



东风乘用车

# 空调系统



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# AC System



- 1、熟悉E70空调系统的组成及各部件的功用
- 2、熟悉E70空调系统的工作原理
- 3、能对E70空调系统进行故障诊断与排除
- 4、掌握E70空调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 AC system and functions of its components
2. Familiar with the working principle of the E70 AC system
3. Troubleshoot the E70 AC system
4. Master the removal and refitting and replacement methods and service precautions of the E70 AC system

# 一、E70空调系统概述



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## 空调的作用

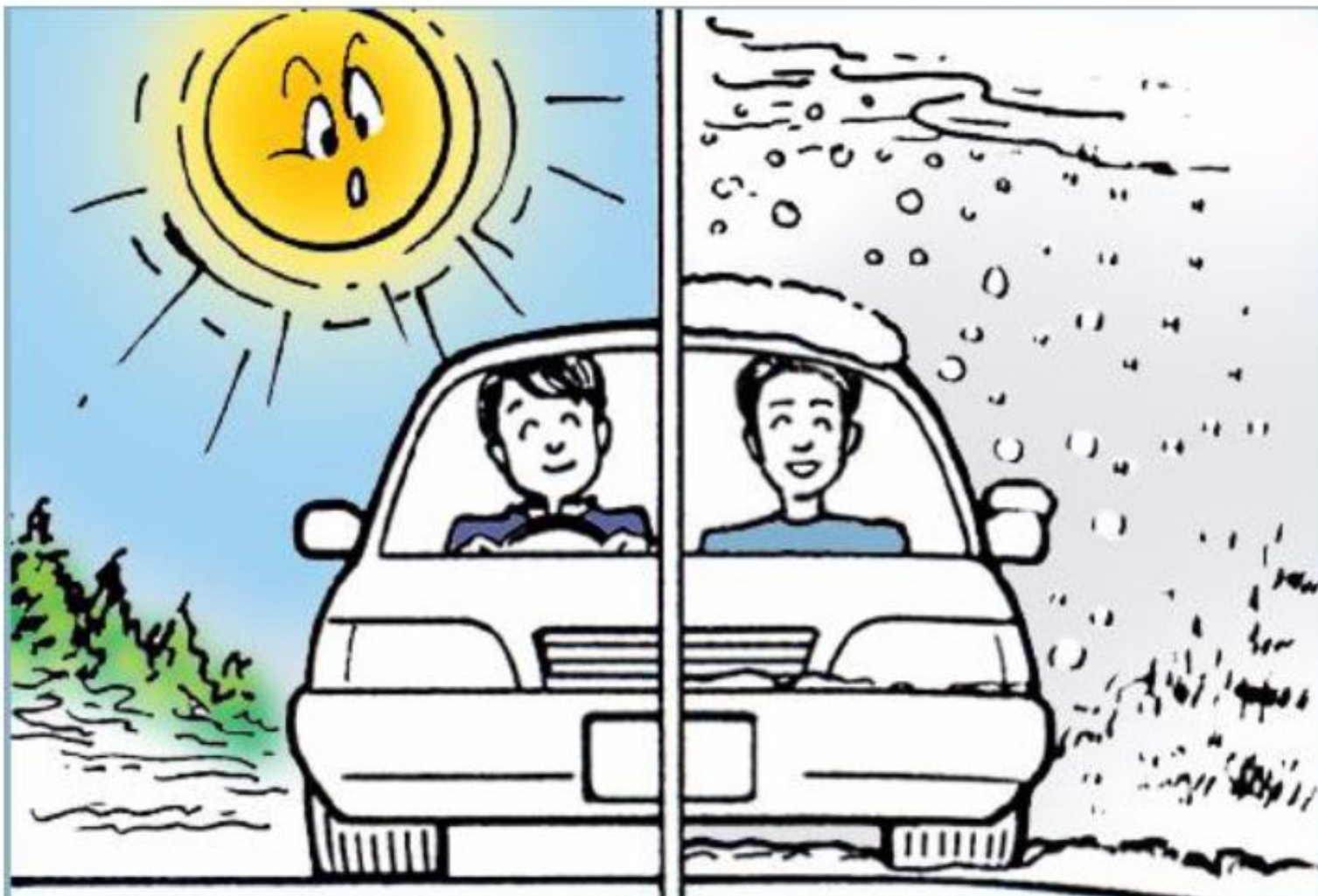
四大作用：

制冷

制热

通风

净化

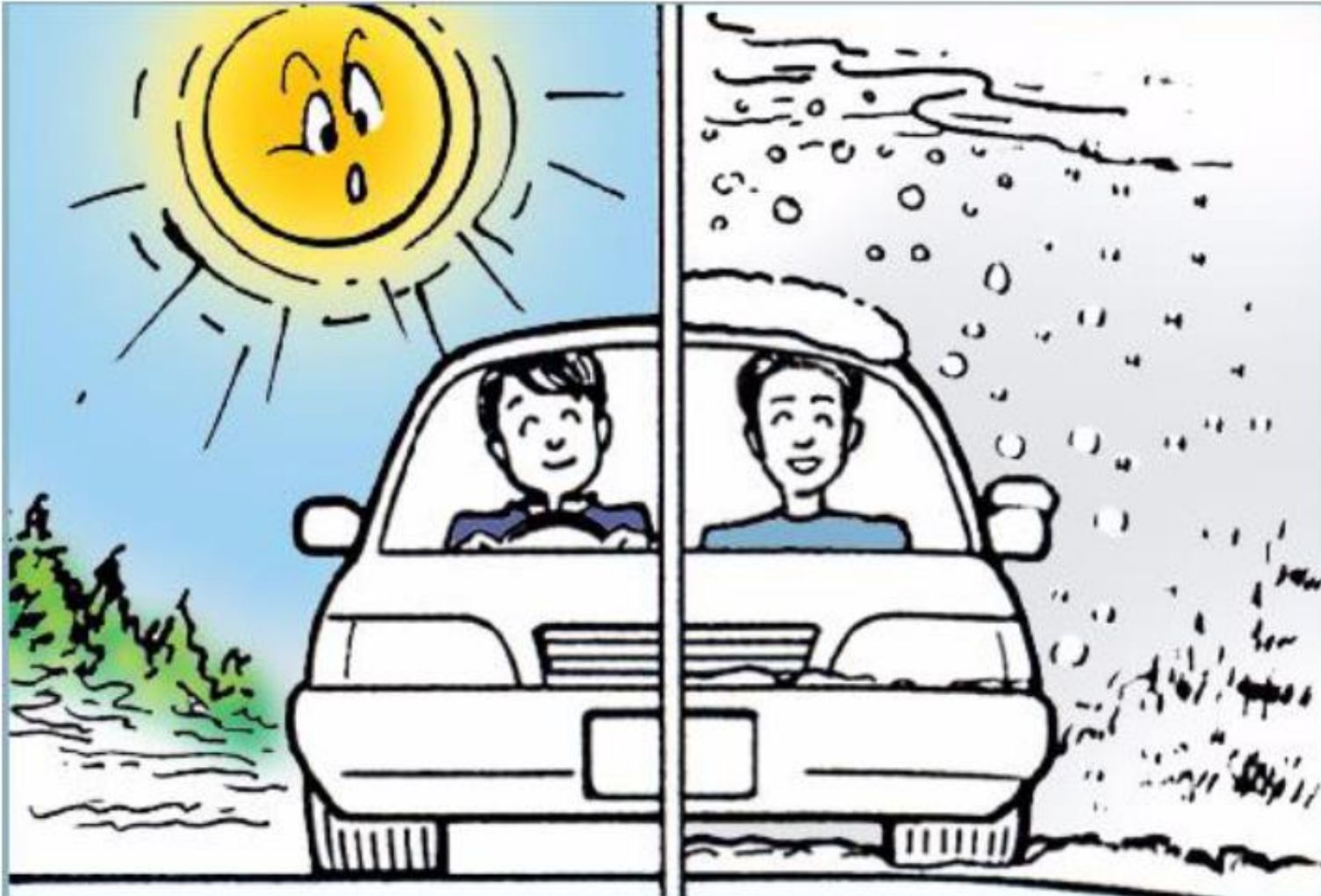


# I. Overview of E70 AC system



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## Function of AC



Four  
functions:

Cooling

Heating

Ventilation

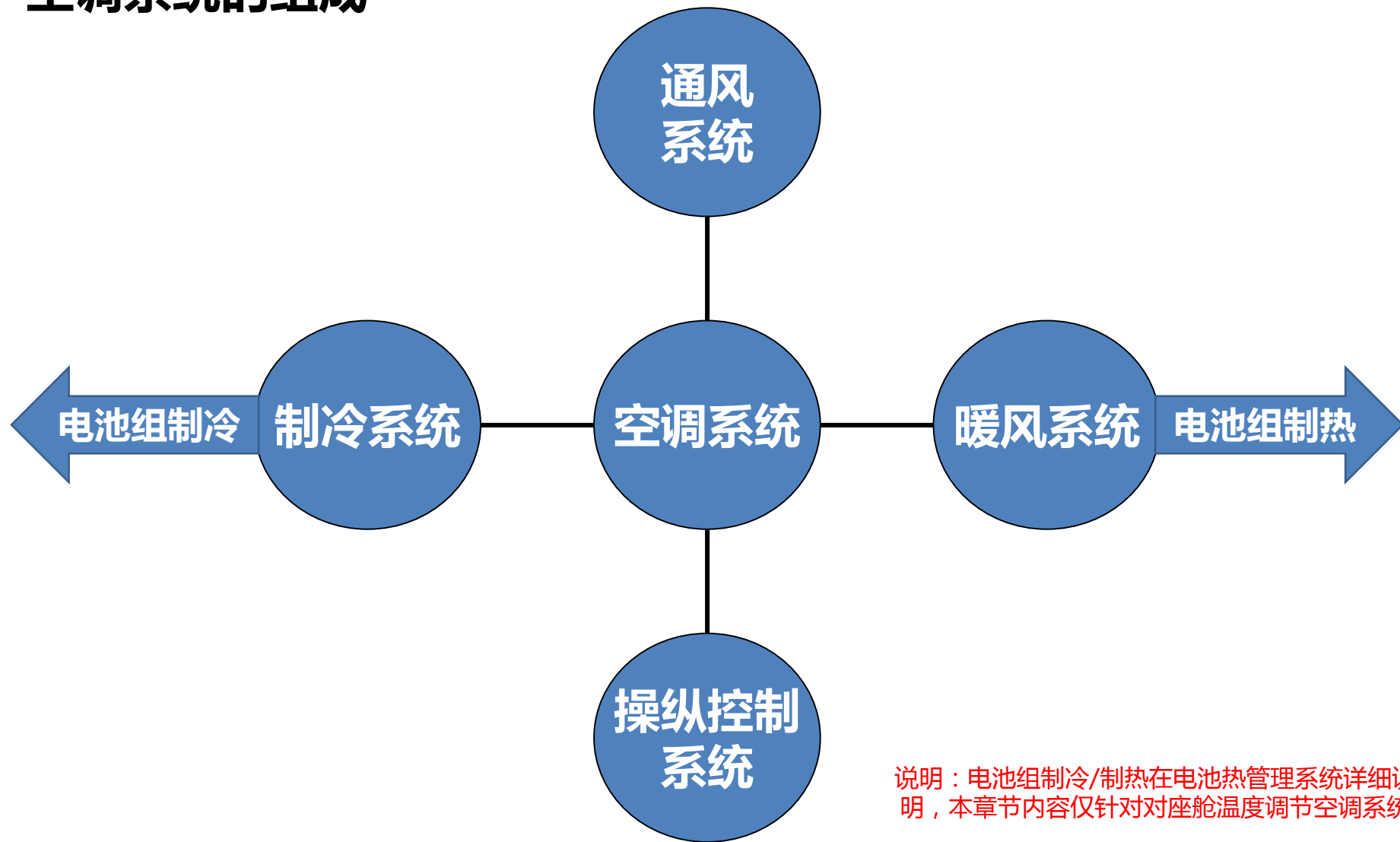
Cleaning

# 一、E70空调系统概述



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## 空调系统的组成



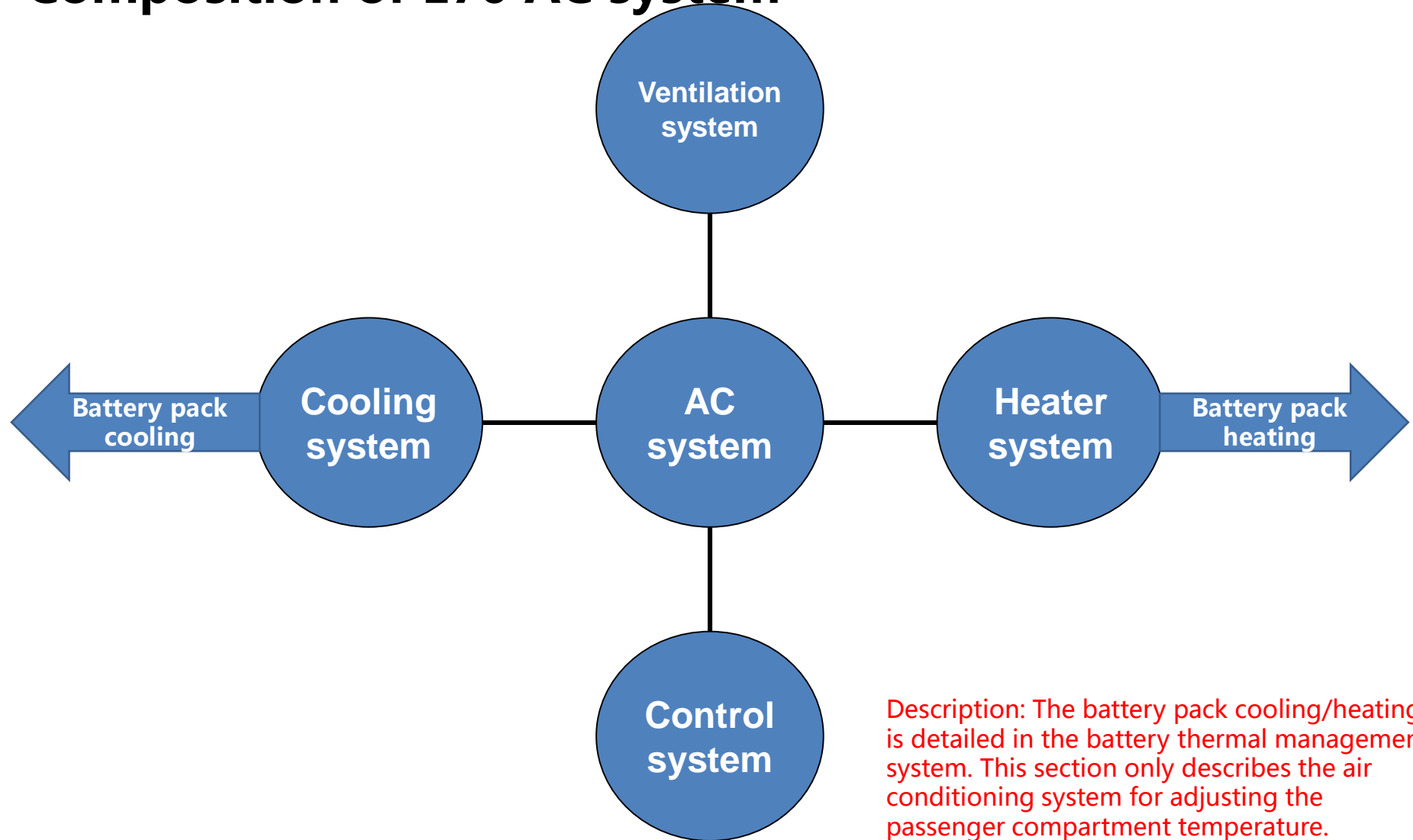
说明：电池组制冷/制热在电池热管理系统详细说明，本章节内容仅针对对座舱温度调节空调系统

# I. Overview of E70 AC system



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## Composition of E70 AC system

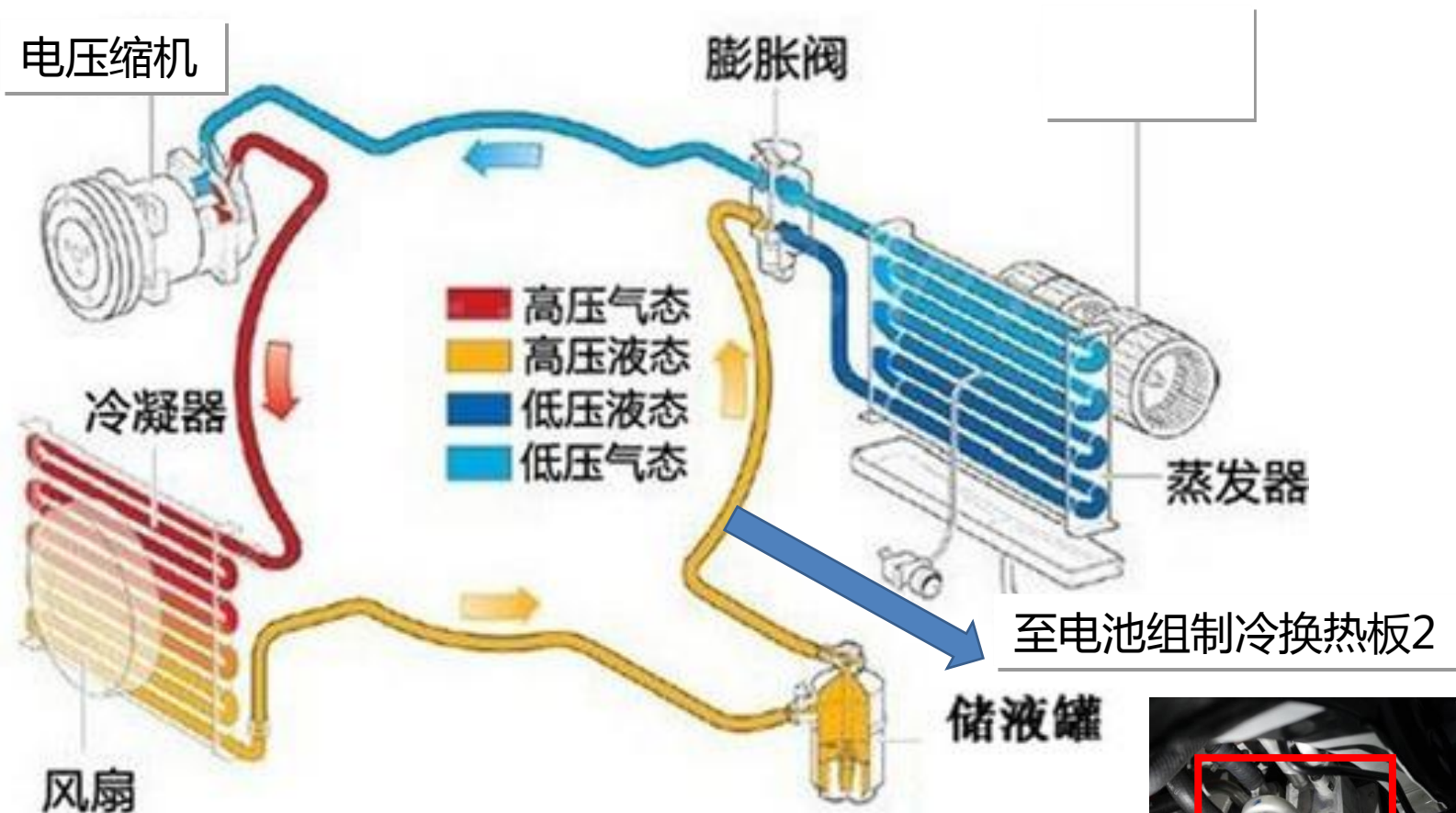






# 一、E70空调系统概述

## 1、制冷系统

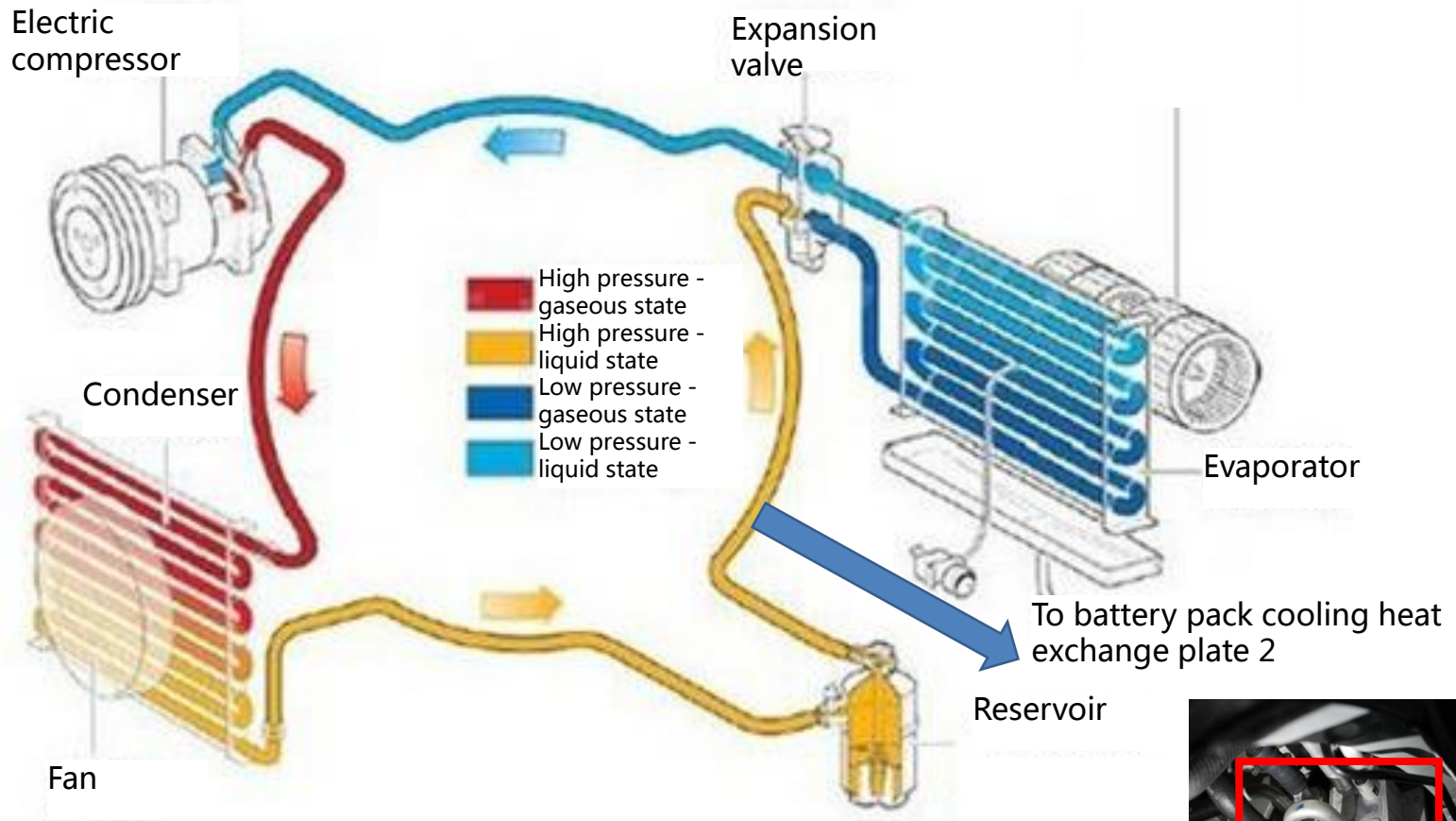


# I. Overview of E70 AC system



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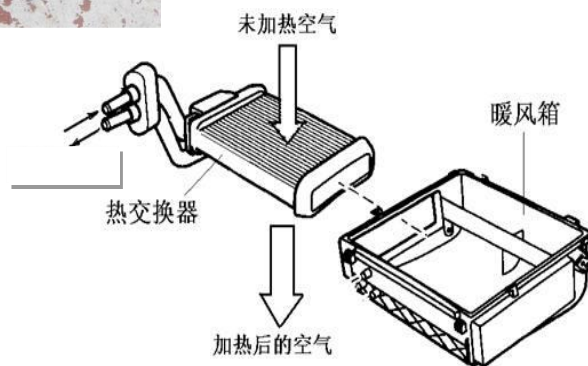
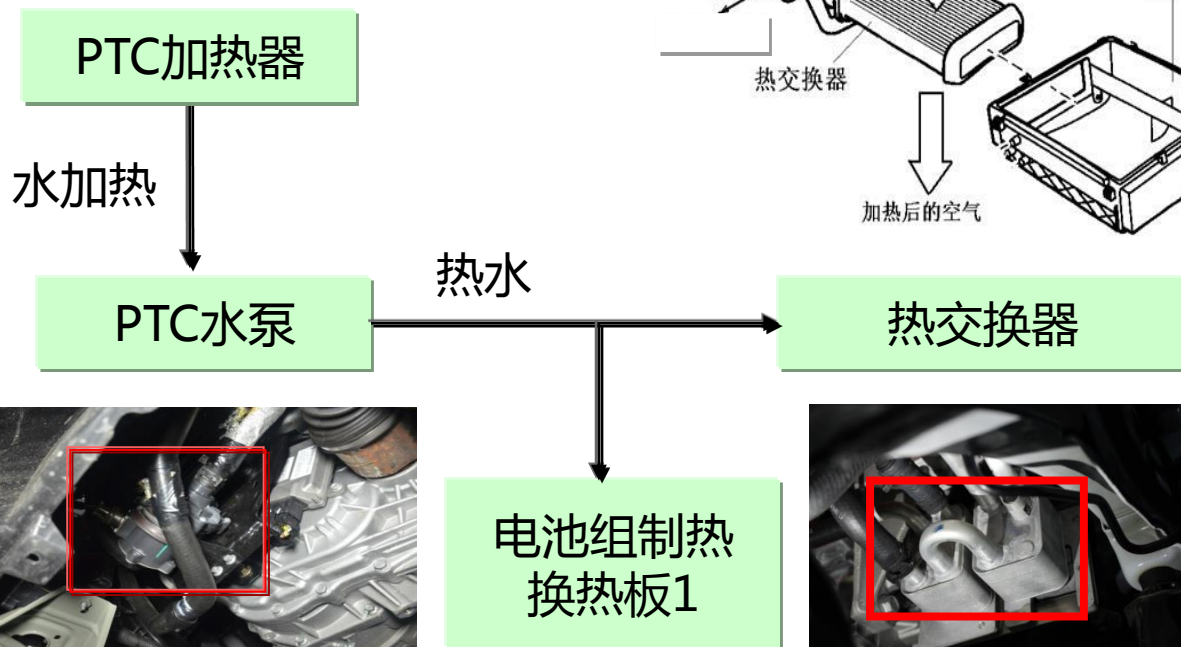
## 1. Cooling system





# 一、E70空调系统概述

## 2、暖风系统





# I. Overview of E70 AC system



## 2. Heater system



PTC heater

Water  
heater

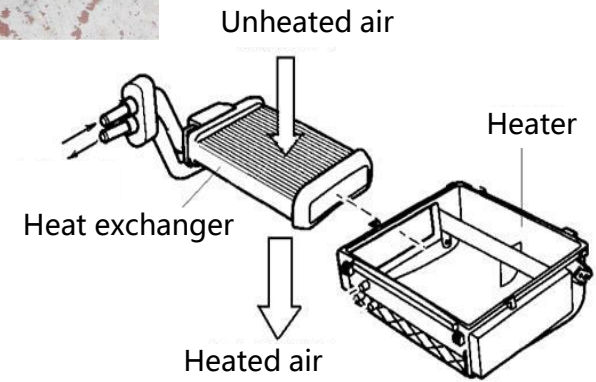
PTC water pump



Hot water

Battery pack  
heating  
Heat exchange  
plate 1

Heat exchanger



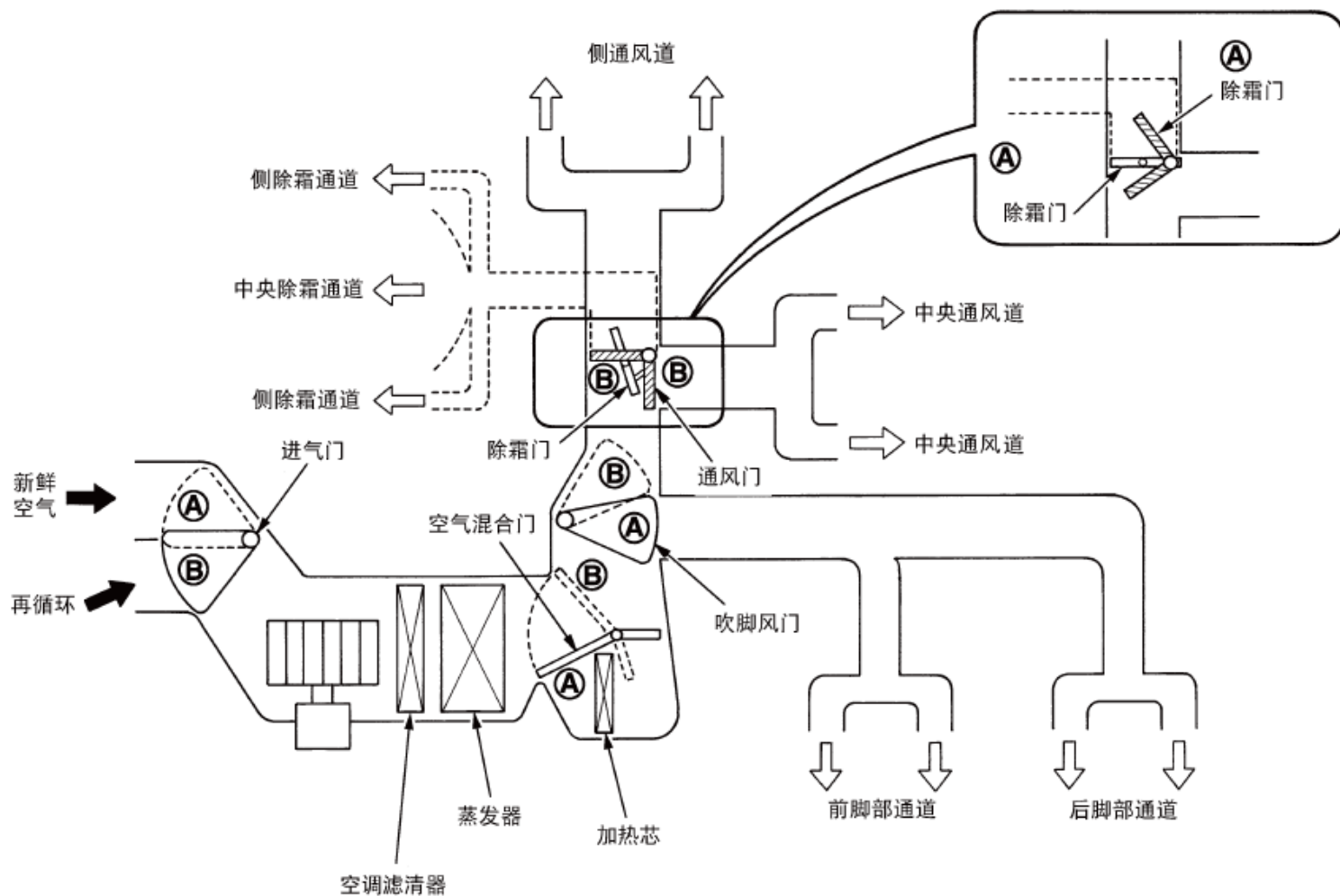
# 一、E70空调系统概述



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## 3、通风系统

包括鼓风机、空调滤清、配风箱、风门电机



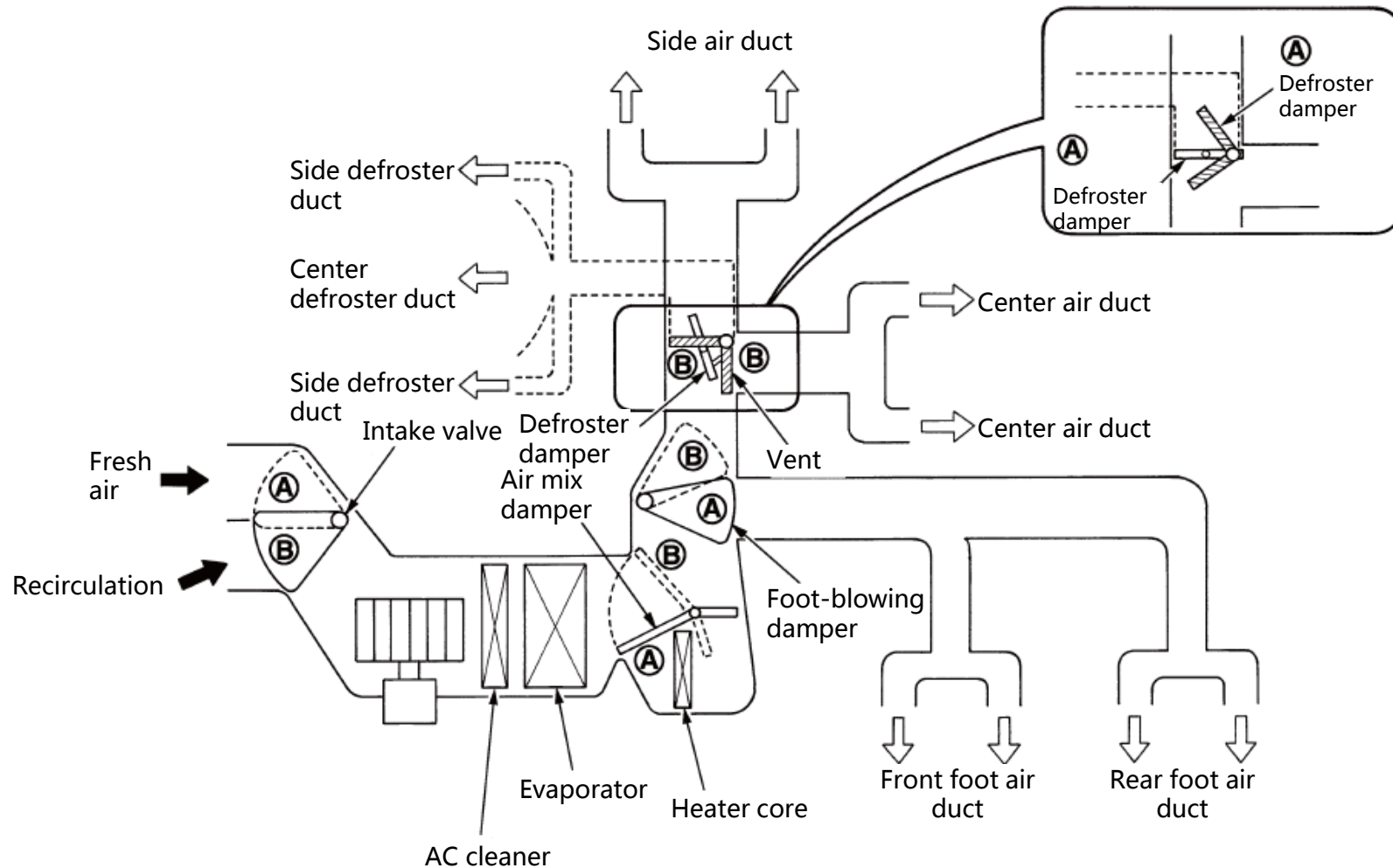
# I. Overview of E70 AC system



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## 3. Ventilation system

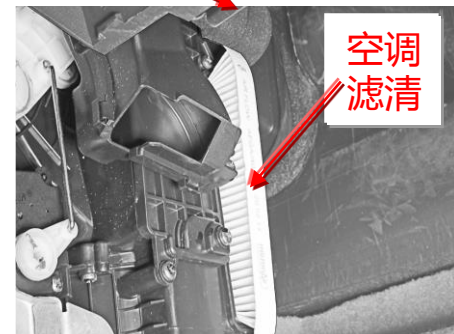
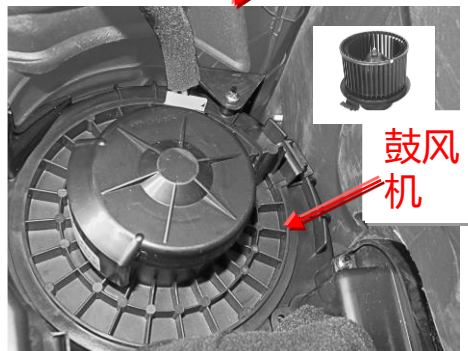
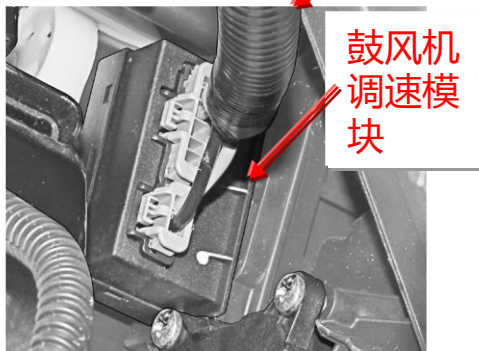
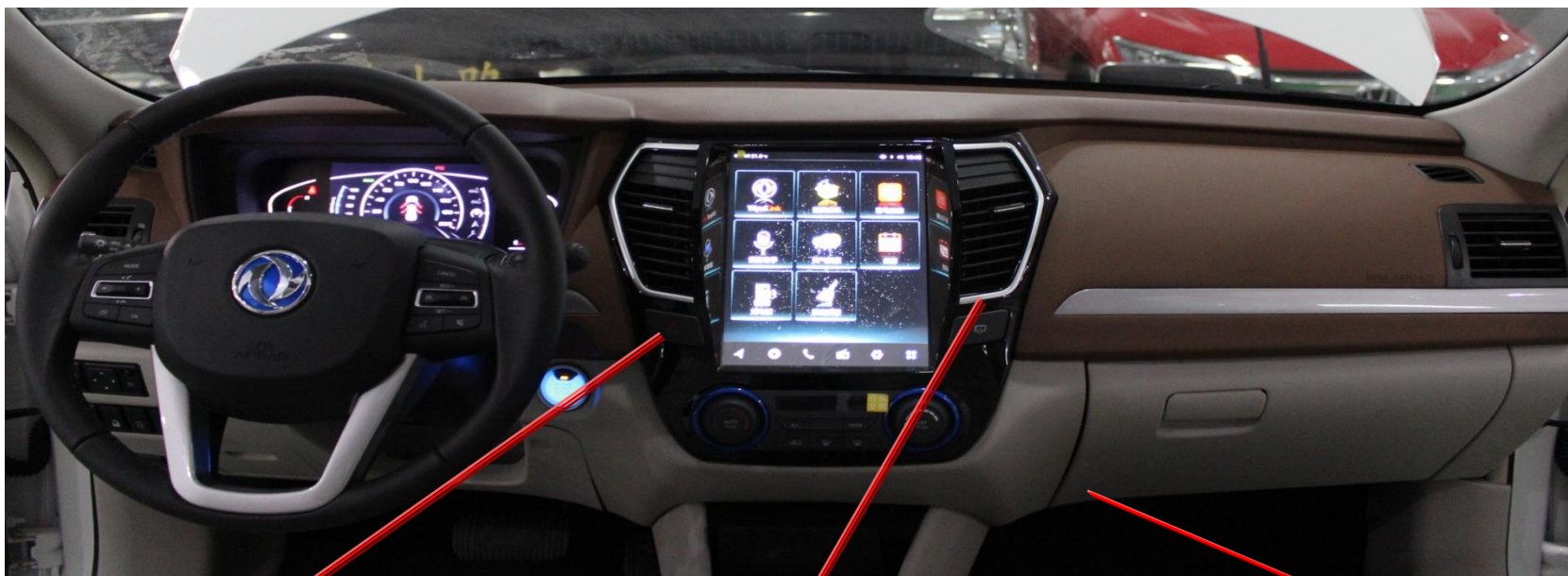
Including blower, AC cleaner, air distribution box, damper motor



# 一、E70空调系统概述

## 3、通风系统

包括鼓风机、空调滤清、配风箱、风门电机



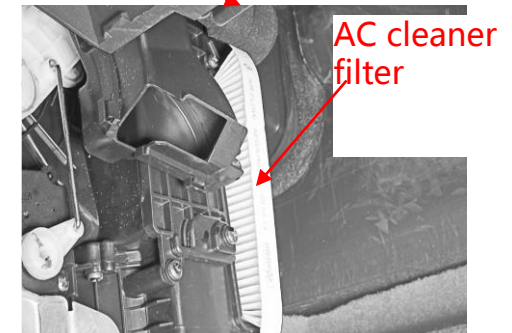
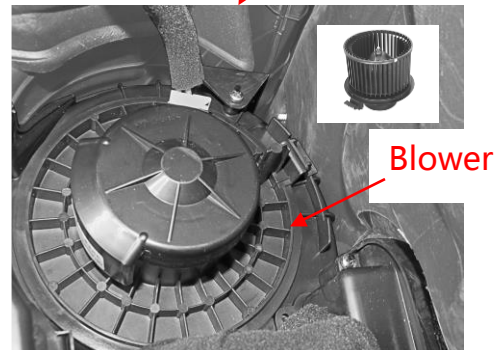
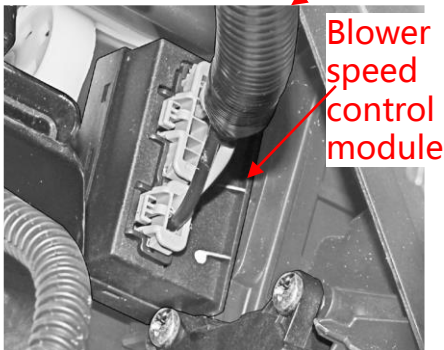


# I. Overview of E70 AC system



## 3. Ventilation system

Including blower, AC cleaner, air distribution box, damper motor

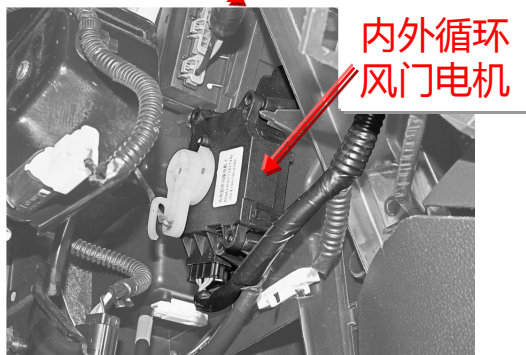




# 一、E70空调系统概述

## 3、通风系统

包括鼓风机、空调滤清、配风箱、风门电机



# I. Overview of E70 AC system



## 3. Ventilation system

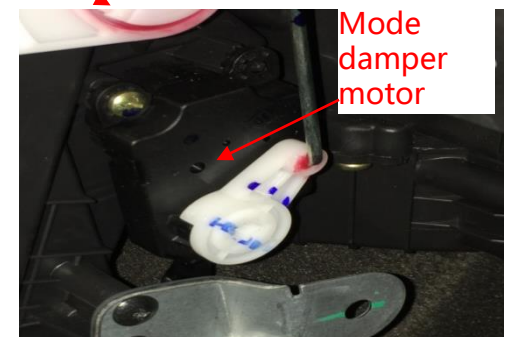
Including blower, AC cleaner, air distribution box, damper motor



Fresh  
air/recirculation  
damper motor



Air mixture  
damper motor  
(temperature  
damper motor )



Mode  
damper  
motor

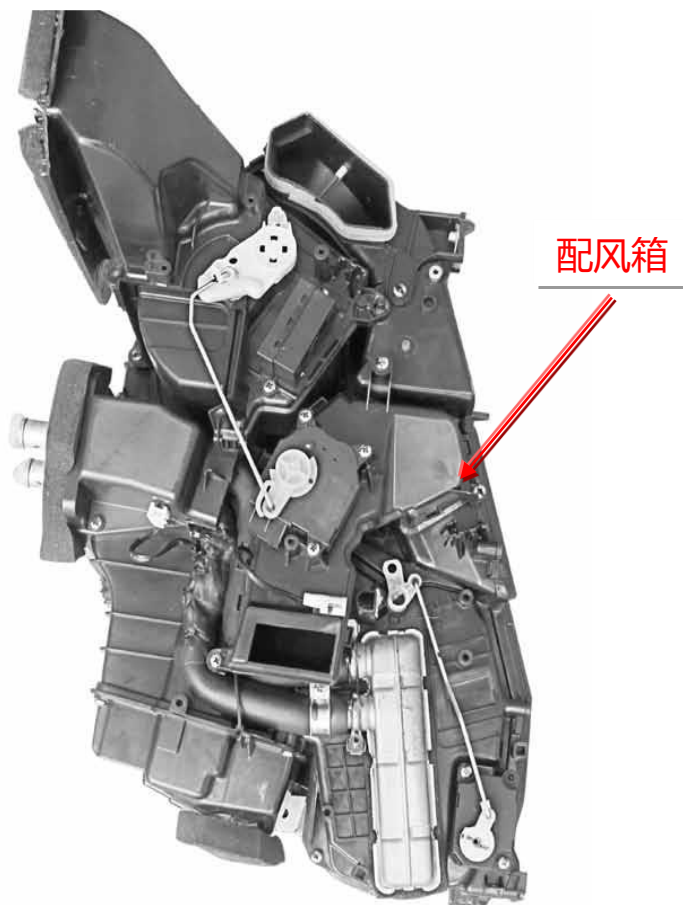
# 一、E70空调系统概述



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## 3、通风系统

包括鼓风机、空调滤清、配风箱、风门电机





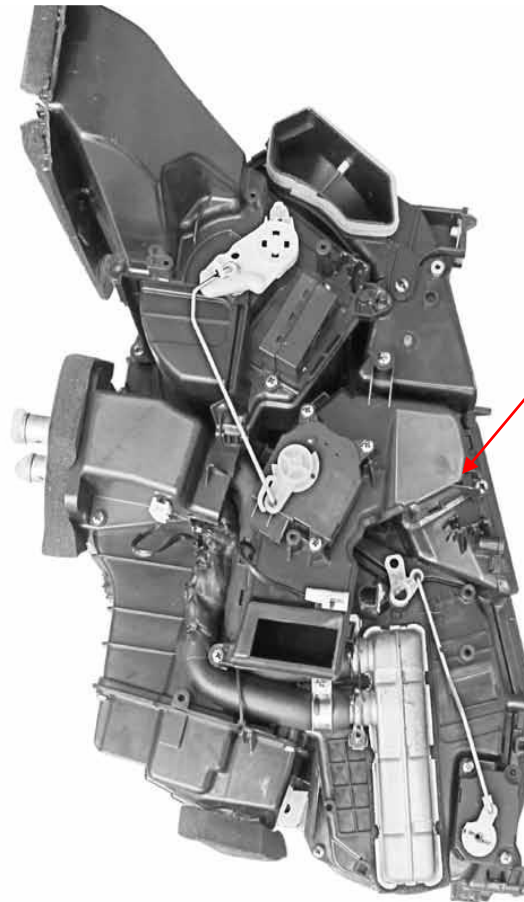
# I. Overview of E70 AC system



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## 3. Ventilation system

Including blower, AC cleaner, air distribution box, damper motor



Air distribution box



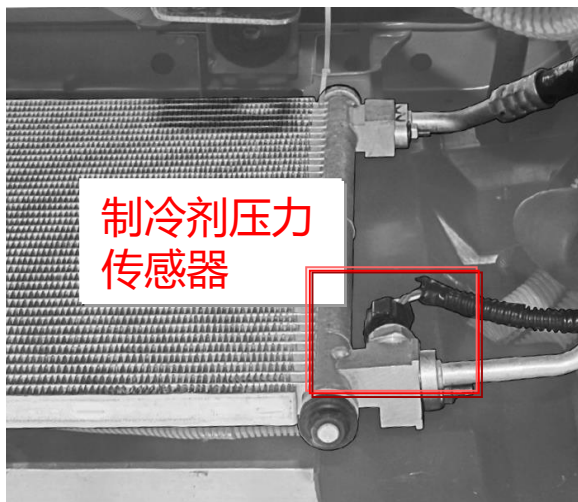
# 一、E70空调系统概述

## 4、操纵控制系统

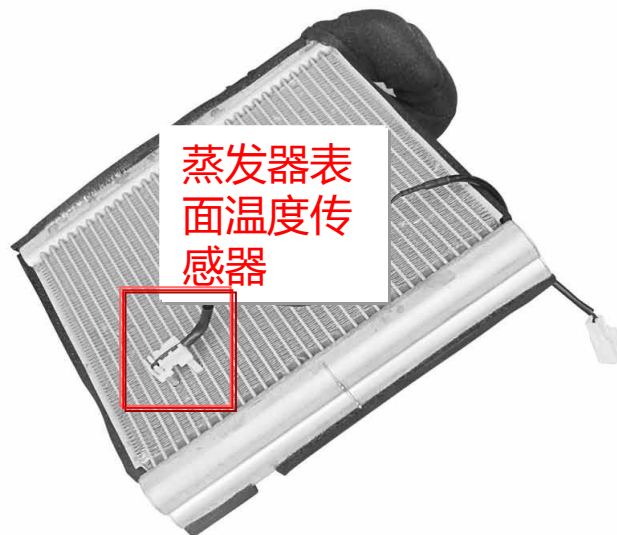
包括空调控制面板及控制模块总成、传感器



空调控制面板及  
控制模块总成



制冷剂压力  
传感器



蒸发器表  
面温度传  
感器



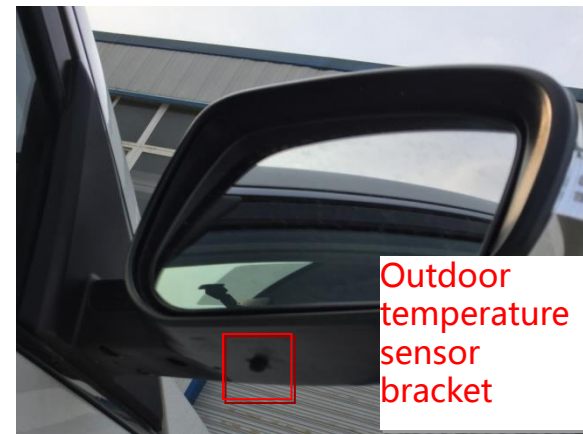
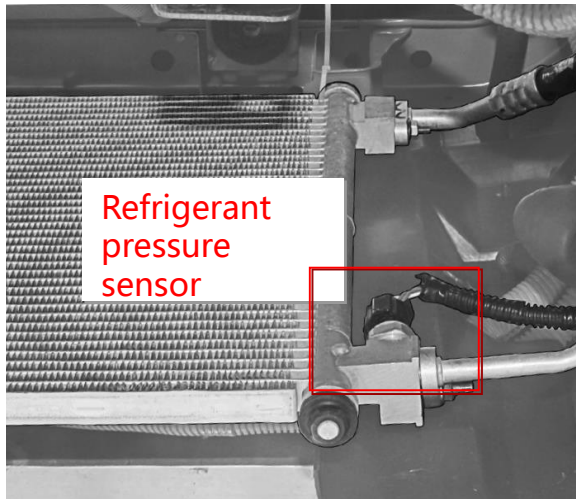
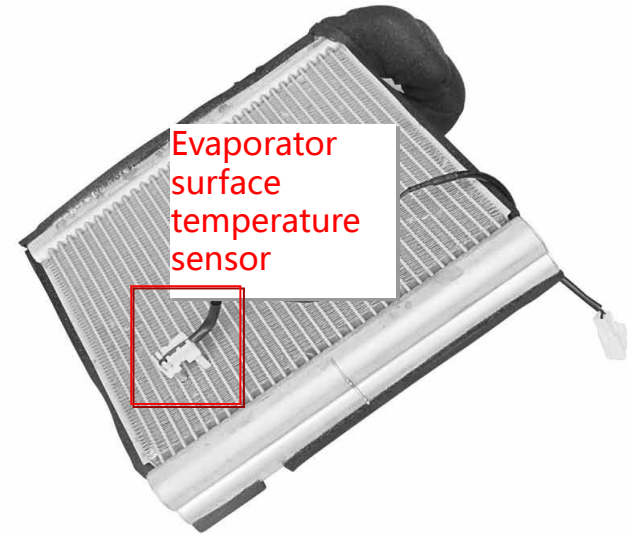
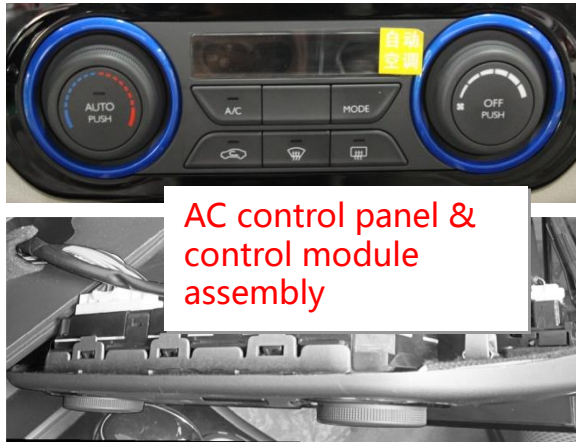
室外温  
度传感  
器

# I. Overview of E70 AC system



## 4. Control system

Including AC control panel & control module assembly, sensor



# 一、E70空调系统概述



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## 空调制冷剂技术参数及特点

### 技术参数

名称	型号	容量 ( kg )
制冷剂	R-134a	0.54

氟利昂134a ( C<sub>2</sub>H<sub>2</sub>F<sub>4</sub> , R134a ) 蒸发温度为-26.5℃

- 无色无嗅和无味
- 无毒和无刺激
- 不燃烧，没有着火或爆炸危险
- 易于液化和蒸发
- 化学和热学性质稳定
- 对系统部件无腐蚀
- 对臭氧层的潜在破坏ODP 几乎为零
- 全球变暖潜在趋势GWP 小于R12



# I. Overview of E70 AC system



## Technical parameters and features of AC refrigerant

### Parameters of coupling rod

Name	Type	Capacity (kg)
Refrigerant	R-134a	0.54

Freon 134a (C<sub>2</sub>H<sub>2</sub>F<sub>4</sub>, R134a), evaporation temperature: -26.5 ° C

- Colorless, odorless and tasteless
- Non-toxic and non-irritating
- Nonflammable, no fire or explosion hazard
- Easy to liquefy and evaporate
- Stable chemical and thermal properties
- Non-corrosive to system components
- ODP almost zero
- GWP less than R12







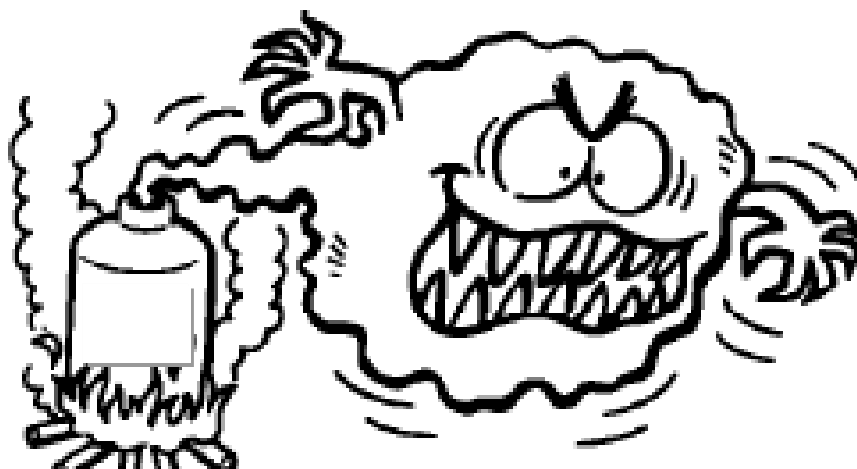
# 一、E70空调系统概述

## 空调制冷剂使用注意事项

~~H<sub>2</sub>O~~



~~R12  
+  
R134a~~



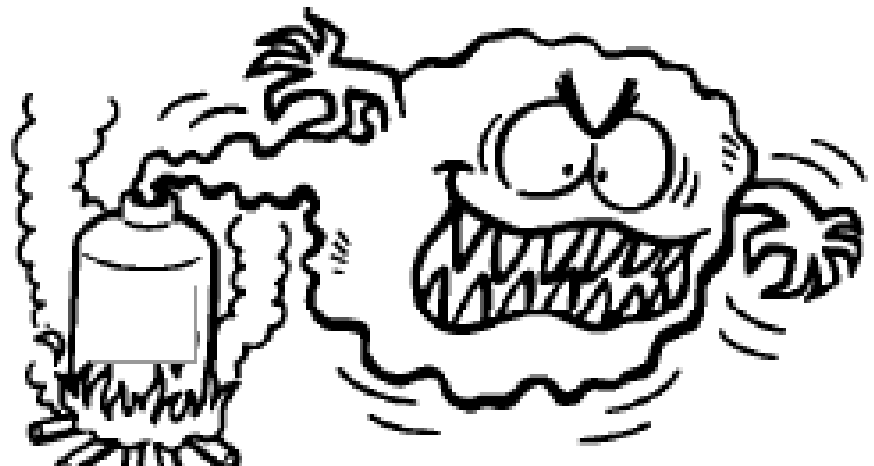
# I. Overview of E70 AC system

## Precautions for use of AC refrigerant

~~H<sub>2</sub>O~~



~~R12  
+  
R134a~~





# 一、E70空调系统概述

## 冷冻机油

比亚迪电动压缩机的冷冻油型号是RL68H， $160\text{g} \pm 5\text{g}$ ，与常规压缩机不同

1.更换空调系统除压缩机以外的零部件时需要向系统中添加冷冻油，更换各部件需要添加的冷冻油量：

蒸发器：30-35ml；冷凝器（含储液罐）：20ml；制冷管管路：10ml；

2.更换压缩机时，如果换装新压缩机前清洗系统，则无需将冷冻油倒出；如果没有清洗系统，需要将压缩机内的冷冻油倒出20ml；

3.如果系统严重泄漏如系统中已无制冷剂或更换零部件前通过加注口将制冷剂快速释放时，需要添加20-30ml冷冻油；系统少量泄漏或缓慢释放冷媒时，可不添加冷冻油或酌情添加10ml；如果通过冷媒回收机回收冷媒则无需添加冷冻油

# I. Overview of E70 AC system



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## Refrigeration oil

The refrigeration oil type of BYD electric compressor is RL68H, 160g±5g, which is different from that of the conventional compressor.

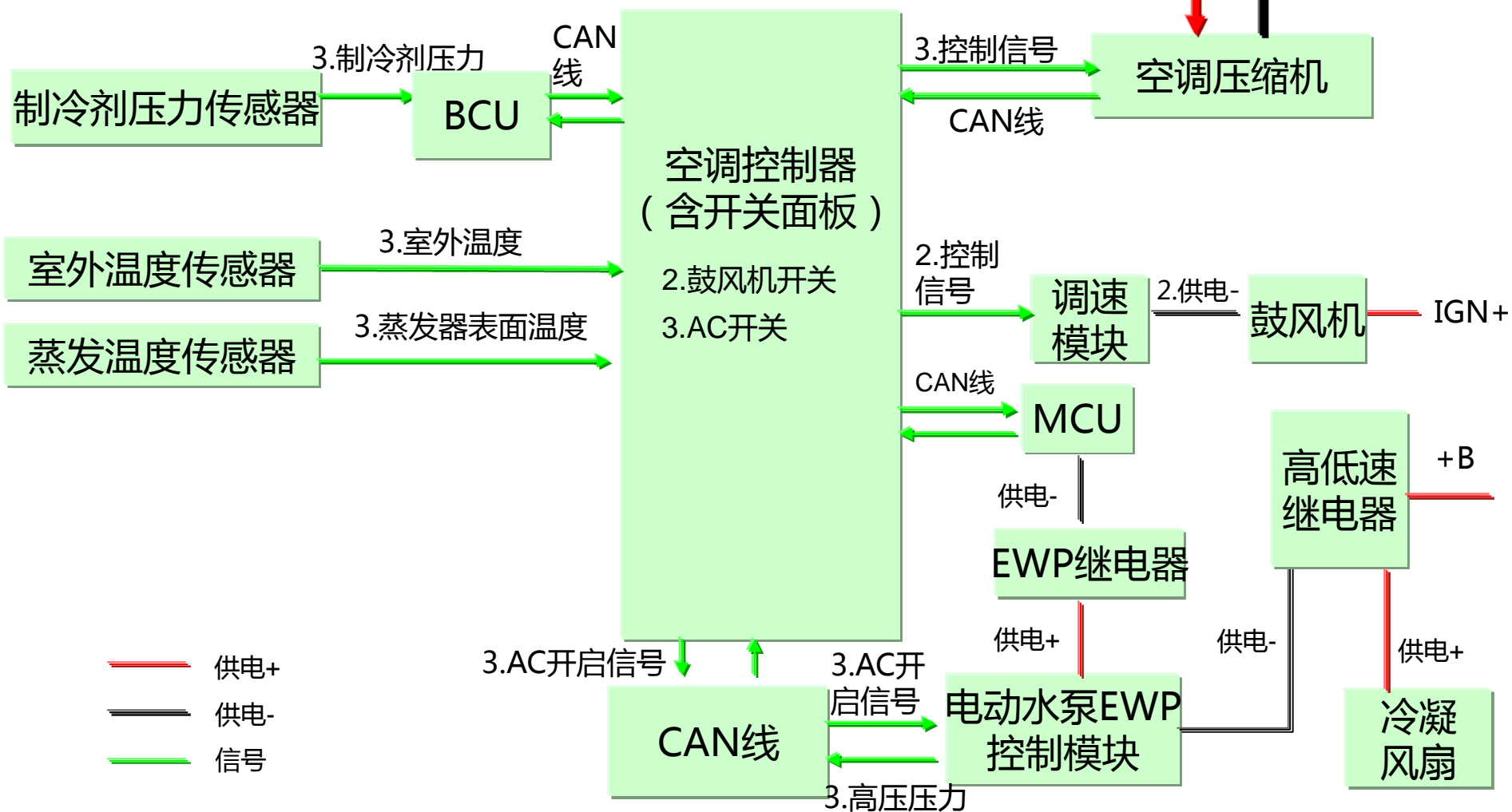
1. When replacing the parts other than the compressor of the AC system, it is necessary to add the refrigeration oil into the system and change the refrigeration oil that is needed for each component:

Evaporator: 30-35 ml; condenser (including liquid reservoir): 20 ml; refrigeration pipe line: 10 ml;

2. If the system is cleaned before a new compressor is installed, it is not necessary to pour the refrigeration oil; if the system is not cleaned, the refrigeration oil in the compressor needs to be poured out by 20 ml;

3. If the system suffers serious leakage, and there is no refrigerant in the system or the refrigerant is quickly released through the filling port before any part is replaced, 20-30 ml refrigeration oil needs to be added; when the system leaks a little or refrigerant is slowly released, it is not needed to add refrigeration oil, or add 10 ml as appropriate; if the refrigerant is recovered by the refrigerant recovery machine, it is not needed to add refrigeration oil.

## 动力电池(点火ON时)

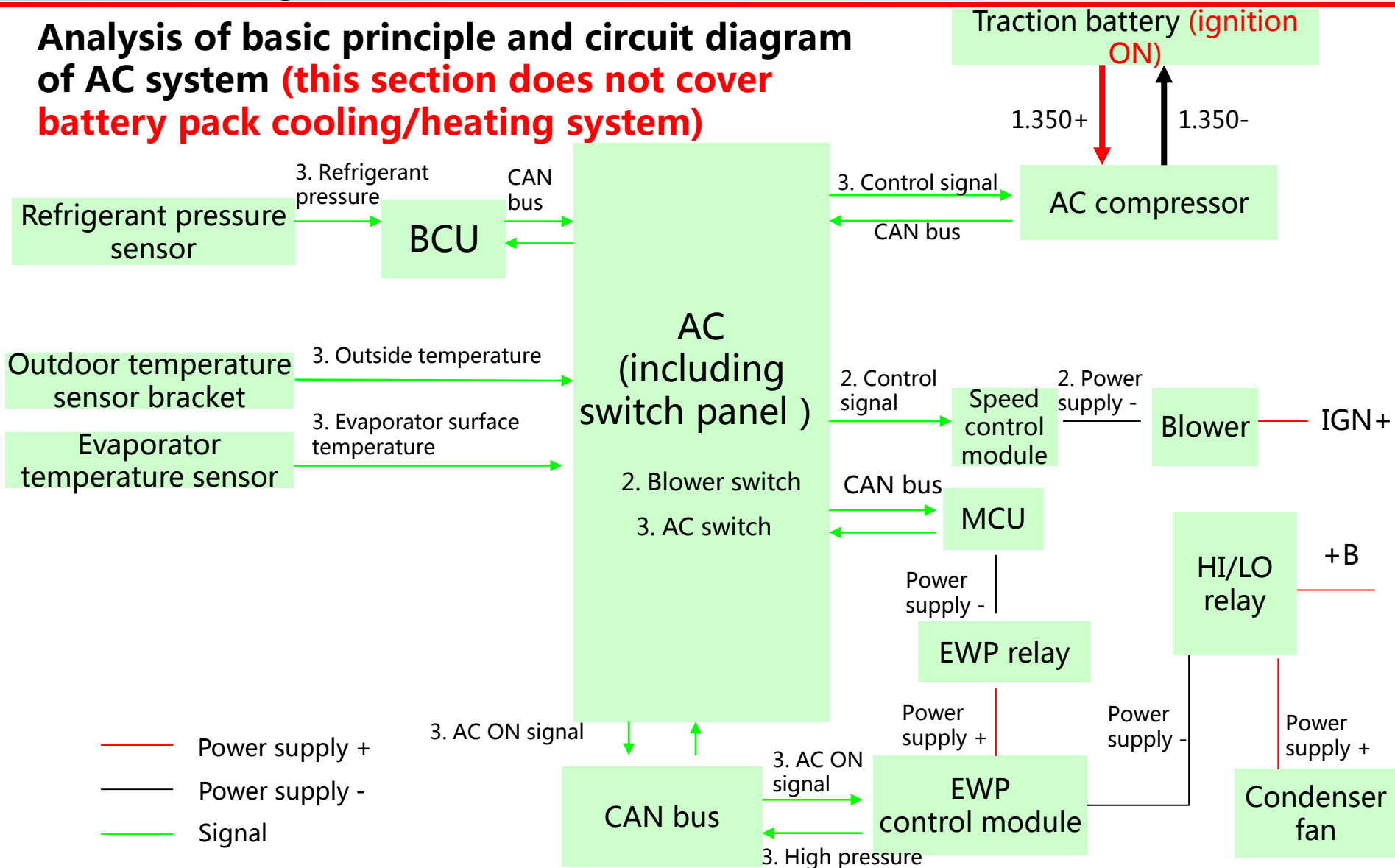


# II. Working principle and circuit diagram of E70 AC system



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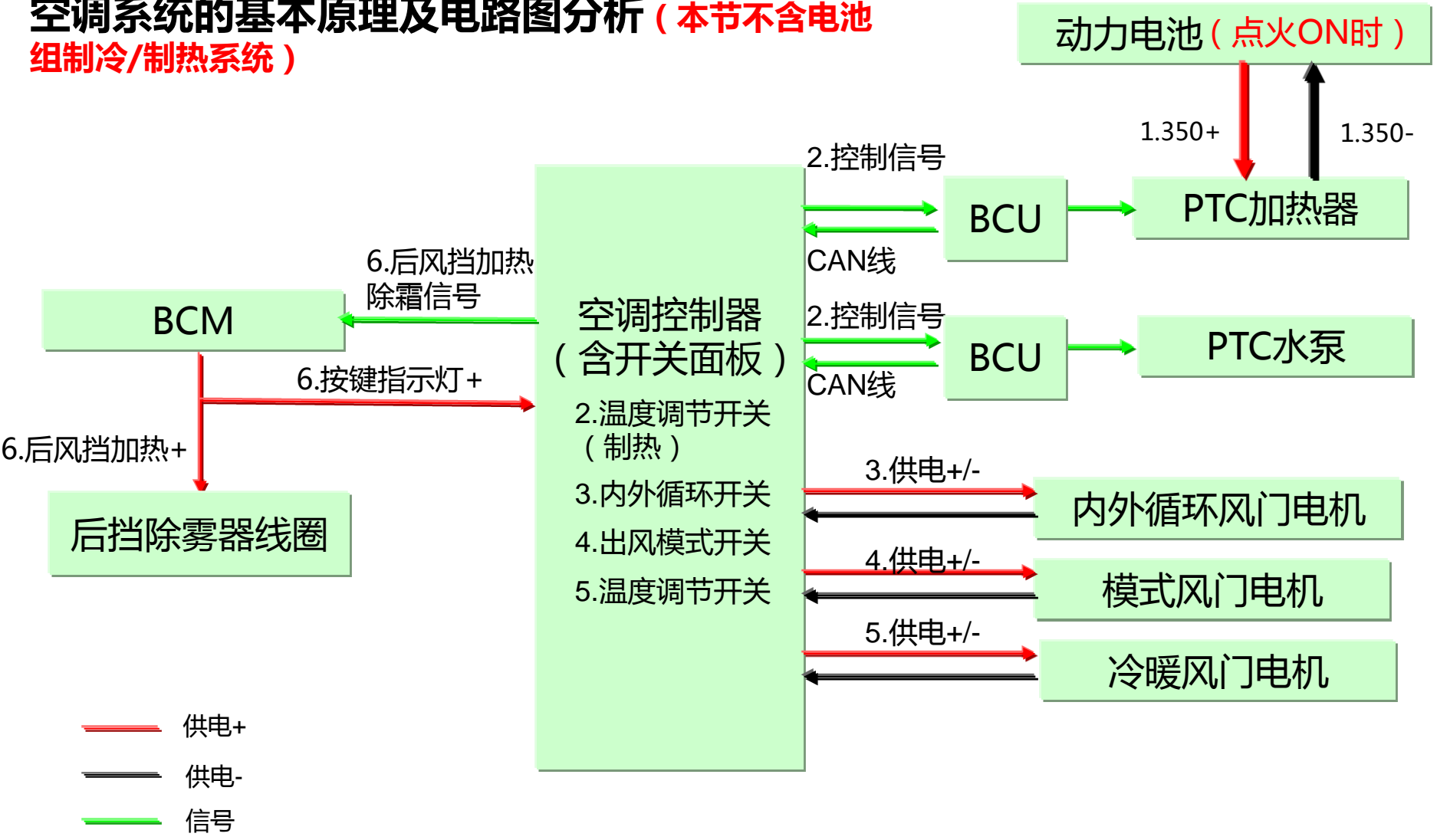
Analysis of basic principle and circuit diagram of AC system (this section does not cover battery pack cooling/heating system)



# 二、E70空调系统工作原理及电路图



## 空调系统的基本原理及电路图分析（本节不含电池组制冷/制热系统）

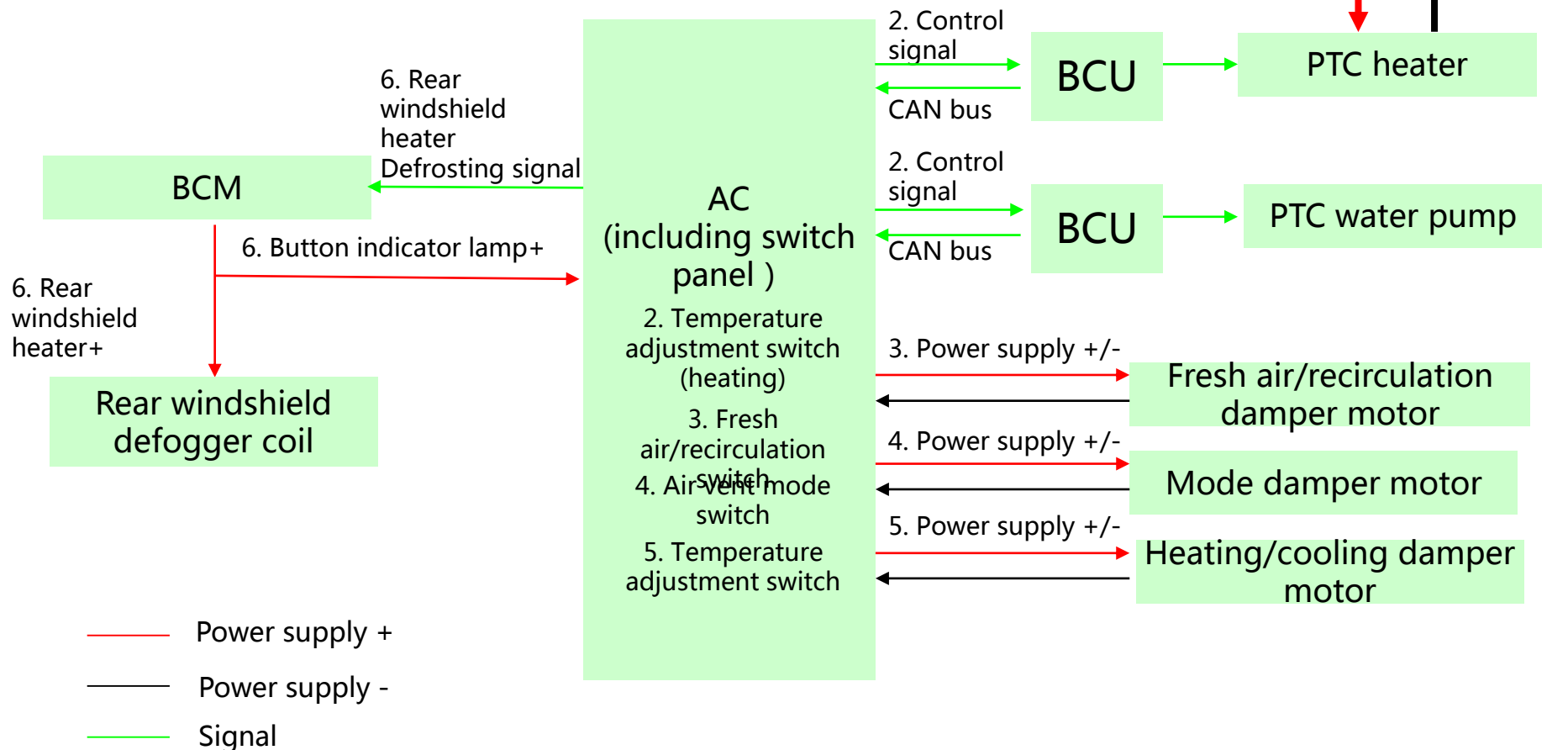


## II. Working principle and circuit diagram of E70 AC system



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Analysis of basic principle and circuit diagram of AC system **(this section does not cover battery pack cooling/heating system)**



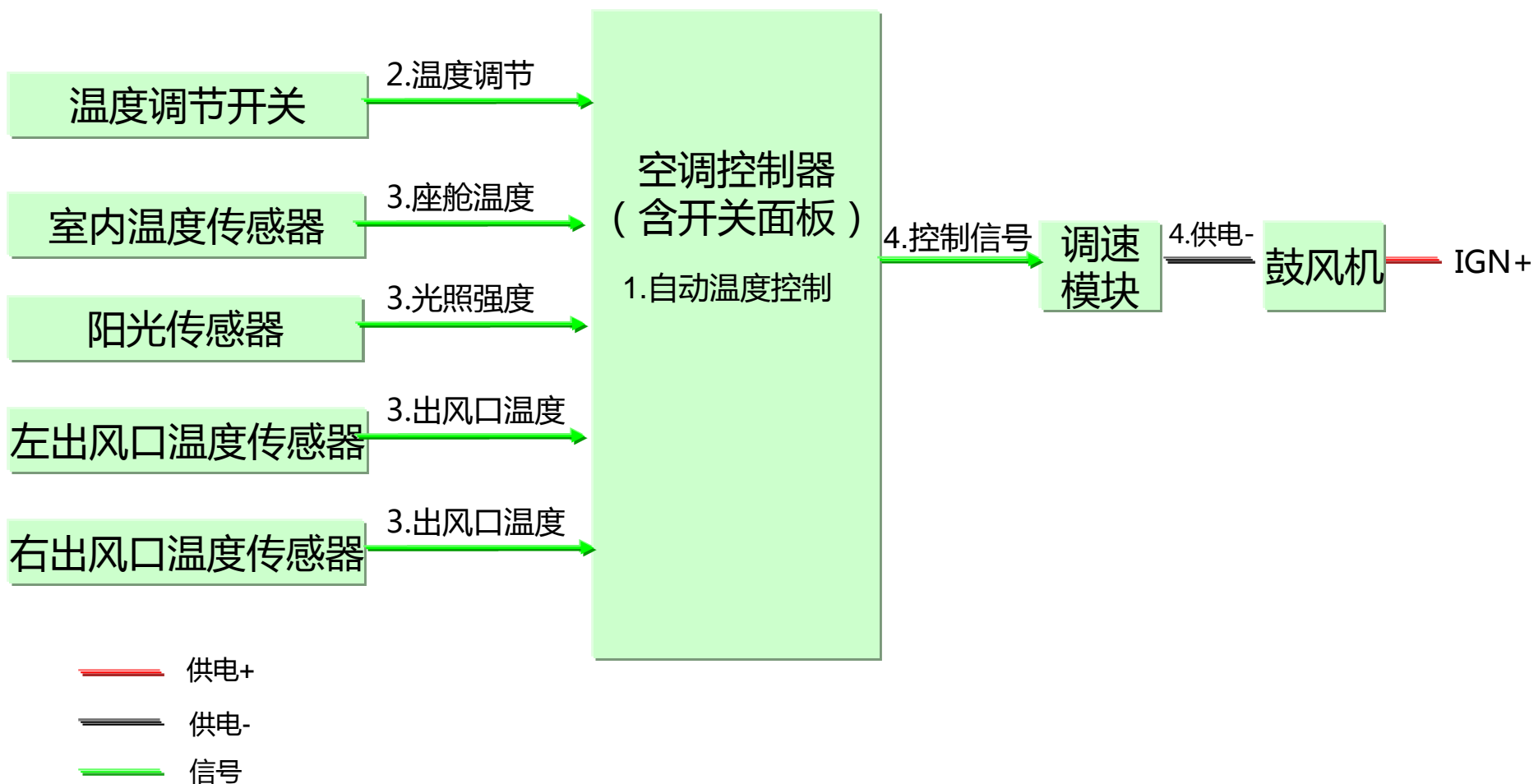


## 二、E70空调系统工作原理及电路图



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### 空调系统的基本原理及电路图分析（本节不含电池组制冷/制热系统）

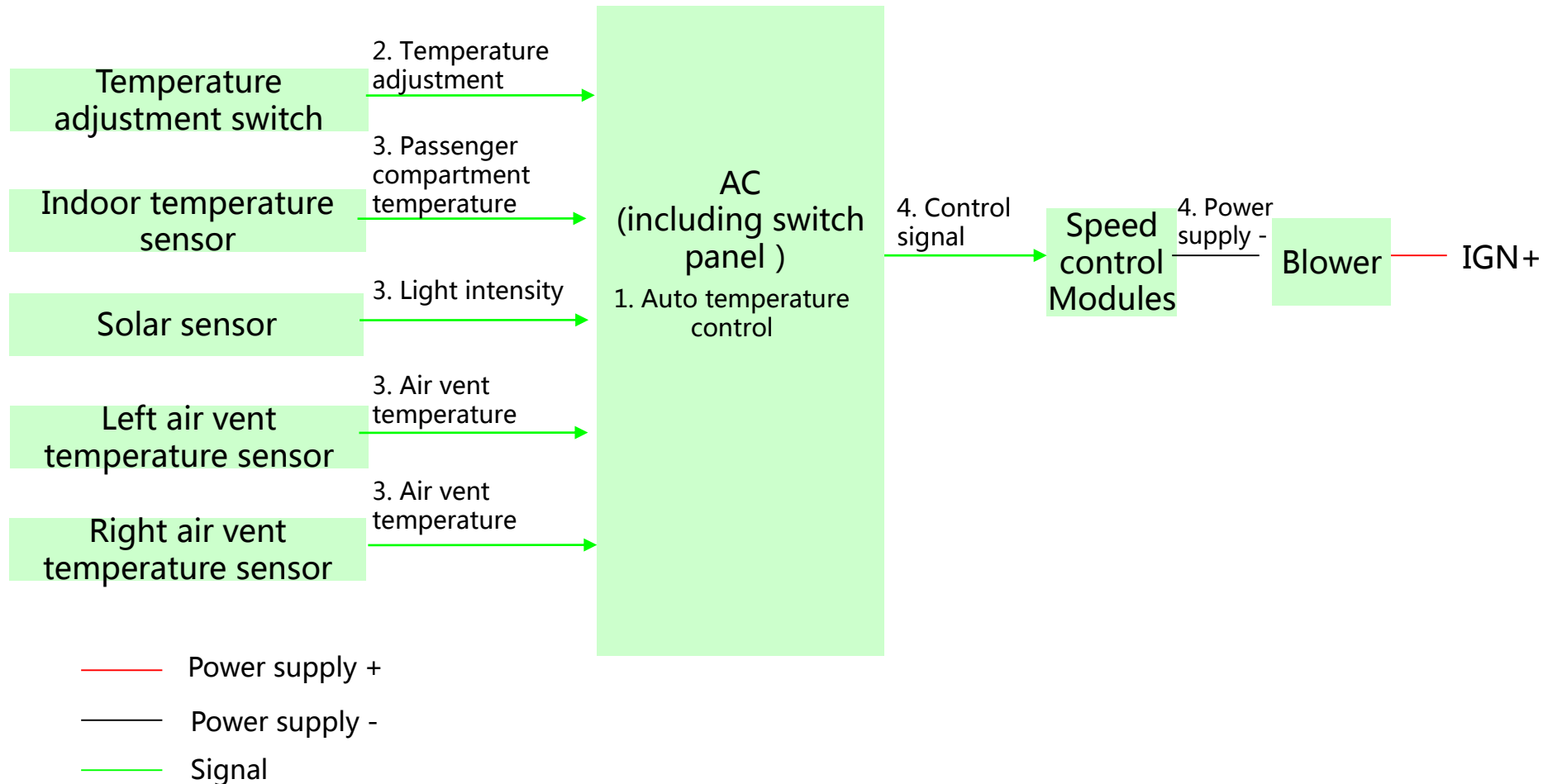


## II. Working principle and circuit diagram of E70 AC system



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**Analysis of basic principle and circuit diagram of AC system (this section does not cover battery pack cooling/heating system)**



## 二、E70空调系统工作原理及电路图

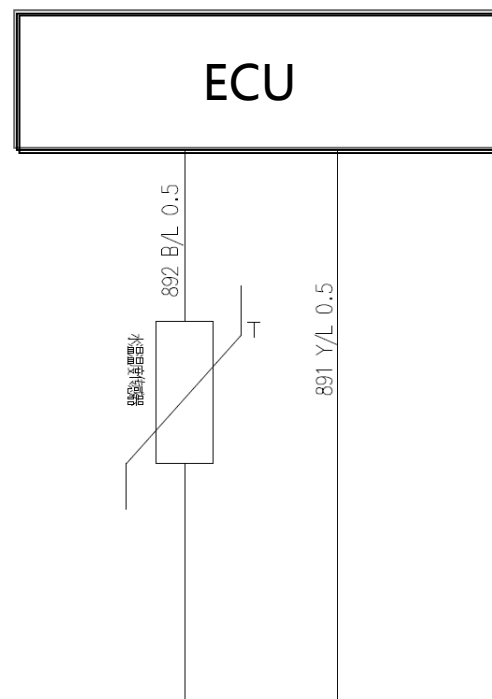
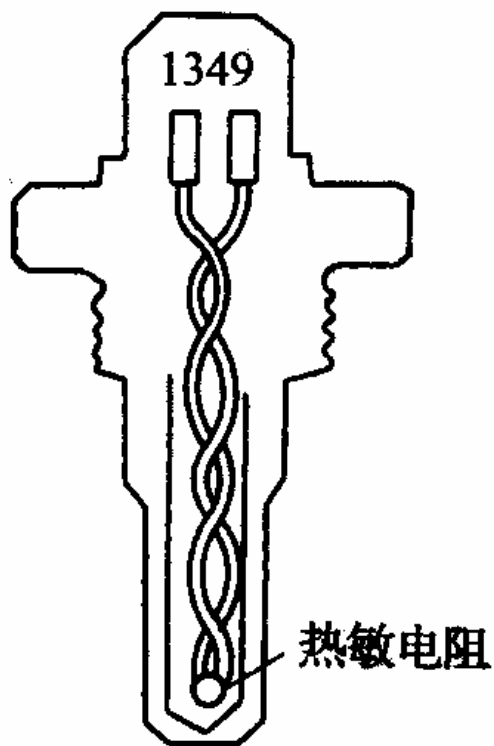


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温度传感器的工作原理及检测方法：

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 AC system

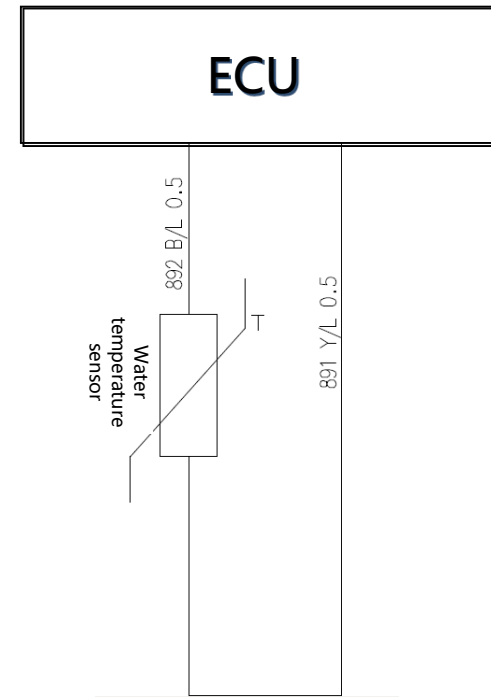
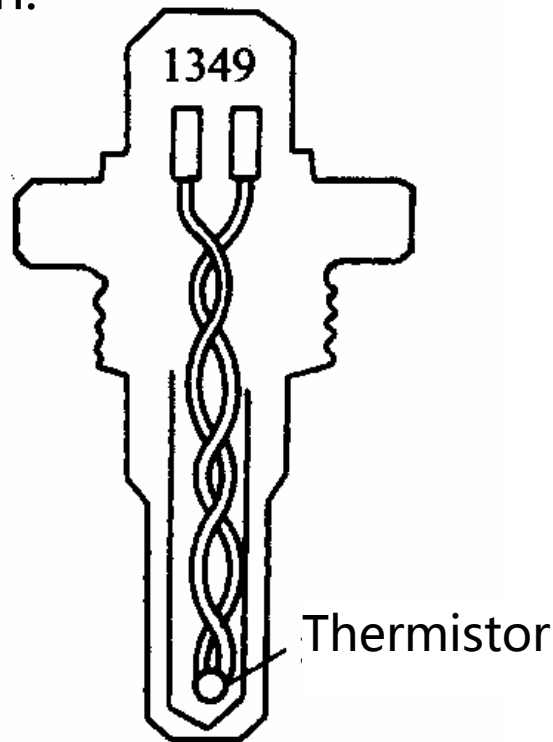


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### Working principle and detection method of temperature sensor:

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.



## 二、E70空调系统工作原理及电路图

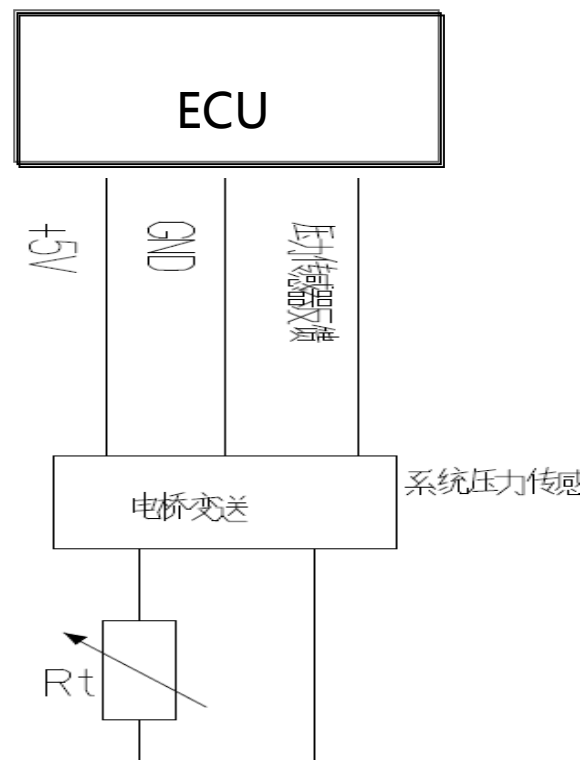
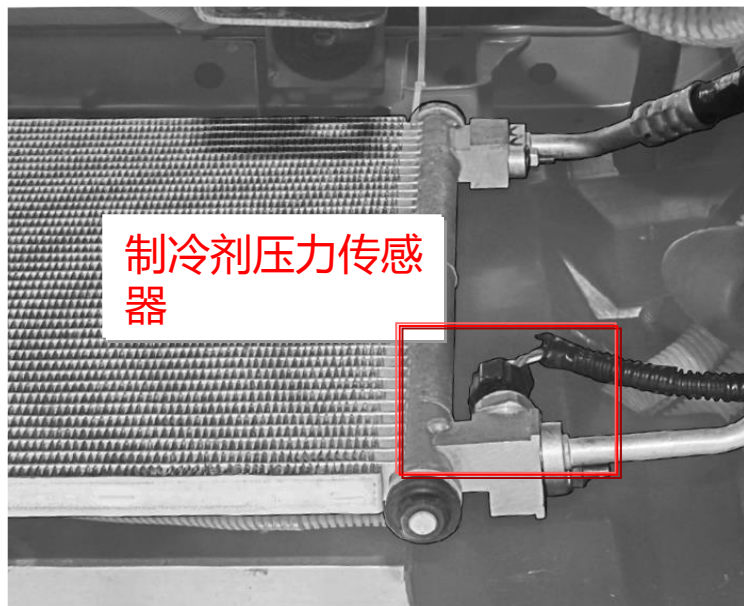


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**压力传感器的工作原理及检测方法：**

原理：压力可变电阻式传感器

检测：测量传感器5V供电及接地，工作时可通过诊断仪读取数据流



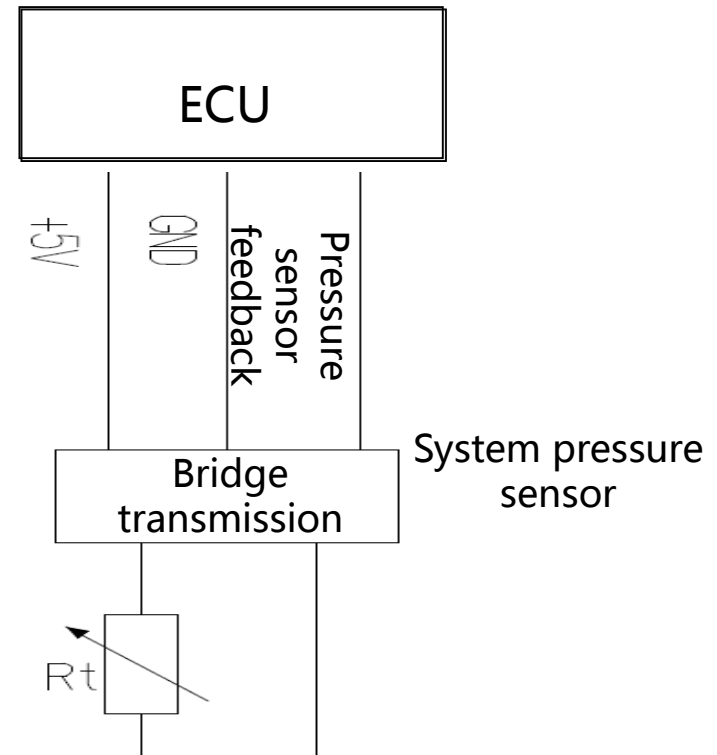
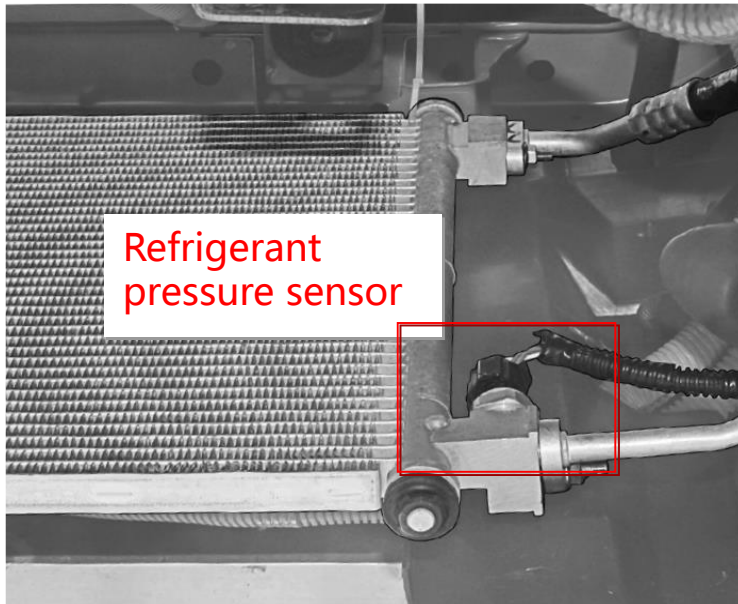
## II. Working principle and circuit diagram of E70 AC system



### Working principle and detection method of pressure sensor:

Principle: Variable resistance pressure sensor

Detection: The multimeter measures the 5 V power supply and grounding of the sensor, and the data stream can be read by the scan tool during operation.



## 二、E70空调系统工作原理及电路图

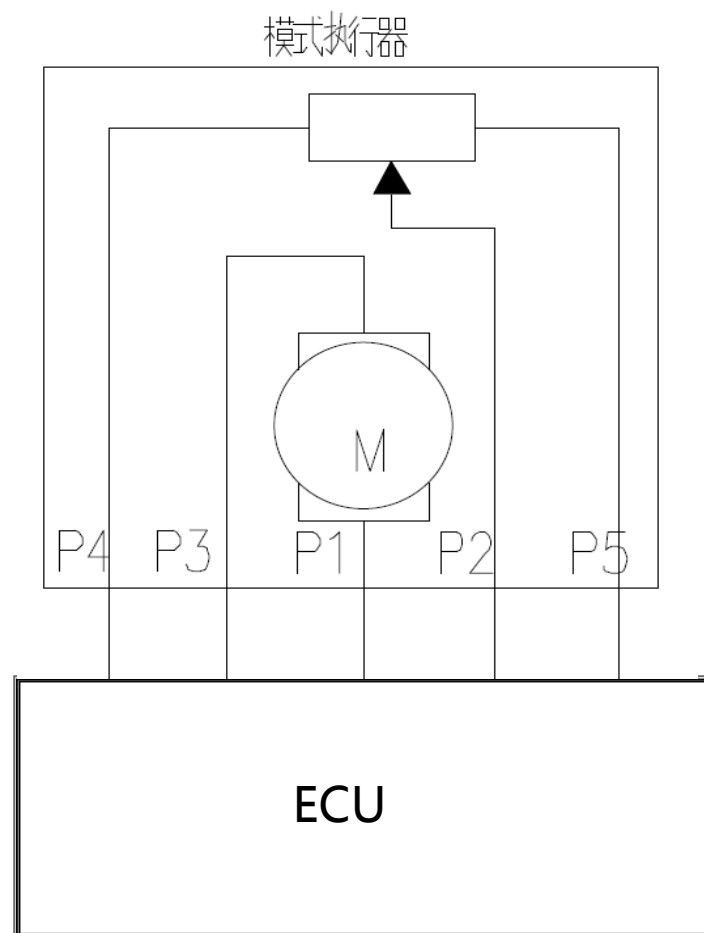
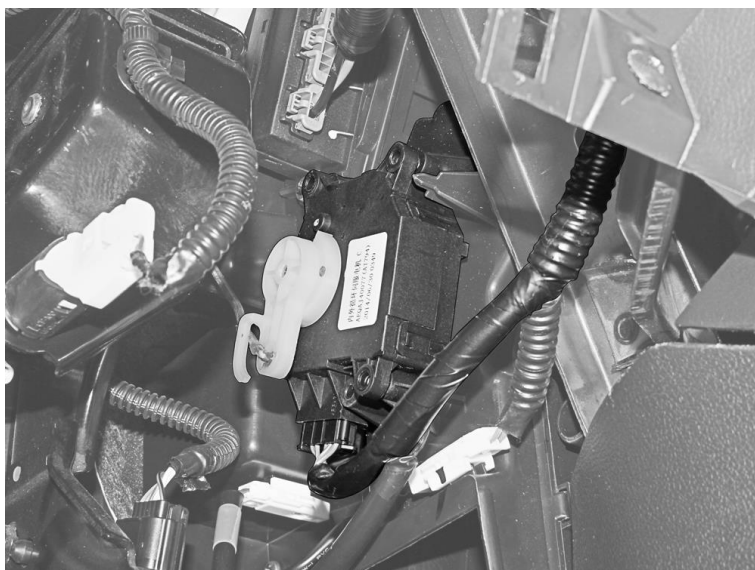


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### 风门电机的工作原理及检测方法：

原理：带滑变电阻式位置传感器的直流电机

检测：万用表测量位置传感器电阻，传感器5V供电及接地，工作时使用诊断仪读取数据流



## II. Working principle and circuit diagram of E70 AC system

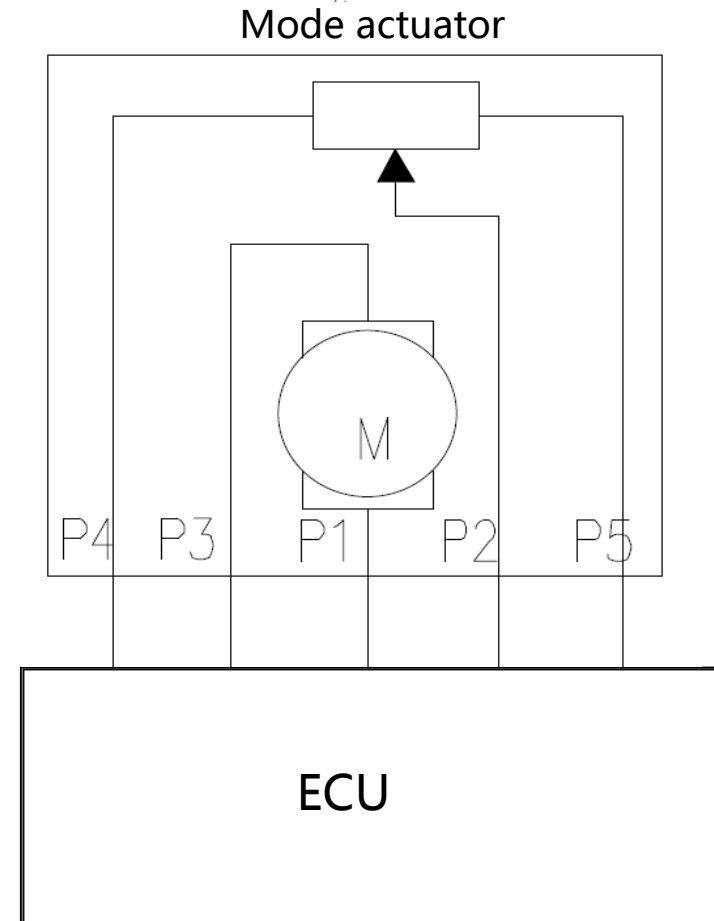


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### Working principle and detection method of damper motor:

Principle: DC motor with slip resistance position sensor

Detection: The multimeter measures the resistance, 5 V power supply and grounding of the position sensor, and the data stream can be read by the scan tool during operation.





### 三、E70空调系统制冷剂回收/抽真空/充注/查漏



E70的制冷剂回收/抽真空/充注/查漏方法与传统汽油车的方法完全一样，**注意按照维修手册规定的制冷剂及冷冻油加注量进行加注**

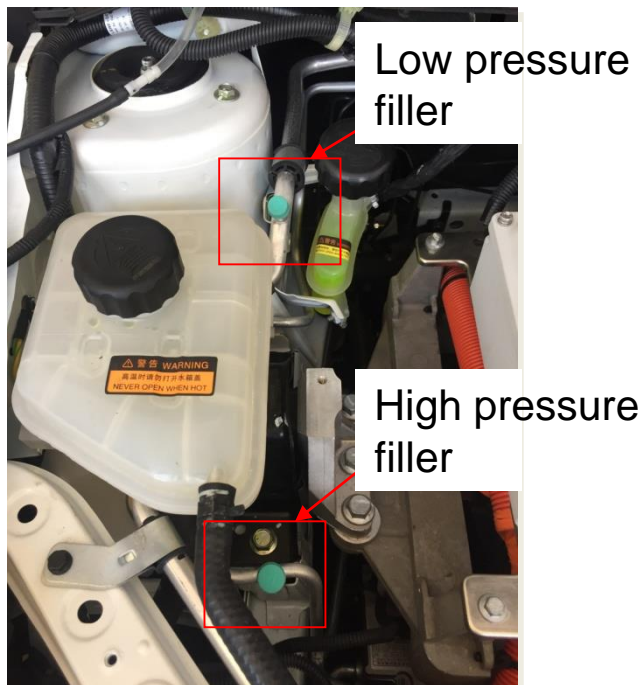


### III. Recovery/vacuumping/charging/leak detection of E70 AC system refrigerant



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The method for E70 refrigerant recovery/vacuumping/charging/leak detection of E70 AC system refrigerant is exactly the same as that of the conventional gasoline vehicle. **Pay attention to the refilling of refrigerant and refrigeration oil as specified in the service manual.**



## 四、E70空调系统维修注意事项



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本车空调系统与传统汽油车空调系统基本相同，传统车的维修注意事项均适合与本车型。

除此之外，应特别注意PTC加热器与电动空调压缩机，因为这两个零件涉及到高压。在对这两个部件进行拆装换件时，应断开维修开关，佩戴好必要的绝缘护具（绝缘手套，绝缘鞋），并注意橙色线束避免高压触电风险。

## IV. Precautions for service of E70 AC system



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The AC system of this vehicle is basically the same as that of the traditional gasoline vehicle. Therefore, the service precautions for the traditional vehicle are suitable for this model.

In addition, special attention should be paid to the **PTC heater and the electric AC compressor** because these two parts involve **high voltage**.

When removing and refitting and replacing these two components, disconnect the service switch, **wear the necessary insulation protectors (insulated gloves, insulated shoes), and pay attention to the orange harness to avoid the risk of high voltage electric shock.**



按照要求排除空调系统设置的故障



Troubleshoot the AC system settings as required.