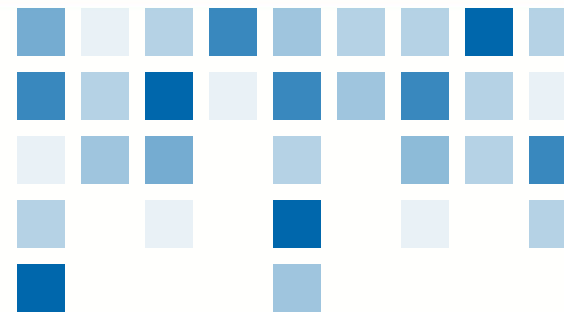
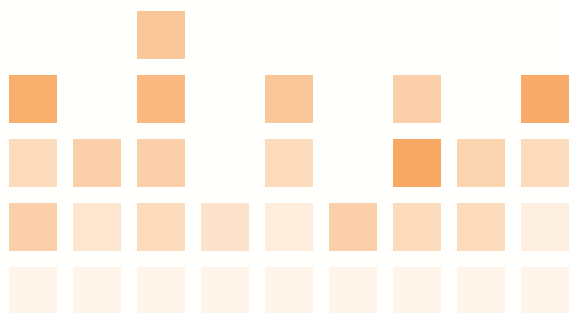




SHACMAN 汽车电器知识培训

F2000-F3000

陕汽进出口公司服务部培训科



第十七课 主要车型启动电路2

1. WP国三发动机起动控制的一些特点:

①. **应急起动功能（3秒启动功能）**：当空档开关损坏又无法及时更换的情况下，将钥匙开关置于起动档持续3秒钟，ECU 便会控制起动机起动。注意：此操作具有一定危险性，操作前一定要确保档位处于空档（一般左右摇动挡杆，如果感觉轻便灵活则表明此时处于空档位置），如无把握则不要通过此种方式起动发动机。

另外在气压足够的情况下，起动前踩下离合器踏板会减少起动阻力，使起动更加顺利。

②. **起动限时保护**：起动机是短时工作制，一次起动时间不可过长，ECU 有限时保护功能，当一次连续起动时间超过12秒仍未能起动，ECU会自动切断起动继电器电源，保护起动机。

③. **起动自动断电**：当起动机已成功起动，ECU 会自动切断起动继电器电源，并且在发动机运转过程中误将钥匙开关置于起动档时ECU也不会接通起动继电器电源。

Some features of the WP Euro III engine starting control:

Emergency Start Function (3-second start function): When the neutral switch is damaged and cannot be replaced promptly, placing the ignition switch in the start position for 3 seconds will prompt the ECU to control the starter motor to start. Note: This operation carries certain risks. Before operation, ensure that the gear lever is in neutral (generally, moving the gear lever left and right should feel light and flexible, indicating that it is in neutral). If uncertain, do not start the engine in this way. Additionally, with sufficient air pressure, pressing the clutch pedal before starting will reduce starting resistance, making the starting process smoother.

Starter Time Limit Protection: The starter motor operates on a short duty cycle, and prolonged continuous operation should be avoided. The ECU has a time limit protection function, automatically cutting off the starter relay power if continuous starting exceeds 12 seconds to protect the starter motor.

Automatic Shutdown After Starting: When the starter motor successfully starts the engine, the ECU will automatically cut off the starter relay power. Additionally, during engine operation, if the ignition switch is accidentally placed in the start position, the ECU will not energize the starter relay.



2. WP国三发动机的ECU开机工作:

学习指南：如何判断潍柴国三发动机ECU是否开始工作？

电控发动机发动机的起动与运转都受（发动机）ECU控制，如果ECU无法工作，则发动机无法也无法运转。那么我们如何判断发动机ECU是否开始工作呢？

首先，我们可以在开启钥匙电源（如将钥匙开关置于1 档位置）的时候看发动机ECU 是否自检，此时信号灯板上的EDC灯（见下图）会点亮后再熄灭，这就表明发动机ECU已经上电工作。否则应排查发动机ECU的电源是否接通。

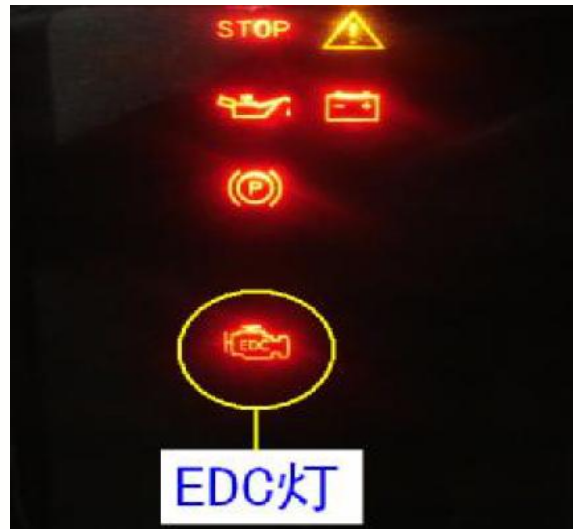
WP Euro III engine ECU startup process:

Study Guide: How to determine if the WP Euro III engine ECU is operational?

The electronic control unit (ECU) controls the starting and operation of the electronically controlled engine. If the ECU fails to operate, the engine cannot start or run. So how can we determine if the engine ECU is operational?

First, we can observe the self-check process of the engine ECU when the ignition power is turned on (such as placing the ignition switch in the position 1). At this time, the EDC indicator light on the signal lamp panel (see diagram below) will illuminate briefly and then turn off, indicating that the engine ECU has powered on and is operational. If not, the power supply to the engine ECU should be checked.





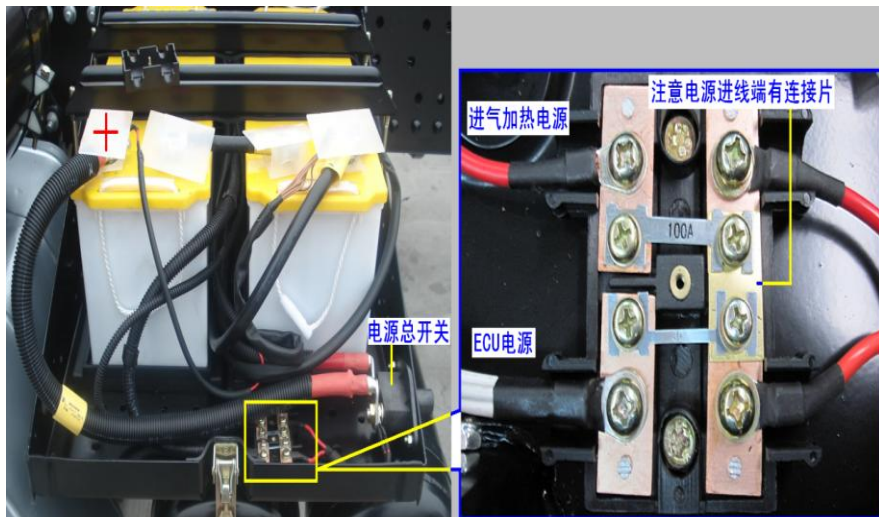
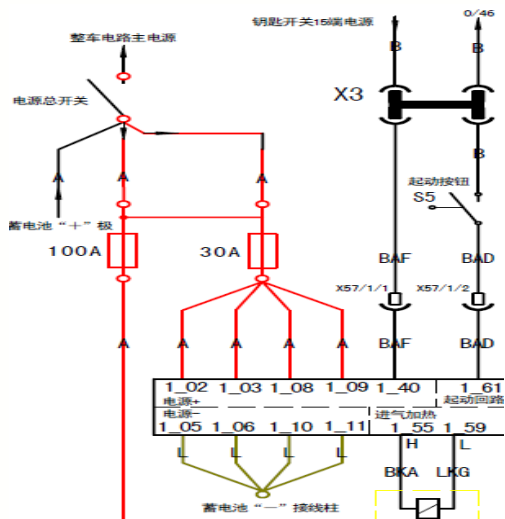
注意：上车后必须检查是否是在钥匙开关开启（1 档位置）后ECU才自检，如果在钥匙开关开启前ECU 就已经工作，则禁止进行下一步的操作，必须首先排查电源故障。因为只有在ECU断电时发动机才能停机，为了保证在出现意外的情况（例如车辆突然起步）下能立即熄火，必须保证在钥匙关闭后ECU也断电。

Note: After getting into the vehicle, it is essential to verify whether the ECU performs self-checking only after the ignition switch is turned on (position 1). If the ECU is already operational before the ignition switch is turned on, proceeding to the next step is prohibited. The power supply fault must be investigated first. This is because the engine can only be shut down when the ECU loses power. To ensure immediate engine shutdown in case of emergencies (such as sudden vehicle movement), it is crucial to ensure that the ECU loses power when the ignition switch is turned off.



WP国三发动机的ECU的工作电源：潍柴国三发动机的ECU的工作电源有两种，分为常电电源和钥匙电电源。它的常电电源有4个正极和4个负极。

The ECU of the WP Euro III engine has two types of power supply: constant power supply and key-on power supply. Its constant power supply consists of four positive poles and four negative poles.



2路保险丝盒接线



由电瓶正极柱的24V常电电源，直接由6平方毫米的红色线连接到2路保险丝盒的30A保险丝，然后通过4根2.5平方毫米白色线连接到了ECU的1.02, 1.03, 1.08, 1.09端子，这是ECU的4个正极常电电源。

由电瓶负极柱的负极（搭铁线），直接由2.5平方毫米的棕色线连接到了ECU的1.05, 1.06, 1.10, 1.11端子，这是ECU的4个负极线。

学习指南：两路保险丝盒的另一路，接100A保险（是由两个50A保险并联而成）对应的出线端连接的是发动机进气加热电源接线。进气加热电源和ECU常电电源的，都不受电瓶总开关控制，关闭电瓶总开关不能关闭进气加热电源和ECU常电电源。

注意：保险丝盒的进线端两端子间有连接片，接反将会导致ECU失去保护，可能会导致ECU烧毁或线束烧毁。

From the positive pole terminal of the battery, the 24V constant power supply is directly connected to the 30A fuse in the 2-way fuse box via a 6 square millimeter red wire. Then, it is connected to terminals 1.02, 1.03, 1.08, and 1.09 of the ECU through four 2.5 square millimeter white wires, which are the four positive constant power supply terminals of the ECU.

From the negative pole terminal of the battery (ground wire), the 2.5 square millimeter brown wire is directly connected to terminals 1.05, 1.06, 1.10, and 1.11 of the ECU. These terminals represent the four ground terminals of the ECU.

Learning Guide: On the other side of the 2-way fuse box, there is a 100A fuse (composed of two parallel-connected 50A fuses), and the corresponding output terminal is connected to the engine intake heating power supply line. Both the intake heating power supply and the ECU constant power supply are not controlled by the battery master switch. Closing the battery master switch cannot turn off the intake heating power supply and the ECU constant power supply.

Note: There is a connection piece between the two terminals of the input end of the fuse box. Connecting them incorrectly may cause the ECU to lose protection, potentially leading to ECU or wire harness damage.



另一种是5路保险丝盒，其接线如图所示，自电源总开关的常火电源直接接到保险丝盒内两保险的公共端，ECU常电电源线接到30A保险，进气加热电源线接到有两个50A保险并联而成的100A保险。

Another type is the 5-way fuse box, the wiring of which is shown in the diagram. The constant power supply from the main power switch is directly connected to the common terminal of the two fuses in the fuse box. The ECU constant power supply line is connected to the 30A fuse, while the intake heating power supply line is connected to the 100A fuse, which is composed of two 50A fuses in parallel.

