

# SHACMAN



## X6000控制器介绍 Introduction to Control Units of X6000

A row of various Shacman heavy-duty trucks, including a red truck, a white truck, and a black truck, positioned at the bottom of the slide.

服务部技术培训室  
TECHNICAL TRAINING OFFICE OF  
SERVICE DEPARTMENT

## 1. ECAS- Electronic Controlled Air Suspension-电子控制空气悬架系统控制器

### 1. ECAS (electronic controlled air suspension)

#### 简介:

##### Introduction:

电控空气悬架以空气弹簧和减振器为基础，引入ECU控制单元、转向角度传感器、空气压缩机、速度和制动传感器，通过ECU的精密计算，利用电磁阀改变空气弹簧内的气体容量和压力来实现软硬调节，使悬架兼有舒适性和运动性的特性。此外还可通过ECU和空气压缩机实现车身高度的自动或手动调节。

Based on air springs and shock absorbers, ECAS introduces the ECU control unit, steering angle sensor, air compressor, speed and brake sensors. Through the precise calculation of the ECU, it uses solenoid valves to change the gas volume (the pressure) in the air spring to achieve soft and hard adjustment, so that the suspension has both comfort and sporty characteristics. In addition, the vehicle height can be adjusted automatically or manually through the ECU and air compressor. 电子控制悬架系统，是相对于传统的悬架系统而言的，它是以电子控制模块为控制核心，对汽车悬架参数，如弹簧刚度、减振器阻尼系数、倾斜刚度和车身高度等进行实时控制的悬架系统。

Compared to traditional suspension systems, ECAS is a suspension system that uses electronic control modules as the control core to realize the real-time control of vehicle suspension parameters such as spring stiffness, shock absorber damping coefficient, tilt stiffness, and vehicle height.



## 2.GW- Gate Way-网关

### 2. GW (Gateway)

#### 简介:

##### Introduction:

网关作为汽车网络系统的核心控制装置，网关负责协调不同结构和特征的CAN总线网络及其他数据网络之间的协议转换、数据交换、故障诊断等工作。

As a core control device of the automotive network system, the gateway is responsible for coordinating protocol conversion, data exchange, fault diagnosis, etc. between CAN bus networks and other data networks with different structures and characteristics.

网关也可以通俗的叫**网络之间的连接器、协议的转换器等**。既可以用于广域互联，也可以用于局域互联，充当着转换重任的计算机系统或者设备，在使用不同协议、数据或者语言，甚至两种体系结构完全不同的两个系统之间做翻译。

A gateway can also be commonly called **a connector between networks or a protocol converter**. It can be used for both wide-area interconnection and local-area interconnection. It serves as a computer system or device responsible for translation, translating between two systems that use different protocols, data or languages, or even two completely different architectures. .

#### 作用:

##### Effect:

1、网关把局域网上的数据转变成可以识别的ACKII码，比如OBD2诊断数据，方便诊断。

1. The gateway converts the data on the LAN into recognizable ACKII codes, such as OBD2 diagnostic data, for easy diagnosis.

2、协调低速率信息与高速率信息在汽车网络系统中的数据信息共享。

2. It coordinates the sharing of data information between low-rate information and high-rate information in the automotive network system.

3、负责接受和转发信息。

3. Responsible for receiving and forwarding information;

4、激活某个控制单元或者某局域网的工作。

4. Activating the work of a certain control unit or a certain LAN;

5、实现对整车网络系统内部数据的同步。

5. Realizing the synchronization of the internal data of the vehicle network system;



### 3. DCM- Door Control Module -车门控制模块

### 3. DCM (door control module)

#### 简介:

#### Introduction:

车门控制模块，即车门控制系统，是汽车常见的门窗、防盗控制系统之一。

The door control module, i.e., the door control system, is one of the common door and window and anti-theft control systems in automobiles.

#### 作用:

#### Effect:

其主要功能是对车窗、门锁、后视镜的控制，门状态、锁状态的检测，门灯、侧转向灯驱动等功能。  
Its main functions are the control of windows, door locks, and rearview mirrors, the detection of door status and lock status, and the driving of courtesy lights and turn signal lamps.

车门控制器其他功能:

Other functions of door control unit:

1、对车窗控制:车窗自动、手动升降、防夹、遥控升降、远程控制、系统保护等功能;

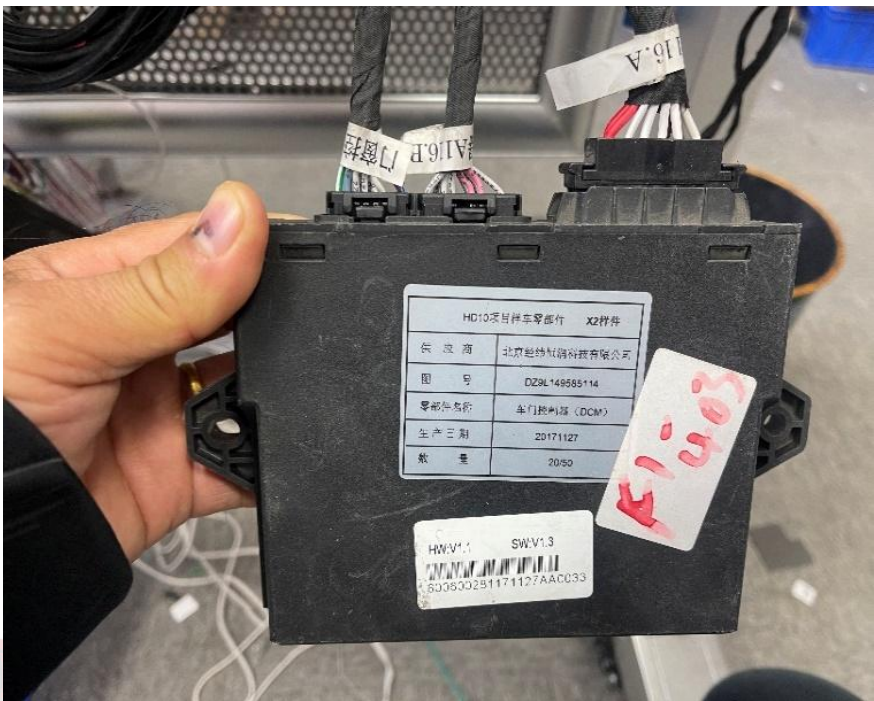
1. Control of car windows: auto window lift, manual lift, anti-pinch, remote control lift, remote control, system protection and other functions;

2、对外后视镜控制: 后视镜调节, 后视镜位置记忆, 后视镜加热, 后视镜倒车下翻, 后视镜折叠;

2. External rearview mirror control: rearview mirror adjustment, rearview mirror position memory, rearview mirror heating, rearview mirror turning down when reversing, rearview mirror folding;

3、对门锁控制: 中控门锁控制, 机械钥匙门锁控制, 行车落锁, 碰撞自动解锁。

3. Door lock control: central door lock control, mechanical key door lock control, driving lock, collision automatic unlocking.



#### 4.BCM- Body control module -车身控制器

#### 4. BCM (body control module)

##### 简介:

##### Introduction:

又称为车身电脑，用于控制车身电器系统的电子控制单元。主要是控制汽车车身上的相关**低压电器**，不涉及动力系统。

Also known as body computer, BCM is an electronic control unit used to control the body's electrical system. It mainly controls the relevant low-voltage electrical appliances on the vehicle body and does not involve the powertrain.

##### 作用:

##### Effect:

车身控制器常见的功能包括控制电动车窗、电动后视镜、空调、大灯、转向灯、防盗锁止系统、中控锁、除霜装置等。车身控制器可以通过总线与其他车载ECU相连。

The common functions of BCM include controlling electric windows, electric rearview mirrors, air conditioner, headlights, turn signal lamps, anti-theft locking systems, central locking, defrosting devices, etc. BCM can be connected to other vehicle ECUs through the bus.



## 5.VCU- Vehicle Control Unit- 整车控制器

### 5. VCU (vehicle control unit)

#### 简介:

##### Introduction:

整车控制器是整个汽车的核心控制部件，相当于**汽车的大脑**。它采集加速踏板信号、制动踏板信号及其他部件信号，并做出相应判断后，控制下层的各部件控制器的动作，驱动汽车正常行驶。

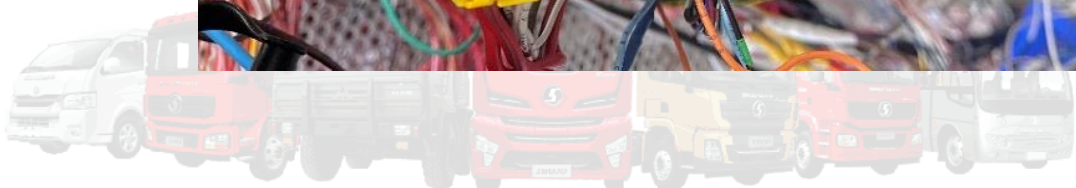
VCU is the core control component of the entire vehicle, which is equivalent to **the brain of the vehicle**. It collects accelerator pedal signals, brake pedal signals and other component signals, and after making corresponding judgments, controls the actions of the lower component control units to drive the car to run normally.

#### 作用:

##### Effect:

驱动力矩控制、制动能量的优化控制、整车的能量管理、CAN 网络的维护和管理、故障的诊断和处理、车辆状态监视等，它起着**控制车辆运行的作用**，因此整车控制器的优劣直接决定了车辆的稳定性和安全性。

Driving torque control, optimal control of braking energy, vehicle energy management, CAN network maintenance and management, fault diagnosis and treatment, vehicle status monitoring, etc., it **plays a role in controlling vehicle operation**, so the VCU quality directly determines the stability and safety of the vehicle.



## 6. EVM - Environmental Monitoring System -环境监控系统

### 6. EVM (environmental monitoring system)

#### 简介:

#### Introduction:

环境监控系统能够对车内温湿度、PM2.5、CO、烟雾等污染物进行监测。当污染物超过规定情况时能够进行语言报警，通过多媒体进行显示以及对车窗、空调通风系统执行措施，从而改善车内环境。

EVM can monitor indoor temperature and humidity, PM2.5, CO, smoke and other pollutants. When the pollutants exceed the specified conditions, it can give a voice alarm, display it through multimedia, and implement measures for the windows and air conditioning and ventilation systems, thus improving the environment inside the car.



## 7. PEPS- Passive Entry Passive Start -无钥匙进入和无钥匙启动

### 7. PEPS (passive entry passive start)

#### 简介:

##### Introduction:

汽车上的PEPS指的是智能进入及启动系统，也叫无钥匙系统、智能钥匙，融合了遥控系统和无钥匙系统。

The PEPS on the car refers to the intelligent entry and start system, also called the keyless system and the smart key, which integrates the remote control system and the keyless system.

当车主走近车辆一定距离时，门锁会自动打开并解除防盗，启动车辆不用掏拧钥匙，把钥匙放在包内或口袋里，按下车内一键启动开关可使发动机点火；

When the owner approaches the vehicle for a certain distance, the door lock will be automatically opened and the anti-theft will be released. To start the vehicle, there is no need to take out the key, but just keep the key in the bag or pocket, and press the PEPS button in the car to ignite the engine;

当车主离开车辆时，门锁会自动锁上并进入防盗状态并且记录所有的服务和诊断信息，记住对空调和资讯娱乐的设置，真正的实现双重射频系统，双重防盗保护，为车主最大限度的提供便利和安全。

When the owner leaves the vehicle, the door locks will automatically lock and enter the anti-theft state and record all service and diagnostic information, remembering the settings of A/C and infotainment, truly realizing dual radio frequency systems and dual anti-theft protection, maximizing the benefits for owners, and providing convenience and safety.

#### 工作原理:

##### Working principle:

1.携带车钥匙走到汽车附近，当按压汽车按钮或拉门把手时，汽车会收到点火或开锁的信号并发送信号给低频天线；

1. Walk near the vehicle with the vehicle key. When you press the vehicle button or pull the door handle, it will receive the ignition or unlock signal and send the signal to the low-frequency antenna;

2.低频天线收到信号后会向车钥匙发出低频触发信号；

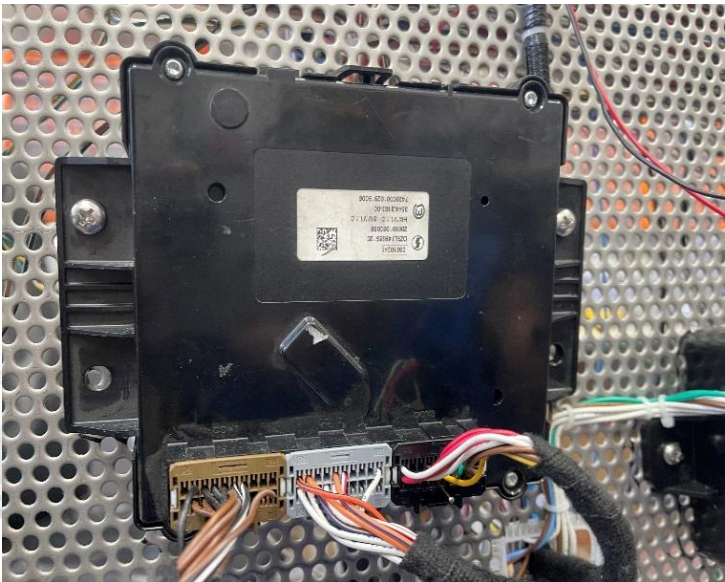
2. After receiving the signal, the low-frequency antenna will send a low-frequency trigger signal to the vehicle key;

3.车钥匙接收到低频触发信号，发出高频解锁信号；

3. The vehicle key receives the low-frequency trigger signal and sends out a high-frequency unlock signal;

4.高频接收器收到高频解锁信号，整车完成解锁或点火。

4. The high-frequency receiver receives the high-frequency unlocking signal, and the vehicle will be unlocked or ignited.



## 8. AC- Air Conditioning Control-空调控制器

### 8. AC (air conditioning control)

#### 简介:

#### Introduction:

空调控制器连接着车内多个传感器，能够通过这些传感器准确获取车内环境。同时，控制器通过CAN线与空调控制面板通讯，可以实时的获取驾驶员对环境的要求。

The A/C is connected to more than one sensors in the vehicle, and can accurately obtain the environment in the car through these sensors. At the same time, the control unit communicates with the air-conditioning control panel through the CAN bus, and can obtain the driver's environmental requirements in real time.

利用内部算法，通过CAN来控制空调压缩机与空调PTC、鼓风机，并且通过控制风门电机，阀门等执行器件，来达到对车内环境的精确控制。

It uses the internal algorithm to control the A/C compressor, air conditioner PTC and blower through CAN, and control the damper motor, valve and other actuators to achieve precise control of the car's interior environment.



## 9.MMI- Multi-Media Interface-多媒体交互系统

### 9. MMI (multi-media interface)

#### 简介:

##### Introduction:

MMI (Multi Media Interface) 系统是“多媒体交互系统”的英文缩写，是通过MMI系统驾驶员可以控制车上的每一个电子设备和功能装备。小到音响的音量调节，大到GPS导航功能，丰富的豪华和舒适功能都可以通过MMI系统完美实现。

MMI system is the English abbreviation of "multimedia interactive system", which means that the driver can control every electronic equipment and functional equipment on the vehicle through the MMI system. From the sound volume adjustment to the GPS navigation function, the rich luxury and comfort functions can be perfectly realized through the MMI system.

#### 作用:

##### Effect:

控制娱乐，通讯，信息和行驶系统。

It controls entertainment, communication, information and travel systems.



## 10. SAS - Steering Angle Sensor-转角传感器

### 10. SAS (steering angle sensor)

#### 简介:

##### Introduction:

SAS用于测量汽车转向时方向盘的旋转角度及旋转方向的装置。多用于自适应前照灯系统 (AFS)、电子稳定系统 (ESP/ESC)、电动助力转向 (EPS)、自动驾驶系统 (ADAS)、车道偏离预警系统 (MPC) 等。一般放在组合开关下方, 套在转向管柱上。

SAS is a device used to measure the rotation angle and direction of the steering wheel when the car is turning. It is mostly used in adaptive front headlamp system (AFS), electronic stability system (ESP/ESC), electric power steering (EPS), advance driver assistance system (ADAS), lane departure warning system (LDWS or MPC), etc. It is generally installed under the combination switch and set on the steering column.

方向盘转角传感器是汽车稳定性控制系统的重要组成部分,其精度和稳定性直接关系着行车安全。

The SAS is an important part of the vehicle stability control system, and its accuracy and stability are directly related to driving safety.

#### 作用:

##### Effect:

1. 车辆稳定性控制系统的一个组成部分, 通过四轮独立地自动加压的制动控制和发动机扭矩控制;

1. It is an integral part of the vehicle stability control system, and controls the brake and engine torque through independent automatic pressurization of four wheels;

2. 以抑制急转向操作或路面状况突变等突发事态时后轮的侧滑 (自转现象)、前轮的侧滑 (漂移现象);  
2. It suppresses the sideslip of the rear wheels (rotation phenomenon) and the sideslip of the front wheels (drifting phenomenon) during emergencies such as sudden steering operations or sudden changes in road conditions;

3. 以及牵引车的制动折叠现象的发生, 达到确保汽车行驶的稳定性。

3. It also suppresses the occurrence of the brake folding phenomenon of the tractor to ensure the stability of the car's driving.



## 11. ESCL - Electrical Steering Column Lock -电子转向管柱锁

### 11. ESCL (electrical steering column lock)

#### 简介:

##### Introduction:

ESCL车辆防盗系统的一部分，用于无钥匙进入无钥匙启动系统(PEPS)中锁止和解锁方向盘。ESCL的上锁和解锁动作通过控制ESCL内的电机动作来实现，它主要是通过锁舌系统来给转向管柱进行上锁和解锁，以起到保护汽车安全的作用，它的安全目标是防止汽车在行驶中意外上锁。

As a part of the vehicle anti-theft system, ESCL is used to lock and unlock the steering wheel in the passive entry passive start (PEPS) system. The locking and unlocking actions of ESCL are realized by controlling the motor action in ESCL. It mainly locks and unlocks the steering column through the lock tongue system to protect the safety of the vehicle. Its safety goal is to prevent the vehicle from being accidentally locked while driving.



## 12.IMMO- Immobilizer -发动机防盗锁止系统（带LF天线）

### 12. IMMO (Immobilizer, with LF antenna)

#### 简介:

##### Introduction:

发动机防盗锁止系统 (Immobilizer, 简称IMMO) 是一种内置到汽车里的, 能防止发动机在没有正确密钥 (或其他验证措施) 的情况下运作的电子装置。它利用钥匙中芯片的密码与起动电门中的密码进行匹配来控制发动机的启动, 以达到防盗的目的, 能防止有人进入汽车后的强行短接启动。

The IMMO is an electronic device built into a vehicle that prevents the engine from operating without the correct key (or other verification measures). It uses the password of the chip in the key to match the password in the starter switch to control the start of the engine to achieve the purpose of anti-theft and prevent forced short-circuit starting in case someone enters the car.

#### 作用:

##### Effect:

当遇到智能钥匙上的电池耗尽时, 无法通过主动 RKE (汽车智能无钥匙进入系统) 进行开锁, 那么将 IMMO 作为备份紧急模式进行解锁。此时, LF 驱动器使用可以作为共享的 IMMO 天线, 既是发射天线又是接收天线, 将智能钥匙靠近 IMMO 线圈, 通过互感充电, 可以实现低频认证, 认证通过后可实现紧急启动。

When the battery on the smart key is exhausted and the lock cannot be unlocked through active RKE (PEPS system), the IMMO can be used as a backup emergency mode to unlock. The LF driver can be used as a shared IMMO antenna, which serves as both a transmitting antenna and a receiving antenna. By placing the smart key close to the IMMO coil and charging through mutual inductance, low-frequency authentication can be achieved. After the authentication is passed, emergency start can be achieved.



### 13. 中长距毫米波雷达 (150m)

### 13. Medium and long distance MMW radar (150 m)

#### 简介:

#### Introduction:

**雷达:** 又称无线电探测和测距, 即用无线电的方法发现目标并测定它们的空间位置。

**Radar:** also known as radio detection and ranging device, which uses radio methods to find targets and determine their spatial positions.

**毫米波雷达:** 是工作在毫米波波段的雷达, 通常是指30 ~ 300GHz (波长为1 ~ 10mm) 频段。毫米波的波长介于厘米波和光波之间, 毫米波雷达穿透雾、烟、灰尘的能力强, 具有全天候、全天时的特点。

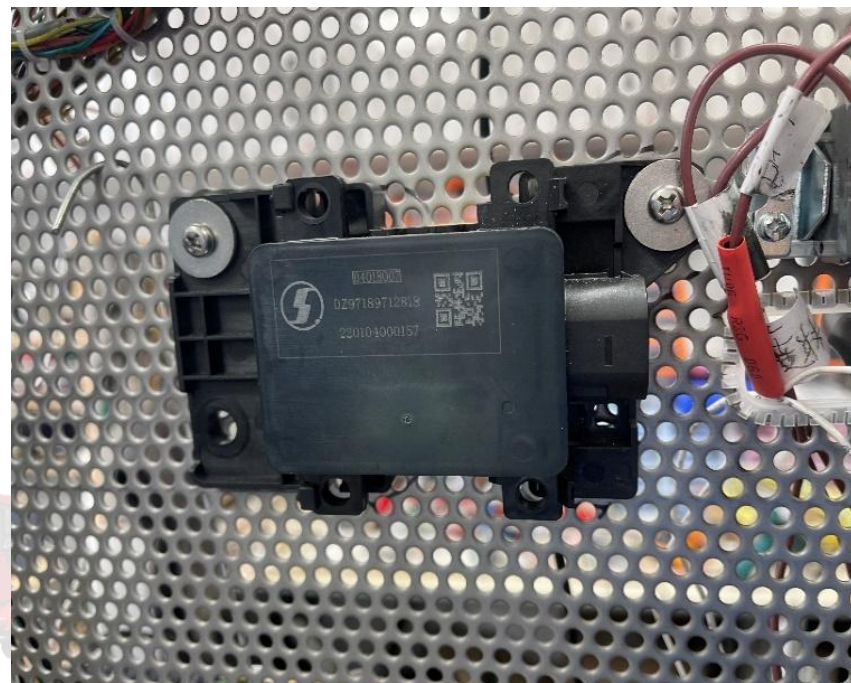
**MMW radar:** It is a radar working in the millimeter wave band, usually referring to the 30-300 GHz (wavelength 1-10 mm) frequency band. Its wavelength is between the centimeter wave and the light wave. The millimeter wave radar has a strong ability to penetrate fog, smoke and dust, and has the characteristics of all-weather and all-time.

#### 作用:

#### Effect:

毫米波雷达可以实现自适应巡航控制 (Adaptive Cruise Control), 前向防撞报警 (Forward Collision Warning), 盲点检测 (Blind Spot Detection), 辅助停车 (Parking aid), 辅助变道 (Lane change assistant) 等**高级驾驶辅助系统 (ADAS)** 功能。

The MMW radar can realize adaptive cruise control (ACC), forward collision warning (FCW), blind spot detection (BSD), parking aid, lane change assistant, and other **advanced driver assistance system (ADAS)** functions.



## 14.CPD- Central Electrical Device Board -G3中央电器装置板

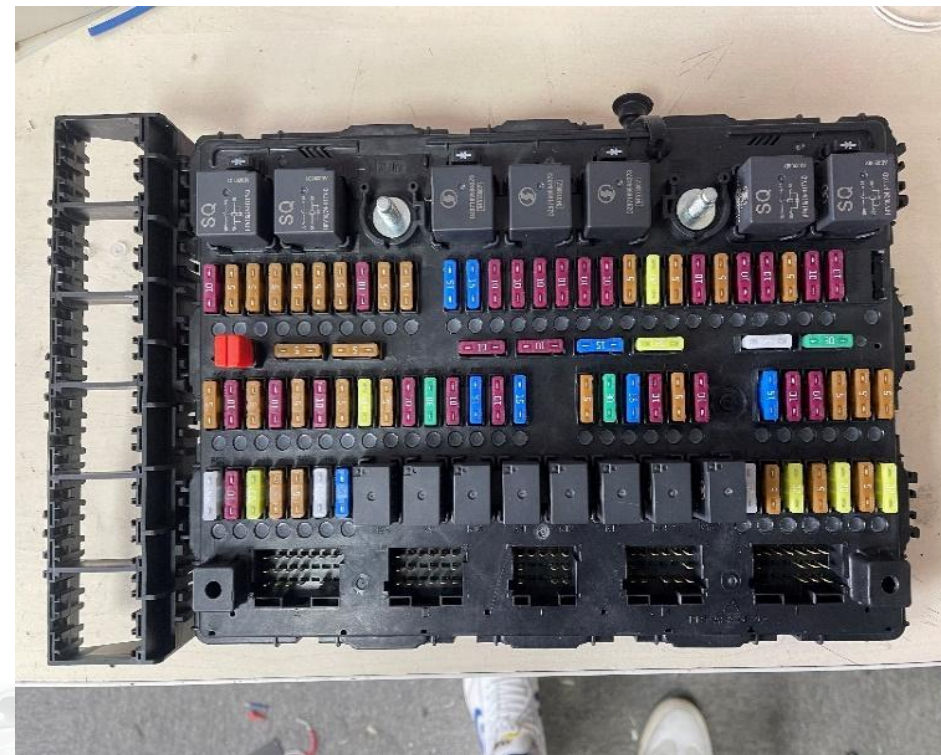
### 14. CPD (G3 central electrical device board )

#### 简介:

#### Introduction:

中央电器装置板总成安装在驾驶仪表台里，是众多保险丝和继电器集成体，车辆装配中央电器装置板总成不仅可以使线束布局更加合理美观，同时维修检测时更加便捷。

The central electric panel assembly is installed in the dashboard and is an integration of many fuses and relays. The vehicle's central electrical device board assembly can not only make the wiring harness layout more reasonable and beautiful, but also make maintenance and inspection more convenient.



## 15.ACC- Adaptive Cruise Control -自适应巡航

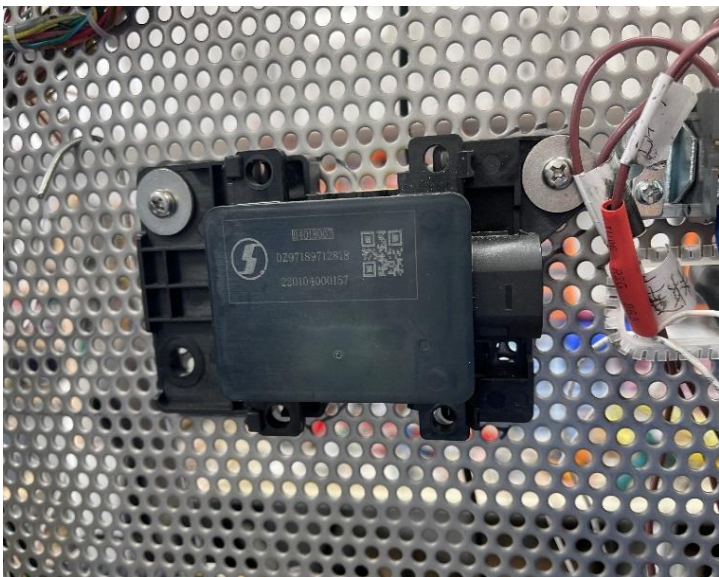
### 15. ACC (adaptive cruise control)

#### 简介:

#### Introduction:

自适应巡航也称为主动巡航，自适应巡航在定速巡航功能上实现了升级，是一种智能化的高级辅助驾驶系统，除了可以设定既定车速，让汽车在道路上自适应行驶外，还对汽车进行了升级。通过在汽车前端安装**雷达**持续扫描车辆前方道路，且同时采集汽车的行驶速度，在汽车过于靠近前方车辆时，自适应巡航控制单元可以通过控制制动防抱死系统、发动机控制系统等，使汽车车轮适当制动，并使发动机功率下降，从而与前方车辆保持一定的安全距离。

ACC, also known as active cruise, has upgraded its cruise control function and is an intelligent advanced driving assistance system. In addition to setting a predetermined speed to allow the vehicle to adaptively drive on the road, it also upgrades the vehicle overall. By installing a **radar** at the front end of the vehicle to continuously scan the road ahead of the vehicle and simultaneously collect the vehicle speed, the ACC control unit can control the anti lock braking system, engine control system, etc. to brake the car wheels appropriately and reduce engine power, thus maintaining a certain safe distance from the vehicle ahead.



## 16. ADAS - Advanced Driver Assistance System-高级驾驶辅助系统

### 16. ADAS (advanced driver assistance system)

#### 简介:

#### Introduction:

高级驾驶辅助系统 (Advanced Driver Assistance System), 简称ADAS, 是利用安装于车上的各式各样的传感器 (毫米波雷达、激光雷达、单/双目摄像头以及卫星导航), 在第一时间收集车内外的环境数据, 进行静、动态物体的辨识、侦测与追踪等技术上的处理, 从而能够让驾驶者在最快的时间察觉可能发生的危险, 以引起注意和提高安全性的主动安全技术。

ADAS is short for advanced driver assistance system, and it uses a variety of sensors installed on the vehicle (millimeter wave radar, lidar, single/binary cameras, and satellite navigation) to collect information in the first place. Environmental data inside and outside the vehicle are processed through technical processes such as identification, detection and tracking of static and dynamic objects, so that drivers can detect possible dangers as quickly as possible to attract attention and improve active safety technology.

ADAS 采用的传感器可以探测光、热、压力或其它用于监测汽车状态的变量, 通常位于车辆的前后保险杠、侧视镜、驾驶杆内部或者挡风玻璃上。早期的ADAS 技术主要以被动式报警为主, 当车辆检测到潜在危险时, 会发出警报提醒驾车者注意异常的车辆或道路情况。对于最新的ADAS 技术来说, 甚至可以主动式地干预。

ADAS uses sensors that detect light, heat, pressure, or other variables to monitor the status of the vehicle. They are usually located on the vehicle's front and rear bumpers, side mirrors, inside the steering column, or on the windshield. Early ADAS technology was mainly based on passive alarms. When the vehicle detects potential danger, it will send out an alarm to remind the driver to pay attention to abnormal vehicles or road conditions. With the latest ADAS technology, it is even possible to intervene proactively.



## 17. RLS-雨量光线传感器

### 17. RLS- Rain Light Sensor

#### 简介:

##### Introduction:

RLS能够实时检测车体所处环境的光强度和前挡风玻璃的雨量大小时数据, 分别进行数据处理后得出当前的车灯控制型号和雨刷速度值, 最终通过LIN将车灯控制信号和雨刷速度值传输至车身控制系统(BCM), 从而替代原有手动操作, 由BCM自动控制车的大灯(近光灯)、示宽灯及前挡风玻璃雨刷速度。

RLS can detect the light intensity of the environment around the vehicle body and the amount of rain on the front windshield in real time. After processing the data respectively, the current car light control model and wiper speed value can be obtained. Lights control signal and wiper speed value are transmitted through LIN. The speed value is transmitted to the body control system (BCM), thus replacing the original manual operation. The BCM automatically controls the speed of the car's headlights (low beam), width lights and front windshield wipers.

#### 作用:

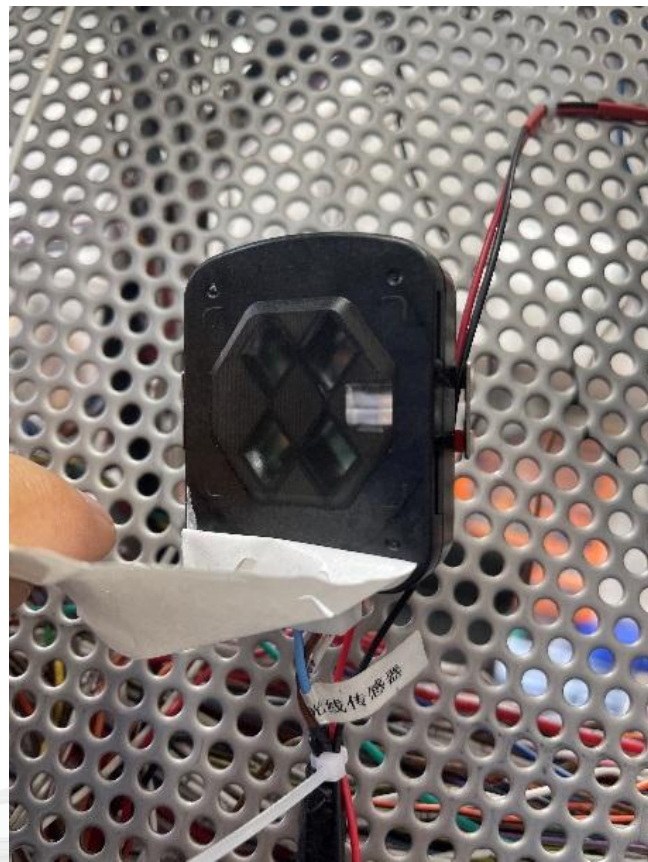
##### Effect:

根据雨量大小自动调整雨刷速度;根据环境光强度自动开启和关闭大灯、示宽灯。

It can automatically adjust the wiper speed according to the amount of rain; automatically turn on and off the headlights and width indicators according inally, the vehicle light conto the ambient light intensity.

突发情况下(前挡风玻璃突遭雨水飞溅)时, 快速自动开启雨刷; 天色变暗、进入隧道时及时开灯, 提高行车安全。

In the event of an emergency (the front windshield is suddenly splashed by rain), the wipers will be turned on quickly and automatically; when the sky becomes dark or the vehicle enters a tunnel, the lamps will be turned on to improve driving safety.



谢谢！  
Thanks!

