1997-2004 C5 CORVETTE OIL COOLER KITS

PART NO. EC5-600 & EC5-603

MADE IN USA





Important: Read these instructions in their entirety prior to installation.

For contact information, visit www.improvedracing.com

Copyright © 2008-2025 Improved Racing Products, LLC. All rights reserved.

Rev 251216

PARTS CHECK

- Visit the website product page for technical data and to confirm all parts have arrived by checking the images.
  - EC5-600 Performance Oil Cooler Kit
  - EC5-603 Street & Strip Oil Cooler Kit

INSTALLATION INSTRUCTIONS

BEFORE YOU BEGIN

⚠ **WARNING: NEVER work under a car supported only by a jack.**

⚠ **WARNING: NEVER cap / plug the oil ports on the adapter.**

⚠ **WARNING: Capped / plugged oil ports block oil flow in the engine and may result in catastrophic engine damage.**

💡 Use a union to loop the lines, or create a new line to join the ports if servicing or removing the oil cooler from the car.

⚠ **WARNING: Only qualified mechanics should install this oil cooler kit.**

⚠ **WARNING: Improper installation may result in severe engine damage.**

⚠ **WARNING: Confirm the car is not hot prior to installation.**

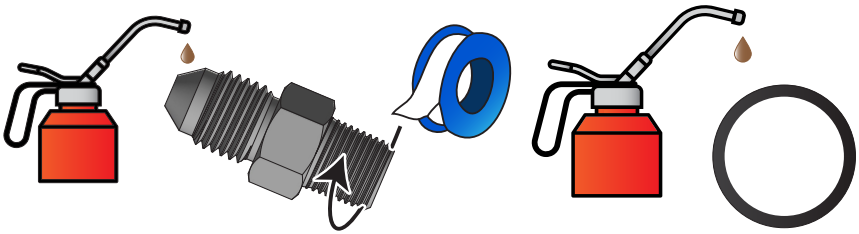
💡 Use aluminum tools to avoid damaging fittings.

💡 Lubricate all fitting flares before final tightening of connection.

💡 Wrap tapered pipe (NPT) threads with Teflon (PTFE) tape or apply thread sealant to seal the threads.

💡 Lubricate O-rings prior to installation to prevent damage and ensure a leak-free seal.

💡 Read through this manual, in addition to the product manuals included with each part prior to installation.



REMOVE THE BUMPER COVER

1. Raise and support the car using automotive-use-approved frame stands, lift, or ramps.
2. Open the hood of the car.
3. Apply masking tape on the fenders to prevent scratching when removing the bumper cover.
4. Use Figure 1 as a guide to locate the following parts to remove:
    a. Remove four screws (#59) or pop clips (#39) at the top of the bumper cover.
    b. Use a 7 mm tool to remove three screws in the wheel wells (#42).
    - Take the wheels off to make this easier, or turn them side-to-side.
    c. Use a 7 mm tool to remove five screws (#47) and bumper closeout panels (#48).
    d. Use a 10 mm tool to remove the screws (#28) and air deflector/spoiler (#29).
5. Use a 7 mm tool to remove five screws from the underside of the bumper cover where it connects to the radiator shroud.
6. Use a 7 mm tool to remove two screws from the underside of the bumper cover that secure the thin bumper cover strips to the core support.
7. Reach through the voids left by removing the closeout panels on each side, then use a 10 mm tool to remove four fender nuts securing the bumper cover to the fender.

- Shown as #17 in Figure 1.

8. If accessible, disconnect the wire harness on the passenger side, behind the bumper cover, otherwise, wait for Step 16.
9. Release the bumper cover from the fender studs on each side of the car.

- Shown as #50 in Figure 1.

10. Peel the top of the bumper cover off the car, then carefully remove the bumper cover from the car.

- Disconnect the wire harness from the bumper cover if not done before.
- Confirm the brake ducts release from the bumper cover.

11. Set bumper cover aside until reinstallation.
12. Remove the driver side brake duct from the fender liner.

- Shown as #41 in Figure 1.

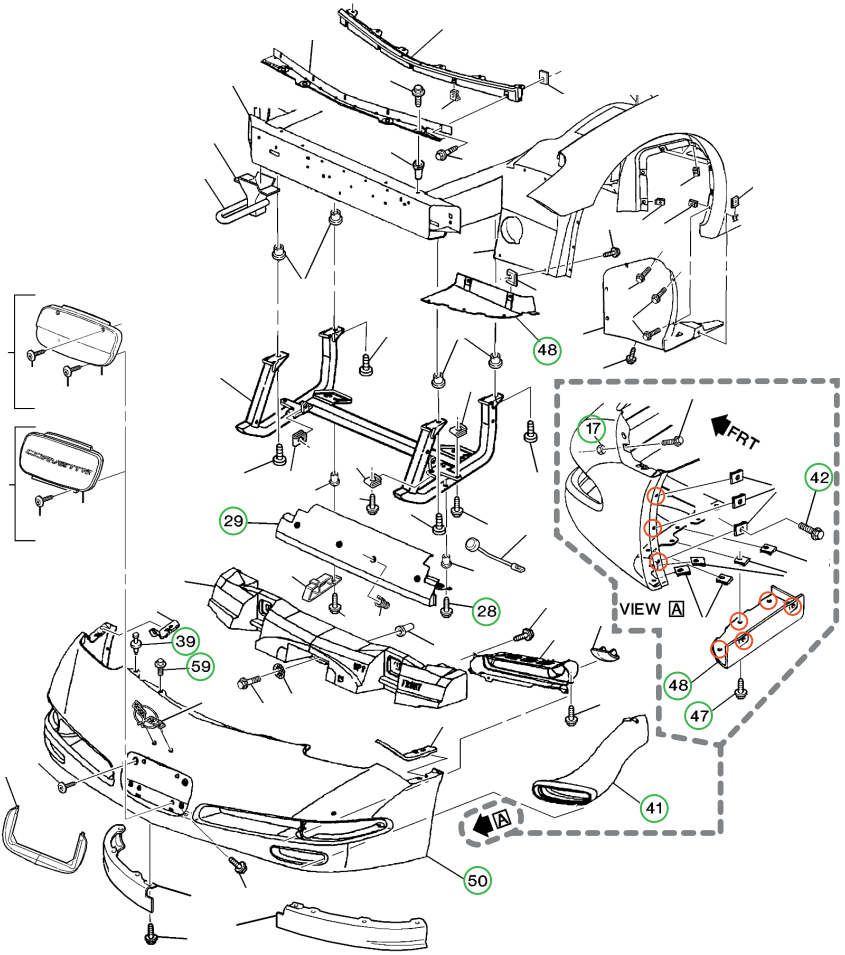


Figure 1 - Removing the Close-Out Panel Screws

13. Use a screwdriver to release the ratchet hose clamps on the smog pump.
14. Remove the hoses from the smog pump.
15. Use a 10 mm tool to loosen all three smog pump mounting screws.
16. Remove the smog pump.
17. Save the screws and temporarily hang the smog pump if reinstalling.

INSTALL THE OIL COOLER ADAPTER

1. Remove the wire harness from the temperature sensor located in the oil bypass cover, above the oil filter.
2. Place a drain pan under the oil filter and remove the oil filter.
3. Use a 10 mm tool to remove the oil bypass cover.
4. Apply pipe thread sealant, then install the included temperature sensor into the oil cooler adapter using a 13 mm wrench.

⚠ **DO NOT overtighten.**

5. Install the included adapter fittings into the oil cooler adapter.
6. Torque the fittings between 20 lb-ft (27 N-m) to 25 lb-ft (33 N-m).
7. Connect the 90° fittings with heat sleeve to the oil cooler adapter.
8. Position the 90° hose end fittings straight towards the front of the car.
9. Tighten the hose ends to the adapter fittings according to the steps below:
   a. Hand tighten the fittings.
   b. Mark the flats as shown in Figure 2.
   c. Tighten 1.25 to 1.75 hex flat rotations.

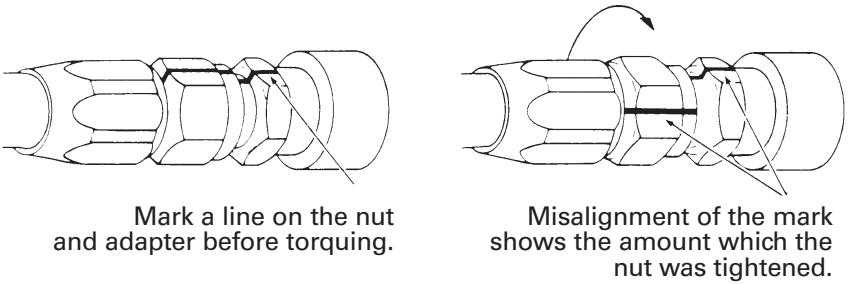


Figure 2 - Marking the Fittings for Correct Tightening

10. Wipe the sealing surface clean.
11. Use a 5 mm hex tool and the included socket screws to install the oil cooler adapter and gasket onto the oil pan.

💡 Shorten a 5 mm hex key to clear the factory catalytic converter and ease installation.

💡 Leave the tags on the lines, and let them droop down while installing the adapter.

💡 The upcoming steps explain final hose routing.

12. Torque the screws to 100 lb-in (11 N-m).
13. Reconnect the wire harness for the oil temperature sensor.

INSTALL THE OIL COOLER & BRACKETS

1. Use a tape measure to mark the center point for the adapter fitting through-hole in the plastic radiator shroud, shown in Figure 3.

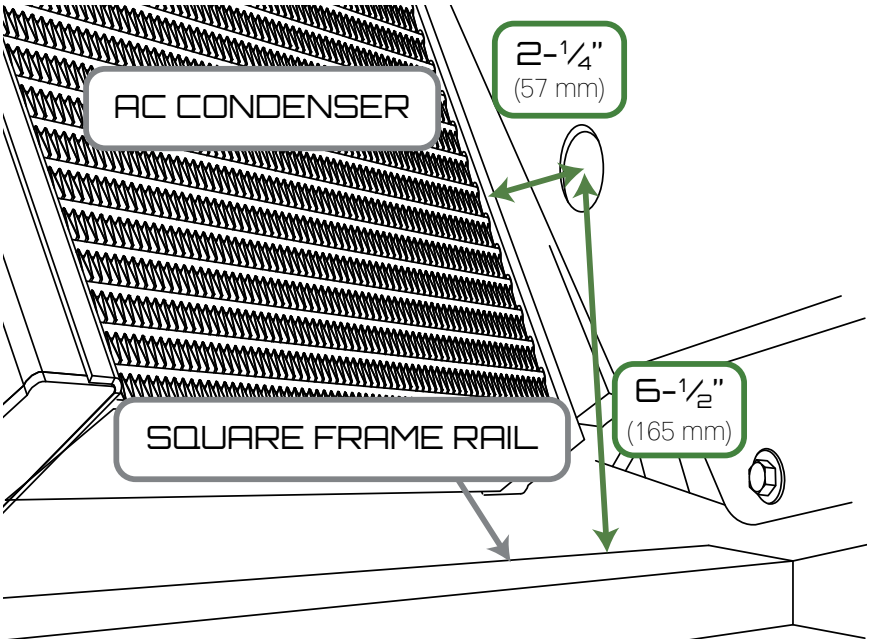


Figure 3 - Marking the Center-Point

2. Use a 1-1/4" (30 mm) hole saw to drill the hole for the upper S-shape adapter fitting.
3. Install the upper S-shape adapter fitting onto the oil cooler as shown in Figure 4.

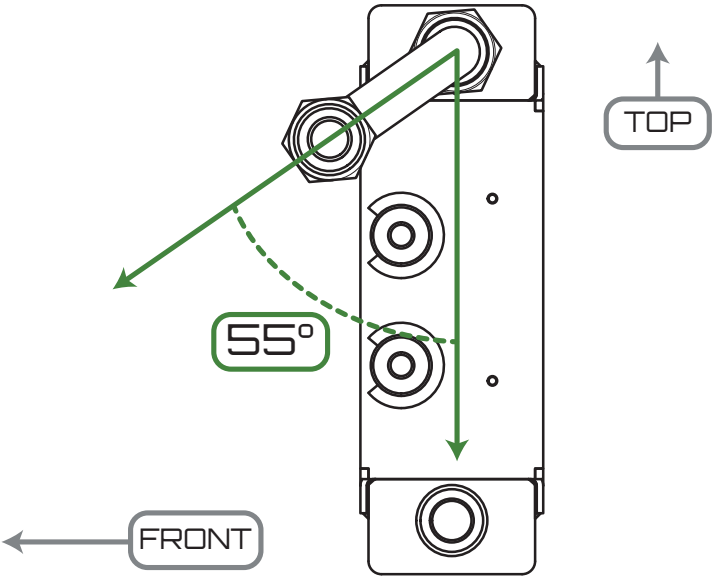


Figure 4 - Installation Angle for Upper S-Shape Adapter Fitting

4. Torque the adapter fitting following the steps for Figure 2.
5. Fasten the EC5-600-01 bracket to the oil cooler using two washers and screws from the EC5-600-60 Hardware Kit, shown in Figure 5.

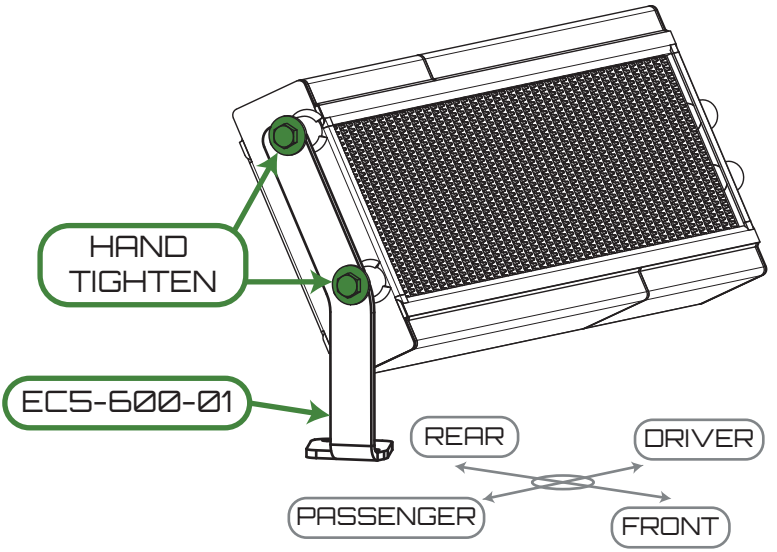


Figure 5 - Loosely Assembling the Passenger Bracket

6. Loosely attach the EC5-600-02 bracket using one washer and screw, shown in Figure 5.

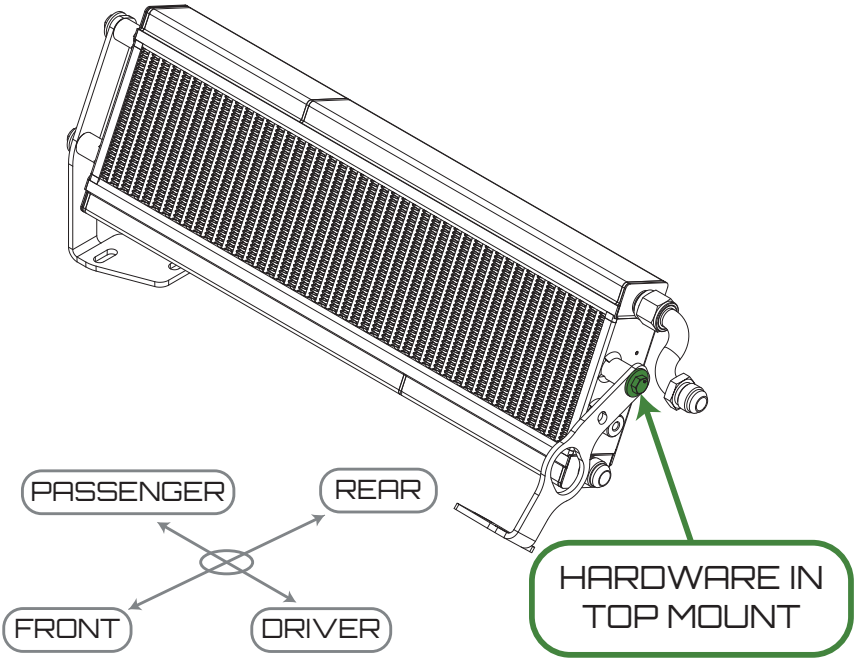


Figure 6 - Loosely Assembling the Driver Bracket

7. Gather the U-bolts from the EC5-600-60 Hardware Kit so they are near.
8. Insert the cooler assembly into the radiator shroud.
9. Guide the upper adapter fitting through the hole in the radiator shroud.
10. Once the fitting is through the shroud, rest the brackets on the square frame rail.
11. Loosely install the U-bolt for the passenger side bracket.
12. Insert the remaining washer and screw from the EC5-600-60 Hardware Kit into the lower hole on the driver bracket and hand-tighten.
13. Loosely install the remaining U-bolt for the driver side bracket.
14. Connect the remaining S-shape adapter fitting to the oil cooler by going through the hole in the driver side bracket.
15. Position the flare end of the fitting as shown in Figure 7.

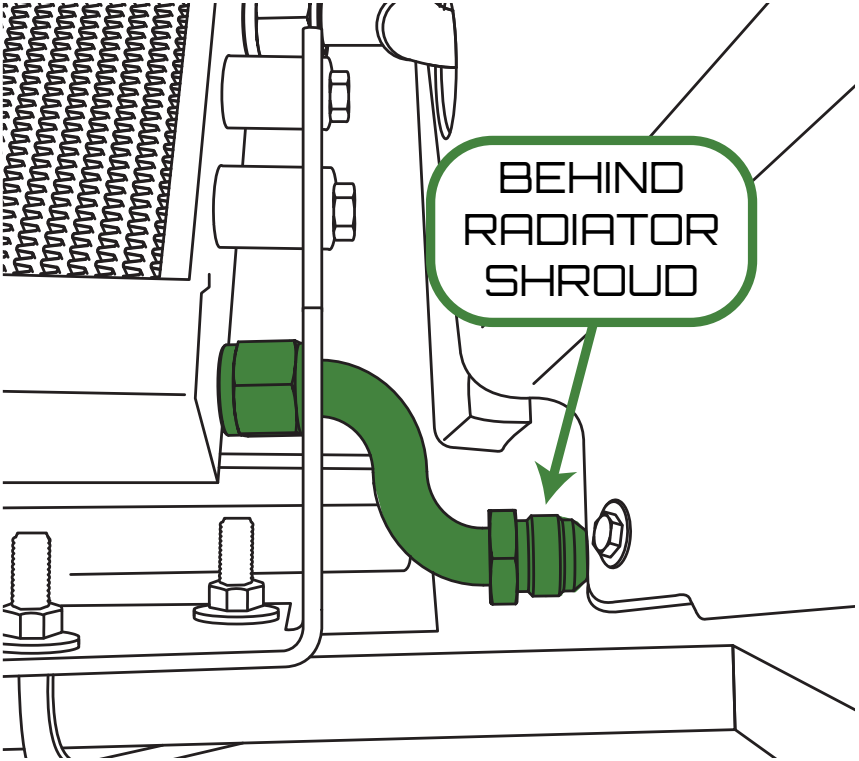


Figure 7 - Positioning the Lower Adapter Fitting

16. Position the oil cooler inside the radiator shroud according to:
    a. Street & Strip = Biased to the driver side without contacting the shroud.
    b. Performance = Centered inside shroud with even gaps for the brackets and fittings on each side.
17. Position the oil cooler so it's parallel to, and about $^{1}/_{8}$" (3 mm) away from the AC condenser.

Cut a piece of cardboard from the box used to ship this kit as the spacer, and to protect the AC condenser fins from damage.

18. Use a 13 mm tool to tighten the oil cooler bracket screws.
19. Use a $^{9}/_{16}$" tool to tighten the U-bolt nuts.
20. Remove the cardboard.
21. Torque the lower adapter fitting following the steps for Figure 2.

Confirm the fitting position does not change from Figure 7.

CONNECT THE LINES

1. Route each line between the engine mount, sub-frame and engine block.
   a. The line with two 90° hose ends goes above the wire harness that runs alongside the engine and oil pan.
   b. The line with one 90° hose end goes below the wire harness that runs alongside the engine and oil pan.
2. Continue to work the lines toward the front of the car, taking care to go over the wiring harness that runs across the front sub-frame where the steering rack is located.
   a. Spray the silicone heat shielding with soapy water if the hoses become stuck.
3. Unpack the EC5-600-61 Hardware Kit and loosely assemble the parts as shown in Figure 8.

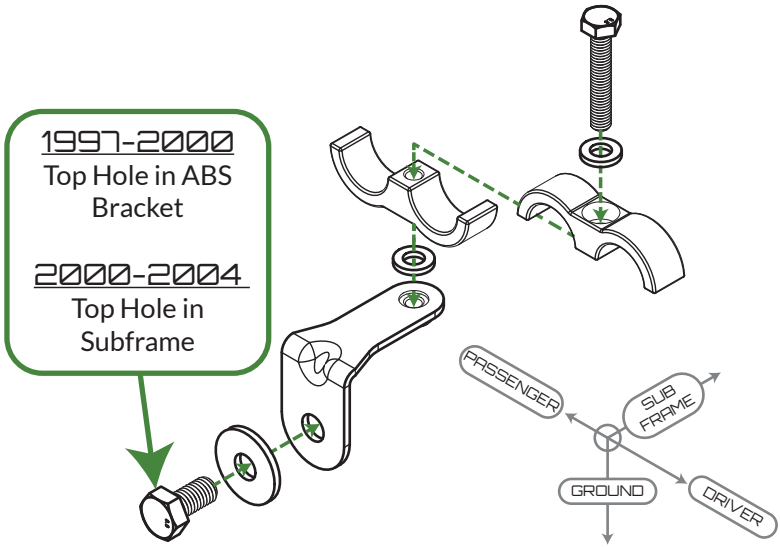


Figure 8 - Hardware Arrangement for Sub-Frame Hose Clamp

4. 1997-2000 cars should install the L-bracket following these steps:
   a. Remove the top screw from the passenger side of the ABS bracket.
   b. Fasten the L-bracket to the ABS pump bracket using the same screw and hole like shown in Figure 9.
   c. Fasten the hose clamp to the L-bracket using the M6 screw in the kit.



Figure 9 - Installing the Sub-frame Hose Holder (Early Models)

5. 2000-2004 cars should install the L-bracket following these steps:
   a. Use the included M8 screw to fasten the L-bracket to the hole in the front sub-frame, as shown in Figure 10.
   b. Use the included M6 screw to fasten the hose clamp onto the L-bracket as shown in Figure 8 and Figure 10.



Figure 10 - Installing the Sub-frame Hose Holder (Late Models)

6. Use a 13 mm tool to torque the sub-frame screw to 25 lb-ft (33 N-m)
7. Use a 10 mm tool to torque the hose clamp screw to 100 lb-in (11 N-m).

Use channel lock pliers to align the hose clamp while tightening.

8. Route each line under the sway bar and through the power steering line, like shown in Figure 10.
9. Connect the lines to the oil cooler:
    a. Cut and remove the perforated zip tie holding the smog pump hose to the radiator support bar to clear a path for the hose that will route through here.
    b. Route the 90° hose end between the smog pump hose and radiator support bar, then connect it to the top fitting on the oil cooler.
    c. Route the 60° hose end around the core support bar and over the smog pump to connect it to the bottom fitting on the oil cooler as shown in Figure 11.
    d. Torque all connections following the steps for Figure 2.

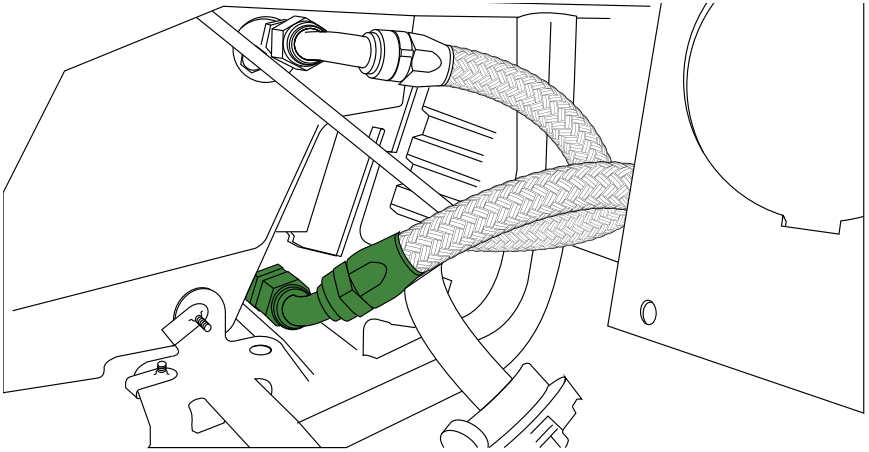


Figure 11 - Routing & Connecting the 60° Hose-End

10. Remove the wire harness clip from the radiator fan and replace it with the push-in zip-tie from the EC6-600-61 Hardware Kit.

This is the **orange** zip tie shown in Figure 11.

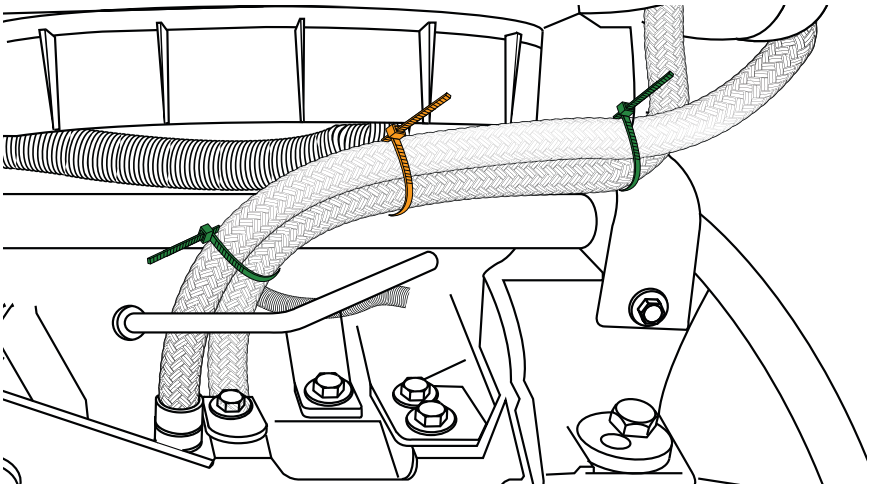


Figure 12 - Replacing the Fan Shroud Wire Clip with Push-In Cable-Tie

11. Confirm the wiring harness is above the two hoses before cinching the zip-tie to the fan shroud.
12. Use two zip-ties to affix the corrugated hose protector to the hose that passes between the smog pump hose and radiator support.
13. Use the remaining zip-ties to group the hoses together in the locations shown in **green** on Figure 10.

PREPARING FOR STARTING

1. Fill a new oil filter with oil and install the oil filter onto the oil pan.

Lubricate the oil filter seal.

WARNING: DO NOT overtighten the oil filter.

2. Verify all hydraulic connections are coupled and properly torqued.
3. Check the engine oil level and add oil if necessary.

The oil level should be at the factory full mark.

4. Prime the system to fill the engine, lines and heat exchanger with fluid before starting:
   a. Remove the fuel injector fuses.

   Refer to the factory service manual.

   b. Crank the engine over for five seconds to build oil pressure, repeating this cycle three to five times.
   c. Replace the fuel injector fuses removed previously.

   Fluid prelubers, such as one made by Melling or Motive, are the preferred method for engine oil priming.
5. Start the car and inspect for oil leaks.

Confirm oil pressure is stable and reading the correct value.

6. Turn off the car.
7. Inspect the engine oil level.

The oil level should be at the factory full mark.

REINSTALLING THE BUMPER COVER

1. Use a 10 mm tool to reinstall the smog pump onto the core support, if reusing the smog pump.
2. Reconnect the hoses to the correct smog pump ports and tighten the hose clamps, if reusing the smog pump.
3. Reinstall the driver side brake duct into the fender liner.
4. Insert the brake ducts into the bumper cover, connect the main wiring harness and reinstall the bumper cover on the car.
5. Use a 10 mm tool to reinstall all four fender washers that secure the bumper cover to the fenders.
6. Use a 7 mm tool to reinstall two screws into the bumper cover strips that secure to the core support.
7. Use a 7 mm tool to reinstall five screws that secure the bottom of the bumper cover to the radiator shroud.
8. Trim the front spoiler/deflector according to Figure 13.

Trimming the spoiler/deflector as shown clears the oil cooler brackets and maintains the fold away function.

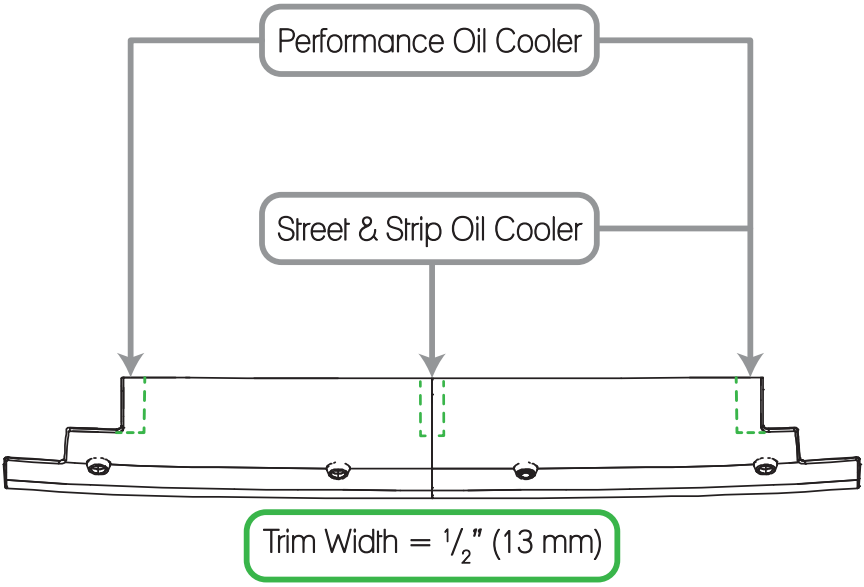


Figure 13 - Trimming the Spoiler / Deflector

9. Use a 10 mm tool to reinstall the modified spoiler/deflector onto the core support.

The U-bolts may require loosening to re-center the brackets before reinstalling the trimmed spoiler/deflector.

10. Use a 7 mm tool to reinstall the front closeout panels on the driver and passenger sides.
11. Use a 7 mm tool to reinstall the wheel well screws.
12. Put the wheels back on the car, if applicable.
13. Reinsert all four screws or plastic push-in fasteners at the top of the bumper cover.
14. Remove any masking tape that was applied.
15. Close the hood of the car and safely lower the car back onto the ground.

Installation is now complete. Thank you for purchasing an Improved Racing product!