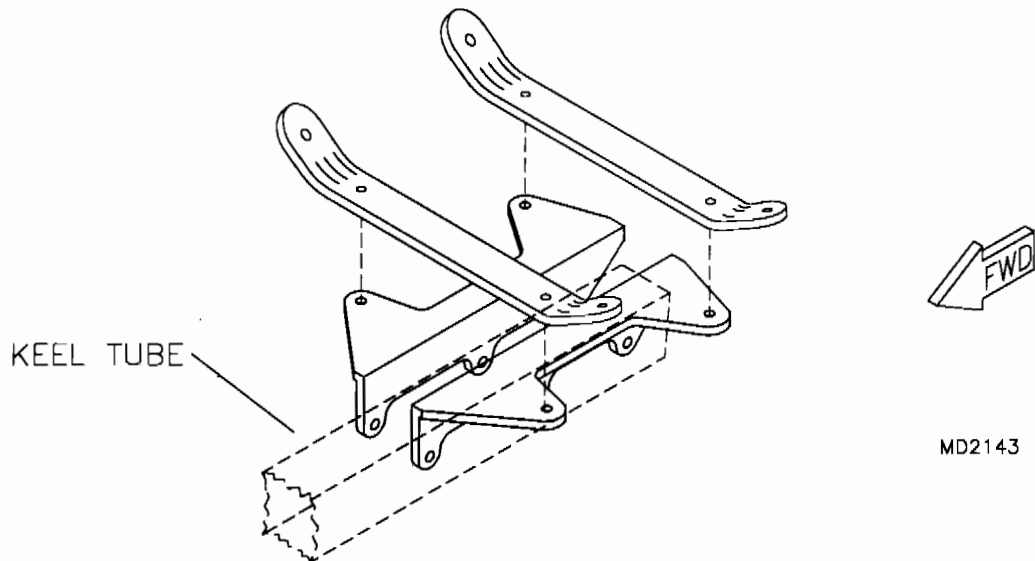


S-12XL 582 ENGINE MOUNT ASSEMBLY

1. Select the parts shown in the parts manual.
2. Bolt the left and right engine mount angles to the keel using the hardware shown. Install the stainless steel "U" bracket in the aft engine mount hole as shown on the parts drawing. Size drill the keel to the hardware shown
3. Bolt the lower focal mount plates to the engine mount angles as per **FIGURE 04-03**.

FIGURE 04-03

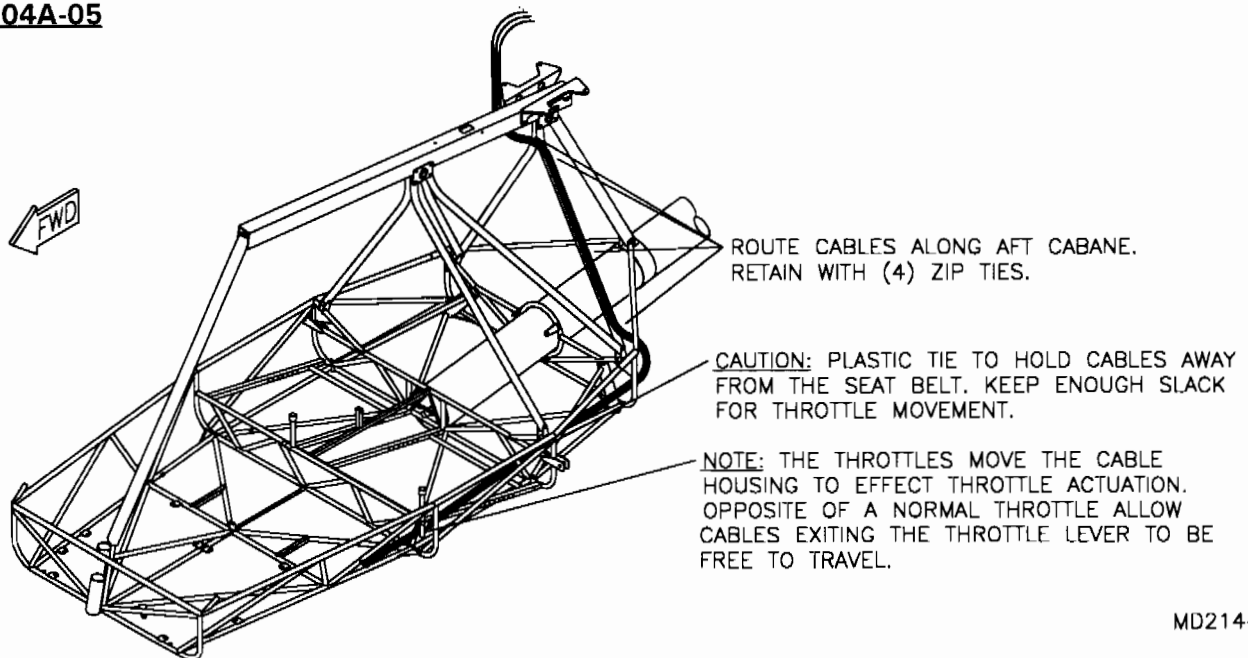


4. Assemble the Barry mounts and upper focal mount plates to the lower focal mount plates as per the parts manual. Use a silicon spray lube to help install the mounts.

S-12XL 582 ENGINE INSTALLATION

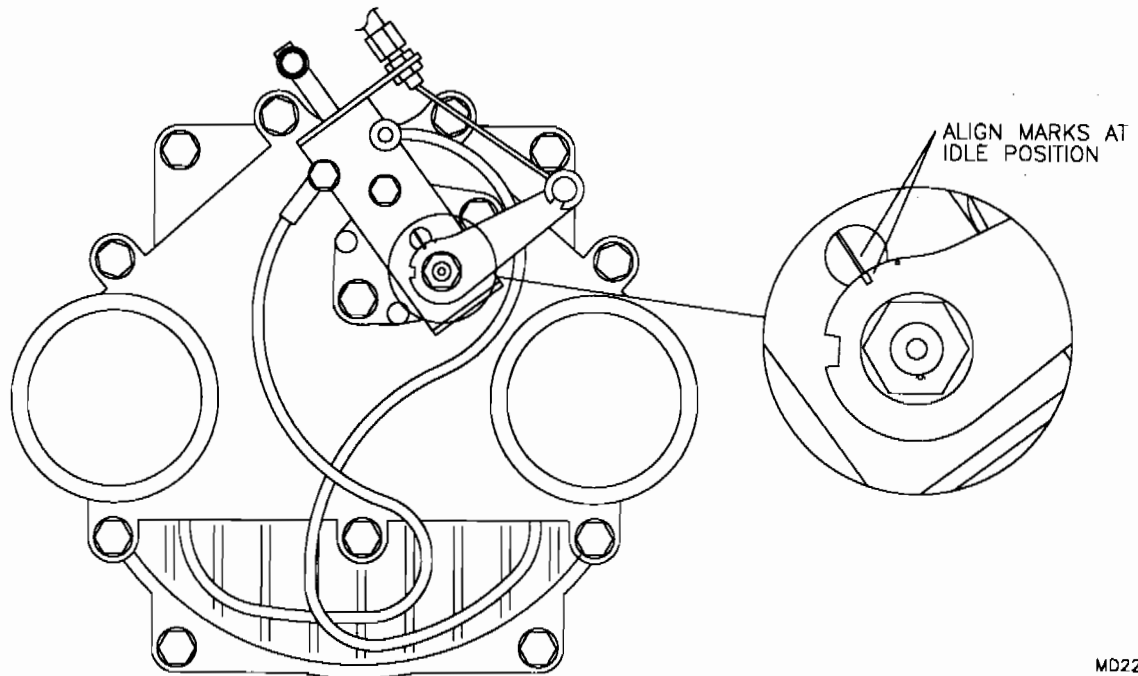
1. Collect the parts shown in the parts manual
2. Put a stack of three (3) 3/8" washers over each mount hole where the engine studs will insert. Place the engine in position and install the loc washers and nuts. **PLEASE** get help lifting the engine into position. It is not a good idea to lift the engine alone. Torque the engine mount nuts to 15 ft/lbs. Inspect all the bolts on the engine mount for security.
3. It is necessary to remove the top plate of the carburetors to install the throttle cable. Remove the carb's top plate and the spring just underneath. Remove the white plastic spring clip, which sits just below the spring. Feed the cable through the top plate, spring, and spring clip. Insert the end of the cable into the "keyhole" shaped hole. Make sure not to dislocate the metering needle of the carb. Reinstall the white plastic spring clip, the spring, and the top plate. Notice that the top plate's hole is not in the center of the carb barrel. Orient the top plate to be in line with the cable and reinstall.
4. Attach carburetors to engine as shown. Make sure that the carbs are completely seated in the boots and the carb clamps are tight. Attach air filters to carbs as shown. Make sure that air filters are completely seated.
5. Route the cable and housing, including cable ferrule caps, to the throttle lever. Follow the route shown in **FIGURE 04A-05**. Be sure that the throttle cables actuate the carbs an equally and simultaneously. **HINT:** With the air filters removed, have an assistant watch the carb barrels move, while moving the throttle lever. Barrels should be equal at all throttle lever positions. If necessary adjust wire stop screws.

FIGURE 04A-05



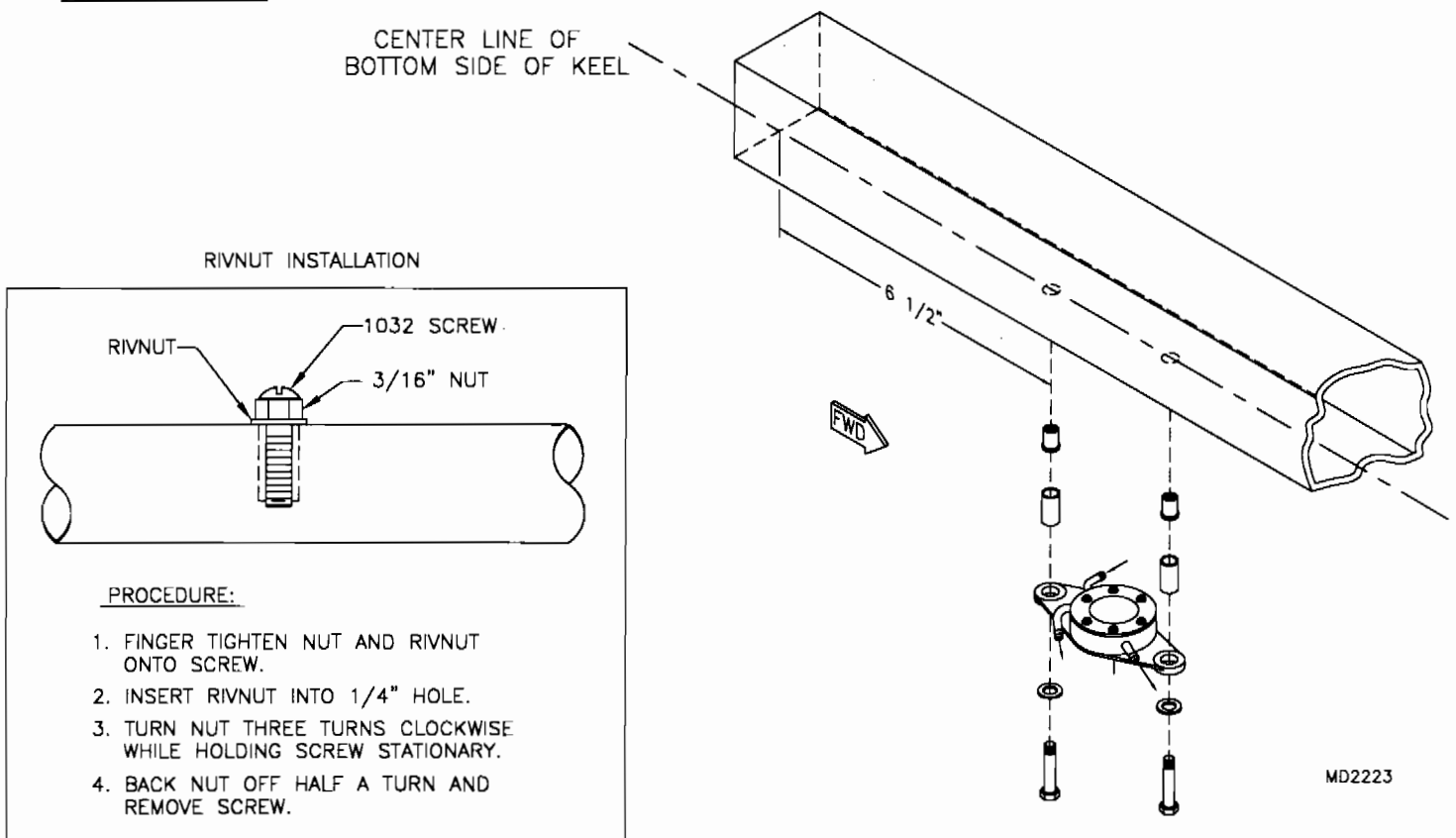
MD2144

6. Install the oil injection cable to the injector actuation arm using the hardware shown in the parts manual. At an idle setting the mark on the arm should line up with the mark on the injector body. This should also be idle setting on the carburetors. Adjust the wire swivel stop/screw as required. See **FIGURE 04A-06**.

FIGURE 04A-06

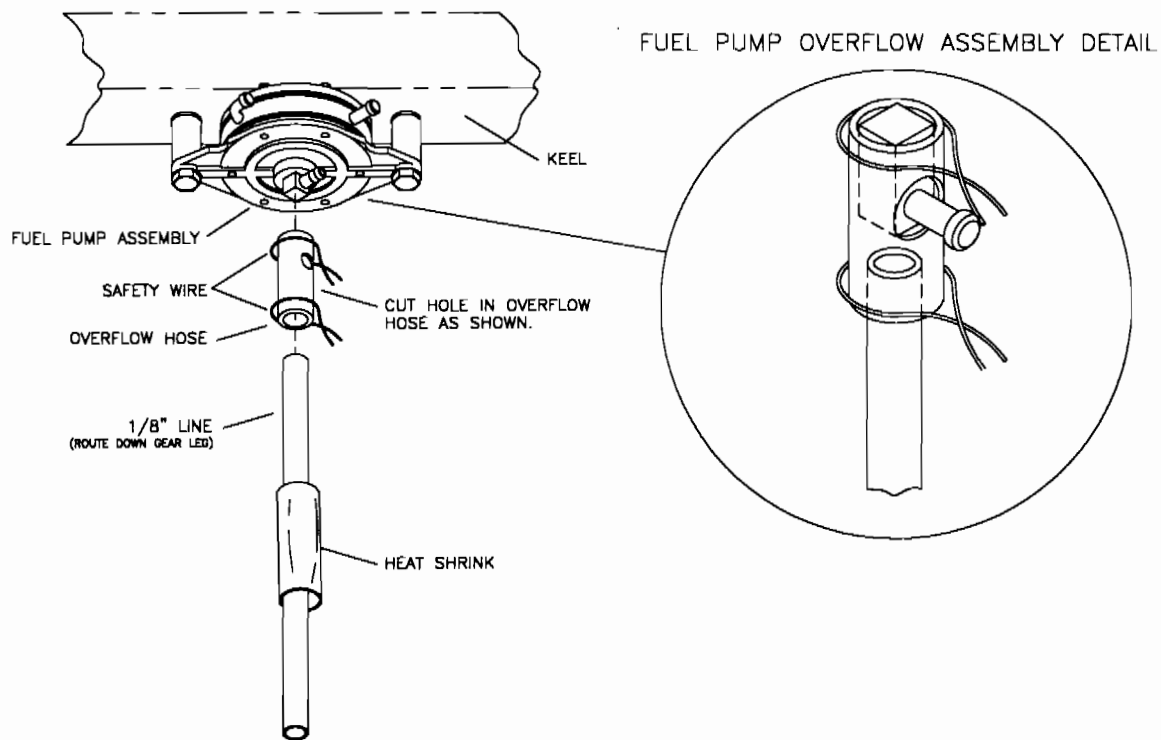
MD2223

7. Drill 1/4" holes and install the rivet nuts to the bottom of the keel at the locations shown in **FIGURE 04A-07**. Install the fuel pump overflow to the bottom of the fuel pump as shown in **FIGURE 04A-07A**. Use a heat gun to activate the heat shrink. Mount the fuel pump to the underside of the keel using the hardware shown in the parts manual. Route the pressure line to the fuel pump. Route the output of the pump to the carb. Be sure to include the "Y" in the line as shown in the parts manual.

FIGURE 04A-07

MD2223

FIGURE 04A-07A

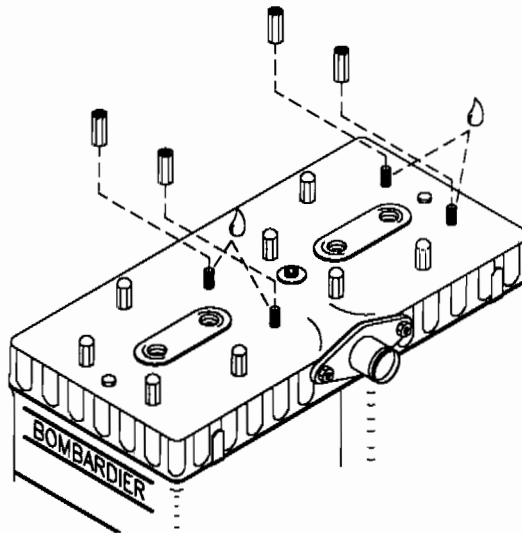


MD2145

S-12XL 582 EXHAUST ASSEMBLY

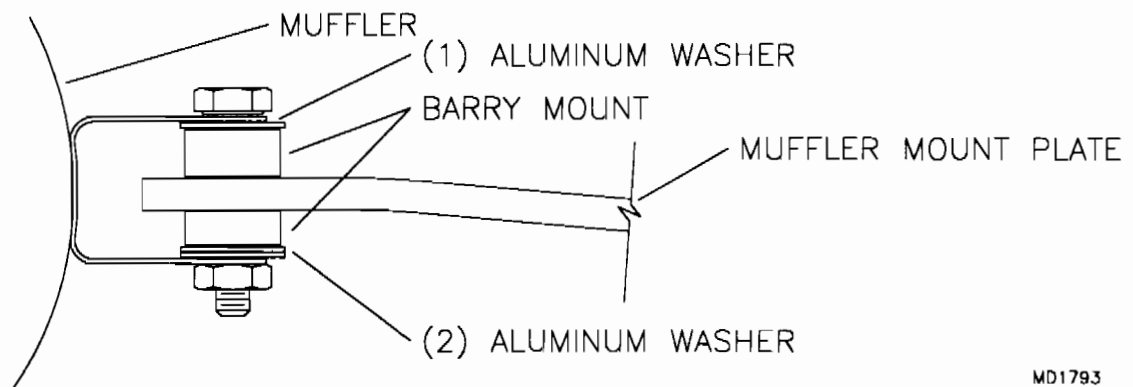
1. Select the parts depicted in the parts manual.
2. Install the exhaust manifold as shown. Apply blue loctite to the 10mm shoulder screws which hold the manifold in place.
3. Remove the four head nuts shown in **FIGURE 04B-03**. Install the stand offs in place of the original nuts. Use a drop of loctite on each of the stand offs. Torque the stand offs to 15 ft/lbs.

FIGURE 04B-03



4. Bolt the two muffler mount plates to the four stand offs as shown. Use both loctite and loc washers. Torque these bolts to 15 ft/lbs.
5. Install the Barry mount to the ends of the muffler mount plates. Slip the 3/8" diameter aluminum spacer inside each of the Barry mounts. Install the muffler to the Barry mounts as shown in **FIGURE 04B-05**.

FIGURE 04B-05

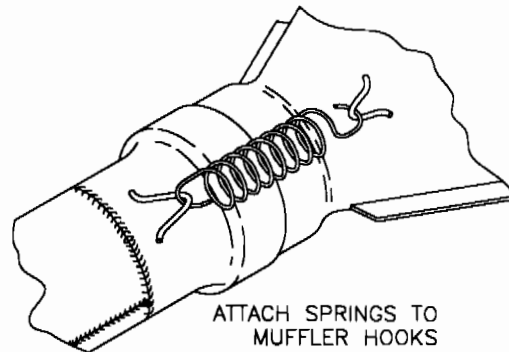


MD1793

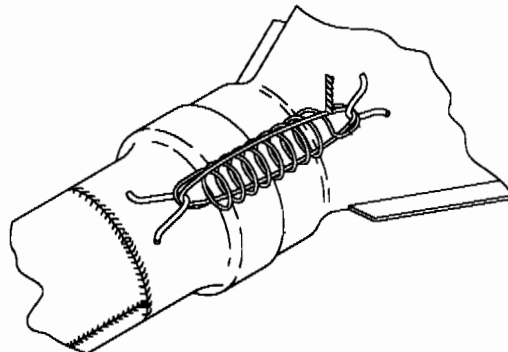
6. Place the small muffler elbow pipe between the manifold and the muffler. Retain with the muffler springs provided. Adjust the fit and tension of the muffler springs by bending the loops welded to the muffler up or down. Install the springs with moderate tension. Over tight springs will have a tendency to break or loosen and go into the prop.

7. **Safety wire** springs in place. Apply a bead of silicone to the springs to dampen any high frequency vibrations. See **FIGURE 04B-07**.

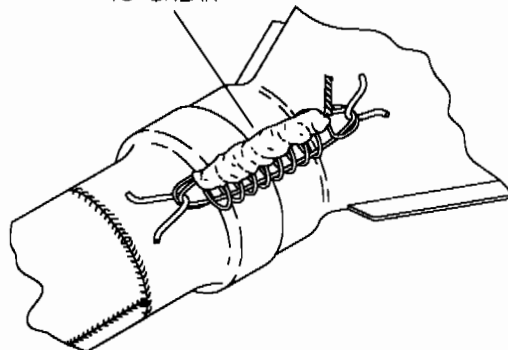
FIGURE 04B-07



SAFETY WIRE FROM HOOK TO HOOK,
ON THE INSIDE OF SPRING, IN CASE
OF SPRING BREAKAGE



A BEAD OF SILICON WILL ABSORB
VIBRATION THAT CAUSES SPRINGS
TO BREAK

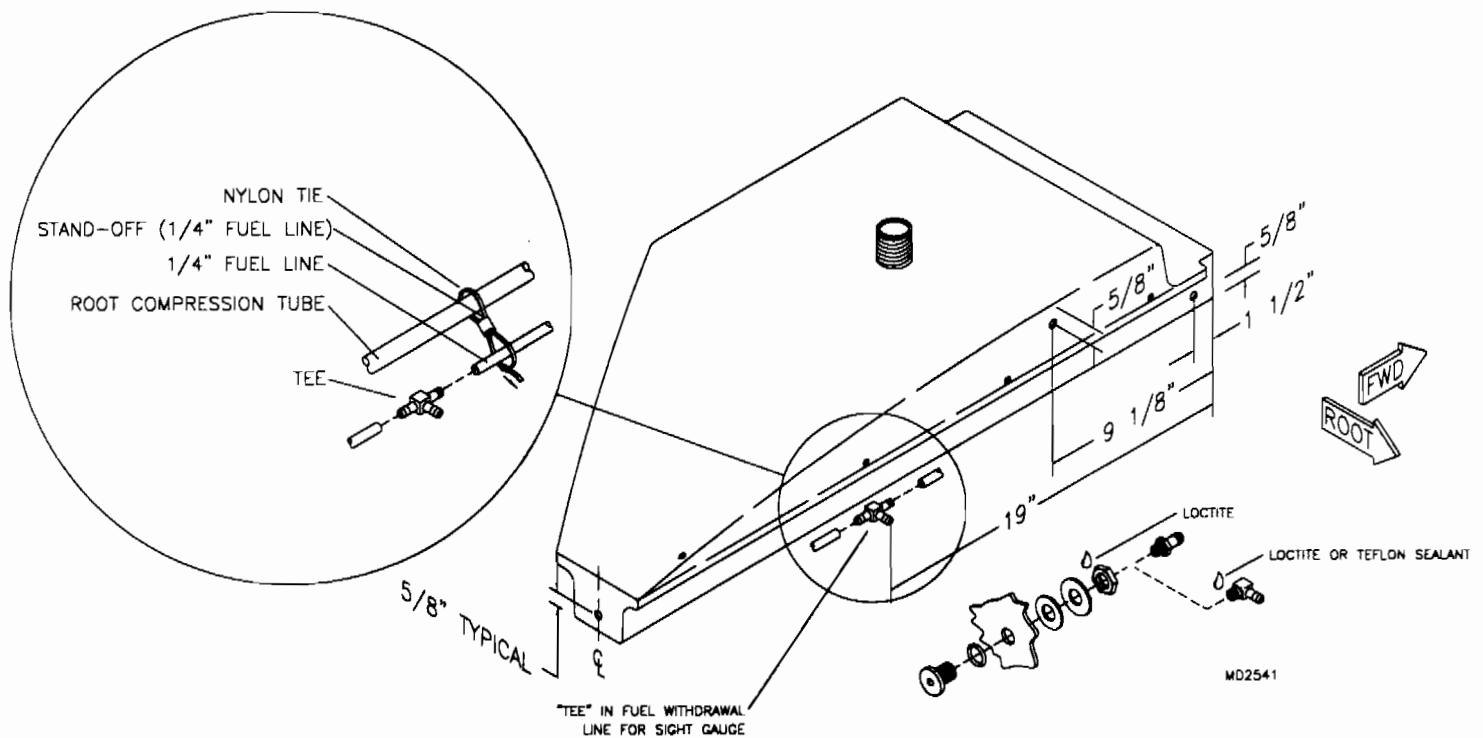


MD2222

FUEL TANK ASSEMBLY

1. Locate the fuel tank(s). See wing frame assembly for part numbers.
2. The fuel tanks are leak tested from the supplier and guaranteed leak proof. You, however, may want to perform a leak test, especially after installing the fuel fittings. If you desire, fill the tank(s) with water and let it sit for approximately 48 hours. Locate (3) 1/2" diameter holes for the fuel fittings at the locations shown in **FIGURE 04C-02**. **IMPORTANT:** These measurements are very critical for proper clearance of the Tank Withdrawal Fittings. **HINT:** A UNIBIT step-drill makes a very clean, accurate hole. All fittings are located on the inboard side of the wing tank (see parts manual for orientation). Debur all holes. **NOTE:** Mark on the tank the position for the 1/4" Tee (lower sight gauge attachment). Secure the Tee to the Root Compression Tube when installing the tank in the wing. Remove **ALL** shavings and loose debris from the interior of the tank. Use a vacuum to assist in removal.

FIGURE 04C-02



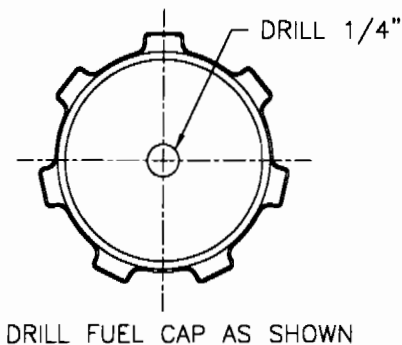
3. Refer to parts drawing, for proper orientation of parts. See wing frame assembly for part numbers.
4. Install the fittings by placing a wire in the fitting hole and up through the filler neck, attach a tank withdrawal fitting and an o-ring. Make a loop in the end of the wire to keep the parts from falling off, then pull the fitting to the hole with the threaded portion out of the tank. Remove the wire. Holding the fitting with the threaded portion extended out of the tank, thread on the rubber washer, metal washer and nut with Loctite. **NOTE:** Use a 1/4" allen wrench to hold the tank withdrawal fitting while tightening the nut. **HINT:** Hold the metal washer with a needle-nose Vise-Grip to prevent rotation while tightening the nut. Allow Loctite to dry. Apply sealant to the straight or 90 degree fuel line fittings, and screw into the tank withdrawal fitting until snug. **CAUTION:** Do not tighten to the point the tank withdrawal fitting turns in the tank. Also do not over-tighten fuel line fittings, this may cause the withdrawal fitting to break.

S-12XL FUEL CAP/VENT ASSEMBLY

1. Remove the rubber gasket and plastic baffle from the fuel cap. The plastic baffle will "snap" out of the fuel cap. A screw driver works well for the removal.

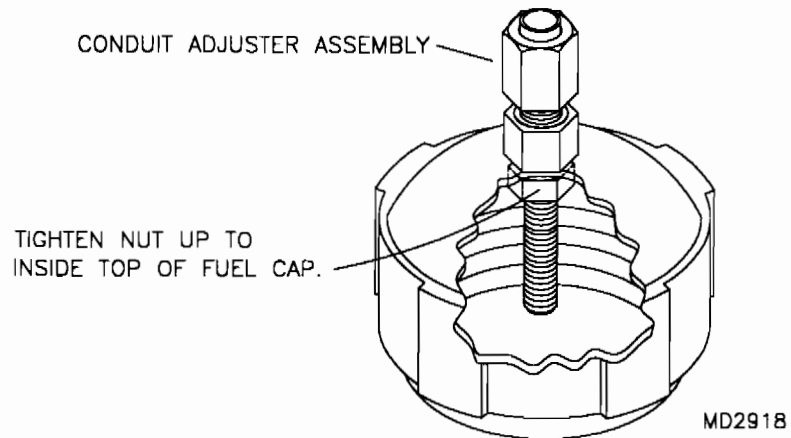
Locate and drill a 1/4" hole in the center of the fuel cap as shown in **FIGURE 04D-01**. Install the conduit adjuster ferrule into the fuel cap. Apply a small drop of loctite and install the 1/4" plain nut and tighten to secure the ferrule into the cap. See **FIGURE 04D-01A**.

FIGURE 04D-01



DRILL FUEL CAP AS SHOWN

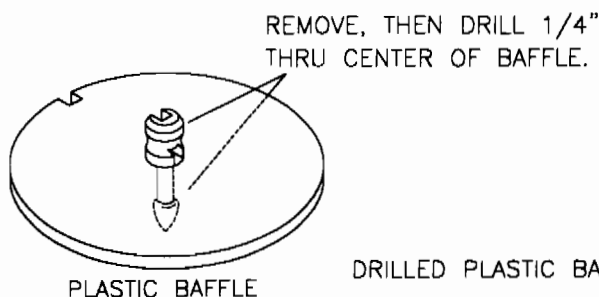
FIGURE 04D-01A



2. With a side cutters or file remove the attach nipples from the plastic baffle. See **FIGURE 04D-02**. Drill a 1/4" hole in the center of the plastic baffle and install into the fuel cap over the adjuster ferrule stem. Drill a 1/4" hole in the center of the rubber gasket and install into the cap. Note the orientation of the rubber gasket.

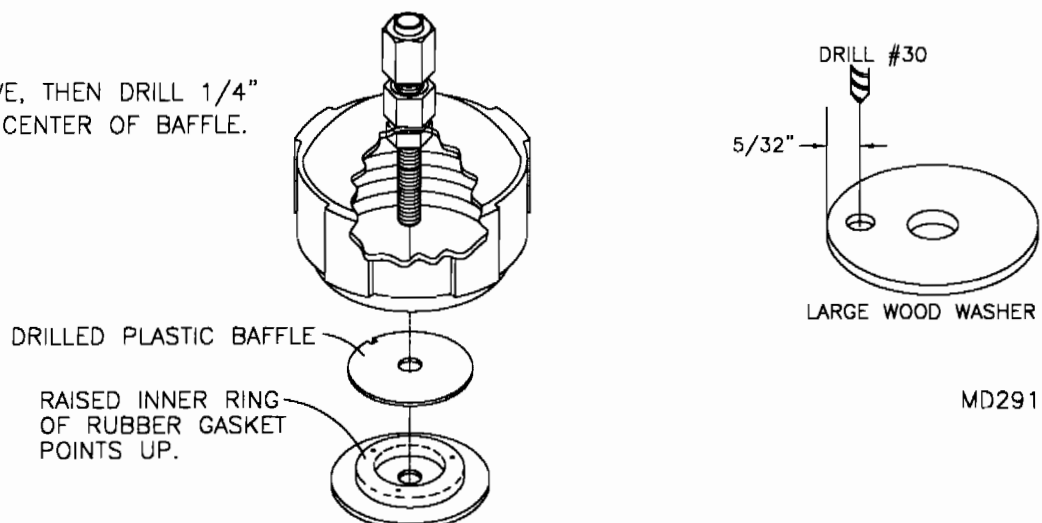
Drill the 1/4" large wood washer as shown in **FIGURE 04D-02A**. Assemble the bead chain to the bead chain retainer sleeve. Install the bead chain and retainer sleeve into the #30 hole in the large wood washer. Install the washer and bead chain into the fuel cap. Install the 1/4" shear nut on the adjuster ferrule stem and tighten.

FIGURE 04D-02



PLASTIC BAFFLE

FIGURE 04D-02A



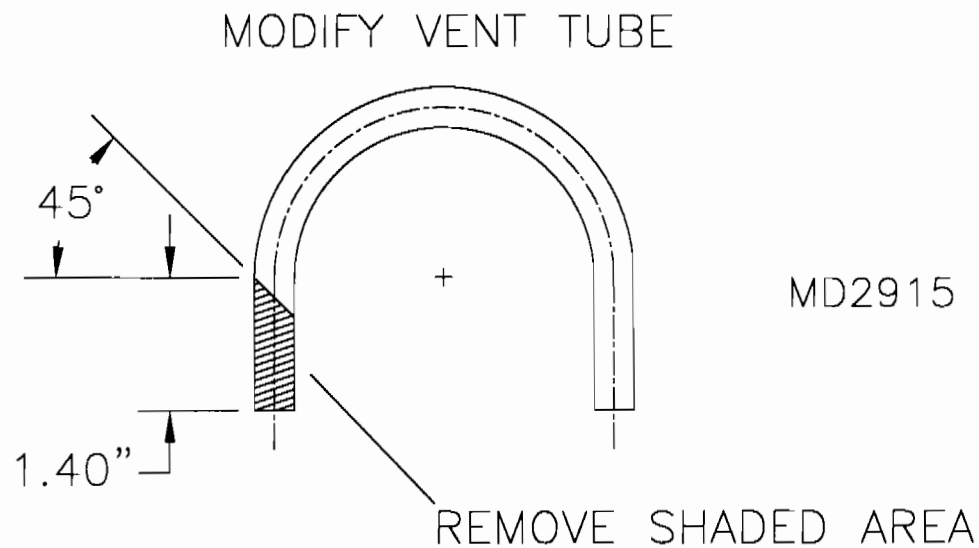
DRILLED PLASTIC BAFFLE

RAISED INNER RING OF RUBBER GASKET POINTS UP.

LARGE WOOD WASHER

MD2918

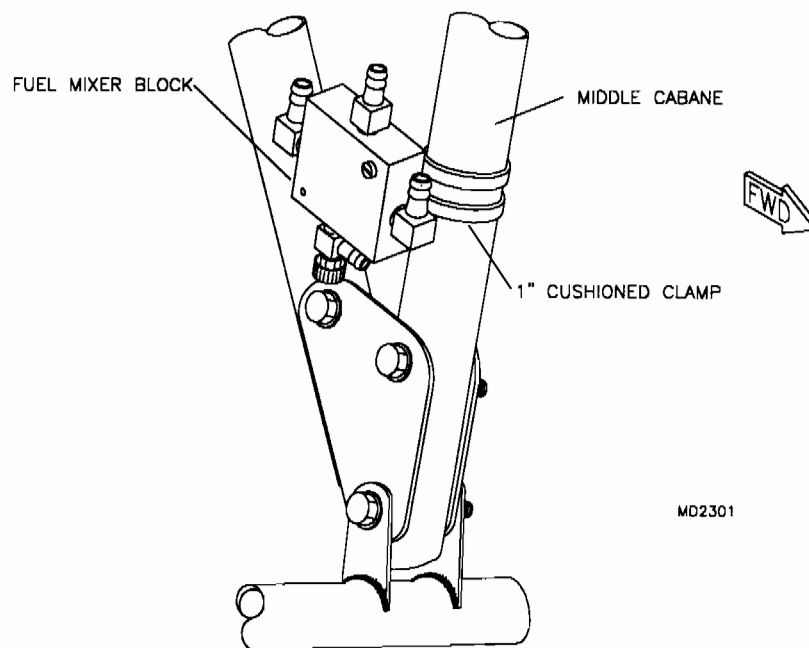
3. Install the bead chain end coupling onto the bead chain. Find the center of the plastic retainer and drill a #30 hole. Using the brass backing washer, rivet the plastic retainer to the bead chain. Refer to the parts drawing.
4. Modify the vent tube as shown in **FIGURE 04D-04**. Install the vent tube into the adjuster ferrule. Install the fuel cap assembly onto the tank and tighten. Position the vent tube so that the 45 degree angle is pointing forward (into the slipstream) and tighten the ferrule cap to secure the vent tube.

FIGURE 04D-04

S-12XL 582 FUEL SYSTEM - SINGLE WING TANK

1. Locate the parts shown in the parts drawing.
2. Route the lines as shown in the parts manual. **HINT:** For now, only tape the fuel lines in position. This will ensure proper routing without wasting zip ties. Zip tie lines in position during final assembly once satisfied with the routing. The fuel mixer block attaches to the middle cabane. See **FIGURE 04E-02**. Route upward from the mixer block to the fuel pump. Include the fuel shut-off valve, the primer bulb, the fuel filter, and the primer line "T." This line will route to the fuel pump as shown. Route the fuel feeds from the mixer block, up the aft cabane. Leave approximately 4 feet of excess line at the keel for the forward withdrawal line and 1 foot of excess for the aft withdrawal line from the fuel tank. This will be connected to the tank during trial assembly and rigging.

FIGURE 04E-02



3. Once the wings are built and the fuel tank(s) in place, it will be necessary to leave fuel lines routed out the root rib. Therefore; it will be necessary to only trial fit the withdrawal lines to the fuselage. Once the wings are assembled, attach the fuel withdrawal lines to their appropriate fittings. Trial assembly and rigging will be the appropriate time for routing of all fuel lines. Remember, once the wings are covered, fuel tanks will become inaccessible.

4. Install the primer pump to the instrument panel and route the lines as shown. The angled fitting on the primer pump is the "in" (from the primer line T). The straight fitting routes to the carburetor. See engine installation for details.

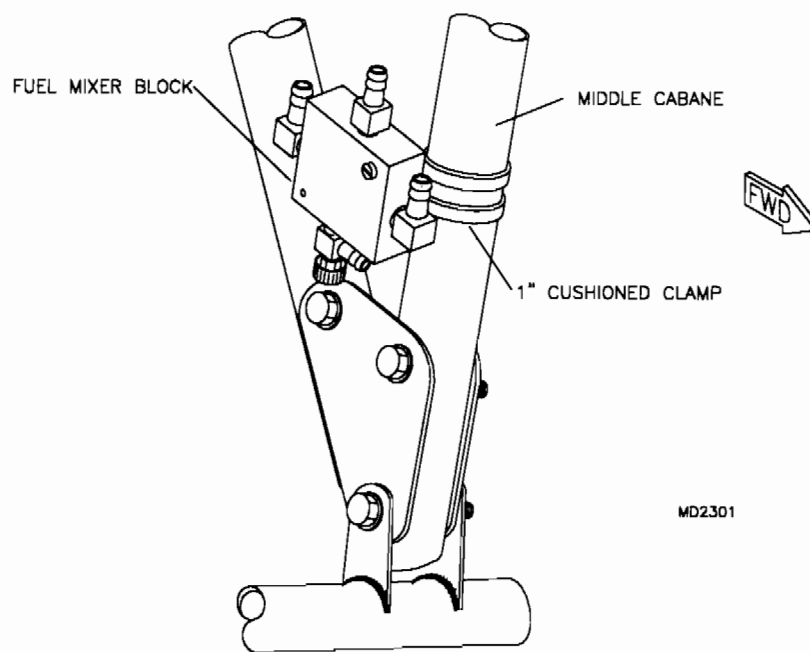
5. Install the sump drain valve to the bottom of the mixer block. Route the sump drain line down the gear leg. For installation of the fuel tanks into the wing, see wing frame assembly.

6. When installing the tensioning ribs (during the covering section) it will be necessary to project the holes for the sight gauge over to the tensioning rib. Once tension ribs and wing skins are installed, locate the loop clamp at the mid-point of the sight. This will allow the turnbuckles to clear the sight gauges.

S-12XL 582 FUEL SYSTEM - DUAL WING TANKS

1. Locate the parts shown in the parts drawing.
2. Route the lines as shown in the parts manual. **HINT:** For now, only tape the fuel lines in position. This will ensure proper routing without wasting zip ties. Zip tie lines in position during final assembly once satisfied with the routing. The fuel mixer block attaches to the middle cabane. See **FIGURE 04F-02**. Route upward from the mixer block to the fuel pump. Include the fuel shut-off valve, the primer bulb, the fuel filter, and the primer line "T." This line will route to the fuel pump as shown. Route the fuel feeds from the mixer block, up the aft cabane. Include the "Y" in the system. Make sure that the "Y" is mounted at least 12" below the keel. Leave approximately 4 feet of excess line at the keel for the forward withdrawal line and 1 foot of excess for the aft withdrawal line from the fuel tank. This will be connected to the tank during trial assembly and rigging.

FIGURE 04F-02



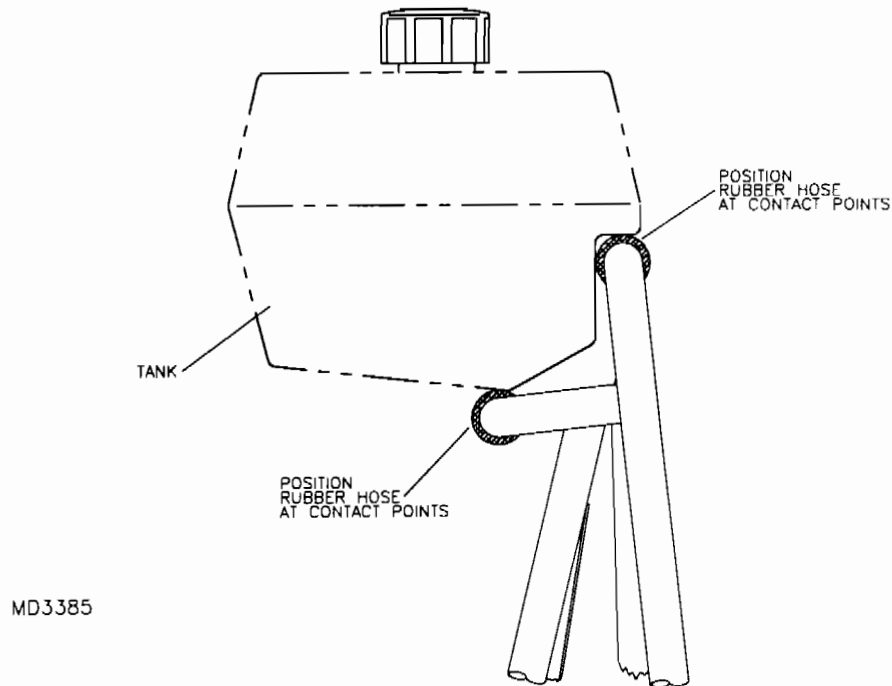
3. Once the wings are built and the fuel tank(s) in place, it will be necessary to leave fuel lines routed out the root rib. Therefore; it will be necessary to only trial fit the withdrawal lines to the fuselage. Once the wings are assembled, attach the fuel withdrawal lines to their appropriate fittings. Trial assembly and rigging will be the appropriate time for routing of all fuel lines. Remember, once the wings are covered, fuel tanks will become inaccessible.
4. Install the primer pump to the instrument panel and route the lines as shown. The angled fitting on the primer pump is the "in" (from the primer line T). The straight fitting routes to the carburetor. See engine installation for details.
5. Install the sump drain valve to the bottom of the mixer block. Route the sump drain line down the gear leg. For installation of the fuel tanks into the wing, see wing frame assembly.
6. When installing the tensioning ribs (during the covering section) it will be necessary to project the holes for the sight gauge over to the tensioning rib. Once tension ribs and wing skins are installed, locate the loop clamp at the mid-point of the sight. This will allow the turnbuckles to clear the sight gauges.

S-12XL 582 OIL INJECTION TANK AND MOUNT

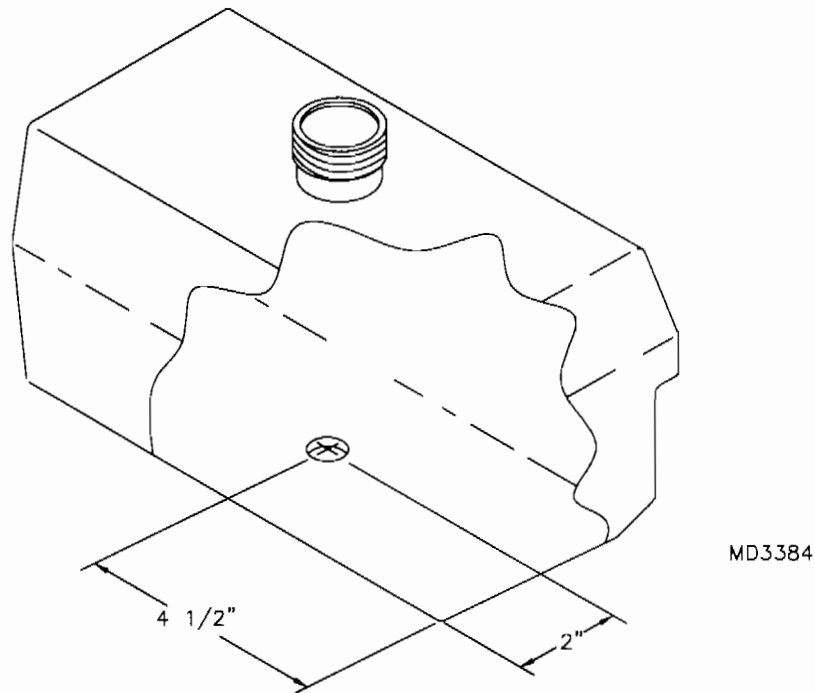
The oil injection tank sits above the engine, supported by the oil tank mount. Refer to Parts Manual.

1. Press 3/4" inch isolators into mount sleeves; press 7/16" isolators into 3/4" isolators (apply a small amount of dish soap to ease assembly). Isolators should be flush with each other and centered within the sleeves.
2. Locate bosses on sides of magneto housing (aft end of engine). Place mount on engine; when properly oriented, sleeves cover both 8mm holes of each boss. Drill out 3/16" washers to accommodate 8mm bolts; slip washers over bolts, apply Loctite, insert through isolators and tighten.
3. Cut 7/16" black fuel line into two 6" segments, split lengthwise and center on cross members of mount, where tank will contact. Refer to **FIGURE 04G-03**.

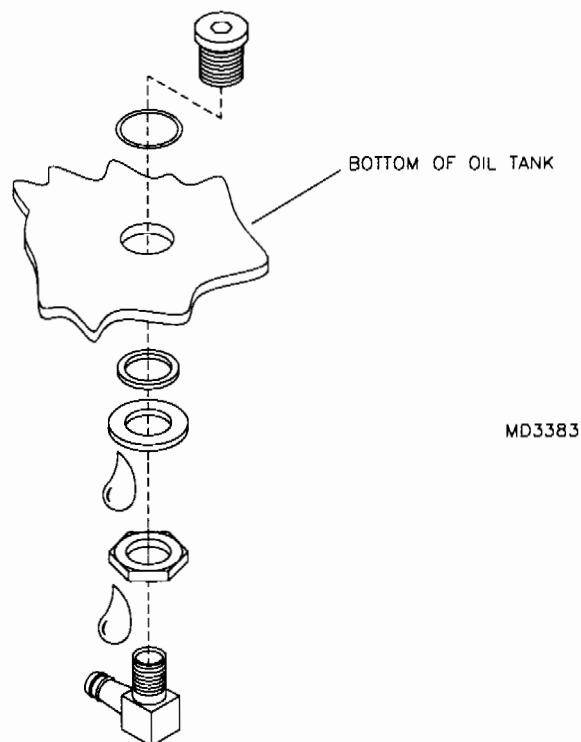
FIGURE 04G-03



4. Locate and drill a 1/2" hole in the bottom of oil tank as shown in **FIGURE 04G-04**. Carefully debur the hole and remove all debris from the tank. Take care not to bevel or enlarge while deburring.

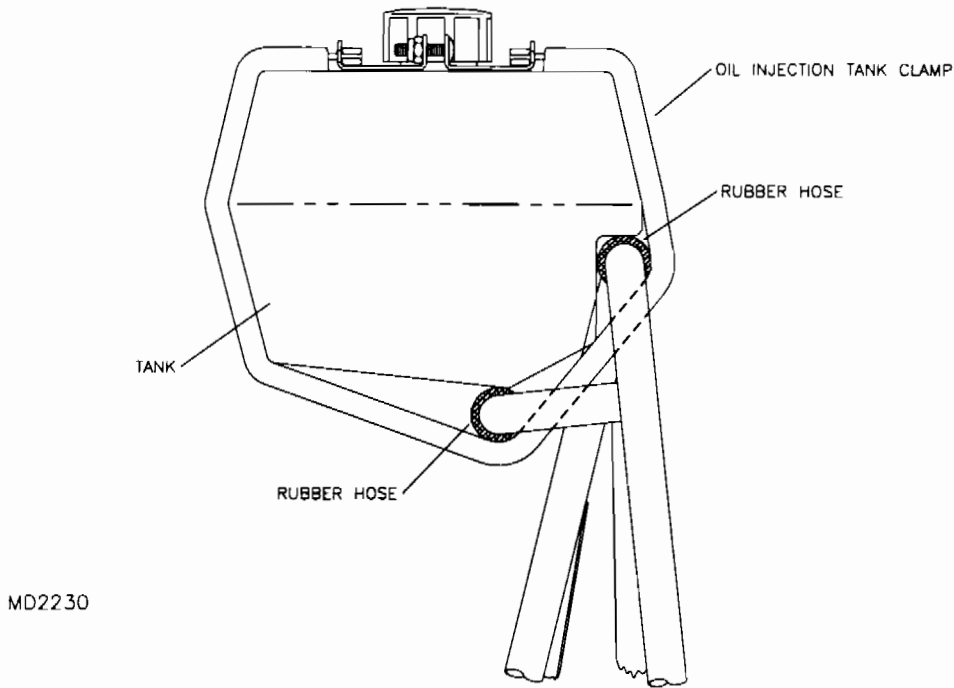
FIGURE 04G-04

5. Insert a rigid wire (an untwisted coat hanger will do) through the $\frac{1}{2}$ " hole and out the filler neck. Install an O-ring on the tank withdrawal fitting and slide the fitting onto the wire. Bend the wire sharply near the end to form a hook to retain the fitting; pull the fitting through the tank and into the $\frac{1}{2}$ " hole. Slide a rubber washer and $\frac{1}{2}$ " thick washer down the wire and onto the fitting; slide the nut-flared tube bulkhead down the wire, apply Loctite and thread onto the fitting. Remove the wire. Insert a $\frac{1}{4}$ " Allen wrench into the fitting to hold it while tightening the tube bulkhead. *Do not allow the fitting to rotate while tightening; leaks may occur otherwise.* Apply thread sealant or Loctite to the 90 withdrawal fitting and install in tank fitting. Again, *do not allow the tank fitting to rotate.* See **FIGURE 04G-05**.

FIGURE 04G-05

6. Install tank on mount as shown in **FIGURE 04G-06** and secure with clamps and hardware as shown in Parts Manual.

FIGURE 04G-06



7. Determine oil line routing and cut the 5/16" fuel line to suit. Fit one segment between the tank withdrawal fitting and the oil filter. **IMPORTANT:** the arrow on the filter case shows the necessary direction of flow; orient the filter accordingly. Fit another segment between the filter and the engine's oil injection pump. Secure connections with small hose clamps.

8. Remove the rubber gasket and plastic baffle from the fuel cap. The plastic baffle will "snap" out of the fuel cap; a screw driver works well for the removal.

Locate and drill a 1/4" hole in the center of the fuel cap as shown in **FIGURE 04G-08**. Install the conduit adjuster assembly in the fuel cap. Apply a small drop of loctite, install the 1/4" plain nut and tighten to secure the assembly to the cap. See **FIGURE 04G-08A**.

FIGURE 04G-08

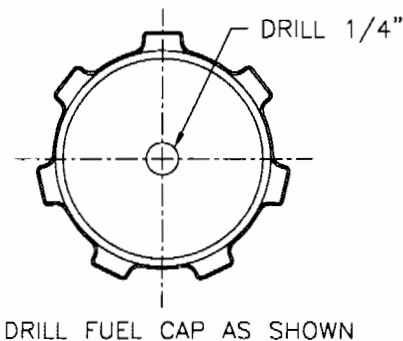
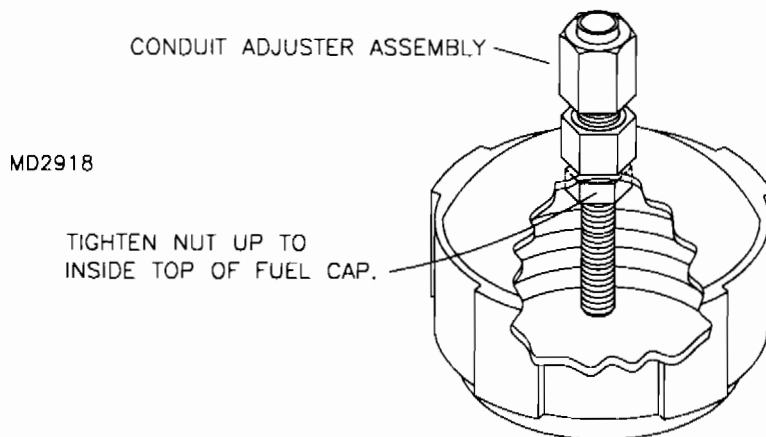
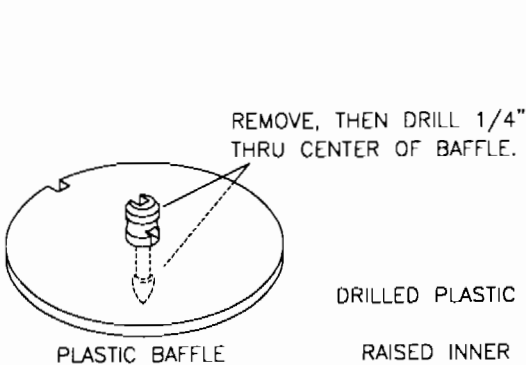
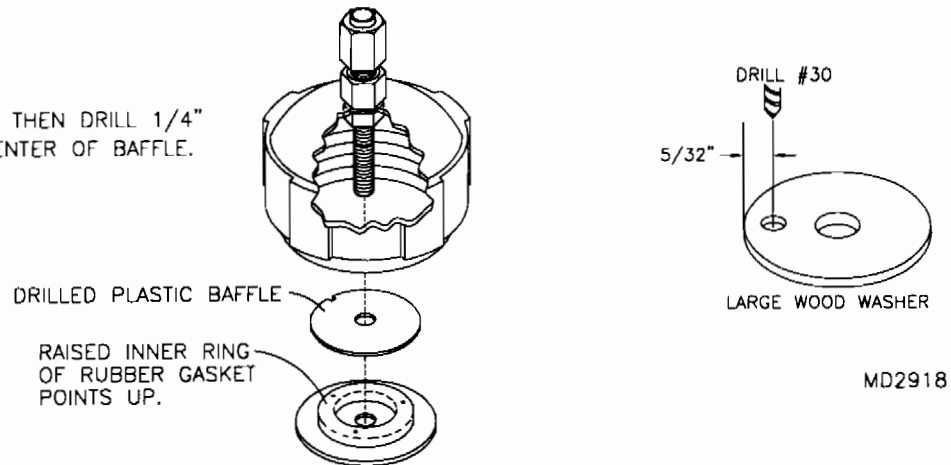


FIGURE 04G-08A



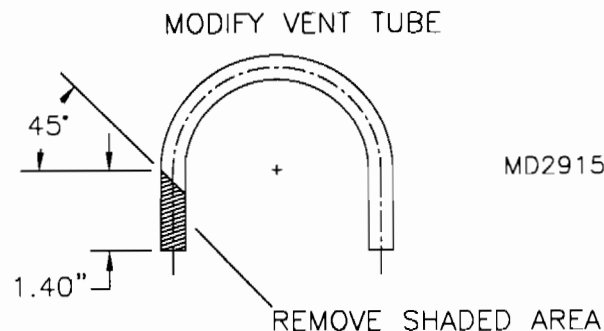
9. With a side cutters or file remove the attach nipples from the plastic baffle. See **FIGURE 04G-09**. Drill a 1/4" hole in the center of the plastic baffle and install into the fuel cap over the adjuster assembly stem. Drill a 1/4" hole in the center of the rubber gasket and install into the cap. Note the orientation of the rubber gasket.

Drill the 1/4" large wood washer as shown in **FIGURE 04G-09A**. Assemble the bead chain to the bead chain retainer sleeve. Install the bead chain and retainer sleeve into the #30 hole in the large wood washer. Install the washer and bead chain into the fuel cap. Install the 1/4" shear nut on the adjuster assembly stem and tighten.

FIGURE 04G-09**FIGURE 04G-09A**

10. Install the bead chain end coupling onto the bead chain. Find the center of the plastic retainer and drill a #30 hole. Using the brass backing washer, rivet the plastic retainer to the bead chain. Refer to the Parts Manual.

11. Modify the vent tube as shown in **FIGURE 04G-11**. Install the vent tube into the adjuster assembly. Install the fuel cap assembly onto the tank and tighten. Position the vent tube so that the 45 degree angle is pointing forward (into the slipstream) and tighten the assembly cap to secure the vent tube.

FIGURE 04G-11

12. Check all clamps and fittings, apply anti-chafe where necessary and secure all lines. **IMPORTANT:** Always check the oil tank and mount before **EACH** flight. An empty oil tank can destroy an engine; **ALWAYS** check the oil level before flying.

S-12XL 582 COOLING SYSTEM - MINI-POD OR PARTIAL

- The cooling system can be installed on the Airaile after the fuselage is completed and the engine mounted. The wings can be off for the cooling system installation; however, you must allow for the coolant hose to route inboard of the composite root ribs and off of center cover assembly.
1. Select the parts shown in the parts manual. Assemble two of the short lengths of radiator hose to the inlet and outlets on the radiator. **HINT:** Apply a drop of blue locitite to the hose clamps then tighten.
 2. Assemble the radiator cooling scoop by first bolting the radiator to the scoop as shown in the parts drawing. Locate the radiator/boom seal. Trim the edge of the seal and locate #30 holes as shown in **FIGURE 04H-02**. Center mold over the cut out in the radiator top panel's bottom side as shown. Mark, drill, and rivet using the radiator/boom seal as a guide. Make sure to use the 1/8" washers as shown in the parts manual. The top panel attaches to the scoop with (5) 1/8" aluminum pop rivets evenly spaced on each side. See **FIGURE 04H-02A**. Be sure to install the rubber edging onto the top panels AFT flange and around the edges of the tail boom hole. This rubber edging helps seal and protect the radiator and tail boom from chafing. Once radiator/boom seal and rubber edging are in place, rivet top panel in position.

FIGURE 04H-02

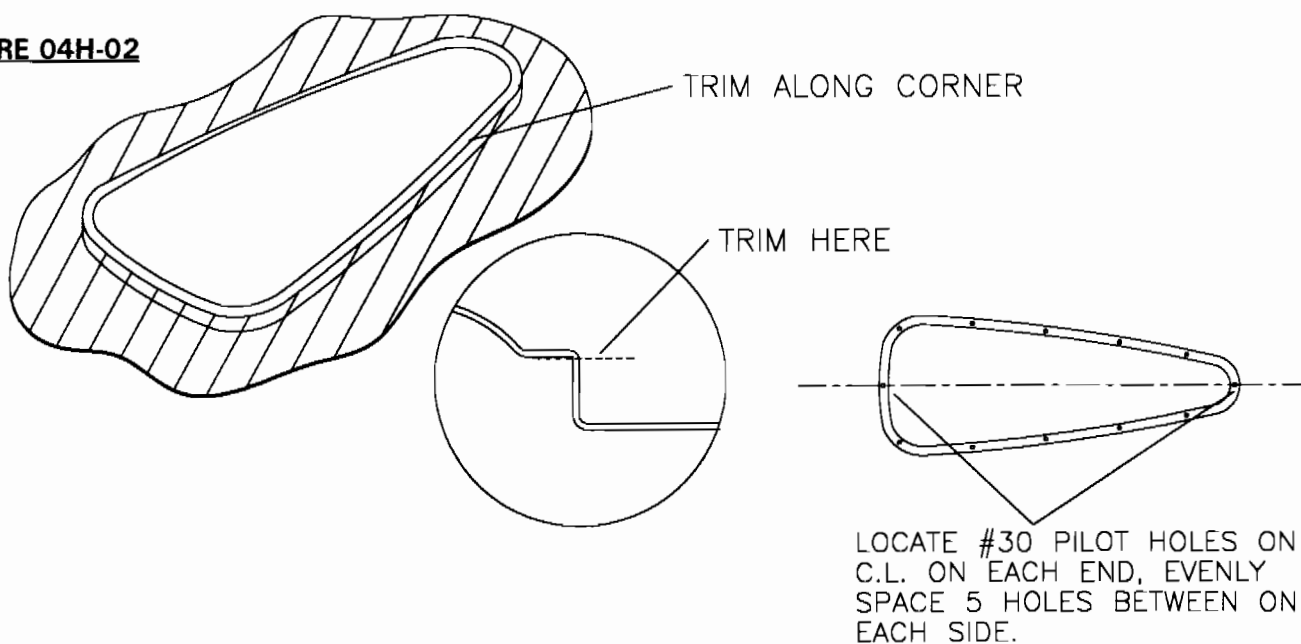
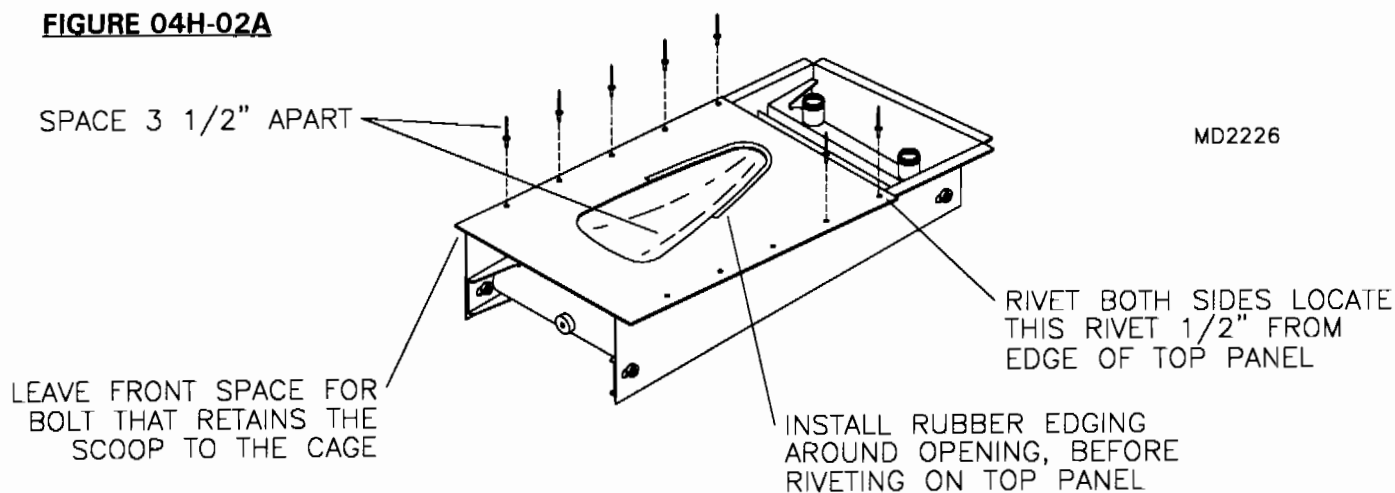
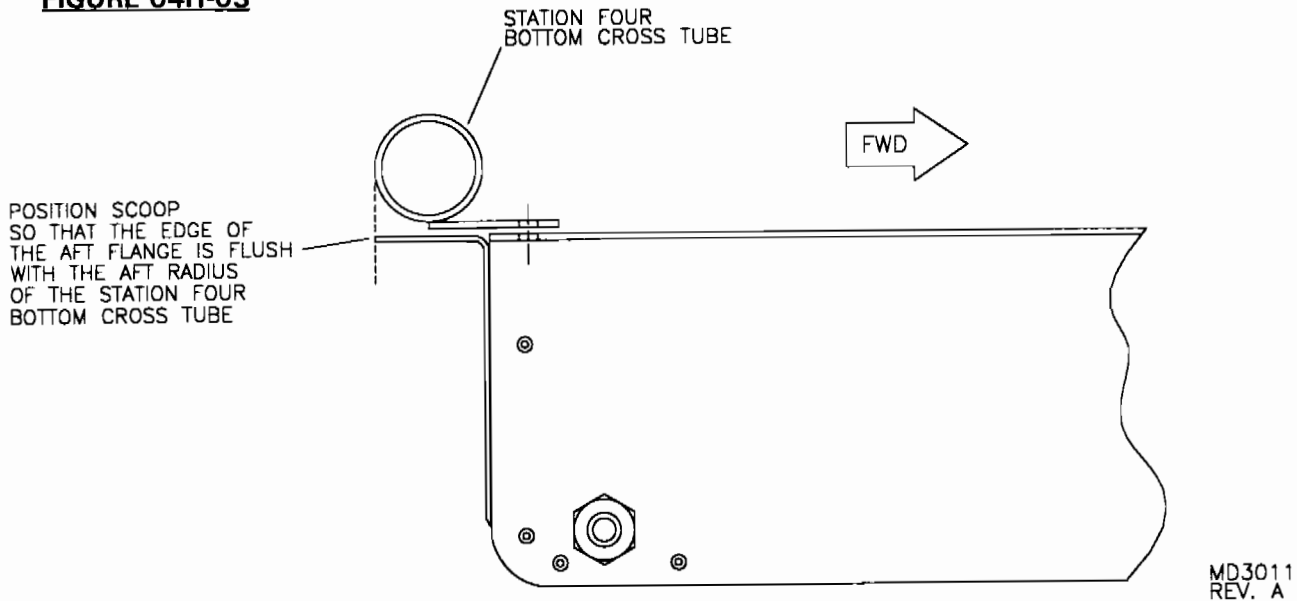
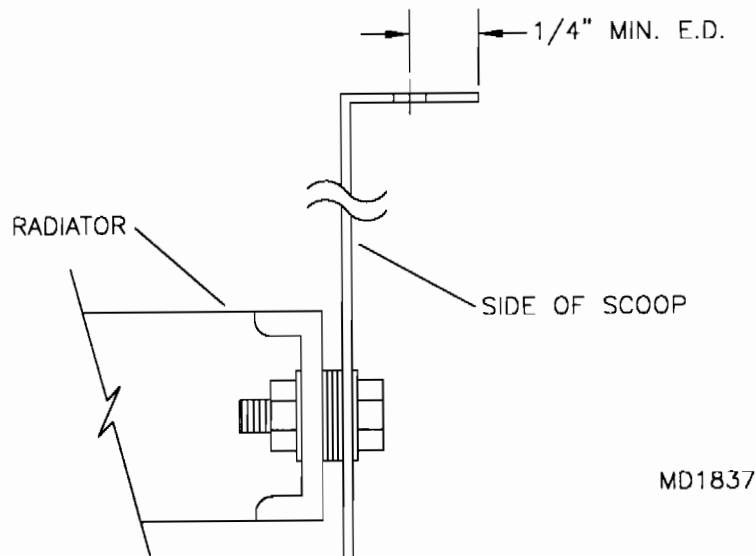


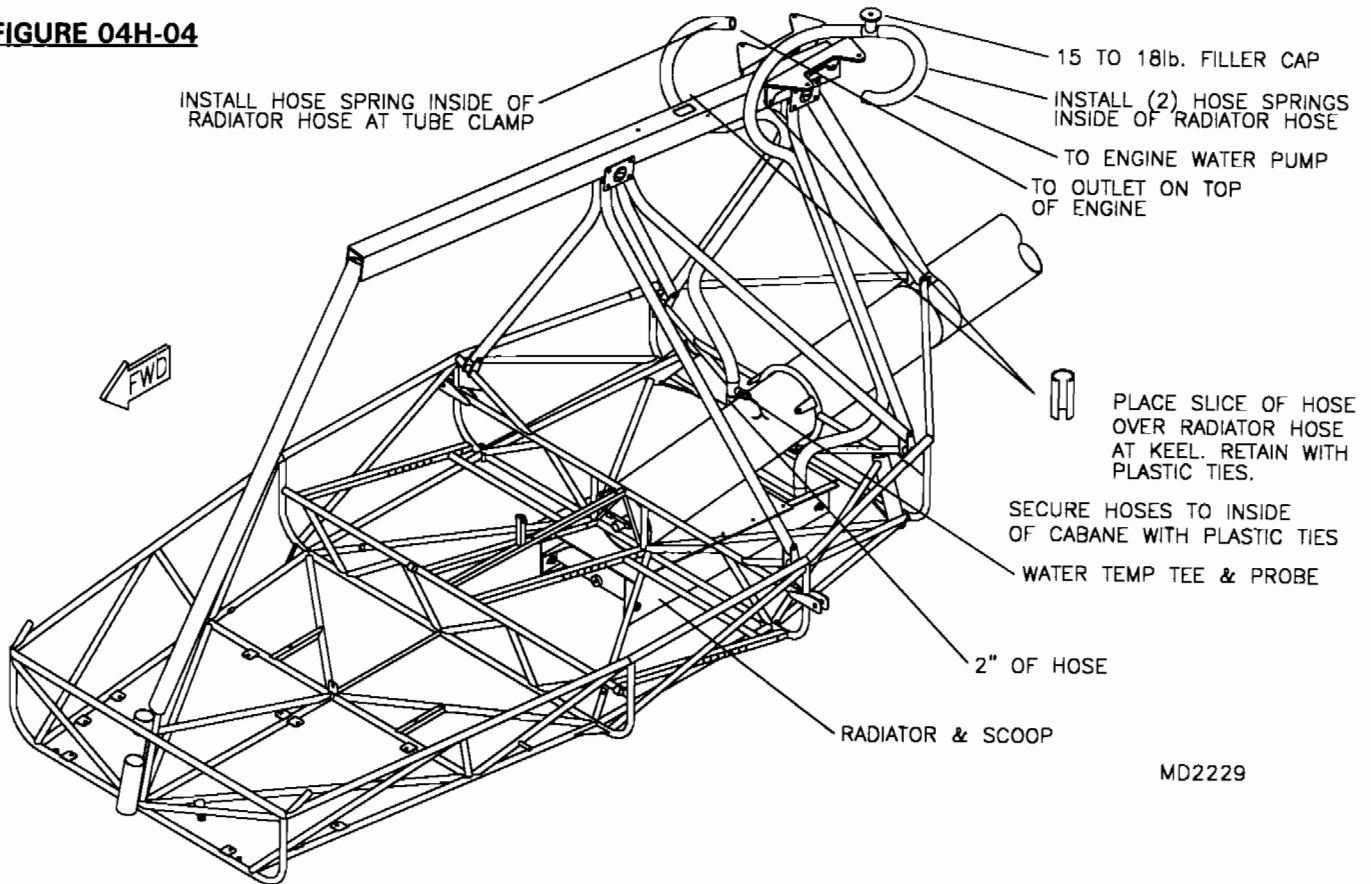
FIGURE 04H-02A



3. Clamp the radiator/scoop assembly to the tabs on the belly of the fuselage so that the aft flange is flush with the aft radius of the station four bottom cross tube. Refer to **FIGURE 04H-03**. Center and square the scoop with the fuselage. With a #11 drill bit, transfer drill through the mount tabs and into the side flanges on the scoop. **NOTE:** It may be necessary to spread or compress the side walls of the radiator scoop to match the holes in the tabs in order to maintain a 1/4" flange E.D. Refer to **FIGURE 04H-03A**. Remove the radiator scoop and nut plate the tabs. **NOTE:** If you are installing the #2 belly pan, do not nut plate the forward mount tabs until the mount holes have been transfer drilled through the belly pan. Upon final installation of the #2 belly pan, bolt the radiator in place using hardware shown.

FIGURE 04H-03**FIGURE 04H-03A**

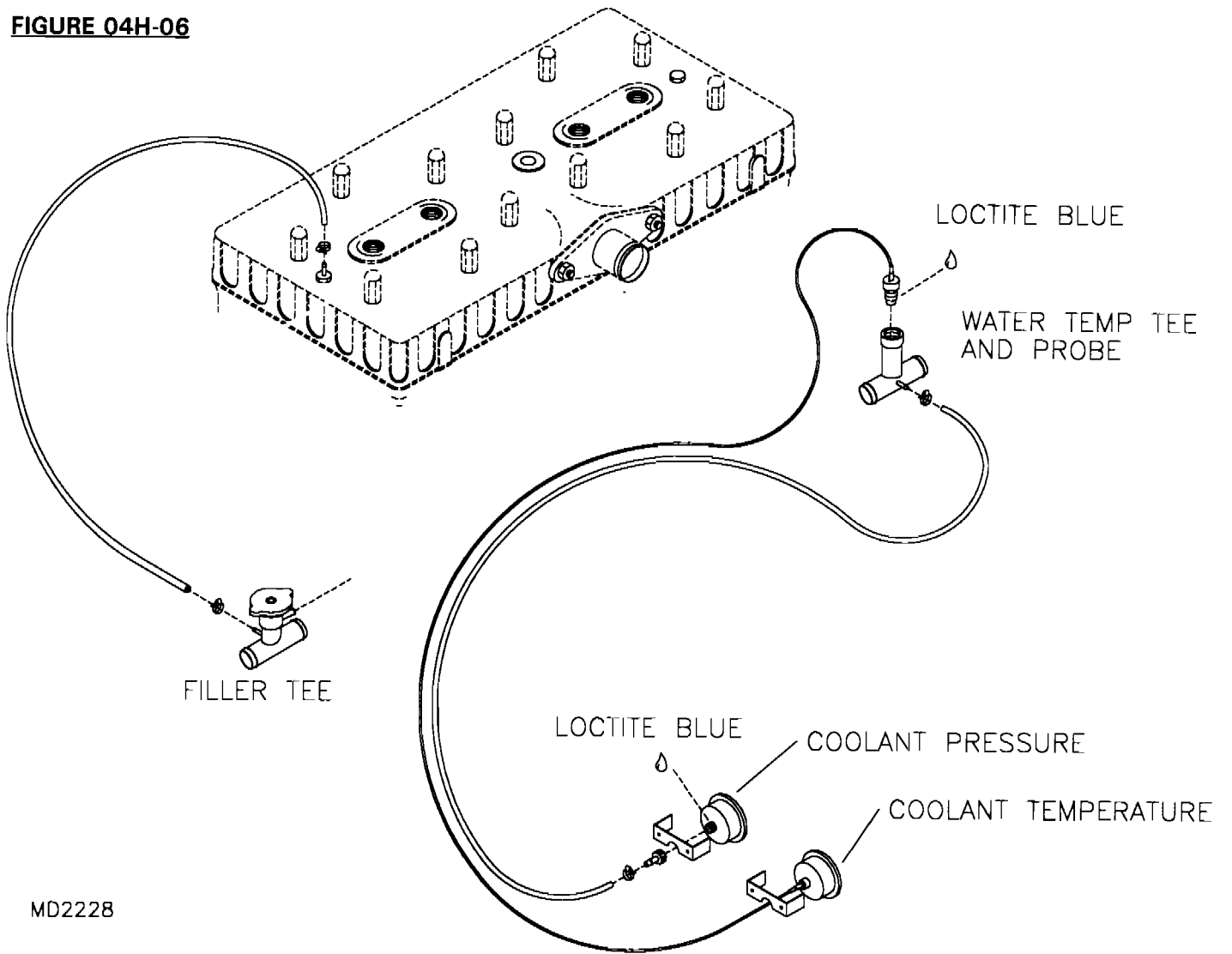
4. Install the hoses to the cockpit cage in the manner shown in **FIGURE 04H-04**. **PLEASE NOTE:** The hoses run up each side of the AFT cabanes and are retained with plastic zip ties. The hoses route around the **FRONT** side of the rear spars. If you are installing the partial enclosure, the radiator hoses must be included **INSIDE** the windshield top former. At the point where the hoses pass by the keel, install the remaining two short segments of rubber hose. Split this lengthwise and retain them to the hoses with plastic ties.

FIGURE 04H-04

MD2229

5. Install the temperature probe tee in the right line directly after the 2" hose coming out of the reducer. Position the tee to point as necessary to help with routing the probe line. Route the lines as direct as possible.
6. When installing the water pressure gauge, run the small 1/8" I.D. line from the barbed nipple on the temperature probe tee fitting to the instrument panel. Another line routes from the filler tee to the purge vent on top of the 582 engine, see **FIGURE 04H-06**. Route the line inside the plastic line housing with the wiring. The pressure gauge is highly recommended. It not only acts as an indicator for coolant quantity and pressure, it also serves as a surge protector. Units with pressure gauges can go to 20 lbs pressure without jettisoning coolant. Water temperature and water pressure probes route as shown.

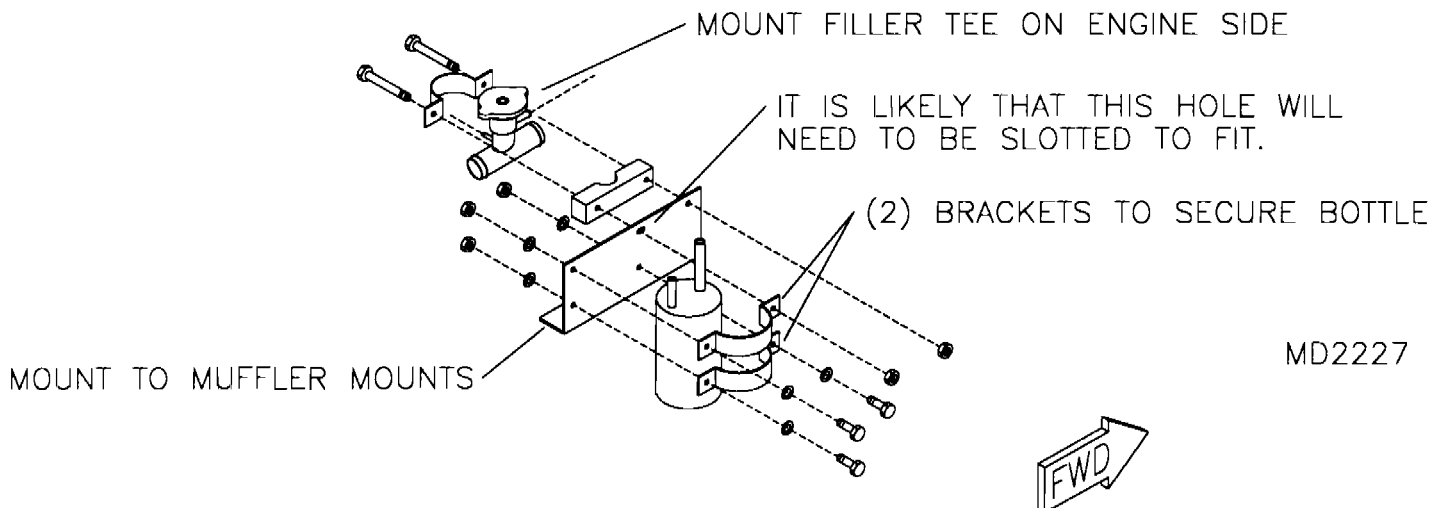
FIGURE 04H-06



MD2228

7. Bolt the filler tee and overflow bottle mount angle to the muffler mounts. See **FIGURE 04H-07** for location and position.

FIGURE 04H-07



MD2227

COOLING SYSTEM FILLING & OPERATIONS

FILLING

Prior to filling the system check all connections and hose clamps for a tight secure fit. Fill the system with 50/50 mix of water and anti-freeze. Air in the cooling system will be your biggest concern. Air is easily purged from the system by unscrewing the 6mm bolt at the top of the engine and filling the fluid until it runs out. Also, the water pump needs to be purged of air by loosening the small hex headed screw on its top side. Tighten the clamp and fill to the top of the filler tee.

BREAK IN & OPERATIONS

IMPORTANT: Use a box fan to circulate the air over the radiator during break in. We usually run our S-12's with quite a breeze, that's Kansas you know, but other parts of the world are less windy. The fan will assure proper cooling during break in. Once broke in, normal operations should not exceed 200 degrees even in a long slow taxi. During the break in run of the engine it is normal for some coolant to overflow. This may be due to air bubbles or excessive fluid. Watch your temperature and pressure gauge. Temps should be around 160 to 170°F with pressure under 16 lbs. Feel the hoses, if you can hold your hand on them for 30 seconds you are getting proper cooling. If you are running 200 or above and not overflowing do the hand test, it may be your gauge is in error.

REASONS FOR POOR COOLING

1. **LOW COOLANT LEVEL:** Check level and fill. Inspect for leaks. Look around the pump, they are famous for leaking through the drive shaft. Make it a habit to check the coolant before every first flight of the day.
2. **AIR IN THE SYSTEM:** Purge by venting the top hose or 6mm bolt on the head of the engine.
3. **KINK OR RESTRICTION IN THE HOSES:** Check for kinks, collapsed hose or broken pump impeller.
4. **DIRTY OR CLOGGED AIR FLOW THROUGH RADIATOR:** The under belly position of the radiator allows debris to collect in the scoop. This will reduce the amount of air flow through the radiator and thus reduce its cooling ability. Inspect for debris as part of your pre-flight.
5. **IMPROPER FILLER CAP PRESSURE:** Using anything less than a 15 to 18 lb cap will allow fluid to overflow and drain down the coolant level. Check to make sure your cap is rated for 15 to 18 lbs.

S-12XL 582 COOLING SYSTEM - FULL ENCLOSURE

- The cooling system can be installed on the Airaile after the fuselage's super structure is completed and the engine mounted. Belly pan #2 and #3 should only be clecoed in place to ease in assembly. The wings can be off for the cooling system installation; however, you must allow for the coolant hose to route inboard of the composite root ribs and off of center cover assembly.
1. Select the parts shown in the parts manual. Assemble two of the short lengths of radiator hose to the inlet and outlets on the radiator. **HINT:** Apply a drop of blue loctite to the hose clamps then tighten.
 2. Assemble the radiator scoop by first riveting the left and right radiator scoop-side panels to the radiator scoop-bottom panel. Refer to the parts manual for the necessary hardware. Bolt the radiator in place using the four pre-drilled holes in the side panels and the proper hardware. See **FIGURE 04I-02A**. Locate the radiator boom/seal. Trim the edge of the seal and locate #30 holes as shown in **FIGURE 04I-02**. Center the boom/seal over the cut out in belly pan #3, mark, drill and rivet using the boom/seal as a guide.

FIGURE 04I-02

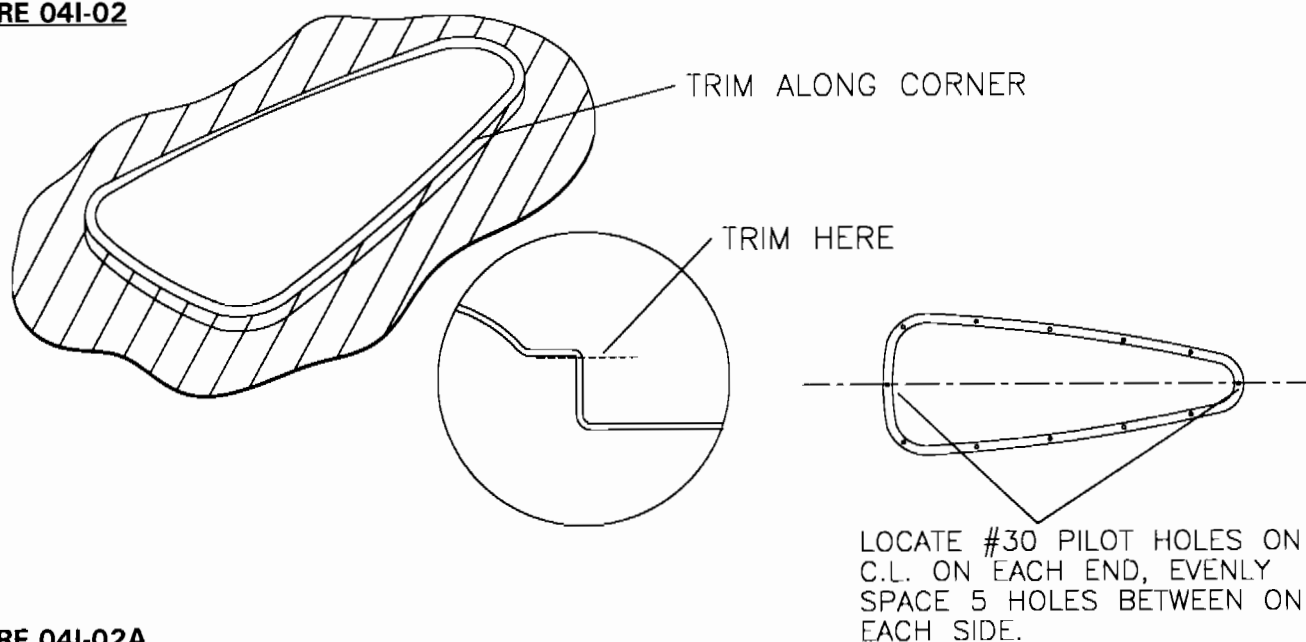
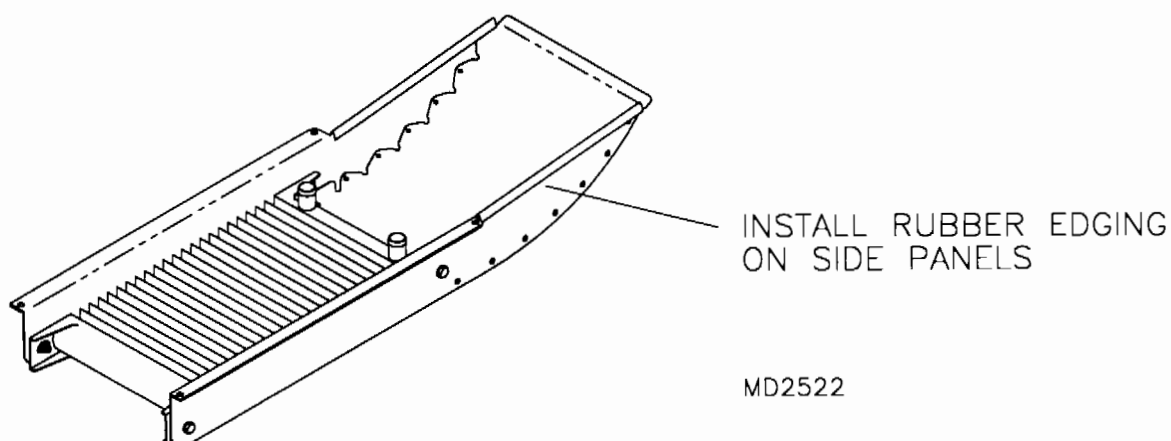
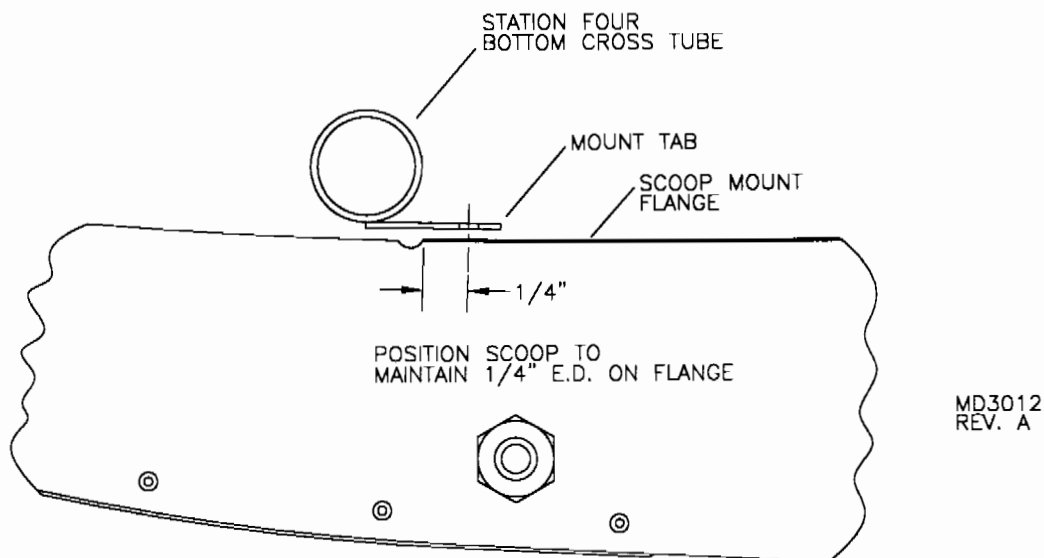
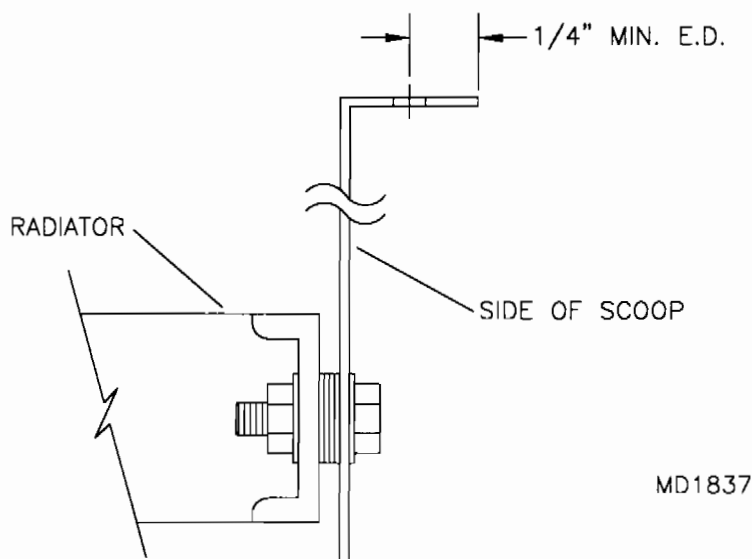


FIGURE 04I-02A

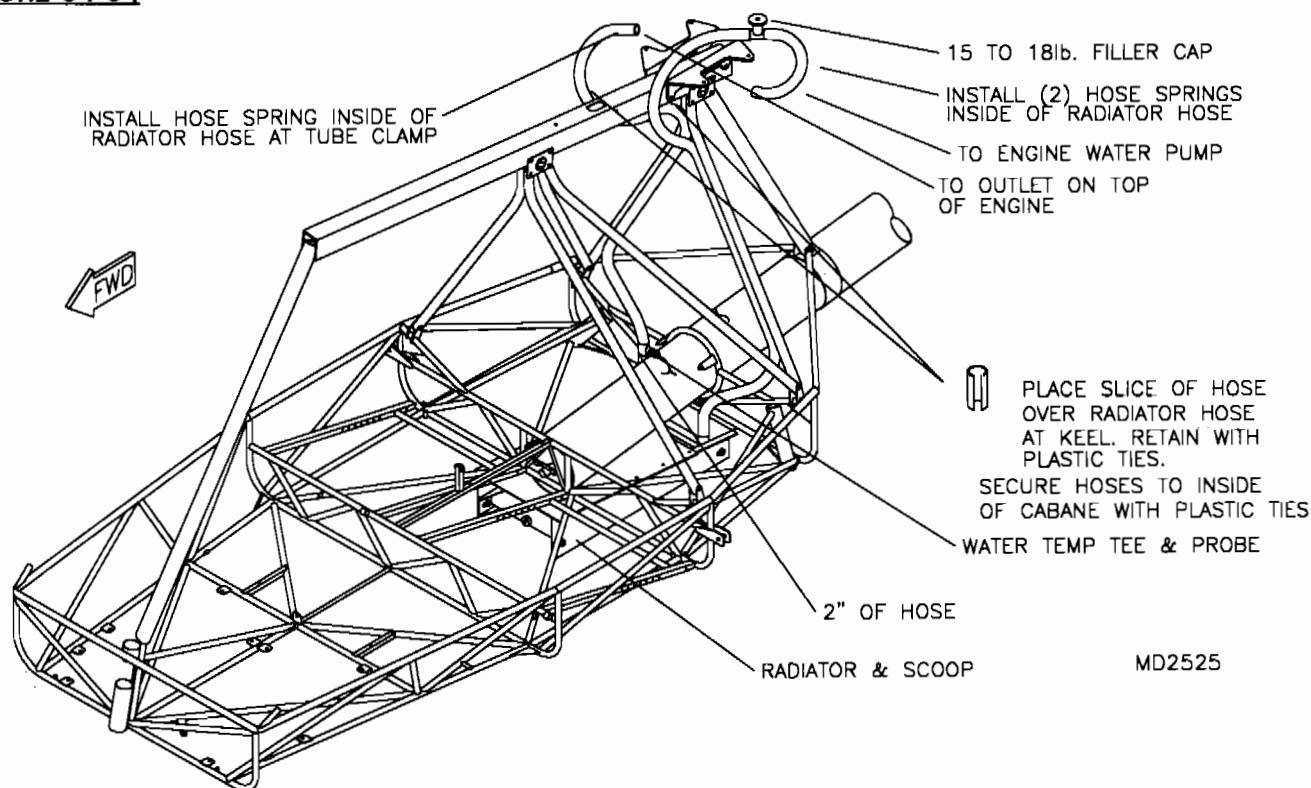


3. Clamp the radiator/scoop assembly to the tabs on the belly of the fuselage so that there is 1/4" E.D. from the aft end of the mount flange to the center of the hole in the mount tab. Refer to **FIGURE 04I-03**. Center and square the scoop with the fuselage. With a #11 drill bit, transfer drill through the mount tabs and into the side flanges on the scoop. **NOTE:** It may be necessary to spread or compress the side walls of the radiator scoop to match the holes in the tabs in order to maintain a 1/4" flange E.D. Refer to **FIGURE 04I-03A**. Once the scoop has been located, install the belly pans and transfer drill the mounting holes through the belly pans. Using the aft set of mounting holes as a reference, locate two 1 3/4" holes in belly pan #3 for radiator hose access. Use a hole saw or adjustable fly cutter. Remove the belly pans and install the nut plates on the mount tabs. Note that the nut plate rivets are installed from the bottom side. Upon final installation of the belly pans, bolt the radiator in place using hardware shown.

FIGURE 04I-03**FIGURE 04I-03A**

4. Install the hoses to the cockpit cage in the manner shown in **Figure 04-04**. **PLEASE NOTE:** The hoses run up each side of the AFT cabanes and are retained with plastic zip ties. The hoses route around the **FRONT** side of the rear spars. At the point where the hoses pass by the keel, install the remaining two short segments of rubber hose. Split this lengthwise and retain them to the hoses with plastic ties.

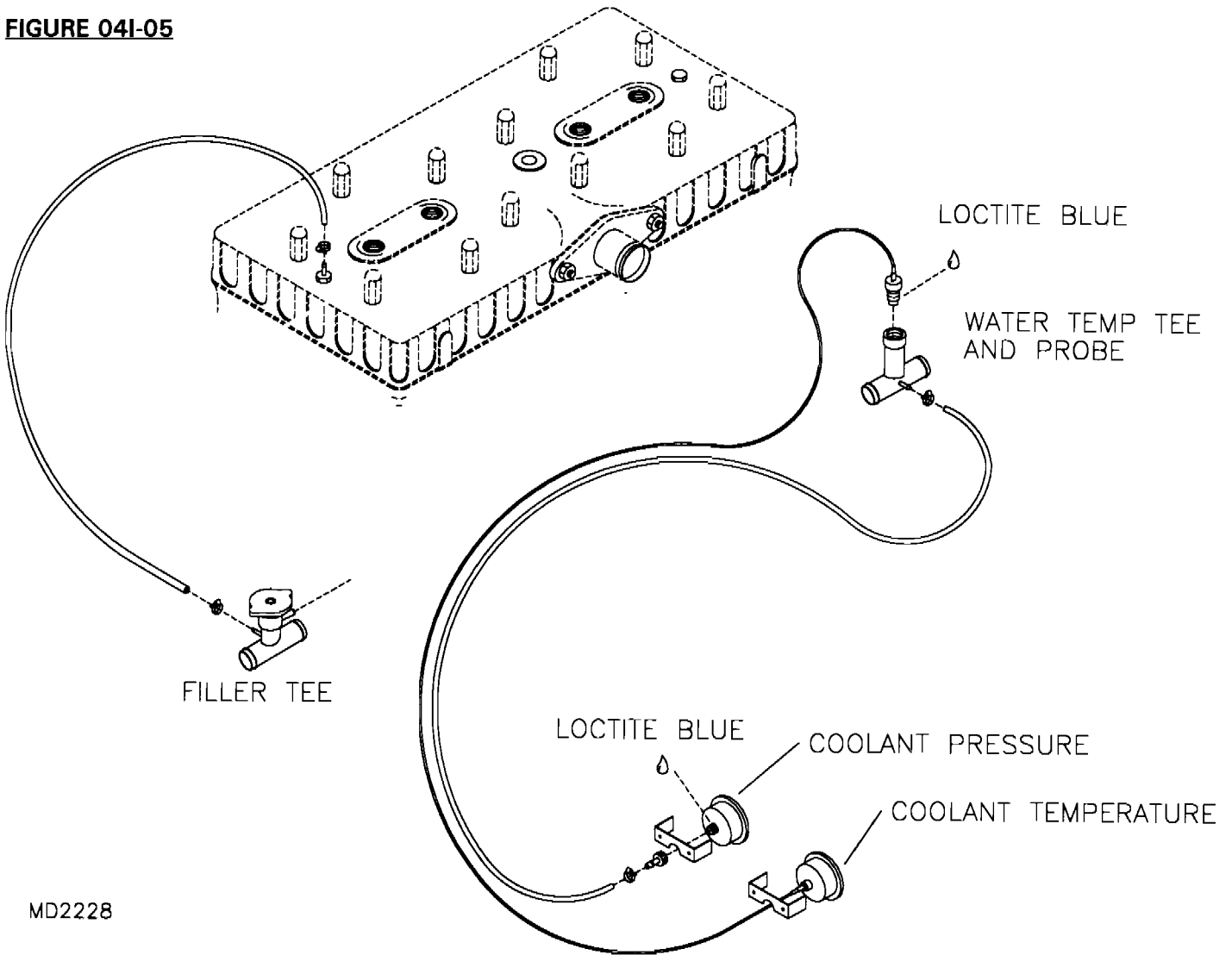
FIGURE 04-04



5. Install the temperature probe tee in the right line directly after the 2" hose coming out of the reducer. Position the tee to point as necessary to help with routing the probe line. Route the lines as direct as possible.

6. When installing the water pressure gauge, run the small 1/8" I.D. line from the barbed nipple on the temperature probe tee fitting to the instrument panel. Another line routes from the filler tee to the purge vent on top of the 582 engine, see **FIGURE 04I-05**. Route the line inside the plastic line housing with the wiring. The pressure gauge is highly recommended. It not only acts as an indicator for coolant quantity and pressure, it also serves as a surge protector. Units with pressure gauges can go to 20 lbs pressure without jettisoning coolant. Water temperature and water pressure probes route as shown.

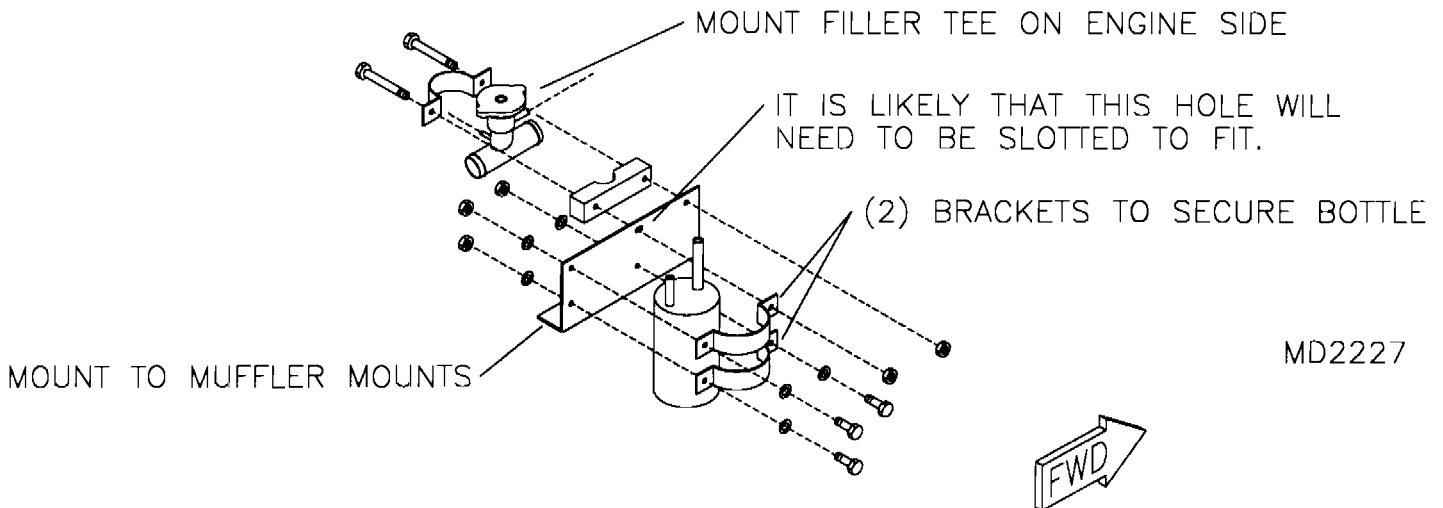
FIGURE 04I-05



MD2228

7. Bolt the filler tee and overflow bottle mount angle to the muffler mounts. See **FIGURE 04I-06** for location and position.

FIGURE 04I-06



MD2227

COOLING SYSTEM FILLING & OPERATIONS

FILLING

Prior to filling the system check all connections and hose clamps for a tight secure fit. Fill the system with 50/50 mix of water and anti-freeze. Air in the cooling system will be your biggest concern. Air is easily purged from the system by unscrewing the 6mm bolt at the top of the engine and filling the fluid until it runs out. Also, the water pump needs to be purged of air by loosening the small hex headed screw on its top side. Tighten the clamp and fill to the top of the filler tee.

BREAK IN & OPERATIONS

IMPORTANT: Use a box fan to circulate the air over the radiator during break in. We usually run our S-12's with quite a breeze, that's Kansas you know, but other parts of the world are less windy. The fan will assure proper cooling during break in. Once broke in, normal operations should not exceed 200 degrees even in a long slow taxi. During the break in run of the engine it is normal for some coolant to overflow. This may be due to air bubbles or excessive fluid. Watch your temperature and pressure gauge. Temps should be around 160 to 170°F with pressure under 16 lbs. Feel the hoses, if you can hold your hand on them for 30 seconds you are getting proper cooling. If you are running 200 or above and not overflowing do the hand test, it may be your gauge is in error.

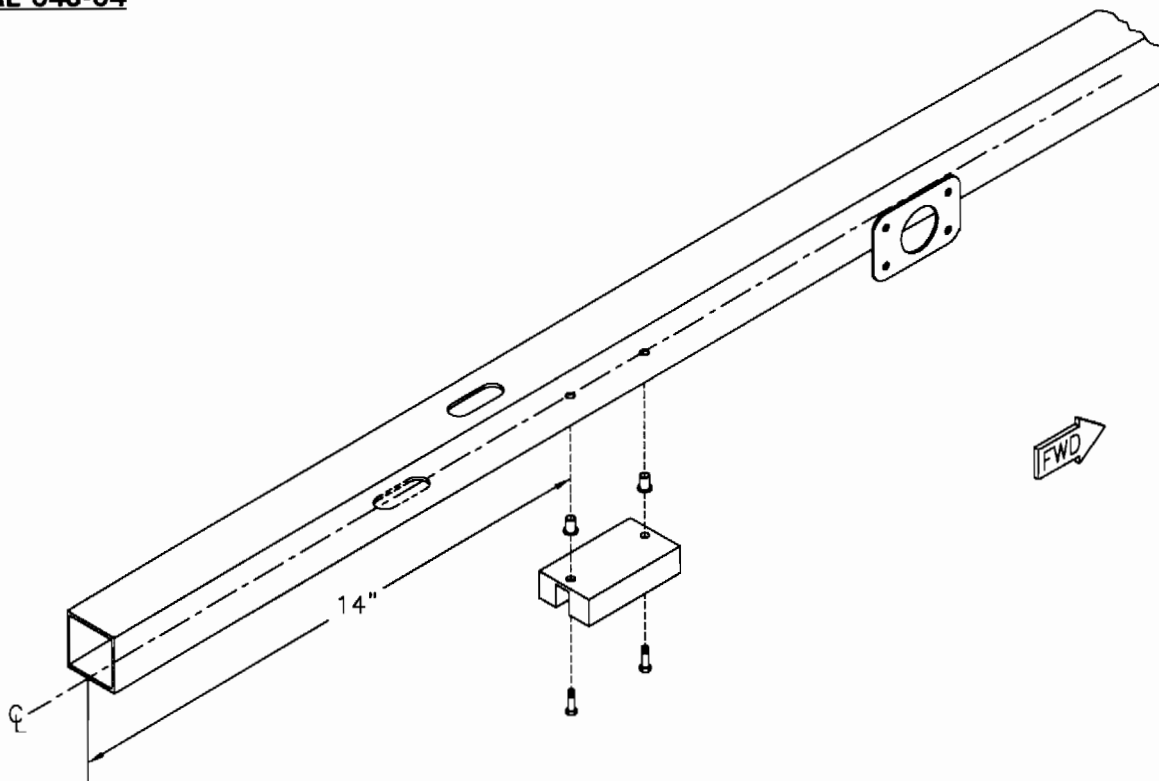
REASONS FOR POOR COOLING

1. **LOW COOLANT LEVEL:** Check level and fill. Inspect for leaks. Look around the pump, they are famous for leaking through the drive shaft. Make it a habit to check the coolant before every first flight of the day.
2. **AIR IN THE SYSTEM:** Purge by venting the top hose or 6mm bolt on the head of the engine.
3. **KINK OR RESTRICTION IN THE HOSES:** Check for kinks, collapsed hose or broken pump impeller.
4. **DIRTY OR CLOGGED AIR FLOW THROUGH RADIATOR:** The under belly position of the radiator allows debris to collect in the scoop. This will reduce the amount of air flow through the radiator and thus reduce its cooling ability. Inspect for debris as part of your pre-flight.
5. **IMPROPER FILLER CAP PRESSURE:** Using anything less than a 15 to 18 lb cap will allow fluid to overflow and drain down the coolant level. Check to make sure your cap is rated for 15 to 18 lbs.

**S-12XL 582 INSTRUMENTS AND ELECTRICAL
WITHOUT ELECTRIC STARTER**

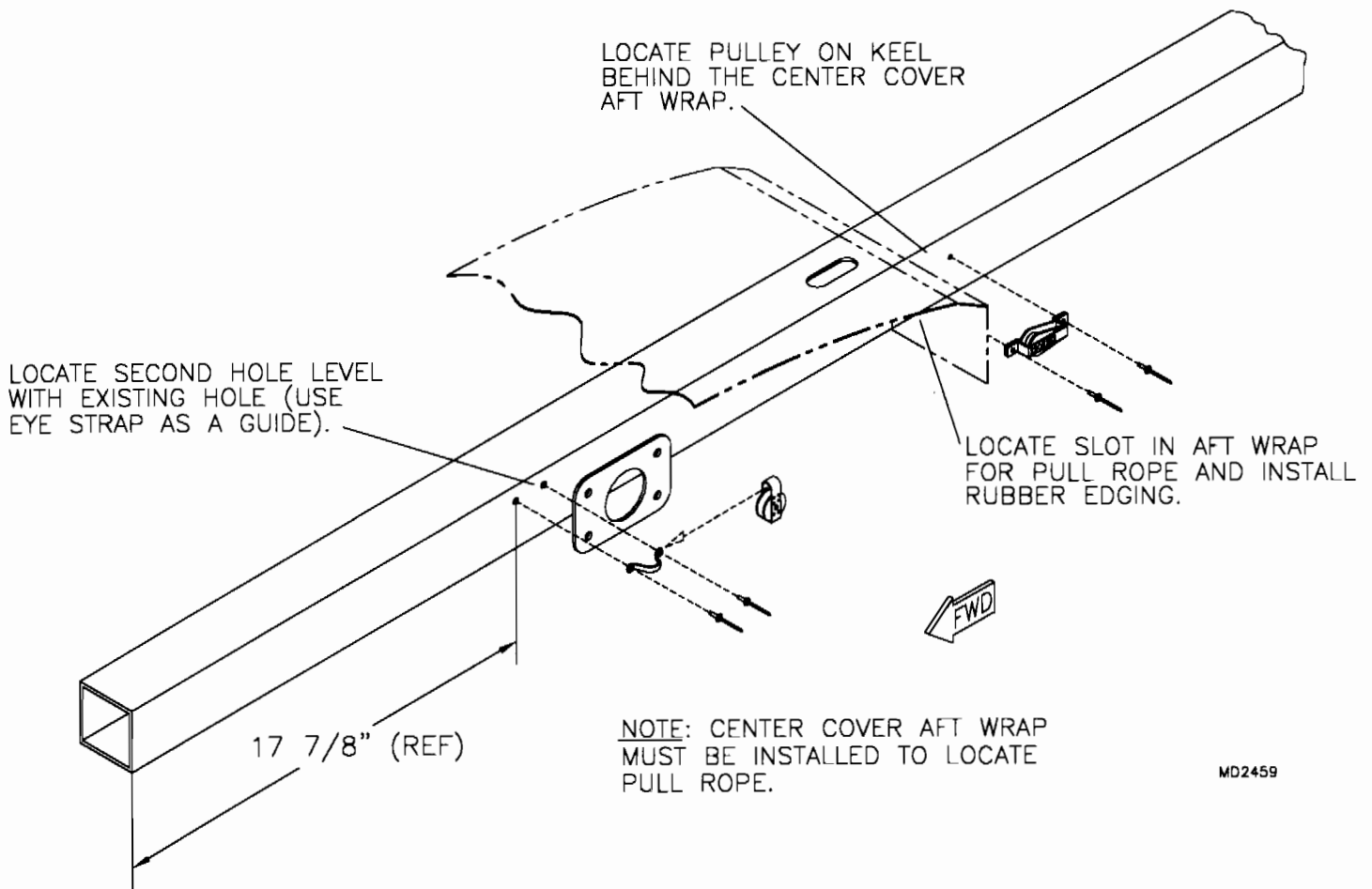
1. Locate the parts shown in the parts manual.
2. Temporarily install the aft center cover as shown in the Fuselage Enclosure section of the manual. This will help to determine the best path for the engine related wires.
3. Install instruments into the instrument panel. Study the instrument and electrical schematic very carefully. Route all wiring as neatly as possible. This will greatly ease installation and any trouble shooting should it ever be required.
4. Install the regulator/rectifier in the location shown in **FIGURE 04J-04**. Drill as required to install the hardware shown.

FIGURE 04J-04



MD2142

5. When routing pitot and static lines into the instrument panel, be sure not to kink or crush the lines.
6. Install the pulleys for the pull rope as shown in **FIGURE 04J-06**. Locate the eye strap as shown in the figure. **Remember** to slip the pulley in position before riveting the eye strap in position. With the engine in place, locate the aft pulley just behind the center cover aft wrap. Locate to prevent chafing of the pull start rope. **NOTE:** it will be necessary to locate a slot in the center cover aft wrap for the pull rope. Slot as required and install rubber edging.

FIGURE 04J-06

MD2459

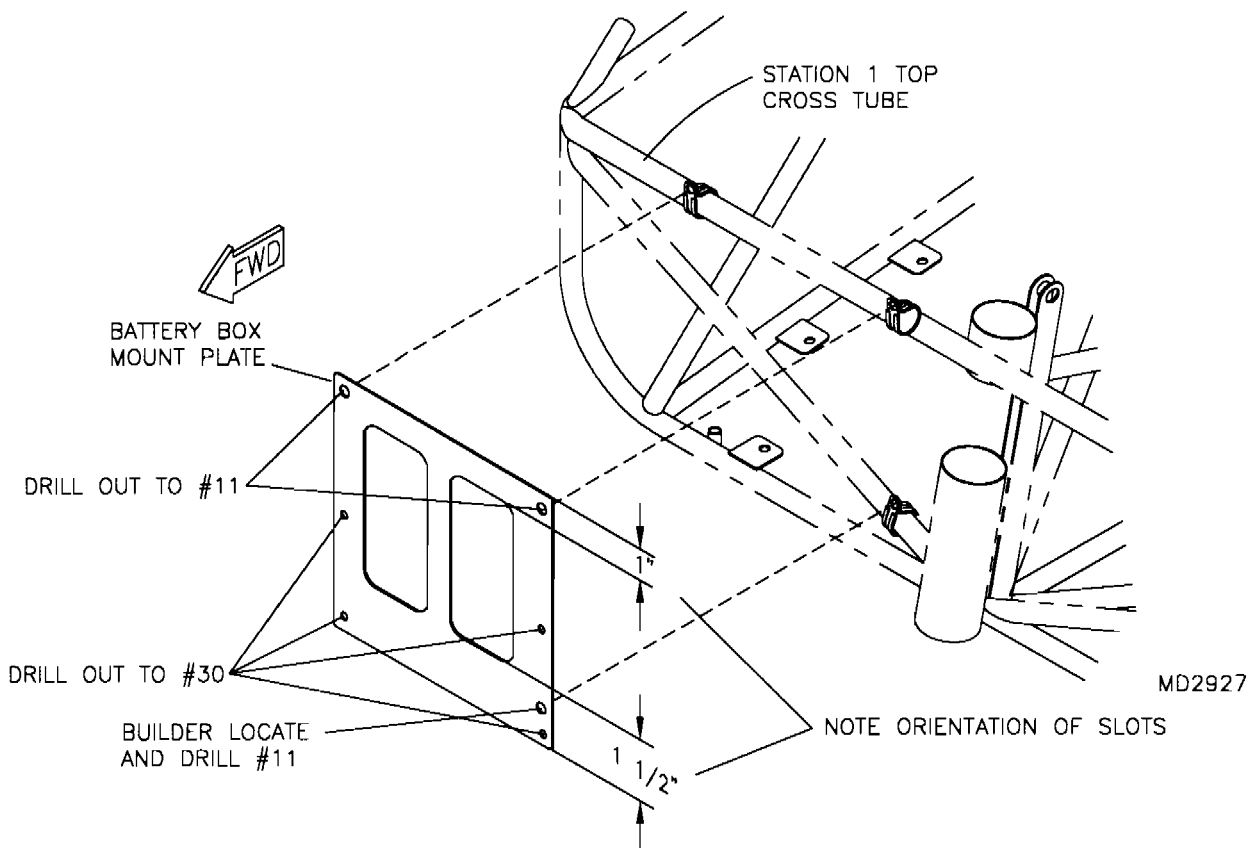
S-12XL 582 BATTERY BOX INSTALLATION

1. Drill out the two pre drilled corner holes only, to #11 shown in **FIGURE 04K-01**. Note the orientation of the battery box mount plate. Drill the remaining holes to #30.

Drill one hole in the support angles and the corresponding hole in the side plate to #30 and rivet the support angles to the side plate. Chase drill through the second hole of the side plate and support angle and rivet. Refer to the parts drawing.

Position one side of the side plate flush with the mount plate. Using a #11 & #30 drill bit and using the mount plate as a guide, transfer drill through the three side holes in the mount plate into the side plate. Rivet the side plate to the mount plate through the #30 hole(s) only. Slide the battery into the box and pull the opposite (loose) side of the side plate in tight to the battery. Using the mount plate as a guide transfer drill through the mount plate into the side plate with the appropriate sized bit. Install only the #30 rivet(s). The #11 holes will be used to mount the battery box.

FIGURE 04K-01



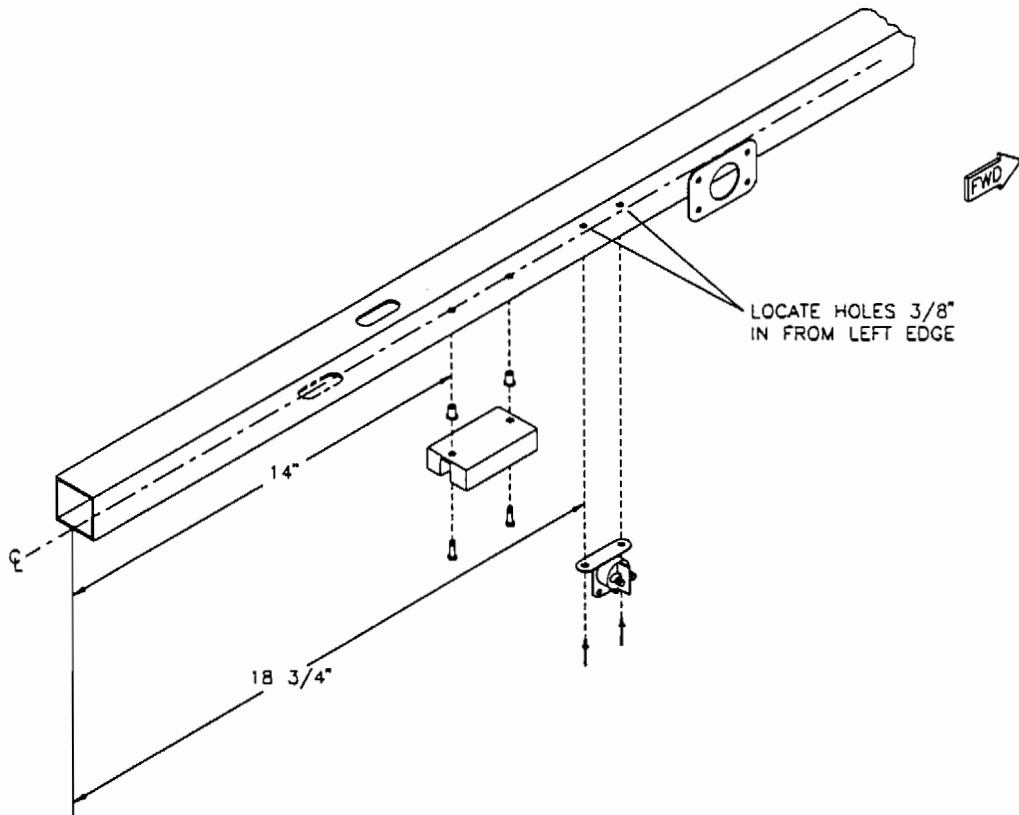
2. Install the cushioned clamps onto the station 1 top cross tube and the diagonal tube as shown in the parts drawing. Note the orientation of the cushioned clamps. Bolt the battery box to the top two cushioned clamps. Slide the third clamp on the diagonal until it lines up with the battery box. Verify clearance between the battery box and the steer link rods. Mark the hole location of the cushioned clamp on the battery box and drill to a #11. Bolt box in place.

3. Install the battery, battery bar and cotter pins. Refer to the instruments and electrical section for wiring.

582 INSTRUMENTS and ELECTRICAL
with ELECTRIC STARTER

1. Locate parts shown in parts manual.
2. It is easier to complete wiring if battery is already installed; see 582 Battery Box Installation.
3. Temporarily install aft center cover as shown in Fuselage Enclosure section; this helps determine optimum path for engine-related wires.
4. Install instruments to instrument panel. Study instrument and electrical schematic very carefully. Route all wiring neatly and carefully; this greatly eases installation and maintenance.
5. Install regulator/rectifier and solenoid at locations in **FIGURE 04L-05**. Drill as required to install depicted hardware.

FIGURE 04L-05



MD2141

6. Avoid crushing or kinking pitot and static lines during installation; install wiring according to schematic in parts manual.

STROBE SYSTEM SCHEMATIC

1. Locate the parts shown in the parts manual.
2. Final wiring of the strobes will be done during trial assembly and rigging. For now just wire to the switch and tape excess wire in a bundle.

582 MUFFLER WRAP HEATER

582 MUFFLER WRAP HEATER IN DEVELOPMENT

**TO BE RELEASED FOR PRODUCTION
AT LATER DATE.**

582 RADIANT HEAT CORE ASSEMBLY

582 RADIANT HEAT IN DEVELOPMENT

TO BE RELEASED FOR PRODUCTION
AT A LATER DATE.

582 RADIANT HEATER INSTALLATION

582 RADIANT HEATER IN DEVELOPMENT

**TO BE RELEASED FOR PRODUCTION
AT A LATER DATE.**