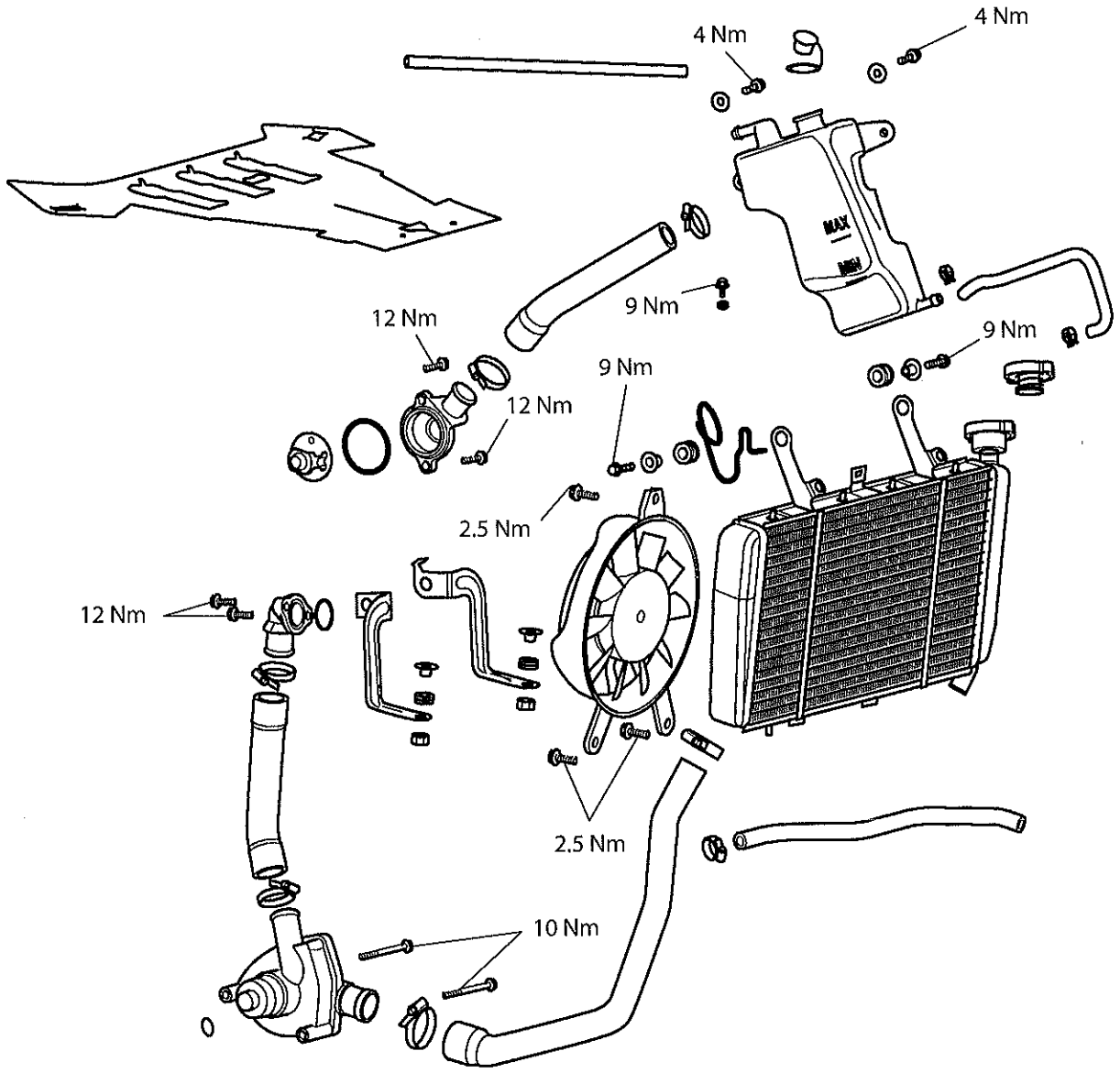
11 Cooling

Table of Contents

Exploded View - Cooling System



Coolant

A permanent type of anti-freeze is installed in the cooling system when the motorcycle leaves the factory. It is coloured blue, contains a 50% solution of ethylene glycol, and has a freezing point of -35°C (-31°F).

Always change the coolant at the intervals specified in the scheduled maintenance chart.

Warning

Coolant mixture which contains anti-freeze and corrosion inhibitors contains toxic chemicals which are harmful to the human body. Never swallow anti-freeze or any of the motorcycle coolant.

Caution

The coolant anti-freeze contains a corrosion inhibitor which helps prevent damage to the metal surfaces inside the cooling system. Without this inhibitor, the coolant would 'attack' the metals and the resulting corrosion would cause blockages in the cooling system leading to engine overheating and damage. Always use the correct anti-freeze as specified in the owner's handbook. Never use a methanol based anti-freeze as this does not contain the required corrosion inhibition properties.

Caution

Distilled water must be used with the anti-freeze (see specification for anti-freeze) in the cooling system.

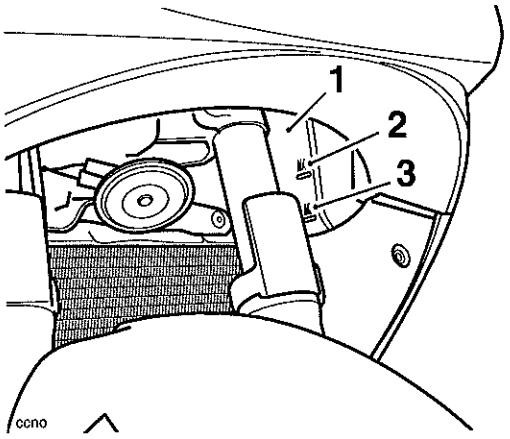
If hard water is used in the system, it causes scale accumulation in the water passages, and considerably reduces the efficiency of the cooling system. Reduced cooling system efficiency may cause the engine to overheat and suffer severe damage.

Coolant Level Inspection

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

1. Position the motorcycle on level ground and in an upright position.
2. Check the coolant level in the expansion tank by looking up, through the centre opening of the front fairing. The coolant level should be between the 'MAX and 'MIN.' marks.



1. Expansion tank
2. 'Max' mark
3. 'Min.' mark

3. If the level of coolant is low, coolant must be added as follows:-
4. Remove the upper and lower left hand infill panels (see page *16-9*).
5. Remove the expansion tank cap and add coolant mixture as necessary to bring the coolant level up to the 'MAX' mark.

Caution

If the coolant level is found to be low, or if coolant has to be added regularly, inspect the cooling system for coolant leaks. If necessary, pressure test the system to locate the source of the leak and rectify as necessary. Loss of coolant may cause the engine to overheat and suffer severe damage.

6. Refit the cap.
7. Refit the upper and lower left hand filler panels (see page *16-10*).

Coolant Replacement

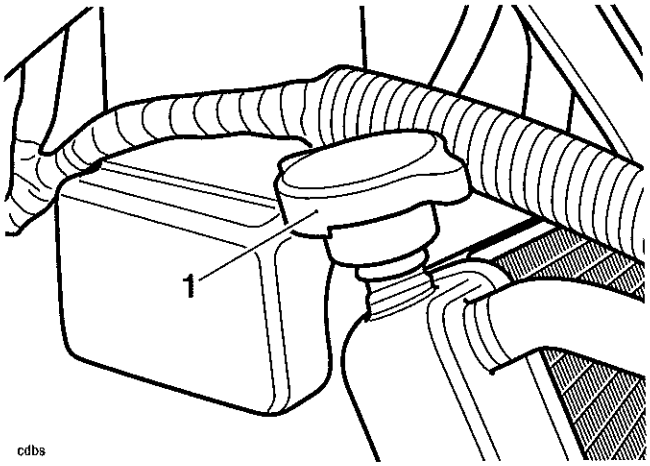
Drainage

1. Remove the seat (see page *16-8*).
2. Disconnect the battery negative (black) lead first.
3. Remove lower fairings (see page *16-11*).

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

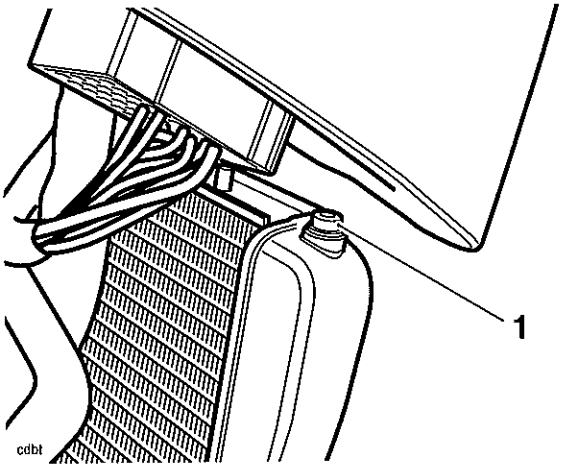
4. Remove the coolant pressure cap on the radiator.



1. Radiator cap

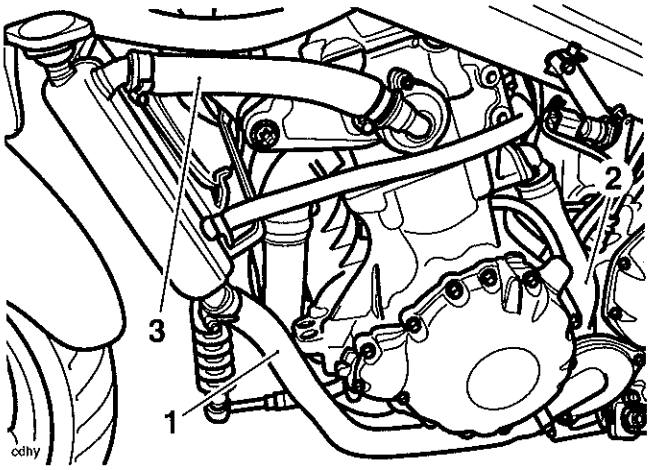
5. Position a container to collect the displaced coolant.

6. Release the bleed screw on the right hand side of the radiator.



1. Bleed screw

7. To ensure full drain-out of the system, release the bottom hose from the water pump.



1. Bottom Hose
2. Bypass Hose
3. Top Hose

Filling

1. Reconnect the bottom hose and tighten the clip.
2. Slowly add coolant mixture to the system, through the filler opening in the radiator, until the system is full. If the system has filled correctly and fully, there should be coolant visible through the bleed screw opening as well as in the filler opening.
3. If there is no coolant visible through the bleed screw opening, but the filler side appears to be full, attach a length of clear tubing to the bleed screw spigot and syphon coolant into the bleed screw side of the radiator.

Note:

- **A hand operated vacuum pump or similar should be used to syphon the coolant through the system.**

4. If necessary, top up the system through the filler and refit the pressure cap.
5. Refit the coolant pressure cap.
6. Reconnect the battery positive (red) lead first.
7. Start the motorcycle and allow the engine to idle for a short period of time to allow any air to be expelled from the system.

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the cooling system is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

8. Stop the engine and top up the coolant level as necessary.
9. Fit the coolant pressure cap.
10. Check the expansion tank level and top up if necessary.
11. Refit the seat (see page *16-8*).
12. Refit both lower fairings (see page *16-12*).

Radiator Hoses

Regularly check all radiator hoses and hose clips for cracks, leaks or deterioration in accordance with the scheduled maintenance chart.

Radiator and Cooling Fan

Check the radiator fins for obstruction by insects, mud, leaves and general debris. Clean off any obstructions by hand or with a stream of low pressure water.

Warning

The cooling fan operates automatically, even with the ignition switched off. To prevent injury, keep hands and clothing away from the fan blades at all times.

Caution

Using high-pressure water, as from a car-wash facility, can damage the radiator fins and impair the radiator's efficiency.

Do not obstruct or deflect airflow through the radiator by installing unauthorized accessories in front of the radiator or behind the cooling fan. Interference with the radiator airflow can lead to overheating and consequent engine damage.

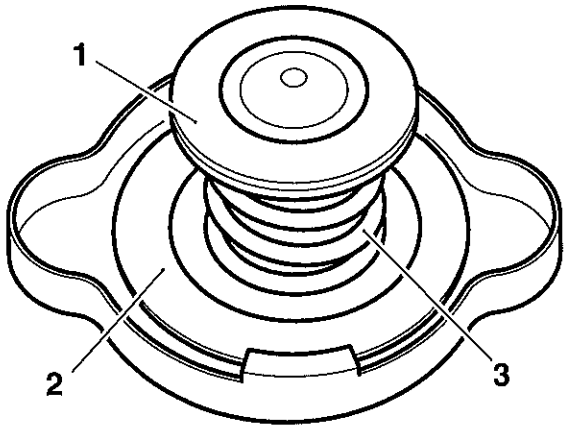
Coolant Pressure Cap

Inspection

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

1. Check condition of the upper and lower seals of the coolant pressure cap.



cawr

1. Lower Seal
2. Upper Seal
3. Spring

Note:

- **If there is any sign of damage or deterioration replace the cap.**

2. Pressure test the cap to the blow off pressure of 1.1 bar. If the cap opens at a lower pressure or fails to open at 1.1 bar, replace the cap.

Water Pump

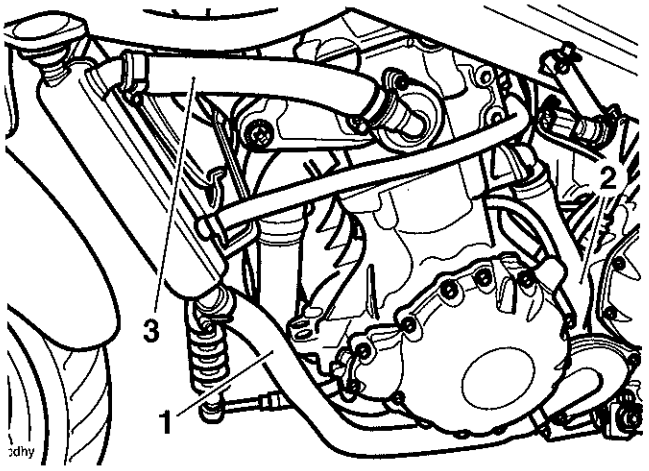
Removal

1. Remove the seat.
2. Disconnect the battery, negative (black) lead first.
3. Drain the coolant (see page *11-4*).

Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

4. Disconnect the coolant hoses to the water pump.



cdhy

1. Bottom Hose
2. Bypass Hose
3. Top Hose

5. Release the bolts securing the water pump to the crankcase.
6. Withdraw the water pump.

Inspection

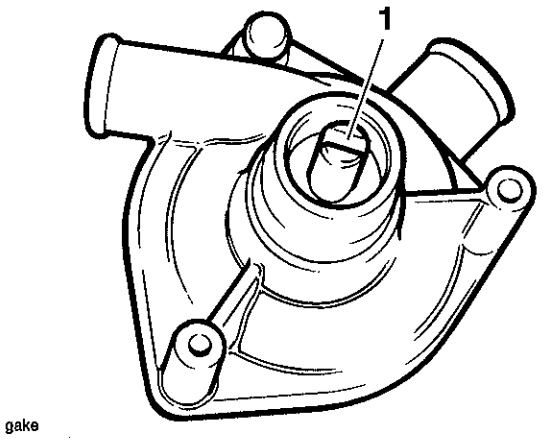
1. Check the water pump shaft and shaft bearings for side and end float. Renew if necessary
2. Check for corrosion and scale build-up around the impeller and in the pump body. Renew if necessary.

Installation

1. Replace the water pump 'O' ring seal.
2. Align the drive slot in the water pump with the drive slot on the oil pump (inside the crankcase)

Note:

- **The water pump will not engage fully into the crankcase unless the drive slots are engaged.**



gake

1. Water pump slot

3. Fit the pump and tighten the fixings to **10 Nm**.
4. Refit the hoses to the water pump and tighten the clips.
5. Refill the cooling system (see page *11-4*).

Thermostat

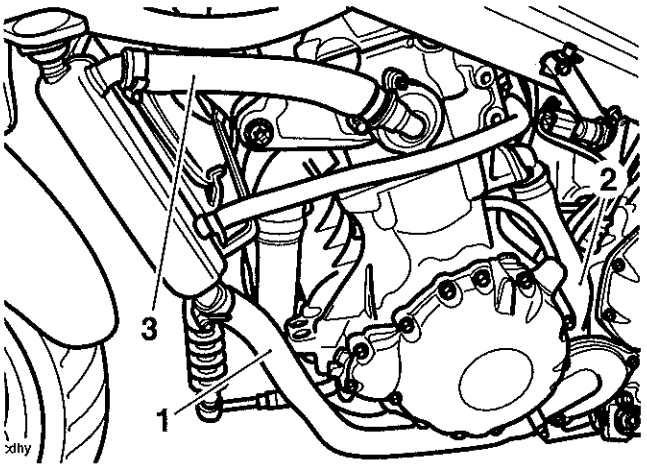
Removal

1. Remove the seat (see page *16-8*).
2. Disconnect the battery, negative (black) lead first.
3. Drain the coolant (see page *11-4*).

⚠ Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

4. Detach the top hose from the thermostat elbow.



xdhy

1. Bottom Hose
2. Bypass Hose
3. Top Hose

5. Release the fixings securing the thermostat elbow to the cylinder head.
6. Remove the thermostat housing. Discard the 'O'-ring.
7. Remove the thermostat from the cylinder head.

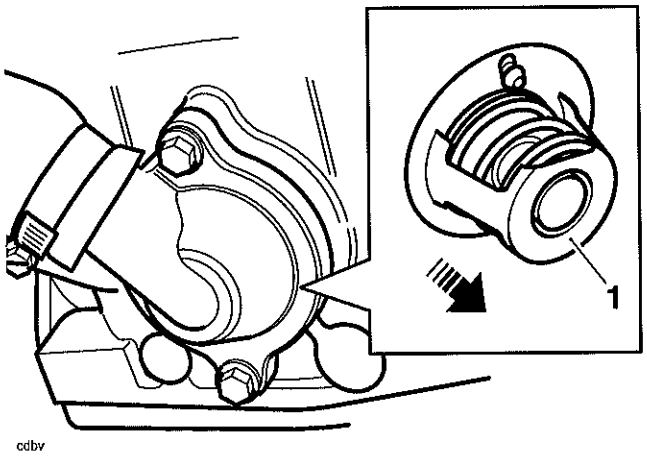
Inspection

1. Inspect the thermostat at room temperature. If the valve is open, the thermostat must be replaced.
2. To check the valve opening temperature, suspend the thermostat in a container of water and raise the temperature of the water until the thermostat opens. The thermostat should start to open at 88°C +/- 5°C.

3. If the temperature at which thermostat opening takes place is incorrect, replace the thermostat.

Installation

1. Locate the thermostat into the cylinder head.



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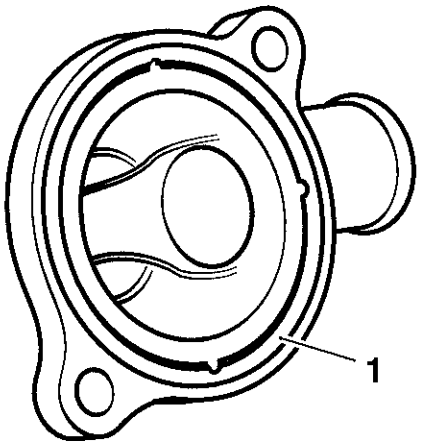
1. Thermostat (face is shown inserted into the head)

2. Fit a new 'O'-ring to the thermostat elbow.



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1. O-ring/groove

3. Tighten the bolts to **12 Nm.**
4. Reconnect the top hose clips.
5. Refill the cooling system (see page *11-4*).

Radiator

Removal

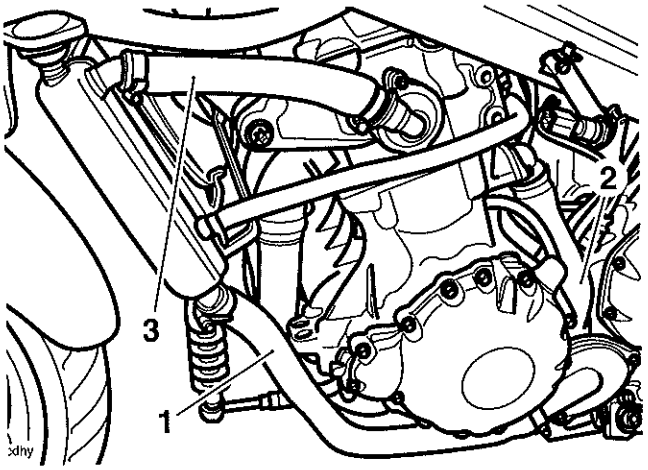
1. Remove the seat (see page *16-8*).
2. Disconnect the battery negative (black) lead first.

⚠ Warning

Do not remove the coolant pressure cap when the engine is hot. When the engine is hot, the coolant inside the radiator is hot and also under pressure. Contact with the pressurised coolant will cause scalds and skin damage.

3. Drain the coolant (see page *11-4*).

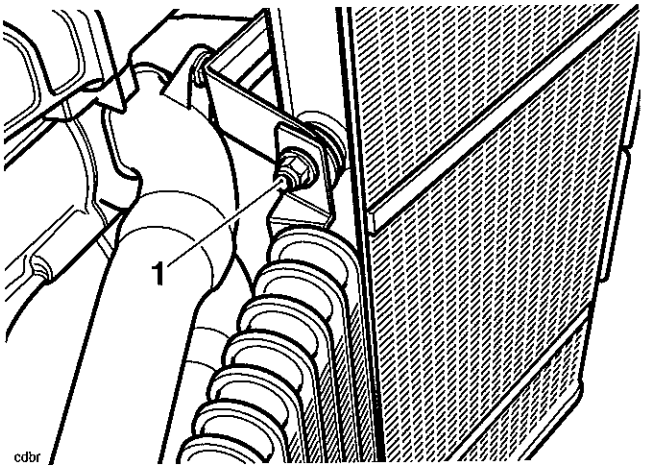
Disconnect the top and bottom hoses at the radiator.



xdhy

1. Bottom Hose
2. Bypass Hose
3. Top Hose

4. Release the oil cooler fixings from the radiator lower mounting.



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1. Radiator lower fixings