube as shown in Figure 1.

Step 6: Attach the VA-216 Fuel Return Assy. to the elbow coming from the bottom of the fuel pressure sensor as shown in Figure 4.

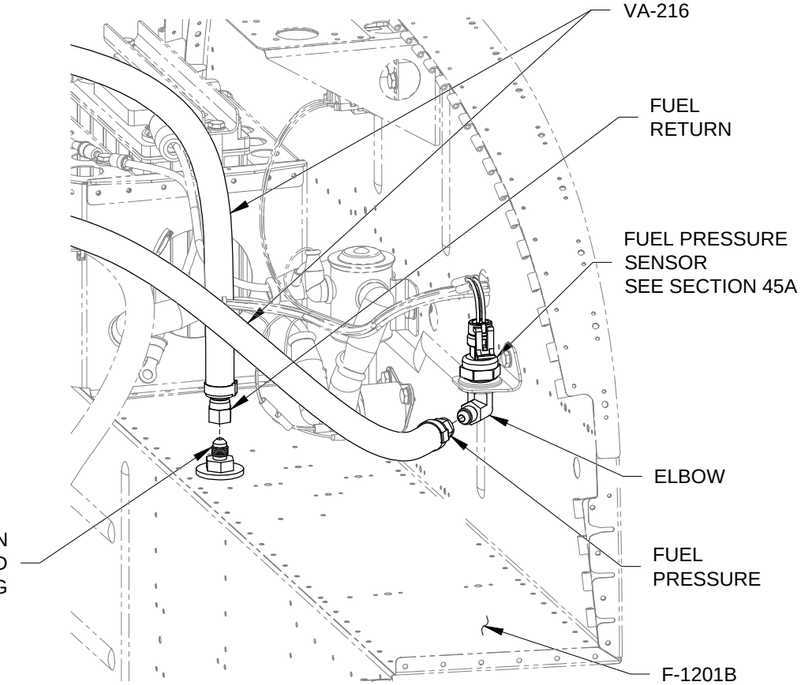


FIGURE 4: CONNECTING FUEL RETURN & FUEL PRESSURE

Step 1: Identify the portion of the WH-RV12-IGNITION Wiring Harness that has the outer insulation removed to expose a length of shielding. The end closest to this will connect to the electrical connectors A1 and B1 at the ignition module. See Figure 1 and View A-A.

NOTE: The A1 and B1 electrical connector plugs should still be disconnected from their opposite halves. This will make it easier to insert the pin connectors.

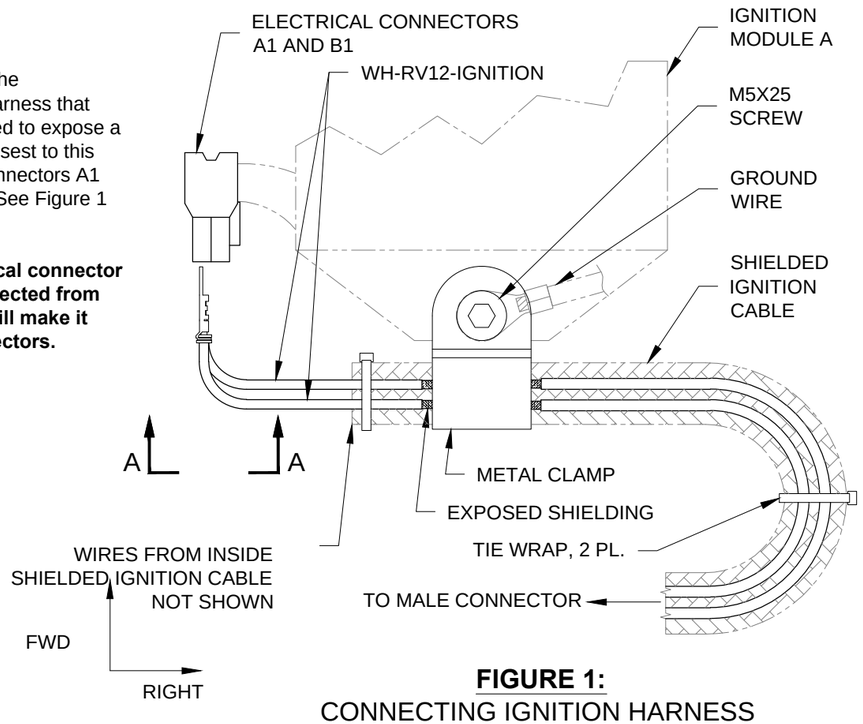


FIGURE 1:
CONNECTING IGNITION HARNESS
(TOP VIEW, NOT TO SCALE.)

NOTE: Wire WH-J152(WHT/BLU) is one inch longer than WH-J153(BLU) if measured from the exposed shield portion of the wires.

Step 2: Insert the WH-J153(BLU) Ignition A Wire into the unused socket of connector A1. See View A-A. Give the wire a gentle tug to check for proper installation.

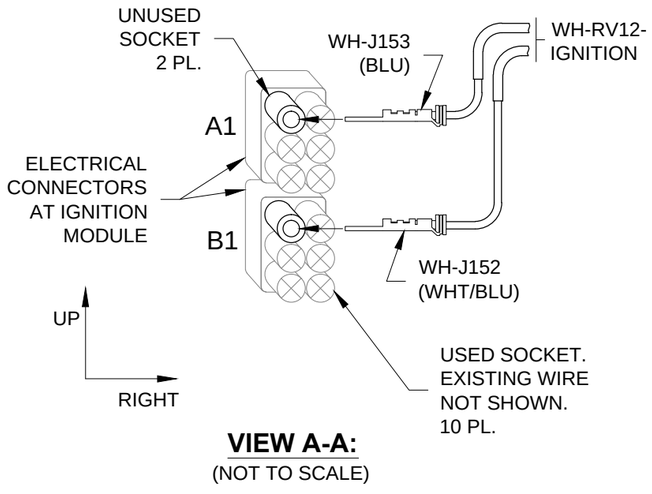
Step 3: Insert the WH-J152(WHT/BLU) Ignition B Wire into the unused socket of connector B1. Give the wire a gentle tug to check for proper installation.

Step 4: Snap together the A1 and B1 sets of 6X ignition electrical connectors and install them back onto the metal ignition module bracket.

Step 5: Remove the M5X25 allen screw retaining the clamp. See Figure 1.

Step 6: Install the exposed shield of WH-J152(WHT/BLU) Ignition B Wire and WH-J153(BLU) Ignition A Wire against the shielding of the ignition cable inside the metal clamp.

Step 7: Make sure there is good contact between all shielding inside the clamp and then reinstall the allen screw with Loctite 221. Torque the screw to 22 in-lbs. Don't forget the ground wire under the screw head.



VIEW A-A:
(NOT TO SCALE)

Step 8: Disconnect the Female Connector from the Male Connector of the WH-RV12-IGNITION Wiring Harness to make it easier to route this end of the harness. See Figure 2.

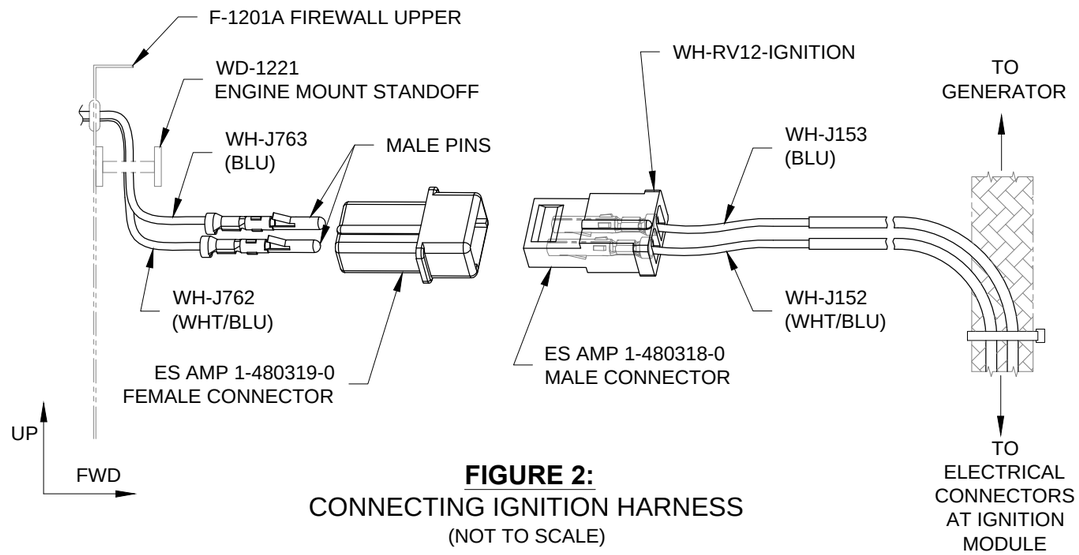


FIGURE 2:
CONNECTING IGNITION HARNESS
(NOT TO SCALE)

Step 9: Route the WH-RV12-IGNITION Ignition Wiring Harness from the A1 and B1 plugs at the ignition modules along the shielded ignition cable to the right, down, and back to the left. See Figure 3 arrows. Tie wrap the wires along the way.

Step 10: To complete the routing leave the shielded ignition cable as it dives downward, turning aft instead to join the main wire bundle going through the cushioned clamp(not shown) attached to the WD-1221 Engine Mount Standoff. See Figure 2.

Step 11: Locate the WH-J762(WHT/BLU) Ignition B Wire and the WH-J763(BLU) Ignition A Wire which are part of the main wire bundle going through the cushioned clamp attached to the WD-1221 Engine Mount Standoff.

Step 12: Insert the male pins into the ES AMP 1-480319-0 Female Connector as depicted in Figure 2. The WH-J763(BLU) Wire must correspond to the WH-J153(BLU) Wire of the WH-RV12-IGNITION Wiring Harness. Give the two wires a gentle tug to check for proper installation.

Step 13: Snap the ES AMP 1-480318-0 Male Connector into the ES AMP 1-480319-0
Female Connector and loosely tie wrap these wires to the main wire bundle for support (another wire will be routed through the same tie-wraps later).

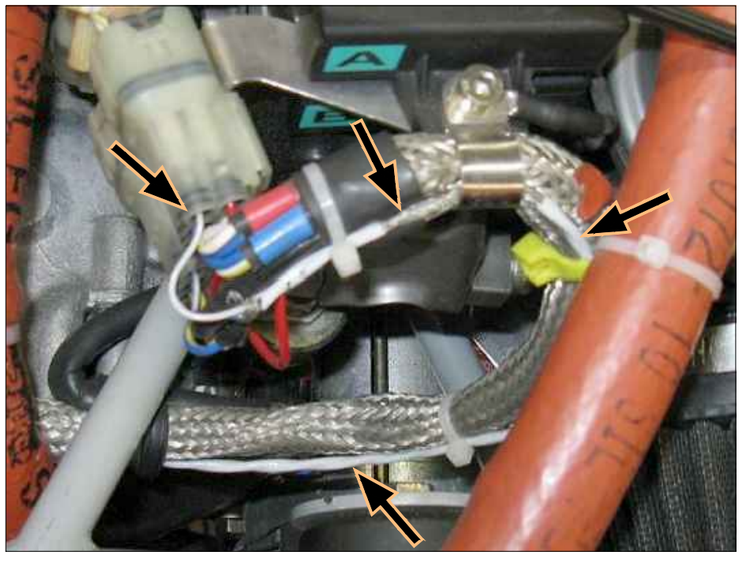


FIGURE 3:
ROUTING IGNITION HARNESS

Step 1: Find the Soft Start (Rotax nomenclature "Easy Start") Black Wire (ROTAX P/N 964090) that Y's together out of the bottom of A2 and B2 Connectors. Reference Figures 1, 2 and 3.

Step 2: Measure 20" from the A2 connector body and cut the 964090 (BLK) Soft Start wire. Strip the wire and crimp a spade terminal to the end, see Figure 3.

Route the wire along the pitot line just to the left of the ignition modules and then aft to follow the WH-K760 (ORN) wire down to the starter relay.

Attach the spade terminal to the piggyback terminal on the WH-K760 (ORN) wire as shown in Figure 4.

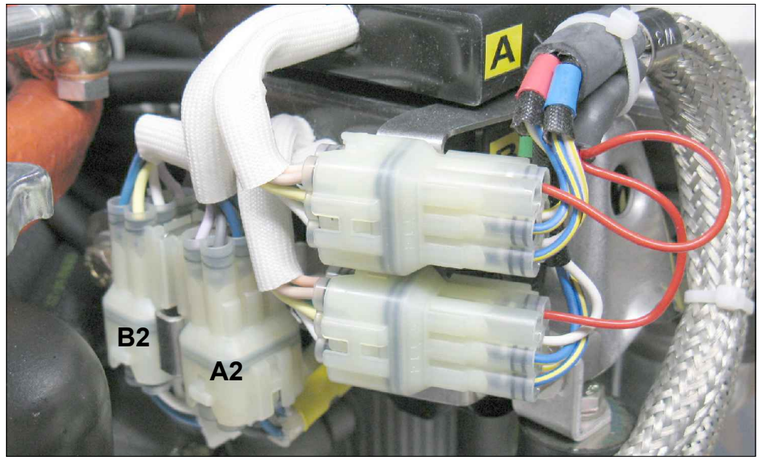


FIGURE 1: IGNITION MODULE CONNECTORS

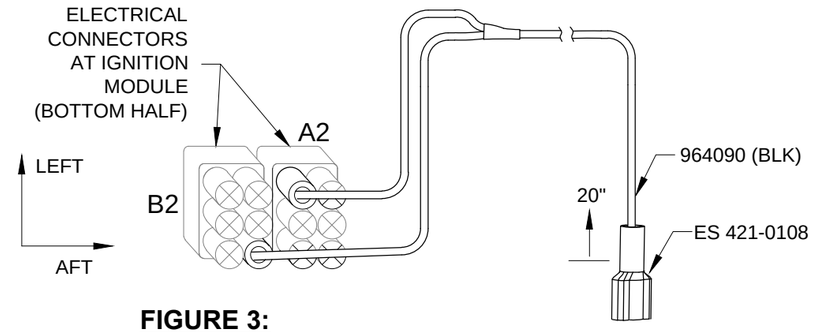


FIGURE 3:
(NOT TO SCALE VIEW
LOOKING FROM BOTTOM OF CONNECTOR)

FIGURE 2: EASY START WIRES IN IGNITION MODULE

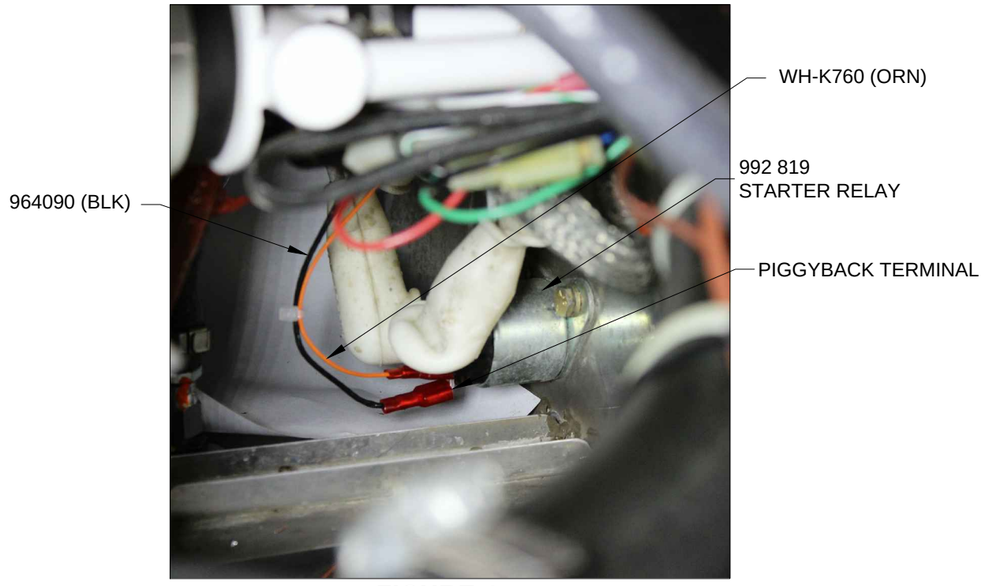


FIGURE 4:
STARTER RELAY CONNECTIONS

Step 1: Find the WH-E764 (WHT/YEL) Oil Pressure Wire and the WH-P765 (RED) Oil Pressure Power Wire and separate them from the wire bundle penetrating the firewall. Strip the ends of these two wires and crimp on the called out spade terminals. See Figure 1.

NOTE: Reverse spade connector polarity to eliminate the potential for accidental misconnection as shown in Figure 1.

Do not tighten down the coolant hose tie wraps until the EGT and CHT wires are installed. See this page and Section 48.

Step 2: Connect the WH-00096 Oil Pressure Sensor Harness to the 456180 Oil Pressure Sensor as shown in Figure 2. Route the harness aft under the right side of the engine as shown in Figure 2. Tie wrap it to the valve pushrod assembly, coolant hose, and Gascolator To Fuel Pump Hose as shown in Figure 3.

Step 3: Connect the spade terminals on the WH-00096 Oil Pressure Sensor Harness to the spade terminals on the WH-E764 (WHT/YEL) and WH-P765 (RED) wires as shown in Figure 2.

Step 4: Check that the Rotax 456180 Oil Pressure Sensor is selected in your EFIS systems setup. Refer to the instructions supplied with your EFIS system.

Step 5: Connect the two sets of spade terminals together as shown in Figure 1.

Step 6: Find the WH-E753 (PRP/YEL) CHT 1 (LEFT) Wire and route it forward along the Gascolator to Fuel Pump Hose and Left Forward Water Tube as shown in Figure 1. Cut the wire to length, strip the end, crimp on the called out connector and attach it to the terminal post as shown in Figure 1.

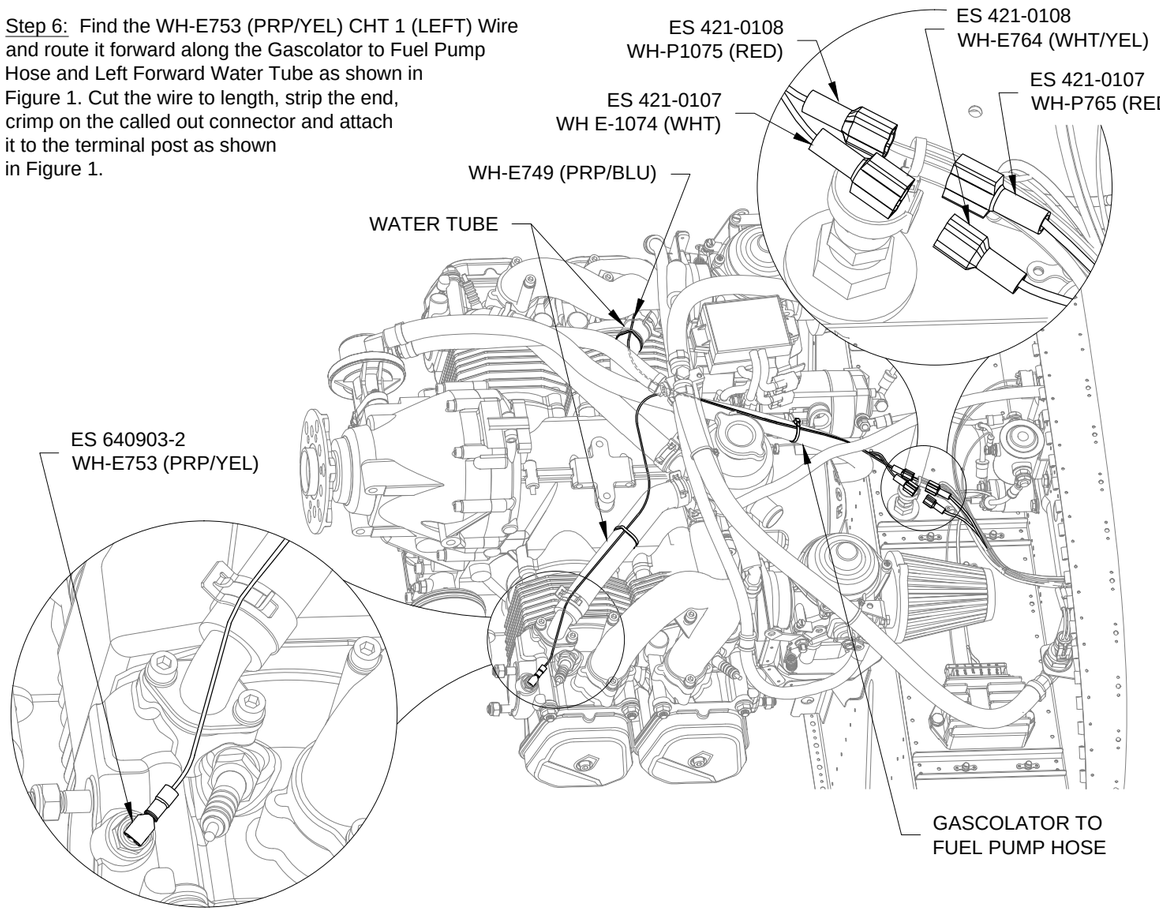


FIGURE 1: OIL PRESSURE CONNECTIONS & CHT WIRE ROUTING

Step 7: Find the WH-E749 (PRP/BLU) CHT 2 (RIGHT) Wire and route it forward along the Gascolator to Fuel Pump Hose and Right Rear Water Tube as shown in Figure 1 and Figure 2. Cut the wire to length, strip the end, crimp on the called out connector and attach it to the terminal post as shown in Figure 2.

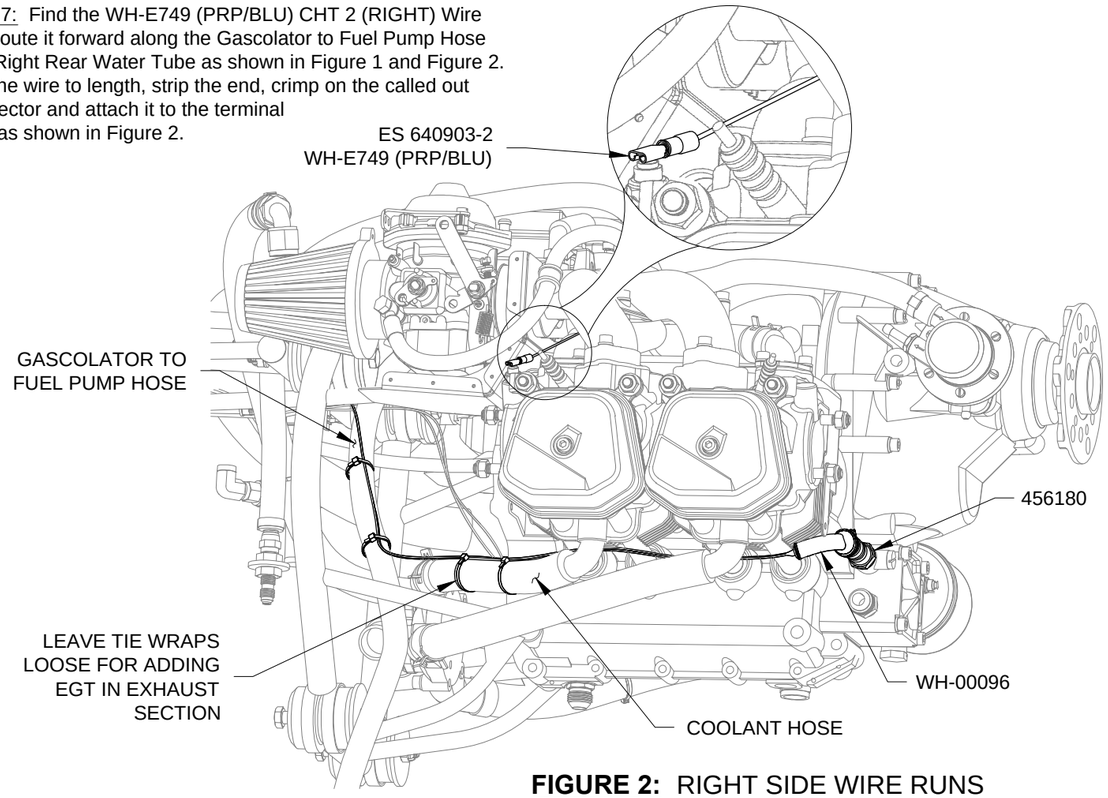


FIGURE 2: RIGHT SIDE WIRE RUNS

Step 8: Find the WH-E754 (WHT/BRN) Oil Temperature Wire, separate it from the bundle and route it forward under the left side, and secure the wire with tie wraps as shown in Figure 3. Cut the wire to length, strip the end, crimp on the called out connector and attach it to the terminal post near the base of the oil filter as shown.

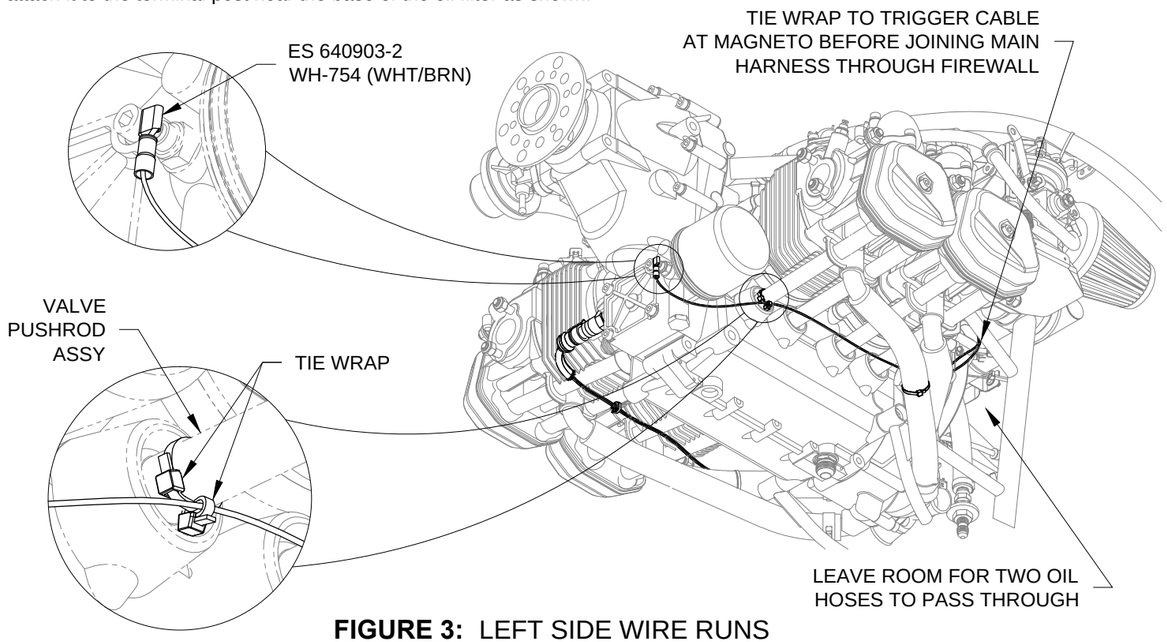


FIGURE 3: LEFT SIDE WIRE RUNS

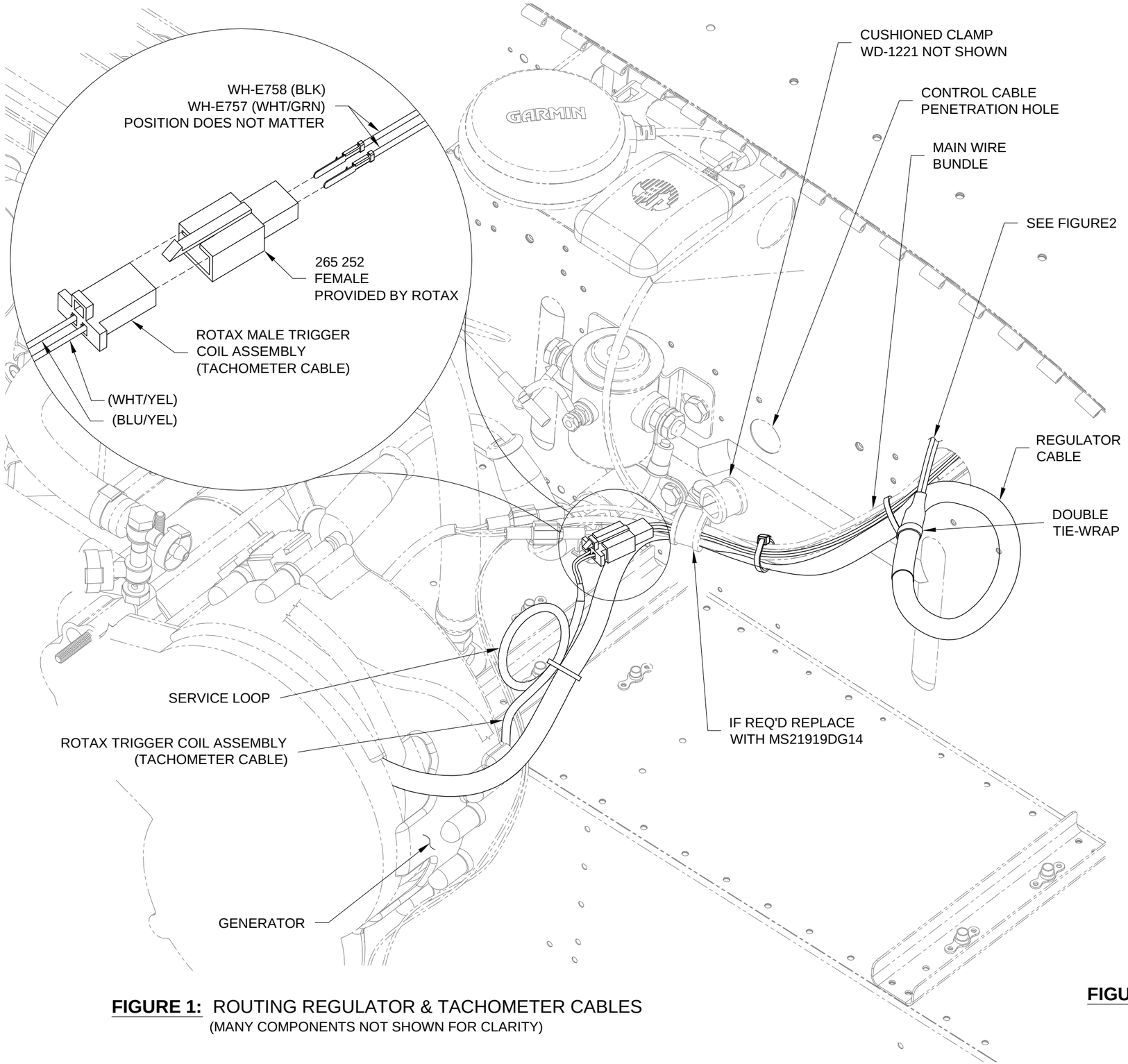


FIGURE 1: ROUTING REGULATOR & TACHOMETER CABLES
(MANY COMPONENTS NOT SHOWN FOR CLARITY)

Step 1: Locate the Generator to Rectifier Regulator Cable (hereafter referred to as the regulator cable) which is a shielded two conductor cable of 0.4 in. diameter and is approximately 26 in. long. The regulator cable exits the upper left side of the generator and has two spade connectors attached to yellow wires at the opposite end. See Figure 1.

Step 2: Route the regulator cable through the Cushioned Clamp. See Figures 1 and 2.

Step 3: Loosely tie wrap the regulator cable to the main wire bundle at suitable points between the firewall and the cushioned clamp attached to the WD-1221 Engine Mount Standoff. Regulator cable minimum bend radius is 3/4 in. Fully tighten the tie wraps after the cable is connected to the regulator later in this section.

Step 4: Insert the WH-E758 (BLK) and WH-E757 (WHT/GRN) wires coming from the WH-00063-1 Rotax Fwl Fwd Wiring Harness into the back of the ROTAX 265 252 female two pole connector housing as shown in Figure 1 detail view. Their position in the connector does not matter.

Step 5: Locate the Male Trigger Coil Assembly connector on the engine. Determine the length necessary to reach the ROTAX 265 252 female two pole connector housing then make a service loop from the excess cable and tie wrap it to the regulator cable. Connect the male and female connectors.

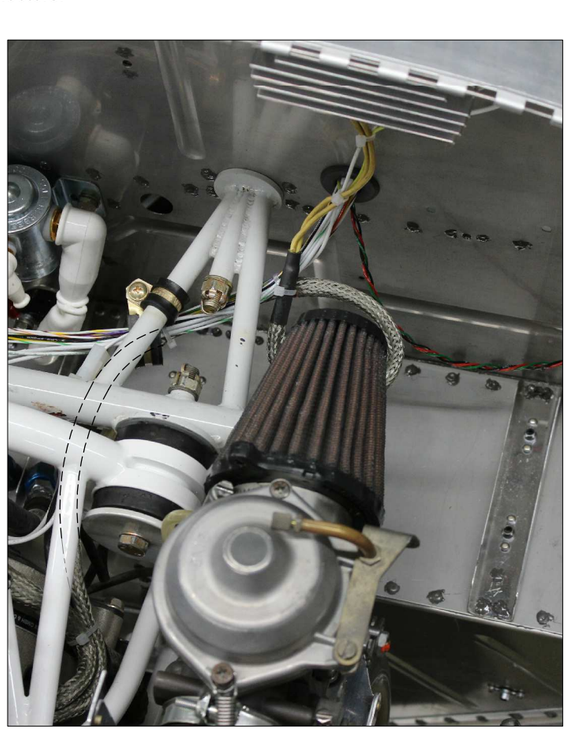


FIGURE 2: ROUTING REGULATOR & TACHOMETER CABLES
(MANY COMPONENTS NOT SHOWN FOR CLARITY)

NOTE: A proper ground connection between the airframe and the engine is essential to proper function of sensors mounted to the engine.

Step 1: Slide an insulated boot over the end of the WH-P155 (WHT) Starter Power Cable then attach the ring terminal to the power stud on the starter using the hardware called out in Figure 1. Torque the 6mm hex nut to 35 in-lbs. Slide the insulated boot into place. See Figure 1.

Step 2: Use the hardware shown in Figure 1 to connect the WH-P151 (WHT) Engine Ground Cable to the remaining lug on the starter.

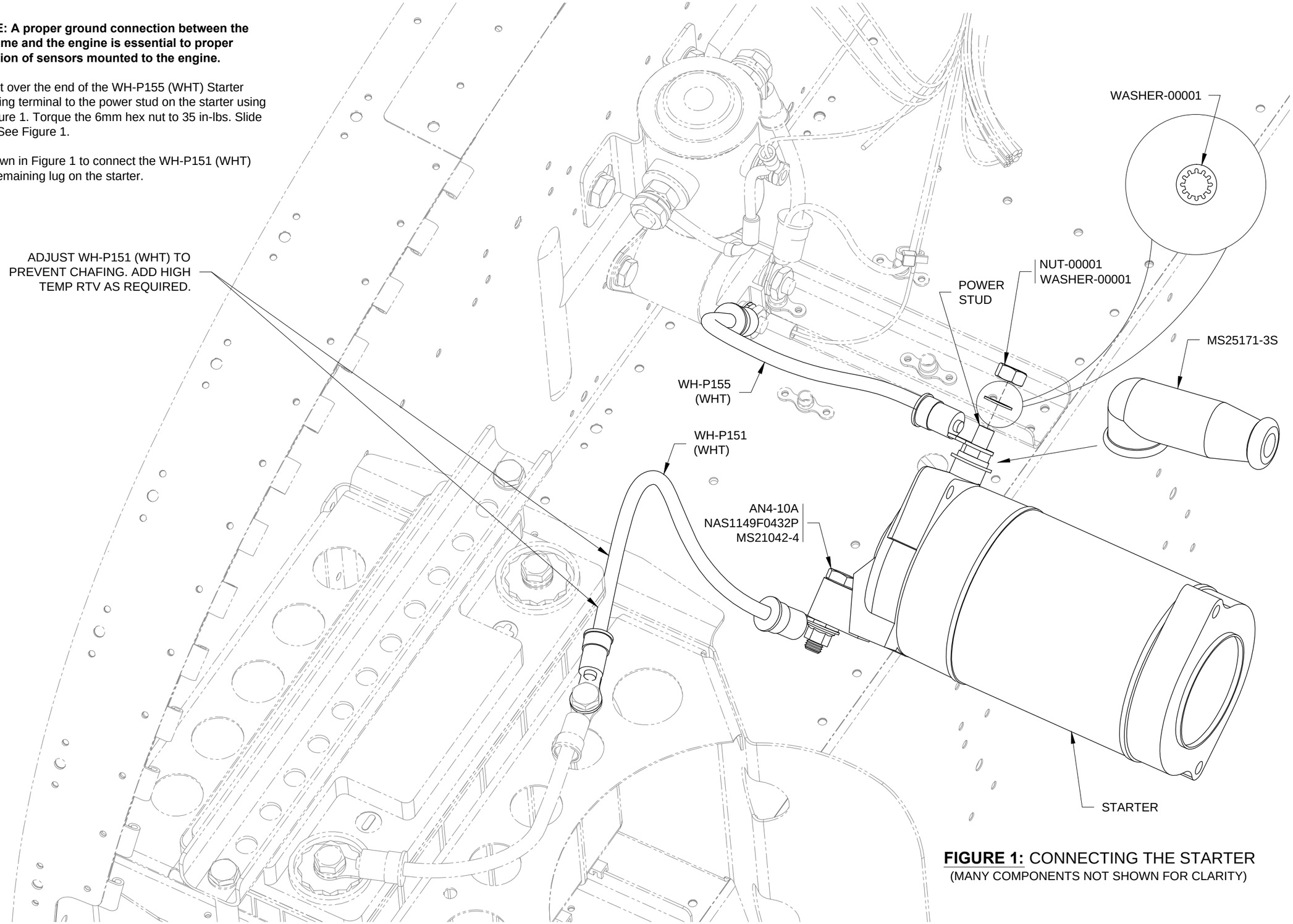


FIGURE 1: CONNECTING THE STARTER
(MANY COMPONENTS NOT SHOWN FOR CLARITY)

Step 1: Fabricate FF-1222 Manifold Pressure Hose from EA HOSE H173 rubber hose per Figure 1 dimensions.

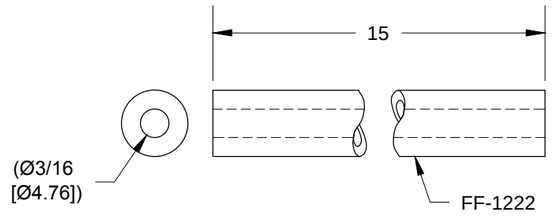


FIGURE 1: CUT MANIFOLD PRESSURE HOSE

Step 2: Remove the small plug from the nipple on compensating tube assembly. See Figure 2.

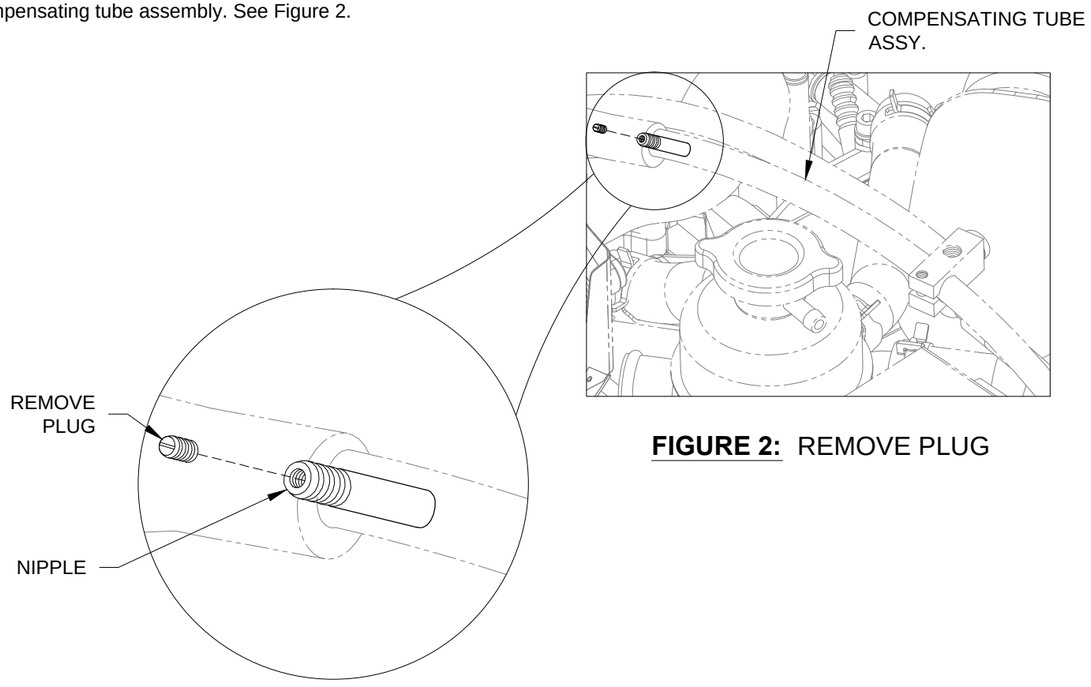


FIGURE 2: REMOVE PLUG

Step 3: Attach one end of the FF-1222 Manifold Pressure Hose to the nipple on the compensating tube assembly. Attach the opposite end to the nipple on the Manifold Pressure Sensor. Hose clamps are not required. See Figure 3.

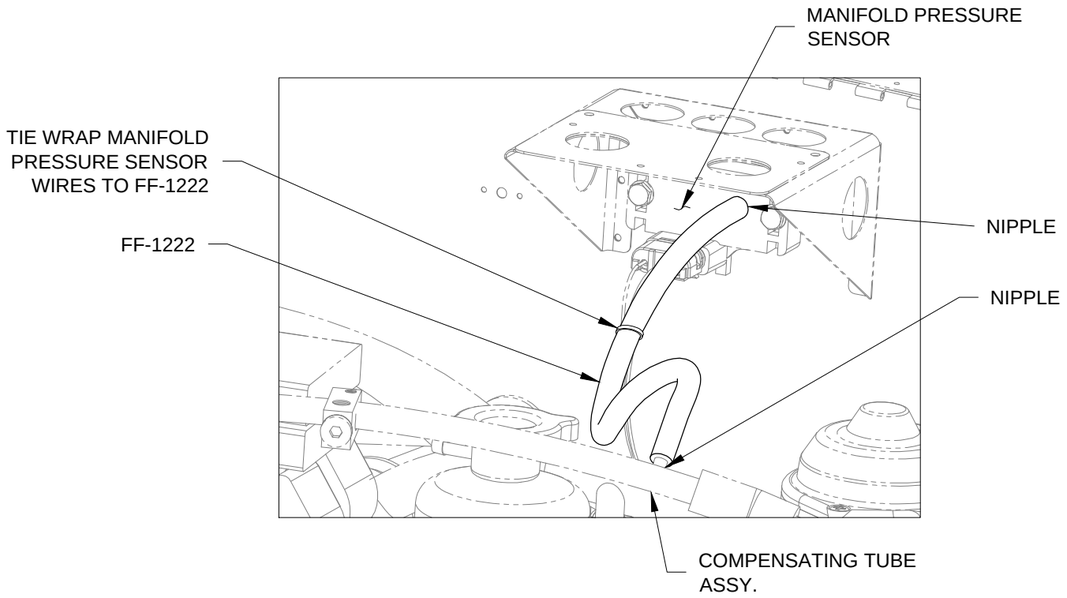


FIGURE 3: ATTACHING MANIFOLD PRESSURE HOSE

NOTE: For retrofit installation removal of the exhaust system is recommended.

Step 1: Cut FF-01224 Interconnect Hose and FF-01225 Drain Hose from EA HOSE H175 per Figure 1 dimensions.

Step 2: Slip FF-01224 Interconnect Hose over fuel pump drain fitting and secure using hose clamp called out in Figure 2.

Step 3: Place cushioned clamps onto engine oil return tubes as shown in Figure 2. Close clamps using safety wire (not shown) to aid installation.

Step 4: Install but delay attachment of FF-01225 Drain Hose. Starting from beneath aft cylinder route hose between two coolant hoses (lower coolant hose not shown) then downward and parallel to Gascolator to Fuel Pump Hose as shown in Figure 2.

Step 5: Straighten out 18 in. length of ATO-032X1/4 Tube. (Unrolling against a flat surface works well.)

Fabricate FF-01223 Drain Tube by cutting to Figure 3 dimensions.

Flare drain tube per Figure 3 dimensions.

Radius flared ends of tube per Figure 3.

Check tube to hose fit. Reduce flare diameter if/as required to allow insertion of tube but keep enough flare to prevent tube from slipping through hose clamp.

Bend drain tube per Page 46-19, Figure 1 template.

Step 6: Insert FF-01223 Drain Tube into FF-01225 Drain Hose.

Slide two hose clamps over end of drain tube.

Insert drain tube into FF-01224 Drain Interconnect.

Position and tighten hose clamps per Figure 2.

Step 7: Attach FF-01223 Drain Tube to large cushioned clamps on engine oil return tubes using small cushioned clamps and hardware called out in Figure 2.

Step 8: Attach FF-01225 Drain Hose to the Gascolator to Fuel Pump Hose using tie wraps per Figure 2.

Step 9: Trim FF-01225 Drain Hose at its lower end per Figure 2 dimension if/as required.

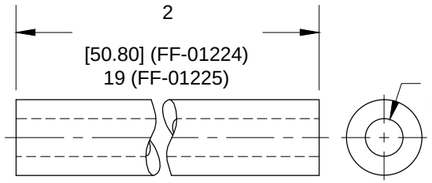


FIGURE 1: HOSE LENGTHS

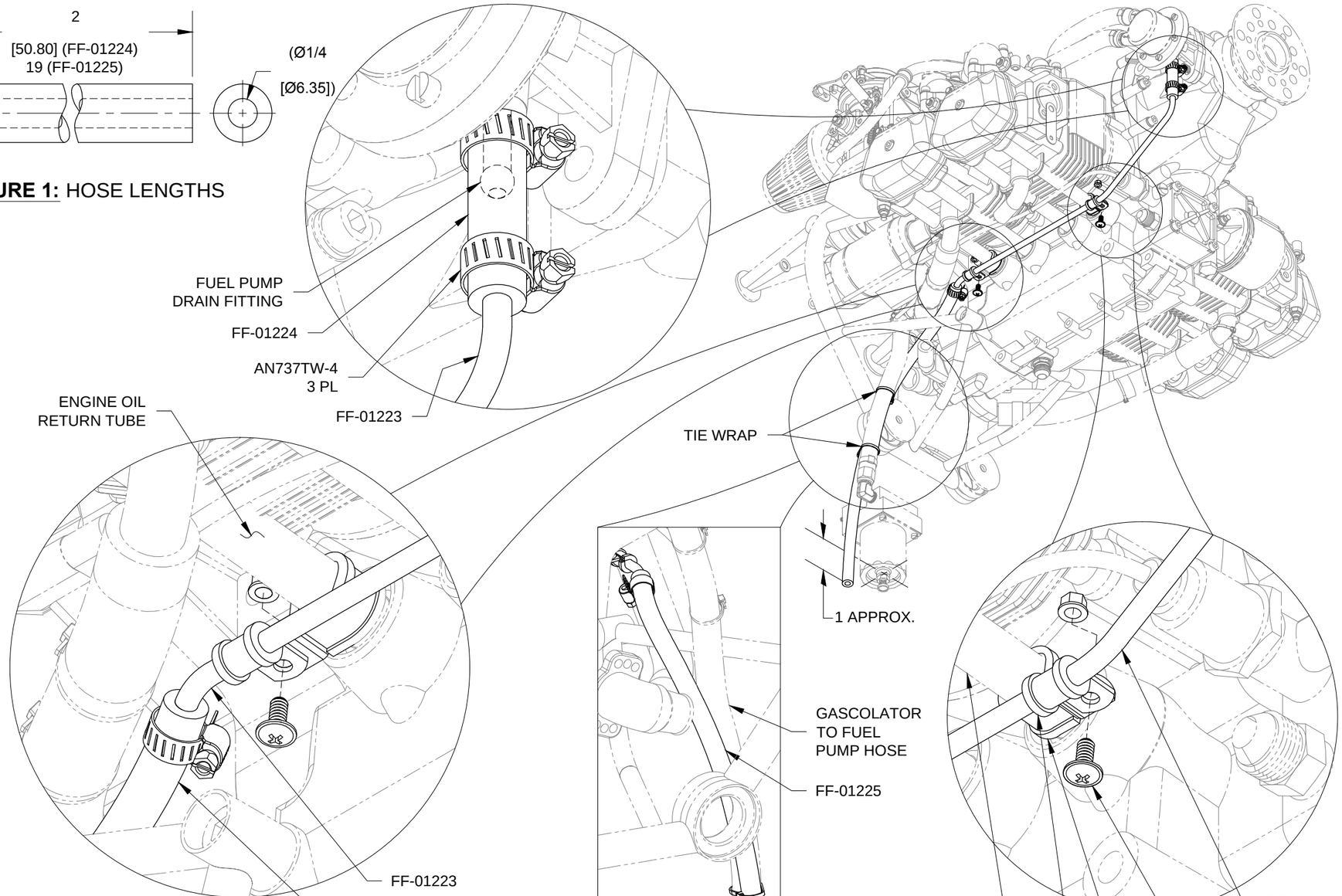


FIGURE 2: FUEL DRAIN ATTACHMENT
SOME PARTS OMITTED FOR CLARITY

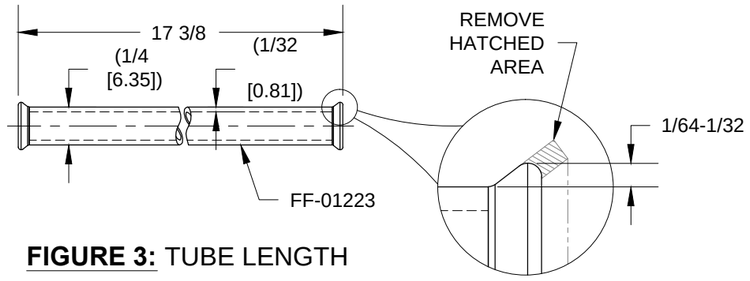
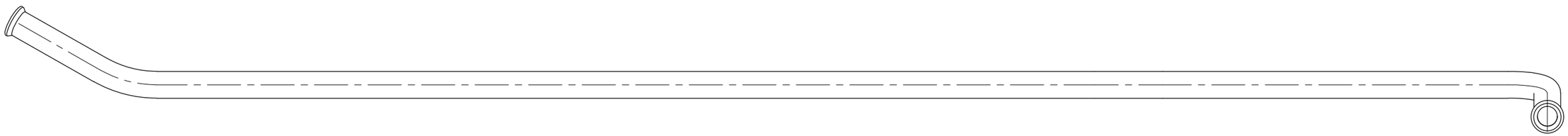


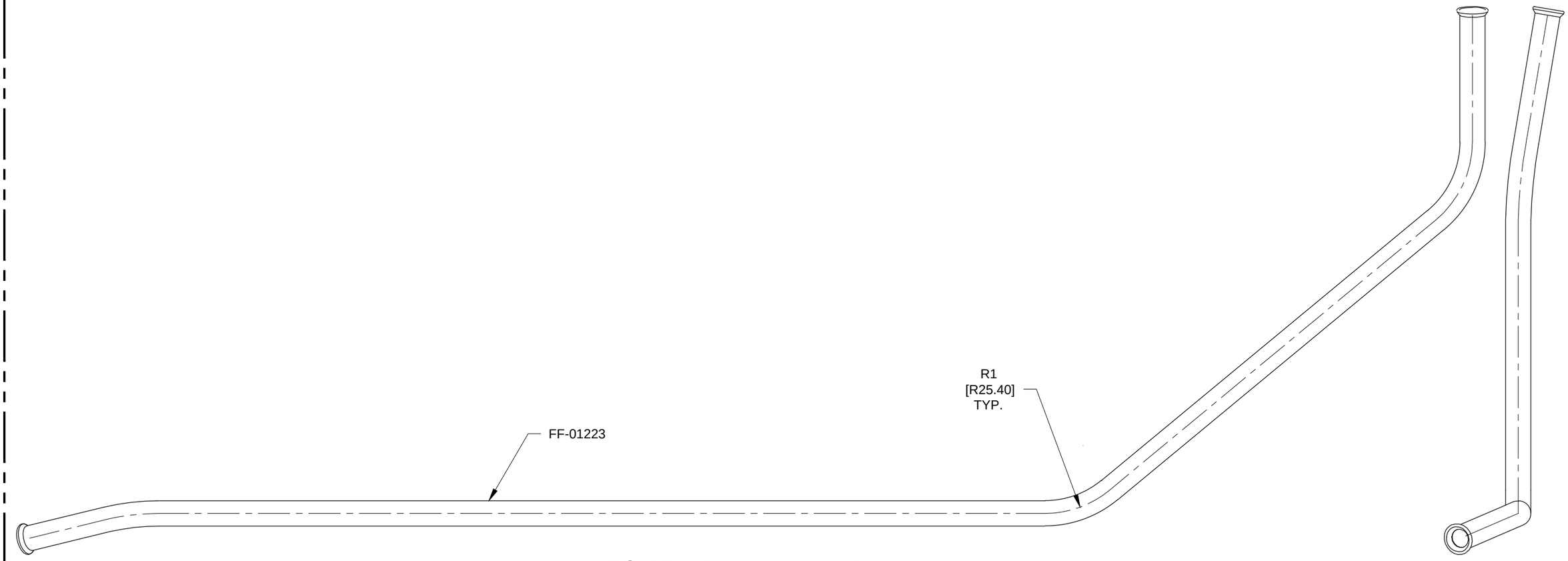
FIGURE 3: TUBE LENGTH



TOP VIEW

10 9/16
[268.29]

A



A

VIEW A-A

FIGURE 1: DRAIN TUBE BEND TEMPLATE
(FULL SCALE)

16
[406.40]

NOTE: CHECK PRINTED SCALE 1:1 PER SECTION 3 BEFORE USING THE TEMPLATE!

NOTE: The instructions on this page apply to engines received with the banjo style hose nipple shown in Figure 1. If the straight Adaptor/Fluid Fitting is already installed, disregard the instructions on this page.

An inventory sheet is provided with the engine that will include the fluid fittings required for this modification.

Step 1: Remove the Banjo Bolt M16X1.5X28 940 879, Hose Nipple 16 956 050 (banjo fitting) and Gasket 430 622 washers from the bottom aft of the engine as shown in Figure 1. In this application one of the removed gaskets/washers may be reused for the straight fitting.

NOTE: Use loctite on the threads of the fitting per manufacturer's instructions. Loctite 243 works best for this application (Loctite 242 will work if Loctite 243 is unavailable).

Dry torque values are for non-oily threads. Dry Torque values are preferred if oil can be removed from case threads.

If there is residual oil (threads are shiny in appearance) reduce torque value down ("wet torque") to 15 ft lbs, or 180 inch lbs [20NM] from 19 ft lbs [25NM].

Step 2: Apply loctite and install the Adaptor 956 651 straight fluid fitting with Gasket 430 622 as shown in Figure 1.

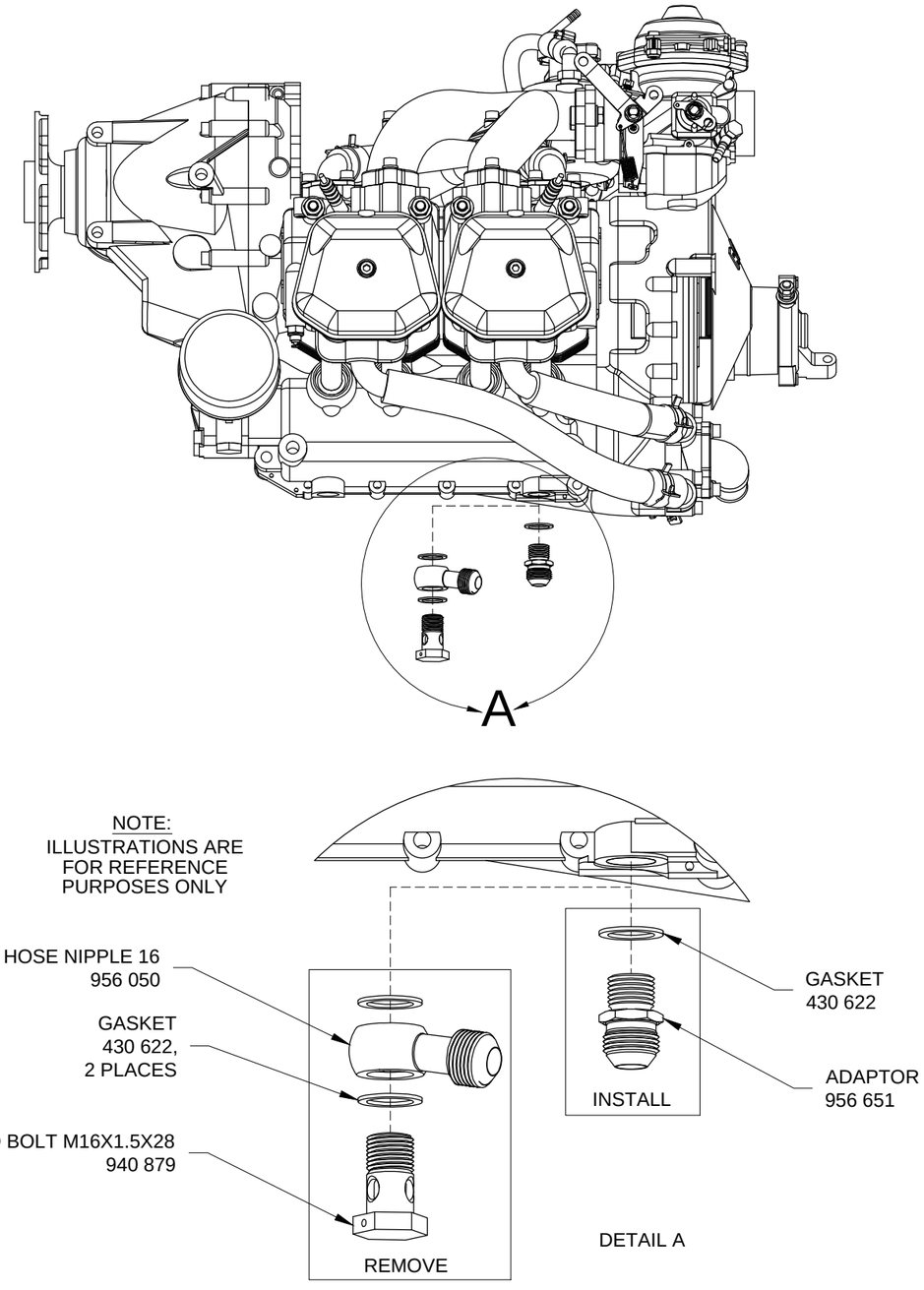


FIGURE 1: FLUID FITTING REPLACEMENT

NOTE: Cover all bare spade connectors in heat shrink.

NOTE: Configure the the EA-XB100-1 to match the requirements for your installation. Refer to the documentation provided with the regulator. For Skyview/G3X systems, the LV Warning function should be "OFF".

Step 1: Machine Countersink the FF-00123 Regulator Adapter Plate for the head of the screw shown in Figure 1.

Step 2: Attach the EA-XB100-1 Voltage Regulator to the FF-00123 using the hardware shown in Figure 1. Temporarily insert the inboard screw shown in Figure 2 to maintain alignment when tightening.

Step 3: Remove the transponder from its tray and remove the existing screws indicated in Figure 2 for replacement with new hardware. Refer to KAI 42C-02, 42C-04 for Skyview and 42N-15 for Garmin installations.

Step 4: Fabricate the WH-P3068 wire including end terminals as shown in Figure 4.

Step 5: Install the EA-XB100-1 on the Firewall using the hardware shown in Figure 2. Capture the ground wire shown in Figure 3. Reinstall the transponder.

Step 6: Attach the wires shown in Figures 3 and 4 to the regulator.

Step 7: Feed the WH-P3070 Warning Wire through the Wiring Grommet shown in Figure 2 and insert the D-sub pin into the 37pin connector at the location shown in Figure 5 (Skyview) or 6 (Garmin). For Garmin also install the WH-P6313 Regulator Warning Pullup Harness.

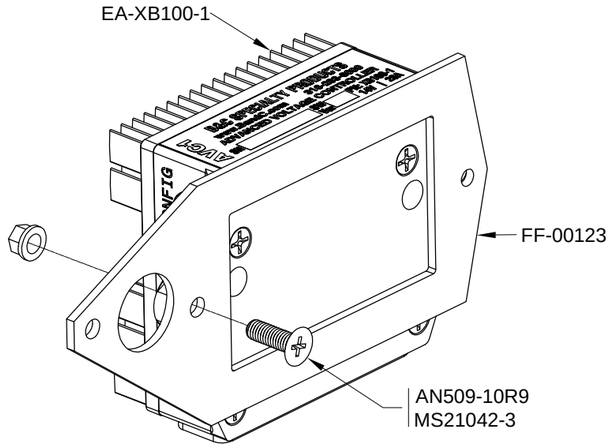


FIGURE 1: REGULATOR AND ADAPTER PLATE

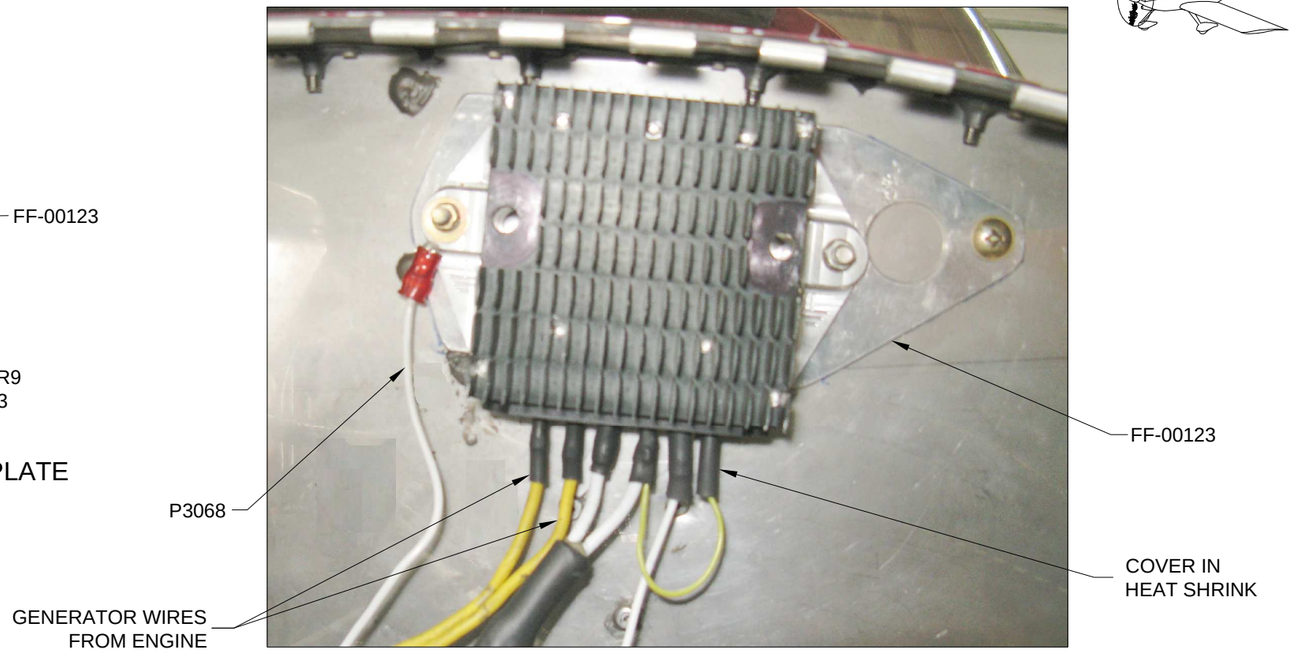


FIGURE 3: REGULATOR WIRING

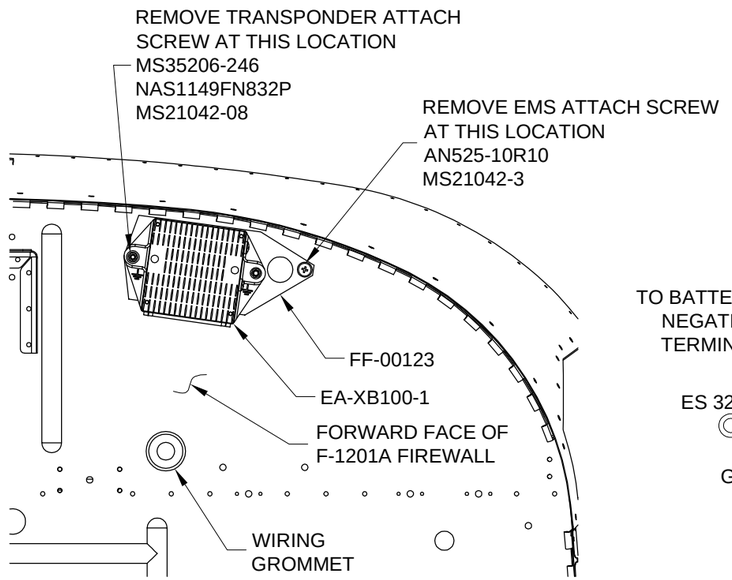


FIGURE 2: REGULATOR ATTACHMENT

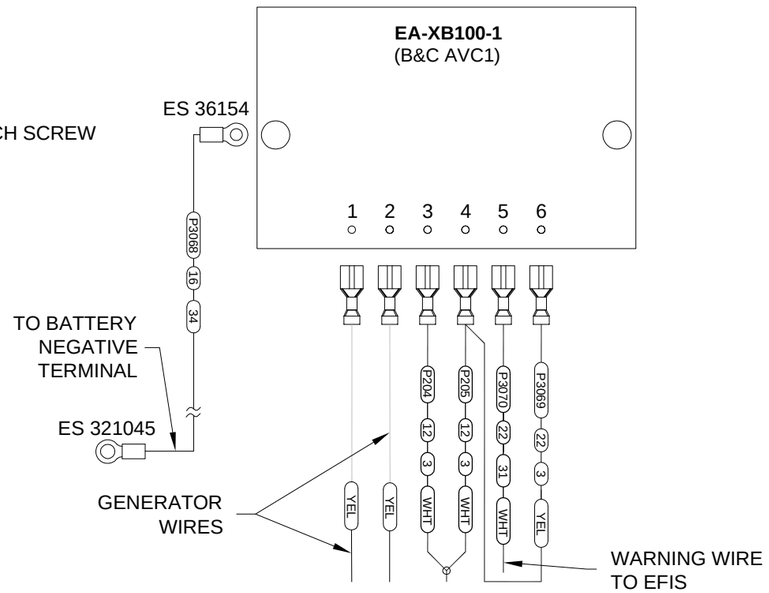


FIGURE 4: REGULATOR WIRING
(P204, P205 AND P3069 SHOWN FOR REFERENCE ONLY)

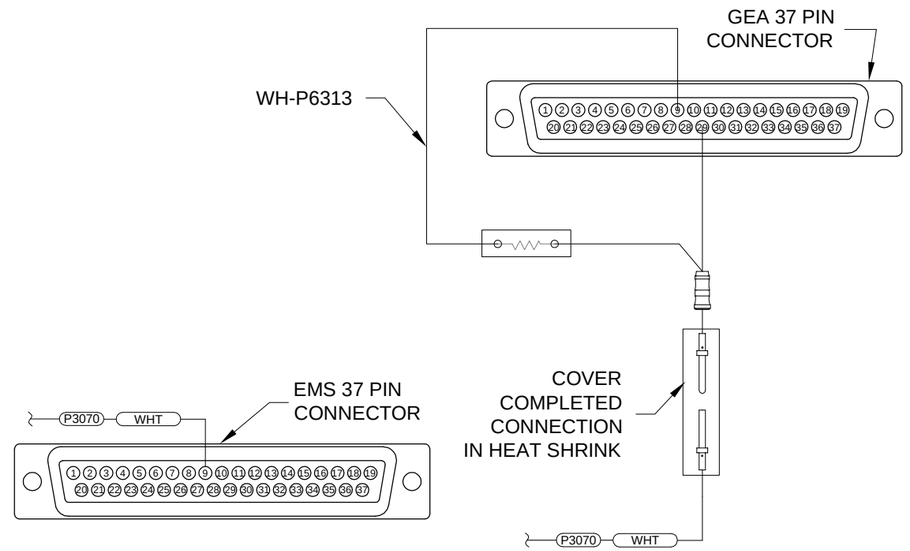


FIGURE 5: INSTALLING SKYVIEW REGULATOR WARNING WIRE
(VIEW FROM WIRE INSERTION SIDE, OTHER WIRES NOT SHOWN)

FIGURE 6: INSTALLING G3X REGULATOR WARNING WIRE
(VIEW FROM WIRE INSERTION SIDE, OTHER WIRES NOT SHOWN)

Step 1: Insert the firewall grommet into the F-1201A Firewall Upper as shown in Figure 1.

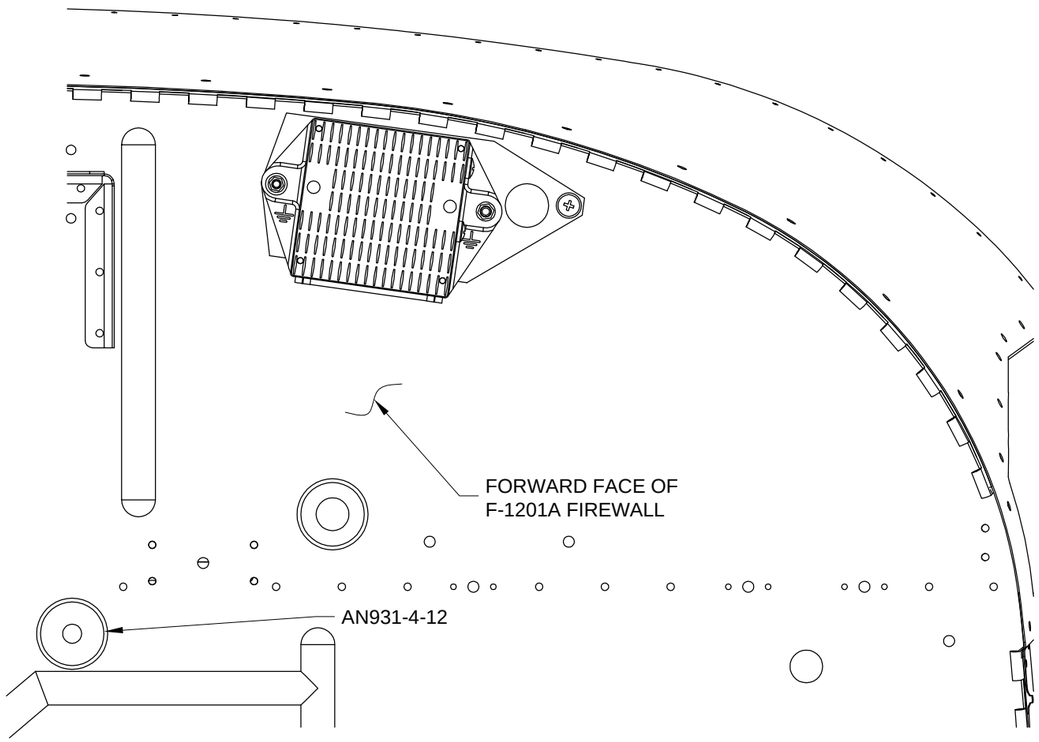


FIGURE 1: GROMMET INSTALLATION

Step 2: Use the provided template drawing to cut a NACA opening on the upper left face of the cowling. See Page 46-21. Remove cowl from aircraft before cutting.

Step 3: Trim the COWL-00011 NACA Scoop to the scribe lines. Position the Scoop for best fit around the NACA opening and aim toward the installed position of the Regulator.

Step 4: Mark the inside surface of the upper cowl around the perimeter of the Scoop when the best position is achieved.

Step 5: Bond the COWL-00011 to the upper cowling using an epoxy flox mixture. A few #40 holes and wax coated clecos work well to hold position and clamp force until the epoxy is cured enough to be “rubbery”. See Figure 2.

Set aside in a warm area to cure. The cowl should remain as close to installed contour as possible during the cure.

Step 6: Fill the edges of the COWL-00011 to cowl interface to make a nearly sharp corner along the sides as indicated in Figure 2. Fill and sand to provide a smooth transition from the cowl surface to the duct. Finish and paint as desired.

Step 7: Install the cowling and check for interference between the aft portion of COWL-00011 and the throttle and choke cables going to the left hand carburetor. Trim the COWL-00011 lower inboard edge to remove interference with the cables.

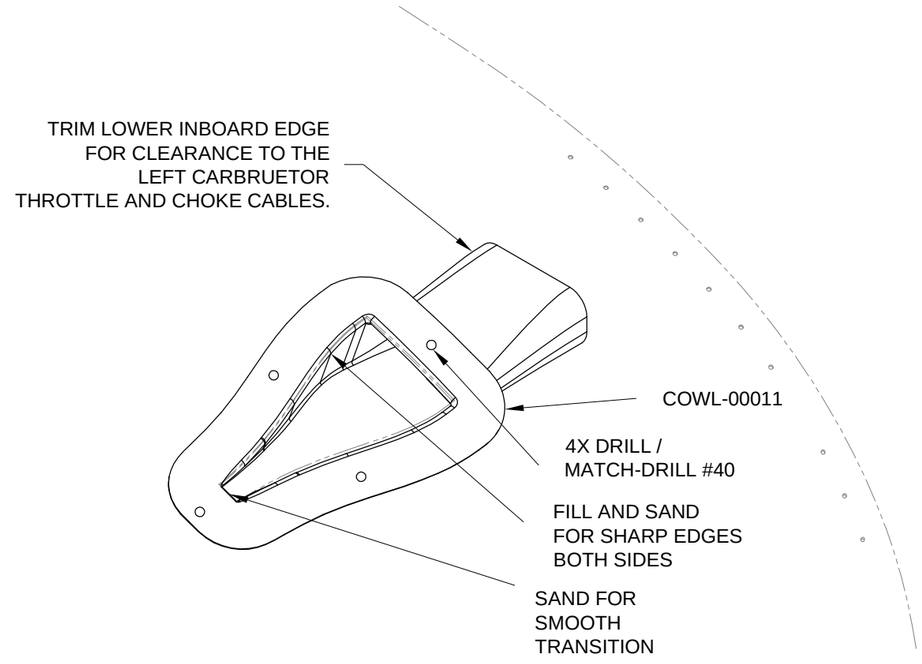


FIGURE 2: DUCT INSTALLATION

14
[355.60],
CUT PAPER
EDGE TO EDGE

8 1/2
[215.90]
CUT PAPER
EDGE TO EDGE

STEP 1:
VERIFY NACA CUTOUT MEASUREMENTS
AND CUT OUT NACA DUCT TEMPLATE.

STEP 2: ALIGN THIS EDGE OF THE PAPER WITH THE
FORWARD EDGE OF THE F-1240 UPPER FORWARD
FUSELAGE SKIN.

Ø1/8
[Ø3.18],
4 PLACES

2 1/2
[63.88]

7/16
[10.95]

5 7/16
TO EDGE OF PAPER
[138.11]

2 11/16
TO EDGE OF PAPER
[68.28]

5 7/32
[132.53]

STEP 3: USING A STRAIGHT EDGE, ALIGN THE
BOTTOM EDGE OF THE PAPER WITH THE CENTER
OF THE 7TH SCREW FROM THE BOTTOM EDGE OF
THE F-1240 UPPER FORWARD FUSELAGE SKIN.

STEP 4:TAPE EDGES OF PAPER TO COWL
USING A SHARPIE ULTRA FINE POINT (OR EQUIVALENT)
TRACE NACA DUCT CUTOUT ONTO TOP COWL.

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 lug on the crankcase 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.

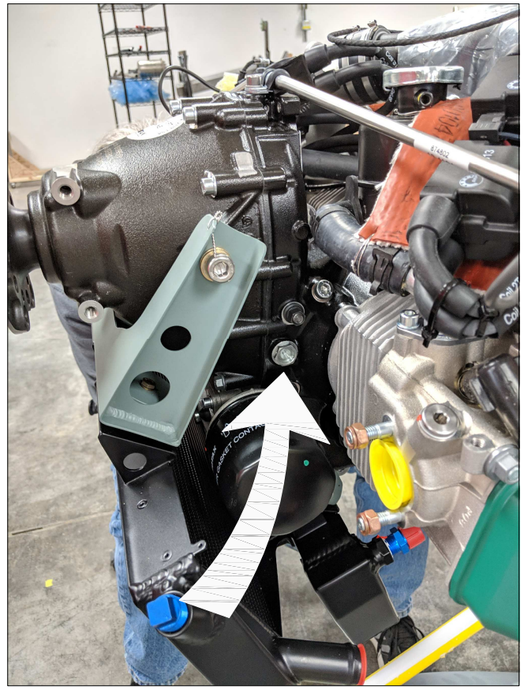


FIGURE 1: MAGNETIC PLUG LOCATION
(912iS SHOWN, SIMILAR FOR 912ULS)

FIGURE 2: SAFETY WIRE MAGNETIC PLUG
(912iS SHOWN, SIMILAR FOR 912ULS)

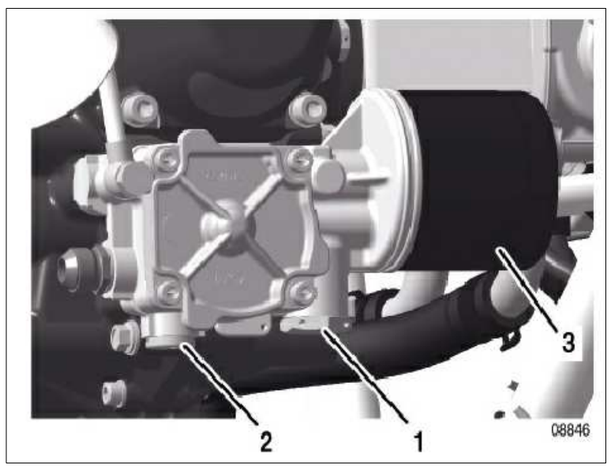


FIGURE 3: OIL PRESSURE REGULATOR PLUG LOCATION
(912iS SHOWN, SIMILAR FOR 912ULS)

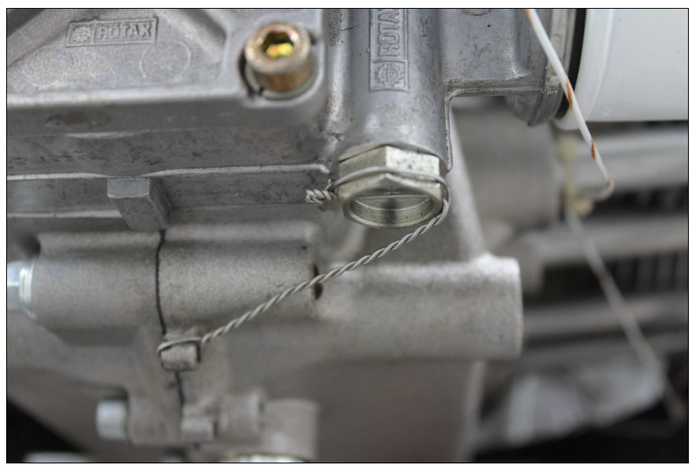


FIGURE 4: SAFETY WIRE OIL PRESSURE REGULATOR PLUG

FIGURE 5: SAFETY WIRE OIL TANK DRAIN PLUG