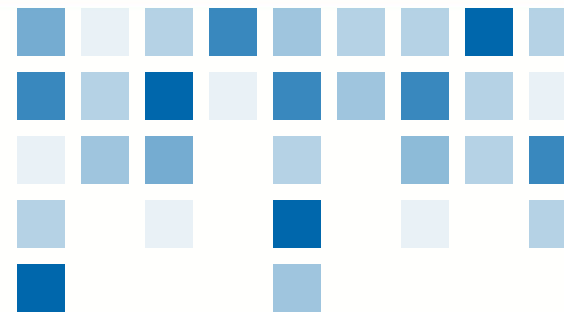
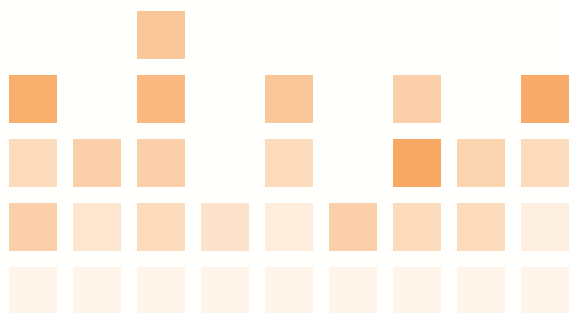




SHACMAN 汽车电器知识培训

F2000-F3000

陕汽进出口公司服务部培训科

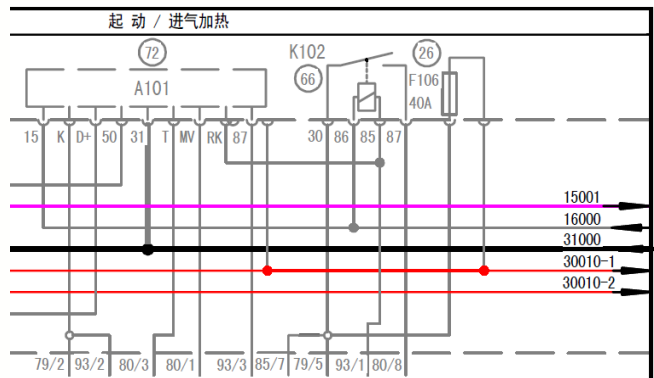


第三十九课 阅读电路图2

1. A101是火焰预热控制器:

火焰预热控制器（如上图）是早期国二F2000车型的发动机冷启动辅助装置，见F-2000新原理图，第1页。现在已经很少见到火焰预热控制器。现在的F3000车型的发动机冷启动辅助装置大多是进气加热装置。

A101 is the Flame Preheating Controller: The flame preheating controller (as shown in the diagram above) is an early auxiliary device for engine cold start in the National Standard II F2000 model, as seen in the F-2000 New Principles Diagram, page 1. Nowadays, flame preheating controllers are rarely seen. Most of the engine cold start auxiliary devices in current F3000 models are intake heating devices.

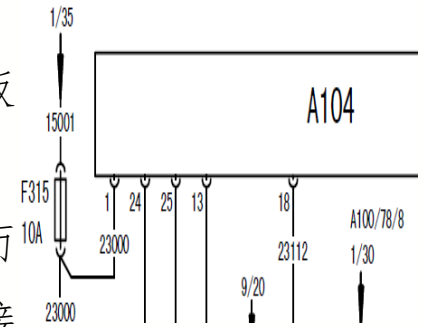


2. A104是空调控制器，A106是空调风机控制器，A387是驾驶室内温度传感器：

以上三个电器元件，见F-2000新原理图，第11页。

A104是空调控制器（如上图），就是空调的液晶操纵面板，通常安装在驾驶室仪表台右侧，电器翘板开关板上。

从图中可以看到的的信息，例如，A104空调控制器的1号针脚是23000线，是电源正极线，来自F315保险丝，而F315保险丝的进线是15001，说明它是钥匙电（T15）。又如，A104空调控制器的18号针脚是23112线，它连接到了A387驾驶室内温度传感器的5号针脚，是驾驶室内空气温度信号。



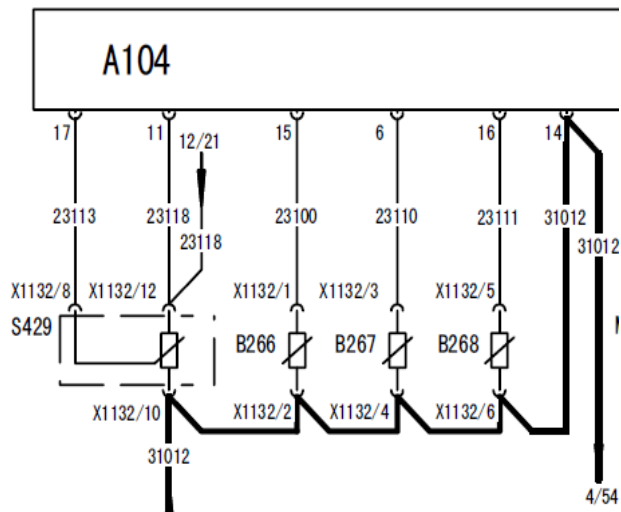
A104 is the Air Conditioning Controller, A106 is the Air Conditioning Fan Controller, A387 is the Cabin Interior Temperature Sensor:

These three electrical components are depicted in the F-2000 New Principles Diagram, page 11.

A104, the Air Conditioning Controller (as shown in the diagram above), is the LCD control panel of the air conditioning system, typically installed on the right side of the dashboard in the cabin, above the electrical switch panel.

From the information visible in the diagram, for instance, Pin 1 of the A104 air conditioning controller is connected to the 23000 line, which is the positive power line sourced from the F315 fuse. The supply line to F315 fuse is the 15001, indicating it is the ignition power (T15). Similarly, Pin 18 of the A104 air conditioning controller is connected to the 23112 line, which links to Pin 5 of the A387 cabin interior temperature sensor, providing the cabin air temperature signal.





在F-2000新原理图，第12页也有A104。从上图中可以看到A104空调控制器的14号针脚是31012，就是电源负极线（图中使用粗黑线画出），它连接到了4/54。

In the F-2000 New Principles Diagram, on page 12, A104 is also depicted. From the diagram above, it can be seen that Pin 14 of the A104 air conditioning controller is connected to the 31012 line, which is the power ground line (illustrated with a thick black line in the diagram). This ground connection links to 4/54.



3. 电器原理图的导航坐标：

4/54是电器原理图的导航坐标，4代表这个原理图的第4页，54代表图纸的54号位置。

如图中，电器原理图在每一页都有页码编号表示这是第几页，在每一页都有1~55的位置坐标号码。当电器原理图需要跨越页码表示电器连接关系时，使用“数学/数字”表示导航坐标，斜线前面的数字表示连接到达原理图的第几页，斜线后面的数字表示连接到达页面的位置坐标号码。

所以4/54表示连接到了第4页的54号位置。

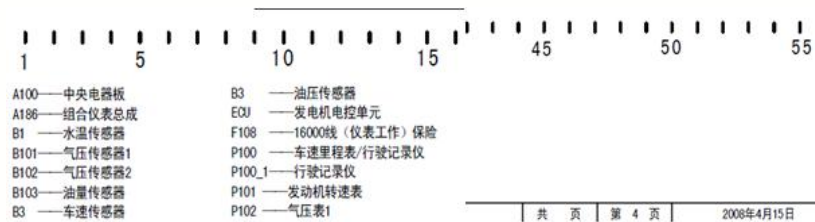
3. Schematic Diagram Navigation Coordinates

4/54 is a navigation coordinate in the schematic diagram. The number 4 represents page 4 of the schematic, and 54 indicates position 54 on that page.

In the diagram, each page is numbered to indicate its sequence within the schematic, and each page has position numbers ranging from 1 to 55. When a connection spans across multiple pages, navigation coordinates are used to indicate this relationship. The format is page/position (e.g., 4/54), where the number before the slash indicates the page number and the number after the slash indicates the position on that page.

Therefore, 4/54 signifies that the connection continues on page 4, at position 54.

This method ensures that complex electrical connections can be traced accurately across different sections of the schematic, facilitating easier diagnosis and troubleshooting of the vehicle's electrical system.



那么，就是说在第4页的54号位置这一竖行，可以找到原位置的31012电源负极线的连接。

同样的，在离开原位置之前，要记得查看原位置的页码和坐标。

31012的原位置是第12页，17号位置，可以标记为12/17。

因为它指向4/54，一定在4/54位置可以找到12/17的标记。它们两个是互相连接、互相印证的同一根电线，只是画图时没有画在同一张页面。所以，一定在12/17位置可以找到4/54的标记。

在原位置的导航坐标与目标位置的导航坐标是互相印证的同一根电线。它们两个互相证明线路连接的正确性。

This means that at position 54 on page 4, you will find the connection for the 31012 negative power line.

Similarly, before leaving the original position, it's important to note the page number and coordinate of the original position. The original position of 31012 is page 12, position 17, which can be marked as 12/17.

Since it points to 4/54, you will definitely find the 12/17 mark at position 54 on page 4. These two coordinates represent the same wire, even though they are depicted on different pages. Thus, at position 12/17, you will find a mark indicating 4/54.

The navigation coordinates of the original position and the target position verify that they represent the same wire. These coordinates confirm the correctness of the wiring connections by cross-referencing each other.

This system ensures accuracy and consistency when tracing and diagnosing electrical connections across multiple pages in a schematic diagram, making it easier to understand and troubleshoot the vehicle's electrical system.

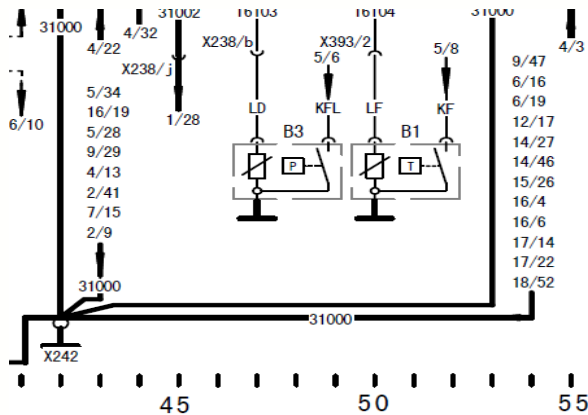


图中在4/54位置的竖行，看到有12根31000搭铁线，压接在了一起，连接在X242，X242是仪表板搭铁点。

注意：这里的图中12/17的31012也是搭铁线，因为通常31开头的线都是搭铁线。

In the diagram, at vertical position 4/54, you can see twelve 31000 ground wires crimped together and connected at X242, which is the instrument panel grounding point.

Note: The 31012 wire at position 12/17 is also a ground wire, as wires starting with 31 are typically ground wires.



4. A106空调风机控制器和A387驾驶室内温度传感器:

A106是空调风机控制器通常安装在驾驶室仪表台内部，位置在点烟器下方的棕红色控制器。A387是驾驶室内温度传感器，通常安装在驾驶室仪表台下方，位置在转向柱右侧的塑料盖板内侧。如下图所示。

图中的A106控制器6号针脚是电源正极，来自25009线，由22号保险丝通过A100电器装置板后面的89/4提供电源。

A106空调风机控制器3号针脚是电源负极，通过A100电器装置板后面的85/4连接到电器装置板的搭铁线31000。

图中的A378驾驶室内温度传感器1号针脚是电源正极，来自23317线，由K486继电器的8号端子通过K486继电器的吸合提供电源。

A378驾驶室内温度传感器2号针脚是电源负极，通过多出搭铁线31000的并联，连接到了1/25，就是电器原理图的第1页25号位置的X244仪表板搭铁点。

另外图中的M代表是电动机，下面的横线，代表是直流电动机。

A106 Air Conditioning Fan Controller and A387 Cabin Temperature Sensor

The A106 air conditioning fan controller is typically installed inside the dashboard of the driver's cabin, located below the cigarette lighter. The A387 cabin temperature sensor is usually installed below the dashboard, inside the plastic cover to the right of the steering column. As shown in the diagram:

A106 Controller:

Pin 6 is the power supply positive, coming from the 25009 wire and provided by the 22A fuse through the A100 electrical device panel at the rear 89/4 connection.

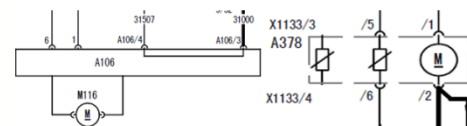
Pin 3 is the power supply negative, connected through the A100 electrical device panel at the rear 85/4 connection to the grounding wire 31000.

A387 Cabin Temperature Sensor:

Pin 1 is the power supply positive, coming from the 23317 wire and provided by terminal 8 of the K486 relay when the K486 relay is engaged.

Pin 2 is the power supply negative, connected through the parallel ground wire 31000 to position 1/25 on the electrical schematic, which corresponds to the X244 dashboard grounding point.

Additionally, the diagram shows that M represents a motor, and the line underneath it indicates a direct current (DC) motor.



5. 电器元件符号代码对照表:

实际上在电器原理图的下方，每一页图中电器元件代码对照表显示的电器元件符号的真实含义，它代表了什么，都有详细解释。在大家读图的时候，仔细对照电器元件代码对照表，通过查询都可以知道图中的电器元件符号字母代码是什么类型。如上图。

并且，电器元件代码对照表的排列按照首写字母“A~Z”，这样查询的时候就很方便。对于同类型的电器元件，字母代码后面还有数字代码加以区分，所以，同类型的电器元件排列按照数字代码“1~100”即从小到大排列。

如“G100”“G101”“G102”等顺序排列。

5. Electrical Component Symbol Code Reference Table

In the electrical schematic diagrams, there is a reference table at the bottom of each page that explains the real meaning of the electrical component symbols. This table details what each symbol represents and provides a thorough explanation.

When reading the diagram, carefully refer to this code table to understand the type of component each symbol represents.

The electrical component code table is organized alphabetically by the first letter (A to Z), making it convenient to look up.

For components of the same type, numerical codes are used for further distinction. Thus, components of the same type are arranged in numerical order from 1 to 100, from smallest to largest.

For example:

Components like "G100," "G101," and "G102" are listed sequentially.

A100——中央电器板	G100——蓄电池	Q101——钥匙开关
A101——火焰预热控制器	G101——蓄电池	R101——进气预热格栅
ECU——发电机电控单元	G102——发电机	S101——车下起动开关
F101——进气预热格栅保险	K101——进气预热继电器	S102——车下停机开关
F106——火焰预热保险	K102——火焰预热继电器	S14——变速箱空档开关
F149——ECU电源保险	K171——负载继电器	S149——电源总开关
F163——ECU电源保险	M100——起动机	V100——抗干扰二极管

