C6 CORVETTE MHX LAY-DOWN COOLER CONVERSION KIT

PART NO. EC6-690

MADE IN USA



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

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Rev 260925

APPLICATIONS

- 2005-2013 (C6) Chevrolet Corvette (except ZR1).
- Requires an installed EC6-600 Oil Cooler Kit.

KIT COMPONENT LIST

- Confirm all parts below are included before beginning installation.

PART #	QTY	DESCRIPTION
EC6-690-01	1	Driver side mounting bracket
EC6-690-02	1	Passenger side mounting bracket
EC6-690-62	1	Rock guard
EC6-690-50	1	Oil line, IN to adapter, OUT from cooler
EC6-690-51	1	Oil line, OUT from adapter, IN to cooler
FML-10-10	2	-10AN flare extension, female to male, long
HSC-1108	5	M6 x 30 mm stud, E5 external Torx
HNT-1024	5	M6 spin nut, 10 mm hex
HNT-3001	5	M6 clip nut
HSC-1109	3	M6 x 20 mm socket head screw
HSC-1110	4	M8 x 20 mm socket head screw
HT-50	1	Silicone foam tape, 2 m roll
HTD-1003	3	Cable tie
HTD-1006	1	Push-in cable tie
EC6-69X	1	Cut template

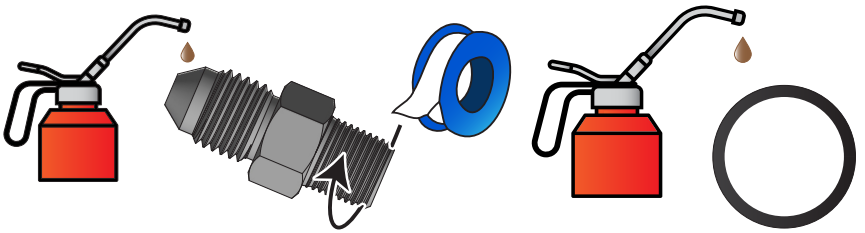
TOOLS REQUIRED

7 mm, 10 mm and 12 mm sockets	Drill with stepper drill bit or hole saw
T15 Torx driver	Center punch
E5 external Torx socket	Rotary cutting tool or reciprocating saw
4 mm and 5 mm hex keys	Tape measure
-10AN fitting wrench, aluminum (1 in.)	Paint pen or permanent marker
Torque wrench, 50 lb-in and 15 lb-ft range	Wire cutters or flush cutters
Push pin removal tool	

INSTALLATION INSTRUCTIONS

BEFORE YOU BEGIN

- **WARNING: These products should only be installed by a qualified-mechanic. Improper installation could result in severe engine damage.**
- **WARNING: NEVER work under a vehicle 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 vehicle.
- **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.



MARK THE BUMPER COVER FOR CUTTING

1. Raise and support the vehicle using an automotive-approved car lift, frame stands or ramps.
2. Remove any underbody panels necessary to access the oil filter area.
3. If present, remove the rubberized felt covering the lower opening on the bumper cover by removing all six screws, shown in **Figure 1**.

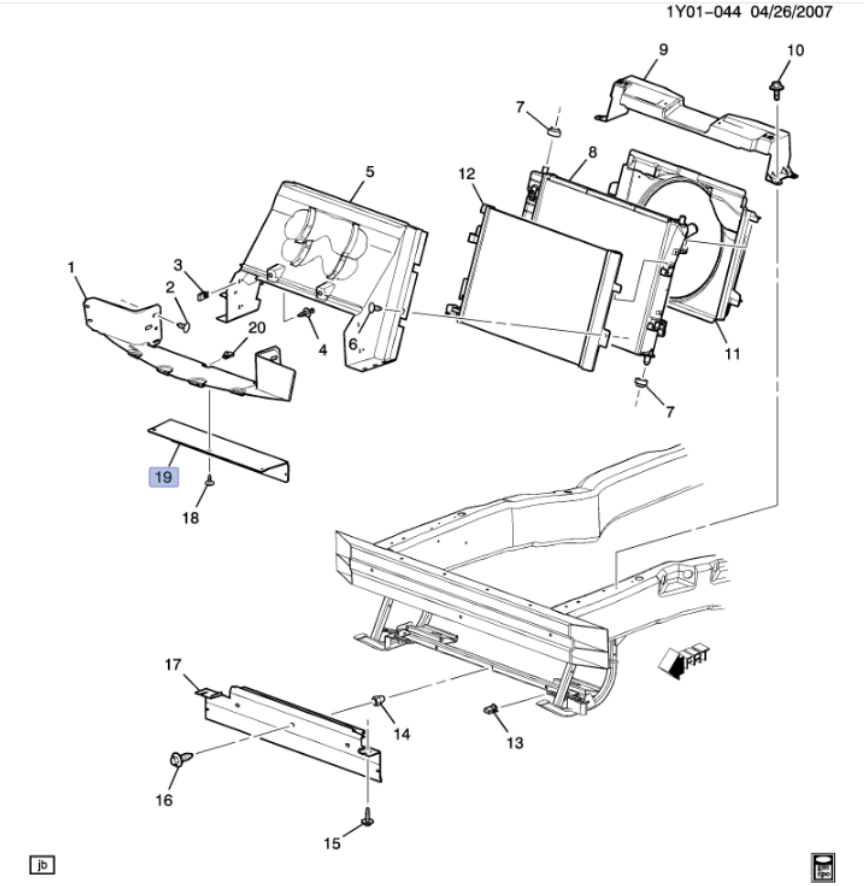


Figure 1 - Rubberized Felt, Item #19

4. Mark the bumper for cutting later in the installation process, referring to **Figure 2** and **Figure 3**.

Apply masking tape over the cut lines to help prevent paint chipping.

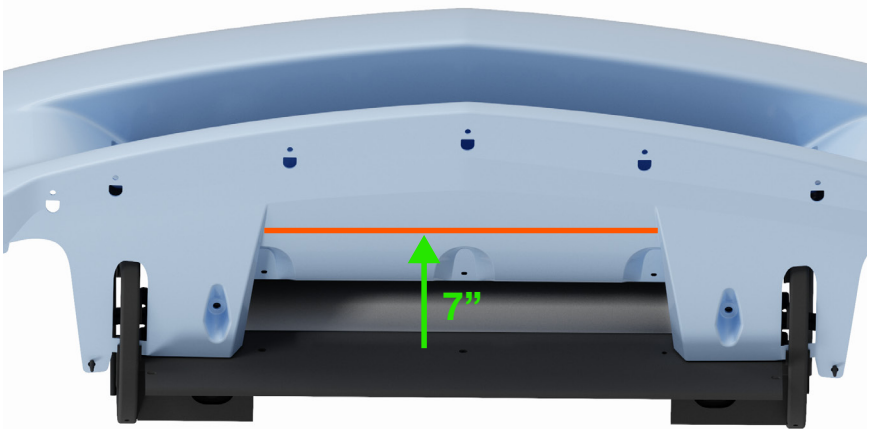


Figure 2 - Front Trim Measurement

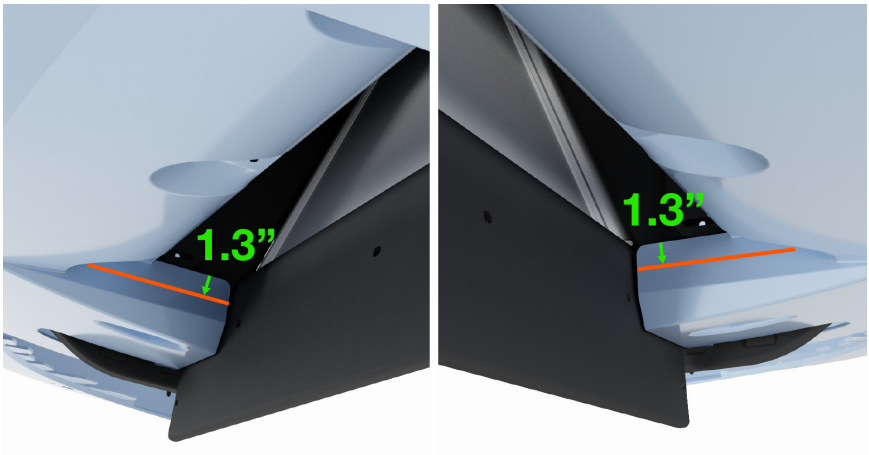


Figure 3 - Side Trim Measurement, Both Sides

REMOVE THE BUMPER COVER

1. Open the hood of the vehicle.

Apply masking tape on the fenders to prevent scratching when removing the bumper cover.

2. Remove the front bumper cover by removing the fasteners listed below, and indicated in **Figure 4**:
   a. Four 7 mm bumper cover screws under the nose of the hood (**blue**).
   b. Ten 7 mm or T15 screws and/or push clips securing the fender liners, five per side (**green**).
   c. Five 7 mm screws securing the lower front edge of the bumper cover (**red**).
   d. Four 10 mm nuts securing the inside of the fenders, two per side (**magenta**).
   e. Two 10 mm nuts securing the rear of the lower bumper cover (**orange**).

Removing the front wheels makes this step easier.

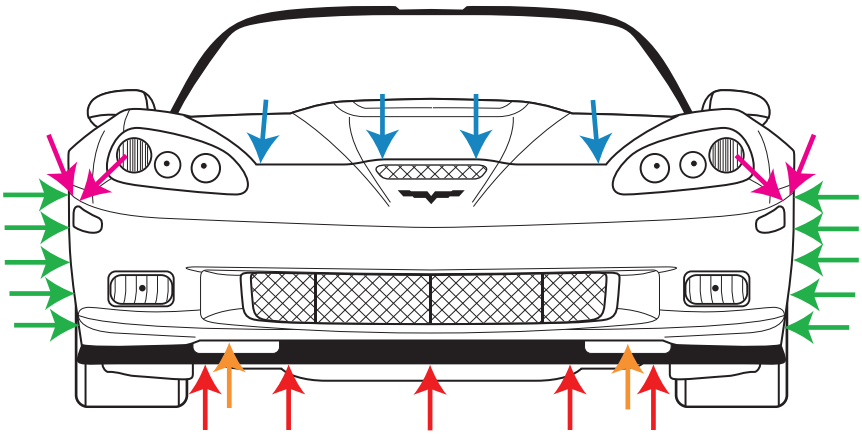


Figure 4 - Front Bumper Fastener Locations

3. Disconnect all indicator and fog light wiring harness connectors.

4. Remove four push pins (two per side) securing the radiator shroud to the core support, shown in **Figure 5**.

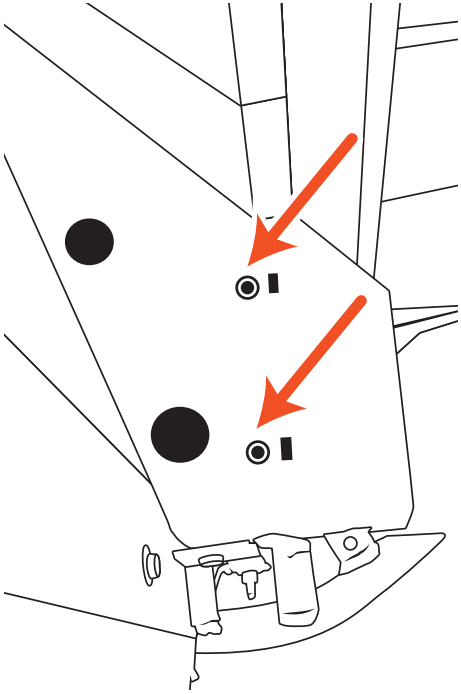


Figure 5 - Radiator Shroud Push Pins

5. Carefully remove the front bumper cover.

The top edges of the bumper cover near the headlights are clipped-in and must be released prior to removal.

REMOVE THE OIL COOLER & LINES

1. Place a drain pan under the oil cooler.
2. Cut and remove the push-in zip tie securing the oil lines to the radiator shroud.
3. Disconnect both oil lines from the oil cooler and allow the oil to drain.
4. Use a 12 mm tool to remove the four M8 screws securing the oil cooler to the radiator shroud.
5. Remove the oil cooler from the vehicle.
6. Place a drain pan under the oil filter and remove the oil filter.
7. Use a 5 mm hex tool to remove the oil cooler adapter located above the oil filter.

Remove the rear screw first so that the front screw clears the catalytic converter during removal.

8. Remove the oil cooler adapter and oil lines out towards the rear of the vehicle.
9. Disconnect both oil lines from the oil cooler adapter. Leave the adapter fittings and NPT plug installed.

Note the path of the oil lines before removal. The new lines follow the same path.

INSTALL THE NEW OIL LINES

1. Connect the EC6-690-50 and EC6-690-51 oil lines to the oil cooler adapter fittings according to the part numbers shown in **Figure 6**.
2. Position the 90° hose end fittings as shown in **Figure 6**.

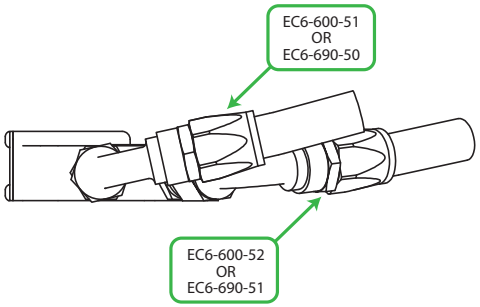
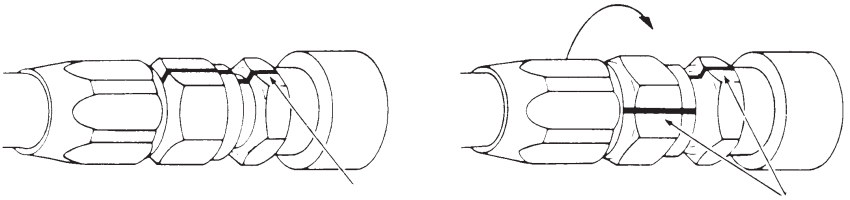


Figure 6 - Hose-End Alignment on EGM-112

3. 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 7**.
   c. Tighten 1.25 to 1.75 hex flat rotations.



Mark a line on the nut and adapter before torquing.

Misalignment of the mark shows the amount which the nut was tightened.

Figure 7 - Marking the Fittings for Correct Tightening

4. Leave the tags on the lines, then route each line between the engine mount, sub-frame and engine block.

Follow the same path as the previous oil lines.

5. Use a 5 mm hex tool and the socket screws to reinstall 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.

6. Torque the screws to 100 lb-in (11 N-m).

INSTALL THE BRACKETS

1. Use a 7 mm tool to remove the air dam from the core support bar.
2. Trim the air dam on both sides where shown in **Figure 8**.

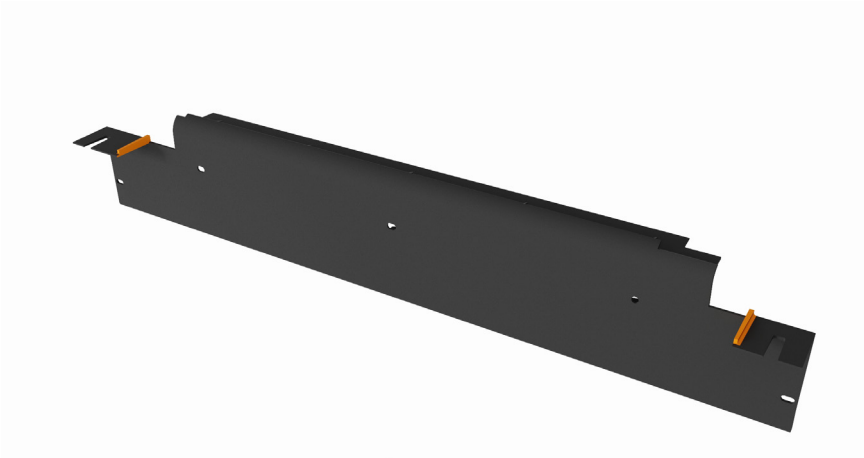


Figure 8 - Air Dam Trim Areas (Orange), Both Sides

3. Reinstall the air dam onto the core support.
4. Apply Loctite 243 onto three M6 studs, then reinstall the studs into the air dam holes.
5. Use an E5 tool to torque the studs to 50 lb-in (5.5 N-m).
6. Remove the factory clip nuts, where shown in **Figure 9**.



Figure 9 - Factory Clip Nut Locations

7. Reinstall the new clip nuts included with the hardware kit in their place.

8. Apply Loctite 243 onto the remaining M6 studs included with the hardware kit.
9. Thread the studs into the barrel nuts.
10. Hand tighten the studs for now.
11. Fasten the brackets to the oil cooler using all four M8 screws included with the hardware kit.
12. Use a 5 mm tool to torque all four screws to 15 lb-ft (20 N-m).
13. Install the oil cooler and mounting brackets onto the car as shown in **Figure 10**.



Figure 10 - Oil Cooler and Mounting Brackets Installed on Car

14. Use a 10 mm tool and the included fender nuts to temporarily install the bracket and oil cooler onto the vehicle.

15. Use a paint pen or permanent marker to trace the top of each bracket onto the plastic shroud as shown in **Figure 11** and **Figure 12**.



Figure 11 - Passenger Side Traced Shroud



Figure 12 - Driver Side Traced Shroud

16. Remove the bracket and cooler assembly.
17. Use the paper hole templates to center point punch the rest of the holes as shown in **Figure 13**.
18. Using a large stepper drill bit or hole saw, create holes according to the instructions on the template.

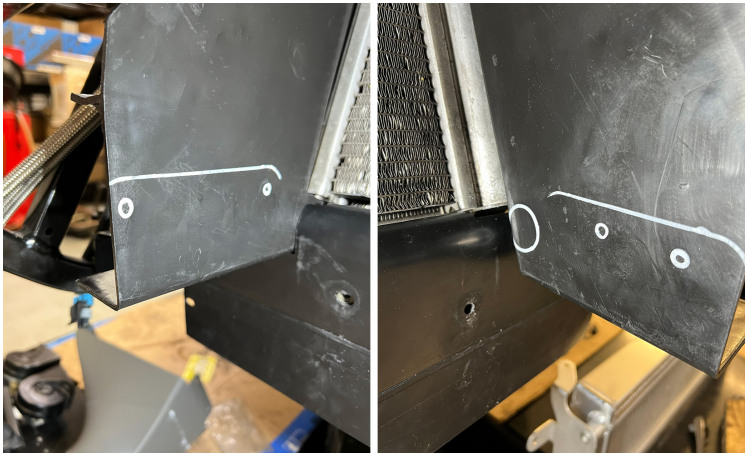


Figure 13 - Passenger and Driver Side Traced Shroud Holes

19. Remove any plastic shavings and debris.

INSTALL THE COOLER

1. Install the long fittings onto the cooler.
2. Use a 1 inch tool to torque each fitting according to the steps below:
   a. Hand tighten the fittings.
   b. Mark the flats as shown in **Figure 14**.
   c. Tighten 1.25 to 1.75 hex flat rotations.
3. Reinstall the cooler with brackets and fittings onto the M6 studs.
4. Use a 10 mm tool and the included fender nuts to temporarily install the assembly again.
5. Connect the EC6-690-51 line to the forward cooler fitting, then connect the EC6-690-50 line to the rearward cooler fitting.
6. Torque the fittings according to the steps below:
   a. Hand tighten the fittings.
   b. Mark the flats as shown in **Figure 14**.
   c. Tighten 1.25 to 1.75 hex flat rotations.

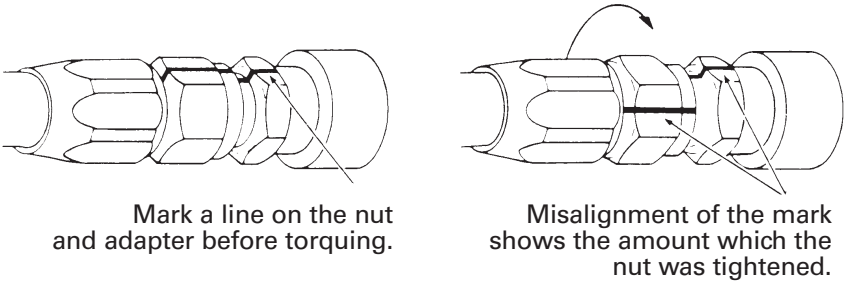


Figure 14 - Marking the Fittings for Correct Tightening

7. Secure the oil lines with the included cable ties, replacing any removed during installation.

MODIFY THE BUMPER COVER PARTS

This part of the installation exercises gradual refinement, wherein a safe cut is made, with final fitment requiring additional trims to perfect fitment for your specific Corvette.

1. Cut the bumper cover using the safe cut lines traced onto the part previously.

2. Cut the black plastic air guide above the bumper cover using the same cut line, shown in **Figure 15.**

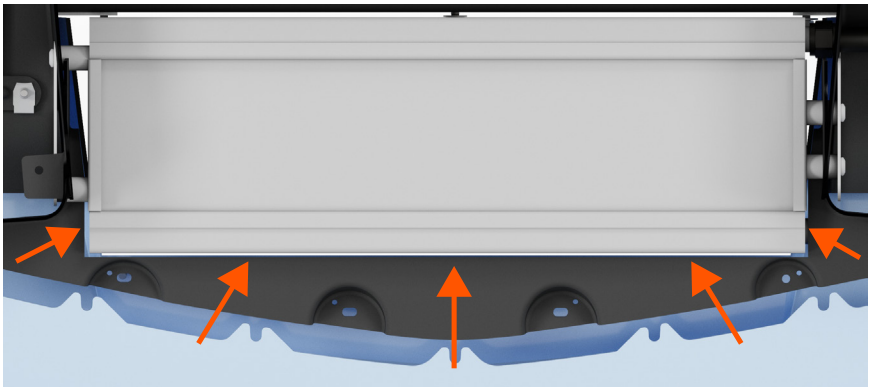


Figure 15 - Air Guide Cut Line Locations

3. Mock install the bumper cover by having a friend help hold it, or by using two fender nuts to hold the bumper cover from falling.
4. Determine if the black plastic air guide interferes with the oil cooler, and trim when necessary.

There should be about 1/8 inch (3 mm) gap between the front end tank and the black plastic air guide.

5. Apply the hi-temp silicone seal to the top of the rock guard as shown in **Figure 16**, to further protect from heat.

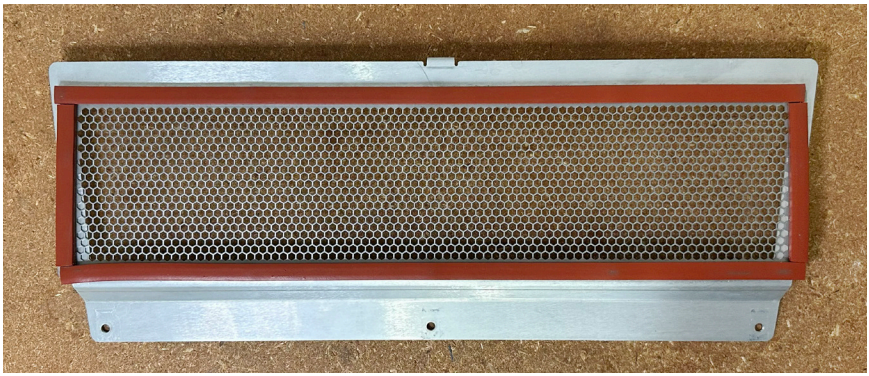


Figure 16 - Rock Guard with Silicone Seal

6. Test install the rock guard assembly.
    a. Determine whether the bumper cover needs to be widened to fit the rock guard.
    b. If necessary, remove the rock guard and trim the bumper cover again.
    c. Repeat until the fitment between the bumper cover and rock guard is satisfactory.
7. Reinstall the rock guard and mark the mounting holes onto the bumper cover.
    a. Loosely install the nuts again onto the air dam studs, shown by the green arrows in **Figure 17**.
    b. Using a marker, trace through the three upper mounting holes, shown by the orange arrows in **Figure 17**, onto the bumper cover.

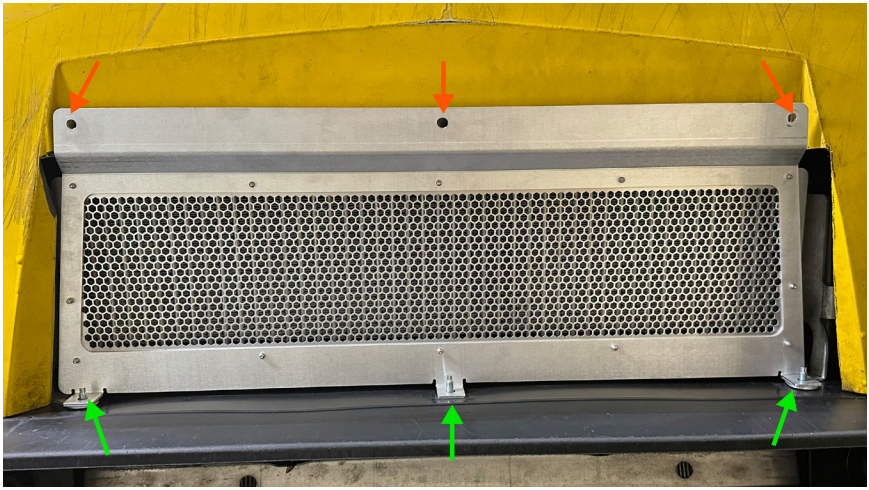


Figure 17 - Loose Mount Locations and Hole Marking Points

8. Remove the rock guard and drill the holes with a stepper bit.
9. Test fit the clip nuts to determine if the bumper cover requires additional cutting to fit the clip nuts, then install the remaining three clip nuts as shown in **Figure 18** on the next page.

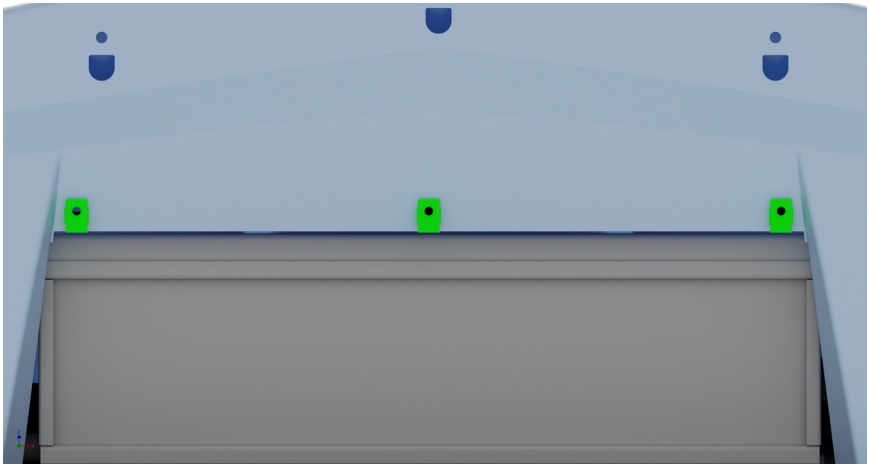


Figure 18 - Bumper Cover Clip Nuts Installed

PREPARE FOR STARTING

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

Lubricate the oil filter seal with engine oil prior to installation to prevent damage and to ensure a reliable 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.
4. Prime the system to fill the engine, lines and heat exchanger with fluid before starting:
   a. Remove the fuel injector fuses.

   Consult the vehicle's factory service manual for the fuse locations.

   b. Crank the engine over for five seconds to build oil pressure: Repeat three to five times, allowing the starter to rest for a minute.
   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 vehicle and inspect for leaks.

Confirm oil pressure is stable and reading the correct value.

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

Add oil when necessary.

REINSTALL THE BUMPER COVER & ROCK GUARD

1. Follow the steps from Remove the Bumper Cover section in reverse to reinstall the bumper cover onto the vehicle.
2. Install the rock guard once the bumper cover has been reinstalled onto the vehicle:
   a. Use a 4 mm hex tool to hand tighten the screws in the clip nuts.
   b. Use a 10 mm tool to tighten the nuts on the air dam studs to 50 lb-in (5.5 N-m).
3. Close the hood and lower the vehicle back onto the ground.

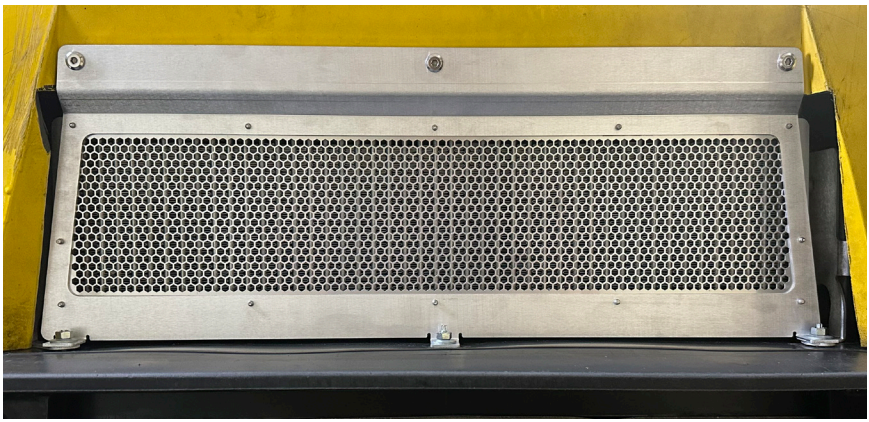


Figure 19 - Rock Guard Installed

Installation is now complete.

Thank you for purchasing an Improved Racing product!