PM1000

# ENGINE & TRANSMISSION OIL COOLER INSTALLATION INSTRUCTIONS

**General Overview**

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 you start.

**The cooler relies on air flow for heat transfer and 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 your 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 your 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 your 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 your engine oil. If the vehicle has an in tank radiator EOC it should plumbed in series to the external cooler. In cold weather the radiator EOC acts as an oil warmer.

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

**BEFORE YOU BEGIN:**

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

2. Always make your hoses at least 2" longer than your rough measurements – Remember once you cut the oil hose you can always shorten it but you cannot make it longer.

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 adaptor kit must be sourced from the engine manufacturer or another aftermarket supplier.

Prior to installation, please check the oil filter mounting thread of your vehicle and the thread of the adaptor 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 your vehicle from the positions shown in the illustration. See Figure 1.

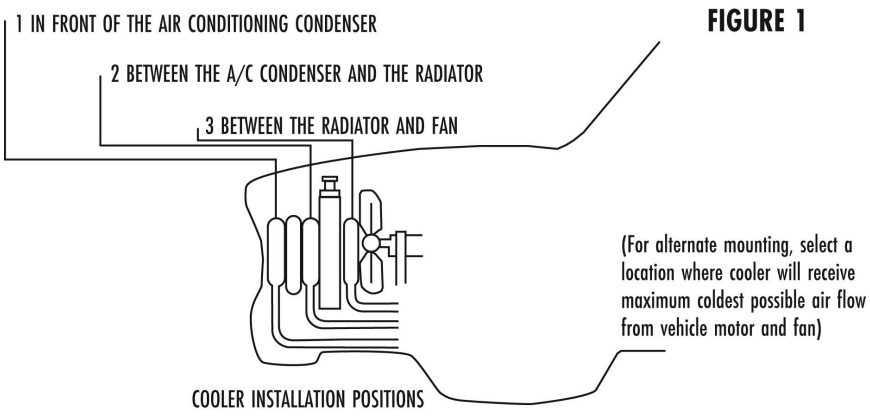


**FIGURE 1**

Position 1 is the preferred location, but positions 2 or 3 are acceptable. However, the mounting for position for 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 PORCEDURES:

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 short 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 location that you have determined. Do not install the cooler yet.

3. Select the mounting adapter and the correct colored threaded ring that will fit your application, and 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 your measurement and keep all bends to a 90 deg. or greater radius, smaller bends may restrict oil flow.

6. Mount the cooler using bolts or mounting screws. Use your electric drill to drill the mounting holes. If you choose a location other than #1 in figure 1 you may need other mounting hardware (see Figure 2). If needed, this mounting hardware will need to be sourced separately to complete the mounting.

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

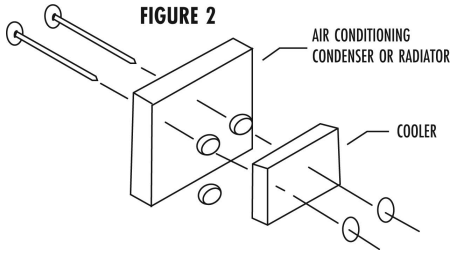


**FIGURE 2**

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, keeping 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 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 and correct the restriction and repeat step 10.

13. Recheck the installation for cooling (step 12) and leaks in a few days and every 3 months after that.

## TRANSMISSION OIL COOLER INSTALLATION:

Northern's Transmission Coolers are designed to provide substantial additional transmission oil cooling.

Included in this kit are the parts and hardware needed for installation. Please follow these installation instructions for best results with your new transmission cooler.

We recommend that this cooler be installed in series with your vehicles original equipment transmission oil cooler located in the radiator.

Series installation provides maximum cooling. By-passing your 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: Your transmission cooler features brackets for rigid mounting to your vehicle's chassis and may be mounted in various locations in front of the radiator or A/C condenser. Remember, you want the maximum air flow through the oil cooler, 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 your automatic transmission to the original equipment cooler, which is located inside and along the bottom or side of your radiator.

3: Position the cooler so its outlets face toward the metal lines entering the radiator.

4: With the steel mounting hardware provided, mount the cooler securely by shaping the brackets to suit the configuration of your mounting location. Sheet metal screws can be used to fasten the cooler to the vehicles sheet metal.

**Connecting the Cooler:**

Your cooler can now be connected using the illustration in Figure 1 as a guide. On all automatic transmissions the transmission oil flows from the Figure 1 transmission through the original equipment cooler, installed inside the radiator, and back to the transmission. For your 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's a simple method for determining which direction your transmission oil flows. In cold weather the in tank radiator TOC acts as an oil warmer so it 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

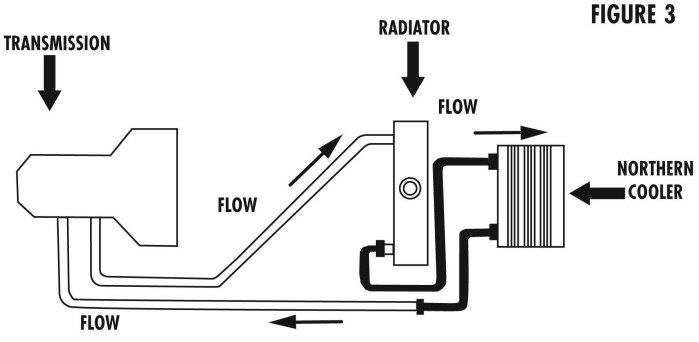

***Figure 3***

This is how you tell:

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, you connect the cooler here. If not, you know the oil flows from the radiator at the other tube so connect there.

4: Once you've determined the direction of the oil flow, you're ready to connect the adapter for your cooler.

5: Attach the rubber hose to either of the outlets on the cooler. Slip a hose clamp over each connection point. Run the hose to the adapter you placed on the radiator in the previous step. Trial measure and cut the hose (remember to add 2 inches beyond your rough measure). After trial fitting the hose, make your 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 inch pounds 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**

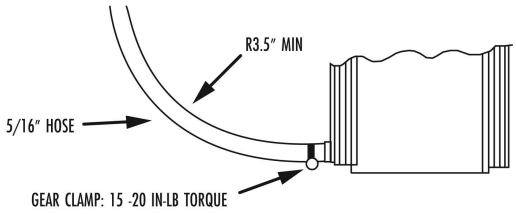


**Figure 4**

6: Repeat the hose fitting process for the second hose and secure the fittings and hose. (See fig.3)

**INSTALLATION NOTICE**

1) After you've mounted the cooler and connected 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 your 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.

**CAUTION**: Many radiators have a hex nut fitting where the steel line from the transmission attaches to the original equipment cooler. Any time you either connect or disconnect one of these lines 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 damage to 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.