

REASON FOR REVISION:

1) O-320/360 Exhaust System installation instructions revised to include greater clarity, as well as information covering filtered air box options and scat tube routing.

OP54-1 REV 1: Steps rewritten for clarity.

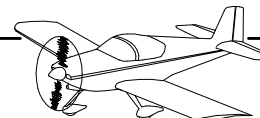
Figure 3 moved to page OP54-3.

OP54-2 REV 1: Steps rewritten for clarity.

In Figure 1, 2 & 3, callouts revised to more accurately reflect installation.

OP54-3 REV 0: New page

OP54-4 REV 0: New page



OP-54: O-320/360 EXHAUST

NOTE: Details of the engine installation that do not pertain to the exhaust system are shown for reference only as some features may have been omitted or are obsolete.

Step 1: Fabricate the EX-00001F Heat Muff Clamp from the HW-00001 Hose Clamp by clamping it over the Heat Muff Assembly. Mark the bend locations on the clamp, then remove the hose clamp and bend as required to ensure a close fit around the Heat Muff Assembly.

WARNING: The Heat Muff Assembly must not be installed over the Exhaust Crossover Slip Joints. Doing so could cause exhaust gasses to enter the Heat Muff Assembly & associated ducting.

Step 2: For installations using O-320 engines, trim the exhaust tube ends to be inserted into the Exhaust Crossover Slip Joints by 1 (25.4 mm) and install as shown in Figure 1 and Figure 2.

Only install lock washers upon final installation.

Step 3: For installations using O-360 engines, install as shown in Figure 1 and Figure 2.

Only install lock washers upon final installation.

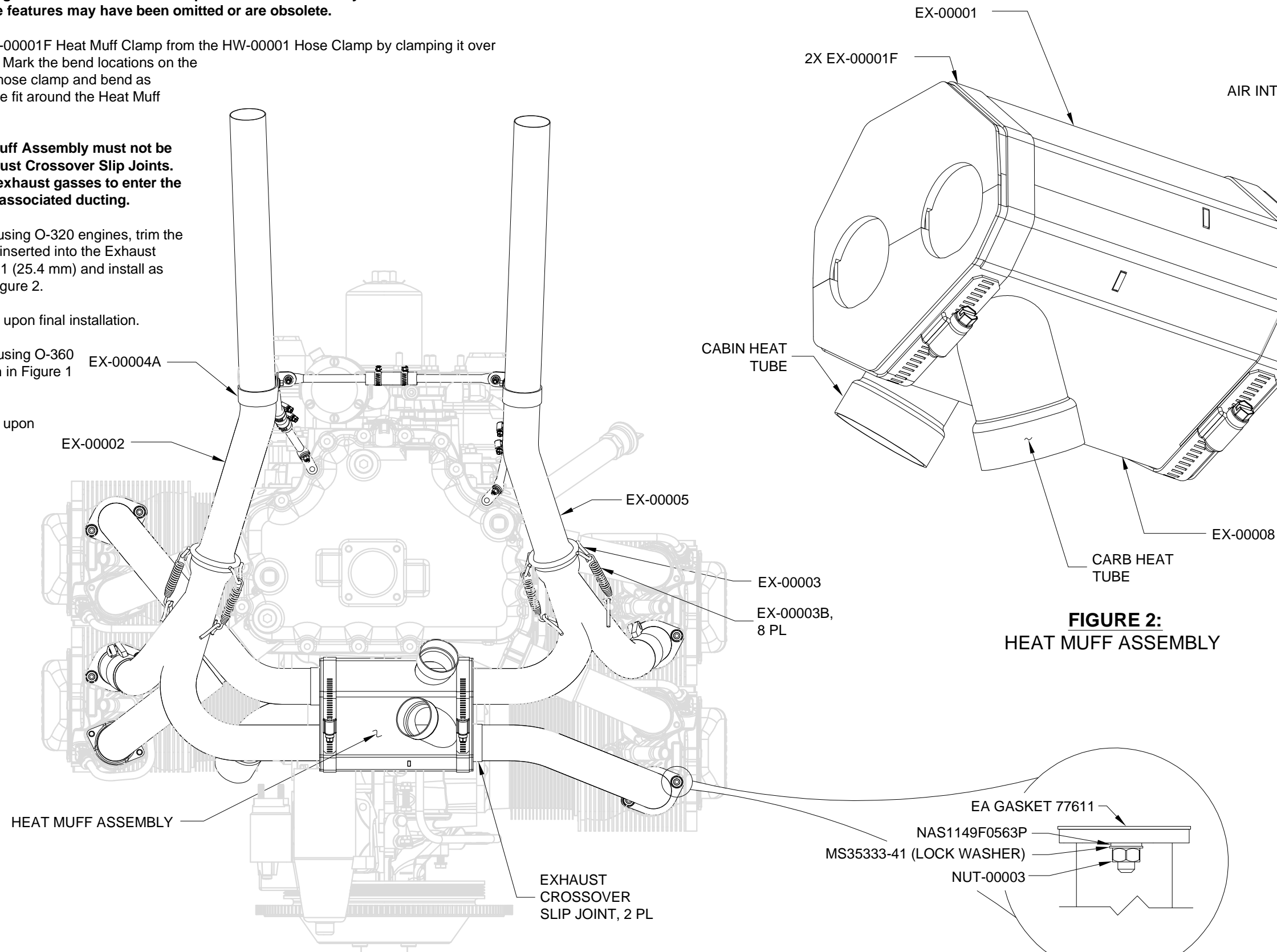


FIGURE 1: EXHAUST ASSEMBLY OVERVIEW

FIGURE 2:
HEAT MUFF ASSEMBLY

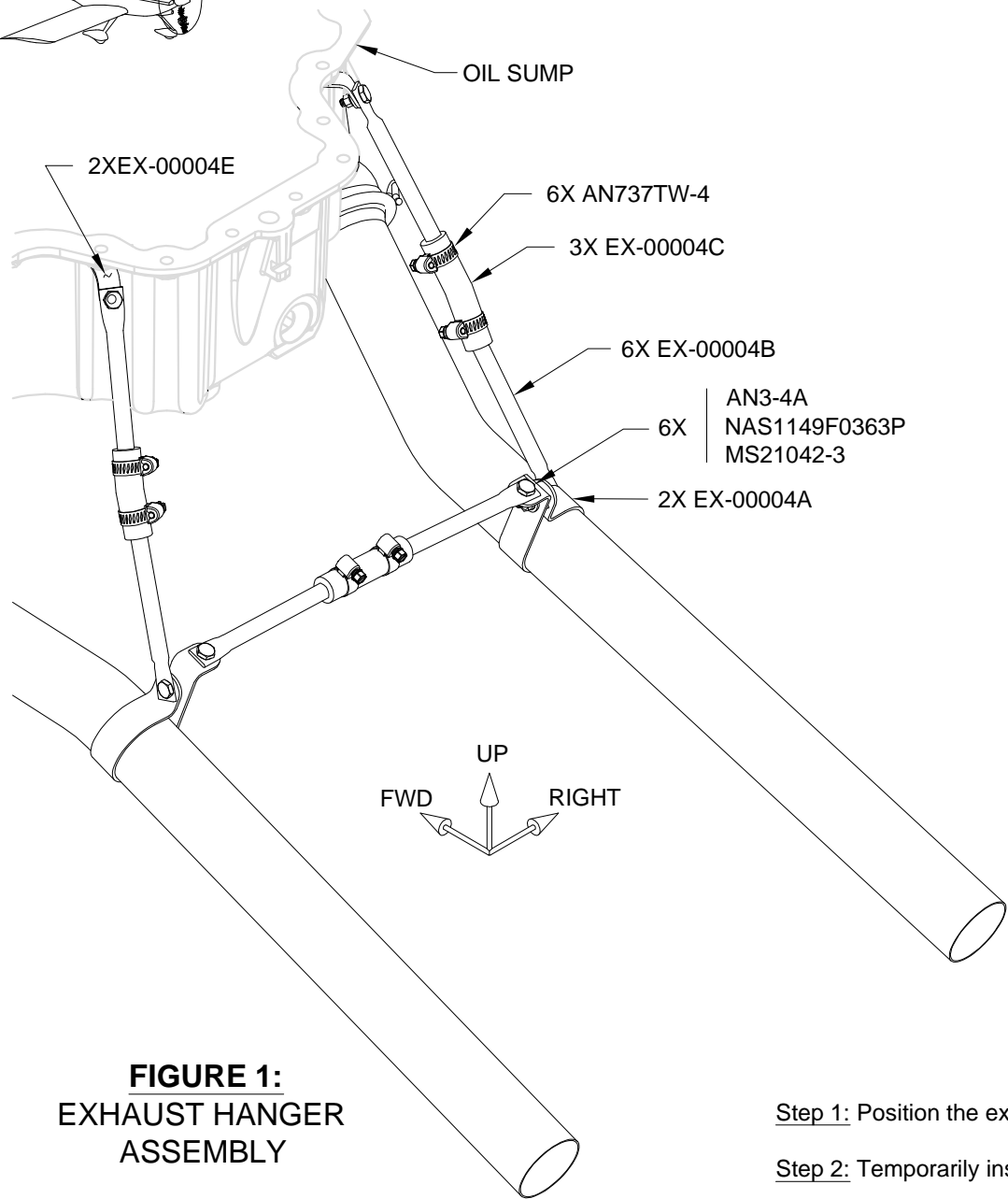


FIGURE 1:
EXHAUST HANGER
ASSEMBLY

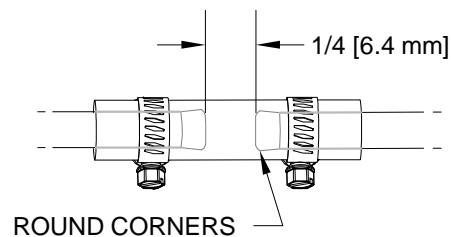


FIGURE 2: TUBING DETAIL
(TYPICAL)

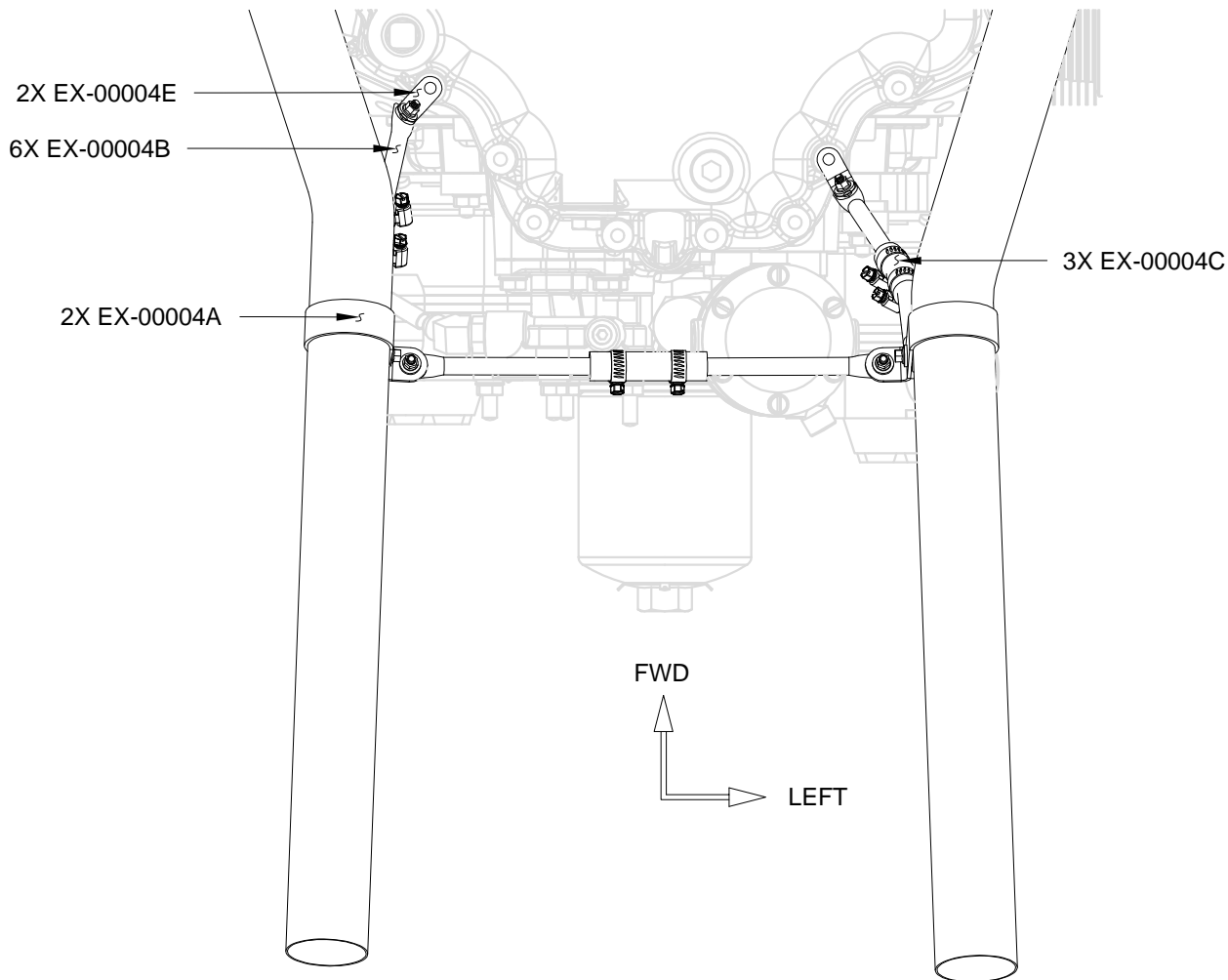


FIGURE 3:
EXHAUST HANGER ASSEMBLY

Step 1: Position the exhaust tubes as desired for cowl and engine mount clearance. Use safety wire to temporarily hold them in place if necessary.

Step 2: Temporarily install the EX-00004A Exhaust Hanger Brackets onto the exhaust tubes.

NOTE: The EX-00004E Exhaust Hanger Support Tab locations shown may vary between aircraft firewall forward installations, use the most convenient bolt locations on the Oil Sump.

Step 3: Install the EX-00004E Exhaust Hanger Support Tabs in positions somewhat forward and above the EX-00004A Exhaust Hanger Brackets. See Figure 1.

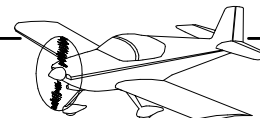
Step 4: Trim all the EX-00004B Exhaust Support Tubes so that the ends reside in the center of their respective spans. Gaps between exhaust support tube ends should be between 1/4 [6.35 mm] and 1/2 [12.7 mm] to allow for motion due to engine vibration. Straight lines between the EX-00004A Exhaust Hanger Brackets and EX-00004E Exhaust Hanger Support Tabs are preferable, but may not be possible depending on engine configuration. Slight angles in the connecting geometry formed by the exhaust support tubes are acceptable.

Step 5: Once the optimum orientation and lengths for the EX-00004B Exhaust Support Tubes have been found, bend the flat ends as necessary to ensure a flat fit against the faces of the mounting hardware EX-00004A Exhaust Hanger Brackets & EX-00004E Exhaust Hanger Support Tabs. This will help reduce wear and tear on the exhaust support tubes. Ensure each exhaust support tube is still aligned in an approximately straight line with its counterpart.

Step 6: Slightly crimp the open ends of all the EX-00004B Exhaust Support Tubes, creating a tube flare that will help to retain the EX-00004C Support Tubing. Round down the sharp corners created by crimping as shown in Figure 2.

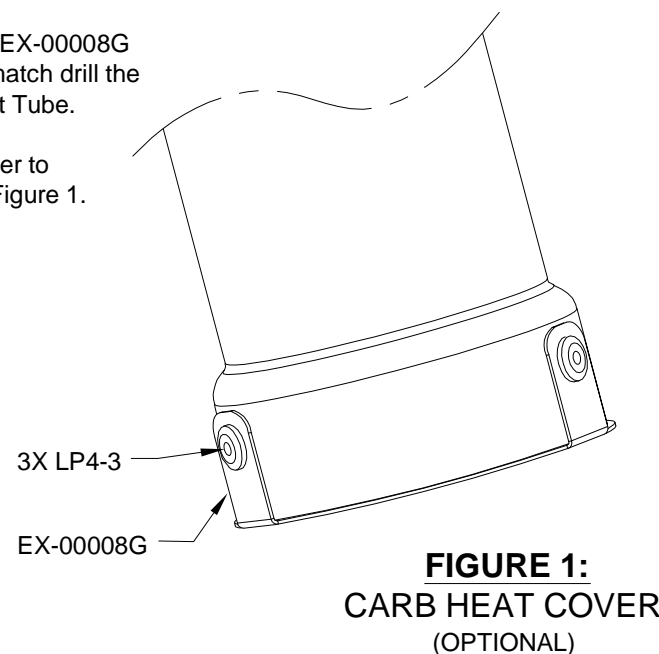
Step 7: Trim the EX-00004C Support Tubing approximately as shown in Figure 2.

Step 8: Install all Exhaust Hanger Assembly hardware as shown in Figure 1.



Step 1: If carb heat is not required, bend the EX-00008G Carb Heat Cover as shown in Figure 1 and match drill the three #30 holes into the EX-00008 Carb Heat Tube.

Step 2: Rivet the EX-00008G Carb Heat Cover to the EX-00008 Carb Heat Tube as shown in Figure 1.



NOTE: Perform Steps 3 thru 13 as part of the VA-130 or VA-131 Filtered Air Box fabrication and assembly instructions. Steps provided here are only a guide, Individual aircraft firewall forward installations may vary. The position of the carb heat tube from the EX-00001 Heat Muff will affect placement of the filtered air box door and cutout. See Step 4.

Step 3: Begin assembly and installation of the VA-130 or VA-131 Filtered Air Box as described in the filtered air box instructions. Perform enough assembly work to determine the physical alignment of the filtered air box to the induction air inlet on the cowling, then proceed with the steps below.

Step 4: Temporarily install the VA-130B or VA-131B Air Box Top Plate onto the carburetor as described in the Filtered Air Box instructions.

Step 5: Use a grinder to remove the "lip" inside the tube of the FF-01407 FAB Carb Heat Inlet.

Step 6: Position the FF-01407 FAB Carb Heat Inlet on as straight a line as possible with the carb heat tube from the EX-00001 Heat Muff on top of the VA-130B or VA-131B Air Box Top Plate. This is especially critical for O-320 installations where there is a very short distance between the filtered air box and the heat muff carb heat tube due to the shorter height of the O-320 carburetor.

Step 7: Mark and trim the FF-01407 FAB Carb Heat Inlet to fit inside the VA-130B or VA-131B Air Box Top Plate in the position found in Step 6. Be aware of the location and travel of the VA-122 Arm per the Filtered Air Box instructions and make allowances in the trim of the FAB carb heat inlet accordingly.

Step 8: Clamp the FF-01407 FAB Carb Heat Inlet Mounting Brackets to the FF-01407 FAB Carb Heat Inlet as shown in Figure 2.

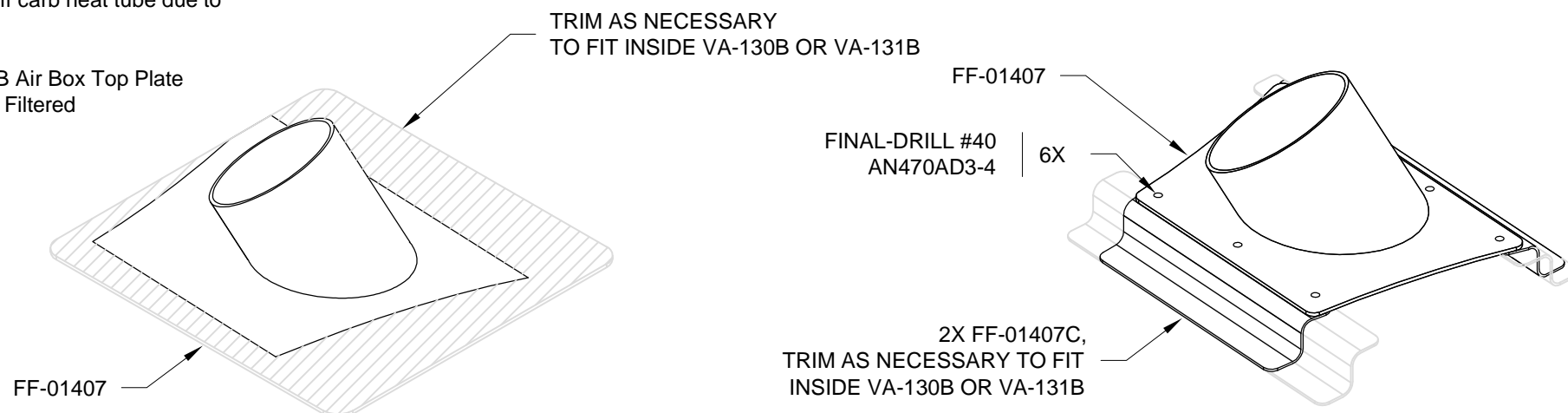
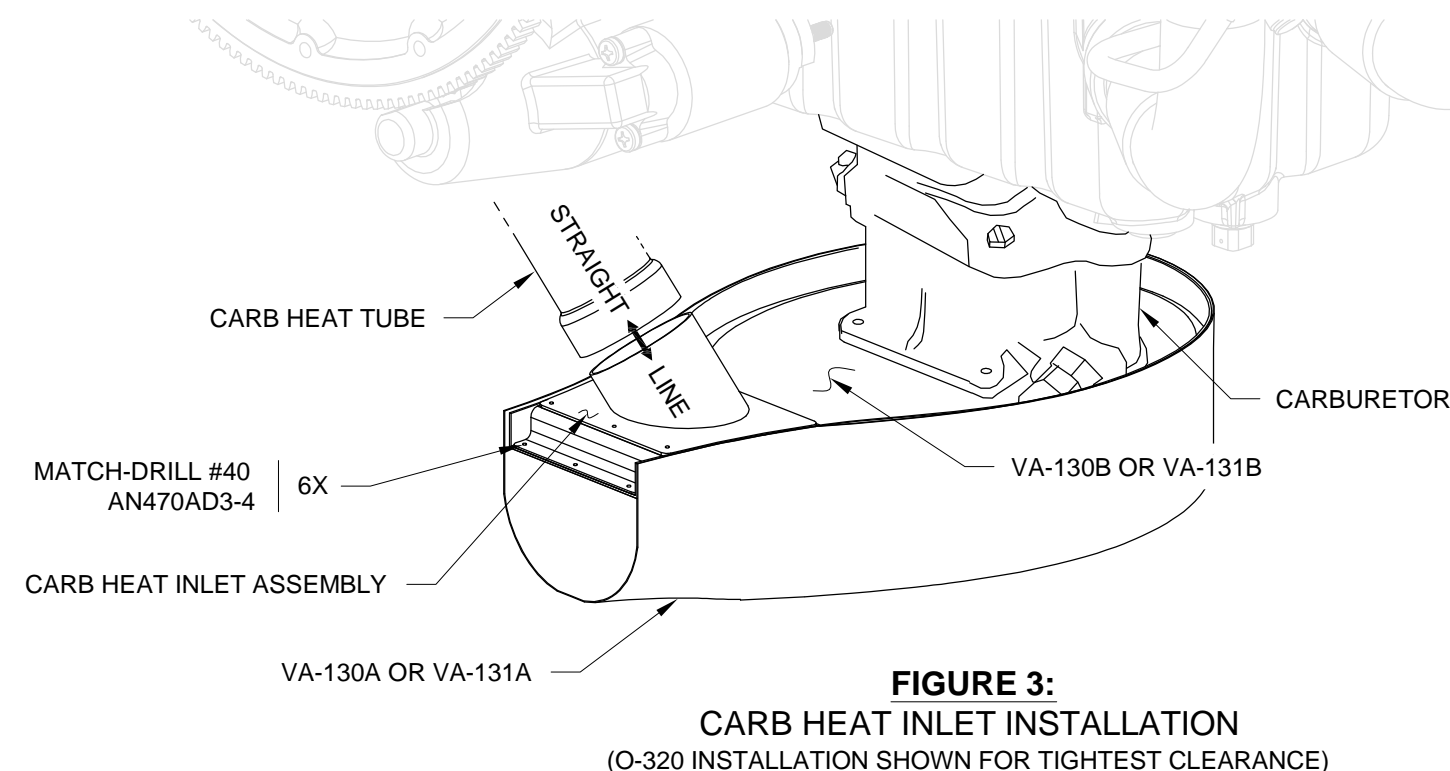
Step 9: Final-Drill #40 six rivet holes into the FF-01407 FAB Carb Heat Inlet and FF-01407C FAB Carb Heat Inlet Mounting Brackets approximately as shown in Figure 2.

Step 10: Mark and trim the FF-01407C FAB Carb Heat Inlet Mounting Brackets as shown in Figure 2.

Step 11: Cleco and rivet the FF-01407C FAB Carb Heat Inlet Mounting Brackets to the FF-01407 FAB Carb Heat Inlet as shown in Figure 2.

Step 12: Match-Drill #40 the FF-01407 FAB Carb Heat Inlet to the VA-130B or VA-131B Air Box Top Plate as shown in Figure 3.

Step 13: Coordinate the final installation of the FF-01407 FAB Carb Heat Inlet with the final assembly of the filtered air box, particularly with respect to the carb heat door.





NOTE: The CB-907A or CB-1007A Right Aft Case Baffle may already have an air intake hole pre-punched. If present, seal this hole with a block-off.

Step 1: Create the air intake hole in the CB-902A or CB-1002A Forward Left Air Ramp as shown in Figure 1. Position the hole aft of the bend line in the CB-907A or CB-1007A Right Aft Case Baffle as shown in Figure 1.

Position the hole left and right so that the scat tube will naturally route from the Heat Muff Air Intake to the VENT DL-03 Scat Tube Flange while avoiding interference from the starter or any other components.

Experiment with the scat tube routing prior to creation of the air intake hole. If necessary, the flange of the VENT DL-03 Scat Tube Flange may be bent to facilitate positioning. Clamp the VENT DL-03 Scat Tube Flange into position.

Step 2: Clamp, then final-drill #30 the holes in the VENT DL-03 Scat Tube Flange to the CB-902A or CB-1002A Forward Left Air Ramp as shown in Figure 1.

WARNING: Install a vent screen in this location if the vent hole is **ONLY** to provide cabin heat. A vent screen installed upstream of a carburetor heat system may obstruct airflow and drastically reduce engine performance.

Step 3: Rivet the VENT DL-03 Scat Tube Flange and VENT SCREEN 3X3 (optional) to the CB-902A or CB-1002A Forward Left Air Ramp as shown in Figure 1.

WARNING: For proper carb heat performance, a vent screen must be installed over the cabin heat tube at the location shown in Figure 3.

Step 4: (If using carb heat) Form the VENT SCREEN 3X3 over the end of the cabin heat tube coming from the Heat Muff Assembly. See Figure 3 for location.

Step 5: Cut lengths of scat tubing to connect the VENT DL-03 Scat Tube Flange to the heat muff air intake tube; the FF-01407 FAB Carb Heat Inlet to the heat muff carb heat tube; and the heat muff cabin heat tube to the VENT TG-10 Assembly installed on the firewall in OP-29 or OP-33. See Figure 2 and Figure 3.

Step 6: Secure the Scat Tubes as shown in Figure 2 and Figure 3. Use additional tie-wraps and clamps as necessary to ensure the scat tubes do not interfere with the oil sump drain, exhaust tube, engine mount or any other components.

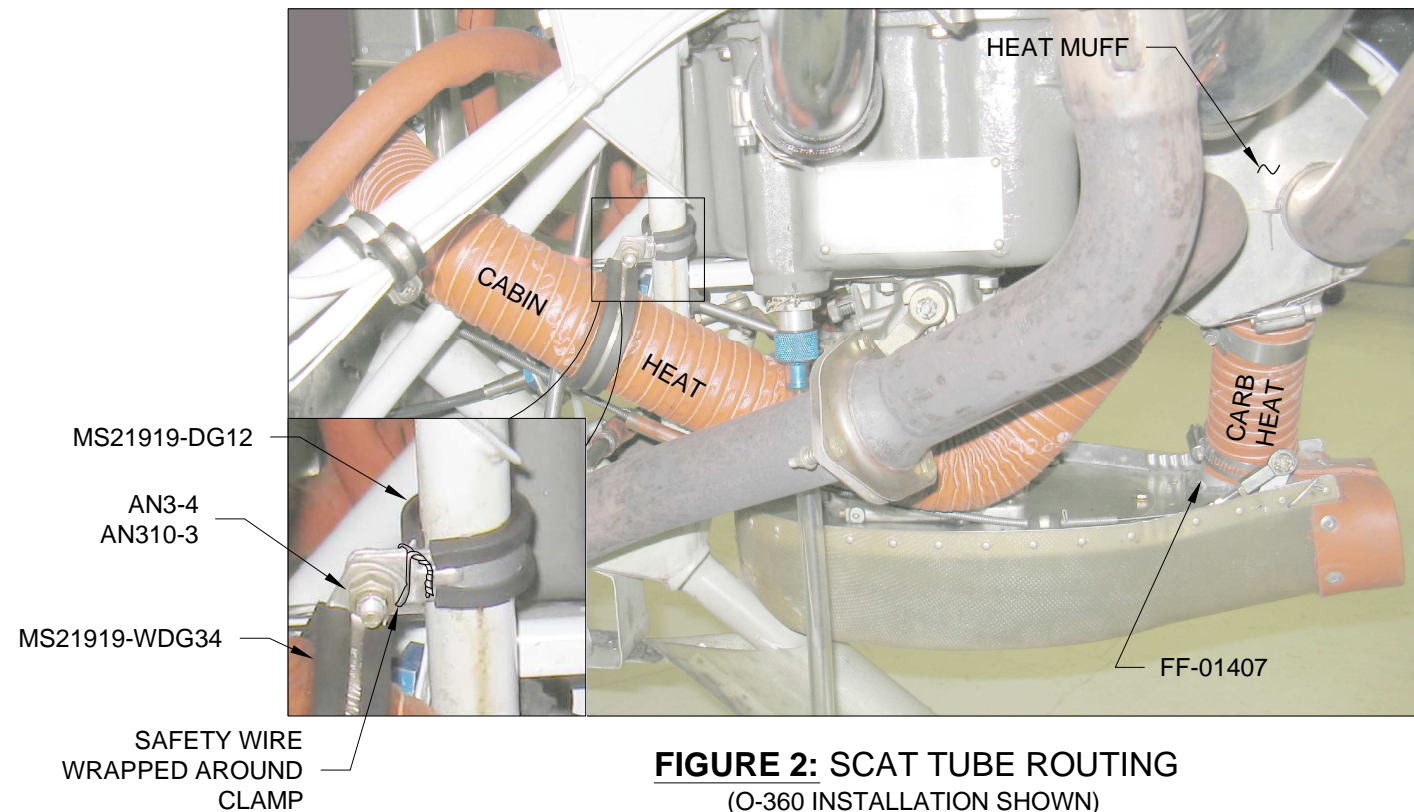


FIGURE 2: SCAT TUBE ROUTING
(O-360 INSTALLATION SHOWN)

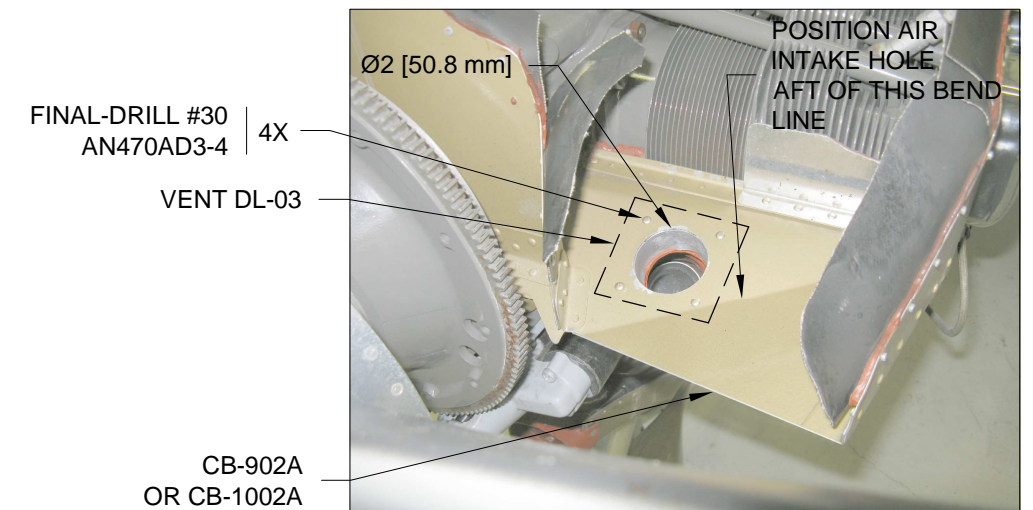


FIGURE 1: AIR INTAKE HOLE LOCATION

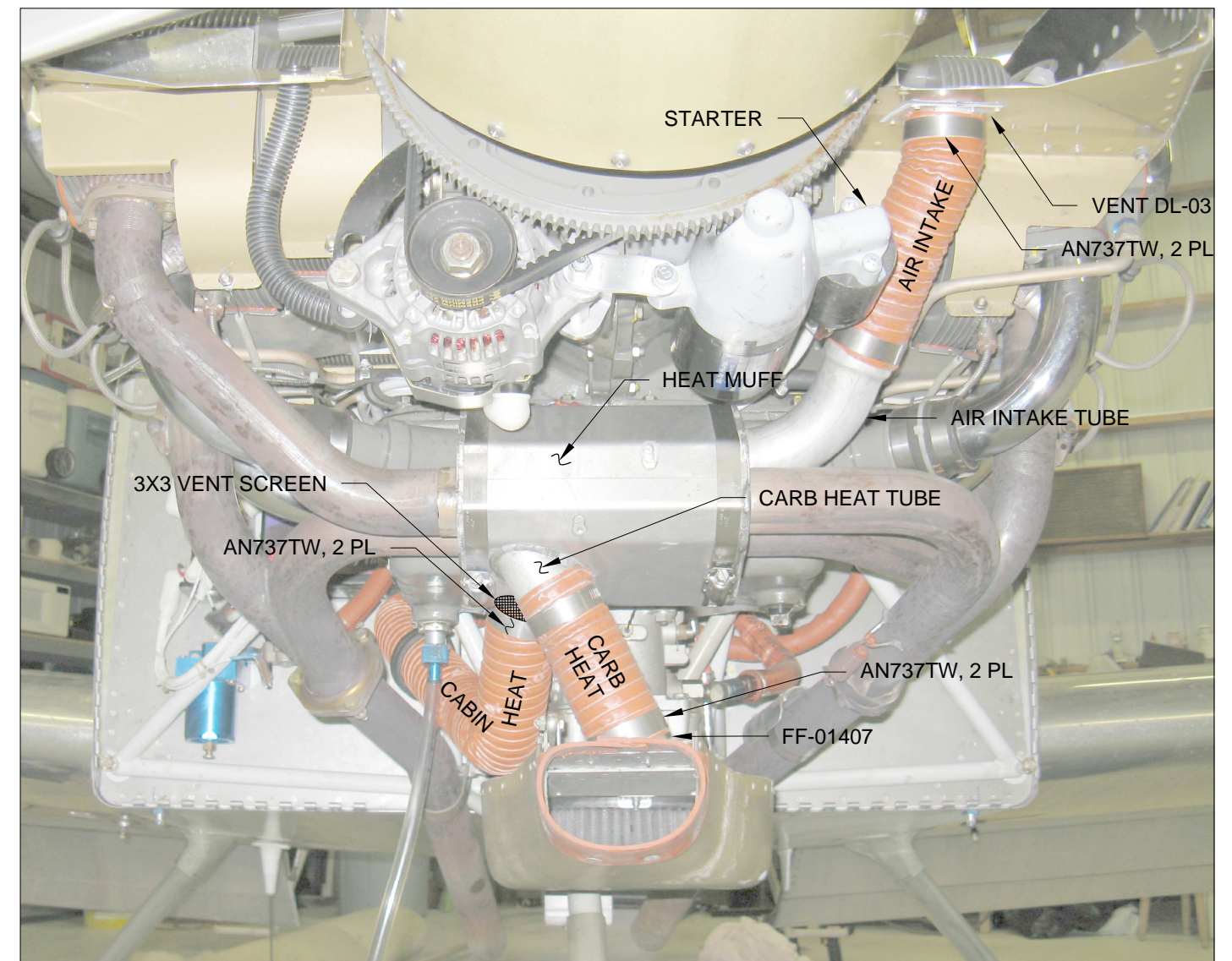


FIGURE 3: SCAT TUBE ROUTING
(O-360 INSTALLATION SHOWN)