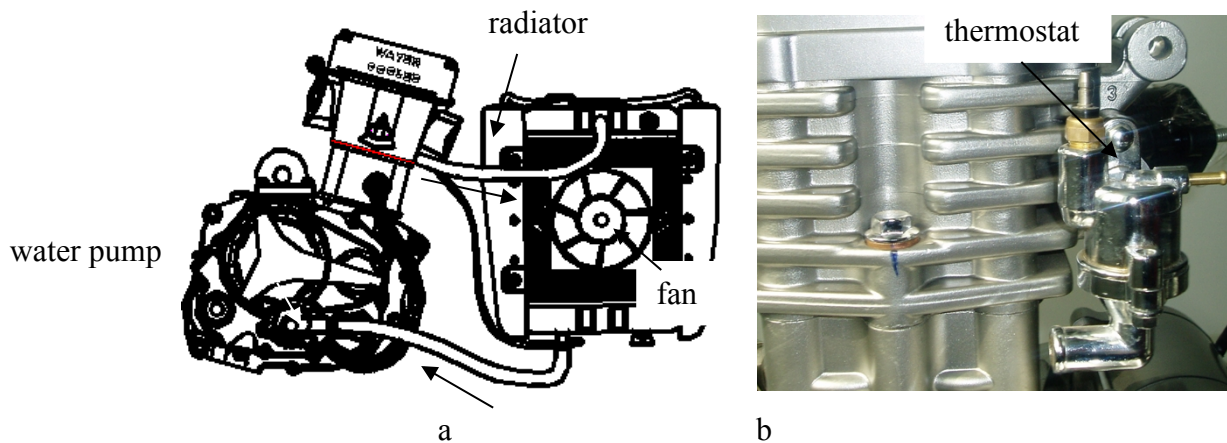


Water cooling system

If the engine's water cooling system breaks down, it will cause undercooling or overheat of the engine, which will affect the engine's normal operation. Therefore, the engine's liquid cooling system shall be maintained regularly and failures that are found shall be eliminated.

- The choosing of cooling liquid shall be consistent with the local temperature and environmental conditions. The freezing point of cooling liquid shall be lower than local ambient temperature. However, the cooling liquid shall not be replaced by tap water or hard water, because cooling liquid is of the functions such as cooling, antiscaling, rust prevention and increasing of boiling point while tap water and hard water are only able to cool down without other functions. The engine which uses tap water or hard water for cooling in a long period of time is hard to dissipate heat due to scale depositing on waterway, which will lead to overheating.
- After the cooling liquid is used for a period, it will discolor and deteriorate, leading to poor cooling effect, then it should be replaced in time. Open the draining bolt and tank cover after the engine cools down, drain the cooling liquid in the pipeline (blow one end with compressed air), then install the draining bolt. The water tank and pipeline shall be fully filled with cooling liquid. After the proper arrangement of tank and water pipe, take out the minor-cycle water pipe of the thermostat, fill the cooling liquid slowly until the liquid level does not decrease any longer (or fill the cooling liquid in the closed system), then close the tank cover. The steps of the replacement of cooling liquid in auxiliary water tank should be like this: add the cooling liquid in auxiliary tank first, and fill cooling liquid between the marking lines on the container, which can ensure the thermally expanded cooling liquid is able to flow into the auxiliary tank when the engine is overheated and that flow back to tank after cooling.
- The bearing of water pump shall be well lubricated in order to reduce the wearing. If the bearing is severely worn, it should be replaced in time. The parts of the water pump shall be sealed reliably; it should be fixed in time if leakage appears. At the same time, the incrustation in the waterway shall be cleansed regularly.
- The pipeline of water cooling system shall be unimpeded without any leakage. The water pipe connection shall be secure and reliable that no leakage is allowed. The water pipe shall be smoothly transited that no bending or deformation is allowed. Cooling fins shall be intact. The dust and dirt on cooling fins shall be cleansed regularly in order to keep good heat dissipation. The damaged parts of pipes and cooling fins shall be fixed or replaced in time.

- The blade's assembly direction and assembly angle of fans shall be correct. The blades if deformed shall be corrected and replaced if necessary.
- The thermostat plays a very important role in maintaining the engine's running and lessening wearing. It shall not be dismantled at liberty. The inspection of thermostat shall be processed in hot water over 72°C (it can be processed in water at its boiling point if no thermometer) and check whether the valve is open. If the valve is not open, it should be replaced, otherwise the cooling liquid can not be major cycled.



b

Figure 1

- When the engine is on the cooled state, open the tank cover to check if the cooling liquid becomes less. If it becomes a lot less, it means leakage happens, and further inspection is necessary for inner leakage or outleakage.

We can judge if there is inner leakage within liquid-cooled engine by the color of engine oil. If leakage flows into engine oil, the engine oil would emulsify and deteriorate and discolor, and turn white. Then, the engine shall be dismantled and the parts, such as water pump, cylinder head, cylinder gasket, cylinder body and right cover, relevant to water lane shall be inspected with more attention.

Through direct observation on the hole under the right cove, water pump, tank, auxiliary tank, shell of thermostat, waterpipe and its joints, we can judge if there is outleakage.

- The overheated illusion of liquid-cooled engines. Users have misunderstandings over the liquid-cooled engines that they use hands to touch the cylinders block and cylinder end and feel it overheated, but the actual temperature is about 120°C which is not high. If we use thermometer or multimeter with temperature sensor test the temperature of cooled liquid, it differs greatly from the indicated temperature, which means resistance of temperature sensor is not consistent with the engine's instruments.

The truth of liquid-cooled engines' overheat. At first, we should confirm if plenty of cooled liquid in tank flows into auxiliary tank. If so, the engine is possible to go boiling. However, following effective measures should be taken to confirm whether it is overheated.

A. Check the unimpededness of water pipe: parts of water pipe deflect severely; the incrustation causes blocking.

B. Check the punch of cylinder gasket: open the tank cover, if the opening of tank burst out a large number of cooled liquid in high speed (8000r/min), it means minor leakage between the combustor and waterway. Besides the phenomenon above, take off the ignition plug and activate the engine, if the cooled liquid burst out to the opening of ignition plug, it means there is severe leakage between combustor and water lane. Then, disassemble the engine to check whether the bolt torque reaches the specified value, whether the cylinder is concave (it is generally concave), whether the flatness of cylinder head is concave, whether the cylinder gasket degums or cracks, and whether the seal line of cylinder body and cylinder head damages or has any dirt attached.