

## MTC-4208, MTC-4210, & MTC-4213 Series Transfer Cases

# CONNECTING AN OIL COOLER

### Hazard Alert Messages

Read and observe all hazard alert messages in this publication.

#### **DANGER**

Indicates imminent danger. Failure to follow this instruction will result in death or serious injury.

#### **WARNING**

Indicates a possibly impending danger. Failure to follow this instruction can result in death or serious injury.

#### **CAUTION**

Indicates a hazardous situation or unsafe practice which, if not avoided, could result in injury or damage to components.

### How to Obtain Additional Maintenance, Service and Product Information

- Maintenance Manual MM-0146 - MTC-4208, MTC-4210, & MTC-4213 Transfer Cases
- Maintenance Manual MM-0861 - MTC-4208X/XL/XP/XLEV/XLEC, MTC-4210X/XL/XP/XLEV/XLEC & MTC-4213X Series Transfer Cases.

#### HOW TO OBTAIN PARTS

Contact Meritor's Commercial Vehicle Aftermarket at 888-725-9355 or by email at [CustCareCntr.Florence@Meritor.com](mailto:CustCareCntr.Florence@Meritor.com).

### Contact the Meritor OnTrac™ Customer Service Center

If you have questions about the procedures in this bulletin, contact the Meritor OnTrac™ Customer Call Center at 866-668-7221 (US and Canada) between 7:30 AM and 10:00 PM ET Monday through Friday, and between 9:00 AM and 6:00 PM ET on Saturday.

### Purpose

Vehicle configuration can have a significant impact on MTC model transfer cases. Vehicles with overdrive transmissions used primarily for high-speed highway routes run at higher transfer case input speeds. Transfer case running temperature is primarily affected by input speed, regardless of rear-wheel-drive only or part-time 4x4 or 6x6 operation.

The truck body can also restrict the airflow to the transfer case. For example, a body with tool boxes hanging below the frame rails will have higher transfer case operating temperatures.

### Requirements

An oil cooler is adaptable to all production MTC 4208/10/13 transfer cases.

Check for a standard vehicle equipment manufacturer suggested cooler before starting.

Cooler-ready transfer cases are available through Meritor's Commercial Vehicle Aftermarket.

All air-to-air coolers must be capable of a heat transfer rate of at least 750 BTU per minute at 325 input horsepower at 3515 RPM. Operating temperatures above 250 degrees should be regarded as a warning of inadequate cooling. Intermittent temperature spikes up to 300 degrees are acceptable for a limited duration. The following factors could cause operating temperatures to exceed 250:

- High ambient temperatures
- Restricted air flow around the transfer case and/or cooler
- Exhaust system (and other heat sources) too close to the transfer case and/or oil cooler
- High horsepower operation
- High speed operation at or above the 3515 rpm limit

## Procedure

### **⚠ DANGER**

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. NEVER work under a vehicle supported only by jacks. Jacks can slip and fall over. Failure to use safety stands can result in death or serious personal injury and damage to components.

### **⚠ WARNING**

To prevent eye injury, always wear eye protection when performing vehicle maintenance or service.

## Oil Cooler Mounting Location

### **⚠ CAUTION**

Failure to properly route oil lines may result in oil draining back into the transfer case sump, giving the appearance of an overfilled transfer case when checking or adjusting the oil level. Improper oil levels can result in component damage.

Check the vehicle equipment manufacturer recommendations for oil cooler placement before mounting the cooler. The suggested airflow rate through the heat transfer media is 1,000 FPM. Additionally, the oil cooler should not have any objects located immediately in front of or behind the oil cooler that could reduce air flow through the cooler. Figure 1.

Meritor MTC model transfer cases must have adequate clearance from exhaust systems and other heat sources which can adversely affect transfer case performance. A heat shield may be required. The OEM is responsible for validating the transfer case installation for proper performance.

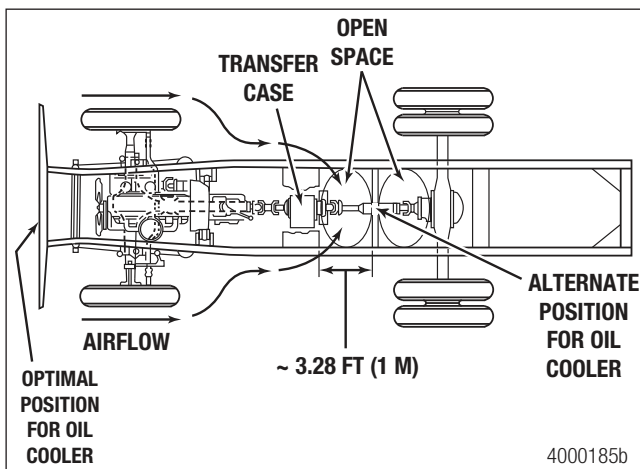


Figure 1

The optimal mounting location for the oil cooler, providing the greatest airflow, is in front of the radiator. The next best mounting location is on the chassis greater than three feet behind the transfer case.

## Oil Cooler Line Routing

### **⚠ CAUTION**

Meritor MTC-4208, MTC-4210, and MTC-4213 Series transfer cases may operate with an oil temperature above 250°F (121°C). However, if the oil temperature reaches 300°F (149°C), stop the vehicle immediately. Check for the cause of overheating to prevent damage to components.

### **⚠ CAUTION**

Failure to properly route oil lines may result in oil draining back into the transfer case sump, giving the appearance of an overfilled transfer case when checking or adjusting the oil level. Improper oil levels can result in component damage.

- Oil cooler lines should be routed to prevent oil flow back into the transfer case sump. This can be accomplished by routing lines in a p-trap configuration for both the oil cooler inlet and outlet lines. Figure 2.
- Oil cooler lines and fittings must be capable of handling temperatures up to 400°F (204.6°C).
- Use Teflon® steel braided hose, if available.
- Never route oil lines near other lower temperature air, oil, or electrical lines.
- Insulate the oil cooler lines, if necessary.

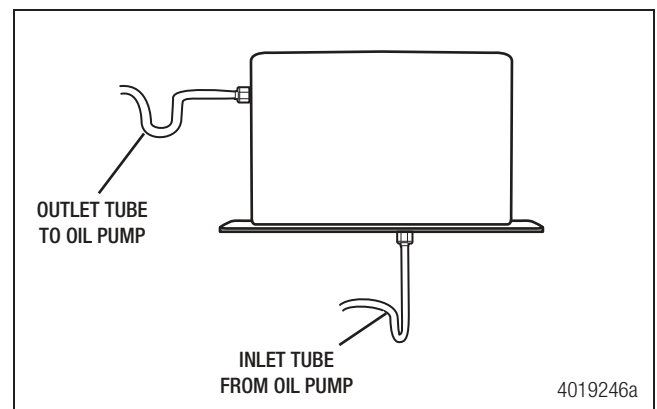


Figure 2

# Installation

## Oil Cooler Line Connection

There are different transfer case lubrication systems available. First, familiarize yourself with which model transfer case you have in order to identify cooler adaptation ports.

1. Disconnect the loop line on top of the transfer case connecting the pump exit and return ports on a standard transfer case model, or disconnect the fitting caps on a rear-mount pump model. Figure 3, Figure 4, Figure 5, Figure 6, and Figure 7.
2. Connect the oil exit line JIC fitting to the transfer case. Tighten to 20 lb-ft (27.2 Nm).
3. Connect the oil return line JIC fitting to the transfer case. Tighten to 20 lb-ft (27.2 Nm).
4. Mount the oil cooler. Refer to Figure 1.
5. Connect the oil lines to the cooler with the oil inlet to cooler in the lower port position, if applicable. Tighten to 20 lb-ft (27.2 Nm).
6. Route and secure the oil lines along the frame rails and chassis. Refer to Figure 1.

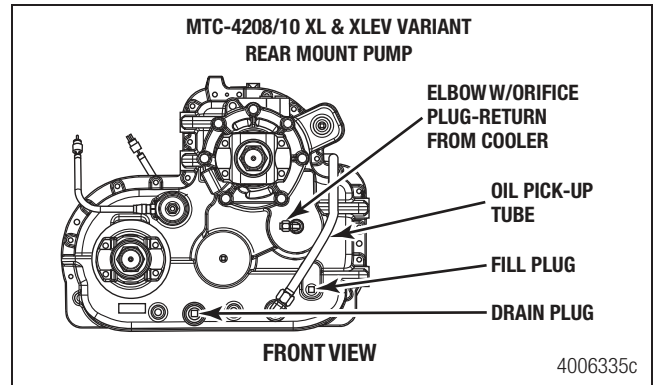


Figure 4

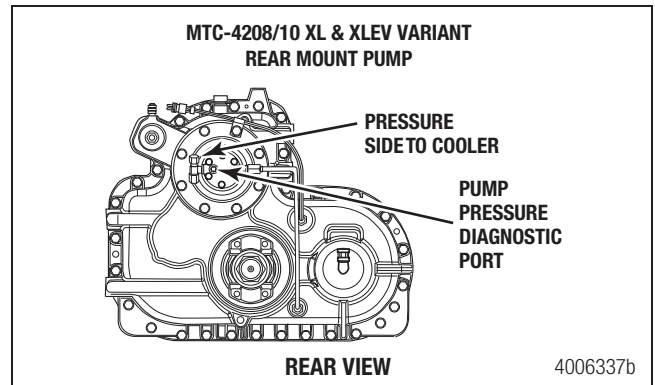


Figure 5

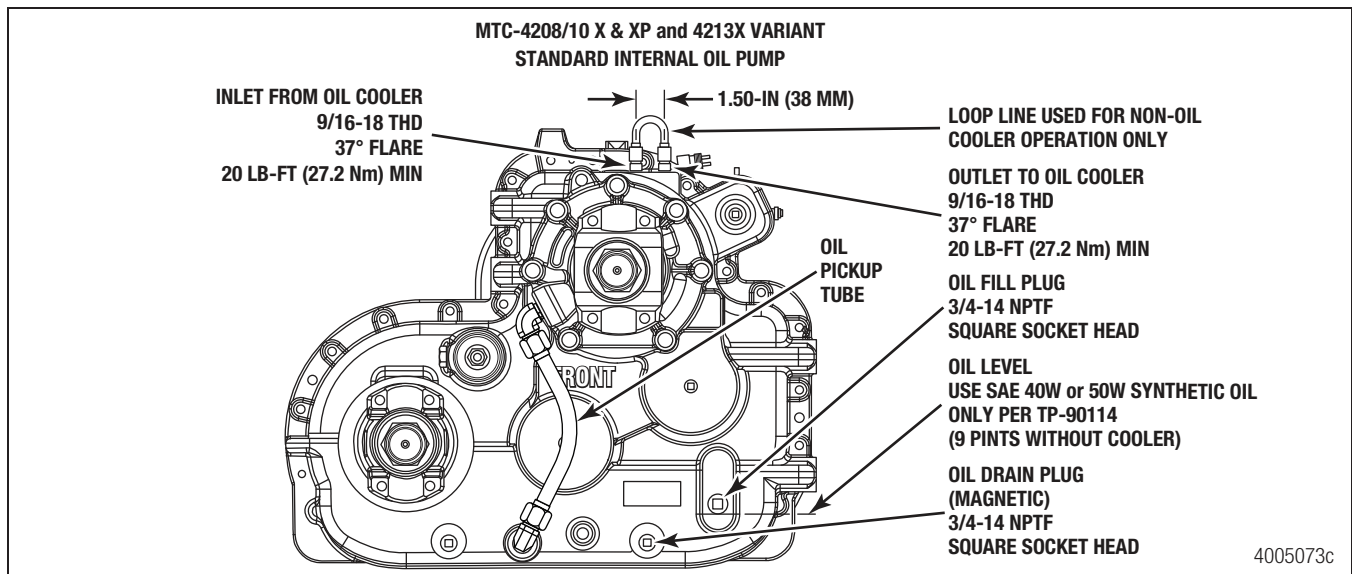


Figure 3

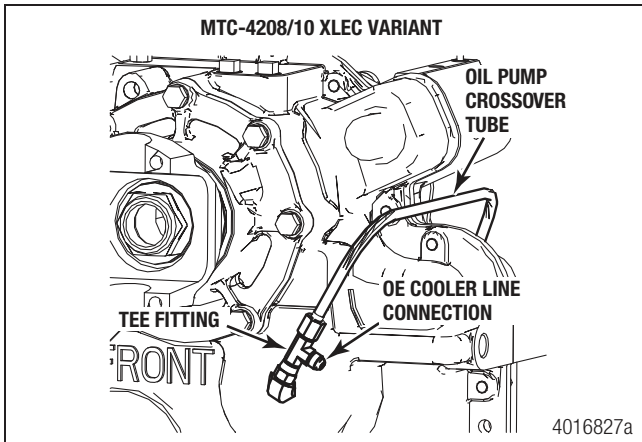


Figure 6

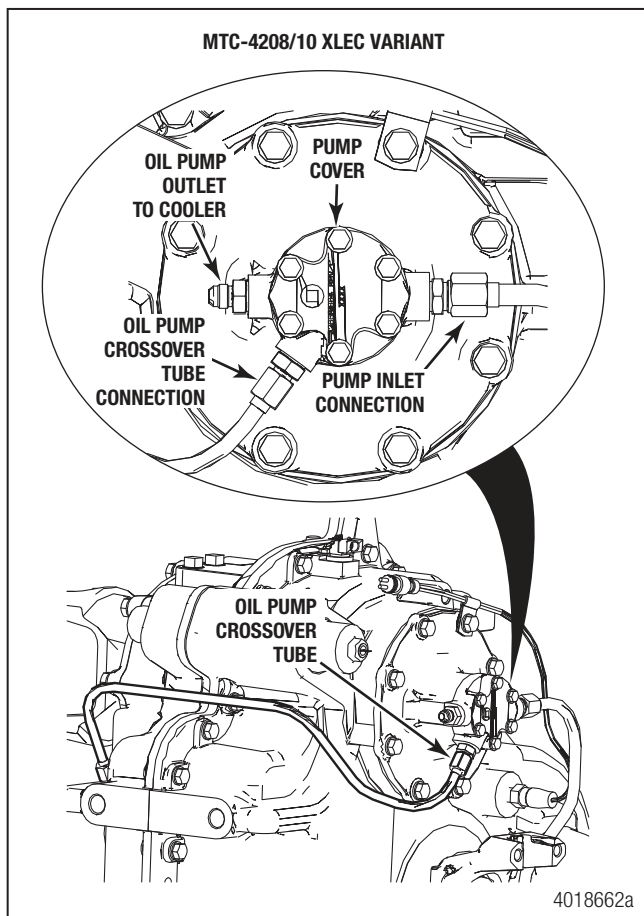


Figure 7

## Oil Fill Procedure

### ⚠ CAUTION

Only use new lubricant when changing or adjusting the oil in the transfer case. NEVER reuse lubricant, which can contain metallic particles and other contaminants. Damage to components can result.

### ⚠ CAUTION

The oil level must be even with the bottom of the fill hole. NEVER over fill the transfer case, which can cause the transfer case to overheat. Damage to components can result.

### ⚠ CAUTION

NEVER operate the transfer case if the oil level is below the bottom of the fill hole, which may be an indication that the transfer case is leaking. Damage to components can result. Ensure adequate oil is in the transfer case to prime the cooling system. After the cooling system is primed, verify proper oil level or damage to components may result.

The oil fill is located on the front of the transfer case. The breather can be used as an alternate oil fill location. Figure 8.

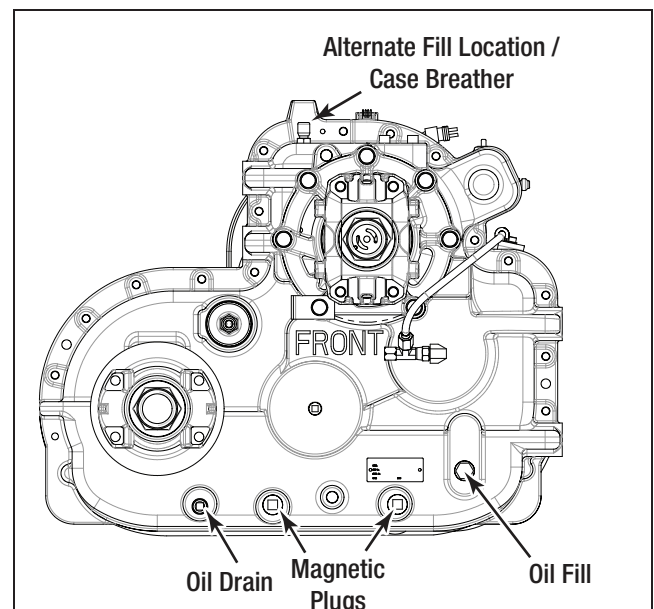


Figure 8

1. Fill the transfer case to the bottom of the oil fill plug opening and reinstall the fill plug
2. Add the OEM recommended cooling system oil volume to the transfer case through the alternate fill location/case breather as shown in Figure 8.

**NOTE:** The transfer case will appear overfull at this time.

3. Complete the priming & pressure check procedures. See MM-0861 for procedures on each specific MTC model transfer case.
4. Check the entire system for leaks including all the fitting connections and transfer case oil ports.

**⚠ WARNING**

Use caution checking the oil level as it may be hot.

5. Once procedure has been completed and a minimum of 10 PSI (0.7 bar) of oil pressure has been achieved, recheck the transfer case oil level at the fill plug location within 15 minutes of priming. Ensure the oil level is at the bottom of the fill hole. Add oil if necessary.

**NOTE:** Oil level may be higher than the oil fill plug after 15 minutes due to drain back from the cooling system.

6. Apply Loctite® 592 or equivalent to the oil fill plug, reinstall and tighten to 38 lb-ft (52 Nm).

**TABLE A: Transfer Case Oil Specifications**

Oil Description <sup>1, 2</sup>	Meritor Specification	A.P.I. Specification	Military Specification	SAE Grade	Outside Temperature
Full Synthetic Oil <sup>3, 4</sup>	O-81	—	—	40W or 50W	Above -40°F (-40°C)

<sup>1</sup> Do not mix or switch oil types. Use the same oil that initially filled the transfer case.

<sup>2</sup> Do not use multi-viscosity oils.

<sup>3</sup> Meritor-approved full synthetic oil for manual Meritor transmissions is also approved for Meritor transfer cases. Use synthetic oil only if the transfer case was initially filled with synthetic oil.

<sup>4</sup> Do not use multi-viscosity (i.e., 80/90W) A.P.I. GL-5 gear oil, axle lube in transfer cases.

