2012-2015 CHEVROLET CAMARO PERFORMANCE OIL COOLER KIT

PART NO. ESG-601

MADE IN USA

Important: Read these instructions in their entirety prior to installation

For contact information, visit www.improvedracing.com

Rev 220408

APPLICATIONS

- This oil cooler kit is designed to install on the following vehicles:
  - 2012-2015 Chevrolet Camaro V8 (SS & ZL1)

⚠ The Z/28 Camaro trim requires additional parts for deleting the factory oil cooler and fan.

PARTS LIST & HARDWARE PACKS

Item	Qty	Part Number	Description
1	1	MHX-245	45-Row 3-Pass Heat Exchanger w/Mounting Hardware
2	1	EGM-114-TX	LSX Oil Pan Adapter for Heat Exchanger
3	2	OM-08-10	Adapter Fitting for Oil Pan Adapter
4	1	E5G-600-50	Line: 90° IN Adapter, 90° OUT Exchanger
5	1	E5G-600-51	Line: 0° OUT Adapter, 45° IN Exchanger
6	1	E5G-600-60	Upper Bracket & Hardware for Mounting MHX-245
7	1	E5G-600-61	Lower Bracket & Hardware for Mounting MHX-245
8	1	E5G-600-62	Rear Hose Clamp Hardware
9	1	E5G-600-63	Middle Hose Clamp Hardware
10	1	E5G-600-64	Washer Fluid Tank Hose Tie Hardware
11	1	E5G-681	2012-2015 V8 Camaro Factory Oil Cooler Delete Kit

E5G-600-60 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	1	E5G-600-01	MHX-245 to Chassis Bracket - Top
2	2	HVR-1002	Rubber Isolator
3	2	HVR-1003	Rubber Isolator Bushing
4	2	HSC-1050	M8x1.25x16 Mounting Screw

E5G-600-61 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	1	E5G-600-05	MHX-245 to Chassis Bracket - Bottom
2	2	HVR-1002	Rubber Isolator
3	2	HVR-1003	Rubber Isolator Bushing
4	1	HSC-1062	1/4"-20 Hex Cap Screw, L = 1"
5	1	HNT-2000	1/4"-20 Rivet Nut
6	1	HTL-2000	Rivet Nut Installation Tool

E5G-600-62 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	1	CP-16	Billet Aluminum Hose Separator
2	1	HSC-1052	Grade 5 Hex Head Screw, 1/4"-20 , L = 2-3/4 inch
3	2	HWA-1004	1/4 inch Washer

E5G-600-63 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	2	CP-16-01	Billet Aluminum Hose Separator
2	1	HSC-1053	8.8 Class Alloy Steel M6x1.00x40 Screw
3	2	HWA-1003	M6 Zinc-Plated Steel Washer

E5G-600-64 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	1	HSC-1051	8.8 Class Alloy Steel M8x1.25x35 Screw
2	1	HWA-1005	M8 Zinc-Plated Steel Fender Washer
3	1	HNT-1018	M8x1.25 IFI Prevailing Torque Nut
4	2	HTD-1004	M8 Stud-Mount, High-Temperature Cable-Tie

E5G-681 Hardware Pack Contents			
Item	**Qty**	**Part Number**	**Description**
1	1	HPL-1001	5/8 inch ID Rubber Cap
2	1	HCP-1022	Smooth Band Stainless Steel Hose Clamp
3	1	12561663	GM LS / Vortec Engine Coolant Plug

TECHNICAL SPECIFICATIONS

Maximum Operating Temperature	302°F (150°C)
Minimum Operating Temperature	-22°F (-30°C)
Maximum Operating Pressure	300 psi (20.68 bar)
MHX-245 Specs	Refer to product manual.
EGM-114 Specs	Refer to product manual.
HPL-1001 Info	Vinyl Rubber Cap (Dorman P/N: 493-100) ID = 5/8 inch

HCP-1022 Info	SAE #4 (DIN 3017) 430 Stainless Steel Smooth Band, Worm-Drive Hose Clamp, Wrench Flat = $^{9}/_{32}$ inch (7 mm), MAX Torque = 20 lb-in (2.3 N-m)
12561663 Info	Genuine GM LS Family Engine Coolant Plug, 17 mm Hexagon Drive, Yellow Brass, Thread-Lock Applied
E5G-600-50 Info	-10 Hose Assembly: 90° & 90° 6061-T6 Aluminum Hose-Ends, ECO Rubber Outside Bonded to Viton Rubber Inside, Stainless Steel Reinforced, Nylon Over-Braid, Fiberglass-Silicone Shield
E5G-600-51 Info	-10 Hose Assembly: 0° & 45° 6061-T6 Aluminum Hose-Ends, ECO Rubber Outside Bonded to Viton Rubber Inside, Stainless Steel Reinforced, Nylon Over-Braid, Fiberglass-Silicone Shield
E5G-600-60 Info	CNC-Pierced 5052-H32 Aluminum, Nitrile Rubber Vibration Grommet, Zinc-Plated Carbon Steel Bushing, M8x1.25x16 10.9 Class Alloy Steel JIS Flange Screw
E5G-600-61 Info	CNC-Pierced 5052-H32 Aluminum, Nitrile Rubber Vibration Grommet, Zinc-Plated Carbon Steel Bushing, M8x1.25x16 10.9 Class Alloy Steel JIS Flange Screw

BEFORE YOU BEGIN

WARNING: NEVER work under a vehicle supported only by a jack.

WARNING: NEVER cap / plug the oil ports on the EGM-114 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.

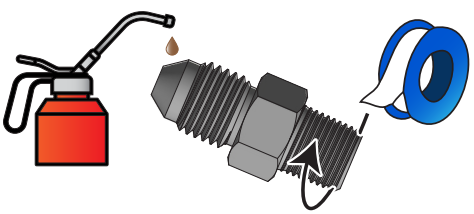
WARNING: Improper installation may result in severe engine damage.

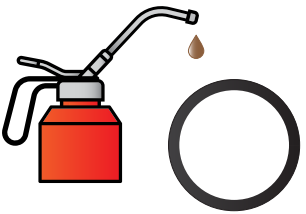
Use aluminum tools to avoid damaging fittings.

Lubricate adapter fitting flares for a better seal.

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

Lubricate O-rings on adapter fittings before installing into ports to prevent damage and ensure a leak-free seal.





REMOVING THE BUMPER COVER

1. Raise the vehicle and support with automotive-use approved frame stands, lift, or ramps.
2. Open the hood.
3. Apply masking tape to the fenders to prevent scratching when removing the bumper cover.
4. Use a plastic prying tool to remove the plastic pop-clips pinning the bumper cover to the radiator support, circled **green** in Figure 1.
5. Use a 10 mm tool to remove the screws at each corner under the hood, circled **red** in Figure 1.

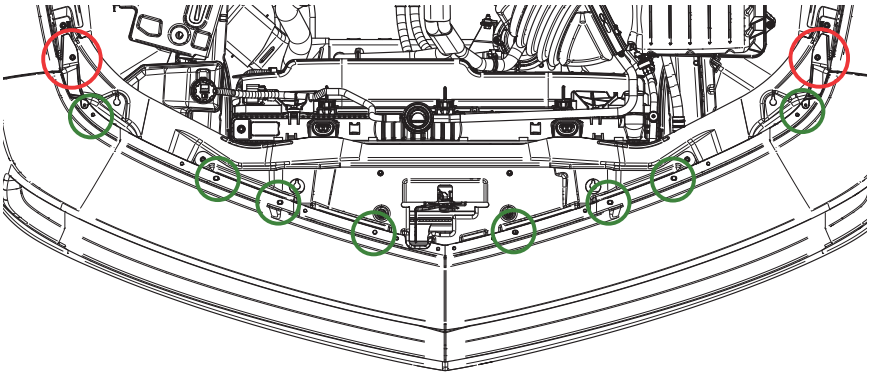


Figure 1 - Removing the Pop-Clips and Screws

6. Under the car, use a 10 mm tool to remove two screws holding the bumper cover to the chassis, circled **green** in Figure 2.

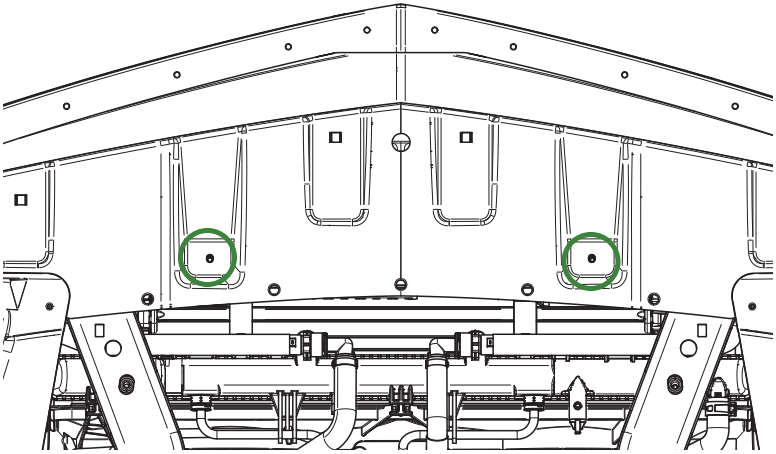


Figure 2 - Removing the Bottom Bumper Cover Screws

7. Use a T20 tool to remove all screws under the bumper cover, in front of the wheels, circled **green** in Figure 3. There are four per side.

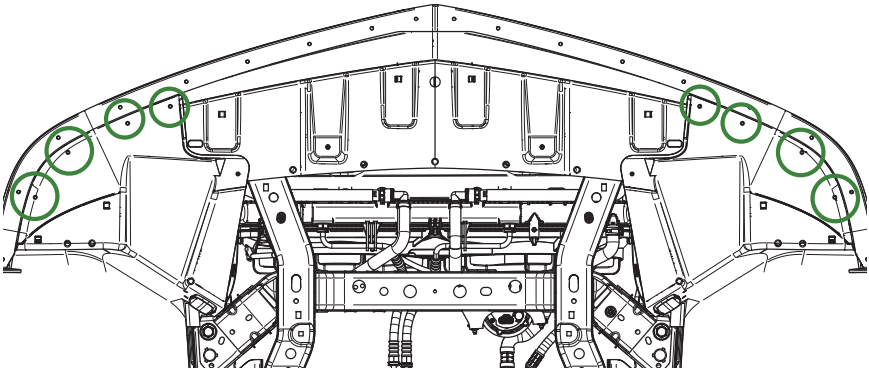


Figure 3 - Removing the T20 Torx Screws

8. Use a 7 mm tool to remove the screws in the wheel wells that attach to the bumper cover, circled **green** in Figure 4.

Take the wheels off to make this easier, or turn them side-to-side.

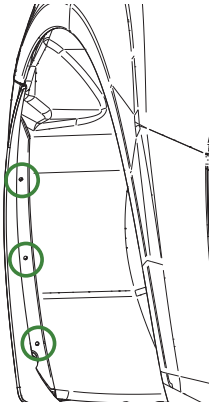


Figure 4 - Removing the Wheel Well Cover to Bumper Cover Screws

9. Peel-back the wheel-well linings on each side, then:
   a. Use a 7 mm tool to remove one screw securing the bumper cover to the fender.
   b. Use an extended 10 mm socket wrench to remove four screws securing the bumper cover to the fender support.
   c. Unplug all fog light harnesses.
10. Carefully remove the bumper cover from the front of the vehicle.

Prepare to release the safety tab and unplug the large wire harness.

11. Use a 10 mm tool to remove the four screws securing the black fascia cover to the front of the car, circled **green** in Figure 5.

⚠ **WARNING: DO NOT adjust the Torx screws circled red.**

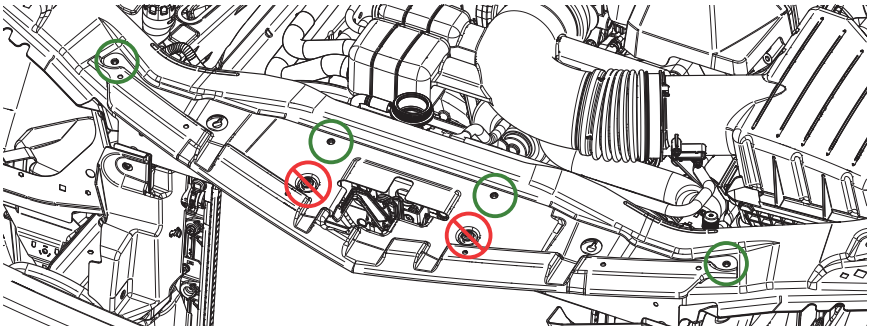


Figure 5 - Removing the Black Fascia Cover

REMOVING THE FACTORY OIL COOLER

1. Place a drain pan under the oil filter and remove the filter.
2. Remove the lower radiator shroud from the car by releasing the four pop-clips, circled **green** in Figure 6.

💡 Removing the bumper bar makes this easier

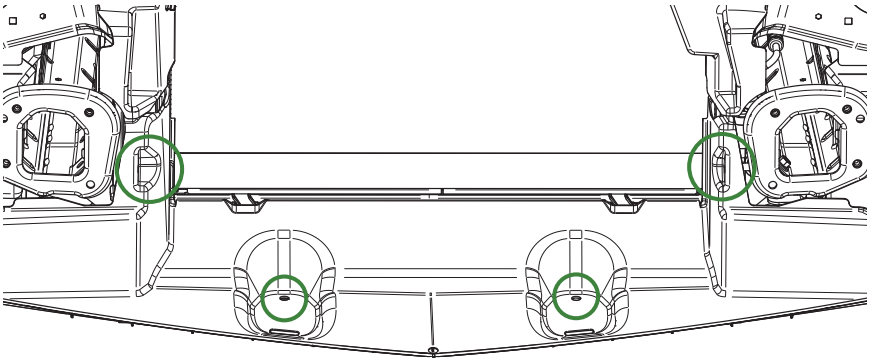


Figure 6 - Removing the Lower Radiator Shroud

3. Locate the hard lines for the factory oil cooler, then remove the plastic dust caps to permit removal of the clover-shape retaining clips securing the hard lines in the fittings, shown in Figure 7.

💡 There are two caps on the front of the factory oil cooler (#17 & #18).

💡 There is one cap on the larger line that goes into the side of the engine block (#4).

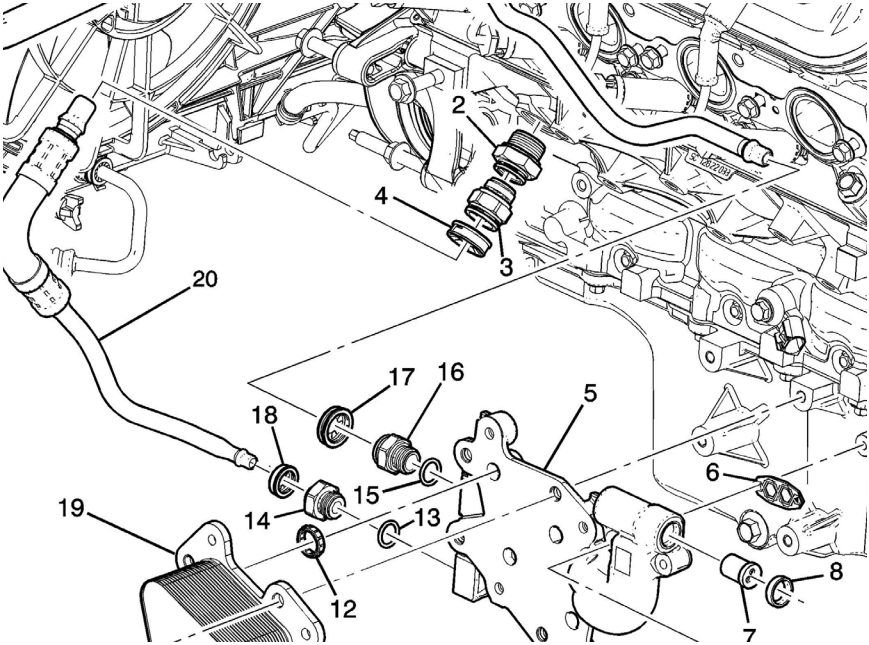


Figure 7 - Removing the Plastic Caps

4. Locate the clamp holding the hard line to the oil pan and remove the flange nut with a 10 mm tool, circled **green** in Figure 8.

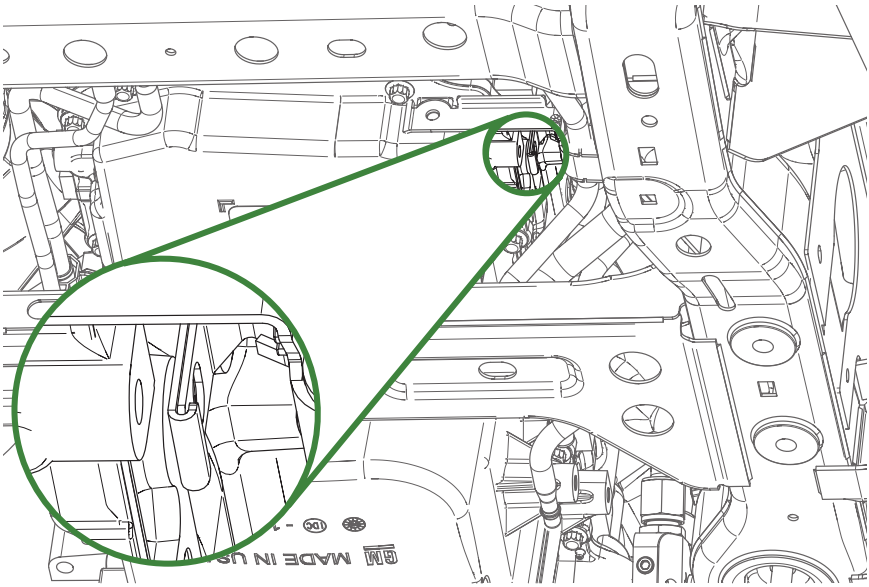


Figure 8 - Removing the Flange Nut from the Hose Clamp

5. Remove the clover-shaped retaining clip from the large engine coolant fitting using a pic or two flat screwdrivers, circled **green** in Figure 9.

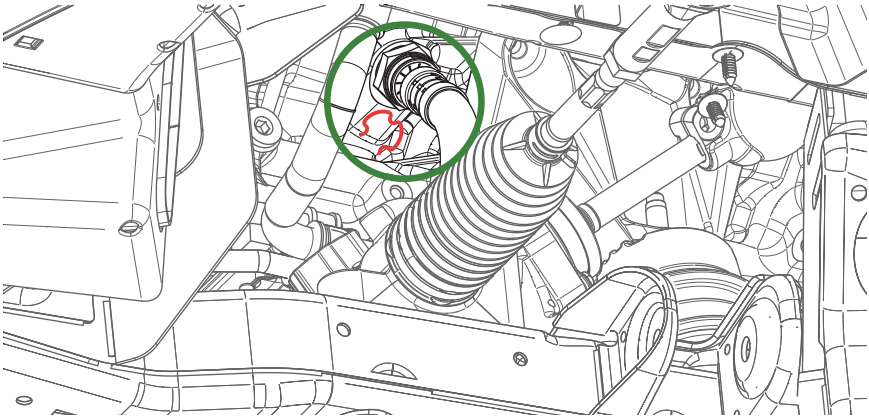


Figure 9 - Removing the Clover-Like Metal Clip

6. Completely disconnect and set aside the spark plug wire for Cylinder #1.
7. Place another drain pan underneath the car.
8. Refer to Figure 10 and:
    a. Remove the #20 coolant line from the #2/3 engine fitting.
    b. Allow the coolant to drain until no longer flowing.
    c. Temporarily reinsert the #20 line back into the #2/3 engine fitting.
    d. Locate the #22 radiator hose circuit that feeds the factory oil cooler.
    e. Gather a 7 mm ($^{9}/_{32}$ inch) tool, HPL-1001 and HCP-1022 from the E5G-681 Hardware Kit and keep close for the next steps.
    f. Use channel-lock pliers to remove the #21 hose clamp from the #22 radiator hose and slide it back past the barb.
    g. Quickly remove the factory hose and cap the fitting barb with the included rubber cap.
    h. Use the 7 mm ($^{9}/_{32}$ inch) tool to secure the rubber cap onto the barb permanently by tightening the stainless steel hose clamp to no more than 20 lb-in (2.3 N-m). DO NOT overtighten.
    i. Completely remove the #20 line from the #2/3 engine fitting and break the engine fitting loose with a breaker bar and deep well 34 mm socket.
    j. Remove the fitting completely.
    k. Wipe-up any coolant that spills.

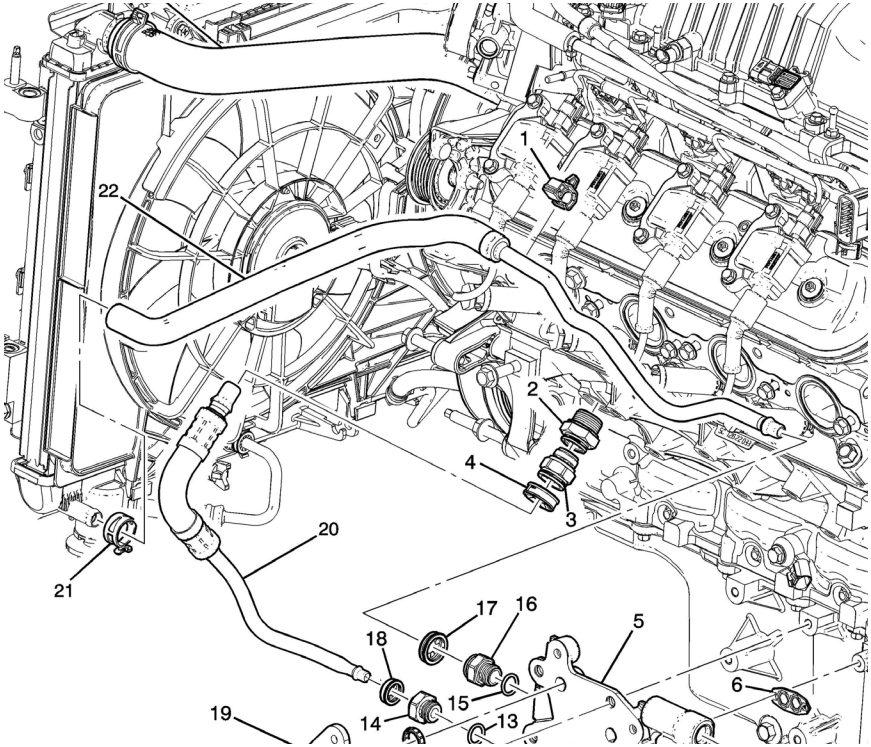


Figure 10 - Removing the Radiator Hose and Capping the Port

9. Use a 17 mm hex bit to install the included brass coolant plug into the engine block, GM part 12561663.
10. Torque the coolant plug to 45 lb-ft (60 N-m), followed by a ¼ turn.
11. Use a 13 mm tool to remove the four M8 screws that hold the factory oil cooler to the side of the oil pan.
12. Remove the factory oil cooler from the vehicle.
13. Use a 13 mm tool to remove the screw at the bottom of windshield washer fluid tank, circled **green** in Figure 11.
14. Replace the tank screw removed in the previous step with HSC-1051 and HWA-1005 from the E5G-600-64 Hardware Kit.

⚠ **WARNING: DO NOT overtighten.**

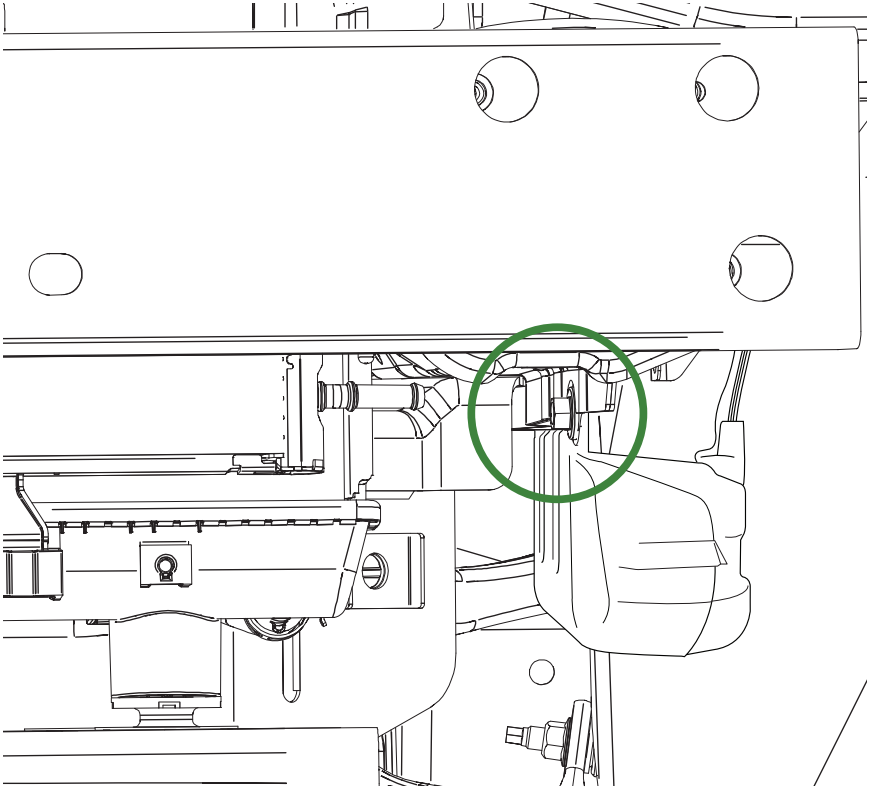


Figure 11 - Replacing the Windshield Fluid Tank Screw

15. Pre-fill and reinstall a new engine oil filter after lubricating the seal with engine oil.
16. Reconnect the spark plug wire for Cylinder #1.
17. Reinstall the bumper bar onto the car, if needed.

Line the screws up with their paint marks inside the bumper bar to ensure that the bumper cover reinstallation fit stays like new.

INSTALLING THE IMPROVED RACING KIT

1. Read the included manuals for EGM-114 and MHX-245.
2. Install the adapter fittings into EGM-114.
3. Torque the fittings to 20 lb-ft (27 N-m).
4. Install EGM-114 using a 5 mm hex-drive tool.

Cut a 5 mm hex key on the short side to make a low profile tool that will clear headers.

5. Fasten the top and bottom brackets to MHX-245 using the mounting screws included with MHX-245, as shown in Figure 12.

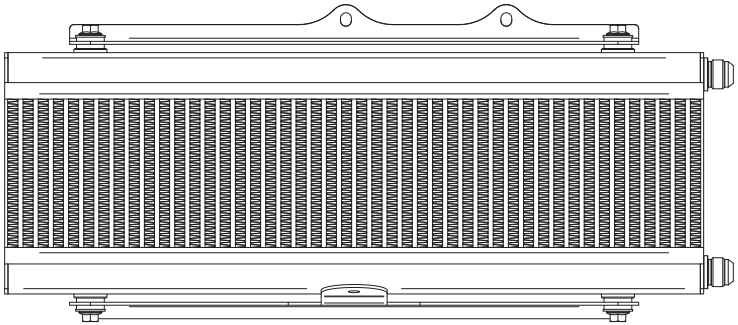


Figure 12 - Brackets Attached to MHX-245

6. Use a 12 mm tool and two HSC-1050 screws from the E5G-600-60 Hardware Kit to secure the top bracket to the vehicle using the two holes circled **green** in Figure 13.

If the nut's threads are filled with paint, run the provided M8 screws through the hole(s) one to three times to clear the threads.

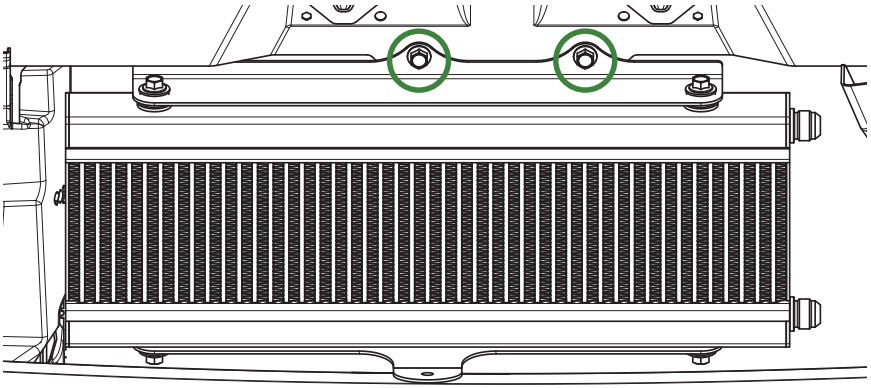


Figure 13 - Securing the MHX-245 & Brackets to the Car

7. Use an angle finder to match the 4° tilt of the factory radiator stack and hold this position to trace the hole for the lower bracket.

When on wheel ramps, re-measure the angle on your ramps.

8. Use a permanent marker to trace the hole outline for drilling.
9. Remove the cooler and bracket assembly from the car.
10. Strike the hole center with a punch.
11. Use a sharp $^{7}/_{16}$ inch drill bit to create the hole in the bumper bar for the bottom oil cooler bracket.

12. Deburr the hole as needed and insert the jack nut into the hole.
13. Use the included jack nut friction wrench to install the jack nut:
    a. Sandwich the friction wrench between the jack nut flange and HSC-1062 screw head.
    b. Hold the friction wrench while using a drill and 7/16 inch socket to squeeze the jack nut tight to the bumper bar. DO NOT over-tighten.
    c. Remove HSC-1062 from the jack nut to complete installation.
14. Re-mount the cooler with brackets back onto the car by first securing the top bracket with a 12 mm tool and two HSC-1050 screws.
15. Torque all M8 screws to 24 lb-ft (33 N-m).
16. Attach the bottom bracket to the bumper bar using a drill, $^{7}/_{16}$ inch socket and HSC-1062. Tighten to feel, DO NOT overtighten.
17. Grab the oil lines and route them towards the back of the car as shown in Figure 14.

E5G-600-50 is on the passenger side of the car.

E5G-600-51 is on the driver side of the car.

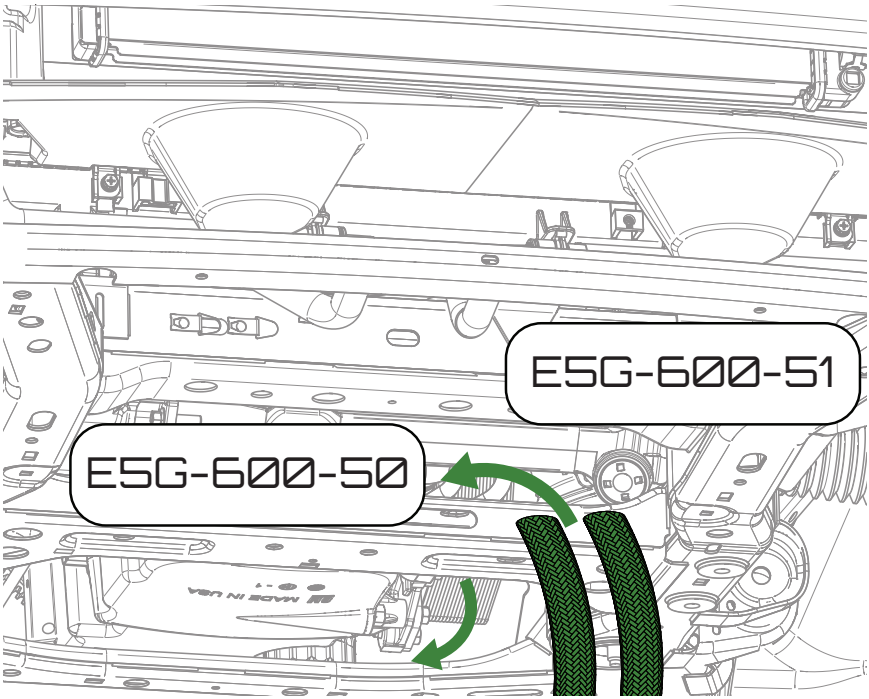


Figure 14 - Routing the Oil Lines Rearwards

18. Apply oil onto the flare of the adapter fitting installed into EGM-114 OUT port.
19. Connect the straight hose-end of E5G-600-51.
20. Torque the hose-end to 20 lb-ft (27 N-m).
21. Repeat the previous step with E5G-600-50 for the IN port on EGM-114.
22. Torque the fitting to 20 lb-ft (27 N-m).

Connect the 90° hose-end with heat shield at the adapter side.

23. Configure HSC-1052, HWA-1003 and CP-16 from the E5G-600-62 Hardware Kit as shown in Figure 15, then secure the hoses to the chassis location circled **green** on Figure 16.

Use channel-lock pliers to keep the hose clamp straight while tightening the screw.

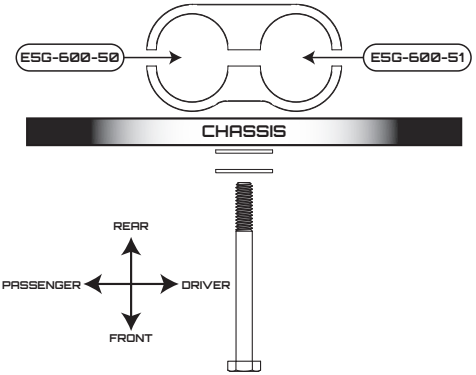


Figure 15 - E5G-600-62 Hardware Pack Arrangement

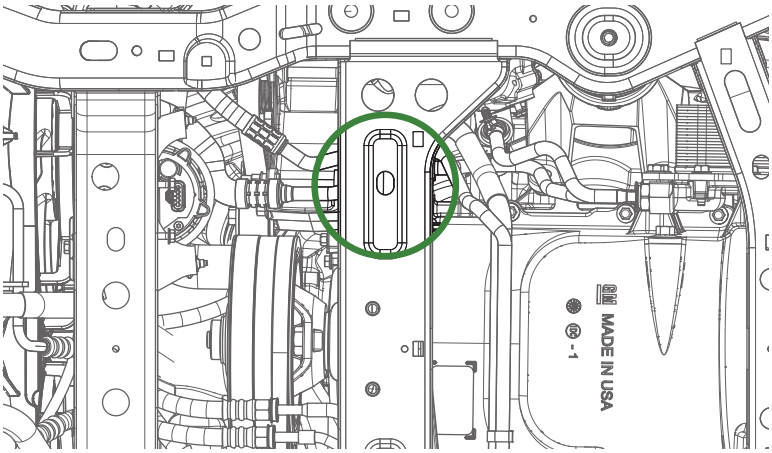


Figure 16 - Chassis Location for Rear Hose Clamp

24. Ensure the hoses are routed above the sway bar.
25. Locate the threaded hole on the top of the chassis for the next clamp, shown in Figure 17, and secure the hoses with E5G-600-63 Hardware Kit as shown in Figure 18.

Use channel-lock pliers to keep the hose clamp straight while tightening.

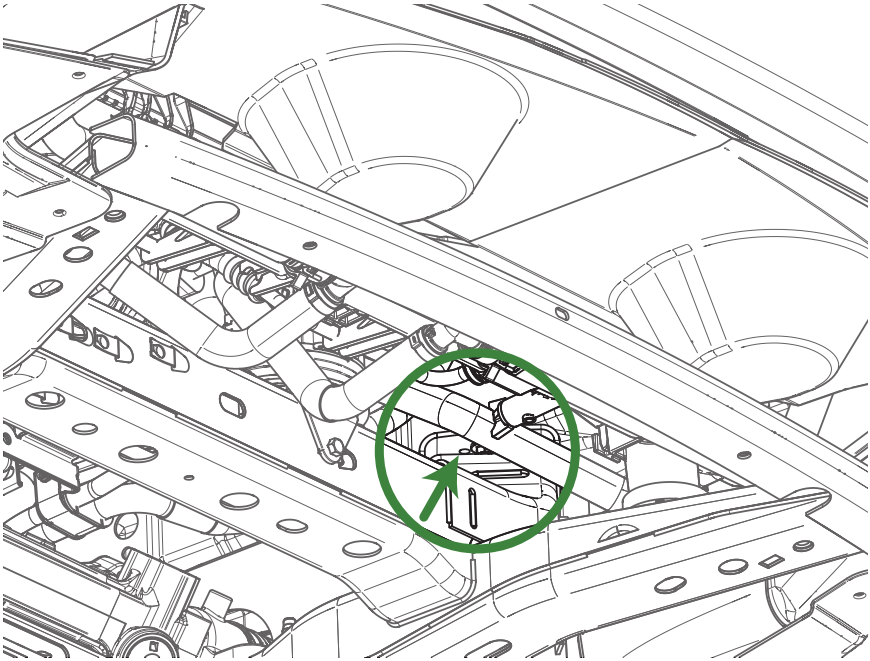


Figure 17 - Chassis Location for Middle Hose Clamp

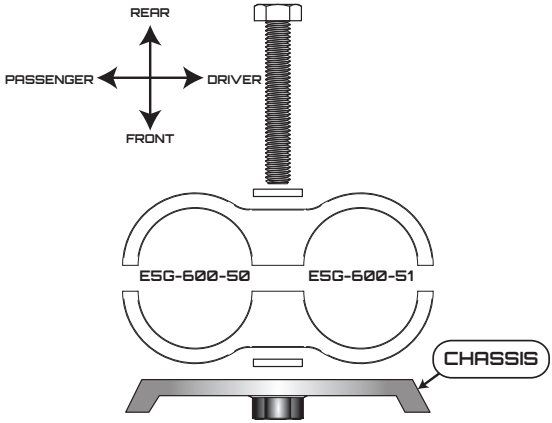


Figure 18 - E5G-600-63 Hardware Pack Arrangement

26. Peel-back the black plastic shroud, circled **green** in Figure 19, and route the system lines up towards MHX-245.

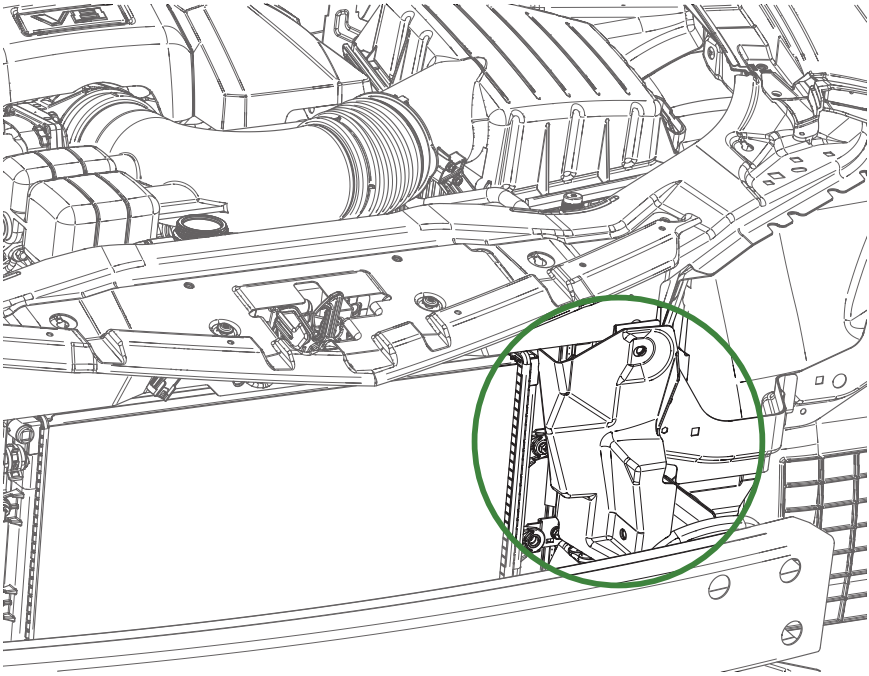


Figure 19 - Black Plastic Shroud to Peel-Back & Route Hoses

27. Use two HTD-1004 from the E5G-600-64 Hardware Kit to secure the hoses onto the M8 screw that was installed into the washer fluid tank previously, as shown in Figure 20.

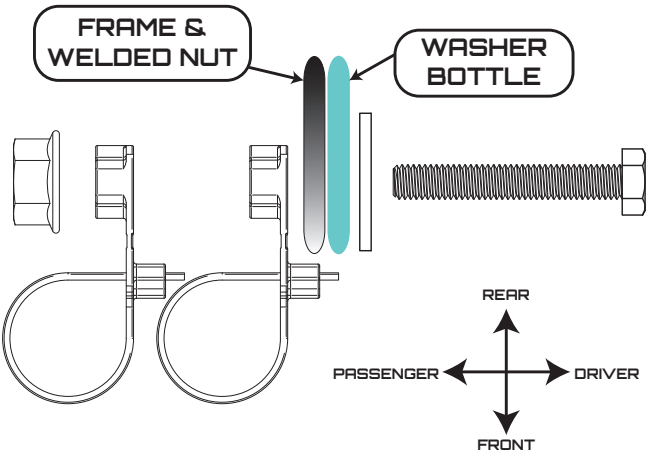


Figure 20 - Securing the Hoses with the High-Temperature Cable Ties & M8 Nut

28. Apply oil onto the flare of the lowest fitting MHX-245.
29. Connect the 45° hose-end to the lowest fitting on MHX-245.
30. Tighten the hose-end to 20 lb-ft (27 N-m).
31. Pre-fill the heat exchanger with engine oil using a tube and funnel.

Use a flexible tube with a maximum O.D. of $^1/_2$ inch (12.7 mm).

32. Remove the tube and funnel.
33. Connect the 90° hose-end to the top fitting on the oil cooler.
34. Tighten the hose-end to 20 lb-ft (27 N-m).
35. Wipe-up any oil that spills.

PREPARING FOR STARTING

1. Check the engine oil level and add oil if necessary.
2. 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, 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.
3. Check the engine coolant level and add coolant if necessary.

Consult the vehicle's factory service manual for the correct inspection and filling procedures

4. Start the vehicle and inspect for oil and coolant leaks.

Be sure the engine does not overheat.

5. Turn-off the vehicle.
6. Inspect the engine oil and coolant level.

Add oil or coolant when necessary.

REINSTALLING THE BUMPER COVER

1. Use a 10 mm tool to replace the four screws securing the black fascia cover to the front of the car, shown in Figure 5.

2. Cut the black plastic, lower radiator shroud as shown in Figure 21.

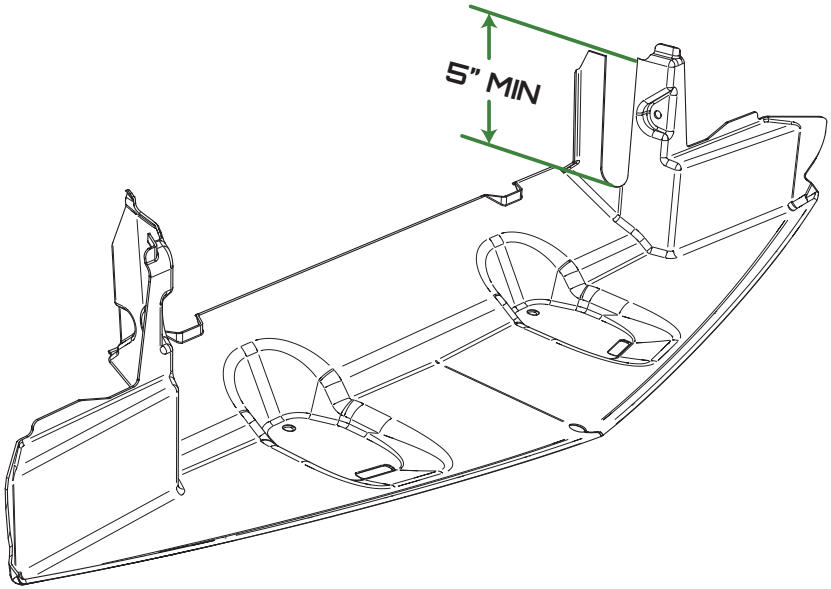


Figure 21 - Trimmed Black Plastic Lower Radiator Shroud

3. Reinstall the modified black plastic shroud onto the vehicle by finagling the hoses into the cutout, followed by reinserting the plastic pop-clips.
4. Carefully place the bumper cover straight onto the front of the car.

Be sure to reconnect all wire harnesses and lock all safety tabs!

5. Peel-back the wheel-well linings on each side to:
   a. Reconnect all fog light harnesses.
   b. Use an extended 10 mm tool to replace the four screws securing the bumper cover to the fender support. DO NOT overtighten.
   c. Use a 7 mm tool to replace one screw securing the bumper cover to the fender.
6. Use a 7 mm tool to replace all screws in the wheel wells.

Refer to Figure 4 for locations.

7. Put the wheels back on, if applicable.
8. Use a T20 tool to replace all screws under the bumper cover, in front of the wheels.

There are four per side.

Refer to Figure 3 for locations.

9. Use a 10 mm tool to replace the two screws on the bottom which hold the bumper cover to the chassis.

Refer to Figure 2 for locations.

10. Use a 10 mm tool to replace the screws at each corner under the hood.

Refer to Figure 1 for locations.

11. Replace all of the plastic pop-clips underneath the hood which pin the bumper cover to the radiator support.

Refer to Figure 1 for locations.

12. Peel-off all masking tape from the fenders.
13. Close the hood and safely lower vehicle back onto the ground.
14. Take a test drive to ensure performance is as desired.
15. Check for loosened fittings and leaks after 50 miles of driving.

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