



东风乘用车

电机及控制器冷却系统

Motor and MCU Cooling System



- 1、熟悉E70电机及控制器冷却系统各部件的功用
- 2、熟悉E70电机及控制器冷却系统的工作原理
- 3、能对E70电机及控制器冷却系统进行故障诊断与排除
- 4、掌握E70电机及控制器冷却系统相关部件的拆装更换方法及维修注意事项



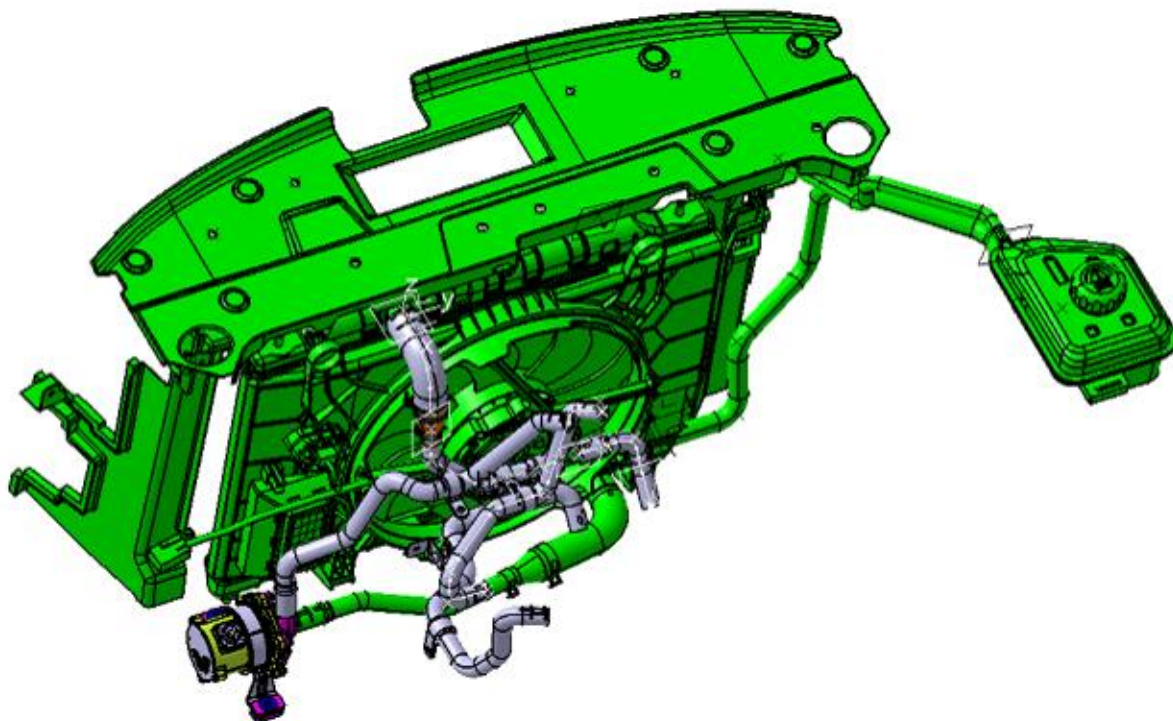
1. Familiar with the composition of E70 motor and MCU cooling system and functions of its components
2. Familiar with the working principle of the E70 motor and MCU cooling system
3. Troubleshoot the E70 motor and MCU cooling system
4. Master the removal and refitting and replacement methods and service precautions of the E70 motor and MCU cooling system

一、E70电机及控制器冷却系统概述



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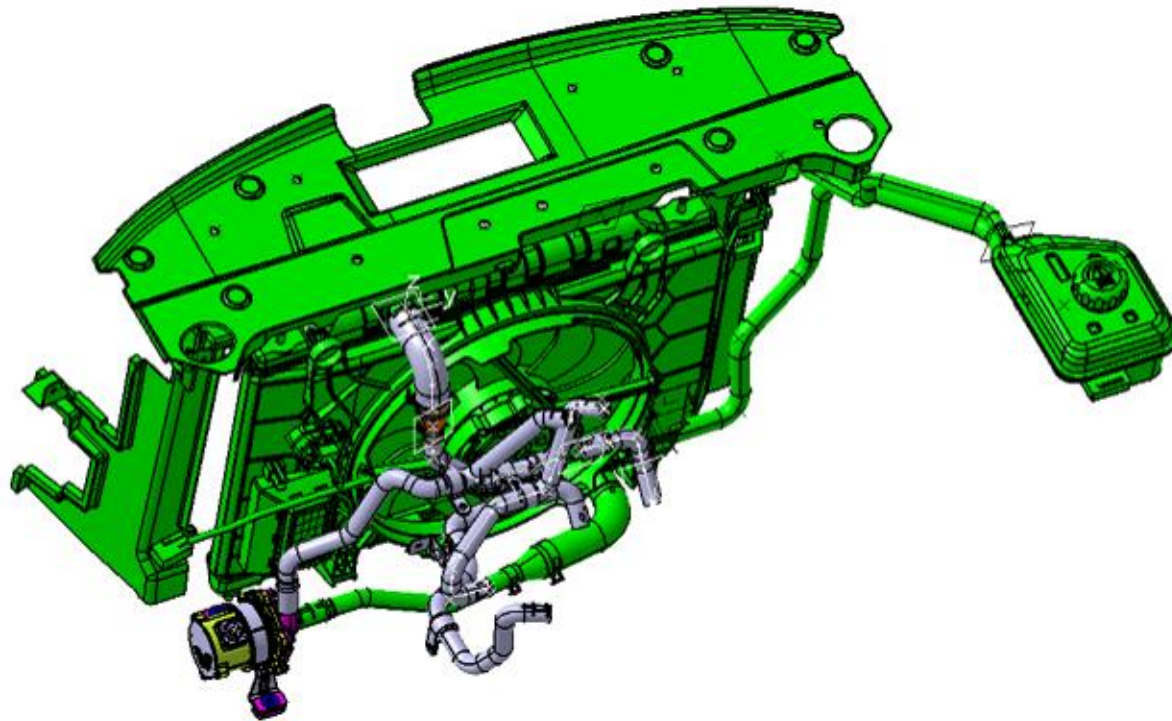
E70电机及控制器冷却系统主要作用是为电机、电机控制器以及车载充电器提供冷却，避免电机、电机控制器以及车载充电器温度过高，影响相关件的正常工作。



I. Overview of E70 motor and MCU cooling system



The main function of the E70 motor and MCU cooling system is to cool the motor, MCU and OBC, to avoid excessive temperature of them, affecting the normal operation of related parts.





一、E70电机及控制器冷却系统概述

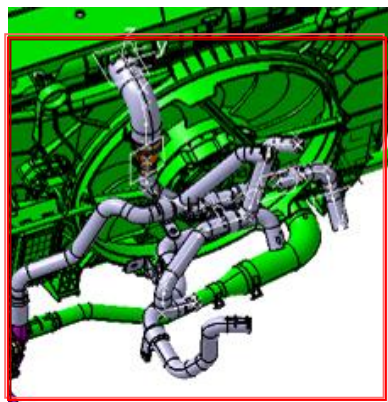
E70电机及控制器冷却系统组成

电机及控制器冷却系统

散热风扇

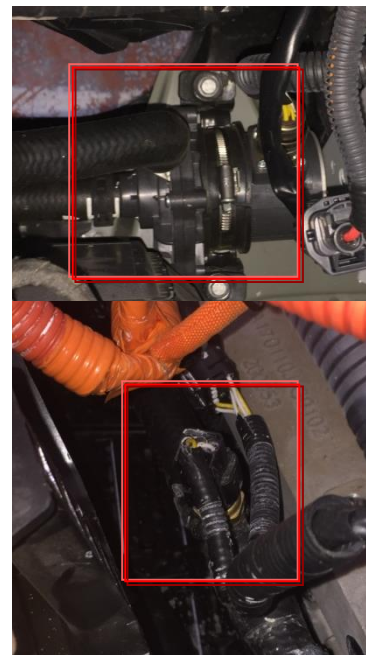


散热水箱



水管

电动水泵及
水温传感器

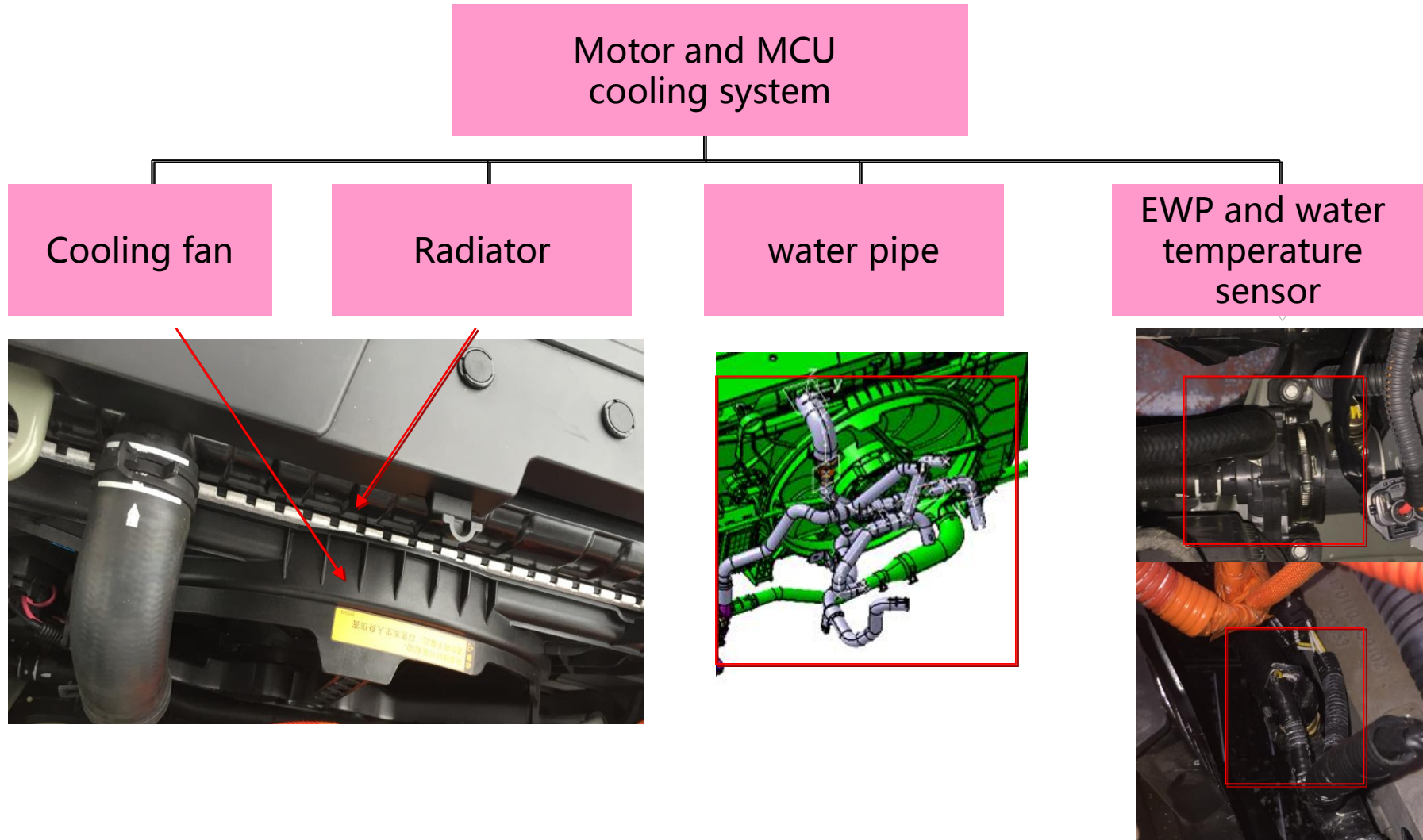


I. Overview of E70 motor and MCU cooling system



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Composition of E70 motor and MCU cooling system

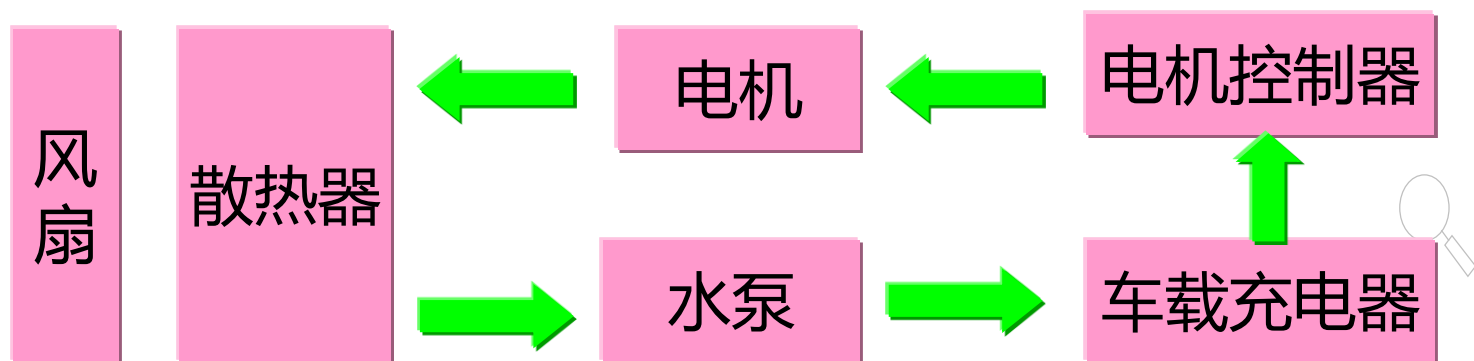


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E70冷却液循环方式

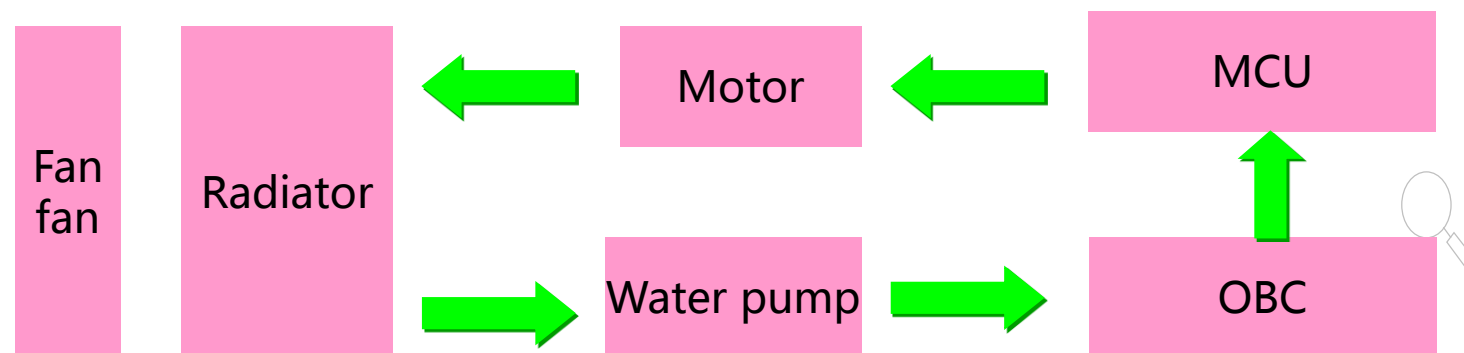


注意：水温、电机运转情况、冷却元件温度达到一定值时，水泵和散热风扇才开始运转，转速会根据不同的情况而变化。

I. Overview of E70 motor and MCU cooling system



Circulation mode of E70 coolant

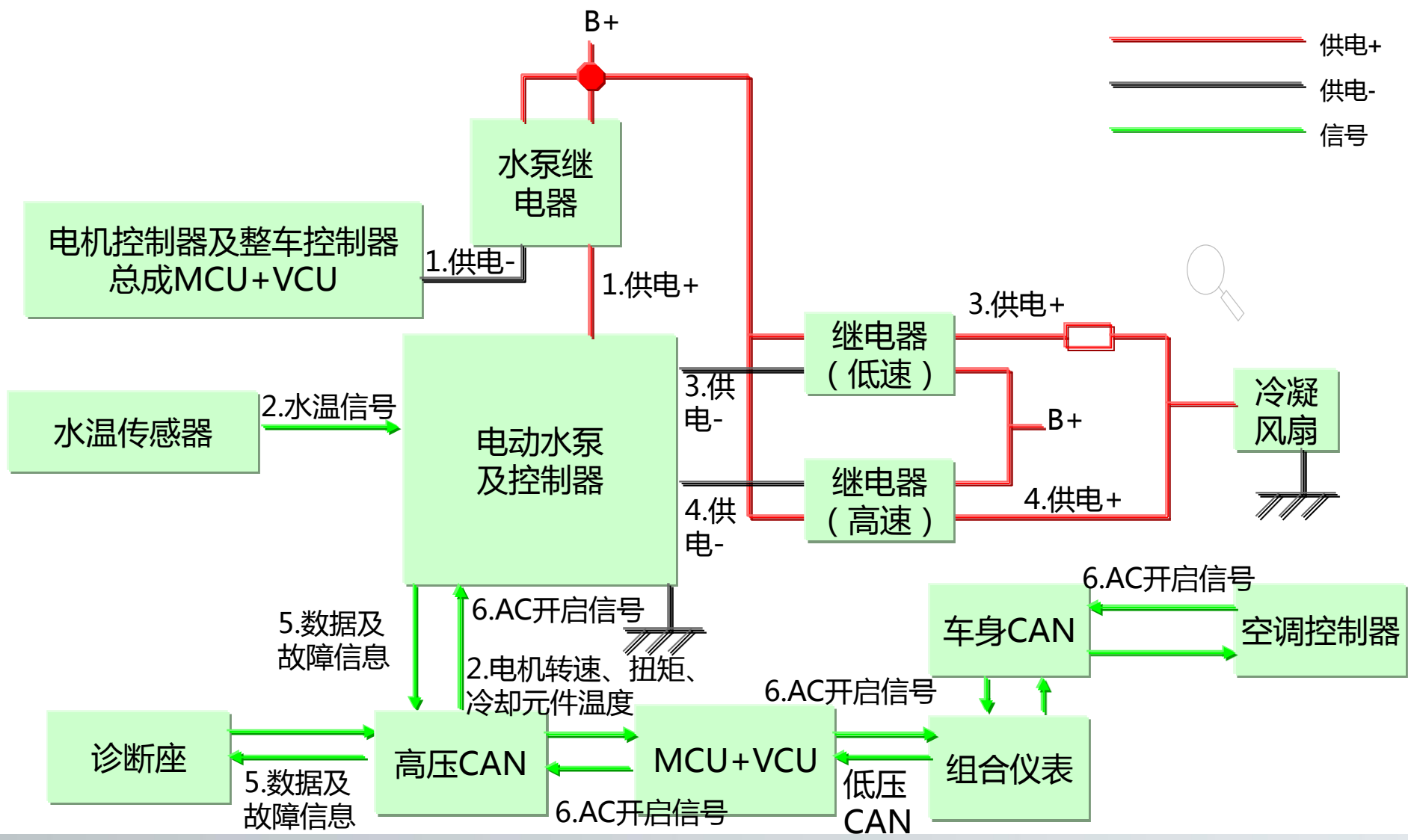


Note: When the water temperature, motor running condition and cooling element temperature reach a certain value, the water pump and the cooling fan will start to run, and the speed will change depending on different conditions.

二、E70电机及控制器冷却系统工作原理及电路图



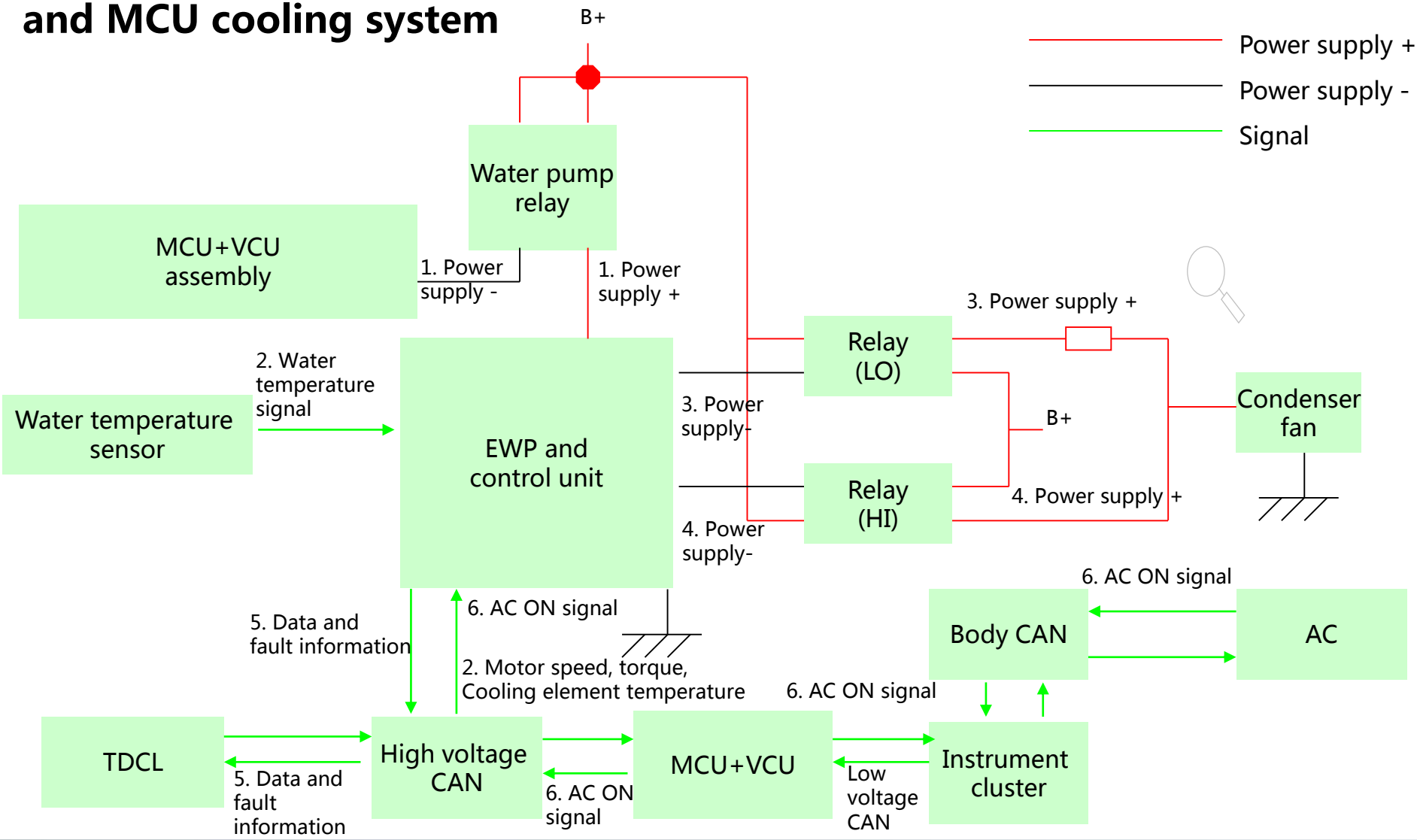
E70电机及控制器冷却系统的基本原理及电路图分析



II. Working principle and circuit diagram of E70 motor and MCU cooling system



Analysis of working principle and circuit diagram of E70 motor and MCU cooling system



二、E70电机及控制器冷却系统工作原理及电路图

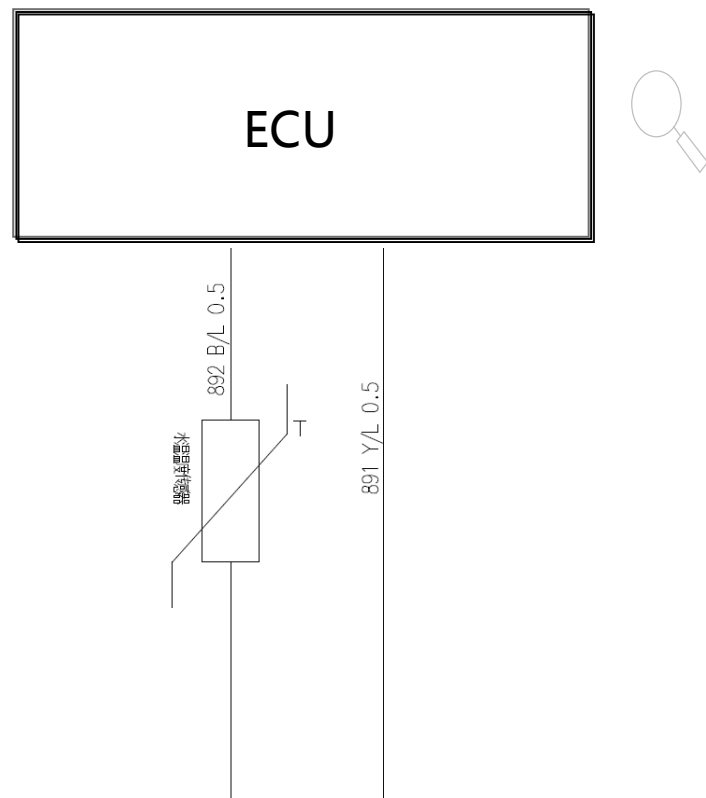
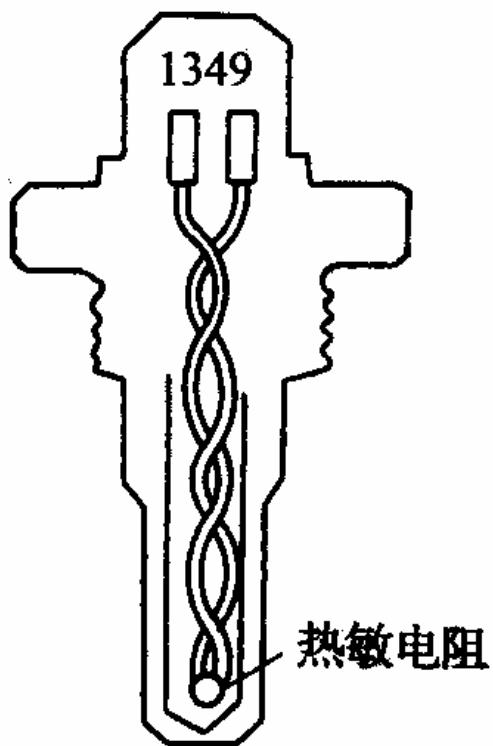


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水温传感器的工作原理及检测方法：

原理：负温度系数的可变电阻式传感器

检测：万用表测量电阻，电阻值会随温度的变化而变化,工作时可用诊断仪读取数据流



II. Working principle and circuit diagram of E70 motor and MCU cooling system

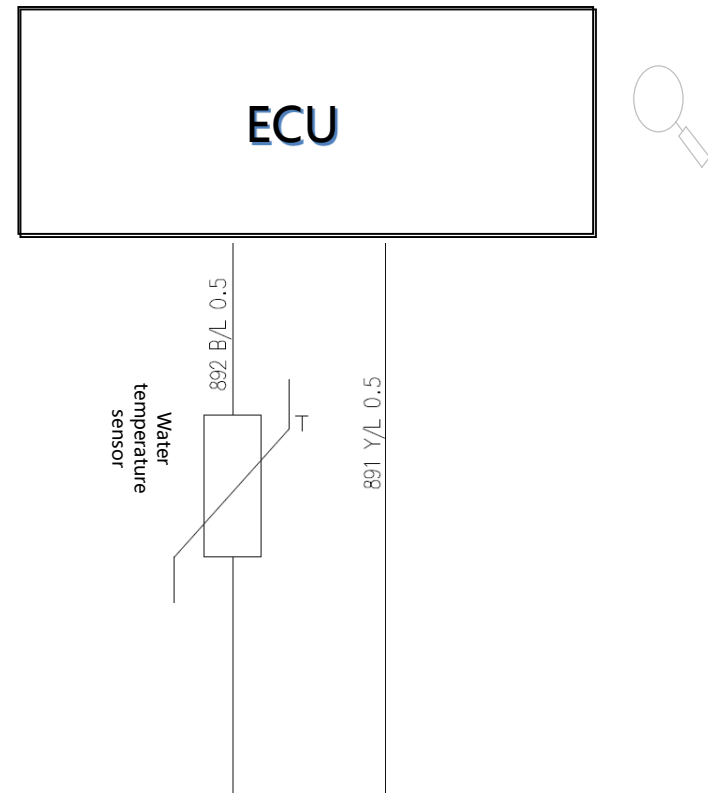
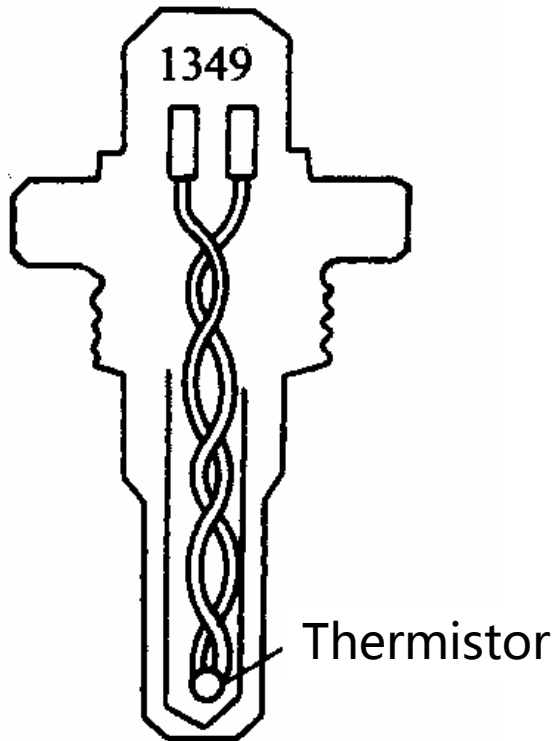


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Working principle and detection method of water temperature sensor:

Principle: Variable resistance sensor with negative temperature coefficient

Detection: The multimeter measures the resistance that changes with the temperature, and the data stream can be read by the scan tool during operation.



三、E70电机及控制器冷却系统故障诊断



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电动水泵及控制器有故障自诊断的功能，且有独立的诊断地址，利用专用故障诊断仪可对系统进行诊断，结合电路图的原理对电路故障进行排查。

常见故障现象及原因如下

常见故障现象	维修建议
水温过高或冷却件温度过高	检查是否缺冷却液，检查水泵是否正常运转，检查冷凝风扇是否正常运转，检查水温传感器是否正常
水温过低	检查水温传感器是否正常
水温信号缺失或不可靠	检查水温传感器是否正常

III. Troubleshooting of E70 motor and MCU cooling system



The motor and MCU cooling system has the function of Circuit fault self-diagnosis, and has an independent diagnosis address. The special scan tool can be used to diagnose the system to troubleshoot according to the principle of the circuit diagram.

Common fault phenomena and causes are as follows:



Fault phenomenon	Recommended countermeasures
High water temperature or high cooling component temperature	Check if coolant is in short supply, if the EWP is running normally, if the condenser fan is running normally, and if the water temperature sensor is normal.
Low water temperature	Check if the water temperature sensor is normal.
Water temperature signal is missing or unreliable.	Check if the water temperature sensor is normal.

四、E70电机及控制器冷却系统维修注意事项



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- 在电动机是热机，且压力很高的情况下打开水箱盖，会导致冷却液瞬间沸腾，冷却液可能飞溅到翼子板和打开膨胀水箱盖的人员身上。
- **禁止用水来当冷却液**，仅用水当冷却液可能会对电动机控制器的冷却水道造成腐蚀性的伤害，长期的腐蚀性伤害可能造成电动机控制系统内部冷却液的泄漏；
- 拆卸任何部件之前先脱开蓄电池的负极电缆；
- 拆卸任何冷却系统中的零部件之前，请先确认电动机冷却液是否冷却到可以触摸的温度；
- 冷却液是有毒液体，使之远离小孩或宠物；
- 冷却液如果没有重复利用的话，废弃流程应该遵循当地政府颁布的相关条例进行。



IV. Precautions for service of E70 motor and MCU cooling system



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- Opening the expansion tank cover when the motor is hot and the pressure is high will lead to instantly boiling coolant, and the coolant may spray into the fender and operator opening the expansion tank cover.
- **Do not use water as coolant.** Only using water as coolant may cause corrosive damage to the cooling water channel of the MCU. Long-term corrosion may cause leakage of coolant inside the motor control system;
- Disconnect the battery negative cable before removing any parts;
- Before removing any part of the cooling system, verify that the coolant is cool enough that it can be touched by hands;
- The coolant is toxic so that it shall be kept away from children or pets;
- If the coolant is not reused, the disposal should follow the relevant regulations issued by the local government.