



## ENGINE & TRANSMISSION OIL COOLER INSTALLATION INSTRUCTIONS

These Northern Oil Coolers will lower oil temperature under all types of driving conditions including trailer towing, heavy loads, hot climates, and high performance uses.

The Northern Oil Cooler features a 100% oven brazed aluminum construction with high efficiency tubes and fins for maximum heat transfer.

\*\*A Northern Oil Cooler is an easy installation; however, we recommend the installation instructions be carefully studied before starting install.

\*\*The cooler relies on air flow for heat transfer. We recommend a location in front of the radiator and/or condenser which will receive maximum air flow. Care should be taken to mount the cooler at least ¼" in from the radiator or condenser. The mounting should be rigid and should never allow the cooler to contact either the radiator or condenser.

\*\*The cooler may be mounted in any position, and oil may flow through the cooler in either direction. However, use care and common sense to select a mounting location which will not subject the cooler to road surface contact or road debris.

\*\*The cooler will help protect the engine and engine oil from overheating, but it cannot correct a faulty or worn engine. The mechanical condition of the engine must be good before the Northern Engine Oil Cooler is installed. If the engine condition is questionable, we recommend the repairs be made prior to oil cooler installation.

\*\***IMPORTANT NOTICE**\*\* For cold weather climate conditions (below 32°F), the engine oil should NEVER be operated below 140°F, or engine damage may occur. If the vehicle will be used during cold periods (below 32°F), we strongly recommend an engine oil thermostat from another aftermarket provider, or disconnect this oil cooler to prevent over cooling of the engine oil. If the vehicle has an in-tank radiator engine oil cooler, it should be plumbed in series to the external cooler. In cold weather, the radiator engine oil cooler acts as an oil warmer.

**NOTE:** These oil coolers are intended for Automotive or Light Truck Engine Oil, Transmission and Power Steering applications only!

### BEFORE BEGINNING:

1. Review the installation area to avoid tight hose bends or sharp edges that could cut the hoses. Make certain the oil hose will not be exposed to hot areas (exhaust manifolds, headers, or exhaust pipes or components). Also, make sure the oil hose will not chafe against other metal surfaces after installation.

Safe Clearance Distances Are:

- 1" from fans
- ¼" from Radiator or Condenser
- 2" from hood, wheel wells, firewalls, etc.
- 6" from exhaust components

### BEFORE BEGINNING: (CONT)

2. Always make the hoses at least 2" longer than the rough measurements. Remember once the oil hose is cut, it can always be shortened, but it cannot be lengthened.
3. Tighten hose clamps until rubber extrudes through hose clamp slots, level with the metal surface of the clamp. After 6 months, hoses should be checked and retightened as necessary.
4. Pipe thread compound should be used on NPT fittings never tape. AN fittings do not require any compound as they seal on the flare. Do not over-tighten fittings. 15 ft-lb is the correct torque.

### ENGINE OIL COOLER INSTALLATION:

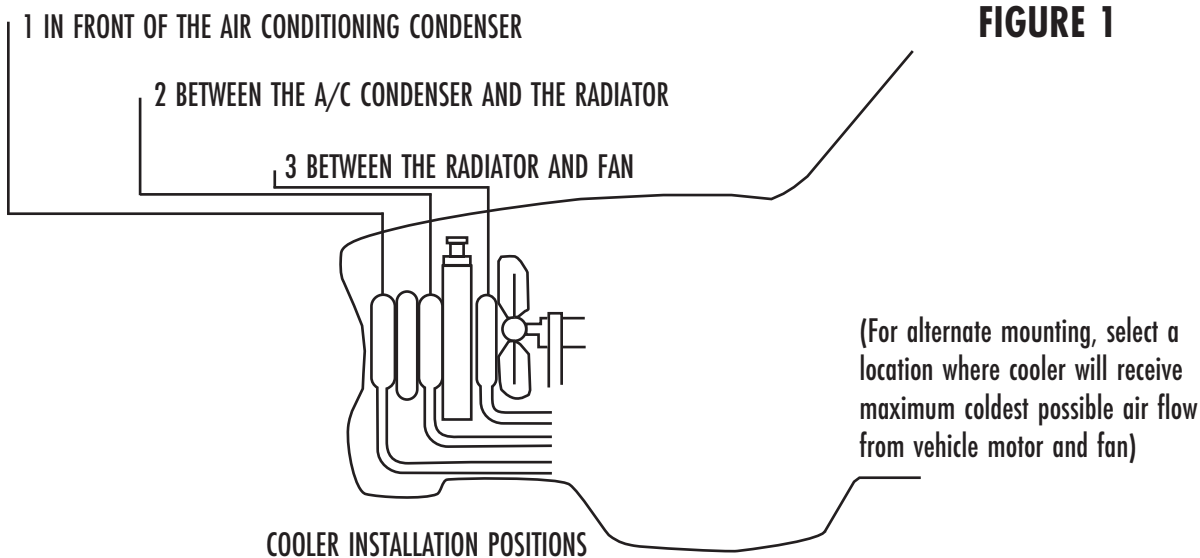
For engine oil use, this kit works only on engines with spin-on oil filters and must have adequate clearance around the filter area for a sandwich adapter and hoses necessary to connect the cooler to the engines oiling system. The sandwich adapter taps into the oil system to supply the hose connections going to the oil cooler by providing the connections needed to plumb the oil lines to the vehicle.

An oil filter sandwich adapter kit must be sourced from the engine manufacturer or another aftermarket supplier.

Prior to installation, please check the oil filter mounting thread of the vehicle and the thread of the adapter are compatible. Certain vehicles, like some GM LS-1 engine blocks, may have a factory block plate which can be replaced with a factory oil hose adapter (a GM part) and do not require the sandwich adapter.

### SUGGESTED MOUNTING POSITIONS:

Determine the best location for the vehicle from the positions shown in the illustration. See Figure 1.



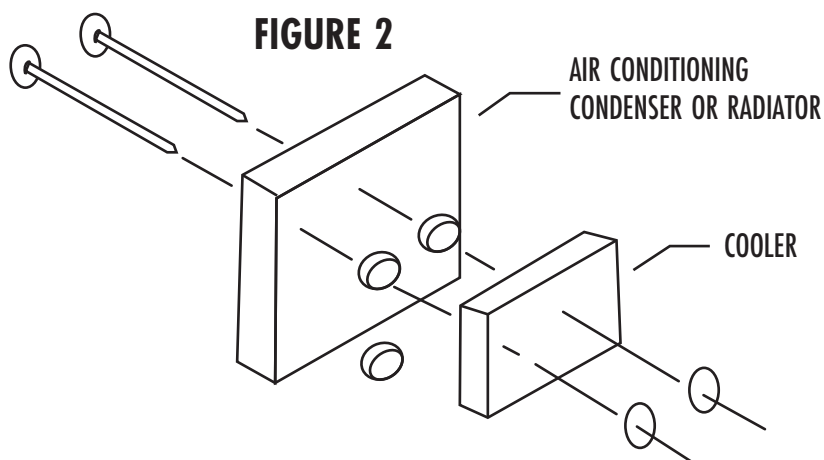
Position 1 is the preferred location, but Positions 2 or 3 are acceptable. However, the mounting for Position 2 or 3 requires different mounting devices or fabricated brackets. Other positions can be used, but they must be locations where there will be a good, cold air flow through the cooler. The cooler can be mounted with the fittings facing up, down, or to either side as is convenient.

## INSTALLATION PROCEDURE:

Before starting the installation, check the oil filter clearance by adding the depth of the sandwich adapter to the filter length. If there is insufficient clearance, the filter must be remotely mounted and additional mounting materials will be needed. In some cases, a shorter filter will suffice. Make sure that the threads on a shorter filter will fit the adapter.

1. Install the fittings into the cooler and sandwich adapter. Use pipe thread compound or suitable thread sealer. Do not over-tighten.
2. Position the cooler in the position determined. Do not install the cooler yet.
3. Select the mounting adapter and the correct colored threaded ring that will fit the application. Thread the ring into the adapter.
4. Apply a light coating of engine oil to the O-ring seal of the sandwich adapter. Insert the adapter with the correct colored ring and screw it over the threaded nipple in the cylinder block. The O-ring seal side of the adapter goes against the block. Locate the fittings on the sandwich adapter in the direction that the hose will be routed. Tighten the nut on the adapter.
5. Fit and rough-cut hoses to length. Remember to add 2" to the measurement and keep all bends to a 90 degree or greater radius. Smaller bends may restrict oil flow.
6. Mount the cooler using bolts or mounting screws. Use an electric drill to drill the mounting holes. If a location other than Position 1 in Figure 1 was chosen, other mounting hardware may be needed. If needed, this mounting hardware will need to be sourced separately to complete the mounting. The hardware in Figure 2 might work for the application.

### Northern Part # Z18344 Quick Mount Kit Cooler Installation to Radiator or A/C Condenser



7. Attach the fittings to the cooler. Be certain to support the fitting on the cooler with a wrench along with a wrench on the fitting installed.

#### INSTALLATION NOTICE!

**IMPORTANT:** Use two wrenches when installing the adapter fittings. Always support the cooler with one wrench to prevent any pressure on the cooler connection or damage to the cooler may result.

8. Complete the hose assembly by routing hoses well away from unprotected sharp edges, exhaust system, etc. Trim the hoses to the final length and tighten the hose clamps per instructions. Use tie wraps to secure hoses if necessary.
9. When installation is complete, test as follows:
  - a. Start engine. Immediately check for oil pressure. If there is no oil pressure, turn off the engine and look for the problem.
  - b. Shut off engine after oil pressure is established. Check for leaks and check the oil level.
  - c. Add oil, as necessary, but do not overfill.
10. Restart the engine and allow the vehicle to idle for 10 minutes. Be certain that the vehicle is in PARK or in NEUTRAL with the parking brake on.
11. Recheck for leaks.
12. Feel both ends of the oil cooler. Both ends should feel warm. If the cooler is cold, lack of oil flow due to a kinked hose may be the problem. Please review the Installation. Correct the restriction and repeat Step 10.
13. Recheck the installation for cooling (Step 12) and leaks in a few days. Recheck every 3 months after that.

### **TRANSMISSION OIL COOLER INSTALLATION:**

Northern's Transmission Coolers are designed to provide substantial additional transmission oil cooling. This kit may or may not include the parts and hardware needed for installation. Please follow these installation instructions for best results with a new transmission cooler. We recommend that this cooler be installed in series with the vehicle's original equipment transmission oil cooler located in the radiator. Installation in series provides maximum cooling. Bypassing the vehicle's OEM radiator-mounted transmission oil cooler is **NOT** recommended.

**NOTE: THIS TRANSMISSION OIL COOLER IS FOR AUTOMOTIVE OR LIGHT TRUCK USE ONLY!!**

### **MOUNTING THE COOLER:**

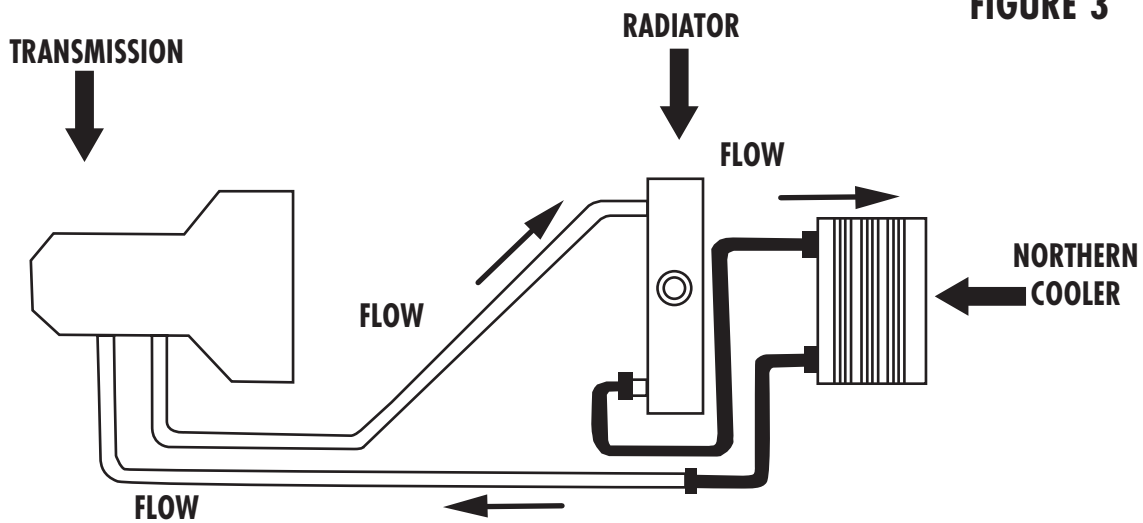
1. The transmission cooler may include brackets for rigid mounting to the vehicle's chassis and may be mounted in various locations in front of the radiator or A/C condenser. Remember, maximum air flow through the oil cooler is desired, so mount the cooler in the best location relative to the grill air opening of the vehicle. The cooler may be mounted in other locations, but this may reduce efficiency and effectiveness. Also, note the cooler should be placed to simplify the routing of the connecting hoses.

**NOTE: TRANSMISSION OIL MAY FLOW IN EITHER DIRECTION THROUGH THE COOLER.**

2. Find the two steel tubes running from the automatic transmission to the original equipment cooler which is located inside and along the bottom or side of the radiator.
3. Position the cooler so its fittings face toward the metal lines entering the radiator.
4. If steel mounting hardware is provided, mount the cooler securely by shaping the brackets to suit the configuration of the mounting location. Sheet metal screws can be used to fasten the cooler to the vehicle's sheet metal. If mounting hardware is not provided, fabricate or purchase the necessary components.

### **CONNECTING THE COOLER:**

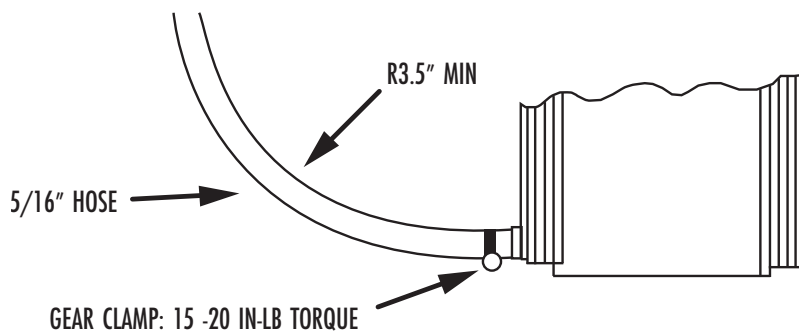
The cooler can now be connected using the illustration in Figure 3 as a guide. On all automatic transmissions, the transmission oil flows from the transmission through the original equipment cooler installed inside the radiator and back to the transmission. For the cooler to work properly (in series), it must be connected so the transmission oil flows through it AFTER going through the original equipment cooler. Here is a simple method for determining which direction the transmission oil flows. In cold weather, the in-tank radiator transmission oil cooler acts as an oil warmer, so it is very important that the flow direction has the fluid going through the radiator first before traveling to the external cooler. NEVER bypass the radiator cooler if the vehicle will be operated in cold weather areas.

**FIGURE 3**

**This is how to determine the transmission oil flow direction:**

1. Place a catch pan under the radiator. Using either a wrench or locking pliers, disconnect one of the two steel lines entering the radiator.
2. Ensure that the vehicle cannot start during installation.
3. With the transmission selector lever in PARK, have a helper crank the engine over a few revolutions. The transmission oil will flow from either the radiator or the disconnected tube. If the oil flows from the radiator, connect the cooler here. If not, the oil flows from the radiator at the other tube so connect there.
4. Once the direction of the oil flow is determined, the adapter for the cooler is ready to be connected.
5. Attach the rubber hose to either of the fittings on the cooler. Slip a hose clamp over each connection point. Run the hose to the adapter placed on the radiator in the previous step. Trial measure and cut the hose. Remember to add 2 inches beyond the rough measure. After trial fitting the hose, make the hose finish cut to length and trim any excess hose. Slip the hose over fitting and secure both ends with hose clamps.

When installing the hose using the hose clamps to the cooler and attaching the hose to the radiator, it is necessary to exert 15-20 in-lbs of torque on each hose clamp (Figure 4). Please ensure that this is completed and check hose clamps one week after installation and periodically thereafter.

**FIGURE 4**

6. Repeat the hose fitting process for the second hose and secure the fittings and hose.

## INSTALLATION PROCEDURE:

1. After mounting the cooler and connecting it in series, all the mounting bolts and clamps should be checked for tightness.
2. Check to be sure the rubber hoses are free of kinks and away from heat and sharp edges.  
**WARNING:** Hoses that have a kink or have been bent too much will cause a significant restriction and will result in transmission failure.
3. Start the engine with the transmission selector lever in PARK and let it run at fast idle for one or two minutes.
4. Stop the engine and check all connections for leaks.
5. Check transmission fluid level according to manufacturer's instructions and add fluid if necessary.
6. During the first week of operation, check connections for leaks and fluid level. The hose clamps may require tightening and the fluid level may need to be topped off.
7. The installation should be checked periodically, as the hose clamps may require retightening.

### INSTALLATION NOTICE!

**CAUTION:** Many radiators have a hex nut fitting where the steel line from the transmission attaches to the original equipment cooler. Any time one of these lines is either connected or disconnected, be sure to do so with one wrench securely holding the nut that is on the radiator and a second wrench loosening or tightening the nut on the steel line. This will prevent breaking or damaging the connection fitting on the radiator.

**Important!** Use two wrenches when installing the adapter fittings. Always support the cooler with one wrench to prevent any pressure on the cooler connection or damage to the cooler may result.