

## Section 6

# Engine Cooling System

# Contents

## **Section 6 Engine Cooling**

- General Service □ Page 111
- De-Aeration Tank Removal □ Page 112
- Radiator Removal □ Page 112
- Fan Service □ Page 113

## Engine Cooling System On-Vehicle Service

### Radiator Coolant Refill & Change

#### Topping Up

1. Open the access door (2 fig. 1.) on the centre right front of the vehicle, by pressing the black button or (insert key for the lockable doors on the early vehicles).

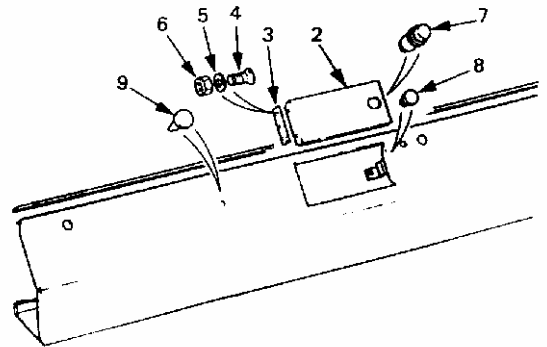
**WARNING:** Do not remove the radiator filler cap when the engine is hot, as this will allow pressurised hot coolant to escape which could cause severe scalding.

2. Remove the filler cap (14 fig. 2).
3. Top up with the recommended coolant (ref. Specifications Section1 Page 5) to the bottom of the neck of the de-aeration tank (9 fig. 2).

#### Changing and Flushing the System

1. Park the vehicle on level ground.
2. Move the heater to the hot position.
3. Open the access door (2 fig. 1.) on the centre right front of the vehicle.
4. Remove the filler cap by turning it to the first stop, allowing the system pressure to escape then continue to turn and lift off.
5. Open the drain tap in the centre bottom of the radiator.
6. Remove drain plug on the engine, there is one on either side of the rear of the block.
7. Fill the system to the top of the filler neck with the recommended coolant, (ref. Specification Section for type and quantity).
8. Run the engine at idle, with the radiator cap off, for one to two minutes and top up when the water drops.
9. Replace the filler cap, making sure it is fully tightened.
10. Run the engine for about five minutes to bring it up to operating temperature. Turn the engine off and allow it to completely cool down.
11. Recheck the coolant level after a short period of time. If the level drops check the system for leaks.

12. Replace the radiator filler cap, tighten it down fully and close the access door. Failure to tighten the cap down fully can result in coolant loss causing the engine to overheat.

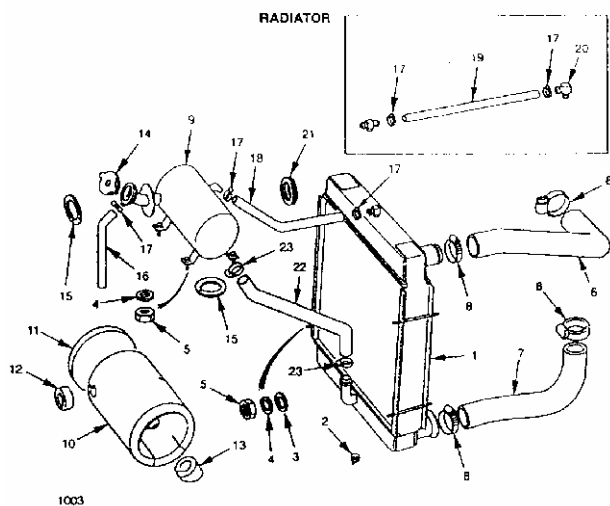


**Fig. 1.** - Upper Front Nose Panel

## De-Aeration Tank Replacement

### Removal

1. Drain the coolant from the drain tap in the bottom of the radiator.
2. Remove the grill.
3. Unplug the harness to the receiver-drier.
4. Remove the two bolts at the top either side of the condenser.
5. Lift the condenser out of the location brackets, located at the bottom of the radiator tunnel and swing the condenser to the left side of the vehicle. (The air conditioning does not need to be evacuated for this operation).
6. Remove the hose clip (23 fig. 2.) from the hose (22) where it is attached to the bottom of the de-aeration tank.
7. Open the access door (2 fig. 1.) to the radiator cap.



**Fig. 2**

8. Remove the radiator cap and the over flow hose (16 fig. 2.)
9. From the inside of the cab remove the centre glove box and lid.
10. Open up the instrument console and remove the three screws that hold it to the dash and turn the console to right angles and place back on the dash clear of the demist duct.
11. Remove the cross bridge between demist duct and the dash.
12. Remove the R/H side demist duct.
13. From the front of the vehicle on the underside of the radiator tunnel, remove the four nuts and washers that hold the deaeration tank in place.
14. Remove the de-aeration tank, it is a tight fit and it will take some manoeuvring to remove it.

### Installation

The reinstallation is the reverse of the removal procedure.

### Radiator Removal & Installation

**WARNING:** Before the radiator is removed. The engine must have cooled down to room temperature and the cooling system pressure must have normalised to prevent injury to personnel.

### Removal

1. Drain engine coolant by removing the drain plug on the centre bottom of the radiator.
2. Open the engine cover, remove the driver's seat and remove the driver's side access panel.
3. To access the top of the radiator, the gear change console will have to be removed, (ref: Section 6 Gear Shift Console Removal).
4. With the console removed, remove the four bolts that hold the fan and hub assembly to the idler pulley.
5. Remove the top and bottom radiator hoses.
6. Remove the fan shroud and remove from the 'T' in the top tank of the radiator the two bleed hoses that are clamped to the
7. From the front of the vehicle remove the grill and swing out condenser as described in operation 3, 4 & 5 deaeration tank removal.
8. Remove the hose clamp (23 fig. 2.) that clamps the hose from the de-aeration tank to the bottom radiator and remove the hose.
9. Remove the four nut and washers that secure the radiator.
10. At this point the radiator can be removed through top of the engine compartment, it is an awkward operation.
11. The removal can be preformed from the under side of the vehicle, it requires another operation.

**Note:** Remove drag-link from the steering arm if the radiator is being removed from the under side of the vehicle. The approach plate will need to be removed if one is fitted as well.

### **Installation**

The reinstallation is the reverse of the removal procedure with the following additional procedures.

1. Refill the cooling system with the correct amount of coolant.
2. After refitting the fan assembly adjust the fan belt.
3. When the gear shift console has been reinstalled it is important that the gear shift is correctly adjusted. (Ref: Section 9 Gear Lever Adjustment.)

### **Fan Service**

#### **Removal**

Release the setscrew and remove the fan. If necessary, fit the setscrews to retain the fan extension and the pulley to the hub.

#### **Installation**

Fit the fan and the setscrews and tighten to the torque recommended in the 'Perkins Engine Section 6B'.

### **Fan Drive Service**

#### **Removal**

1. Loosen the pivot fasteners of the alternator and fasteners of the adjustment link. Remove the drive belt(s).
2. Release the setscrews and remove the fan. Remove the extension, if fitted, and the pulley.
3. Check the end-float of the drive shaft. If it is more than 0.25mm (0.010in), the assembly must be renewed.
4. Release the setscrews and remove the fan drive.

#### **Installation**

1. Fit the fan drive and tighten the setscrews to 44Nm (33lbf ft).
2. If necessary, release the setscrews from the hub of the fan drive. Fit the fan and the setscrews and tighten the setscrews to torque recommended in Perkins Engine Section 6B.
3. Fit the belt(s) and adjust the tension, operation 23A-02 (Engine Section 6B).

### **Disassembly**

1. Use a suitable puller to remove the hub from the drive shaft.
2. Remove the circlip which retains the bearing.
3. Provide a suitable support for the front of the bearing and press the bearing and shaft assembly out through the front of the bearing housing. Do not apply force to the shaft.

### **Assembly**

1. Put the bearing housing on a suitable support with the largest opening towards the top.
2. Put the bearing on the housing with the shortest end of the shaft towards the housing. Put a suitable adaptor on the bearing and press the bearing and shaft assembly into the housing. Do not apply force to the shaft.