

Instrument Cluster

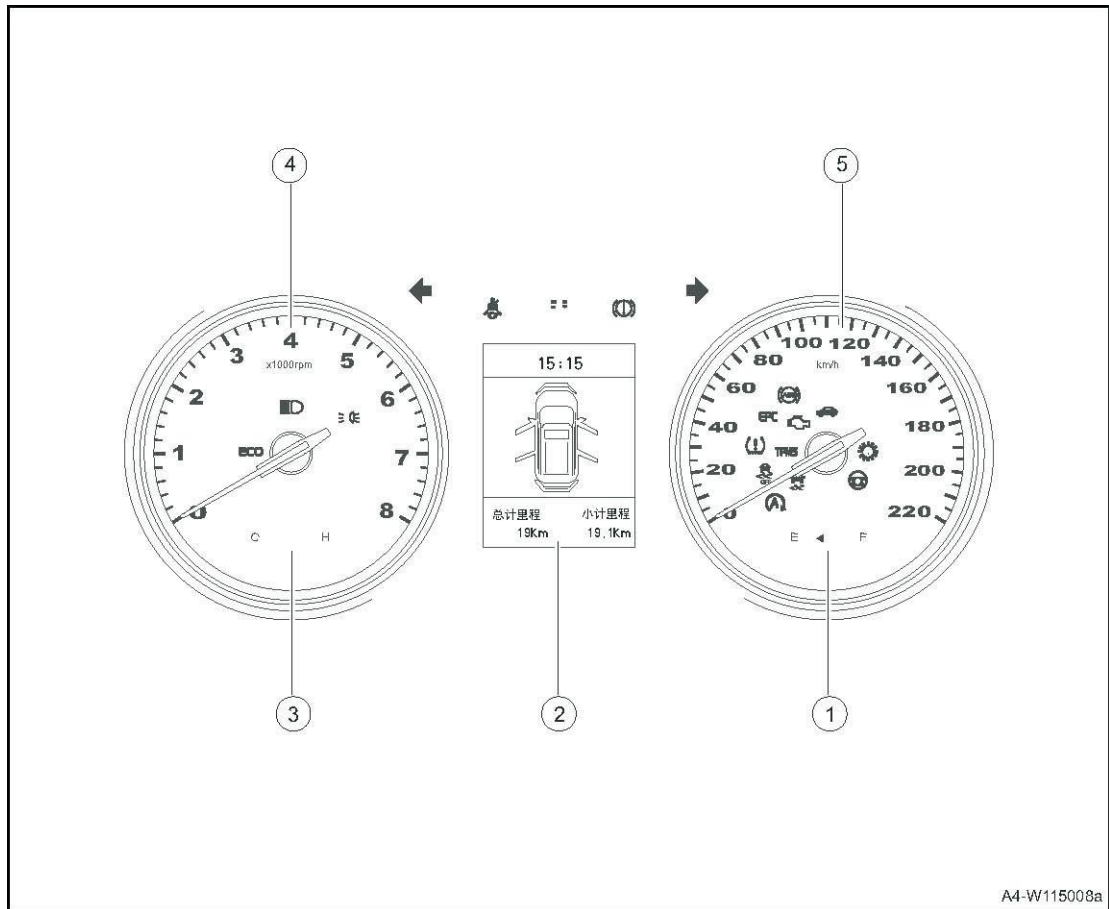
I. Overview

(I) Combination instrument

The instrument is located in front of the driver and in the dashboard above the steering column opening. The rest of the combined meter, including mounting parts and electrical connections, is enclosed inside the instrument panel behind the combined meter frame. In addition to analog meters and indicators, a variety of alarm or reminder indications as well as certain diagnostic information are also available.

The instrument of the vehicle adopts the form of four meters and adopts a plane structure. Two large instructions header, on the left for the tachometer, speedometer on the right, fuel gauge and water temperature gauge respectively in the tachometer and speedometer header. The middle LCD display is the driving information display, which includes: clock, total mileage, mileage subtotal, instantaneous fuel consumption and mileage.

Instrument Cluster Drawing (3.5 inch)



- | | |
|----------------------|----------------|
| 1. Fuel guage | 4. Tachometer |
| 2. Display screen | 5. Speedometer |
| 3. Water thermometer | |

A4-W115008a

Instrument Cluster Drawing (10.25-inch)



- | | |
|-------------------|------------------------------|
| 1. Tachometer | 4. Coolant temperature gauge |
| 2. Display screen | 5. Fuel guage |
| 3. Speedometer | |

The combination meter can indicate the following functions:

1. Speedometer: The speedometer pointer moves according to the CAN signal sent from the ESC, indicating the speed at which the vehicle is traveling.
2. Tachometer: The tachometer pointer moves according to the speed CAN signal sent from the engine EMS indicating the engine speed.
3. Water temperature meter: The water temperature meter pointer moves according to the CAN signal sent from the EMS, indicating the engine coolant temperature.
4. Fuel Gauge: The fuel gauge hands move according to the resistance signal from the fuel sensor, indicating the amount of fuel left in the fuel tank.
5. LCD display: alarm information / message, driving computer, menu, total mileage, subtotal mileage, local time, gear position.

Combination instrument related parameter

Item		3.5-inch	10.25-inch
Dial	Color	Black	Black
	Instrument Panel Technology	3D, draw-bench	All Black
	Scale Line/Figure	White	White
	Red Zone	Red	/

Item		3.5-inch	10.25-inch
Back Light	Dial	White	White
	Pointer	Red	/
	LCD	3.5-inch monochrome TFT screen	10.25-Inch high definition LCD display screen
Speedometer	Clock mechanism type	Stepping Motor	Digital display
	Signal Source	CAN bus VehSpdVd VehSpd	CAN bus VehSpdVd VehSpd
	Vehicle speed unit	km/h	km/h
	Maximum Scale (Km/h)	220	220
	Minimum Scale (km/h)	5	1
	Km/h Symbol	Yes, with back light	Yes
Coolant temperature gauge	/	8 stage EngCoolantTpt	8 stage EngCoolantTpt
Fuel guage	/	8 stage	8 stage
Tachometer	Movement Type	Stepping Motor	Digital display
	Signal motor	CAN bus EngspdVd ; Engspd	CAN bus EngspdVd ; Engspd
	Maximum tachometer scale	8000	8000
	Min scale	200	100
	Red Zone	6200~8000	5000~8000
	x1000rpm	Yes, with back light	Yes
LCD Display Content	Fuel consumption information	Average fuel consumption L/100km FuelConsumption	Average fuel consumption L/100km FuelConsumption
	Range	km	km
	Total mileage	0~999999km	0~999999km
	Sub-total mileage	0~999.9km	0~999.9km
	Gear position	DrvModsp TCU-HSC-FrP01	DrvModDsp TCU_HSC_FrP01
	Time	hour/minute CPSTimeHour HU-LSC-FrP00 CPSTimeMinute HU-LSC-FrP00 CPSTimeSecond HU-LSC-FrP00	Hour/minute GPSTimeHour HU_LSC_FrP00 GPSTimeMinute HU_LSC_FrP00 GPSTimeSecond HU_LSC_FrP00

Name	Display	Color	Signal Type		
Left Steering Indicator Lamp	Display/full color screen on gauge	Green	CAN signal		<i>DirIndicationLeft</i>
Right Steering Indicator Lamp	Display/full color screen on gauge	Green	CAN signal		<i>DirIndicationRight</i>
High beam lamp	Display/full color screen on gauge	Blue	CAN signal		<i>HeadLampHighBeamCtrl</i>
Low beam lamp	Display/full color screen on gauge	Green	CAN signal		<i>HeadLampLowBeamCtrl</i>
Front Fog Lamp	Display/full color screen on gauge	Green	CAN signal		<i>FrontFogLamp</i>
Rear fog lamps	Display/full color screen on gauge	Yellow	CAN signal		<i>RearFogLamp</i>
Position lamp	Display/full color screen on gauge	Green	CAN signal		<i>PosLamp</i>
Brake system failure/Low brake fluid level	Display/full color screen on gauge	Red	CAN signal		<i>EBDfailure , HandBrakingStatus</i>
Brake anti-lock system	Display/full color screen on gauge	Yellow	CAN signal		<i>ABSFailure</i>
Tire pressure warning lamp	Display/full color screen on gauge	Yellow	CAN signal		FLPressureWarning,
Airbag	Display/full color screen on gauge	Red	CAN signal		FRPressureWarning <i>AirbagFailSts</i>
Driver safety belt	Display/full color screen on gauge	Red	CAN signal/pin signal		<i>Low voltage, VehSpd</i>
Engine exhaust fault lamp	Display/full color screen on gauge	Yellow	CAN signal		<i>EngMIL</i>
Engine failure indicator lamp	Display/full color screen on gauge	Yellow	CAN signal		<i>EngFailure</i>
Engine Anti-theft	Display/full color screen on gauge	Yellow	CAN signal		<i>IMMOFeedback</i>
Low engine oil pressure	Display/full color screen on gauge	Red	CAN signal/pin signal		<i>Low voltage, OilPressureWarn</i>
Engine water temperature is high	Display/full color screen on gauge	Red	CAN signal		<i>Meter drive, EngCoolantTpt</i>
Low fuel level	Display/full color screen on gauge	Yellow	pin signal		Meter driving
Cruise control	Display/full color screen on gauge	Green/ white	CAN signal		CruiseSwitch, CruiseActive
Charging and discharging indicator	Display/full color screen on gauge	Red	pin signal		Low voltage
TPMS system status indicator	Display/full color screen on gauge	Yellow	CAN signal		FLPressureWarning, RPressureWarning,
EPS electronic power steering	Display/full color screen on gauge	Yellow/ Red	CAN signal		RLPressureWarning <i>EPS_EpsFailed</i>

ESC Electronic Stability Control	Display/full color screen on gauge	Yellow	CAN signal		AAYCFailure, TCSFailure,
ESC OFF Electronic Stability Control Off	Display/full color screen on gauge	Yellow	CAN signal		AYCItvInProgress, <i>ESCSw</i>
Transmission failure	Display/full color screen on gauge	Yellow	CAN signal		WarningLamp_CVT, smFailure
Co-driver safety belt	Display/full color screen on gauge	Red	CAN signal		OccupantDetPsgSide
ECO indicator light	Display/full color screen on gauge	Green	CAN signal	ECO	<i>ECOSW</i>
Start-stop failure	Display/full color screen on gauge	Yellow	CAN signal		<i>AutoStartStopIndication</i>
Start-stop working	Display/full color screen on gauge	Green	CAN signal		<i>AutoStartStopIndication</i>
Automatic Parking	Display/full color screen on gauge	Green/red	CAN signal	AUTO HOLD	AutoHoldActive, AutoholdFailure,
Blind spot monitoring system failure	On dial gauga display	Yellow	CAN signal		AVHstandby SYSTEM_STATUS
Speeding alarm (outlet)	Display/full color screen on gauge	Red	CAN signal		<i>VehSpd</i>
EPB fault	Display/full color screen on gauge	Yellow	CAN signal		<i>FailureLampSts</i>
Electronic parking working indicator	Display/full color screen on gauge	Yellow	CAN signal		FunctionLampSts
Lane departure	Display/full color screen on gauge	Yellow/white/green	CAN signal		<i>LDW_Status</i>
Front collision warning	Display/full color screen on gauge	Yellow/red	CAN signal		FCW_Error_Status, FCW_Warning
Shift lock indicator	Display/full color screen on gauge	Green	CAN signal		GearLvlUnlockWarning
HMA	Display/full color screen on gauge	Green/yellow	CAN signal		HMA_Status
ACC failure indicator light	ONLY full color screen	Yellow	CAN signal		ACCMode_HMI
ACC working indicator light	ONLY full color screen	White/Green	CAN signal		ACCMode_HMI
AEB Alarm Indicator Lamp	ONLY full color screen	Yellow/Red	CAN signal		FRS_AEB_Status, PCW_latentWarning, PCW_preWarning, AWBRequest, FRS_FCW_Switch,
AEB closed Indicator Lamp	ONLY full color screen	Yellow	CAN signal		FRS_FCW_status FRS_AEB_Switch
Second-row left passenger safety belt not fastened	ONLY full color screen	Red	CAN signal		OccupantDetSecondRowRL
Second-row middle passenger safety belt not fastened	ONLY full color screen	Red	CAN signal		OccupantDetSecondRowRM
Second-row right passenger safety belt not fastened	ONLY full color screen	Red	CAN signal		OccupantDetSecondRowRR

(II) Working Principle

Speedometer

Speedometer inspection

- 1). Adjust the tire pressure to the required value
- 2). Put the vehicle on the vehicle speed test platform
- 3). Confirm the right the parking brake motion.
- 4). To prevent the car from moving around, the car should be fixed around.
- 5). To prevent the car from running out, fasten the rear end with a chain or wire rope, and secure the end of the chain or wire rope.
- 6). Check if the speedometer indication range is within the standard value range.

Speedometer indicating standard range and CAN information table:

Actual vehicle speed (km/h)	CAN message value	Vehicle speed indication range (km/h)
60	0x042A	60~65
100	0x06F1	100~105
160	0x0B1 C	160~168

△Attention When testing, don't suddenly operate clutch or rapidly increase or decrease the vehicle speed.

△Attention Confirm the change of the CAN value.

Tachometer

Compare the readings between the engine tachometer and the on-board tachometer at each engine speed to see if the difference between them is within the standard values.

Tachometer indicating standard range and CAN information comparison table:

Engine speed (rpm)	CAN message value	Allowable error range
700	0x0578	±30
2000	0x0FA0	±40
4000	0x1F40	±80
6000	0x2EE0	±120

Coolant temperature gauge

1 Water temperature

gauge description:

space - low

temperature zone

During the warm-up process, the engine will work in this area for a short time. In this temperature zone, the engine should not run at high speed and the working load of the engine should not be too large.

Display between scale 1 and scale 4--normal temperature area, in normal driving state, coolant temperature gauge should be in this range. When the outside temperature is very high and the engine load is very heavy, it may deviate from this range. As long as the coolant alarm lamp does not flash, the car can still run normally.

If the coolant alarm light flashes, the engine must be shut down and the cooling system must be checked

Display full scale (scale 8)---overheating area, if in this area, it indicates the engine is too hot. Immediately stop the car safely, turn off the ignition and look for the cause of the problem after the engine has cooled down. Description:

Auxiliary headlamps installed in front of the front bumper cold air inlet will affect the flow of cooling air is not conducive to engine cooling. If the outside temperature is high, the engine is in heavy-duty work, the engine can easily overheat. The front spoiler also guides the cooling air If it is damaged or even broken due to a collision, it may cause the engine to overheat.

2 Water temperature table inspection

Measure the information sent by the EMS.

Compares the water temperature gauge

indication and CAN information.

Instrument water temperature display	Engine water temperature (°C)	CAN signal value
1 scales	50	0x82
2 scales	60	0x90
3 scales	70	0x9D
4 scales	80	0xAA
5 scales	110	0xD2
7 scales	120	0x2EO
8 scales	130	0xED

Fuel guage

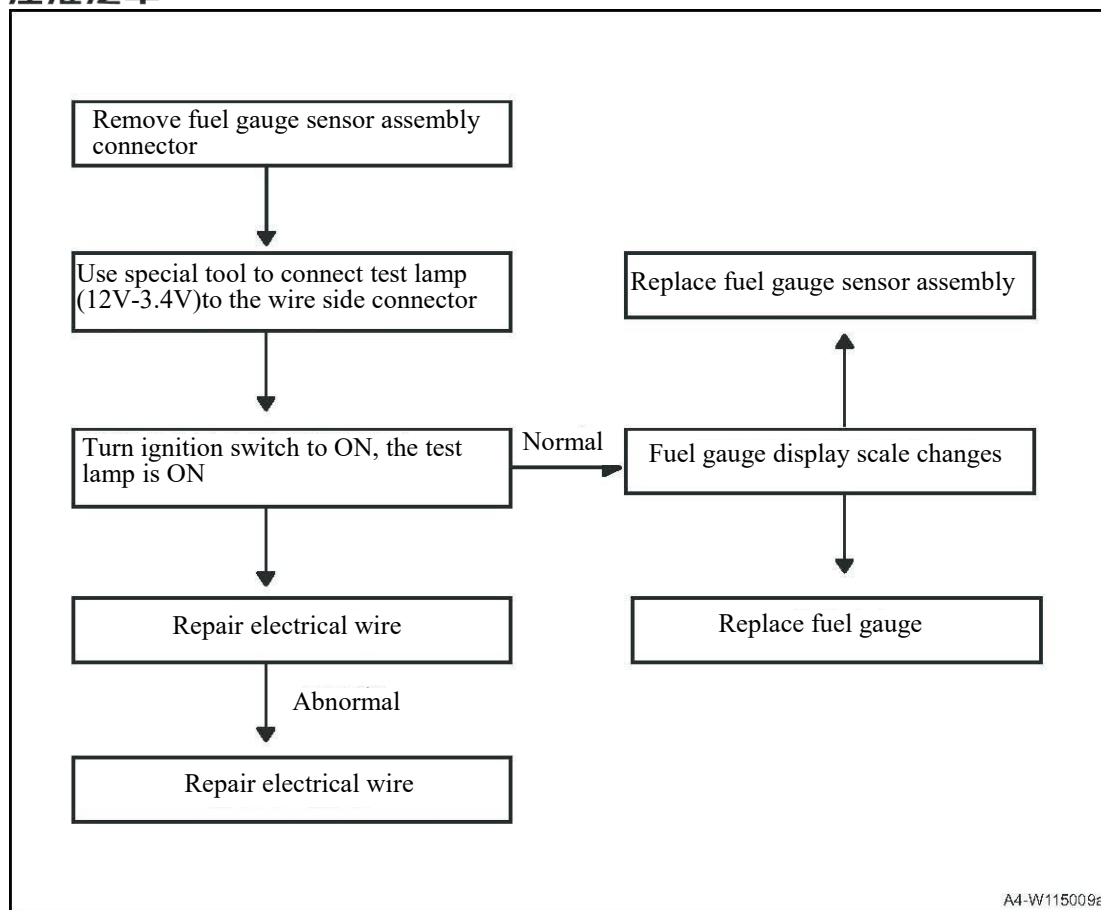
When the float changes with the height of the oil level in the fuel tank, the sliding contact in linkage with the float rod responds to change the resistance of the thick film resistor. When the fuel tank is filled with fuel, the resistance value of the thick film resistor is the smallest, and the fuel gauge shows full scale (8 scale). On the contrary, when the fuel in the fuel tank is exhausted, the resistance of the thick film resistor is the largest, and the fuel gauge shows a space

1. Inspection methods

1). Check the working of the fuel gauge

When the fuel gauge shows just below 1 scale, there is about 8 liters of fuel in the tank. After filling up the fuel tank car for some distance, the fuel gauge will show full scale When refueling, due to the remaining oil, so the amount of fuel that can be added will be lower than the marked capacity

2). Simple check procedure for fuel gauge



2. Fuel gauge sensor assembly inspection: Remove the fuel gauge sensor assembly from the fuel tank for inspection.

3. Fuel gauge sensor assembly resistance

1) Check if the resistance between the fuel gauge sensor terminals is within the standard value when the float of the fuel gauge sensor assembly is in the full (highest) position and the space (lowest) position.

Fuel gauge sensor resistance and instrumentation table:

Display screen fuel indicating	Fuel pump resistance value input (Ω)	Designed volume (L)	Instrument designed value (Ω)
E-STOP	321~2	3	
E	304~2	5	
1 scale (warning point)	278~2	8	278
2 scales	234~2	15	234
3 scales	199~2	21	199
4 scales	164~2	29	164
5 scales	138~2	34	138
6 scales	111~2	340	111
7 scales	94~2	44	94
8 scales	85~2	46	85
F-STOP	50~2	52	

2) Check if the resistance value changes smoothly when the float slowly moves between F (highest) and E (lowest).

Safety belt indicator

Blinks at 1 Hz until the driver fastens the seat belt. If the driver has fasten the seat belt, this indicator does not blink

Safety belt indication tone

When the vehicle speed is more than 3km / h, when the seat belt is not fastened, it will sound for 90s with a 0.5s ring and a 0.5s stop frequency. When the alarm condition is met again, the audible alarm will be triggered again.

Airbag ready indicator lamp

There is a balloon indicator on the dashboard that shows the balloon symbol. The system checks for air bag system failure. This lamp can be used to understand the airbag system with or without electrical failure. System checks include airbag sensors, airbag modules, wiring and diagnostic modules. When the vehicle is started, the light is on for a few seconds and then goes out. This means that the airbag system is ready. If the air bag ready light does not go out after the vehicle starts or turns on while driving, it indicates that there is an abnormality in the air bag system.

Charging system indicator lamp

As a check, when the ignition switch is turned on and the engine is not started, the charging system indicator will briefly turn on, indicating that it is functioning properly. When the engine is started, the indicator should go out. If the light does not go out or turns on while driving, there may be an electrical fault in the charging system. Driving while this light is on will run out of battery power. If you have to drive a short distance while the light is on, be sure to turn off all accessories, such as radio and air conditioning.

Anti-lock brake system indicator lamp

The warning light will turn on continuously for a few seconds when the ignition switch is turned on. This is normal phenomenon. If the warning light does not go out, set the ignition switch to the LOCK position. Or, if the warning light is on, stop as soon as possible and turn the ignition off, then restart the engine to reset the system. If the warning light does not go out or turn on again while driving, you need to repair the vehicle. If the normal brake system warning light is not on, the vehicle will still be able to brake, but anti-lock brakes will not work. If the conventional brake system warning light is also on, there is not only no anti-lock brake, but also a problem with the conventional brake system. When the ignition switch is turned to the ON position, the anti-lock brake warning light will turn on briefly, which is normal. If the warning light does not light at this point, troubleshoot the problem so that it can warn you whenever a problem occurs.

Water temperature gauge

When the ignition switch is turned on, the water temperature meter shows the engine coolant temperature.

Oil pressure warning light

If the engine oil pressure is too low, the warning light will illuminate all the way after the engine is started, or on when driving.

This indicates that the engine oil pressure is not enough. Engine oil level may be too low, other engine oil failure may also occur.

The oil pressure warning light may also turn on in the other three cases:

/

- 1 As a test, when the ignition switch is on but the engine is not running, the warning light illuminates to indicate that it is functioning properly. After the engine is started, this warning light will go out. If the light is not on when the ignition is on, the fuse or light bulb is defective.
- 2 If the engine idles while the red light is on, the warning light may blink and then turn off. If you carry out emergency braking, the light will turn on shortly. This is normal phenomenon.

△Warning Do not continue driving when the oil pressure is too low.

Sound alarm

The combination meter drives the buzzer through the internal amplification circuit and the microprocessor's sonic generator to generate the necessary audible alarm, reversing radar alarm, driver's seat belt alarm, co-pilot seat belt alarm, parking brake alarm, Alarm priority that is the above order, the sound loudness: 55 ± 5db.

1. Reversing radar alarm

- 1 Voltage signal input, from the anti-collision radar sensor
- 2 Signal processing

Obstacle distance (mm)	Sound frequency (Hz)	Area	Attention
> 1500	-	Safe area	Normal back-up
1200~1500	1	Safe area	Normal back-up

Obstacle distance (mm)	Sound frequency (Hz)	Area	Attention
900~1200	2	Safe area	Normal back-up
600~900	4	Warning area	Deceleration back-up lamp
350~600	8	Dangerous area	Stop reversing
<350	Long buzzing	Dangerous area	Stop reversing

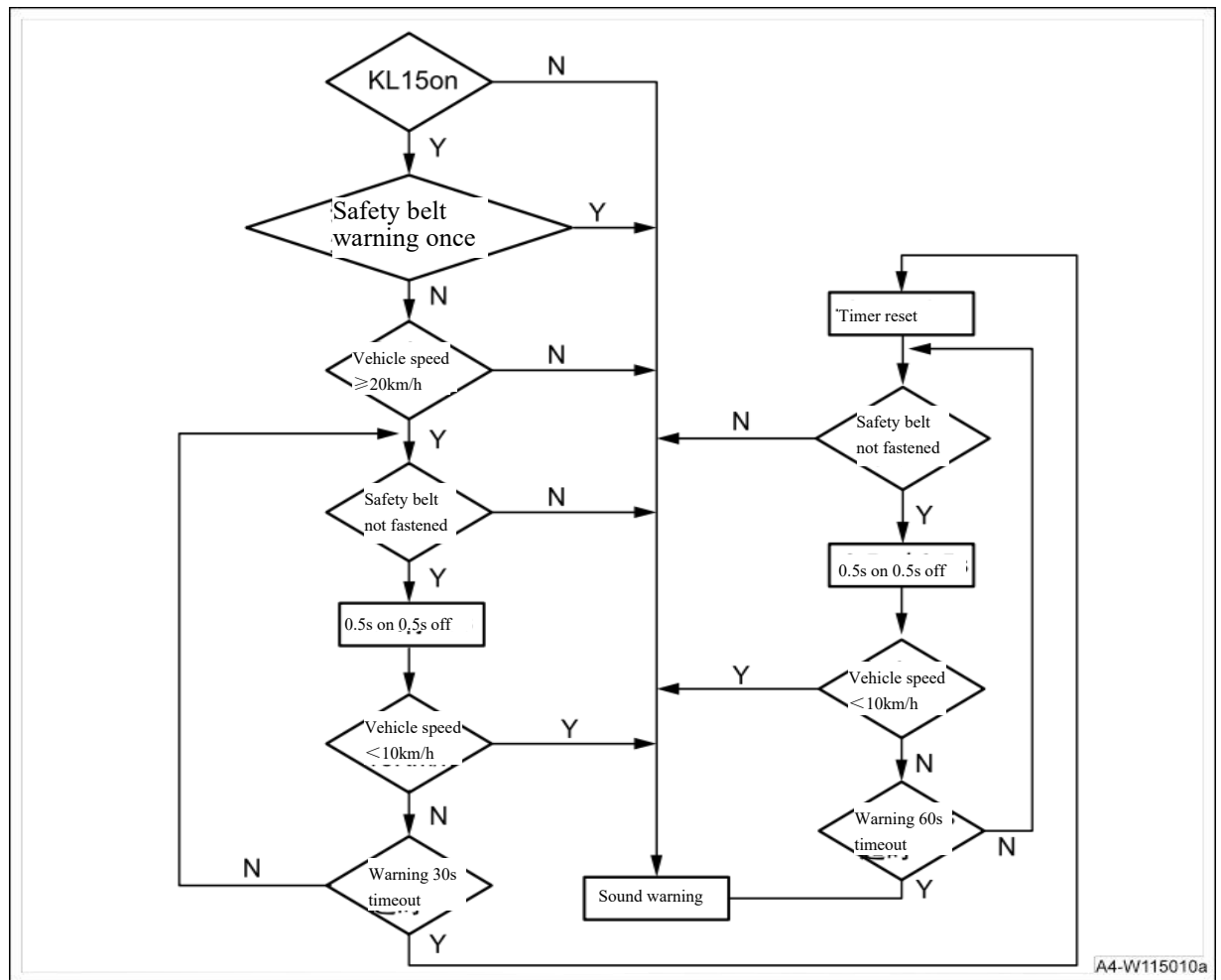
3. Sound signal continues to be sent until the input signal disappears, sound frequency: $2000 \pm 10\text{Hz}$.

2. No seatbelt alarm

1). Signal Source: Driver's Seat Belt Light, Passenger Seat Belt Light, Passenger Seat Sensor, Speed Signal.

2). Signal processing

See the alarm control logic in the figure below for details. The co-pilot seat belt alarm adds the judgment of whether the co-pilot seat is occupied.



3). The alarm is triggered by the sound signal, the sound frequency: $2000 \pm 10\text{Hz}$.

3. Parking brake alarm

1. Signal input Depend on the following signal:
parking brake and vehicle speed

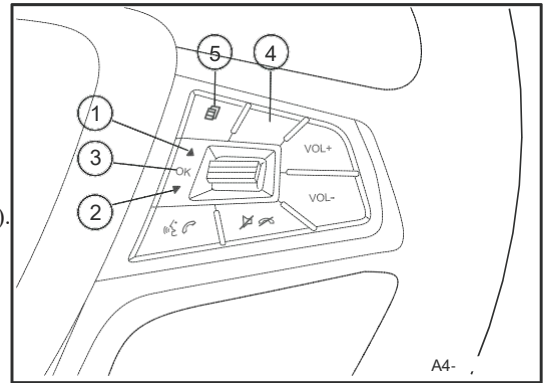
2. Signal treatment Parking brake signal and vehicle speed $\geq 5\text{km/h}$.

Signal output

The alarm is triggered by the sound signal, the sound frequency: $2000 \pm 10\text{Hz}$, vocal cycle: longing.

Combination meter steering wheel switch control

- Button function:**
1. Up: Select the previous option of the list element and press and hold.
 2. Down: Select the next option of the list element to press and hold.
 3. Confirm: Press to confirm the selection.
 4. Back: Press to return to the previous interface.
 5. Turn page: Press to bring up the instrument menu interface (dot screen).

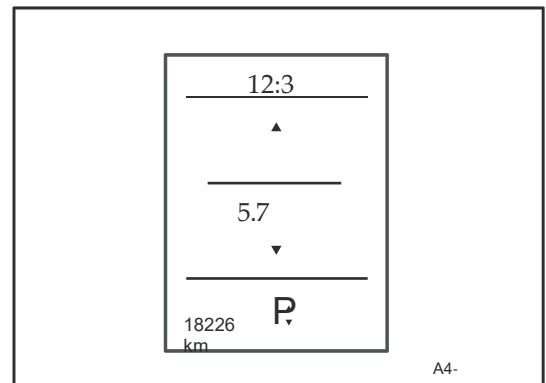


Driving computer information

Average fuel consumption

The average fuel consumption is the average fuel consumption by L / 100 km since last memory was emptied. This information can help you adjust your driving habits to achieve the fuel consumption you expect, update every 5 seconds. If you want to measure the average fuel consumption during a certain driving cycle, reset the travel information in the menu to empty the memory before measurement. Clear records, less than 100m driving shows --- L / 100km; After driving 100m, shows the calculated average fuel consumption.

After each ignition, the average fuel consumption using the value of the last exit; if the instrument is disconnected with the battery, the average fuel consumption will reset to 0.

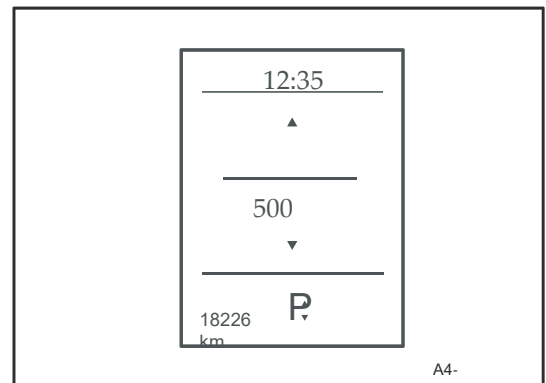


Range

The range is used to display the mileage with current fuel in the tank. The system calculates the endurance mileage every 1 second, the interface is updated every 10 seconds.

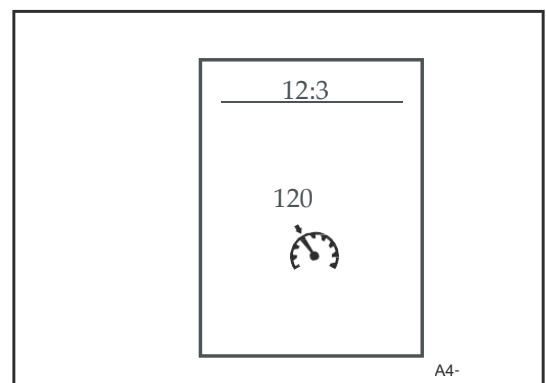
The range value is calculated based on the current fuel consumption. Therefore, due to the different road conditions and driving conditions, the display of the range will change, which will be different from the actual driving distance. This value is for reference only.

When the fuel sensor is open or short circuit, the interface displays "-- km"; Continuing mileage is shown at least 50km.



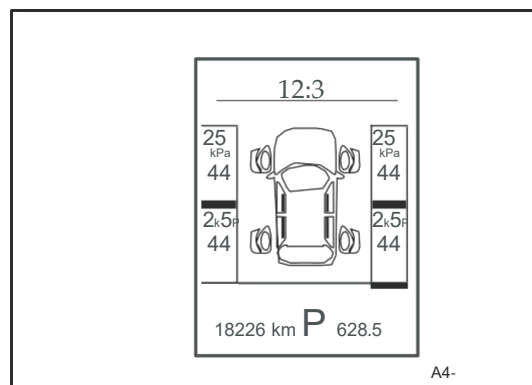
Cruise speed

Cruise speed displays vehicle's current cruise speed set by the driver. The cruise speed can be set by cruise switch. If the cruise function is activated, ---km/h will be displayed on screen.



Tire pressure, tire temperature

Tire pressure/temperature monitor interface: it can monitor tire pressure and temperature. Tire pressure unit is kPa, accuracy is 1kPa, when receiving invalid value, tire flash, the value is -.-; The tire temperature is °C, the accuracy is 1°C, when the invalid value is received, the tire flash, the value -.- /



(III) Torque Parameter

No.	Project	Torque (N·m)
1	Instrument cluster screw	4~6

II. Troubleshooting

(I) Troubleshooting List

1. Check additional installation after sales that may affect instrument system operation;
2. Check system components that are easily accessible or visible to see if they have been significantly damaged or that could cause problems.
3. Check whether the sensors of each meter display information are normal.

No.	Fault symptoms	Fault analysis	Solutions	Remark
1	Instrument cluster malfunction	The circuit is disconnected	Check power supply and grounding circuit	
		Damaged instrument circuit	Replace the instrument cluster	
2	The light and indicating light are off	The circuit is disconnected	Check if the circuit and connection pieces are connected	
		Control signal flow fault	Check the related switching signal	
		Damaged instrument circuit	Replace the instrument cluster	
3	The indicating instrument has error or fault. The mileage LCD does not work.	System Malfunction	Check if all relative sensors have normal output. If all the circuits and connecting pieces are connected.	
		Meter circuit damaged	Replace the instrument cluster	
4	Mileage information is not completely displayed.	Instrument Circuit Damage	Replace the instrument cluster	

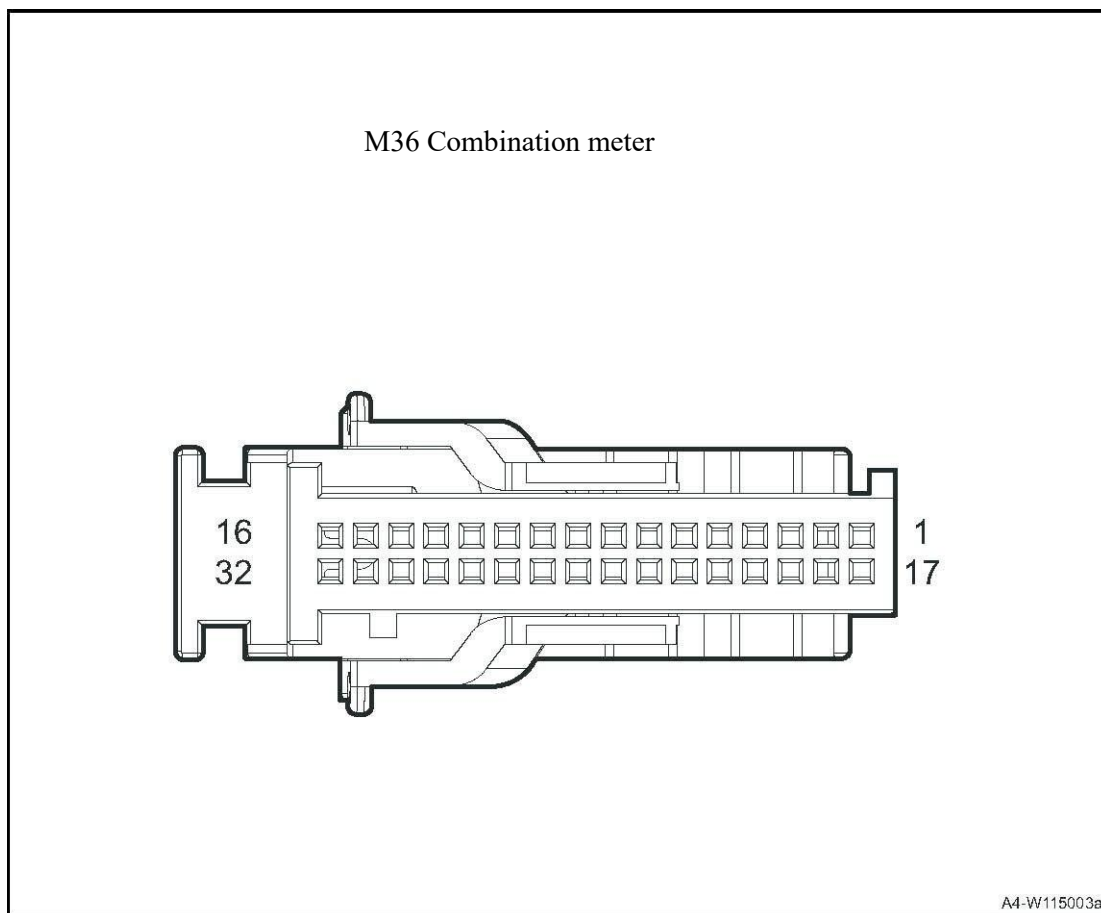
2 Troubleshooting Flow Chart

Instrument cluster malfunction



III Pin Definition

Instrument cluster diagram



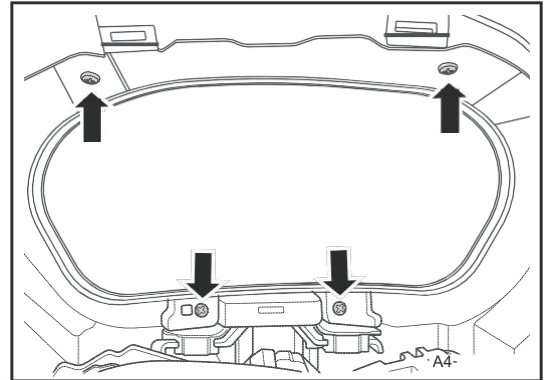
Connector No.	Definition of connector pin	Wire Color	Wire Diameter	Pin Definition
M3 6	8	O	0.5	CAN high
M3 6	9	Y	0.5	CAN low
M3 6	11	Y	0.5	Brake fluid level -
M3 6	15	G/O	0.35	Rear radar beep signal +
M3 6	18	Gr/Y	0.5	B+ Power
M3 6	19	O/G	0.5	IGN signal
M3 6	23	B	0.5	GND
M3 6	24	Bl/Y	0.5	Fuel sensor GND
M3 6	25	Bl/G	0.5	Fuel signal
M3 6	29	G/B	0.5	Charging indicating-
M3 6	30	P/B	0.5	Engine oil pressure -

M3 6	31	Bl/Br	0.35	Steering wheel switch signal +
M3 6	32	Gr/R	0.35	Steering wheel switch signal -

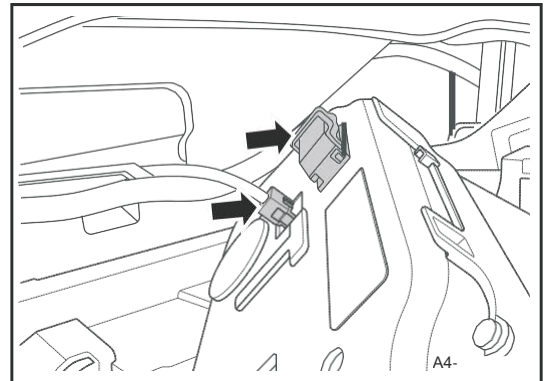
IV Instrument Cluster Assy.

(I) Disassemble

1. Open the engine hood.
2. Disconnect the negative cable of the battery.
3. Remove the combination meter cover assembly, refer to the combination meter cover assembly.
4. Remove combination meter assembly.
 - 1). Dismantle the 4 screws fixing the instrument cluster assembly.

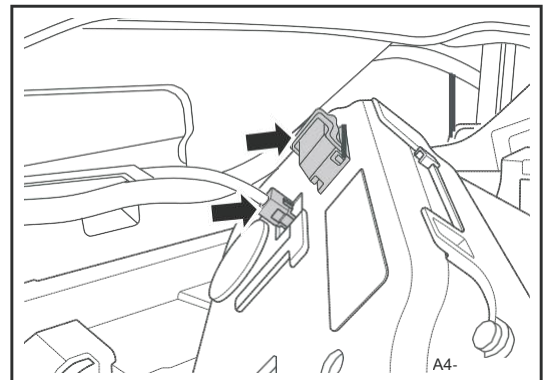


- 2). Disconnect the instrument cluster assembly wire harness connector.
- 3). Take down the combination instrument assembly,



(II) installation

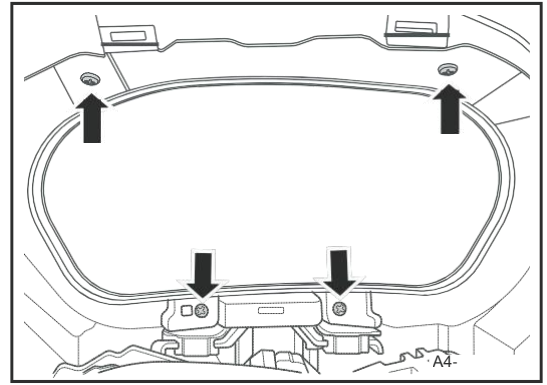
1. Install the combination meter assembly
 - 1). Put the instrument cluster assembly at installation position.
 - 2). Connect the instrument cluster assembly wire harness connector.



3). Mount and tighten the 4 screws that fix the instrument cluster assembly.

Tightening torque 4~6N·m

2. Install combination instrument cover assembly
3. Connect the battery negative cable.
4. Close the engine cover



Wiper & Washer

I Overview

(1) Structure Outline

Front wiper system

The wiper has four control modes: high speed, low speed, auto, and inching, the wiper switch is integrated on the combination switch on the right of the steering column. The front wiper system consists of wiper/washer switch, wiper motor, connecting rod, wiper arm and wiper blade. The front wiper circuit consists of a self-stop device, which consists of a worm gear and a cam disc, designed to temporarily maintain circuit integrity after the wiper/washer switch is disconnected until the wiper arm is fully returned to its original position. The wiper system is driven by a permanent magnet motor, which is mounted on the front wall panel and directly connected to the front wiper rod.

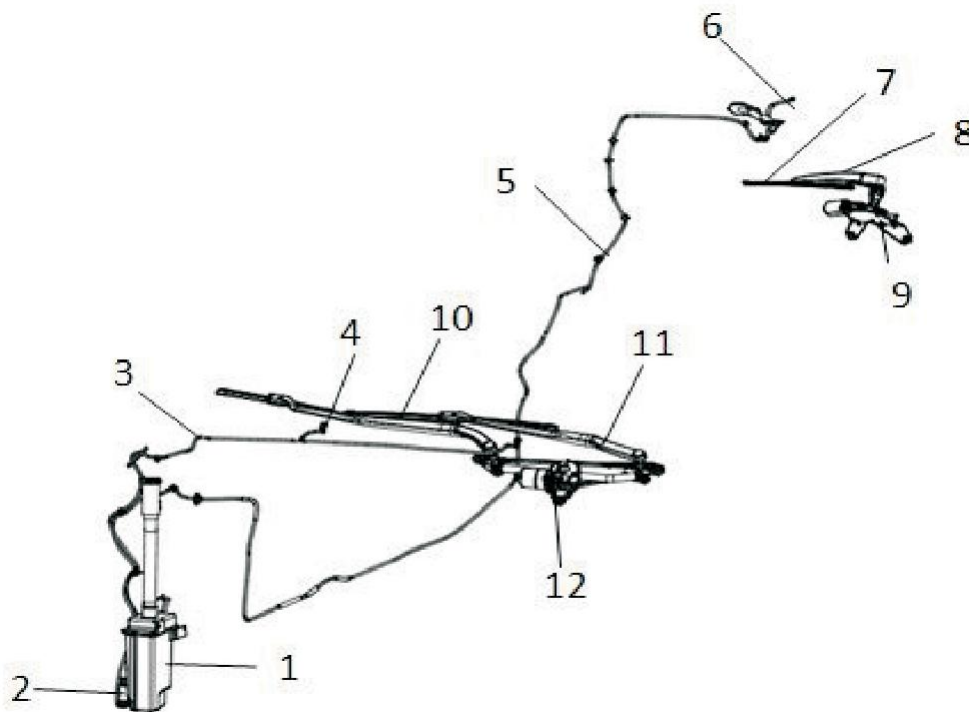
Windshield washer system

Windshield washer system consists of glass cleaner, wash water pipe, washing liquid kettle and washing motor assembly, front nozzle, rear nozzle, washing switch, windshield washer installed under the right headlight assembly. The washing motor is fixed on the washing liquid pot, and the washing motor controls positive and negative rotation so that the washing liquid is delivered to the front nozzle or the rear nozzle through the hose.

Rear wiper system

The rear wiper system consists of a rear wiper motor assembly, a rear wiper arm assembly and a rear wiper blade assembly. The rear wiper motor assembly is located in the tailgate and is directly connected to the rear window wiper arm.

Part position diagram



- | | |
|--|--|
| 1. Cleaning fluid pot | 7. Rear wiper blade assembly |
| 2. Washing motor | 8. Rear wiper arm assembly |
| 3. Front wash water pipe assembly | 9. Rear wiper motor assembly |
| 4. Front window nozzle | 10. Front wiper blade assembly |
| 5. Rear wash water pipe assembly | 11. Front wiper arm assembly |
| 6. Rear wiper spraying nozzle assembly | 12. Front wiper motor and linkage assembly |

(II) Torque parameter

No.	Project	Torque (N·m)
1	Front wiper motor and connecting rod assembly fixing bolt	10~12
2	Rear wiper arm assembly nut M10	28~32
3	Rear wiper arm assembly nut M8	17~21
4	Rear wiper motor assembly fixing bolt	6~10
5	Rear wiper arm mounting nut	10~14

II. Troubleshooting

(I) Troubleshooting List

Troubleshooting table of wiper & washer system

Common failures	Failure causes and solutions	
Stop working	Moving parts get stuck	Exclude the stuck
	Power off,the connector falls off	Power on
	The motor is burned	Replace a new motor
Abnormal noise,Doesn't work normally	Abnormal noise inside the motor	Replace the motor
	The connecting mechanism has collision and friction during movement	Exclude collision and friction
	Abnormal noise between blade and windshield	Clean the windshield
The wiper blade shakes during working	Add cleanser to the washer kettle to reduce friction during work,	Adjust or replace wiper blade
Wiper blade is not in the stop position after return	After motor returns, take down the wiper arm to install again, to make the wiper blade in stop position	
Can not wipe clean	The windshield is not clean	Clean the windshield
	The wiper blade is badly worn	Replace the wiper blade(We advice to change the wiper blade every 3 months)

Wiper and washer system check

No.	Measure	Normal Result	Abnormal results
1	Turn the ignition switch to "ON", keep the washer switch to "ON" position	The wiper works at low speed Only if the washer switch is on ON position,the washer spray liquid to the windshield Turn off the switch, the washer stops working and the wiper returns to the stop position after 24 times	The washer does not work

No.	Measure	Normal Result	Abnormal results
2	Place the wiper switch at interval position	After the wiper has completed one wipe, it will pause for a few seconds, and then perform the next wipe.	Wiper intermittent mode does not work The wiper defogger/delay and low speed model can not work
3	Place the wiper switch at interval position, keep washer switch on for 12 s	As long as the washer switch is held in the on position, the washer sprays on the windshield. The wiper works at low speed during spraying, the blade scrapes for 2-4 times when releasing the washer switch. Then, the wiper returns to interval work.	The washer does not work Wiper intermittent mode does not work The wiper defogger/INT and low speed model can not work
4	Turn the wiper switch to low speed position	The wiper continues to work at low speed	The wiper defogger/INT and low speed model can not work
5	Turn the wiper switch to the high speed(HI) Position	The wiper continues to work at high speed	The wiper can not work at high speed model, it works at low speed model
6	Switch the wiper to OFF Position	The wiper will return to stopping position at low speed	The windshield blade doesn't stop, wiper can not open.

2 Troubleshooting Flow Chart

The wiper and washer don't work wherever the wiper switch's position

Step	Solution	Yes	No
1	Check whether the fuses in the engine compartment fuse box and inside fuse box are fused	Turn to step 2	Turn to step 3
2	After troubles caused by other circuit problems are eliminated, replace the fuse, is trouble eliminated or not		Turn to step 3
3	Turn on the ignition switch and wiper switch, check whether the motor's power supply and ground is normal The voltage between pin 3 and ground of the wiper motor is 12V, The pin 1 is grounding The voltage between the power supply terminal of the washing motor plug and the ground is 12V	ND	Turn to step 4
4	Replace the wiper and washer motors, check whether the failure is solved		Turn to step 5
5	Replace the wiper switch		

Wiper does not work at high speed

Step	Solution	Yes	No
1	Check whether the pin 4 and pin 1 of the wiper motor are connected	Turn to step 3	Turn to step 2
2	Replace the wiper motor		Turn to step 3
3	Check if wiper high speed relay is damaged	Turn to step 4	Turn to step 5

Steps	Solution	Yes	No
4	Replace the wiper high speed relay to check whether the failure is solved		Turn to step 5
5	Turn the wiper combination switch to interval position, check whether the resistance between pin 9 and 8 is normal.	Turn to step 7	Turn to step 6
6	Replacing the wiper combination switch to check whether the failure is solved		Turn to step 7
7	Repair or replace the connection line between the wiper high speed relay and BCM and the connection wire harness between the wiper high speed relay and the high speed terminal of the wiper motor, whether the fault is removed		Turn to step 8
8	Replace the BCM		

Wiper does not work at low speed only.

Step	Solution	Yes	No
1	Check whether the pin 3 and pin 1 of the wiper motor are connected	Turn to step 3	Turn to step 2
2	Replace the wiper motor		Turn to step 3
3	Turn the wiper combination switch to wiper low speed position, check whether the resistance between pin 9 and 8 of combination switch is normal /	Turn to step 5	Turn to step 4
4	Replacing the wiper combination switch to check whether the failure is solved		Turn to step 5
5	Repair or replace the connection line between the wiper high speed relay and the low speed terminals of the wiper motor		

The wiper does not work at interval position only.

Step	Solution	Yes	No
1	Turn the wiper combination switch to interval position, check whether the resistance between pin 9 and 8 is normal.	Turn to step 3	Turn to step 2
2	Replacing the wiper combination switch to check whether the failure is solved		Turn to step 3
3	Check if wiper combination switch terminal 12/13 and BCM connection line is conducted	Turn to step 5	Turn to step 4

Steps	Solution	Yes	No
4	Repair or replace the connecting wire between pin 12/13 of the wiper motor and BCM, check whether the failure is solved		Turn to step 5
5	Replace the BCM Whether the failure is solved		Turn to step 6
6	Replace wiper relay		

Only the rear wiper start shift does not work

Step	Solution	Yes	No
1	Check whether the rear fuse in the engine compartment fuse box is fused, if rear wiper relay is damaged	Turn to step 2	Turn to step 3
2	Replace the fuse or relay, the fault is excluded?		Turn to step 3
3	Check whether the pin 3 and pin 4 of the wiper motor are connected	Turn to step 5	Turn to step 4
4	Replace the wiper motor		Turn to step 3
5	Open rear wiper switch, check whether the conduction of the switch is normal, the pin 2 and 11 should be conducted	Turn to step 7	Turn to step 6
6	Replacing the wiper combination switch to check whether the failure is solved		Turn to step 7
7	Check whether the connection line between the wiper combination switch terminal 11 and BCM and the connection line between the wiper combination switch terminal 2 and the ground is conducting	Turn to step 9	Turn to step 8
8	Repair or replace the connecting wire between wiper combination switch pin 11 and BCM, check whether the failure is solved		Turn to step 9
9	Check that the wiring harness between the rear wiper relay and the BCM and the wiring harness between the rear wiper relay and the rear wiper power terminal are conducting	Turn to step 11	Turn to step 10
10	Repair or replace the wiring harness between the rear wiper relay and the BCM and the wiring harness between the rear wiper relay and the rear wiper power terminal, if the fault is removed.		Turn to step 11
11	Replace the BCM		

Wiper keeps working

Step	Solution	Yes	No
1	Check whether the resistance of each position of the wiper combination switch is normal	Turn to step 3	Turn to step 2
2	Replace the wiper combination switch Whether the failure is solved		Turn to step 3
3	Check whether the connecting wire between the wiper motor and BCM is normal	Turn to step 5	Turn to step 4

Step	Solution	Yes	No
4	Repair or replace the connecting wire between the wiper motor and BCM, check whether the failure is solved		Turn to step 5
5	Replace the wiper motor		

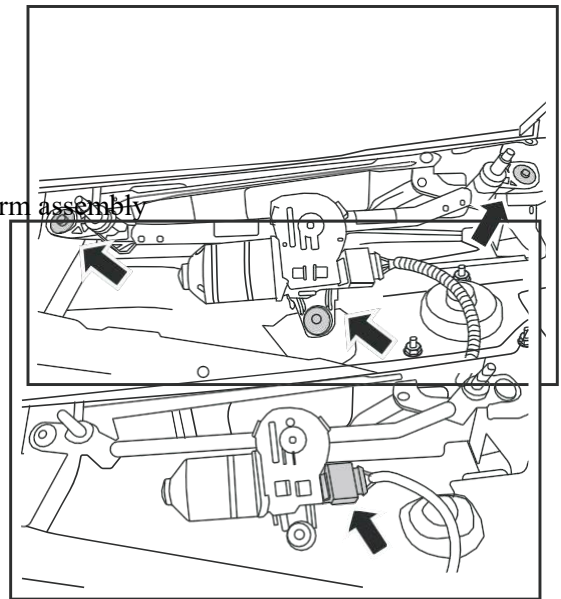
Washer does not work

Step	Solution	Yes	No
1	Check if the washer motor fuse inside the fuse box are fused	Turn to step 2	Turn to step 3
2	Troubleshoot problems caused by other lines Check if the fault is eliminated after changing fuse		Turn to step 3
3	Check whether the power supply of the washer motor is normal, open the ignition switch and washer switch, the voltage between the positive port of the washer motor plug and ground equals to the battery voltage	Turn to step 4	Turn to step 5
4	Replacing the washing motor		
5	Turn the wiper combination switch to washing position, check whether the conduction of the switch is normal, the pin 6 and 7 should be conducted, Open rear wiper switch, check whether the pin 1 and 2 is conducted	Turn to step 7	Turn to step 6
6	Replacing the wiper combination switch to check whether the failure is solved		Turn to step 7
7	Check whether the connecting wire between wiper combination switch and washing motor is normal	Turn to step 9	Turn to step 8
8	Repair or replace the connecting wire between wiper combination switch and wiper motor. If fault is removed		Turn to step 9
9	Check whether the connecting wire between the wiper motor and BCM is normal	Turn to step 11	Turn to step 10
10	Repair or replace the connecting wire between wiper combination switch and BCM. If failure is removed		Turn to step 11
11	Check if circuit between wiper combination switch terminal 6 and grounding, pin 2 and grounding is normal	Turn to step 13	Turn to step 12
12	Repair or replace the connecting wire between wiper combination switch and grounding. If failure is removed		Turn to step 13
13	Replace the BCM		

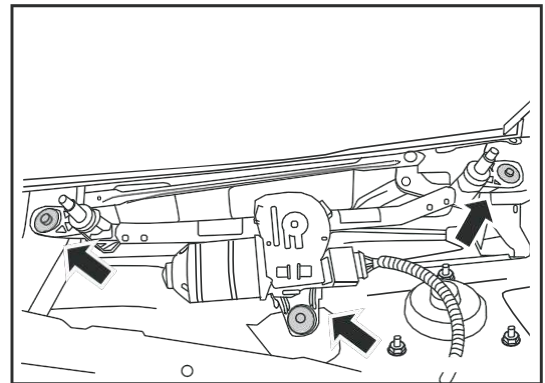
III. Front wiper motor and linkage assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. **Disassemble front wiper arm assembly** See front wiper arm assembly
4. Remove the vent cover assembly See vent cover assembly
5. Remove the front wiper motor and linkage assembly
 - 1). Disconnect the front wiper motor connector.



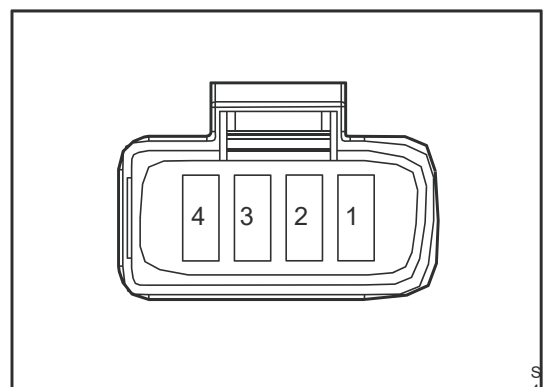
- 2). Remove the 3 fixing bolts of front wiper motor and linkage assembly.
- 3). Remove the front wiper motor and linkage assembly.



(II) Inspection

1. **Disconnect the wiper motor wire harness connector.**
2. Terminal 3 is connected to the positive terminal of the battery, terminal 1 is connected to the negative terminal of the battery

NO	1	2	3	4
Definition	GND	Stopping position	Low speed	High speed



3. As shown in the table, check whether the motor is normal

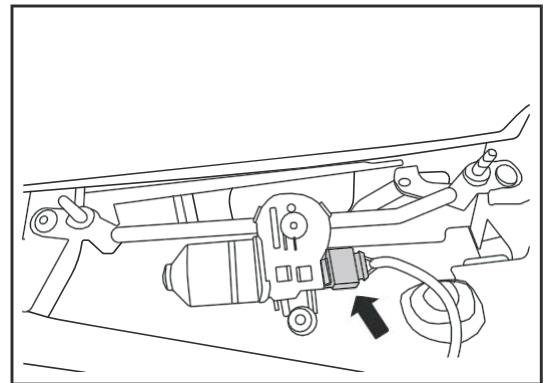
△ NOTICE In general, sources of contamination come from insects, sap, and hot wax treatment using some commercial vehicle washings. If the wiper blade can not work normally, use good or mild washing fluid to clean the windshield and blade, and clean with clean water thoroughly

Position terminal	1	2	3	4
OFF	○ — ○			
LO	○ — — — ○			
HI	○ — — — — — ○			

S4-W116021b

(III) Installation

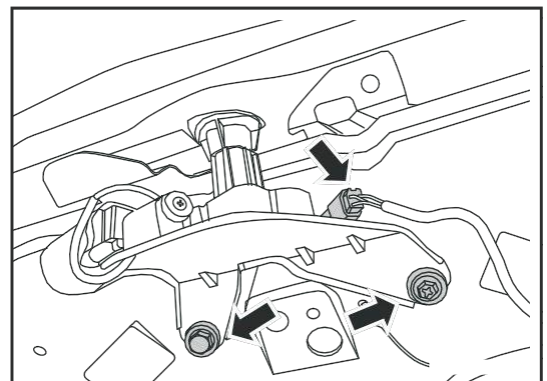
1. Install the front wiper motor and linkage assembly
 - 1). Put the front wiper motor and linkage assembly in the vehicle mounting position.
 - 2). Tighten the 3 fixing bolts of the front wiper motor and linkage assembly. Tightening torque 10~12N·m
 - 3). Connect the front wiper motor wiring harness connector.
2. Install the vent cover assembly
3. Install front wiper arm assembly
4. Connect the battery negative cable.
5. Close engine compartment



4. Rear wiper motor assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Open the tailgate
4. Remove the tail door lower guard board assembly refer to tail door lower guard board assembly
5. Dismantle rear wiper arm assembly See Rear wiper arm assembly
6. Remove the rear wiper motor assembly
 - 1). Disconnect rear wiper motor assembly wiring harness connector.
 - 2). Remove the 2 fixing bolts of rear wiper motor assembly.
 - 3). Remove the rear wiper motor assembly.

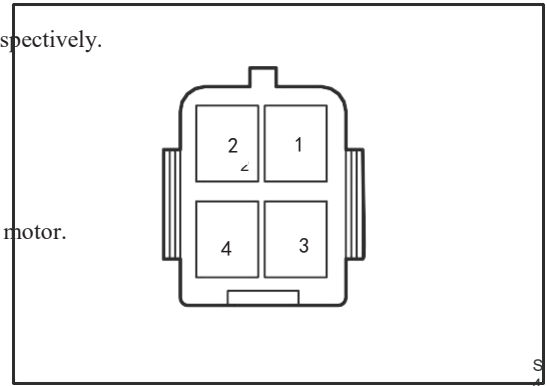


(II) Inspection

1. Disconnect rear wiper motor harness connector.
2. Connect the battery positive and negative leads to terminals 3 and 4, respectively.

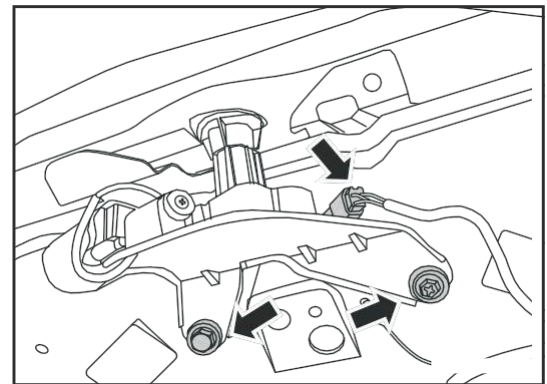
NO	1	2	3	4
Definition	Signal	Return	Power supply	GND

3. Check the motor is working properly. If abnormal, replace the motor.



(3) Installation

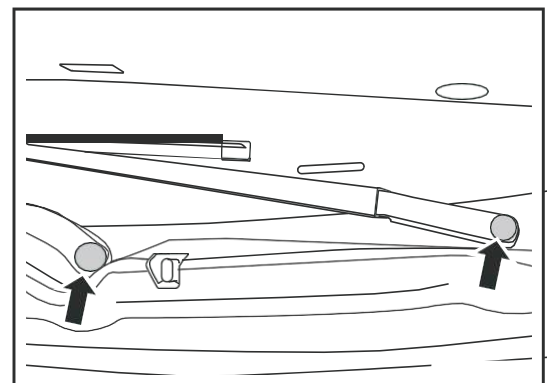
1. Install rear wiper motor assembly
 - a. Remove the 2 fixing bolts of rear wiper motor assembly.
Tightening torque 6~10N·m
 - a. Connect the rear wiper motor assembly wiring harness connector.
2. Install front wiper arm assembly
3. Install tail door lower guard panel assembly
4. Close the tail door.
5. Connect the battery negative cable.
6. Close engine compartment



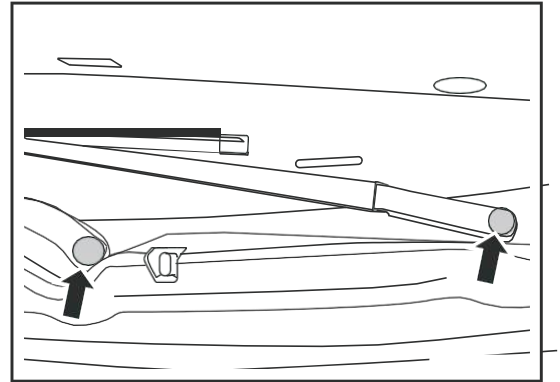
V. Front Wiper Arm Assembly

(I) Removal

1. Remove the front wiper blade assembly See front wiper blade assembly
2. Disassemble front wiper arm assembly
 - 1) Remove the front wiper end cap
 - 2). Remove the nuts fixing the front wiper arm.
 - 3). Remove front wiper arm.



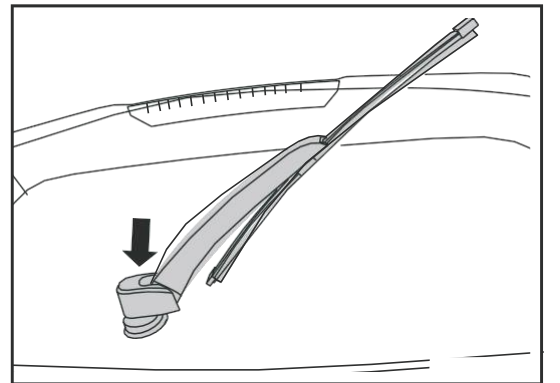
1. Install front wiper arm assembly
 - 1). Place the front wiper arm to the mounting position.
 - 2). Install the nuts fixing the front wiper arm assembly and install the plug. M10 nut tightening torque 28~32N·m
M8 nut tightening torque 17~21N·m
2. Install the front wiper blade assembly



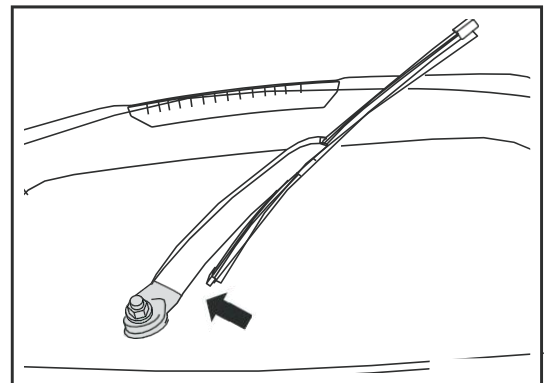
VI. Rear Wiper Arm Assembly

(I) Removal

1. Remove the rear wiper arm assembly
 - 1). Remove the rear wiper nut cover.

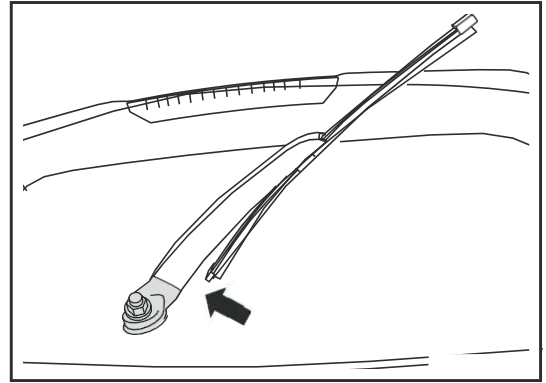


- 2). Remove the 1 fixing nut of the rear wiper arm.
 - 3). Remove rear wiper arm.

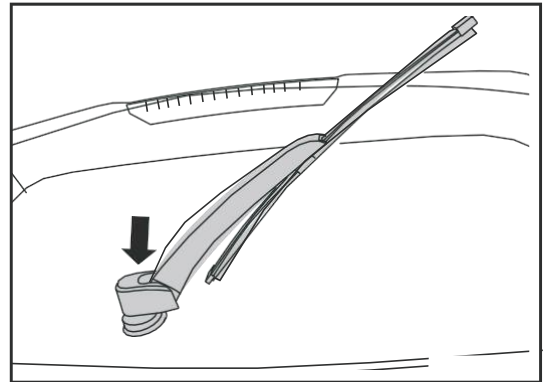


1. After installation, the wiper arm assembly

- 1). Position the rear wiper arm in the mounting position.
- 2). Tighten the 1 nut of rear wiper arm assembly. Tightening torque 10~14N·m



- 3). Install the rear wiper nut cover.



VII. Front wiper blade assembly

(I) Removal

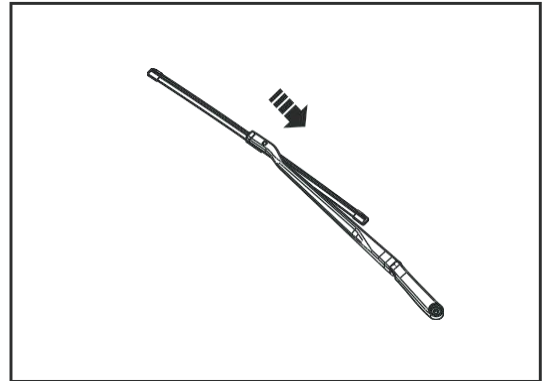
Disassemble the front wiper blade assembly 1) Lift the wiper arm.

- 2) Press the connection with a thumb and pull out the wiper blade.



(II) installation

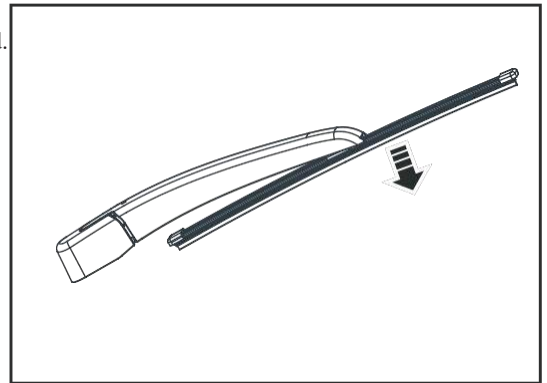
1. Install the front wiper blade assembly
 - 1). Insert the wiper blade into the wiper arm slot until the connection.
 - 2). Place down the wiper arm.



VIII. Rear wiper blade assembly

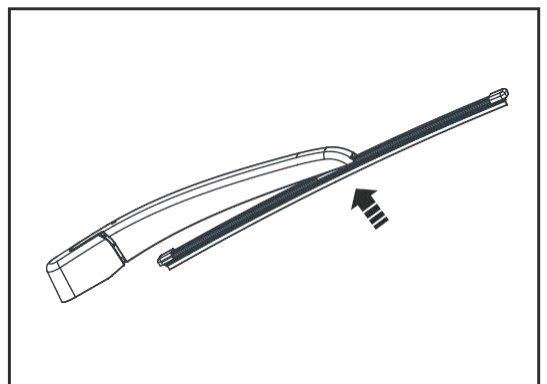
(I) Removal

1. Remove Rear wiper blade assembly
 - 1). Lift up the rear wiper arm, and pull out the wiper blade downward.
 - 2). Take down the rear wiper blade assembly.



(2). installation

1. Install rear wiper blade assembly
 - 1). Push the rear wiper blade upward, and install the rear wiper blade into the rear wiper arm.
 - 2). Place down the rear wiper arm.

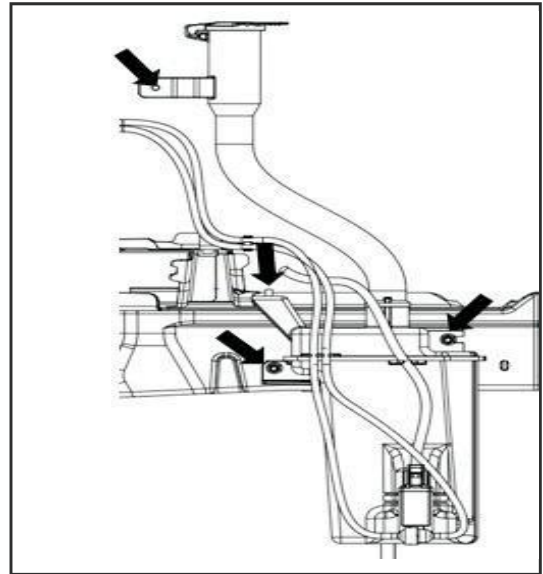


IX. Washing liquid kettle assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly. See front bumper body assembly
4. Remove the front washing pipe assembly, refer to the front washing pipe assembly

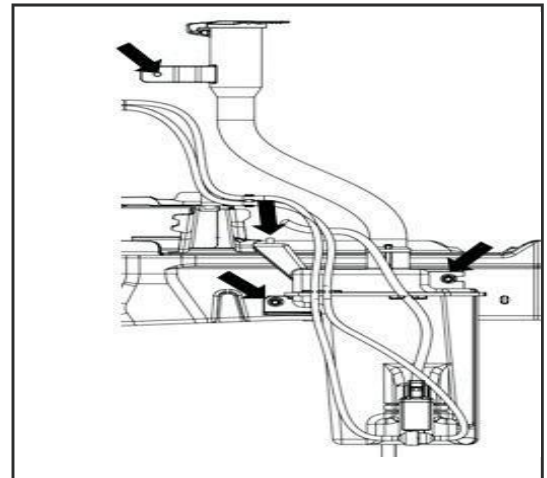
5. Remove the rear washing pipe assembly, refer to the rear washing pipe assembly
6. Remove the washing motor assembly, refer to the washing motor assembly
7. Remove the washing liquid kettle assembly
 - 1). Remove the 2 fixing bolts and 2 fixing nuts of washing liquid kettle.
 - 2). Take down the washing liquid kettle.



(II) installation

1. Install the washing liquid kettle assembly
 - 1). Install the washing liquid kettle, and tighten the 2 fixing bolts and 2 nuts of washing liquid kettle.

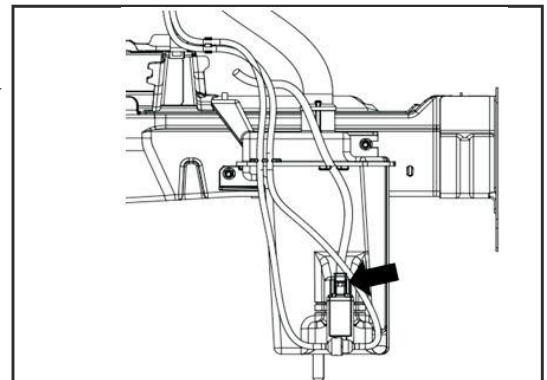
Tightening torque 6~9N·m
2. Install the washer motor
3. Wash water pipe assembly after installation
4. Install the front washing pipe assembly
5. Install front bumper body assembly
6. Connect the battery negative cable.
7. Close engine compartment



X. Washer motor

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly. See front bumper body assembly
4. Dismantle the washing motor
 - 1). Disconnect the washer motor wiring harness connector.
 - 2). Disconnect the front washing pipe and the rear washing pipe.
 - 3). Pull out the washer motor.



(II) Inspection

1 Connect the washer motor to the washing liquid pot, and fill washing liquid to the pot.

△Note Before adding water to the tank, check the tank for external

impurities or contamination. Clean the washing liquid kettle if necessary.

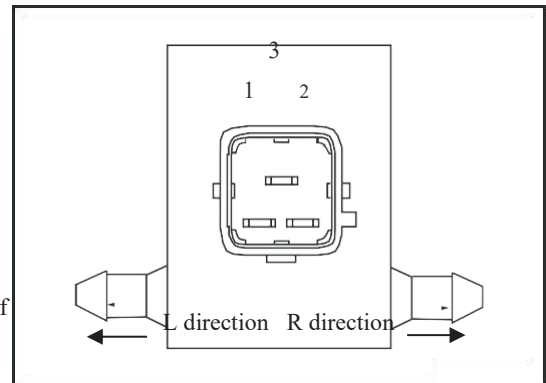
2 Condition 1: Connect the battery positive and negative electrode to terminal 1 and 2 respectively.

3 Condition 2: Connect the battery positive and negative electrode to terminal 1 and 3 respectively.

	1	2	3
Definition	Battery positive pole	R direction outlet	L direction outlet

4 In the two conditions, should check if the motor is working normally, if the washer motor is running. When in condition 1, check if spray water from rear washing nozzle; when in condition 2, check if spray water from front washing nozzle.

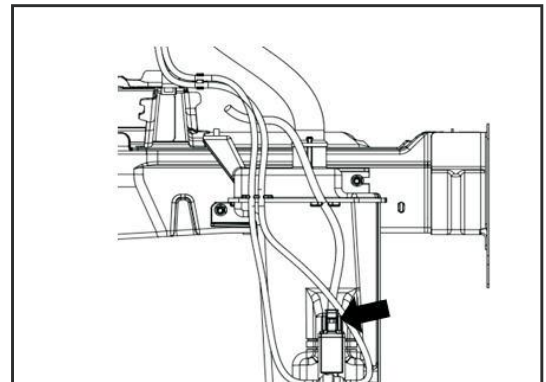
5 If abnormal, replace the washing motor



(III) Installation

Install the washer motor

- 1). Install the washing motor into the mounting hole and install it in place.
- 2). Connect the front washing pipe and rear washing pipe.
- 3). Connect the washer motor wiring harness connector.
2. Install front bumper body assembly
3. Connect the battery negative cable.
4. Close the engine compartment cover



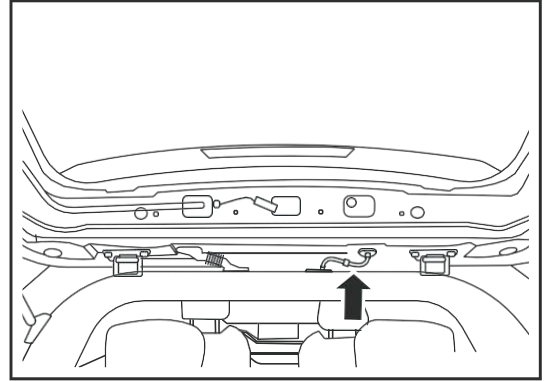
XI. Rear spraying nozzle assembly

(I) Removal

Open the engine cover

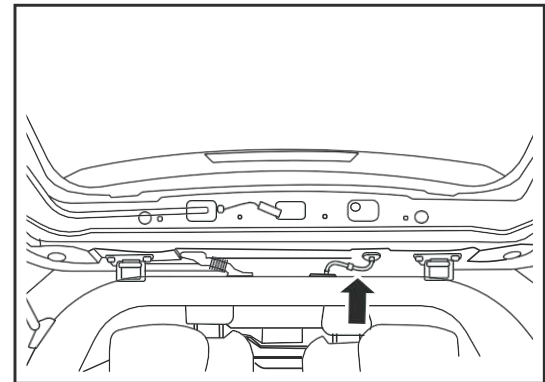
2. Disconnect the battery negative cable
3. Remove the tail door upper guard panel assembly refer to tail door upper guard panel assembly
4. Remove the tail door left and right guard board assembly refer to tail door left and right guard board assembly
5. Remove the tail door lower guard board assembly refer to tail door lower guard board assembly
6. Remove the high position brake lamp assembly

7. Remove the rear spraying nozzle assembly
 - 1). Disconnect the connection of the rear spraying nozzle assembly and rear washing pipe.
 - 2). Pull down the rear spraying nozzle.



(II) installation

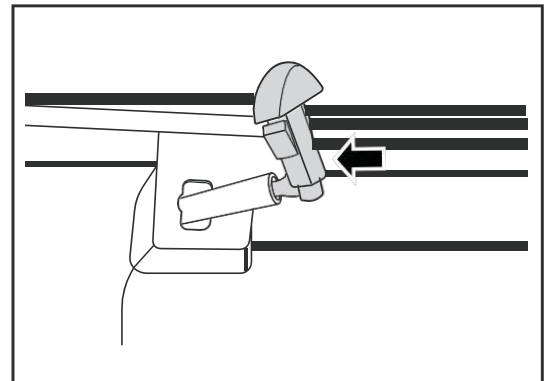
1. Install the rear spraying nozzle
 - 1). Install the rear spraying nozzle onto the high position brake light assembly.
 - 2). Connect the rear spraying nozzle to the rear washing pipe.
2. Install high brake light assembly
3. Install tail door lower guard panel assembly
4. Install tail door left and right guard panel assembly
5. Install tail door upper guard panel assembly
6. Connect the battery negative cable.
7. Close engine compartment



XII. Front spraying nozzle

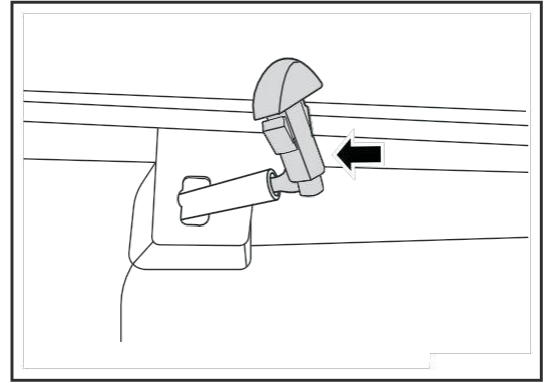
(I) Removal

1. Open the engine cover
2. Remove front spraying nozzle
 - 1). Pry off the front spraying nozzle, disconnect the front spraying nozzle and front washing pipe connection.
 - 2). Remove the front spraying nozzle.



(II) installation

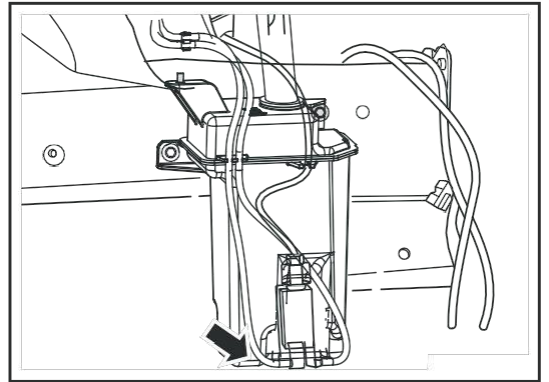
1. Install front spraying nozzle
 - 1). Connect front spraying nozzle and front washing pipe, install front spraying nozzle.
2. Close engine compartment



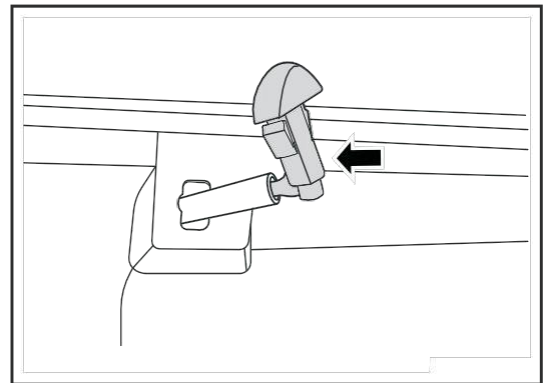
XIII. Front washing pipe assembly

(I) Removal

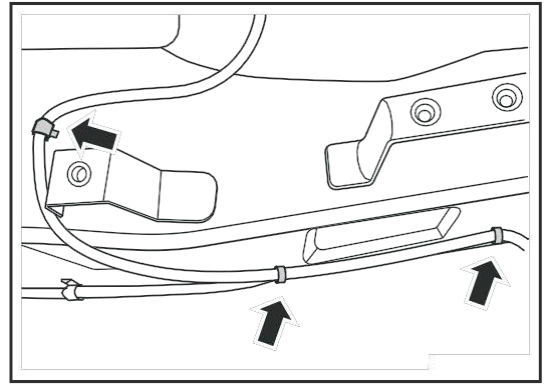
1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly. See front bumper body assembly
4. Disassemble wheel fender refer to 'wheel fender'
5. Remove Front wash water pipe assembly
 - 1). Disconnect the wash hose assembly and wash motor before disconnecting.



- 2). Disconnect front wash water pipe assembly from front window nozzle.

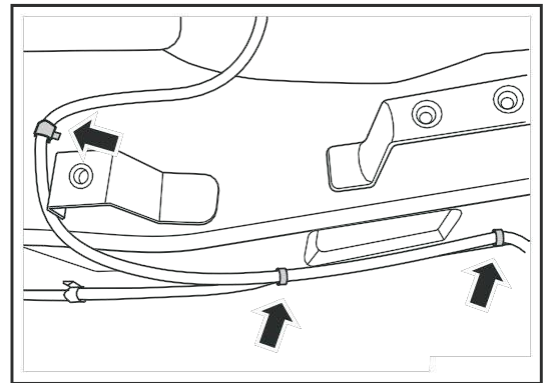


- 3). Detach the front washer hose assembly and the body connection buckle.
- 4). Pull out the wash hose assembly.

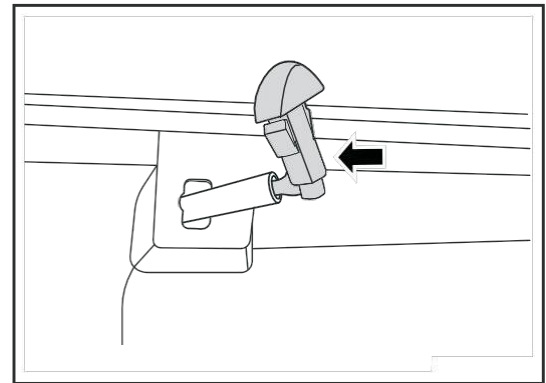


(II) installation

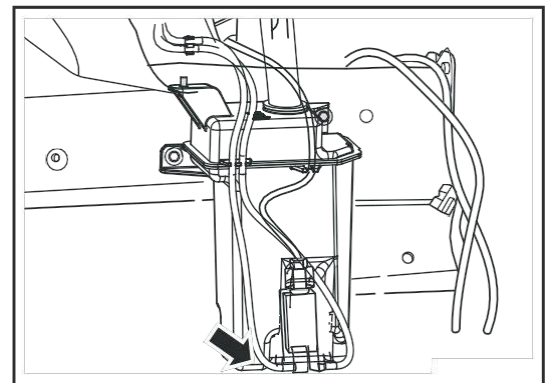
1. Install the front washing pipe assembly
 - 1). Install the front wash hose assembly into the mounting position.



- 2). Install the front washing pipe assembly fixing buckle.
- 3). Connect front wash hose assembly with front window nozzle.



- 4). Connect the wash hose assembly and wash motor before connecting.
2. Install the wheel fender
3. Install front bumper body assembly
4. Connect the battery negative cable.
5. Close engine compartment



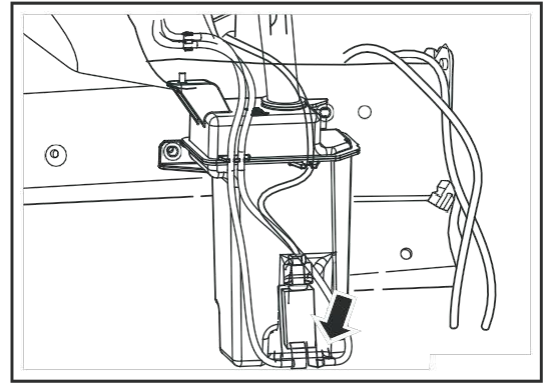
XIV. Rear washing pipe assembly

(I) Removal

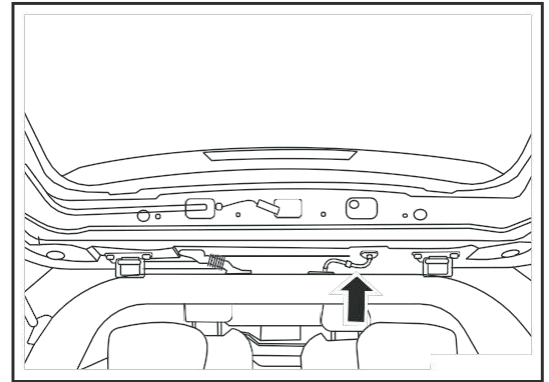
1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly. See front bumper body assembly
4. Disassemble wheel fender refer to 'wheel fender'

5. Remove the rear washing pipe assembly

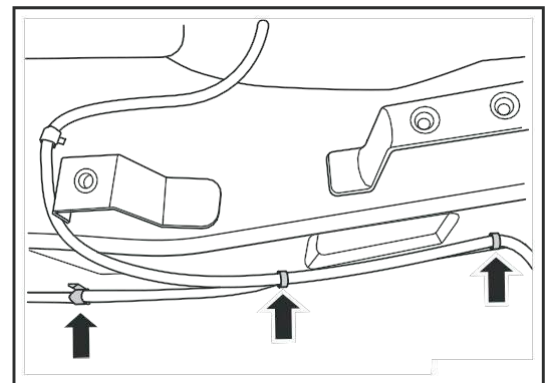
- 1). Disconnect the wash hose assembly to the wash motor.



- 2). Disconnect wash water pipe assembly and rear window nozzle connection.



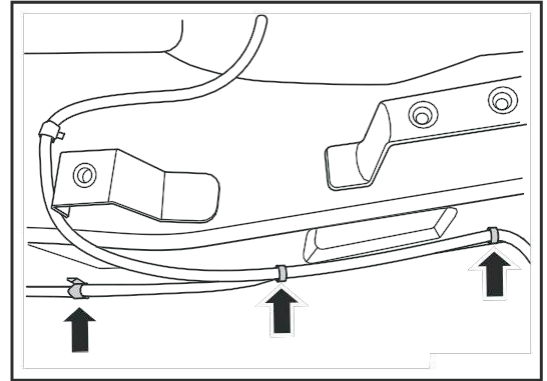
- 3). Disconnect the buckles fixing the rear washer water pipe assembly.
- 4). Remove the wash water pipe assembly.



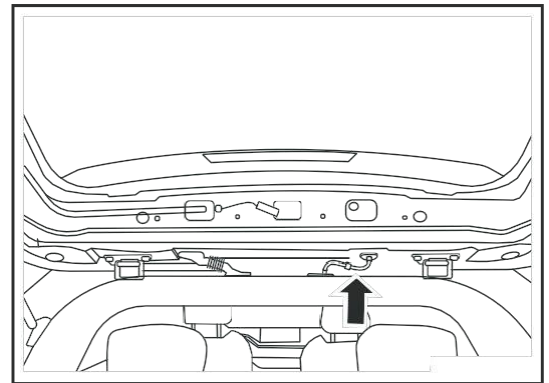
(II) installation

1. Wash water pipe assembly after installation

1). Install the rear wash water pipe assembly and fix the buckle.

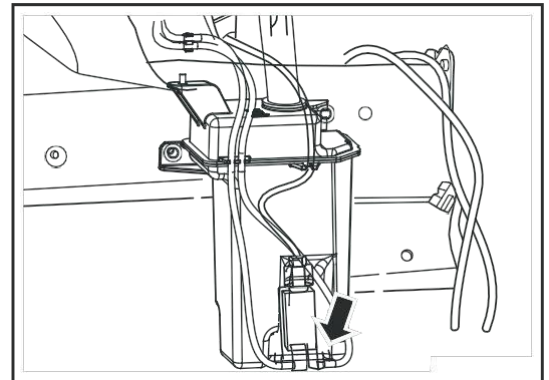


2). Connect the rear washer water pipe assembly and rear window sparying nozzle.



3). Connect the rear wash hose assembly and wash motor

2. Install the fender
3. Install front bumper body assembly
4. Connect the battery negative cable.
5. Close engine compartment



Air conditioning control system(3481)

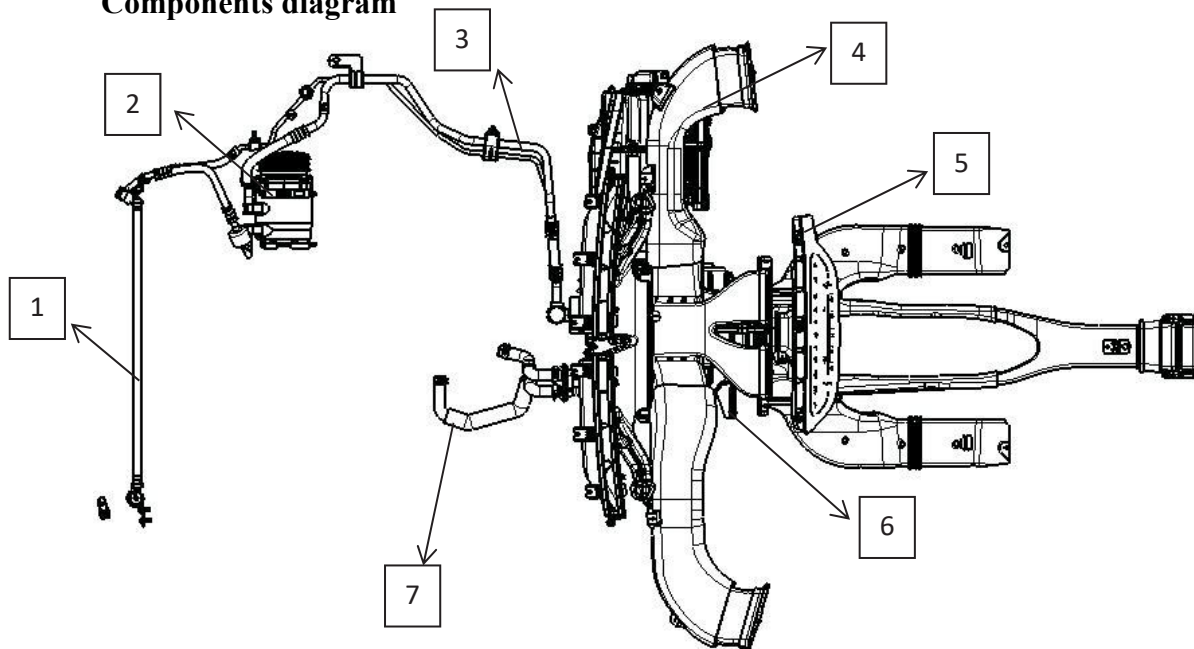
I. Overview

(I) Structure Outline

The vehicle model uses electric control A/C system. The A/C condenser uses supper-cooling type which improve the cooling performance. To help defrost, the external cycle mode is automatically switched to when mixing and defrosting modes are selected. Condenser fan is divided to low and high phase control according to the vehicle speed, cooling water temperature, A/C refrigerant pressure. The increase of the blower wind value and the improvement of air mixture ability can enhance the cooling and warming performance.

(II) Working principle

Components diagram



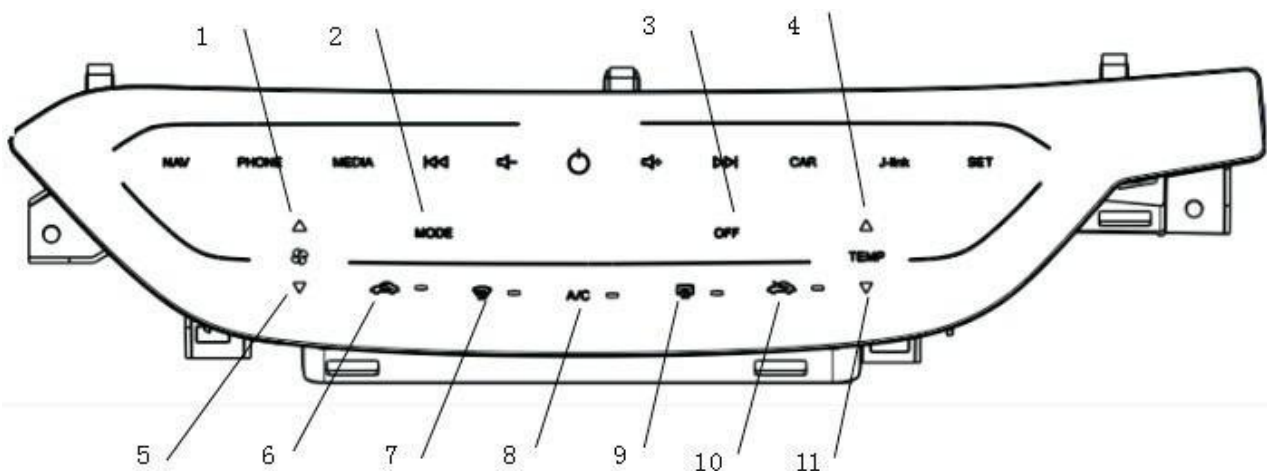
A/C system parts Schematic

Diagram

1-Condenser assembly 2-Compressor assembly 3-Cooling piping device 3-Air duct device
5-Front A/C controller assembly 6-A/C host device 7-Blower water pipe assembly

4. A/C control panel control type and function description

The air conditioning system adopts electric control mode, touch panel integrated control function, including rear defrost (including rearview mirror heating function) switch, wherein temperature adjustment, internal and external circulation and air outlet mode are controlled by servo motor, panel lighting is backlit, the touch panel backlight is always bright in the daytime, the backlight can be adjusted at night. The key and adjustment functions of the air conditioning panel are shown in the figure below.

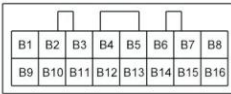
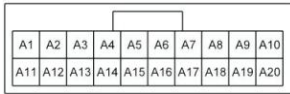


Front A/C control panel sketch map

- 1- Wind volume+ button; 2-mode adjust button; 3-OFF button; 4-Temperature + button; 5-Wind volume- button; 6- Inner circulation button; 7-Front defrost button; 8-A/C compressor switch; 9-Rear defrost (rearview mirror heating) switch; 10-Outer circulation switch; 11-Temperature-button

Control panel pin definition

A:AMP 172257 B:172258



A/C controller connector pin definition		Definition of the horn connector (component side)
AMP 172.257	A1	IGN.1 key is at ON
	A2	IGN.1 key is at ON
	A3	Back light +
	A4	Back light -
	A5	-
	A6	-
	A7	Blower asking signal(to ECU)
	A8	Air conditioning request signal
	A9	-
	A10	GND ground wire
	A11	BATT+ battery +
	A12	-
	A13	Key ACC position
	A14	Blower relay control
	A15	-
	A16	FET(D) Blower negative voltage feedback end
	A17	FET(G) Blower voltage control end FET(G)
	A18	CAN high
	A19	CAN low
	A20	GND ground wire
AMP 172.258	B1	Temperature motor + (towards refrigeration)
	B2	Temperature motor - (towards refrigeration)
	B3	Mode motor + (face mode)
	B4	Mode motor - (face mode)
	B5	New air return motor - (towards new air)
	B6	New air return motor - (towards new air)
	B7	-

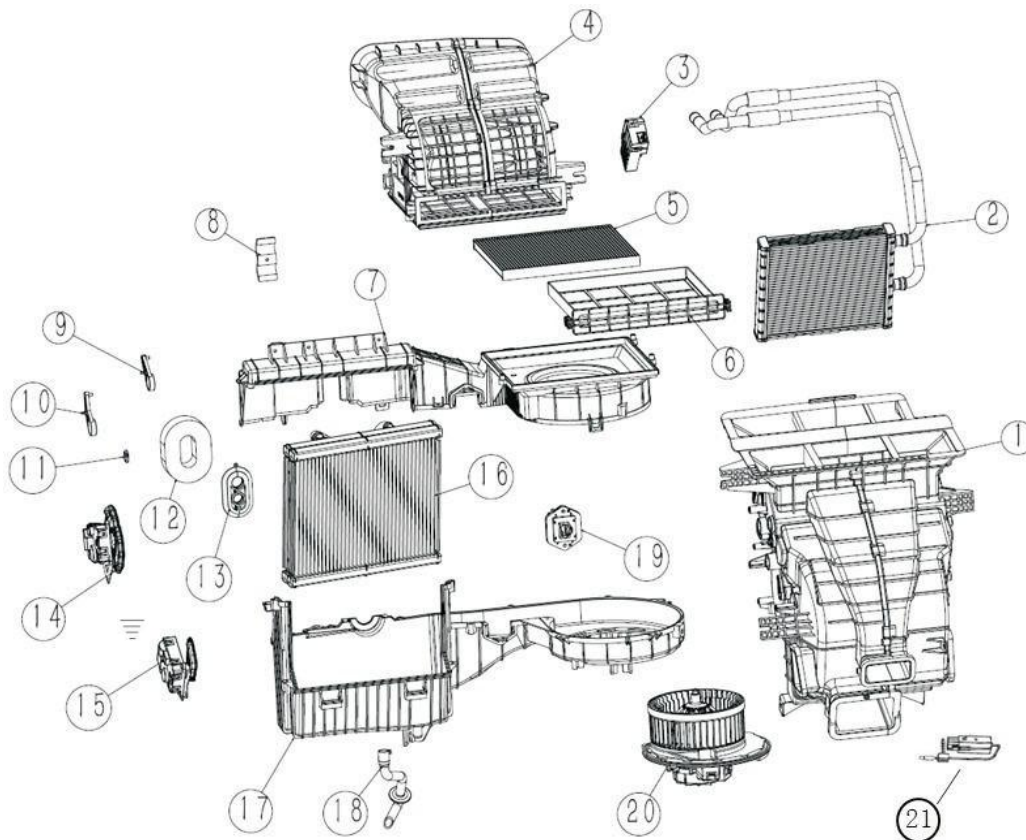
	B8	Sensor GND sensor ground wire
	B9	standard voltage (5V)
	B10	Temperature throttle position feedback
	B11	Mode throttle position feedback
	B12	Mode throttle position feedback
	B13	Evaporator temperature sensor signal
	B14	Outside temperature sensor signal
	B15	-
	B16	-

A/C control system principle diagram

Function, position and inspection of system parts

1. A/C host assembly

A/C host assembly consists of blower, expansion valve, evaporator, heater and shell. Blower inhaled outside air, after the evaporator, heater, etc. into the car, in order to achieve the normal operation of air conditioning.



A/C host assembly explosive diagram

1-Housing assembly 2-Heater core assembly 3-Air duct motor assembly 4-Air inlet casing assembly 5-Air filter (non-woven)
6-Filter cover 7-Blower upper housing 8-Heater water pipe clamp 9-Air door connecting rod-Face/Foot 10-Air door connecting rod-Defrost 11-Gasket 12-Sealing sponge 13-Guide panel 14-Mode motor 15-Temperature motor assembly 16-Evaporator core assembly 17-Blower lower housing 18-Water pipe 19-Speed adjusting module 20-Blower motor blade assembly 21-Thermal bulb

2. Blower

Blower consists of motor and fan, using air suction throttle motor to switch inner&outer mode And intake inside air or outside air

The suction port damper motor function is achieved through the controller's internal and external air buttons. In the inner circulation mode, air is taken in from two air intakes on the side;

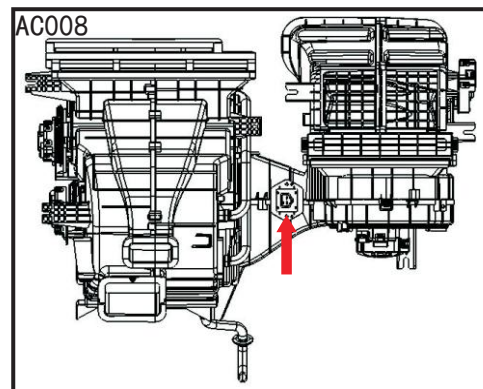
and in the outer circulation mode, through the filter on the front cover of the vehicle. At this time, the use of air blower suction, and heat exchange through the evaporator, the cooled air into the car.

3. Adjuster module

1) Function

Blower motor speed is adjusted according to the change of output current. 2) Installation position

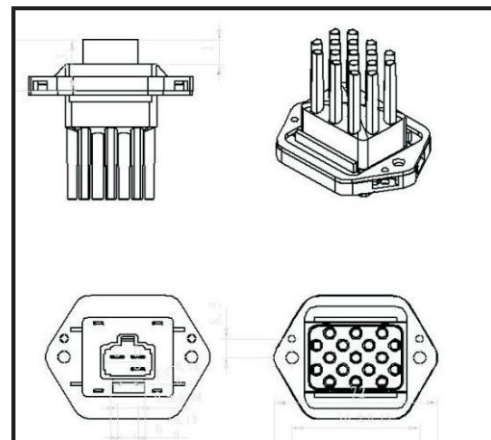
Installation position of the speed regulating module is as shown in the figure AC008



3) Exterior

Appearance of the speed regulating module is as shown in the figure AC009

AC009



4. Blower motor

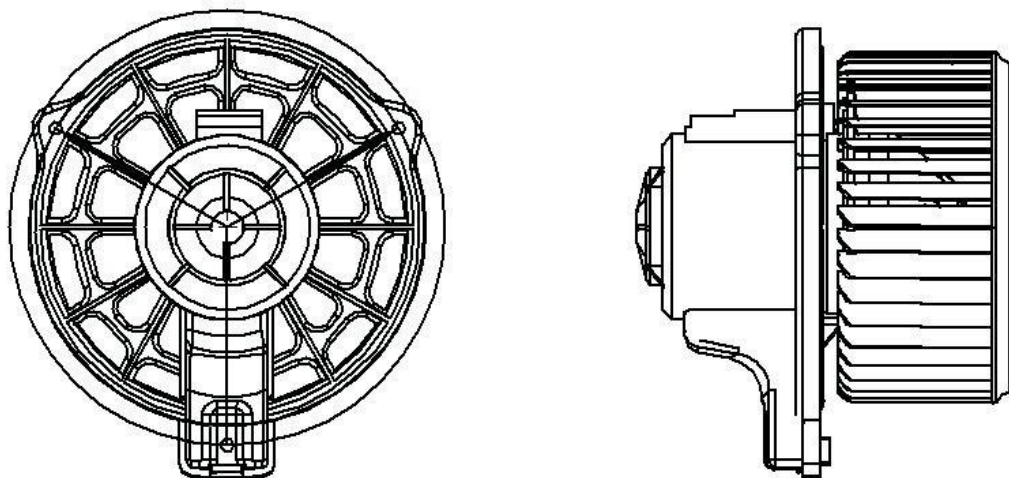
1) Function

Utilize the power of the vehicle, rotate the fan to form the air volume needed for the air conditioning system. 2)

Components diagram

3) Test method:

“+”Terminal loading arbitrary voltage,“-”terminal earthing then inspecting Normally, the higher the applied voltage, the higher the rotating speed of the blower.

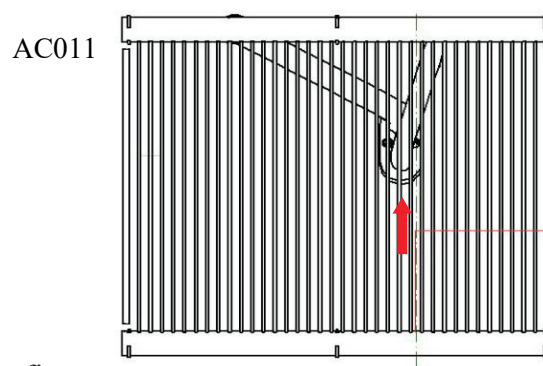


5. Evaporator temperature sensor

1) Function

Perception of the evaporator core temperature, passed to the controller to prevent the evaporator ice.

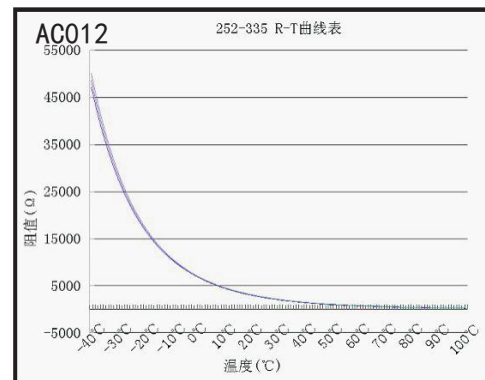
2) Installation position



Install in the evaporator core, position is shown in the figure. There is negative temperature coefficient thermistor inside the sensor, so resistance decreases as temperature decreases and resistance increases as temperature increases.

■ Parameter table (temperature-resistance-output voltage)

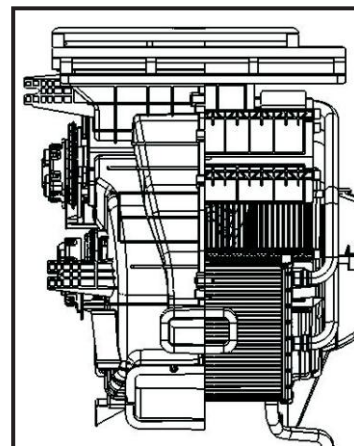
The compressor is switched off at 0 ° C (6.9kΩ) and the compressor is closed at 3.5 ° C (5.9kΩ). Evaporator temperature sensor parameter chart AC012



6. Evaporator and heater

After the air sent by the blower is cooled down by the evaporator, a part of the air passing through the evaporator is sent to the heater core according to the degree of opening and closing of the temperature control damper, and the rest is sent to the upper part of the heater case. In order to control room temperature control and air mixing, the air passing through the heater core and the air flowing into the upper portion of the heater housing are mixed at the rear of the heater housing. This mixed air through the mode door motor role, was sent to the required outlet, play a vehicle interior temperature control and defrost/defogging function. Heater assembly adjust the air mixture, temperature control, the direction of the air.

AC013

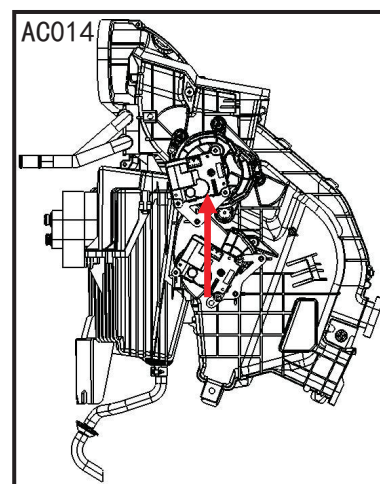


7. Mode throttle motor

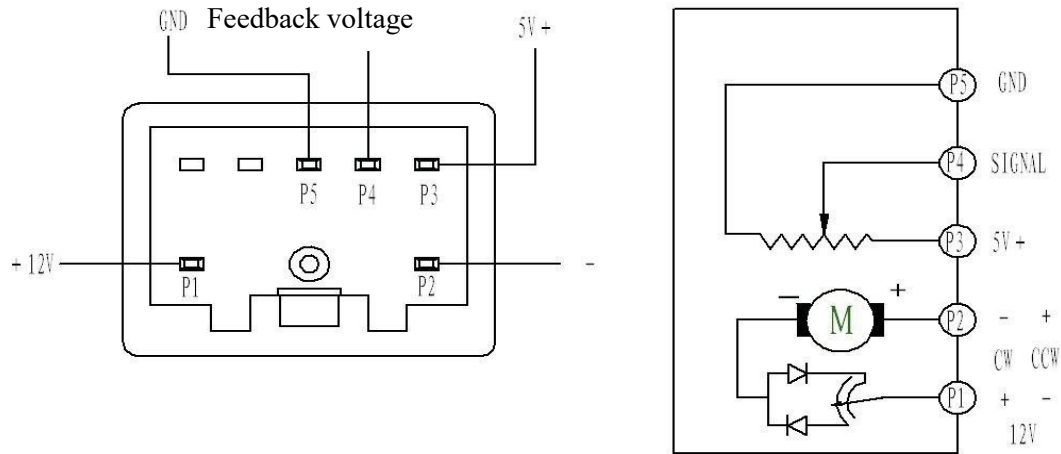
1) Function

Assembled on the left side of the heater housing, controlled by the signal from the air conditioner panel (FATC) mode switch, activates the position of the miniature motor adjustment mode damper inside the damper motor. When the motor starts, the voltage change is reflected in the FATC, then FATC judges the signal. When the throttle reaches the required position, the motor will stop working.

2) Installment position



3) Circuit principle diagram



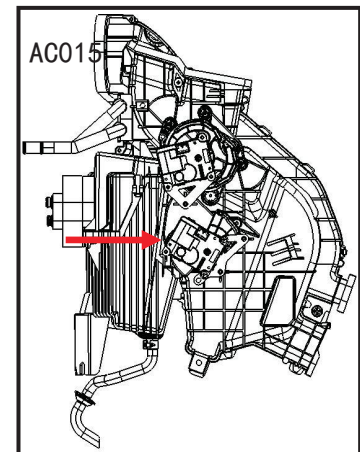
Mode throttle motor circuit diagram

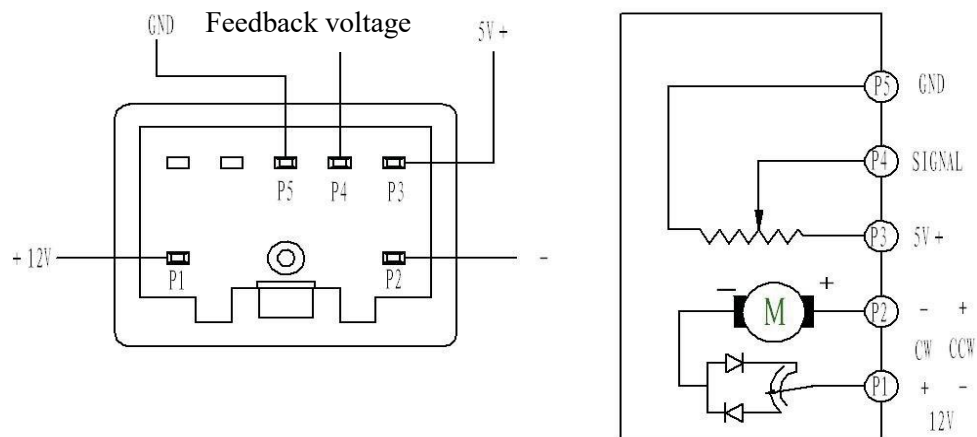
8. Temperature control throttle motor

1) Function

Installed in the right part of the evaporator housing, controlled by the operation signal of the temperature control knob of the A/C control module, and starts the position of the small motor to adjust the temperature control damper. The motor voltage difference that changes when the motor starts is reflected to the air conditioning control box, and the air conditioning control box judges the reflected signal. When the throttle reaches the required position, the motor will stop working.

2) Installation position





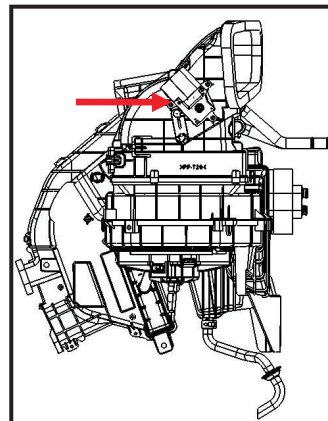
Temperature control throttle motor
circuit diagram

9. Cycle model throttle motor

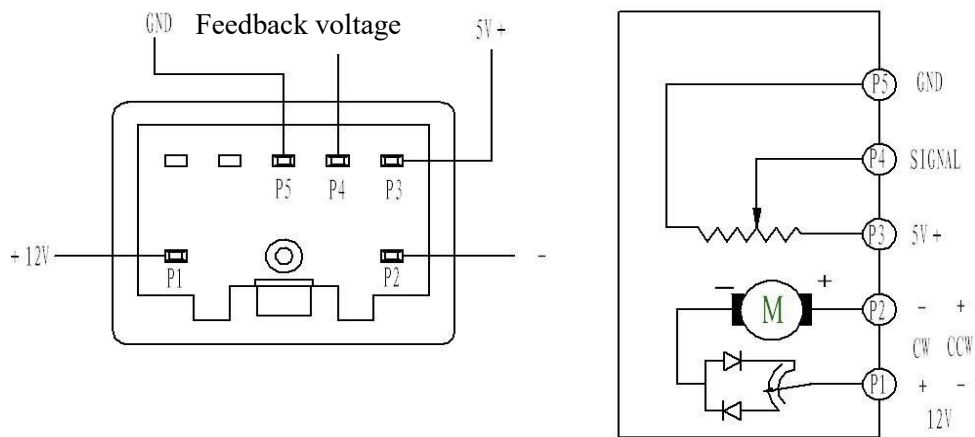
1) Function

It is installed on the right side of the air inlet of the main air conditioner and is controlled by the inner and outer circulation keys of the air conditioning control box. The motor voltage difference that changes when the motor starts is reflected to the air conditioning control box, and the air conditioning control box judges the reflected signal. When the throttle reaches the required position, the motor will stop working.

2) Installment position



3) Circuit principle schematic



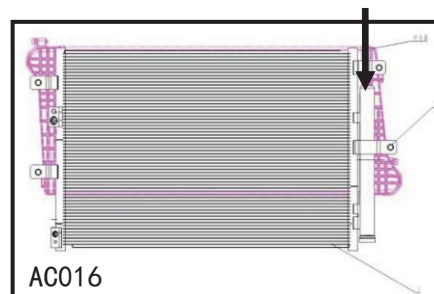
Temperature control throttle motor
circuit diagram

10. Condenser and receiver drier

1) Function

The compressor from the high temperature and pressure gas refrigerant at room temperature cooling. The cooling of the condenser depends on the driving air and the forced air volume of the fan. The condenser of this model is a parallel flow, combined with the drying bottle. Cooling performance is improved by subcooling, reducing the amount of refrigerant required by the system and reducing the number of components in combination with the drying bottle. When the system pollution occurs, it is used to replace the drying bottle, but this model can replace the desiccant after separating the cover of the lower part of the drying bottle.

2) Installment position



11. Three-way pressure switch

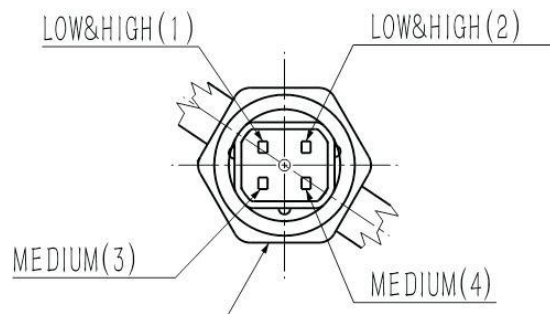
1) Function

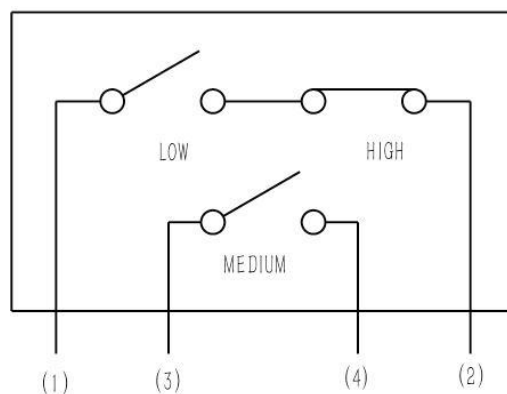
The three-way pressure switch is to add the middle pressure switch in the previous A/C two-way pressure switch; when the system pressure increase, the middle pressure switch activate and send the signal to engine control unit. In this case, the water tank fan and the condensing fan are in a high-speed state, thereby preventing the performance drop caused by the pressure increase. And it can protect the air conditioning system when the pressure (high pressure/low pressure) is abnormal.

2) Installation position

Installation position is as shown in the figure.

3) Route diagram





Three-phase pressure switch circuit diagram

4) Specification parameter

Three-phase pressure switch specification parameter table

	HFC-134a	
High pressure	OFF	3.14Mpa
Middle pressure	ON	1.77Mpa
Low pressure	OFF	0.196Mpa

(III) Technical parameter: refrigerant filling amount $480\text{g} \pm 20\text{g}$.

(IV) Maintenance Precautions

The following precautions must be observed when inspecting and repairing the air conditioning system. Failure to do so may result in damage to the vehicle and personal injury.

- Refrigerants have a low freezing point and high volatility. Therefore, gloves and glasses must be used to prevent chilblains and blindness caused by contact with the skin.

- If the refrigerant splashed into the eyes or contact with the skin, rinse the contact area immediately with water and must be treated with ophthalmology and dermatology. Do not rub your eyes with your hand or handkerchief.

- Ventilation must be performed at the site when performing refrigerant-related operations. Refrigerant in a closed place a lot of discharge, can lead to hypoxia.

- Refrigerant discharge allowance: 1000ppm ($4184\text{mg} / \text{m}^3$)

- Excessive discharge can cause heart and cardiovascular system, abnormal or allergic immune system; respiratory system abnormalities or skin diseases.

- When performing refrigerant-related operations, there should be no foreign matter such as moisture and dust in the surrounding environment. The flow of foreign materials into the air-conditioning system will be detrimental to the system.

- Gas leak detectors are required for refrigerant-related operations. R-134a Refrigerants contact with hot objects can produce harmful gases, so pay attention to prevent leakage.
- The vehicle air-conditioning system must use R-134a refrigerant. System components can be adversely affected by the use of other refrigerants.
- Refrigerant R-134a and R-12 are not compatible. Even a very small amount is forbidden to be mixed.
- Special attention should be paid to the fact that there is no ignition or ignition possible around the vehicle when operating in relation to the refrigerant, and the exposure of the refrigerant tank to the heat source can cause an explosion.
- The R134a container is under high pressure and must not be left in a hot environment. And to check whether the storage temperature is below 52°C.
- Generally, dust cap is used to keep A/C components from sewage, dust, moisture. Dust cover should be removed before operation and sealed after operation.
- Synthetic oil (PAG) frozen oil suitable for R-134A absorbs water more readily than R-12 and is 10 times more absorbent than MINERAL oil. Excessive moisture affects the compressor, lubrication and durability.
- The impact of moisture on the air conditioning system is very bad, so it is best to avoid rainy days operation.
- Air-conditioning system and then install the O-ring seal must be coated with frozen oil, especially the bolt-type connection parts manually installed before using two wrenches assembly.
 - When assembling the flange connection part, the nut and the bolt should be connected while pushing the pipe lightly.
 - When installing A/C,
the use of more than the specified torque
assembly or O-ring clamping force is too
large will lead to refrigerant leakage, so it
must be in accordance with the provisions of
the operation.
- Hose can not be distorted.
- Never completely separate the air conditioning system until it has been completely recovered. If the separation before recovery, the system pressure under the influence of refrigerant and refrigerant discharge, will pollute the surrounding environment.
- When replacing air conditioning components, refrigerant must be added when adding (type: PAG).
When replacing a compressor, the amount of refrigerant oil discharged from the old compressor is subtracted from the specified amount of 120ml. The result is the amount of refrigerant oil that needs to be discharged from the new compressor.

Specified Quantity - Amount of Refrigerant Expelled in Old Compressor = Amount of Refrigerant Expelled in New Compressor.

Note: Do not discharge more than 50ml of oil from the new compressor even if there is no discharge from the disassembled compressor.

II. Troubleshooting

Common fault phenomenon and solution

Common Malfunction Diagnosis Table

Malfunction Symptom	Possible malfunction reason	Troubleshooting
Air-conditioning system without refrigerant	There is a leak in the system	1. Visual examination: ① Observe the connection parts of each part for grease, once there are leaks here. You can use soapy water painted on suspicious sites, to see if there are bubbles; ② Observe abnormalities in the various components, condenser and evaporator core surface scratched, crushed, bumps
		2. Listen for the "sizzling" sound in the part position by vacuuming; If there is a leak here;
		3. Check with the instrument: ① Electronic leak detector testing, high sensitivity 2 Dye tracing leak detection;
System oil is not appropriate	Replace the system components, in accordance with the provisions of supplement or reduce	1. First confirm the frozen oil specifications, can not be mixed; General Specifications: PAG;
		2. After the recovery of refrigerant: add about 30g of frozen oil;
		3. Replace the compressor, pour out all the frozen oil in the compressor and add the same oil as in the replaced compressor;
		4. Replace the pipe: add about 30g of frozen oil;
		5. Replace the condenser: add about 60g of frozen oil;
		6. Replace the evaporator: add about 50g of frozen oil;
		7. Replace the receiver drier: add about 10g of frozen oil;

Wind volume is abnormal	No wind from A/C	1. Circuit faults: ① Check if the motor circuit and the connector is loosen; ② Fuse off or damaged, replace it; relay damage, replace the relay; 2. Mechanical fault ① Motor damages, replace it; ② Temperature throttle body damage, can not adjust the damper to the cooling state, replace it; ③ Control box damaged, replace it; speed control module damage, replace it;
	air volume is small than normal	1. Insufficient voltage, check the power supply battery 2. If the air duct is stuck or if the grille is fully opened Blowing wind whether there is leakage; check 4. Adjuster module faults, replace it 5. If the wind resistance of the air filter is too big, or there is dust or foreign materials blockage. 6. Motor reversely rotates, adjust the positive and negative terminal of the connector
Not cooling	System without refrigerant	Pressure gauge test, see "refrigerant leak" inspection;
	No wind blowing	Refer to "Air volume is abnormal" for inspection.
	Compressor doesn't work	1. Electromagnetic wave not work ① The fuse is burned, replace it ② Connector loosen or damage in the circuit, check the wire harness and replace. ③ Relay is burnt, replace it. ④ The clutch is burnt, disassemble the clutch assembly, repair or replace it. 2. Drive belt is broken, replace; 3. Signal obstructed 1 Pressure switch damaged, no pressure signal; short signal detection, damage replacement; 2 ECU with faults, check and repair; 4. Compressor inner broken, replace;
Bad cooling performance	Refrigerant not enough	1. Check if the pressure is in the normal range; if it lacks refrigerant, add or refill 2. If the system has small leakage, do the leakage check.
	Too much refrigerant oil	1. Exhaust the excessive refrigerant oil and add refrigerant oil to the required volume.
	Compressor is abnormal	1. Compressor belt or clutch slips
	Air flow is small	Refer to "Air volume is abnormal" for inspection.

	Abnormal pressure	1. High pressure and low pressure is lower than the normal value. ① The expansion valve is stuck, clear the barriers. ② Expansion valve opening insufficient, adjust the expansion valve or replace it; ③ Less refrigerant, add refrigerant.
		2. High pressure and low pressure is higher than the normal value. 1 Condenser heat is not good, condensing fan air flow check, fault replacement; 2 Too much refrigerant, release some refrigerant.
		3. High pressure is lower than the normal value, the low pressure is higher than the normal value. 1 Compressor failure, lack of capacity, need to be replaced; 2 Insufficient refrigerant, add or fill.
		4. High pressure is higher than normal value, low pressure is lower than normal value 1. There are impurities in the system, blocked;
Air-conditioning system without heating	Core without hot water	Warm wind water pipe stuck, clear the stuck materials.
		Water valve damages, the hot water can not recycle, replace it.
		Engine water position is wrong, so that water does not enter the core loop; need to check and repair.
	A/C not blow air	according to “Wind volume is abnormal” inspection.
	Control malfunction	The control box temperature adjustment is damaged, the temperature throttle cannot be adjusted to the maximum heating, in this case the control box should be replaced.
Bad A/C system heating	Insufficient hot water circulation	Check if engine water supply is insufficient, or the engine malfunctions.
	Water flow inside the heat exchanger not smooth	Eliminate internal blockages, or replace the heat exchanger.
	Small outlet wind	Refer to “Air volume is abnormal” for inspection.
	Mode throttle is not correct	Temperature throttle rotation is not in place, causing a mixture of hot and cold air.
	The compressor has abnormal sound	Turn on the air conditioner, the compressor work, check if the clutch friction has noise, if it has abnormal sound, replace the compressor.
	Expansion valve abnormal sound	After turn on the air conditioning, check if the expansion valve position has flowing chirps sound, if so, adjust or replace the expansion valve.
	Air duct mechanism has abnormal noise	If there is resistance when adjust the wind damper, or if it has tick or chuckle sound; if it has such situation, paint the lubrication oil on wind dampers or replace the mechanism part.

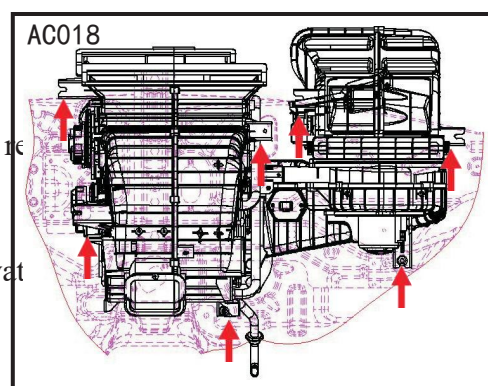
Abnormal sound in A/C system	The blower has abnormal sound	Blower volute has abnormal sound 1 With booming sound, confirm if the motor has reversing rotation, adjust the connector circuit; 2 With squeak or sizzle sound, the motor damages, replace the motor; 3 With bang-bang sound, check if there is foreign materials in the volute, disassemble it to check.
		Check if the blower is tightly assembled
	Heater exchanger core has water sound	① Step down the accelerator on the ground(compressor not open) to condenser fan high speed rotation; ② Continue to step down the accelerator, engine rotation speed>5000 rpm, last for one minute; ③ Check if there is water sound at idle or rapid accelerating state
		If so, repeat step until there is no sound of water flow.
A/C system has abnormal smell	Filter has mildew	Remove the filter, check if the surface has any serious pollution and replace it timely ;
	Radiator surface has pollution	If the evaporator and heater production surface contains grease, need to be replaced or cleaned.
	Poor condensate drainage	Exclude condensate water is not net, there is water within the shell, metamorphism, replace the drain position.

III. System removal and installation

1. Removal and installation of A/C host assembly

1)Removal

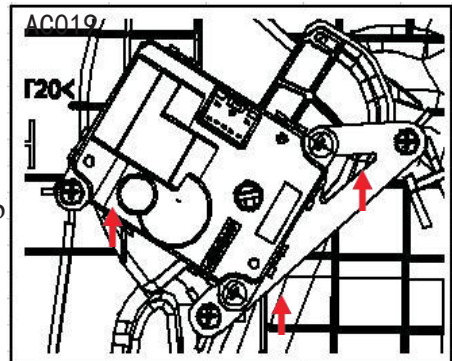
- ① Use the refrigerant recovery equipment and recover the refrigerant
- ② Disconnect the battery negative electrode.
- ③ Open the engine compartment, disconnect the blower water pump
- ④ Remove the expansion valve bolts.



- ⑤ Remove instrument panel assembly.
- ⑥ Unscrew the dashboard bracket bolt, take down the dashboard bracket.
- ⑦ Remove the fixed nut and bolt of A/C host assembly.
- ⑧ Disconnect the circuit connector, and

remove the A/C host assembly. 2) Installation

Assemble according to the opposite sequence of disassembly



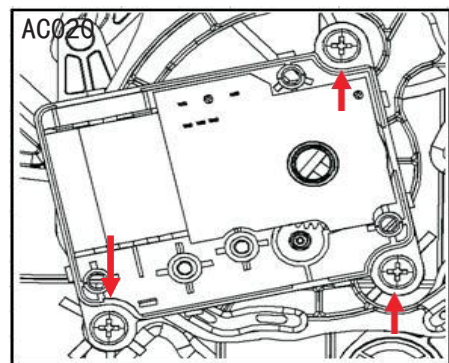
2. Removal and installation of temperature control motor

1) Removal

- ① Disconnect the battery negative connecting wire
- ② Disassemble the instrument panel
- ③ Disconnect the connector, and remove the fixing screw of the temperature control motor.
- ④ Take down the temperature control motor.

2) Installation

Assemble according to the opposite sequence of disassembly.



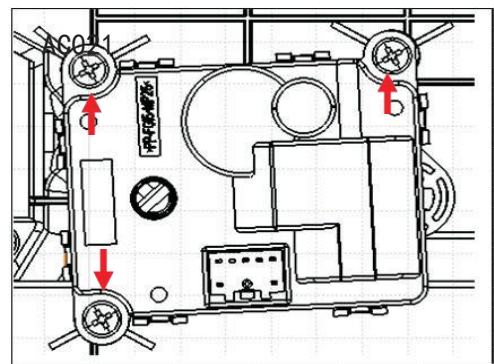
3. Dismantle mode Air Throttle Motor

1) Removal

- ① Disconnect the battery negative connecting wire
- ② Disassemble the instrument panel
- ③ Disconnect the connector, and remove the fixing screw of the mode air duct motor.
- ④ Take out the mode air

duct motor. 2) Installation

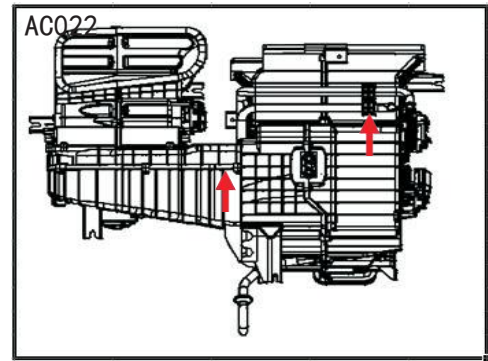
Assemble according to the opposite sequence of disassembly.



4. Removal and installation of the inner and outer circulation throttle motor

1) Removal

- ① Disconnect the battery negative connecting wire
- ② Disassemble the instrument panel
- ③ Disconnect the connector, and remove the fixing screw of the inner/outer circulation motor.
- ④ Take out the inner and outer throttle motor. 2)



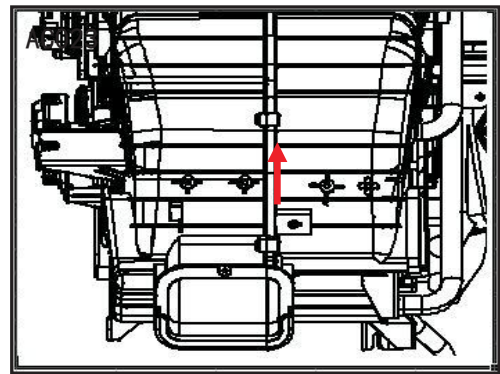
Installation

Assemble in the reverse order of removal. 5.

Removal and installation of the heater

1) Removal

- ① Dismantle the A/C host assembly.
- ② Remove the fixing bolt of the heater.
- ③ Take down the fixing guard plate, and pull out the heater outward.



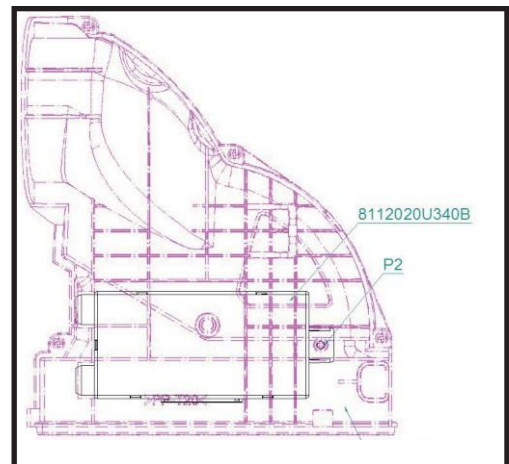
2) assembly

Assemble according to the opposite sequence of disassembly.

6. Removal and installation of the evaporator

1) Removal

- ① Dismantle the A/C host assembly.
- ② Remove the middle screws and buckles on the distribution box assembly (That's not the whole in the picture)
- ③ Remove the fastening screws around the evaporator assembly.
- ④ Pull out the evaporator assembly and heater



assembly from the middle, and take out the evaporator.

2) assembly

Assemble according to the

opposite sequence of

disassembly. 7. Removal

and installation of the A/C

panel

1) Removal of A/C panel

① Disconnect the A/C control box lower connector.

② Remove the control box fixing screw, and take out the control box.

2) Installation

Assemble in the reverse order of removal. 8. Removal and installation of condenser

1) Removal

① Use the refrigerant recovery equipment and recover the refrigerant.

② Disconnect the battery negative electrode.

③ Remove the front bumper.

④ Remove the front bumper frame.

⑤ Drain the coolant, disconnect the connection of the pipelines.

⑥ Remove the front terminal module assembly.

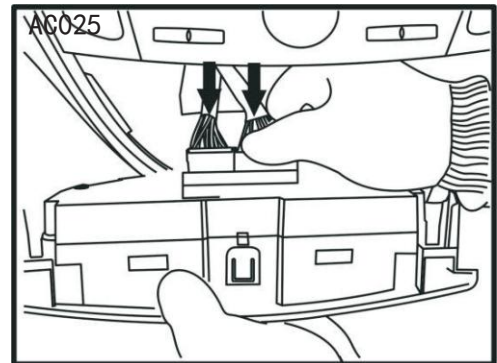
⑦ Remove the installation bolt on the condenser.

⑧ Take out the

condenser assembly. 2)

Installation

Assemble according to the opposite sequence of disassembly.



9. Removal and installation of the A/C filter

1) Function

Use of air conditioning filters, to avoid the debris outside the car into the car, to maintain a comfortable car environment.

2) Replacement cycle
Long-term non-replacement of filter will cause foreign matter to block air conditioner filter and increase blower noise increase and reduce air volume, etc.

The replacement cycle is 5,000~12,000km. Frequent inspection and replacement are required in areas with serious air pollution or poor road conditions.

It is recommended to wash and replace frequently.

3.Replace step

- ① Press down both sides of the glove box and remove the glove box.
- ② Press and pull outward the A/C filter cover buckle, remove the A/C filter cover.
- ③ Remove the A/C filter from the A/C filter cover
- ④ Install the A/C filter in the reverse order of disassembly. **Note:**

■ When replacing the filter, the concave side is located on the upper side and cannot be reversed.

Note:

■ If the exhaust speed is too high, compressor refrigeration oil will be discharged from the system.

- 4) Check the rag for trace of refrigerant oil, and close the manual valve slightly when there is a trace.
- 5) Open the low pressure manual valve slowly after the scale of the filling instrument drops to 3.5kg/cm².
- 6) In order to reduce system pressure, high pressure and low pressure manual valves should be slowly opened until the scale shows 0kg/cm².

3. Refrigeration

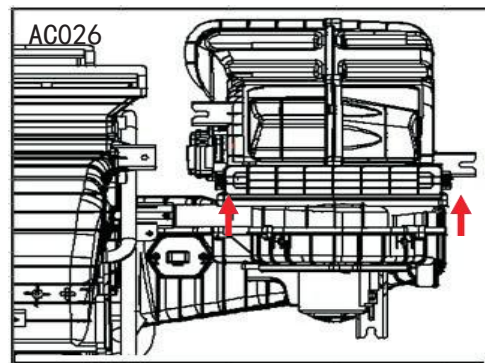
system vacuum

operation **Note:**

■ The system must be evacuated after it has been vented. This operation is to remove the air and moisture that flow into the system, the time is 15 minutes after each part is installed.

1) Check if the engine is off.

- 2) Connect the filler to the compressor connector and close both ends.
- 3) Check if refrigerant is discharged from the system.
- 4) The central line is connected to the vacuum pump suction.
- 5) Operate the vacuum pump and turn on the high pressure and low pressure valves of the filling instrument.
- 6) After 10 minutes, when the low pressure detector is greater than 0.960.96kg/cm² vacuum scale, otherwise is the system leakage, should follow the steps below to repair.



- Use the refrigerant container to fill the system.
- Leak detector leak check site, repair it.
- Discharge refrigerant and evacuate the system.
- If no signs of leaks are found, continue vacuuming.

7) Re-operate the vacuum pump

8) Both ends of the filler scale should maintain a 0.96kg/cm^2 vacuum.

9) Continue vacuuming until the scale shows 0.96kg/cm^2 .

10) After about 15 minutes of vacuum operation, close the filler pressure valve and stop the vacuum pump to disconnect the pipeline from the vacuum pump. Then fill the refrigerant.

4. Use refrigerant control valve

1) Turn the handle fully counterclockwise before connecting the valve to the refrigerant container.

2) Turn the disc counterclockwise to its highest position.

3) After the central line is connected to the valve unit, turn the disc clockwise by hand.

4) Turn the handle clockwise and drill the upper part of the seal.

5) Loosen the nut on the connection port of the filling instrument center.

6) Tighten the nuts after evacuation for a few seconds.

5. Fill refrigerant (Gas state)

Note:

- This operation is the operation of filling the gas refrigerant to the system through the low-pressure side device, in which case the refrigerant container is straightened and the gas-state refrigerant flows into the system.

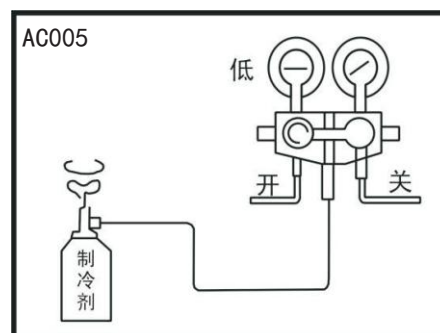
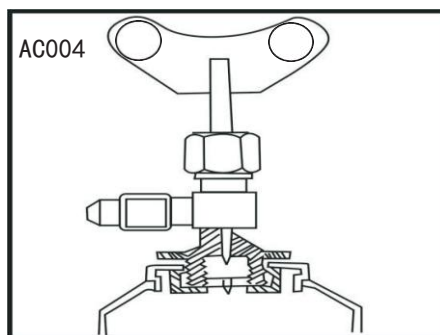
1) Install the refrigerant container to the adjusting valve.

2) Open the low-pressure valve, adjust the valve so that the low pressure rod can be controlled below 4.2kg/cm^2 .

3) Start the engine and turn on the air conditioner.

Note:

- To prevent liquid refrigerant from filling the compressor through the suction port, straighten the container.
- 4) Close the low pressure valve after filling to the specified amount.



■ Specified refrigerant filling amount: $480 \pm 20\text{g}$

1) Refrigerant filling speed is too slow, you can put the container into about 40°C water container. **Note:**

■ No matter what the situation, the water can not be heated above 52°C .

■ High temperature light can not reach the container.

6. Filling refrigerant (liquid state)

Note:

■ This operation is used when filling on the high pressure side. Reverse the refrigerant container, the refrigerant can enter the system. 1) After the system is evacuated, both ends of the high and low pressure valves should be completely closed. 2) Install the refrigerant container and adjust the valve.

3) Open the high-pressure valve completely and then invert the container.

4) When the system is overfilling, it can increase discharge pressure, so fill the correct capacity and close the high pressure valve while determining the weight of the refrigerant.

■ Specified refrigerant filling amount: $480 \pm 20\text{g}$

5) After filling the specified refrigerant, close the filler valve.

6) Use a leak detector to check for leaks or not.

Note:

■ Do not start the engine when the high-pressure side is used for filling.

■ Do not open the low-pressure valve when the liquid refrigerant is used for filling.

■ The performance test must be done before separating the filling detector.

Air conditioning control system(U3400)

I. Overview

(I) Structure Outline

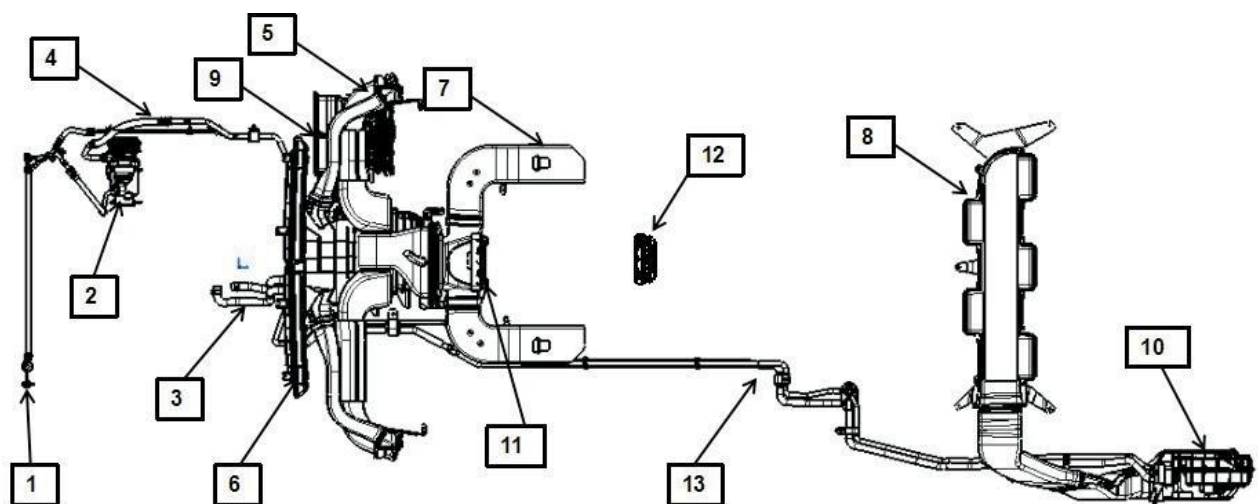
The vehicle (U340B) model uses electric control A/C system. The A/C condenser uses super-cooling type which improve the cooling performance

. To help defrost, the external cycle mode is automatically switched to when mixing and defrosting modes are selected. Condenser fan is divided to low and high phase control according to the vehicle speed, cooling water temperature, A/C refrigerant pressure. The increase of the blower wind value and the improvement of air mixture ability can enhance the cooling and warming performance.

(II) Working principle

Same with above

Components diagram



A/C system parts Schematic Diagram

1-Condenser assembly 2-Compressor assembly 3-Heater water pipe assembly 4-Pipeline and expansion valve assembly

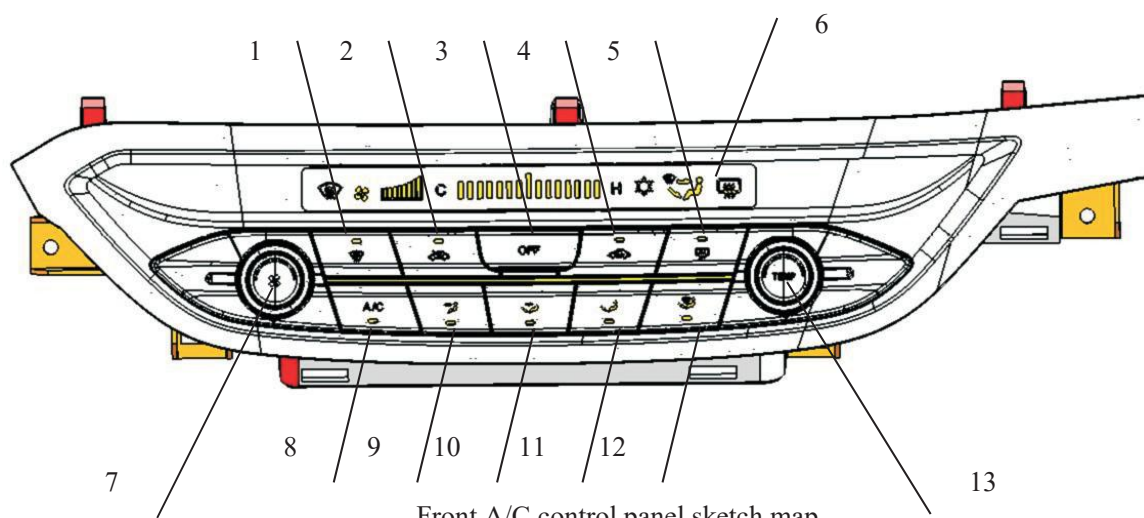
5-Blow face air duct assembly 6-Front defrost air duct assembly 7-Second row blow feet air duct assembly 8-Rear blow face air duct assembly

9-Front A/C host assembly 6-Rear A/C host host assembly 11-Front A/C controller assembly

12-Rear A/C controller assembly 13-Rear A/C pipe assembly

4. A/C control panel control type and function description

The air conditioning system adopts electric control mode, the panel is integrated with defrosting (including rearview mirror heating function) switch, wherein temperature adjustment, internal and external circulation and air outlet mode are controlled by servo motor, panel lighting is backlit, key symbols are painted with lightning sculpture, with LCD display screen. Rear A/C panel only is equipped with wind volume regulating function. The button and rotary knob functions of the air conditioning panel are shown in the figure below.

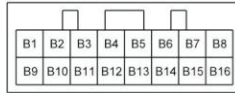
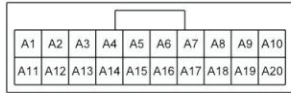


Front A/C control panel sketch map

1-Front defrost button; 2-Outer circulation button; 3-OFF button; 4-Inner circulation button; 5-Rear defrost button; 6-A/C display screen; 7-Blower wind volume rotary knob; 8-A/C compressor switch; 9-Blow face mode button; 10-Blow face blow feet mode button; 11-Blow feet mode button; 12-Blow feet defrost mode button; 13-Temperature adjusting rotary knob;

Control panel pin definition

A:AMP172257 B:172258



Control circuit principle schematic

A/C controller connector pin definition	Definition of the horn connector (component side)	
AMP172257	A1	IGN.1 key is at ON
	A2	IGN.1 key is at ON
	A3	Back light +
	A4	Back light -
	A5	Rear defrost button signal
	A6	Rear defrost indicator signal
	A7	Blower asking signal(to ECU)
	A8	Air conditioning request signal
	A9	-
	A10	GND ground wire
	A11	BATT+ battery +
	A12	-
	A13	-
	A14	Blower relay control
	A15	-
	A16	FET(D) Blower negative voltage feedback end
	A17	FET(G) Blower voltage control end FET(G)
	A18	CAN high
	A19	CAN low
	A20	GND ground wire
AMP172258	B1	Temperature motor + (towards refrigeration)
	B2	Temperature motor - (towards refrigeration)
	B3	Mode motor + (face mode)
	B4	Mode motor - (face mode)
	B5	New air return motor - (towards new air)
	B6	New air return motor - (towards new air)
	B7	-
	B8	Sensor GND sensor ground wire

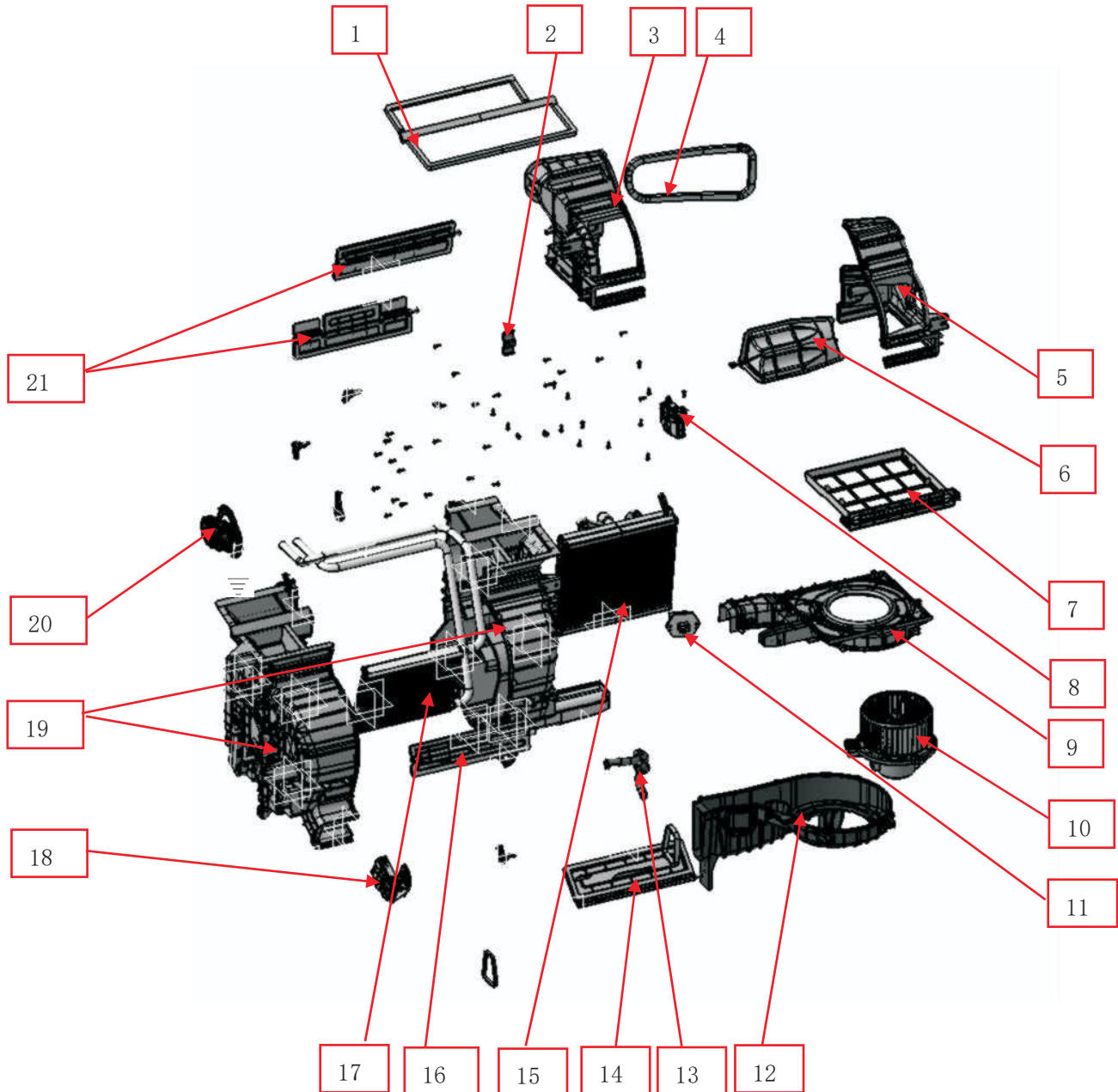
	B9	standard voltage (5V)
	B10	Temperature throttle position feedback
	B11	Mode throttle position feedback
	B12	Mode throttle position feedback
	B13	Evaporator temperature sensor signal
	B14	-
	B15	-
	B16	-

A/C control system principle diagram

Function, position and inspection of system parts

1. A/C host assembly

A/C host assembly consists of blower, expansion valve, evaporator, heater and shell. The blower intakes the external air and enters the vehicle through the evaporator and heater, so as to realize the normal operation of the air conditioning.



A/C host assembly explosive diagram

1-Blow face defrost air duct sponge 2-Warm air water inlet&outlet pipe 3-Circulation air duct left housing 4-Circulation air duct sponge
 5-Circulation air duct right housing 6-Circulation air duct 7-Filter element 8-Circulation air duct motor
 9-Blower upper housing 10-Blower assembly 11-Speed regulating resistance 12-Blower lower housing
 13-Water pipe 14-Feet mode air duct 15-Evaporator core 16-Temperature air duct
 17-Heater core 18-Temperature air duct motor 19-Distribution box 20-Mode motor 21-Mode air duct

2. Blower

Blower consists of motor and fan, using air suction throttle motor to switch inner&outer mode And inhale indoor air or outside air.

The suction port damper motor function is achieved through the controller's internal and external air buttons. In the inner circulation mode, air is taken in from two air intakes on the side; and in the outer circulation mode, through the filter on the front cover of the vehicle. At this time, the use of air blower suction, and heat exchange through the evaporator, the cooled air into the car.

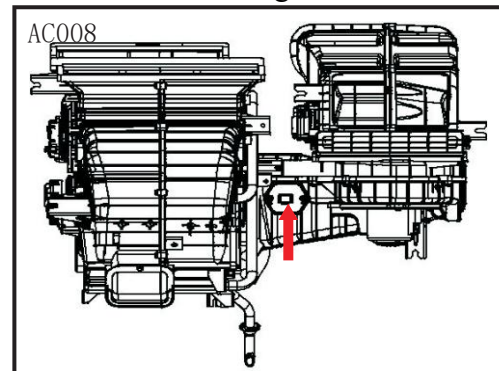
3. Adjuster module

1) Function

Blower motor speed is adjusted according to the change of output current.

2) Installation position

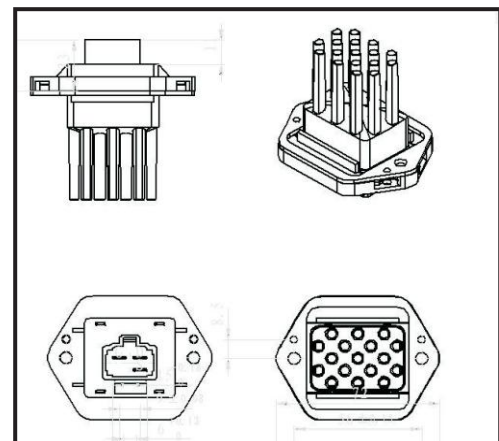
Installation position of the speed regulating module is as shown in the figure AC008



3) Exterior

Appearance of the speed regulating module is as shown in the figure AC009

AC009



4. Inner and outer cycle

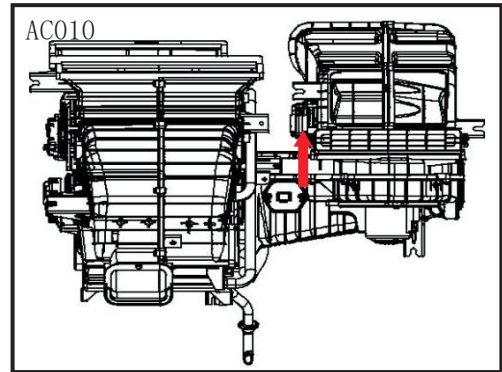
model throttle motor 1)

Function

Installed in the blower assembly, by the automatic air conditioning control buttons on the inside and outside the cycle, driven by internal and external circulation damper to achieve the conversion of the intake mode.

2) Installation position

Installation position is as shown in the figure AC010



5. Blower

motor 1)

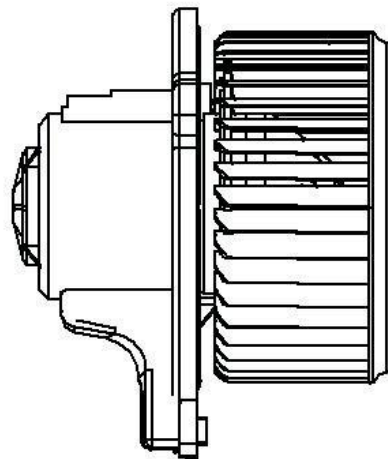
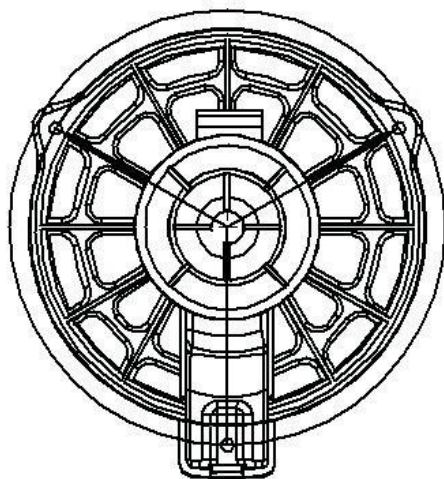
Function

Utilize the power of the vehicle, rotate the fan to form the air volume needed for the air conditioning system. 2)

Components diagram

3) Inspection method:

“+”Terminal loading arbitrary voltage,“-”terminal earthing then inspecting Normally, the higher the applied voltage, the higher the rotating speed of the blower

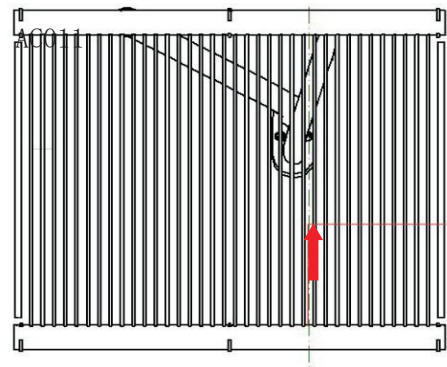


6. Evaporator temperature sensor

1) Function

Perception of the evaporator core temperature, passed to the controller to prevent the evaporator ice.

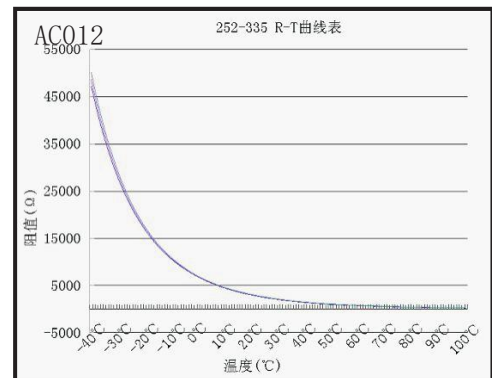
2) Installment position



Install in the evaporator core, position is shown in the figure. There is negative temperature coefficient thermistor inside the sensor, so resistance decreases as temperature decreases and resistance decreases as temperature increases.

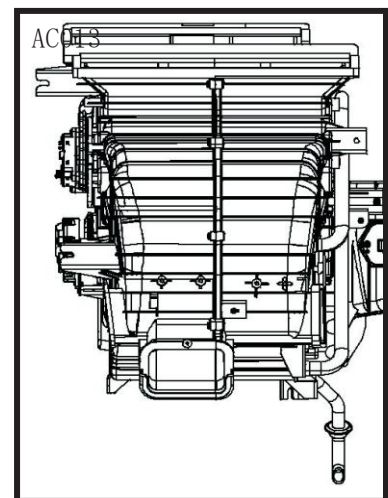
■ Parameter table (temperature-resistance-output voltage)

The compressor is switched off at 0 ° C (6.9kΩ) and the compressor is closed at 3.5 ° C (5.9kΩ). Evaporator temperature sensor parameter chart AC012



7. Evaporator and heater

After the wind sent by the blower first passes through the evaporator to cool down, according to the temperature control of the opening and closing degree of the air duct, part of the air passing through the evaporator is sent to the heater core, and the rest is sent to the upper part of the heater case. In order to control room temperature control and air mixing, the air passing through the heater core and the air flowing into the upper portion of the heater housing are mixed at the rear of the heater housing. This mixed air through the mode door motor role, was sent to the required outlet, play a vehicle interior temperature control and defrost/defogging function. Heater assembly adjust the air mixture, temperature control, the direction of the air.

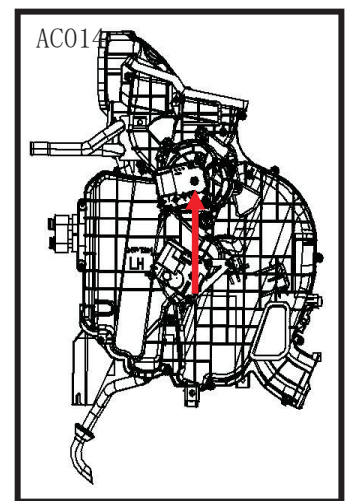


8. Mode throttle motor

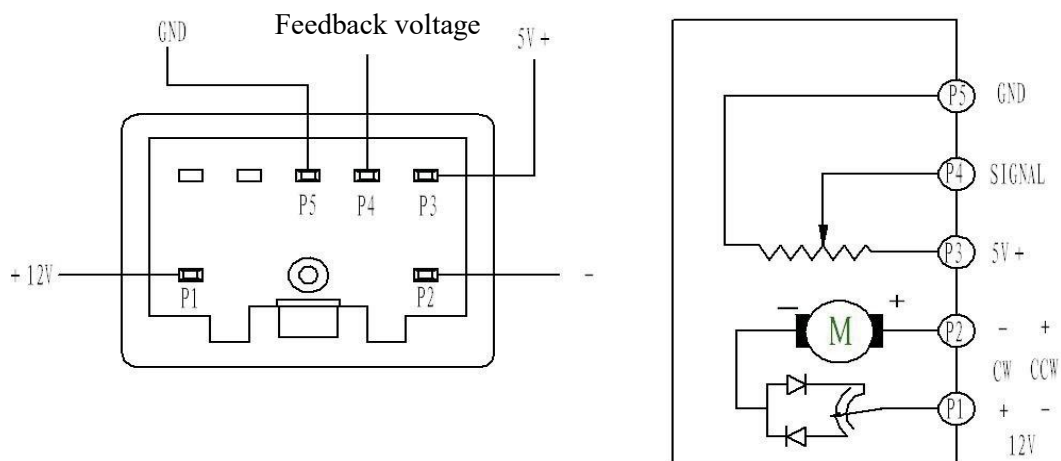
1) Function

Assembled on the left side of the heater housing, controlled by the signal from the air conditioner panel (FATC) mode switch, activates the position of the miniature motor adjustment mode damper inside the damper motor. When the motor starts to change the voltage difference is reflected in the FATC, FATC judge the feedback signal. When the throttle reaches the required position, the motor will stop working.

2) Installment position



3) Circuit principle schematic



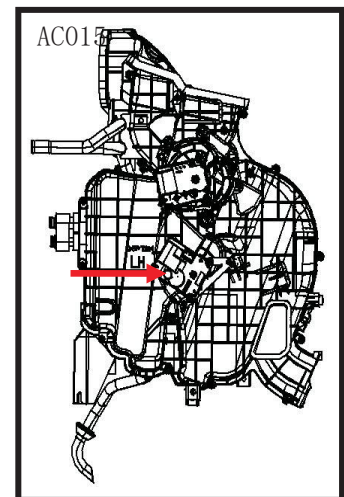
Mode throttle motor circuit diagram

9. Temperature control throttle motor

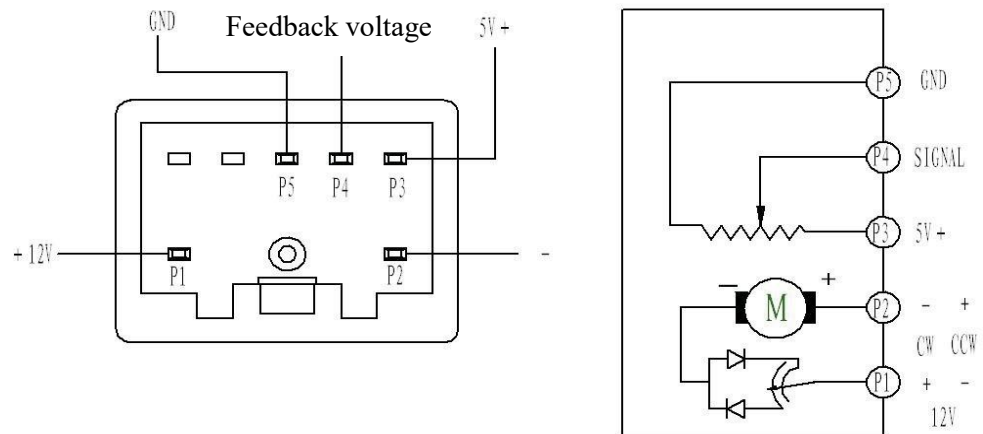
1) Function

Installed in the right part of the evaporator housing, controlled by the operation signal of the temperature control knob of the A/C control module, and starts the position of the small motor to adjust the temperature control damper. When the motor starts, the varying motor voltage difference is reflected to the A/C controller, and the A/C controller judges the reflected

signal. When the throttle reaches the required position, the motor will stop working. 2) Installation position



3) Circuit principle diagram



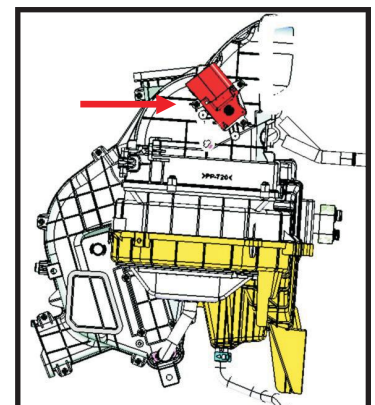
Temperature control throttle motor circuit diagram

10. Cycle model throttle motor

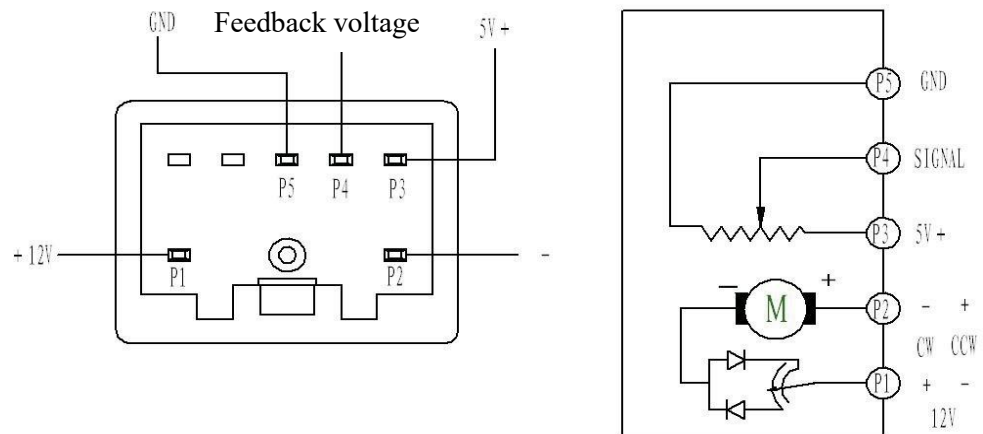
1) Function

It is installed on the right side of the air inlet of the main air conditioner and is controlled by the inner and outer circulation keys of the air conditioning controller. When the motor starts, the varying motor voltage difference is reflected to the A/C controller, and the A/C controller judges the reflected signal. When the throttle reaches the required position, the motor will stop working.

2) Installation position



3) Circuit principle schematic



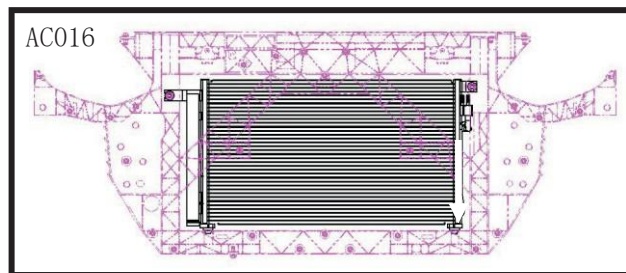
Temperature control throttle motor circuit diagram

11. Condenser and receiver drier

1) Function

The compressor from the high temperature and pressure gas refrigerant at room temperature cooling. The cooling of the condenser depends on the forced air flow of the traveling wind and the fan. The condenser of this model is a parallel flow, combined with the drying bottle. Cooling performance is improved by subcooling, reducing the amount of refrigerant required by the system and reducing the number of components in combination with the drying bottle. When the system pollution occurs, it is used to replace the drying bottle, but this model can replace the desiccant after separating the cover of the lower part of the drying bottle.

2) Installment position

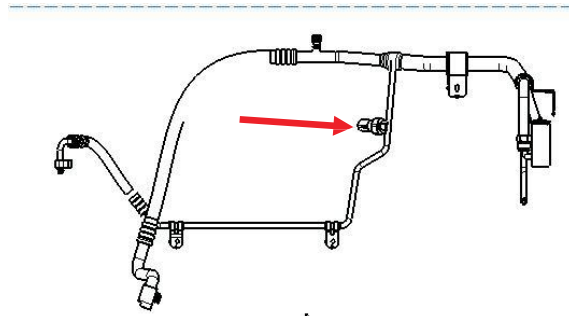


12. Three-way pressure switch

1) Function

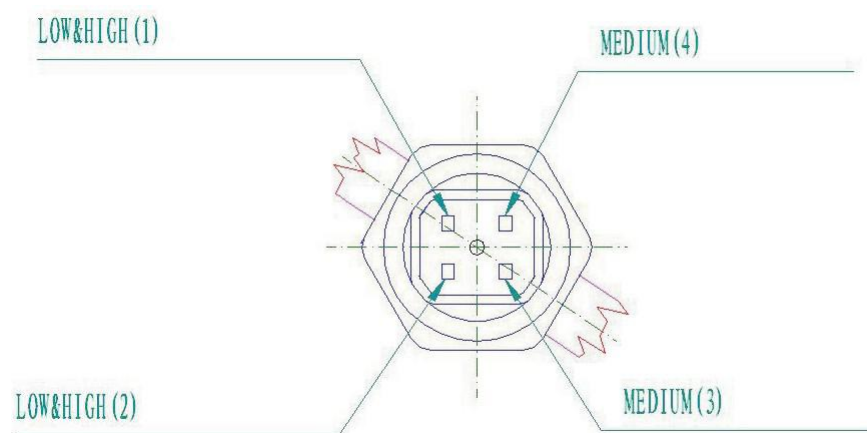
The three-way pressure switch is to add the middle pressure switch in the previous A/C two-way pressure switch; when the system pressure increase, the middle pressure switch activate and send the signal to engine control unit. In this case, the water tank fan and the condensing fan are in a high-speed state, thereby preventing the performance drop caused by the pressure increase. And it can protect the air conditioning system when the pressure (high pressure/low pressure) is abnormal.

2) Installation position

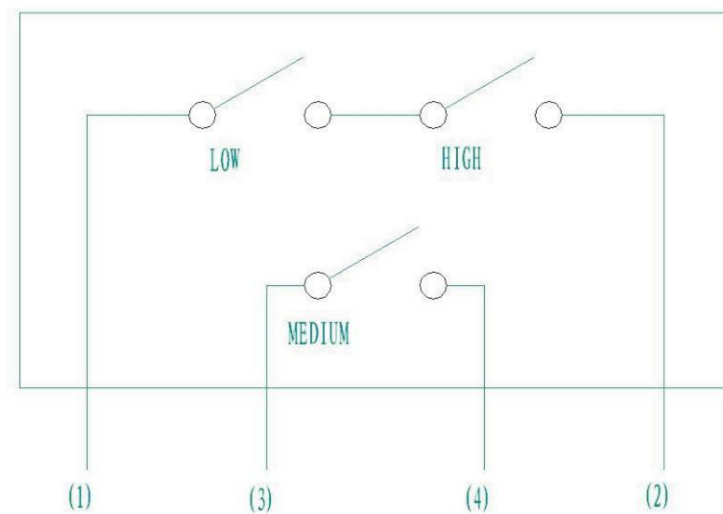


Installation position is as shown in the figure.

3) Route diagram



Three-phase pressure switch circuit diagram



4) Specification parameter

Three-phase pressure switch
specification parameter table

	HFC-134a	
High pressure	OFF	3.14Mpa
Middle pressure	ON	1.77Mpa
Low pressure	OFF	0.196Mpa

(III) Technical parameter: refrigerant filling amount 700g.

(IV) Maintenance Precautions

The following precautions must be observed when inspecting and repairing the air conditioning system. Failure to do so may result in damage to the vehicle and personal injury.

- Refrigerants have a low freezing point and high volatility. Therefore, gloves and glasses must be used to prevent chilblains and blindness caused by contact with the skin.

- If the refrigerant splashed into the eyes or contact with the skin, rinse the contact area immediately with water and must be treated with ophthalmology and dermatology. Do not rub your eyes with your hand or handkerchief.

- Ventilation must be performed at the site when performing refrigerant-related operations. Refrigerant in a closed place a lot of discharge, can lead to hypoxia.

- Refrigerant discharge allowance: 1000ppm (4184mg / m³)

Excessive discharge can cause heart and cardiovascular system, abnormal or allergic immune system; respiratory system abnormalities or skin diseases.

- When performing refrigerant-related operations, there should be no foreign matter such as moisture and dust in the surrounding environment. The flow of foreign materials into the air-conditioning system will be detrimental to the system.

- Gas leak detectors are required for refrigerant-related operations. R-134a Refrigerants contact with hot objects can produce harmful gases, so pay attention to prevent leakage.

- The vehicle air-conditioning system must use R-134a refrigerant. System components can be adversely affected by the use of other refrigerants.

- Refrigerant R-134a and R-12 re not compatible. Even a very small amount is forbidden to be mixed.

- Special attention should be paid to the fact that there is no ignition or ignition possible around the vehicle when operating in relation to the refrigerant, and the exposure of the refrigerant tank to the heat source can cause an explosion.

- The R134a container is under high pressure and must not be placed in high temperature environment. And to check whether the storage temperature is below 52°C.

■ Generally, dust cap is used to keep A/C components from sewage, dust, moisture. Dust cover should be removed before operation and sealed after operation.

■ Synthetic oil (PAG) frozen oil suitable for R-134a absorbs water more easily than R-12 and is 10 times more absorbent than MINERAL oil. Excessive moisture affects the compressor, lubrication and durability.

■ The impact of moisture on the air conditioning system is very bad, so it is best to avoid rainy days operation.

■ Air-conditioning system and then install the O-ring seal must be coated with frozen oil, especially the bolt-type connection parts manually installed before using two wrenches assembly.

■ When assembling the flange connection part, the nut and the bolt should be

connected while pushing the pipe lightly.

■ When in air-conditioning installation, the use of more than the specified torque assembly or O-ring clamping force is too large will lead to refrigerant leakage, so it must be in accordance with the provisions of the operation.

■ Hose can not be distorted.

■ Never completely separate the air conditioning system until it has been completely recovered. If the separation before recovery, the system pressure under the influence of refrigerant and refrigerant discharge, will pollute the surrounding environment.

■ When replacing air conditioning components, refrigerant must be added

when adding (type: PAG). Refrigerant oil

Replace the pipeline	adding volume chart 30 cc	Replace the evaporator	30 cc
Replace the condenser	30 cc	-	-

When replacing a compressor, the amount of refrigerant oil discharged from the old compressor is subtracted from the specified amount of 120ml.

The result is the amount of refrigerant oil that needs to be discharged from the new compressor.

Specified Quantity - Amount of Refrigerant Expelled in Old Compressor = Amount of Refrigerant Expelled in New Compressor.

Note: Do not discharge more than 50ml of oil from the new compressor even if there is no discharge from the disassembled compressor.

II. Troubleshooting

Common fault phenomenon and solution

Common fault diagnosis list

Malfunction Symptom	Possible malfunction reason	Troubleshooting
Air-conditioning system without refrigerant	There is a leak in the system	1. Visual examination: 1 Observe the connection parts of each part for grease, once there are leaks here. You can use soapy water painted on suspicious sites, to see if there are bubbles; 2 Observe abnormalities in the various components, condenser and evaporator core surface scratched, crushed, bumps;
		2. Listen for the "sizzling" sound in the part position by vacuuming; If there is a leak here;
		3. Check with the instrument: 1 Electronic leak detector testing, high sensitivity 2 Dye tracing leak detection;
System oil is not appropriate	Replace the system components, in accordance with the provisions of supplement or reduce	1. First confirm the frozen oil specifications, can not be mixed; General Specifications: PAG;
		2. After the recovery of refrigerant: add about 30g of frozen oil;
		3. Replace the compressor, pour out all the frozen oil in the compressor and add the same oil as in the replaced compressor;
		4. Replace the pipe: add about 30g of frozen oil;
		5. Replace the condenser: add about 60g of frozen oil;
		6. Replace the evaporator: add about 50g of frozen oil;
		7. Replace the receiver drier: add about 10g of frozen oil;
Wind volume is abnormal	No wind from A/C	1. Circuit faults: 1 Check if the motor circuit and the connector is loosen; 2 Fuse off or damaged, replace it; relay damage, replace the relay;
		2. Mechanical fault 1 Motor damages, replace it; 2 Temperature throttle body damage, can not adjust the damper to the cooling state, replace it; 3 Controller damage, replace it; speed control module damage, replace it;
	air volume is small than normal	1. Insufficient voltage, check the power supply battery
		2. If the air duct is stuck or if the grille is fully opened
		Blowing wind whether there is leakage; check
		4. Adjuster module faults, replace it
		5. If the wind resistance of the air filter is too big, or there is dust or foreign materials blockage.
		6. Motor reversely rotates, adjust the positive and negative terminal of the connector
	System without refrigerant	Pressure gauge test, see "refrigerant leak" inspection;

Not cooling	No wind blowing	Refer to “Air volume is abnormal” for inspection.
	Compressor doesn't work	1. Electromagnetic wave not work 1 The fuse is burned, replace it 2 Connector loosen or damage in the circuit, check the wire harness and replace. 3 Relay is burnt, replace it. 4 The clutch is burnt, disassemble the clutch assembly, repair or replace it.
		2. Drive belt is broken, replace;
		3. Signal obstructed 1 Pressure switch damaged, no pressure signal; short signal detection, damage replacement; 2 ECU with faults, check and repair;
Bad cooling performance	Refrigerant not enough	1. Check if the pressure is in the normal range; if it lacks refrigerant, add or refill
		2. If the system has small leakage, do the leakage check.
	Too much refrigerant oil	1. Exhaust the excessive refrigerant oil and add refrigerant oil to the required volume.
	Compressor is abnormal	1. Compressor belt or clutch slips
	Air flow is small	Refer to “Air volume is abnormal” for inspection.
	Abnormal pressure	1. High pressure and low pressure is lower than the normal value. 1 The expansion valve is stuck, clear the barriers. 2 Expansion valve opening insufficient, adjust the expansion valve or replace it; 3 Less refrigerant, add refrigerant.
		2. High pressure and low pressure is higher than the normal value. 1 Condenser heat is not good, condensing fan air flow check, fault replacement; 2 Too much refrigerant, release some refrigerant.
		3. High pressure is lower than the normal value, the low pressure is higher than the normal value. 1 Compressor failure, lack of capacity, need to be replaced; 2 Insufficient refrigerant, add or fill.
		4. High pressure is higher than normal value, low pressure is lower than normal value 1. There are impurities in the system, blocked;
Air-conditioning system without heating	Core without hot water	Warm wind water pipe stuck, clear the stuck materials.
		Water valve damages, the hot water can not recycle, replace it.
		Engine water position is wrong, so that water does not enter the core loop; need to check and repair.
	A/C not blow air	according to “Wind volume is abnormal” inspection.
Bad A/C system heating	Control malfunction	Controller temperature adjusting damages, can not adjust the air damper to maxim heating, replace the controller.
	Insufficient hot water circulation	Check if engine water supply is insufficient, or the engine malfunctions.

	Water flow inside the heat exchanger not smooth	Eliminate internal blockages, or replace the heat exchanger.
	Small outlet wind	Refer to“Air volume is abnormal”for inspection.
	Mode throttle is not correct	Temperature throttle rotation is not in place, causing a mixture of hot and cold air.
Abnormal sound in A/C system	The compressor has abnormal sound	Turn on the air conditioner, the compressor work, check if the clutch friction has noise, if it has abnormal sound, replace the compressor.
	Expansion valve abnormal sound	After turn on the air conditioning, check if the expansion valve position has flowing chirps sound, if so, adjust or replace the expansion valve.
	Wind dampers mechanism abnormal sound	If there is resistance when adjust the wind damper, or if it has tick or chuckle sound; if it has such situation, paint the lubrication oil on wind dampers or replace the mechanism part.
	The blower has abnormal sound	Blower volute has abnormal sound 1 With booming sound, confirm if the motor has reversing rotation, adjust the connector circuit; 2 With squeak or sizzle sound, the motor damages, replace the motor; 3 With bang-bang sound, check if there is foreign materials in the volute, disassemble it to check.
		Check if the blower is tightly assembled
	Heater exchanger core has water sound	① Step down the accelerator on the ground(compressor not open) to condenser fan high speed rotation; ② Continue to step down the accelerator, engine rotation speed>5000 rpm, last for one minute; ③ Check if there is water sound at idle or rapid accelerating state If so, repeat step until there is no sound of water flow.
A/C system has abnormal smell	Filter has mildew	Remove the filter, check if the surface has any serious pollution and replace it timely.
	Radiator surface has pollution	If the evaporator and heater production surface contains grease, it need to be replaced or cleaned.
	Poor condensate drainage	Exclude condensate water is not net, there is water within the shell, metamorphism, replace the drain position.

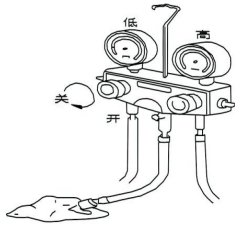
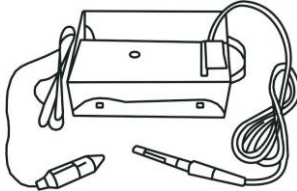
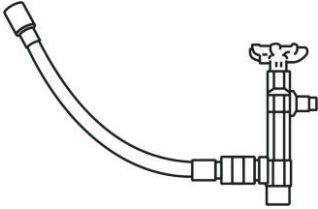
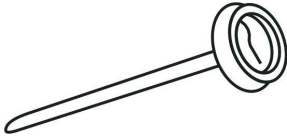
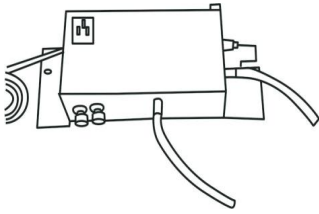
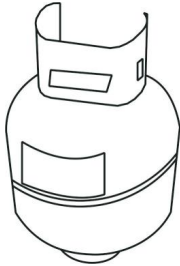
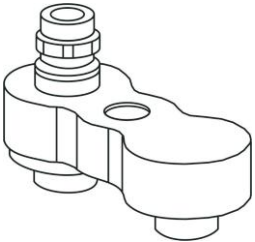
III. Disassembly and Assembly

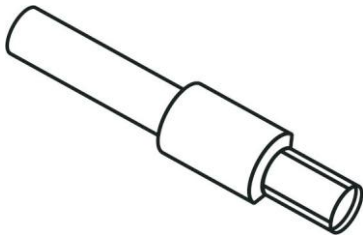
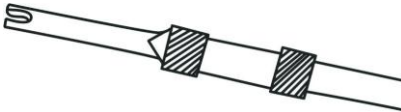
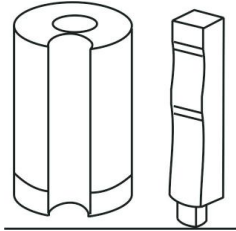
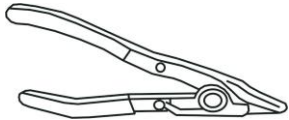
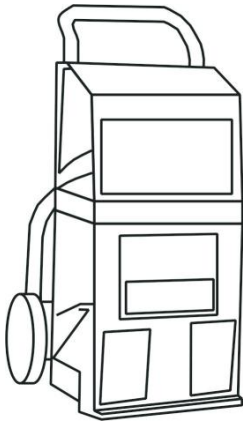
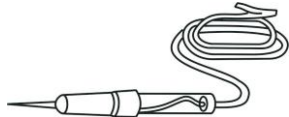
Tool: General tools are needed for maintenance.

(I) A/C system maintenance tools list

Tool List

Tool Designation	Tool picture	Tool name	Tool picture
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Digital multimeter		High strength invisible light	
Suture pliers		R-134A manifold gauge	
Halogen leak detector		Tracer color injector	
R134A tracer pigment		precision thermometer	
Forward direction flow control valve		Shaft seal protecti on device	
50 pound reload type recycling tank		Pressure experim ent adapter	
Tool Designation	Tool picture	Tool name	Tool picture

Air conditioning system lip seal removal tool		O-shape sealing ring removal tool	
Valve core removal and installation tool		O-shape sealing ring installation tool	
Spruing calliper		Spruing calliper	
Refrigerant recovery/regeneration, refilling system		Passive test light	

(II). System removal and installation 1. Removal and installation of A/C host assembly

1) Removal

① Use the refrigerant recovery equipment and recover the refrigerant.

② Disconnect the battery negative electrode.

③ Open the engine compartment, disconnect the blower water pipe connector

④ Remove the expansion valve bolts.

⑤ Remove instrument panel assembly.

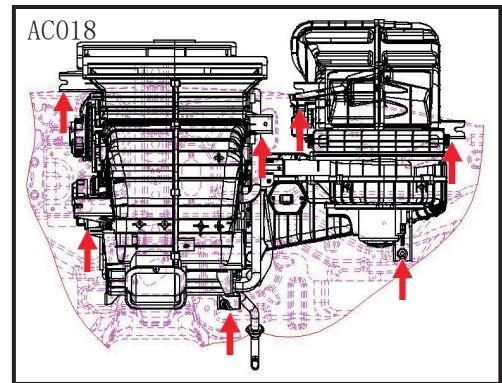
⑥ Unscrew the dashboard bracket bolt, take down the dashboard bracket.

⑦ Remove the fixed nut and bolt of A/C host assembly.

⑧ Disconnect the circuit connector, and

remove the A/C host assembly. 2) Installation

Assemble according to the opposite sequence of disassembly.



2. Removal and installation of temperature control motor

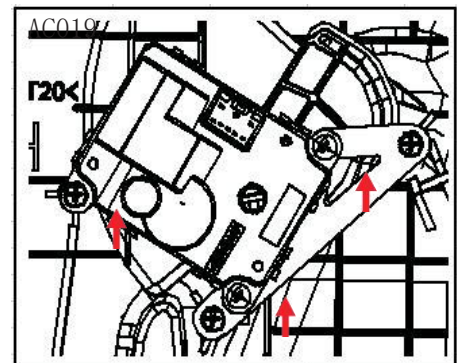
1) Removal

① Disconnect the battery negative connecting wire

② Disassemble the instrument panel

③ Disconnect the connector, and remove the fixing screw of the temperature control motor.

④ Take down the temperature control motor.



2) Installation

Assemble in the reverse order of removal.

3. Dismantle mode Air Throttle Motor

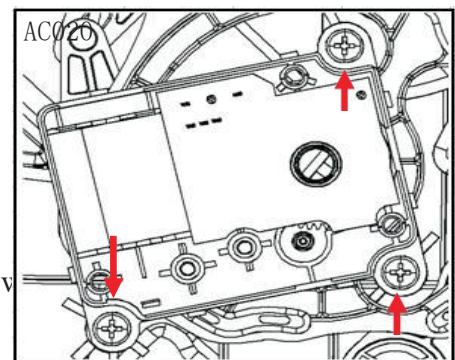
1) Dismantling

① Disconnect the battery negative connecting wire

② Disassemble the instrument panel

③ Disconnect the connector, and remove the fixing screw

④ Take out the mode air duct motor.



2) Installation

Assemble in the reverse order of removal.

4. Removal and installation of the inner and outer circulation throttle motor

1) Dismantling

① Disconnect the battery negative connecting wire

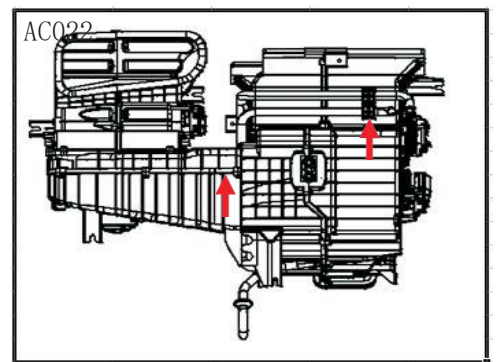
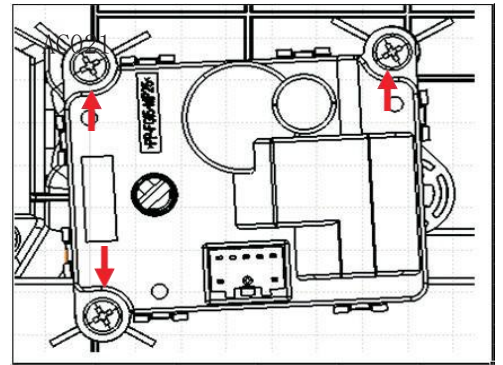
② Disassemble the instrument panel

③ Disconnect the connector, and remove the fixing screw of the inner/outer circulation motor.

④ Take out the inner and outer throttle motor. 2)

Installation

Assemble according to the opposite sequence of disassembly.



5. Removal and installation of the heater 1)

Removal

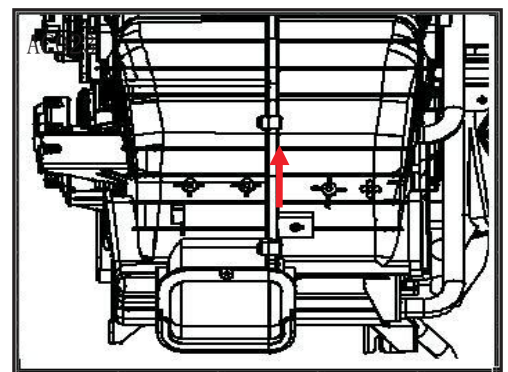
① Dismantle the A/C host assembly.

② Remove the fixing bolt of the heater.

③ Take down the fixing guard plate, and pull out the heater outward.

2) assembly

Assemble according to the opposite sequence of disassembly.



6. Removal and installation of the evaporator 1)

Removal

① Dismantle the A/C host assembly.

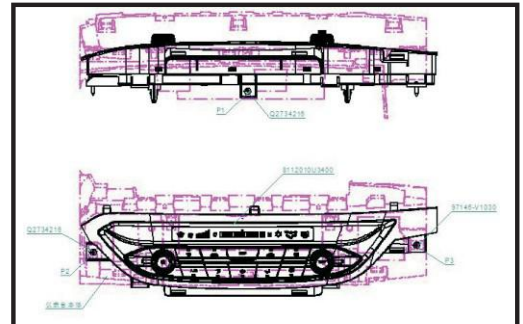
- ② Remove the middle screws and buckles on the distribution box assembly (That's not the whole in the picture)
- ③ Remove the fastening screws around the evaporator assembly.
- ④ Pull out the evaporator assembly and heater assembly from the middle, and take out the evaporator.

2) assembly

Assemble according to the opposite sequence of disassembly.

7. Removal and installation of A/C panel

1) Front A/C panel removal



- ① Remove the soft cover of the central control, and remove the fixing screw of the controller.
- ② Take out the controller and pull out the two connectors behind.

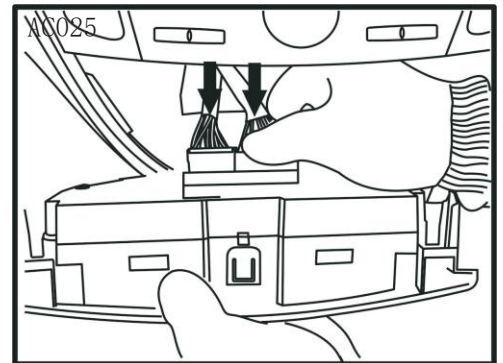
2) Installation

Assemble in the reverse order of removal.

8. Removal and installation of condenser

1) Removal

- ① Use the refrigerant recovery equipment and recover the refrigerant.
- ② Disconnect the battery negative electrode.
- ③ Remove the front bumper.
- ④ Remove the front bumper frame.
- ⑤ Drain the coolant, disconnect the connection of the pipelines.
- ⑥ Remove the front terminal module assembly.
- ⑦ Remove the installation bolt on the condenser.
- ⑧ Take out the condenser assembly.



2) Installation

Assemble according to the opposite sequence of disassembly.

9. Removal and installation of the A/C filter

1) Function

Use of air conditioning filters, to avoid the debris outside the car into the car, to maintain a comfortable car environment.

2) Replacement cycle

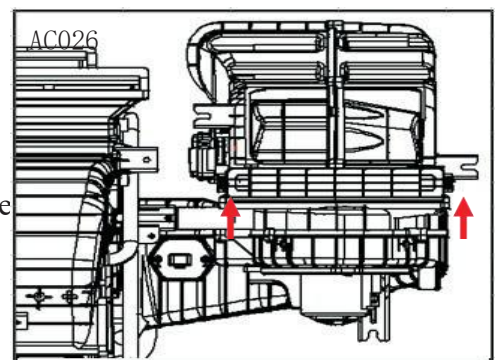
Long-term non-replacement of filter will cause foreign matter to block air conditioner filter and increase blower noise increase and reduce air volume, etc. The replacement cycle is 5,000~12,000km. Frequent inspection and replacement are required in areas with serious air pollution or poor road conditions.

It is recommended to wash and replace frequently.

3. Replace step

- ① Press down both sides of the glove box and remove the glove box.
- ② Press and pull outward the A/C filter cover

buckle, remove the A/C filter cover.



- ③ Remove the A/C filter from the A/C filter cover
- ④ Install the A/C filter in the reverse order of disassembly.

Note:

- When replacing the filter, the concave side is located on the upper side and cannot be reversed.

A/C inspection and
refrigerant adding 1.

Install refrigerant refill
device

- 1) Turn off the manual valve on both ends of the refrigerant injector.

2) The refill tube of the refrigerant injector is mounted on the connection. Low-pressure pipe in the low-pressure nozzle, high-pressure pipe in the high-pressure nozzle, use hand to tighten the nut after connection.

2. Refrigerant exhaust operation

- 1) Connect the refrigerant injector to system.

- 2) Place a clean rag on the central hose opening.
- 3) Gradually open the high pressure manual valve and discharge the refrigerant.

Note:

- If the exhaust speed is too high, compressor refrigeration oil will be discharged from the system.
- 4) Inspect the rag for traces of frozen oil, and close the manual valve slightly when there is a trace.
- 5) Open the low pressure manual valve slowly after the scale of the filling instrument drops to 3.5kg/cm².
- 6) In order to reduce system pressure, high pressure and low pressure manual valves should be slowly opened until the scale shows 0kg/cm².

3. Refrigeration system vacuum operation

Note:

- The system must be evacuated after it has been vented. This operation is to remove the air and moisture that flow into the system, the time is 15 minutes after each part is installed.

- 1) Check if the engine is off.
- 2) Connect the filler to the compressor connector and close both ends.
- 3) Check if refrigerant is discharged from the system.
- 4) The central line is connected to the vacuum pump suction.
- 5) Operate the vacuum pump and turn on the high pressure and low pressure valves of the filling instrument.
- 6) After 10 minutes, the low pressure detector scale is greater than 0.96kg/cm² vacuum,

otherwise the system leaks and should be repaired according to the following steps.

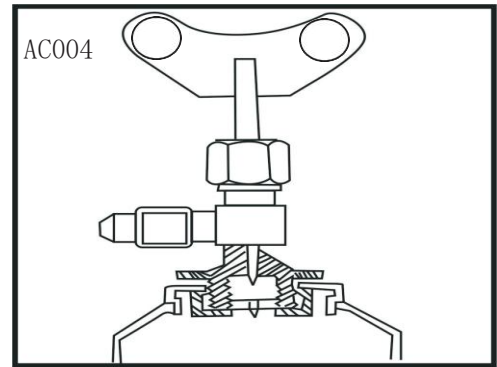
- Use the refrigerant container to fill the system.
- Leak detector leak check site, repair it.
- Discharge refrigerant and evacuate the system.
- If no signs of leaks are found, continue vacuuming.
- 7) Re-operate the vacuum pump

- 8) Both ends of the filler scale should maintain a 0.96kg/cm² vacuum.

- 9) Continue vacuuming until the scale shows 0.96kg/cm².

10) After about 15 minutes of vacuum operation, close the gauge pressure valve and stop the vacuum pump to disconnect the line from the vacuum pump. Then fill the refrigerant.

4. Use refrigerant control valve
 - ① Turn the handle fully counterclockwise before connecting the valve to the refrigerant container.
 - ② Turn the disc counterclockwise to its highest position.
 - ③ After the central line is connected to the valve unit, turn the disc clockwise by hand.
 - ④ Turn the handle clockwise and drill the upper part of the seal.
 - ⑤ Loosen the nut on the connection port of the filling instrument center.
 - ⑥ Tighten the nuts after evacuation for a few seconds.



5. Fill refrigerant (Gas state)

Note:

- This operation is the operation of filling the gas refrigerant to the system through the low-pressure side device, in which case the refrigerant container is straightened and the gas-state refrigerant flows into the system.
- 1) Install the refrigerant container to the adjustment valve.
 - 2) Open the low-pressure valve, adjust the valve so that the low pressure rod can be controlled below 4.2kg/cm^2 .
 - 3) Start the engine and turn on the air conditioner.

Note:

- To prevent liquid refrigerant from filling the compressor through the suction port straighten the container
- 4) Close the low pressure valve after filling the specified amount.

■ Refrigerant charging capacity: $480 \pm 20\text{g}$

- 5) If the refrigerant filling speed is too slow, the container can be put into the water container at

about 40°C . **Note:**

- No matter what the situation, the water can not be heated above 52°C .
 - High temperature light can not reach the container
6. Fill refrigerant (Liquid state)

■ **Note:**

■ This operation is used when filling on the high pressure side. Reverse the refrigerant container, the refrigerant can enter the system.

1) After the system is evacuated, both ends of the high and low pressure valves should be completely closed.

2) Install the refrigerant container and adjust the valve.

3) Open the high-pressure valve completely and then invert the container.

4) When the system is overfilling, it can increase discharge pressure,

so fill the correct capacity and close the high pressure valve while determining the weight of the refrigerant.

■ Refrigerant charging capacity: $480 \pm 20\text{g}$

5) After filling the specified refrigerant, close the filler valve. 6) Use a leak detector to detect leakage.

Note:

■ Do not start the engine when the high-pressure side is used for filling.

■ Do not open the low-pressure valve when the liquid refrigerant is used for filling.

■ The performance test must be done before separating the filling detector.

Air conditioning control system(3401)

— Outline

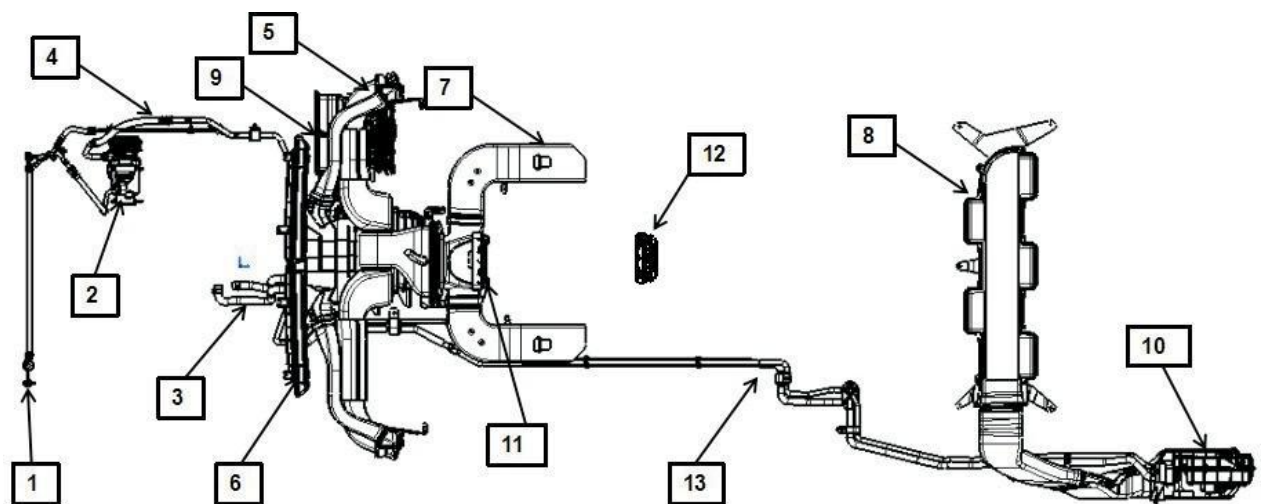
(I) Structure Outline

The vehicle (V5000, V5002, V5020, V5022) model uses electric control A/C system. The A/C condenser uses super-cooling type, which improve the cooling performance. To help defrost, the external cycle mode is automatically switched to when mixing and defrosting modes are selected. Condenser fan is divided to low and high phase control according to the vehicle speed, cooling water temperature, A/C refrigerant pressure. The increase of the blower wind value and the improvement of air mixture ability can enhance the cooling and warming performance.

(II) Working principle

Same with the above

Components diagram

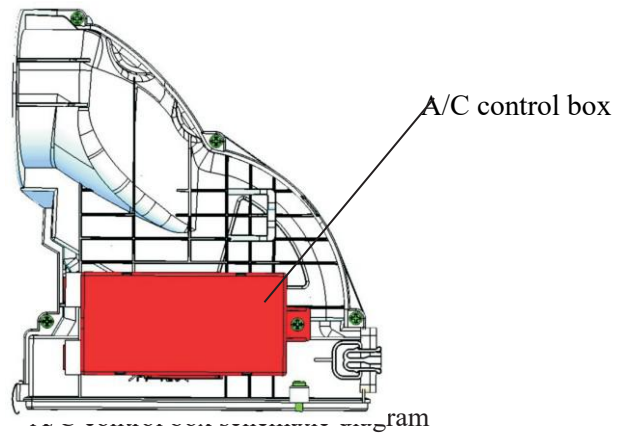


A/C system parts Schematic Diagram

- 1-Condenser assembly 2-Compressor assembly 3-Heater water pipe assembly 4-Pipeline and expansion valve assembly
5-Blow face air duct assembly 6-Front defrost air duct assembly 7-Second row blow feet air duct assembly 8-Rear blow face air duct assembly
9-Front A/C host assembly 6-Rear A/C host host assembly 11-Front A/C control box assembly
12-Rear A/C control box assembly 13-Rear A/C pipe assembly

4. A/C control box control type and function description

The air conditioning system adopts electric control mode, the air conditioning panel is integrated in the central control panel (touch control), the specific air conditioning system control is completed by the control box, the control box is installed on the left side of the air inlet of the A/C host. In addition to the general air conditioning control functions, but also with voice, remote control and other functions, air conditioning information in MP5 display.



Control panel pin definition

Control box connector type: AMP1318384

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20
A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40

Control circuit principle schematic

A/C control box connector pin definition		Definition of the horn connector (component side)
AMP172257 AMP172258	A1	IGN.1 key is at ON
	A2	IGN.1 key is at ON
	A3	-
	A4	-
	A5	-
	A6	-
	A7	Blower on signal
	A8	Compressor request signal
	A9	-
	A10	GND ground wire
	A11	-
	A12	-
	A13	Temperature motor + (towards refrigeration)
	A14	Temperature motor - (towards refrigeration)
	A15	Mode motor + (face mode)
	A16	Mode motor - (face mode)
	A17	New air return motor - (towards new air)
	A18	New air return motor - (towards new air)
	A19	-
	A20	Sensor GND sensor ground wire
	A21	BATT+ battery +
	A22	-
	A23	-
	A24	Blower relay control
	A25	-
	A26	FET(D) Blower negative voltage feedback end
	A27	FET(G) Blower voltage control end
	A28	CANH
	A29	CANL
	A30	GND ground wire
	A31	-

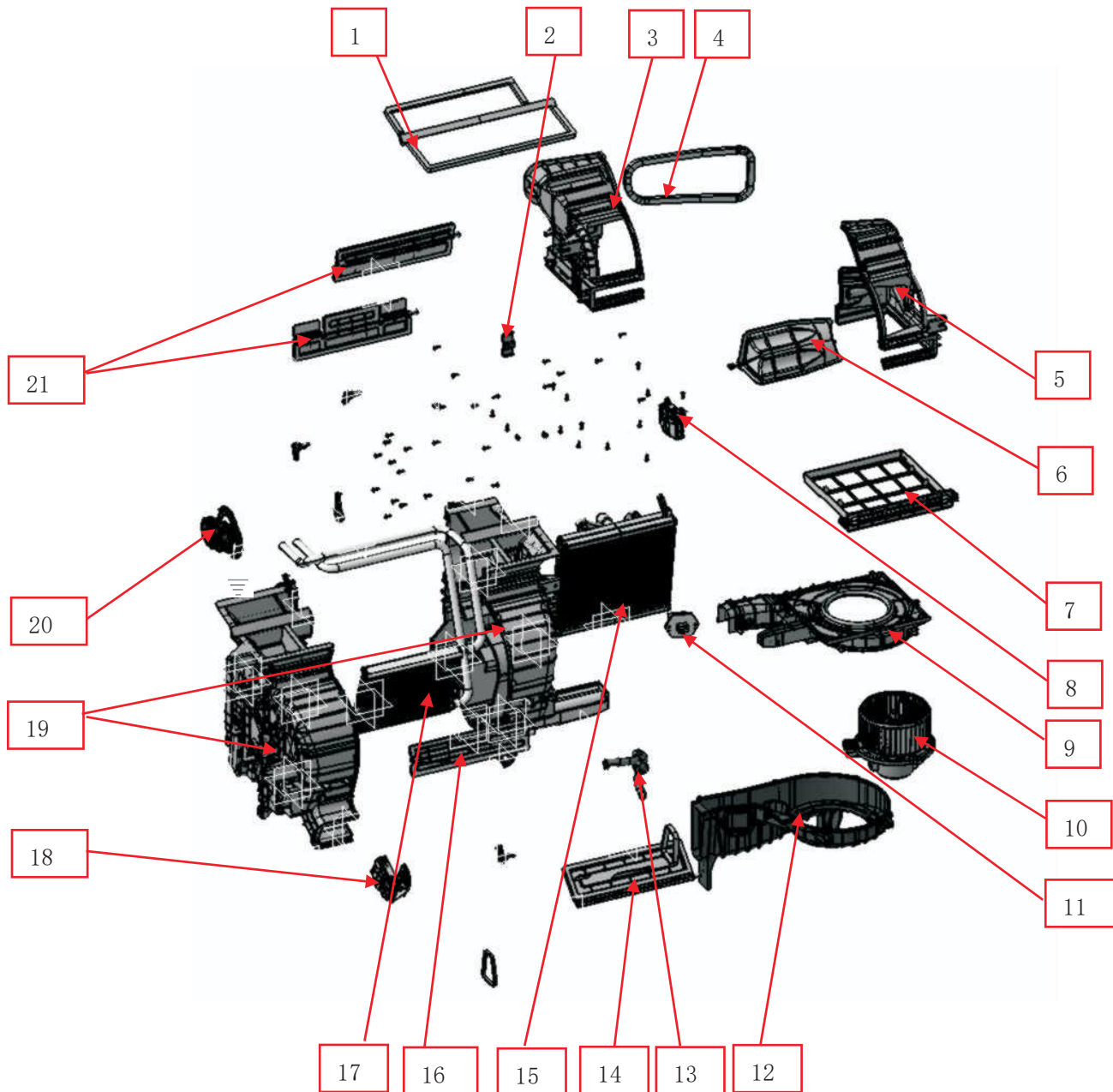
	A32	-
	A33	REF+5V Reference voltage (5V)
	A34	Temperature throttle position feedback
	A35	Mode throttle position feedback
	A36	New air return throttle position feedback
	A37	Evaporator temperature sensor signal
	A38	-
	A39	-
	A40	-

A/C control system principle diagram

Function, position and inspection of system parts

1. A/C host assembly

A/C host assembly consists of blower, expansion valve, evaporator, heater and shell. The blower intakes the external air and enters the vehicle through the evaporator and heater, so as to realize the normal operation of the air conditioning.



A/C host assembly explosive diagram

1-Blow face defrost air duct sponge 2-Warm air water inlet&outlet pipe 3-Circulation air duct left housing 4-Circulation air duct sponge
5-Circulation air duct right housing 6-Circulation air duct 7-Filter element 8-Circulation air duct motor
9-Blower upper housing 10-Blower assembly 11-Speed regulating resistance 12-Blower lower housing
13-Water pipe 14-Feet mode air duct 15-Evaporator core 16-Temperature air duct
17-Heater core 18-Temperature air duct motor 19-Distribution box 20-Mode motor 21-Mode air duct

2. Blower

Blower consists of motor and fan, using air suction throttle motor to switch inner&outer mode And inhale indoor air or outside air.

The suction port damper motor function is achieved through the controller's internal and external air buttons. In the inner circulation mode, air is taken in from two air intakes on the side; and in the outer circulation mode, through the filter on the front cover of the vehicle. At this time, the use of air blower suction, and heat exchange through the evaporator, the cooled air into the car.

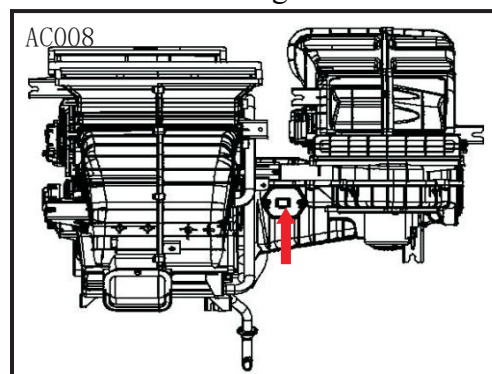
3. Adjuster module

1) Function

Blower motor speed is adjusted according to the change of output current.

2) Installation position

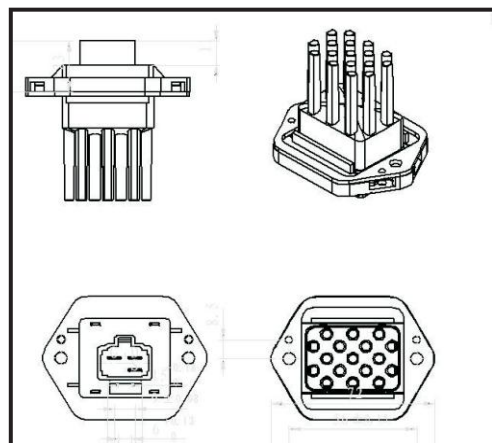
Installation position of the speed regulating module is as shown in the figure AC008



3) Exterior

Appearance of the speed regulating module is as shown in the figure AC009

AC009



4. Inner and outer cycle

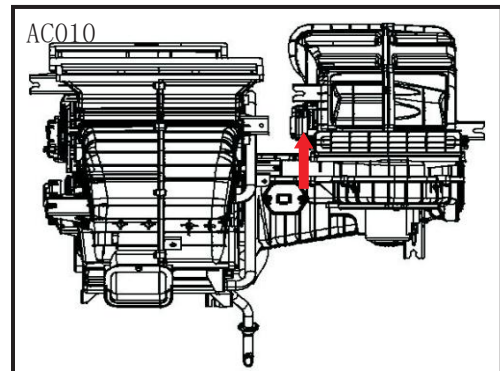
model throttle motor 1)

Function

Installed in the blower assembly, by the automatic air conditioning control buttons on the inside and outside the cycle, driven by internal and external circulation damper to achieve the conversion of the intake mode.

2) Installation position

Installation position is as shown in the figure AC010



5. Blower

motor 1)

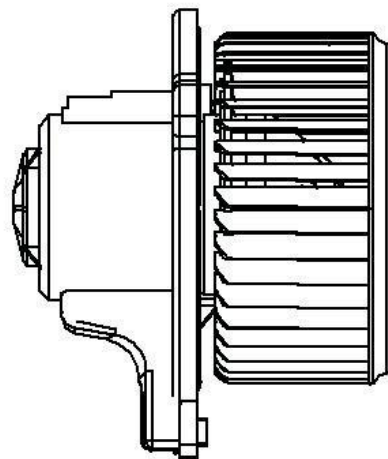
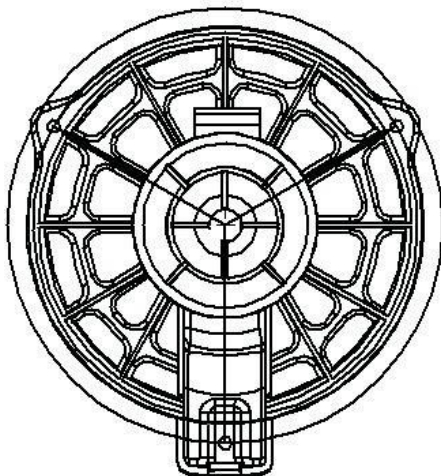
Function

Utilize the power of the vehicle, rotate the fan to form the air volume needed for the air conditioning system. 2)

Components diagram

3) Inspection method:

“+”Terminal loading arbitrary voltage,“-”terminal earthing then inspecting Normally, the higher the applied voltage, the higher the rotating speed of the blower

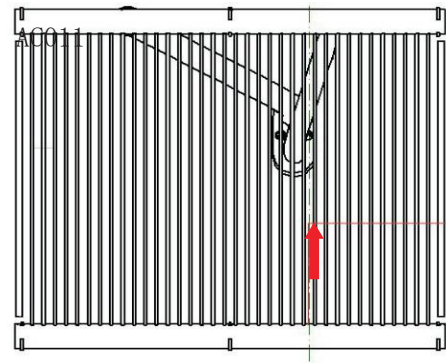


6. Evaporator temperature sensor

1) Function

Perception of the evaporator core temperature, passed to the controller to prevent the evaporator ice.

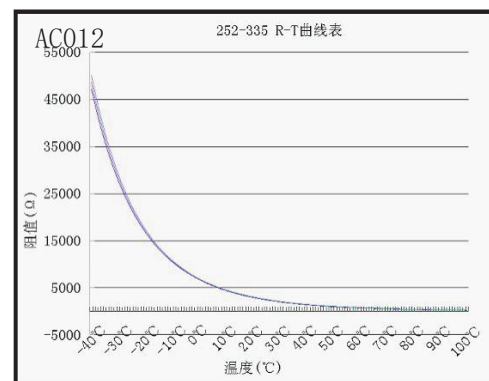
2) Installment position



Install in the evaporator core, position is shown in the figure. There is negative temperature coefficient thermistor inside the sensor, so resistance decreases as temperature decreases and resistance decreases as temperature increases.

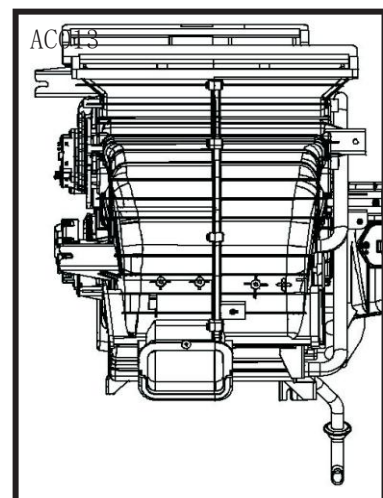
■ Parameter table (temperature-resistance-output voltage)

The compressor is switched off at 0 ° C (6.9k Ω) and the compressor is closed at 3.5 ° C (5.9k Ω). Evaporator temperature sensor parameter chart AC012



7. Evaporator and heater

After the wind sent by the blower first passes through the evaporator to cool down, according to the temperature control of the opening and closing degree of the air duct, part of the air passing through the evaporator is sent to the heater core, and the rest is sent to the upper part of the heater case. In order to control room temperature control and air mixing, the air passing through the heater core and the air flowing into the upper portion of the heater housing are mixed at the rear of the heater housing. This mixed air through the mode door motor role, was sent to the required outlet, play a vehicle interior temperature control and defrost/defogging function. Heater assembly adjust the air mixture, temperature control, the direction of the air.

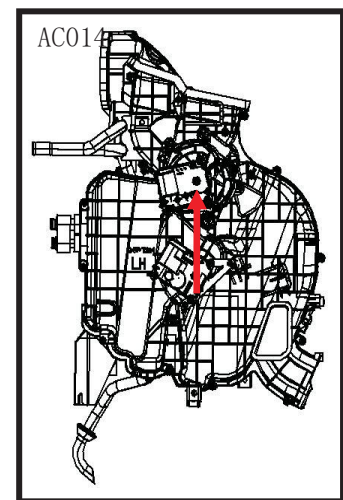


8. Mode throttle motor

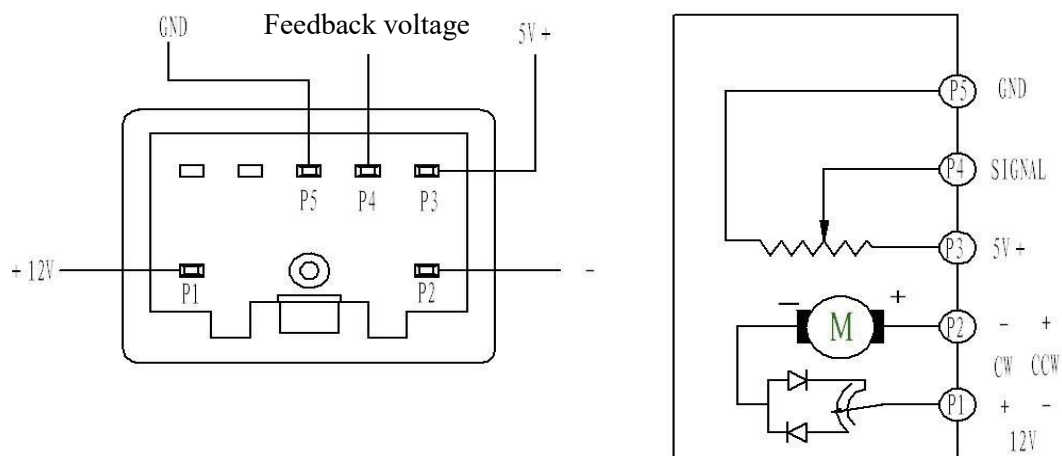
1) Function

Assembled on the left side of the heater housing, controlled by the signal from the air conditioner panel (FATC) mode switch, activates the position of the miniature motor adjustment mode damper inside the damper motor. When the motor starts to change the voltage difference is reflected in the FATC, FATC judge the feedback signal. When the throttle reaches the required position, the motor will stop working.

2) Installment position



3) Circuit principle schematic



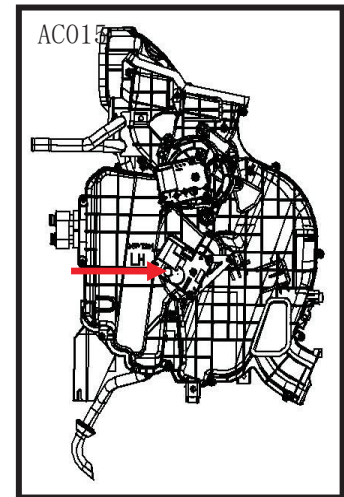
Mode throttle motor circuit diagram

9. Temperature control throttle motor

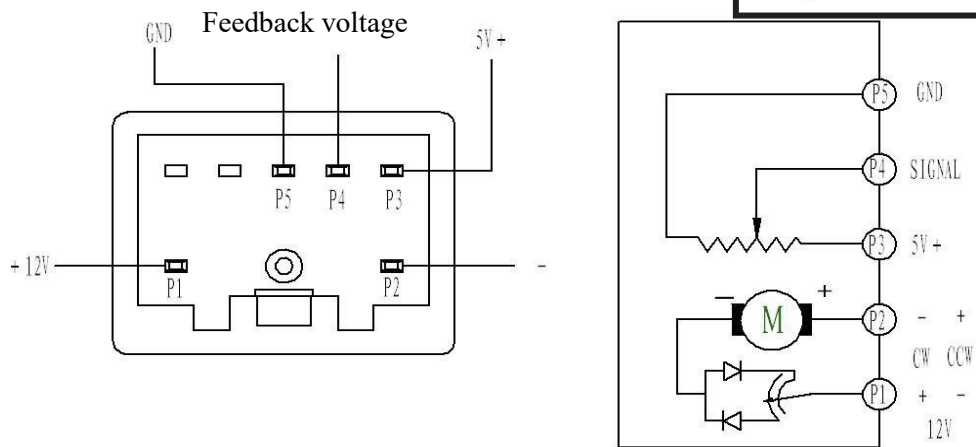
1) Function

Installed in the right part of the evaporator housing, controlled by the operation signal of the temperature control knob of the A/C control module, and starts the position of the small motor to adjust the temperature control damper. The motor voltage difference that changes when the motor starts is reflected to the air conditioning control box, and the air conditioning control box judges the reflected

signal. When the throttle reaches the required position, the motor will stop working. 2) Installation position



3) Circuit principle diagram



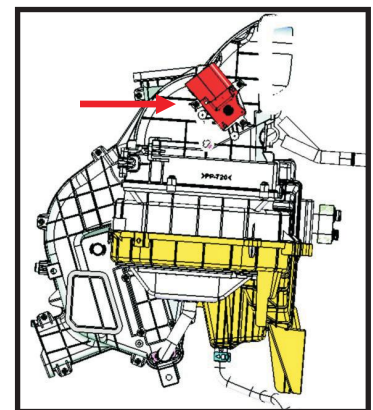
Temperature control throttle motor circuit diagram

10. Cycle model throttle motor

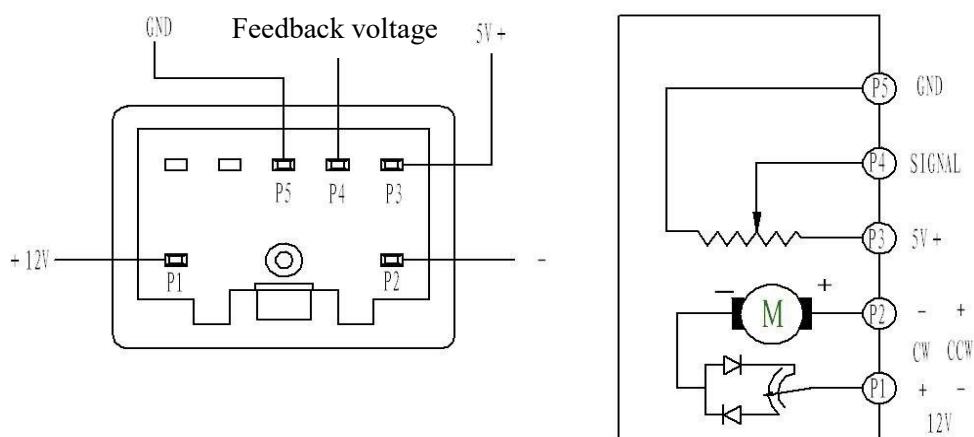
1) Function

It is installed on the right side of the air inlet of the main air conditioner and is controlled by the inner and outer circulation keys of the air conditioning control box. The motor voltage difference that changes when the motor starts is reflected to the air conditioning control box, and the air conditioning control box judges the reflected signal. When the throttle reaches the required position, the motor will stop working.

2) Installation position



3) Circuit principle schematic



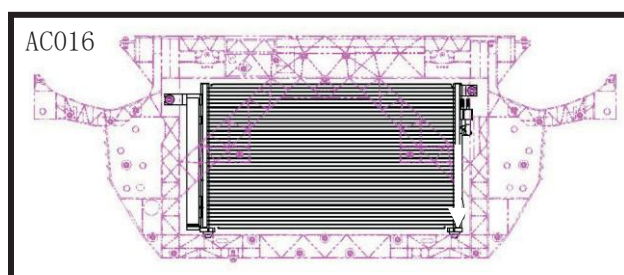
Temperature control throttle motor circuit diagram

11. Condenser and receiver drier

1) Function

The compressor from the high temperature and pressure gas refrigerant at room temperature cooling. The cooling of the condenser depends on the forced air flow of the traveling wind and the fan. The condenser of this model is a parallel flow, combined with the drying bottle. Cooling performance is improved by subcooling, reducing the amount of refrigerant required by the system and reducing the number of components in combination with the drying bottle. When the system pollution occurs, it is used to replace the drying bottle, but this model can replace the desiccant after separating the cover of the lower part of the drying bottle.

2) Installment position

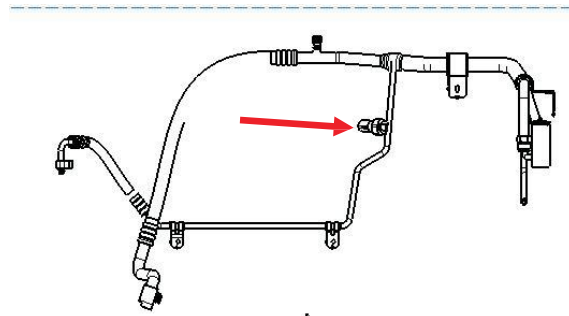


12. Three-way pressure switch

1) Function

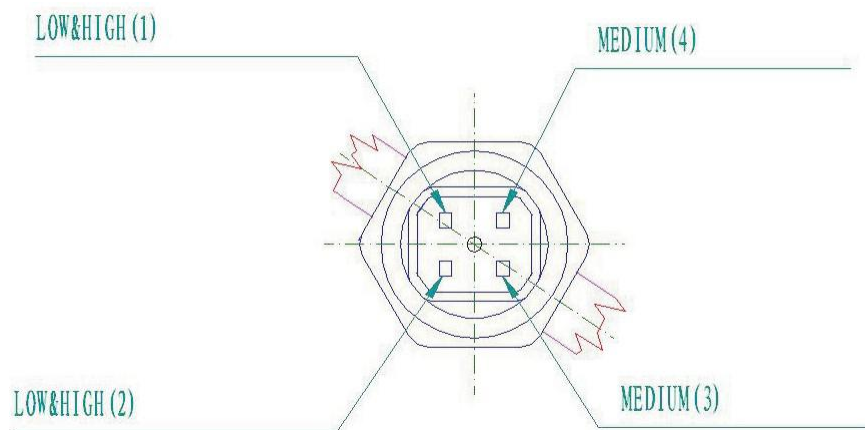
The three-way pressure switch is to add the middle pressure switch in the previous A/C two-way pressure switch; when the system pressure increase, the middle pressure switch activate and send the signal to engine control unit. In this case, the water tank fan and the condensing fan are in a high-speed state, thereby preventing the performance drop caused by the pressure increase. And it can protect the air conditioning system when the pressure (high pressure/low pressure) is abnormal.

2) Installation position

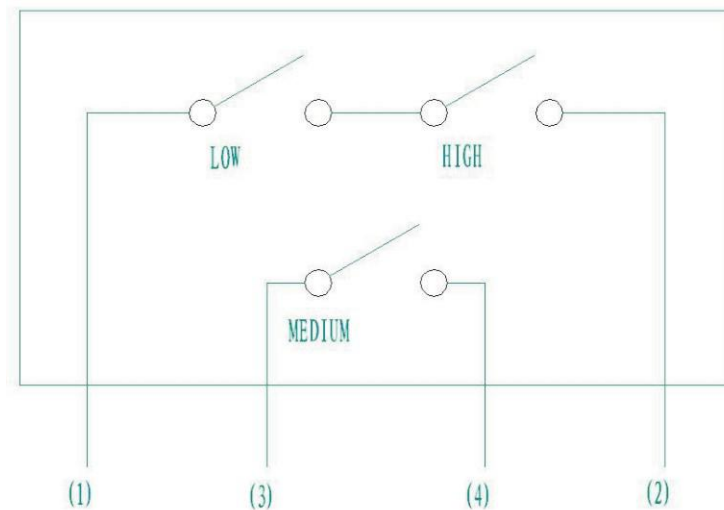


Installation position is as shown in the figure.

3) Route diagram



Three-phase pressure switch circuit diagram



4) Specification parameter

Three-phase pressure switch specification
parameter table

	HFC-134a	
High pressure	OFF	3.14Mpa
Middle pressure	ON	1.77Mpa
Low pressure	OFF	0.196Mpa

(III) Technical parameter: refrigerant filling amount 700g.

(IV) Maintenance Precautions

The following precautions must be observed when inspecting and repairing the air conditioning system. Failure to do so may result in damage to the vehicle and personal injury.

- Refrigerants have a low freezing point and high volatility. Therefore, gloves and glasses must be used to prevent chilblains and blindness caused by contact with the skin.

- If the refrigerant splashed into the eyes or contact with the skin, rinse the contact area immediately with water and must be treated with ophthalmology and dermatology. Do not rub your eyes with your hand or handkerchief.

- Ventilation must be performed at the site when performing refrigerant-related operations. Refrigerant in a closed place a lot of discharge, can lead to hypoxia.

- Refrigerant discharge allowance: 1000ppm (4184mg / m³)

Excessive discharge can cause heart and cardiovascular system, abnormal or allergic immune system; respiratory system abnormalities or skin diseases.

- When performing refrigerant-related operations, there should be no foreign matter such as moisture and dust in the surrounding environment. The flow of foreign materials into the air-conditioning system will be detrimental to the system.

- Gas leak detectors are required for refrigerant-related operations. R-134a Refrigerants contact with hot objects can produce harmful gases, so pay attention to prevent leakage.

- The vehicle air-conditioning system must use R-134a refrigerant. System components can be adversely affected by the use of other refrigerants.

- Refrigerant R-134a and R-12 re not compatible. Even a very small amount is forbidden to be mixed.

- Special attention should be paid to the fact that there is no ignition or ignition possible around the vehicle when operating in relation to the refrigerant, and the exposure of the refrigerant tank to the heat source can cause an explosion.

- The R134a container is under high pressure and must not be placed in high temperature environment. And to check whether the storage temperature is

below 52°C.

■ Generally, dust cap is used to keep A/C components from sewage, dust, moisture. Dust cover should be removed before operation and sealed after operation.

■ Synthetic oil (PAG) frozen oil suitable for R-134a absorbs water more easily than R-12 and is 10 times more absorbent than MINERAL oil. Excessive moisture affects the compressor, lubrication and durability.

■ The impact of moisture on the air conditioning system is very bad, so it is best to avoid rainy days operation.

■ Air-conditioning system and then install the O-ring seal must be coated with frozen oil, especially the bolt-type connection parts manually installed before using two wrenches assembly.

■ When assembling the flange connection part, the nut and the bolt should be connected while pushing the pipe lightly.

■ When in air-conditioning installation, the use of more than the specified torque assembly or O-ring clamping force is too large will lead to refrigerant leakage, so it must be in accordance with the provisions of the operation.

■ Hose can not be distorted.

■ Never completely separate the air conditioning system until it has been completely recovered. If the separation before recovery, the system pressure under the influence of refrigerant and refrigerant discharge, will pollute the surrounding environment.

■ When replacing air conditioning components, refrigerant must be added when adding (type: PAG). Refrigerant oil adding volume chart

Replace the pipeline	30 cc	Replace the evaporator	30 cc
Replace the condenser	30 cc	-	-

When replacing a compressor, the amount of refrigerant oil discharged from the old compressor is subtracted from the specified amount of 120ml.

The result is the amount of refrigerant oil that needs to be discharged from the new compressor.

Specified Quantity - Amount of Refrigerant Expelled in Old Compressor = Amount of Refrigerant Expelled in New Compressor.

Note: Do not discharge more than 50ml of oil from the new compressor even if there is no discharge from the disassembled compressor.

II. Troubleshooting

Common fault phenomenon and solution

Common fault diagnosis list

Malfunction Symptom	Possible malfunction reason	Troubleshooting
Air-conditioning system without refrigerant	There is a leak in the system	1. Visual examination: ① Observe the connection parts of each part for grease, once there are leaks here. You can use soapy water painted on suspicious sites, to see if there are bubbles; ② Observe abnormalities in the various components, condenser and evaporator core surface scratched, crushed, bumps;
		2. Listen for the "sizzling" sound in the part position by vacuuming; If there is a leak here;
		3. Check with the instrument: 1 Electronic leak detector testing, high sensitivity 2 Dye tracing leak detection;
System oil is not appropriate	Replace the system components, in accordance with the provisions of supplement or reduce	1. First confirm the frozen oil specifications, can not be mixed; General Specifications: PAG;
		2. After the recovery of refrigerant: add about 30g of frozen oil;
		3. Replace the compressor, pour out all the frozen oil in the compressor and add the same oil as in the replaced compressor;
		4. Replace the pipe: add about 30g of frozen oil;
		5. Replace the condenser: add about 60g of frozen oil;
		6. Replace the evaporator: add about 50g of frozen oil;
		7. Replace the receiver drier: add about 10g of frozen oil;
Wind volume is abnormal	No wind from A/C	1. Circuit faults: ① Check if the motor circuit and the connector is loosen; ② Fuse off or damaged, replace it; relay damage, replace the relay;
		2. Mechanical fault 1 Motor damages, replace it; 2 Temperature throttle body damage, can not adjust the damper to the cooling state, replace it; 3 Control box damaged, replace it; speed control module damage, replace it;
	air volume is small than normal	1. Insufficient voltage, check the power supply battery
		2. If the air duct is stuck or if the grille is fully opened
		Blowing wind whether there is leakage; check
		4. Adjuster module faults, replace it
		5. If the wind resistance of the air filter is too big, or there is dust or foreign materials blockage.

		6. Motor reversely rotates, adjust the positive and negative terminal of the connector
	System without refrigerant	Pressure gauge test, see "refrigerant leak" inspection;
Not cooling	No wind blowing	Refer to "Air volume is abnormal" for inspection.
	Compressor doesn't work	1. Electromagnetic wave not work 1 The fuse is burned, replace it 2 Connector loosen or damage in the circuit, check the wire harness and replace. 3 Relay is burnt, replace it. 4 The clutch is burnt, disassemble the clutch assembly, repair or replace it.
		2. Drive belt is broken, replace;
		3. Signal obstructed 1 Pressure switch damaged, no pressure signal; short signal detection, damage replacement; 2 ECU with faults, check and repair;
		4. Compressor inner broken, replace;
Bad cooling performance	Refrigerant not enough	1. Check if the pressure is in the normal range; if it lacks refrigerant, add or refill
		2. If the system has small leakage, do the leakage check.
	Too much refrigerant oil	1. Exhaust the excessive refrigerant oil and add refrigerant oil to the required volume.
	Compressor is abnormal	1. Compressor belt or clutch slips
	Air flow is small	Refer to "Air volume is abnormal" for inspection.
	Abnormal pressure	1. High pressure and low pressure is lower than the normal value. 1 The expansion valve is stuck, clear the barriers. 2 Expansion valve opening insufficient, adjust the expansion valve or replace it; 3 Less refrigerant, add refrigerant.
		2. High pressure and low pressure is higher than the normal value. 1 Condenser heat is not good, condensing fan air flow check, fault replacement; 2 Too much refrigerant, release some refrigerant.
		3. High pressure is lower than the normal value, the low pressure is higher than the normal value. 1 Compressor failure, lack of capacity, need to be replaced; 2 Insufficient refrigerant, add or fill.
		4. High pressure is higher than normal value, low pressure is lower than normal value 1. There are impurities in the system, blocked;
		Warm wind water pipe stuck, clear the stuck materials.

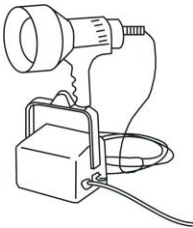
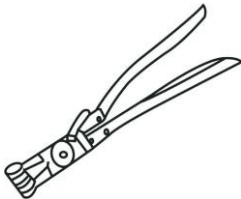
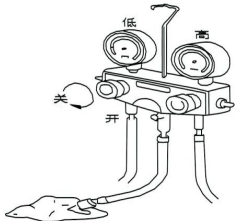
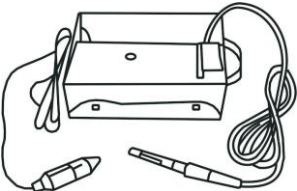
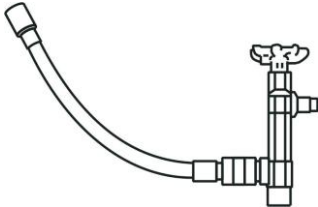
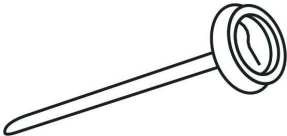
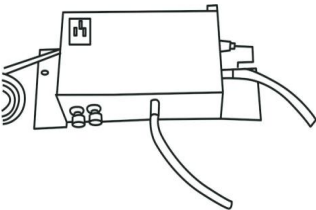
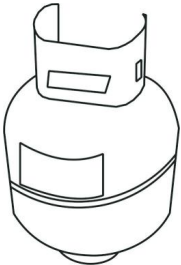
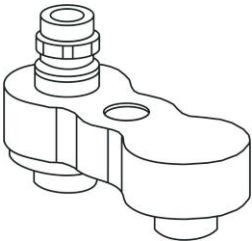
Air-conditioning system without heating	Core without hot water	Water valve damages, the hot water can not recycle, replace it.
		Engine water position is wrong, so that water does not enter the core loop; need to check and repair.
	A/C not blow air	according to "Wind volume is abnormal" inspection.
	Control malfunction	The control box temperature adjustment is damaged, the temperature throttle cannot be adjusted to the maximum heating, in this case the control box should be replaced.
Bad A/C system heating	Insufficient hot water circulation	Check if engine water supply is insufficient, or the engine malfunctions.
	Water flow inside the heat exchanger not smooth	Eliminate internal blockages, or replace the heat exchanger.
	Small outlet wind	Refer to "Air volume is abnormal" for inspection.
	Mode throttle is not correct	Temperature throttle rotation is not in place, causing a mixture of hot and cold air.
Abnormal sound in A/C system	The compressor has abnormal sound	Turn on the air conditioner, the compressor work, check if the clutch friction has noise, if it has abnormal sound, replace the compressor.
	Expansion valve abnormal sound	After turn on the air conditioning, check if the expansion valve position has flowing chirps sound, if so, adjust or replace the expansion valve.
	Wind dampers mechanism abnormal sound	If there is resistance when adjust the wind damper, or if it has tick or chuckle sound; if it has such situation, paint the lubrication oil on wind dampers or replace the mechanism part.
	The blower has abnormal sound	Blower volute has abnormal sound 1 With booming sound, confirm if the motor has reversing rotation, adjust the connector circuit; 2 With squeak or sizzle sound, the motor damages, replace the motor; 3 With bang-bang sound, check if there is foreign materials in the volute, disassemble it to check.
		Check if the blower is tightly assembled
	Heater exchanger core has water sound	① Step down the accelerator on the ground (compressor not open) to condenser fan high speed rotation; ② Continue to step down the accelerator, engine rotation speed > 5000 rpm, last for one minute; ③ Check if there is water sound at idle or rapid accelerating state If so, repeat step until there is no sound of water flow.
A/C system has abnormal smell	Filter has mildew	Remove the filter, check if the surface has any serious pollution and replace it timely.
	Radiator surface has pollution	If the evaporator and heater production surface contains grease, it need to be replaced or cleaned.
	Poor condensate drainage	Exclude condensate water is not net, there is water within the shell, metamorphism, replace the drain position.

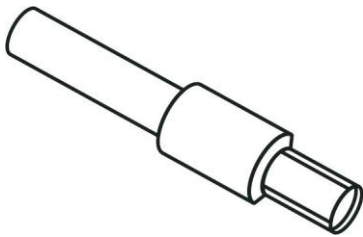
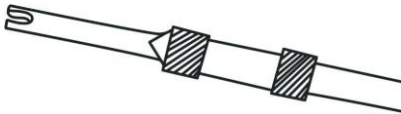
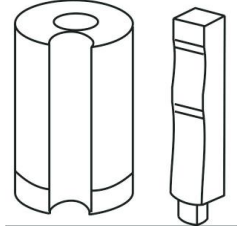
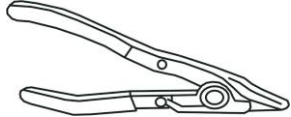
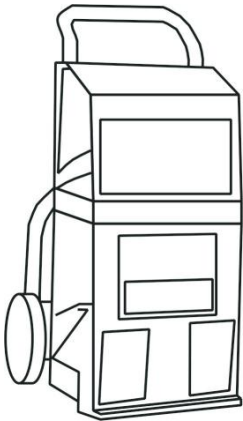
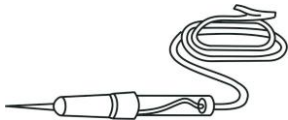
III. Disassembly and Assembly

Tool: General tools are needed for maintenance.

(I) A/C system maintenance tools list

Special tools list

Tool Designation	Tool picture	Tool name	Tool picture
Digital multimeter		High strength invisible light	
Suture pliers		R-134A manifold gauge	
Halogen leak detector		Tracer color injector	
R134A tracer pigment		precision thermometer	
Forward direction flow control valve		Shaft seal protection device	
50 pound reload type recycling tank		Pressure experiment adapter	

Tool Designation	Tool picture	Tool name	Tool picture
Air conditioning system lip seal removal tool		O-shape sealing ring removal tool	
Valve core removal and installation tool		O-shape sealing ring installation tool	
Spring calliper		Spring calliper	
Refrigerant recovery/regeneration, refilling system		Passive test light	

(II). System removal and installation

1. Removal and installation of A/C host assembly

1) Removal

① Use the refrigerant recovery equipment and recover the refrigerant.

② Disconnect the battery negative electrode.

③ Open the engine compartment, disconnect the blower water pipe connector

④ Remove the expansion valve bolts.

⑤ Remove instrument panel assembly.

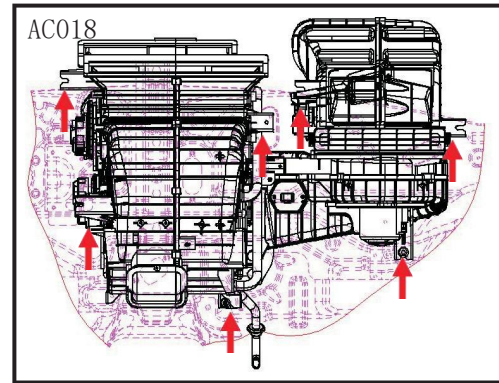
⑥ Unscrew the dashboard bracket bolt, take down the dashboard bracket.

⑦ Remove the fixed nut and bolt of A/C host assembly.

⑧ Disconnect the circuit connector, and

remove the A/C host assembly. 2) Installation

Assemble according to the opposite sequence of disassembly.



2. Removal and installation of temperature control motor

1) Removal

① Disconnect the battery negative connecting wire

② Disassemble the instrument panel

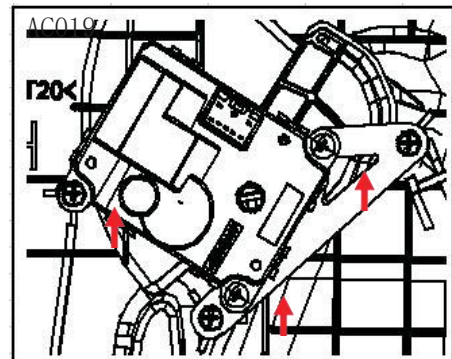
③ Disconnect the connector, and remove the fixing screw of the temperature control motor.

④ Take down the temperature control motor.

2) Installation

Assemble in the reverse

order of removal.



3. Dismantle mode Air

Throttle Motor

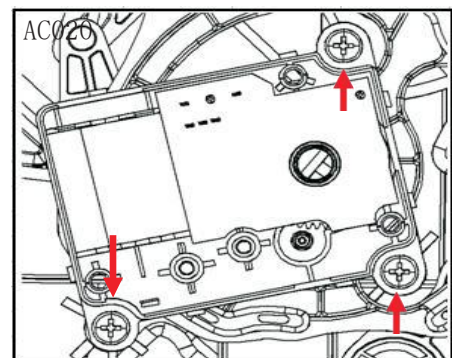
1) Dismantling

① Disconnect the battery negative connecting wire

② Disassemble the instrument panel

③ Disconnect the connector, and remove the fixing screw of the mode air duct motor.

④ Take out the mode air duct motor.



2) Installation

Assemble in the reverse order of removal.

4. Removal and installation of the inner and outer circulation throttle motor

1) Dismantling

① Disconnect the battery negative connecting wire

② Disassemble the instrument panel

③ Disconnect the connector, and remove the fixing screw of the inner/outer circulation motor.

④ Take out the inner and outer throttle motor.

2) Installation

Assemble according to the opposite sequence of disassembly.

5. Removal and installation of the heater

1)

Removal

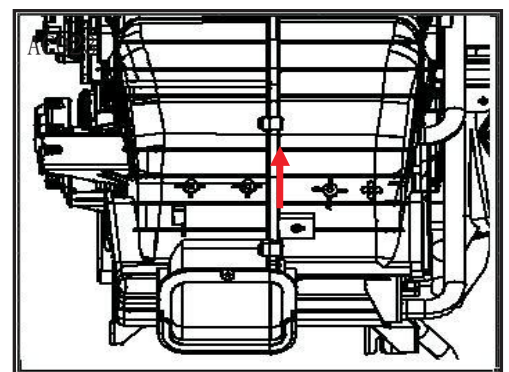
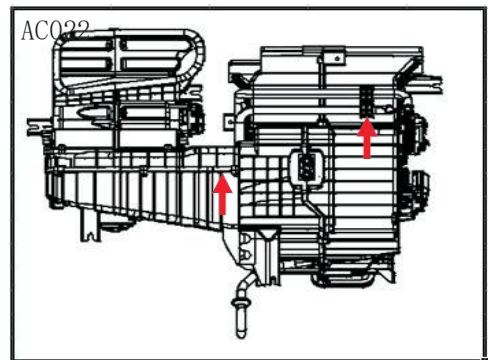
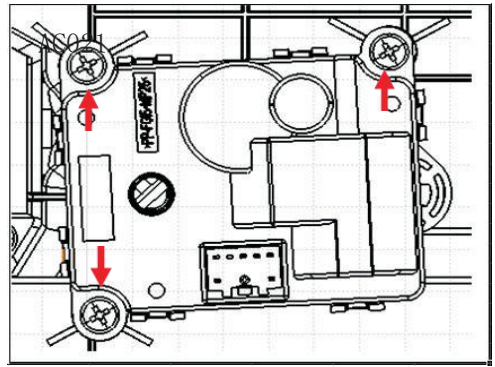
① Dismantle the A/C host assembly.

② Remove the fixing bolt of the heater.

③ Take down the fixing guard plate, and pull out the heater outward.

2) assembly

Assemble according to the opposite sequence of disassembly.



6. Removal and
installation of the
evaporator 1)

Removal

① Dismantle the A/C host assembly.

② Remove the middle screws and

buckles on the distribution box assembly

(That's not the whole in the picture)

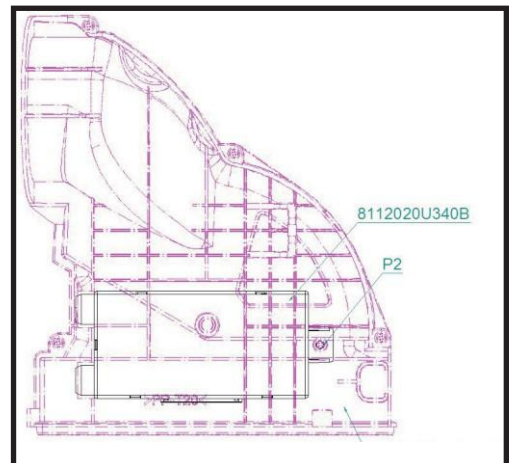
③ Remove the fastening screws around the evaporator assembly.

④ Pull out the evaporator assembly and heater assembly from the middle, and take out the evaporator.

2) Assemble

Assemble according to the opposite sequence of disassembly.

7. Removal and
installation of A/C
panel 1) Front
A/C panel
removal



- ① Disconnect the A/C control box lower connector.
- ② Remove the control box fixing screw, and take out the control box.

2) Installation

Assemble in the reverse order of removal.

8. Removal and installation of condenser

1) Removal

- ① Use the refrigerant recovery equipment and recover the refrigerant.
- ② Disconnect the battery negative electrode.
- ③ Remove the front bumper.
- ④ Remove the front bumper frame.
- ⑤ Drain the coolant, disconnect the connection of the pipelines.
- ⑥ Remove the front terminal module assembly.
- ⑦ Remove the installation bolt on the condenser.
- ⑧ Take out the condenser assembly.

2) Installation

Assemble according to the opposite sequence of disassembly.

9. Removal and installation of the A/C filter

1) Function

Use of air conditioning filters, to avoid the debris outside the car into the car, to maintain a comfortable car environment. 2) Replacement cycle

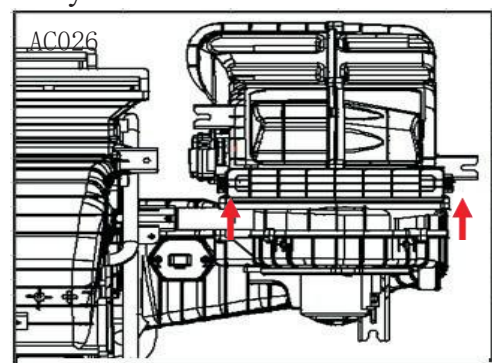
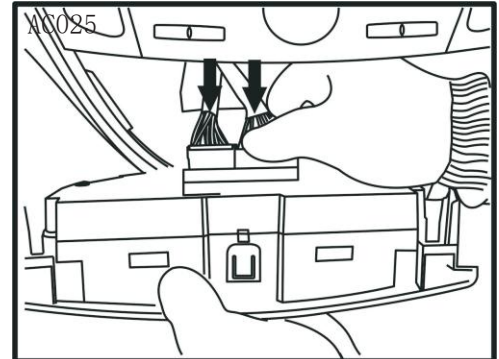
Long-term non-replacement of filter will cause foreign matter to block air conditioner filter and increase blower noise increase and reduce air volume, etc.

The replacement cycle is 5,000~12,000km. Frequent inspection and replacement are required in areas with serious air pollution or poor road conditions.

It is recommended to wash and replace frequently.

3. Replace step

- ① Press down both sides of the glove box and remove the glove box.



- ② Press and pull outward the A/C filter cover buckle, remove the A/C filter cover.
- ③ Remove the A/C filter from the A/C filter cover
- ④ Install the A/C filter in the reverse order of disassembly.

Note:

- When replacing the filter, the concave side is located on the upper side and cannot be reversed.

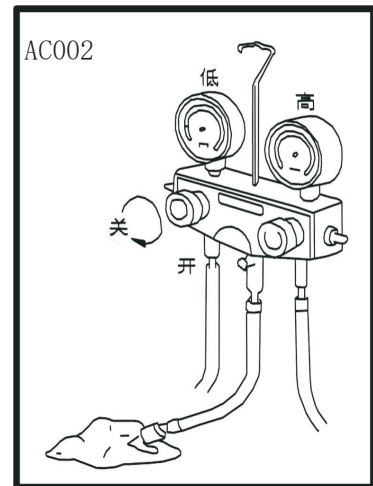
A/C inspection and refrigerant adding

1. Install refrigerant refill device

1) Turn off the manual valve on both ends of the refrigerant injector.

2) The refill tube of the refrigerant injector is mounted on the connection. Low-pressure pipe in the low-pressure nozzle, high-pressure pipe in the high-pressure nozzle, use hand to tighten the nut after connection.

2. Refrigerant exhaust operation



- 1) Connect the refrigerant injector to system.
- 2) Place a clean rag on the central hose opening.
- 3) Gradually open the high pressure manual valve and discharge the refrigerant.

Note:

- If the exhaust speed is too high, compressor refrigeration oil will be discharged from the system.
- 4) Inspect the rag for traces of frozen oil, and close the manual valve slightly when there is a trace.
- 5) Open the low pressure manual valve slowly after the scale of the filling instrument drops to 3.5kg/cm².
- 6) In order to reduce system pressure, high pressure and low pressure manual valves should be slowly opened until the scale shows 0kg/cm².

3. Refrigeration system vacuum operation

Note:

- The system must be evacuated after it has been vented. This operation is to remove the air and moisture that flow into the system, the time is

15 minutes after each part is installed. 1) Check

if the engine is off.

- 2) Connect the filler to the compressor connector and close both ends.
- 3) Check if refrigerant is discharged from the system.
- 4) The central line is connected to the vacuum pump suction.
- 5) Operate the vacuum pump and turn on the high pressure and low pressure valves of the filling instrument.
- 6) After 10 minutes, the low pressure detector scale

is greater than 0.96kg/cm² vacuum, otherwise the system

leaks and should be repaired according to the following

steps.

- Use the refrigerant container to fill the system.
- Leak detector leak check site, repair it.
- Discharge refrigerant and evacuate the system.
- If no signs of leaks are found, continue

vacuuming. 7) Re-operate the vacuum pump

- 8) Both ends of the filler scale should maintain a 0.96kg/cm² vacuum.

- 9) Continue vacuuming until the scale shows 0.96kg/cm².

10) After about 15 minutes of vacuum operation, close the gauge pressure valve and stop the vacuum pump to disconnect the line from the vacuum pump. Then

fill the refrigerant.

4. Use refrigerant control valve

1) Turn the handle fully counterclockwise before connecting the valve to the refrigerant container.

2) Turn the disc counterclockwise to its highest position.

3) After the central line is connected to the valve unit, turn the disc clockwise by hand.

4) Turn the handle clockwise and drill the upper part of the seal.

5) Loosen the nut on the connection port of the filling instrument center.

6) Tighten the nuts after evacuation for a few seconds.

5. Fill refrigerant (Gas state)

Note:

- This operation is the operation of filling the gas refrigerant to the system through the low-pressure side device, in which case the refrigerant container is straightened and the gas-state refrigerant

flows into the system. 1) Install the refrigerant container to the adjustment valve.

2) Open the low-pressure valve, adjust the valve so that the low pressure rod can be controlled below 4.2kg/cm^2 .

3) Start the engine and turn on the air conditioner.

Note:

- To prevent liquid refrigerant from filling the compressor through the suction port, straighten the container

4) Close the low pressure valve after filling the specified amount.

- Specified refrigerant filling amount: $480 \pm 20\text{g}$

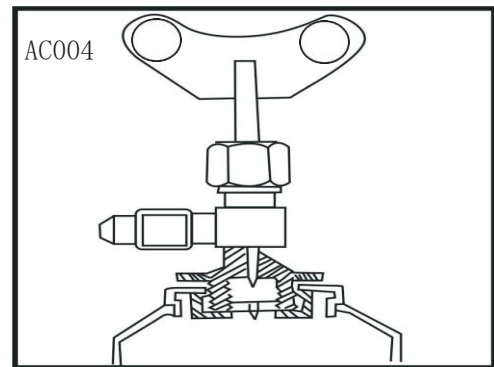
5) Refrigerant filling speed is too slow, you can put the container into about 40°C water container.

Note:

- No matter what the situation, the water can not be heated above 52°C .

- High temperature light can not reach the container.

6. Filling refrigerant (liquid state)



Note:

■ This operation is used when filling on the high pressure side. Reverse the refrigerant container, the refrigerant can enter the system. 1) After the system is evacuated, both ends of the high and low pressure valves should be completely closed. 2) Install the refrigerant container and adjust the valve.

3) Open the high-pressure valve completely and then invert the container.

4) When the system is overfilling, it can increase discharge pressure,

so fill the correct capacity and close the high pressure valve while determining the weight of the refrigerant.

■ Refrigerant charging capacity: $480 \pm 20\text{g}$

5) After filling the specified refrigerant, close the filler valve. 6) Use a leak detector to detect leakage.

Note:

■ Do not start the engine when the high-pressure side is used for filling.

■ Do not open the low-pressure valve when the liquid refrigerant is used for filling.

■ The performance test must be done before separating the filling detector.

Switch

Rear view mirror switch

Summary

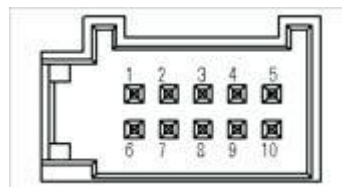
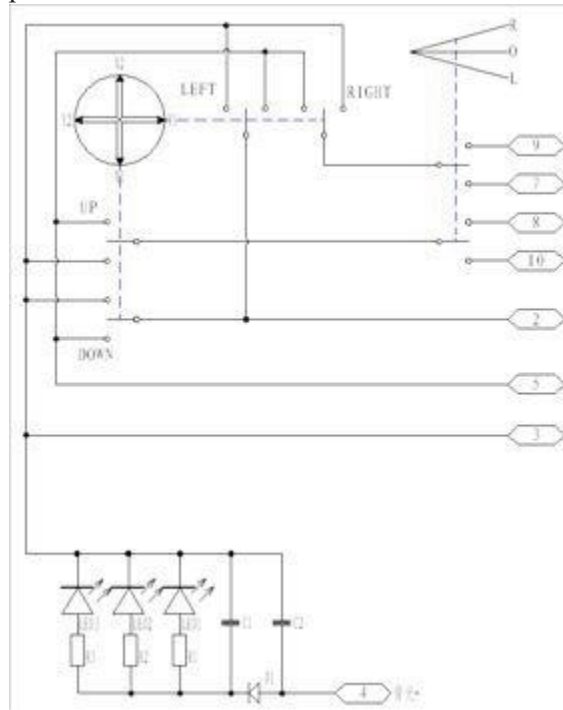
(I) Structure Outline

The rearview mirror switch is used for the four-way adjustment of the rearview mirror, which is located at the driver side lower guard plate.



(II) Working Principle

The rearview mirror switch directly drives the motor for mirror four-way adjustment. The circuit schematic diagram and pins are defined as follows:



(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load/Max load	100mA/150mA	

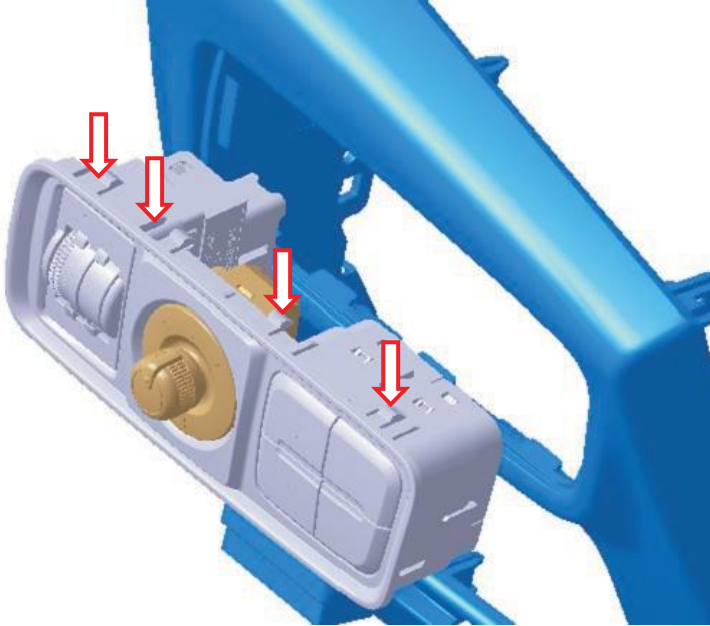
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Mirror regulating function invalid	Circuit fault	5. Check if wiring harness connector is loosened; 6. Use multimeter to check the continuity of the switch according to the logic diagram. 7. Check other circuits and the rearview mirror control module.

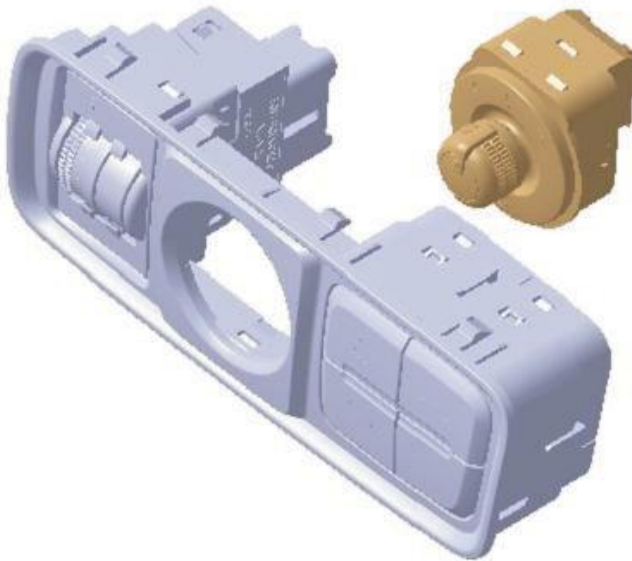
III. Disassembly and Assembly

1. Dismantling

1) First, peel off the guard plate from the switch group of the lower guard plate at the driver's side, operate through the buckle screwdriver, pry up according to the position shown in the picture, and unplug the switch wiring harness;



2) Then remove the rearview mirror switch from the switch group and operate with flat screwdriver.



2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

- After installation, check if the functions of each button are normal.
- If not normal or unable to work should be re-installed or replaced.
- When using, it can use when first shifting the middle gear of the switch to the mirror adjustment gear on both sides, and it is not effective when in the middle position.

Backlight and headlight height adjustment switch--Summary

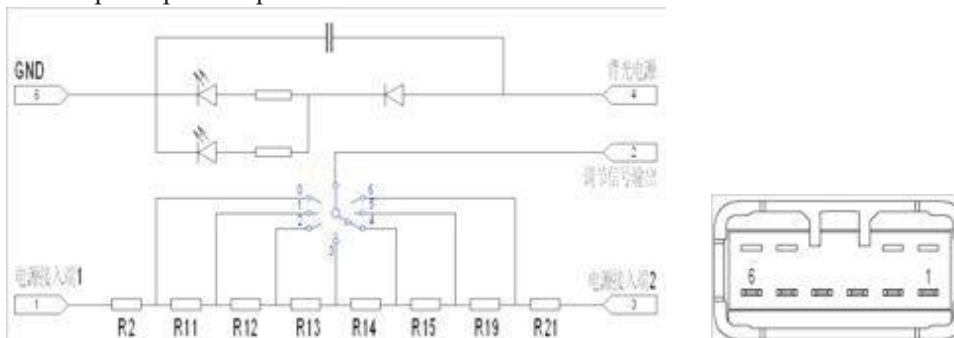
(I) Structure Outline

Backlight and headlight height adjustment switch is used for the beam height of headlights, there are 7 gears: 0-6, located at the driver side lower guard plate.



(II) Working Principle

Backlight and headlamp height adjusting switch has 0-6 gear resistance output, adjust the headlamp horizontal height. Circuit principle and pin definition is shown below:



Whereinto, "Power Access Terminal 1" and "Power Access Terminal 2" can output opposite and symmetrical voltage values by connecting different positive and negative poles, as follows:

X4 uses working feature one.

(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10mA	

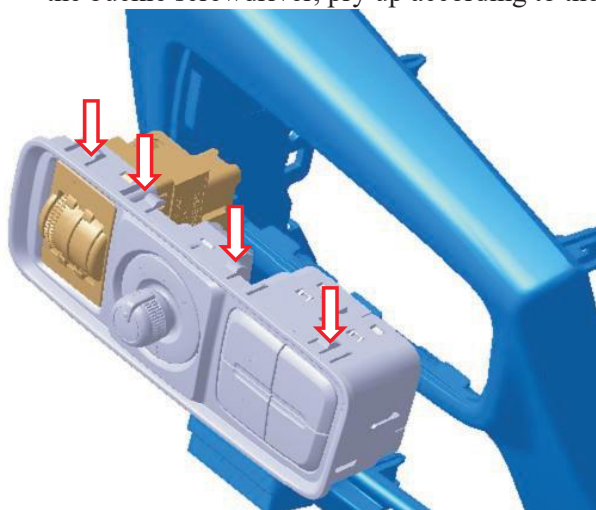
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Headlight height adjustment invalid	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the output voltage of the switch according to the logic diagram. 3. Check other circuits and the headlight module.

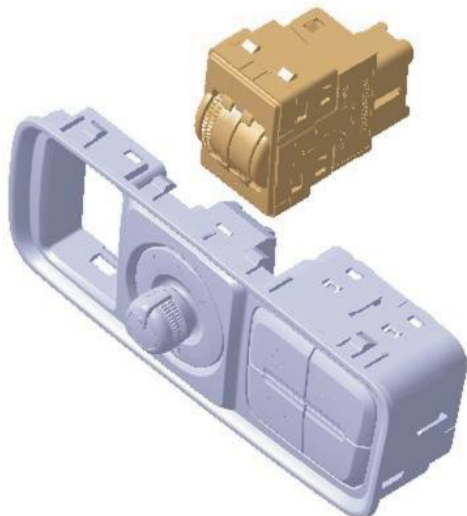
III. Disassembly and Assembly

1. Dismantling

1) First, peel off the guard plate from the switch group of the lower guard plate at the driver's side, operate through the buckle screwdriver, pry up according to the position shown in the picture, and unplug the switch wiring harness;



2) Then remove the rearview mirror switch from the switch group and operate with flat screwdriver.



2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

- After installation, check if the functions of the switch are normal.
- If not normal or unable to work should be re-installed or replaced.

Left lower switch group

Summary

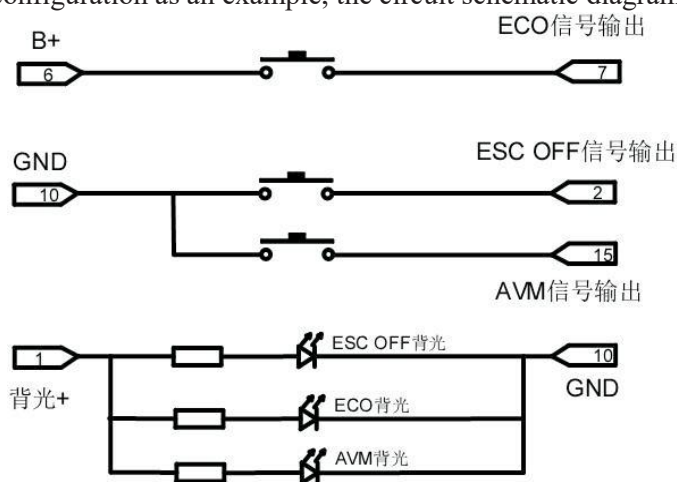
(I) Structure Outline

There are 4 buttons on the left lower side switch set, namely ESC OFF, semi-auto parking switch, parking assist switch and electrical tail door. (According to the configuration definite the switch button function)



(II) Working Principle

The switch group on the lower left is used for some common electrical function switch control. Take S432 highest configuration as an example, the circuit schematic diagram and pin definition are as follows:



(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10mA	

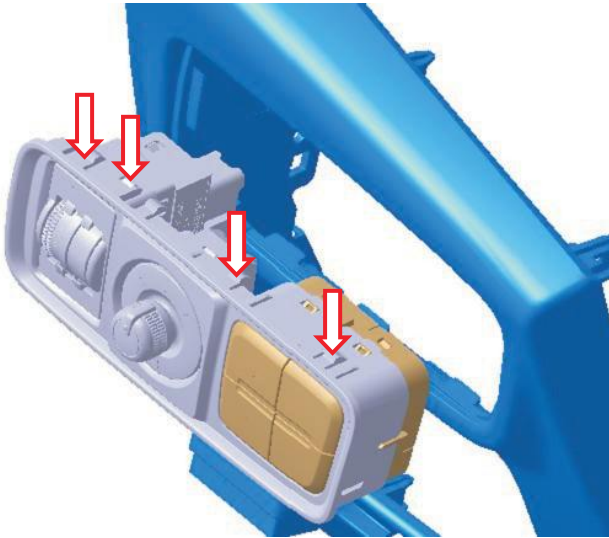
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
ESC function lose efficacy	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and ESC.
ECO function lose efficacy	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and ECU.
Park assist function invalid	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and radar module.

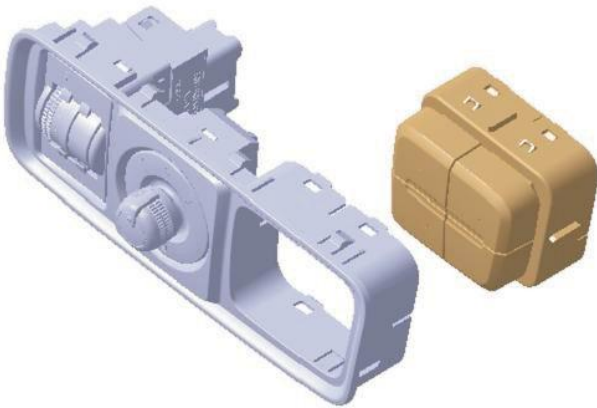
(II) Disassembly and Assembly

1. Dismantling

- 1) First, peel off the guard plate from the switch group of the lower guard plate at the driver's side, operate through the buckle screwdriver, pry up according to the position shown in the picture, and unplug the switch wiring harness;



- 2) Then remove the left lower side switch group from the switch group, and operate with flat screwdriver.



2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

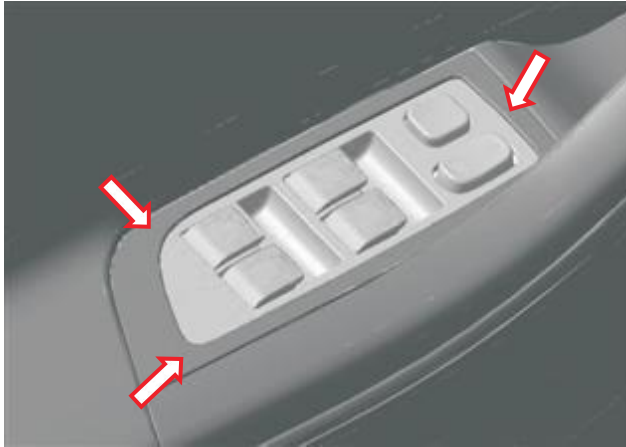
- After installation, check if the switch functions of each button are normal.
- If not normal or unable to work should be re-installed or replaced.

Window regulator switch

Overview

(I) Structure Outline

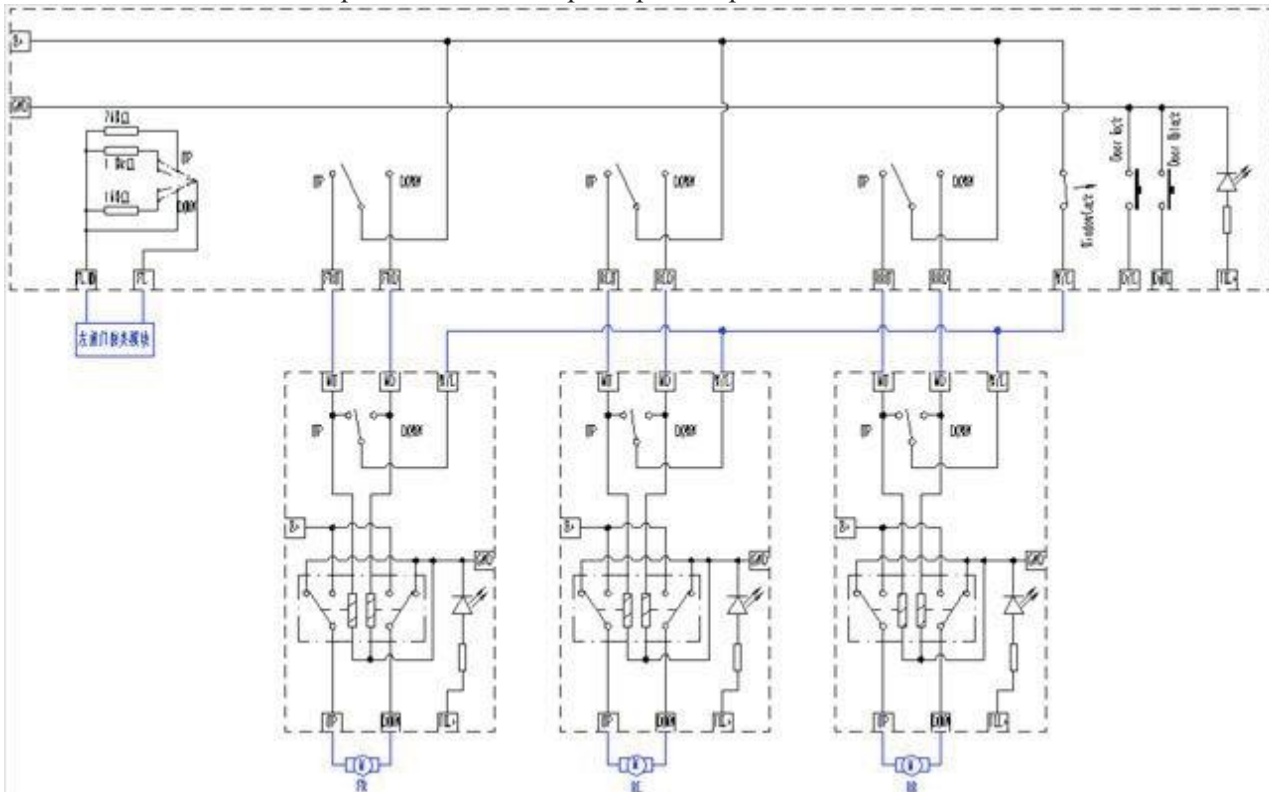
The window regulator switch is used to control the window up and down. The driver's switch can control the other three doors' window up and down, and realize the function of window locking, door lock. Located at the four doors' armrest panel.



(II) Working Principle

There are two configurations of the window regulator switch: driver's side one-button up and down, four-door one button up and down. The circuit schematic diagram and pin definition are as follows:

A. Driver's side one-button up and down circuit principle and pin definition is shown below:



B. four-door one button up and down circuit principle and pin definition is shown below:

V. Technical parameter

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10A	Driver's side one button regulator
3	Rated load	<10mA	Four-window one button regulator

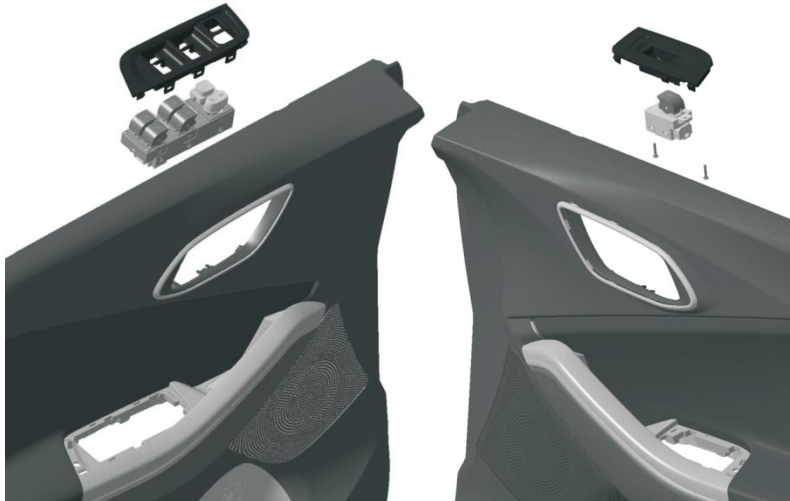
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Window lifting function failure	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and the anti-pinch module and motor.
Window lock failure	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and the anti-pinch module.
Door lock failure	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and BCM.

4. Disassembly and Assembly

4) Removal

- 1) First, peel off the switch and panel assembly from the door panel handle panel, operate through the buckle screwdriver, pry up according to the position shown in the picture, and unplug the switch wiring harness;
- 2) Then, peel off the switch from the panel, main switch operate through the flat screwdriver, auxiliary switch operate through the cross screwdriver.



2. Assemble

Follow the opposite sequence of the disassembly to assemble.

Note:

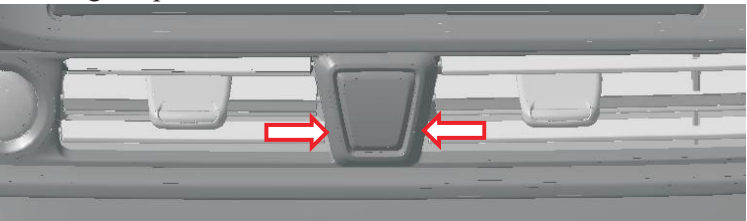
- After installation, check if the functions of the switch are normal.
- If not normal or unable to work should be re-installed or replaced.

Hazard warning lamp

Summary

I) Structure summary

Warning lamp switch is located in the middle of the central control air outlet.



(II) Working Principle

Hazard warning lamp switch supply BCM signal, drive the two hazard warning lamps flash, and receive BCM signal, control backlight flash along with the hazard warning lamps. Circuit principle diagram and Pin definition are as follows:

(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10mA	

2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Hazard warning lamp function invalid	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and BCM, lamp module.

III. Disassembly and Assembly

1. Dismantling

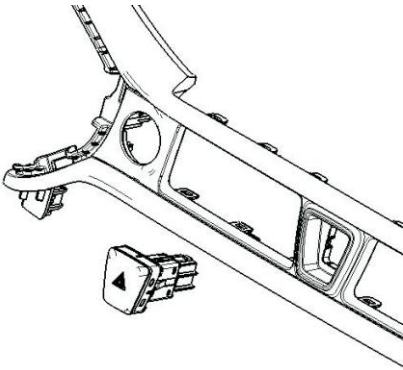
1) Directly separate the switch from the middle air outlet decoration strip, pry the position as shown in the figure by the buckle screwdriver, and disconnect the connector.

2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

- After installation, check if the functions of each button are normal.
- If not normal or unable to work should be re-installed or replaced.



Parking switch
Overview

(I) Structure Outline

Parking switch is on the auxiliary dashboard, where the primary mechanism manual brake used to be.



(II) Working Principle

Parking switch supplies ESC module signal, consists of EPB and AUTOHOLD two functions. Circuit principle and pin definition is shown below:

(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<15mA	

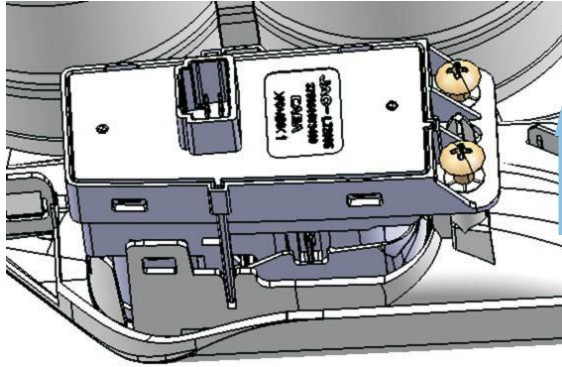
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
EPB function lose efficacy	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and ESC.
AUTOHOLD function lose efficacy	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check the continuity of the switch according to the logic diagram. 3. Check other circuits and ESC.

III. Disassembly and Assembly

1. Dismantling

- 1) Remove the auxiliary dashboard upper trim panel, unplug the electronic parking switch connector;
- 2) Then unscrew the fixed screw in the direction shown;
- 3) Use flat screwdriver to pry the buckles in two sides, and remove the switch.



2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

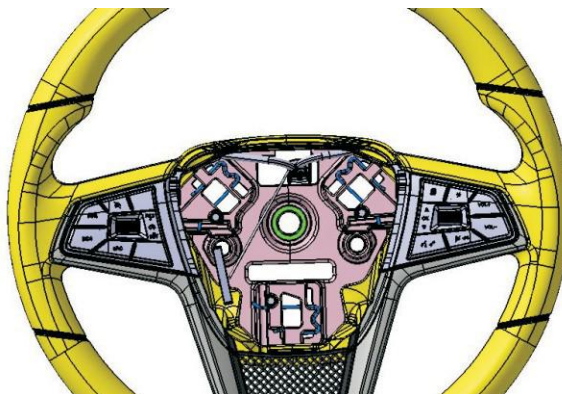
- After installation, check if the functions of each button are normal.
- If not normal or unable to work should be re-installed or replaced.

Steering wheel multifunction switch

1. Summary

(I) Structure Outline

Steering wheel multifunction switch is for instrument and information entertainment adjusting, and it is installed on the steering wheel.



(II) Circuit schematic

Circuit principle and pin definition of steering wheel multifunction switch is shown below:

(III) technical parameters

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10mA	

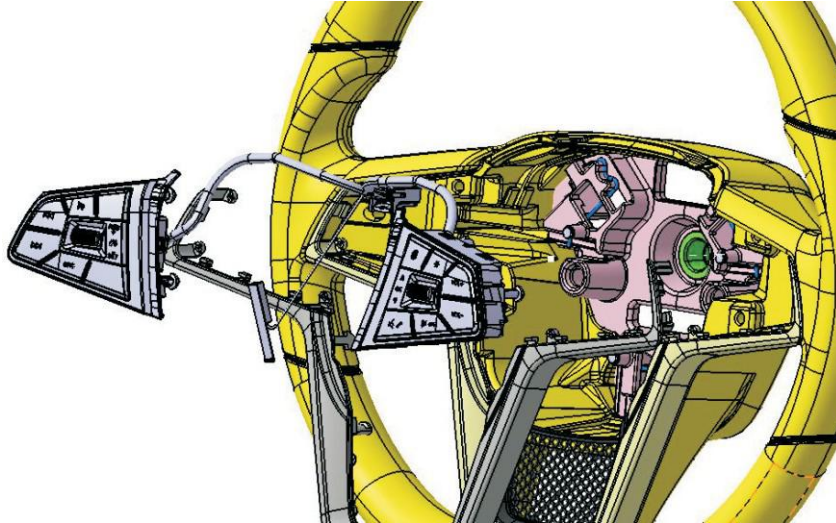
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Entertainment function invalid	MP5 software, circuit, wiring harness fault	1. Check if MP5 software is the latest. 2. Check if wiring harness connector is loosened; 3. Use multimeter to check if the switch function is normal according to the logic diagram; 4. Check other module circuit
Instrument adjustment invalid	Instrument software, circuit, wiring harness fault	1. Check if instrument software is the latest. 2. Check if wiring harness connector is loosened; 3. Use multimeter to check if the switch function is normal according to the logic diagram; 4. Check other module circuit
Cruise control invalid	Calibration software, circuit, wiring harness fault	1. Check if calibration software is the latest. 2. Check if wiring harness connector is loosened; 3. Use multimeter to check if the switch function is normal according to the logic diagram; 4. Check other module circuit

III. Disassembly and Assembly

1. Dismantling

- 1) Use flat screwdriver to disassemble the air bag.
- 2) Disconnect the switch connector.
- 3) Use flat screwdriver to remove the switch installation panel on the steering wheel.
- 4) Use cross screwdriver to remove the switch from the panel.



2. Installation

Follow the opposite sequence of the disassembly to assemble.

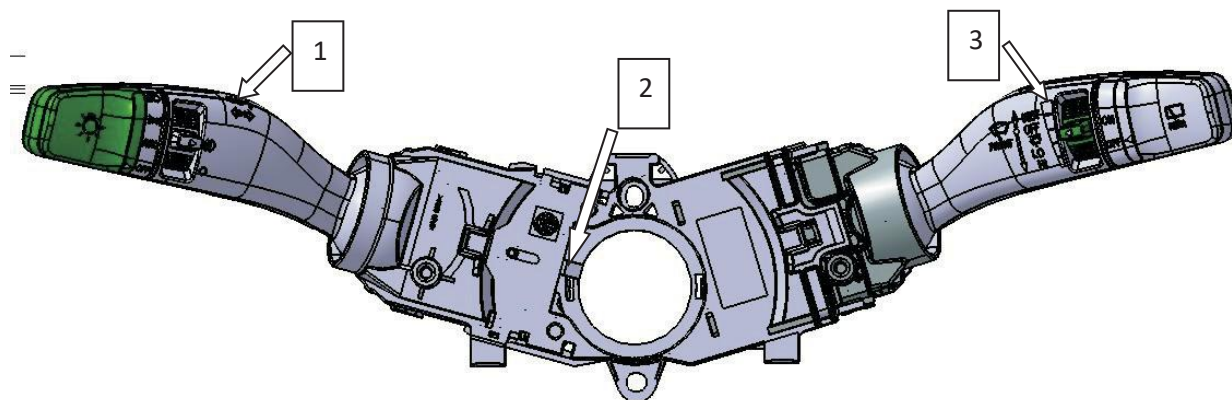
Note:

- After installation, check if the functions of each button are normal.
- If not normal or unable to work should be re-installed or replaced.

Combination switch

I. Overview

(I). Structure Overview



1-Lamp control switch 2-Auto return switch 3-Wiper control switch

(2) Circuit schematic

Circuit principle and pin definition of combination switch assembly is shown below:

(3) Technique parameter

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Lamp main switch rated load	10mA (Connect to BCM)	
3	High Beam	10mA (Connect to BCM)	
4	Low beam lamp	10mA (Connect to BCM)	
5	Overtaking lamp	10mA (Connect to BCM)	
6	Left/right turning, changing lane	10mA (Connect to BCM)	
7	Rear fog lamp	10mA (Connect to BCM)	
8	Front wiper	10mA (Connect to BCM)	
9	Front wiper inching	10mA (Connect to BCM)	
10	Front/Rear washer	5.5A (Motor load)	
11	INT adjusting	10mA (Connect to BCM)	
12	Rear wiper	10mA (Connect to BCM)	

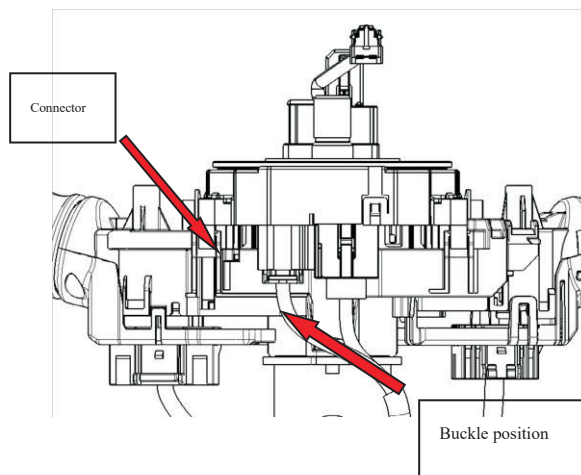
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Function invalid	Circuit, wiring harness fault	1. Check if wiring harness connector is loosened; 2. Use multimeter to check if the switch function is normal according to the logic diagram; 3. Check other circuit

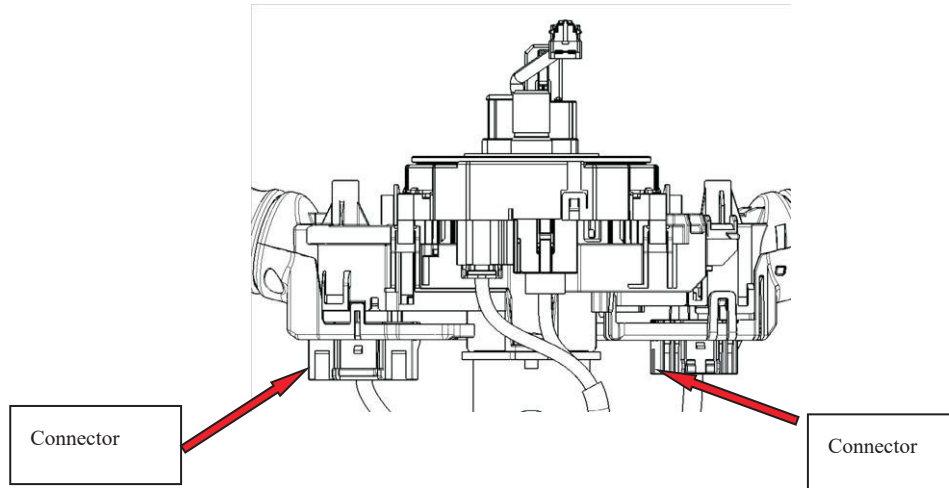
III. Disassembly and Assembly

1. Dismantling

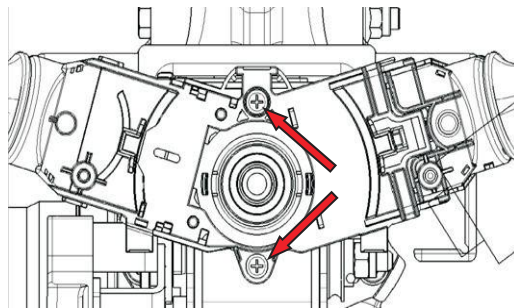
- 1) Close the ignition switch, and disconnect the negative terminal of the battery and wait more than one minute.
- 2) Remove the steering wheel
- 3) Remove upper and lower guard plate of the steering column
- 4) Disconnect the clock spring wiring harness, and remove the clock spring



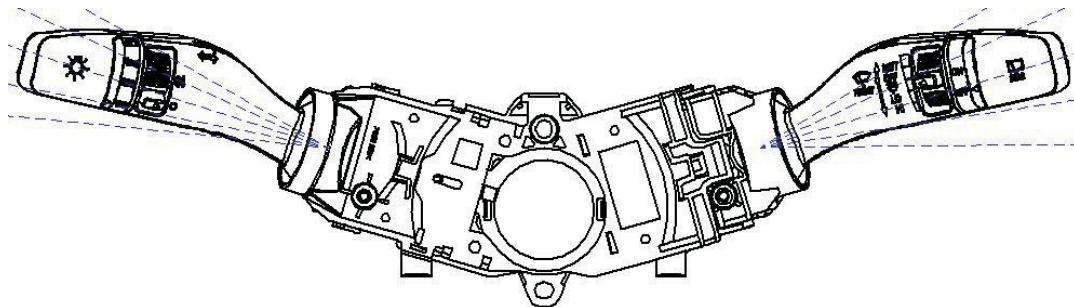
- 5) Disconnect the combination switch wiring harness connector.



- 6) Remove the 2 fixing screws of the combination switch.



- 7) Take down the combination switch assembly.



2. installation steps:

Install in the reverse procedure of disassembly.

■ Fixing screw tightening torque: 1.5Nm~3Nm

Test after Installation

1. Operate the combination switch spinner and test the working condition of all lights and switches.
2. Light handle in the "OFF" file, all the vehicle exterior lighting and interior lighting equipment should turn off the night lights.
3. When the spinner in the small light gear, the clearance lamp, Fore and aft light ,license plate lamp ,instrument lighting and all other electrical appliance within the car should be turned on. If the vehicle is in running state, the side marker lamps should also be on.
4. When the light control handle is in the small light gear, when the front (rear) fog lamp switch is pressed, all front (rear) fog lights should be on.

5. When spinner is in headlight gear, the headlight short-distance beam and all the clearance light should be on. Turn the handle downward for 6 degree, the headlight is on long-distance light in on. Turn the knob back and up by 6 degree the light will be on instantly. Get hand off and the switch will be back to original position.

6. When the light lever is turned 15° forwards (rearward), all right (left) turn signals start to flash and the right (left) turn indicator light on the instrument starts flashing and the handle stops returning to its original position. Rotate the handle forward (backward) 6.5 °, right (left) turn signal light flashes, the handle automatically resets after release hand.

7. Press the alarm switch, all turn signals should be flashing at the same time, the left and right turn indicators on the instrument also flash.

8. Operate combination switch wiper/ washing functions to check wiper and washer state.

1) When the spinner is in OFF position, the wiper and washer does not work

2) When the spinner is in INT gear, the wiper rod moves in a regular interval according to the set time period.

3) Turn the intermittent time adjustment knob to change the time between wiper movements as the time changes between HI and LO.

4) When the handle is in the LO position, the wiper works at long intervals time, and the wiper moves continuously at a lower speed.

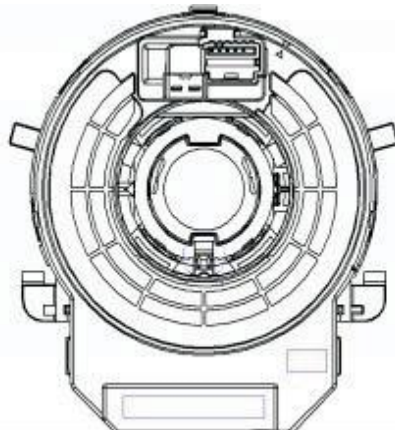
5) When the handle is in the HI position, the wiper works at short intervals time, the wiper moves continuously at a higher speed.

6) Press the washing button at the end of the handle while the wiper is working, and then turn the right joystick of the combination switch to 6.5° in the direction of the body. The washer spray nozzle will spray the washer fluid toward the front windshield.

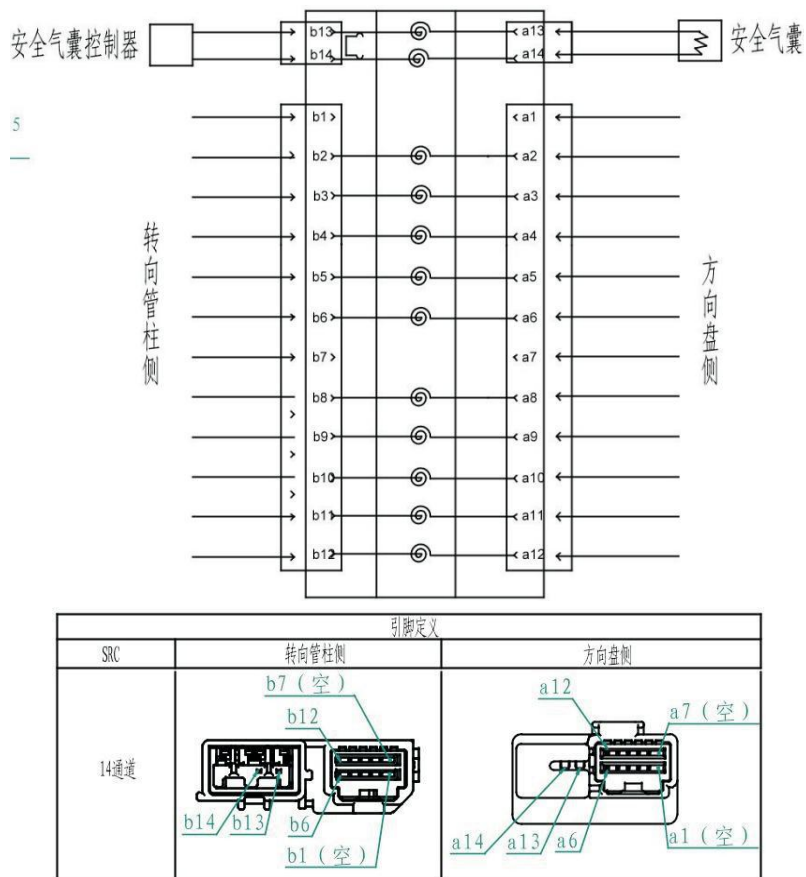
Clock spring

I. Overview

(1) Structure Overview



(2) Circuit schematic



(3) Design parameter

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/6V~18V	
2	Rated load	10mA~30mA (6A, 0.1s, MAX)	Airbag circuit
3	Rated load	200mA~220mA	Horn circuit
4	Rated load	<15mA	Other control circuit

II. Troubleshooting

Fault phenomenon	Possible Cause of Malfunction	Solution
Open Circuit	Circuit, wiring harness fault	1. Check if the clock spring wiring harness connector is loosened; 2. Use multimeter to check the continuity of the clock spring according to the principle diagram. 3. Check other circuit

III. Disassembly and Assembly

1. Dismantling

- 1) Disconnect the negative electrode of the vehicle battery for more than 3 minutes.
- 2) Disassemble the driver safety airbag module, and take down the connector.
- 3) Screw off the steering wheel fastening nut and take down the steering wheel.
- 4) 2 Disconnect the horn connector
- 5) Pull out the three springs of the clock spring stuck on the combination switch.
- 6) Take out the clock spring

2. Installation

Follow the opposite sequence of the disassembly procedures.

Attention:

- Remove the clock spring from the package and check if it is undamaged and if the retaining pin is inserted into the part.
- Open the connector gland, insert the airbag harness connector into the connector hole, and then fasten the gland.
- Before installing the clock spring, ensure that the front wheels are centered (direction).
- Before installing the clock spring, make sure the clock spring is centered (turn clockwise to the end, and then turn it in the opposite direction by 2.5 turns)
- When removing clock spring, it requires to remove the steering wheel, thus when installing, please carry out the 4-wheel alignment operation.

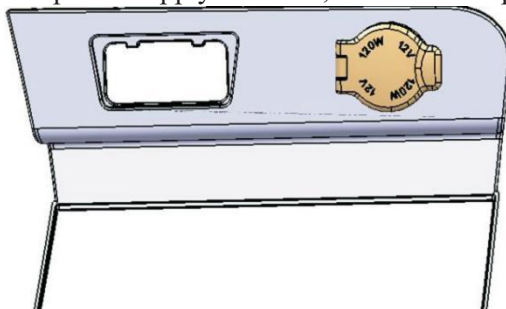
On Board Power

I.

Overview

(1) Structure Overview

X4 is equipped with 12V on-vehicle power supply interface, is in the front part of the auxiliary dashboard.



(2) Circuit schematic



(3) Design parameter

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 12V/9V~16V	
2	Rated load	<10A	

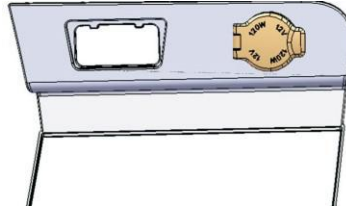
2. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Open Circuit	Circuit, wiring harness fault	1. Check if the on-board power wiring harness connector is loosened; 2. Check if the wiring harness is open circuit
Burnt	Current is too large	1. Check if the electrical equipment power is over 120W; 2. Check if there is short circuit on the on-board power.

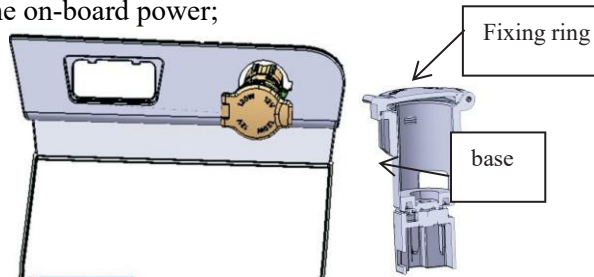
Disassembly and Assembly

1. Dismantling

- 1) Use special tool or flat screwdriver to remove the on-board power installation panel from the auxiliary dashboard;



- 2) Disconnect the on-vehicle power supply wiring harness connector.
- 3) Use special tool open mouth plier to remove the on-board power base from the panel;
- 4) Remove the fixing ring of the on-board power;



2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

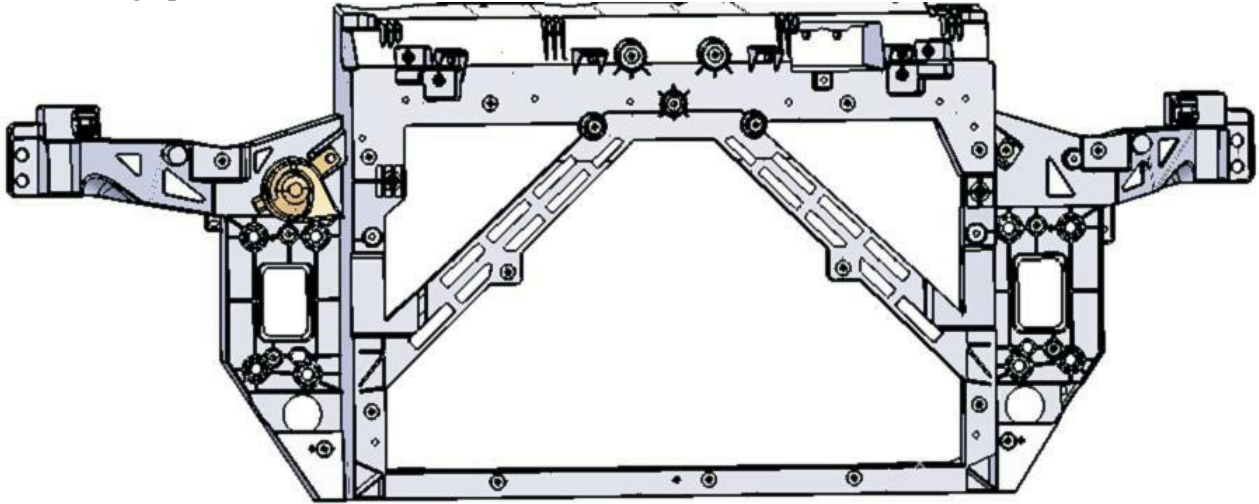
- After installation, check if the function of power supply on vehicle is normal.
- If not normal or unable to work should be re-installed or replaced.

Electric Horn

I. Overview

(1) Structure Overview

Only use one high-pitched electronic horn, which is mounted and fixed on the front-end module.



(2) Circuit schematic

Circuit principle of the electronic fanfare horn switch is shown below:

(3) Design parameter

No.	Project	Specification	Remark
1	Rated voltage/working voltage range	DC 13V/9V~15V	
2	Rated load	$\leq 4.5A$	

II. the fault diagnosis

Fault phenomenon	Possible Cause of Malfunction	Solution
Electrical horn doesn't work	Water inlet, burnt, wiring harness failure	1. Check if the electrical horn can work normally when locking or searching the vehicle; 2. Check if the electrical horn wiring harness connector is loosened; 3. Check if the wiring harness is open circuit

III. Disassembly and Assembly

1. Dismantling

- 1) Remove the front bumper from the vehicle;
- 2) Pull out the electrical horn connector;
- 3) Use socket spanner to remove the fixing screw of the wind baffle and the electrical horn, and take down the horn.

2. Installation

Follow the opposite sequence of the disassembly to assemble.

Note:

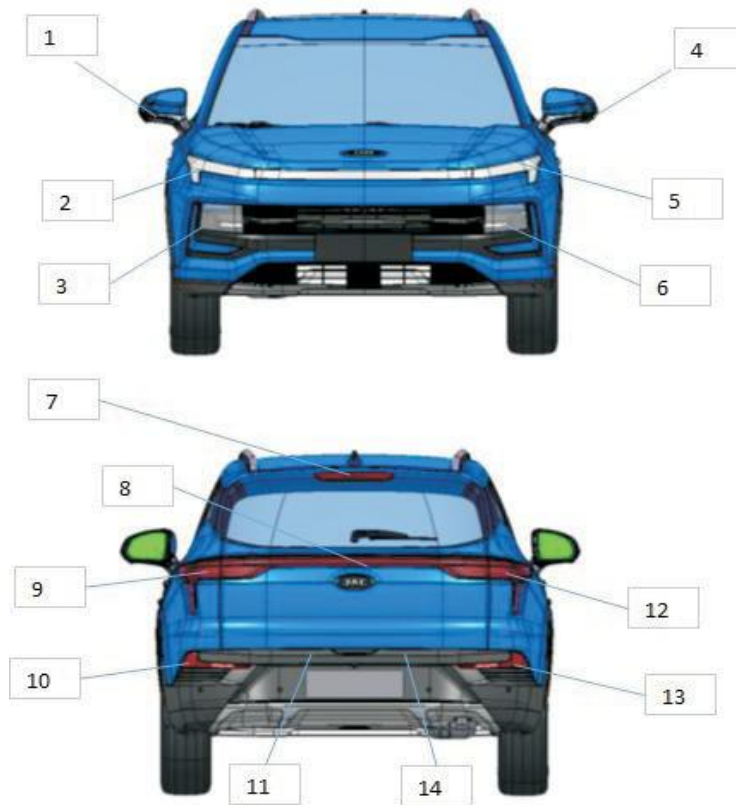
- After installation, check if the function of the electrical horn is normal.
- If not normal or unable to work should be re-installed or replaced.

Lighting system

I Overview

(I) Structure Outline

Lighting parts location map



- 1/4 Side turning lamp assembly 8 Throughout lamp assembly
2/5 Front combination small lamp assembly 9/12 Side wall combination lamp assembly
3/6 Front combination lamp assembly 10/13 Rear fog lamp and retro reflector assembly
7. High position brake lamp assembly 11/14 License lamp assembly

(II) Technical Parameters

Name		Bulb type	Bulb rate	Lighting color
Front combination small lamp	Front position light	LED		White
	Front turning lamp	LED		amber
	Daytime running light	LED		White
Front combination Lamp	High/ow beam lamp (low configuration)	halogen tungsten lamp (HB3)	2×55W	White
	High/low beam lamp (high configuration)	LED		White
Side turn lamp		LED		amber
Rear Combination Lamp	Brake lamp	LED		Red
	Rear turn lamp	LED		amber
	Rear position light	LED		Red
	Reversing lamp	LED		White
Rear fog lamp		Bulb (H21W)	2×21W	Red
License plate lamp		LED		White
High brake lamp		LED	1.7W	Red
Reading lamp		Halogen lamp	5W×4	White
Left/right welcome logo lamp		LED	5W×2	

(III) Torque Parameter

No.	Project	Tightening torque (N · m)
1	Front/rear roof lamp screw	1~3
2	Front combination small lamp/Front combination lamp bolt	3~5
3	Tail door combination lamp screw	1~3
4	Tail door combination lamp nut	7~9
5	Rear fog lamp and retro reflector screw	1~3

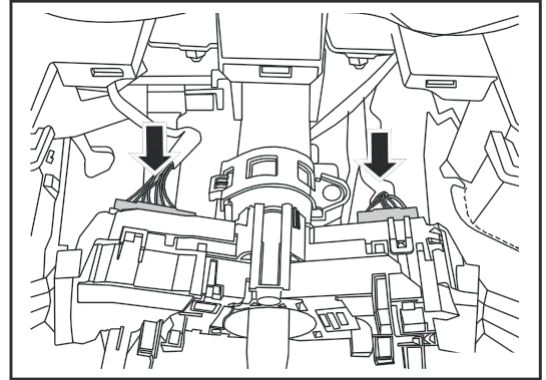
II. Combination switch assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove driver airbag with reference to driver airbag
4. Disassemble steering plate assembly. Refer to drive shaft steering plate assembly.
5. Remove the steering column upper housing, refer to steering column upper housing
6. Disassemble the steering column housing lower and upper shell, refer to steering column housing
7. Remove the clock spring. Refer to the clock spring.

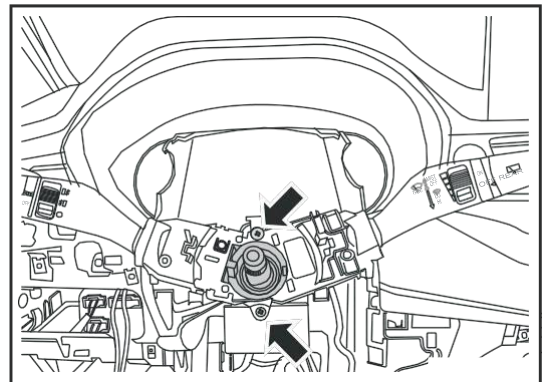
8. Remove the combination switch assembly

- 1). Disconnect the combination switch assembly wiring harness connector.



- 2). Remove the 2 screws fixing the combination switch assembly.

- 3). Take down the combination switch assembly.

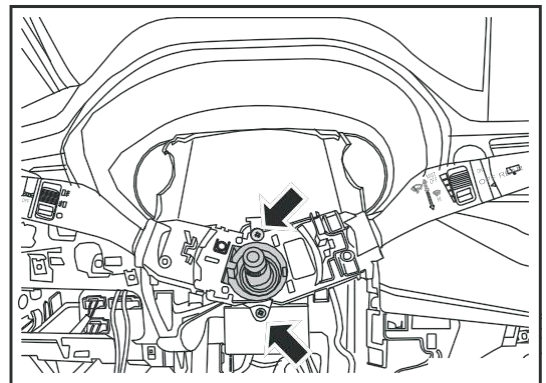


(II) installation

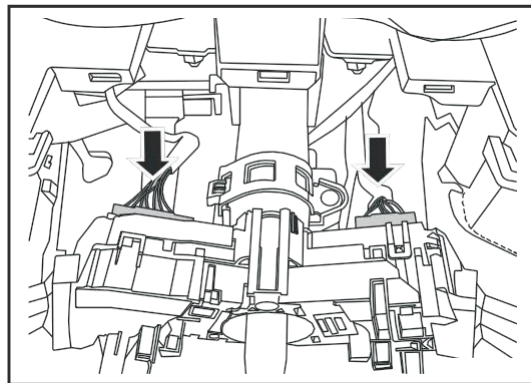
1. Install the combination switch assembly

- 1) Install the combination switch assembly to the steering column, and tighten the 2 screws of the combination switch.

Tightening torque 1.5 N·m



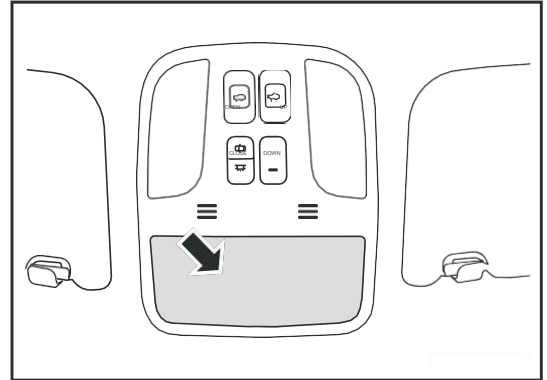
2. Connect the combination switch assembly wiring harness connector.
2. Install the clock spring
 3. Install the steering column housing lower and upper shell
 4. Install the steering column housing lower and upper shell
 5. Install steering wheel assembly
 6. Install the driver airbag
 7. Connect the battery negative cable
 8. Close engine compartment



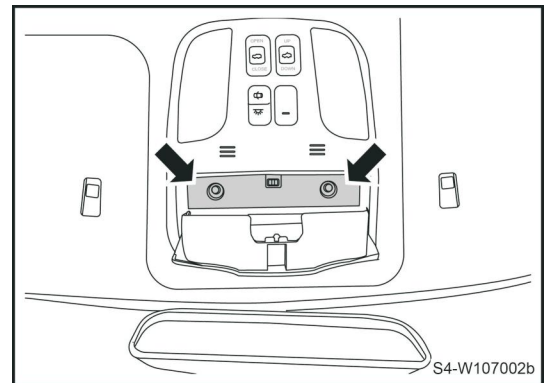
III. Front roof lamp assembly

(I) Removal

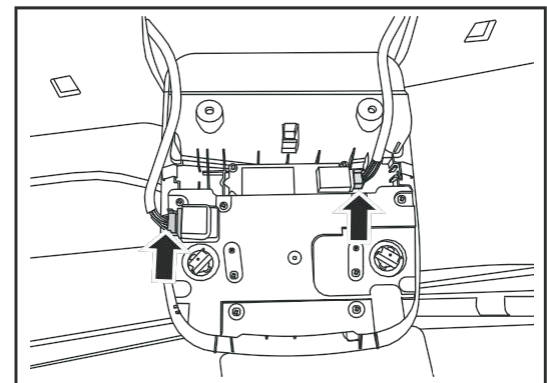
1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the front roof lamp assembly 1)
Open the glasses box.



- 2). Remove the 2 screws of the front roof lamp assembly.

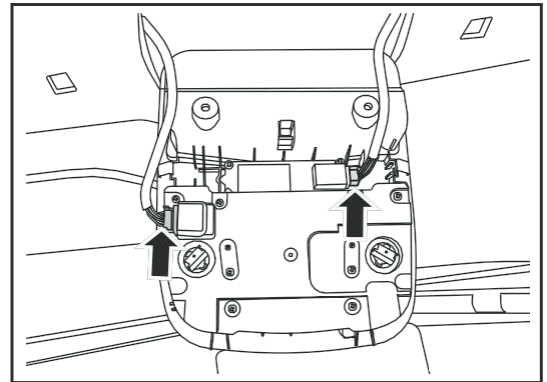


- 3). Pry up the front roof lamp assembly.
- 4). Disconnect the front roof lamp assembly wiring harness connector.
- 5). Take down the front roof lamp assembly.

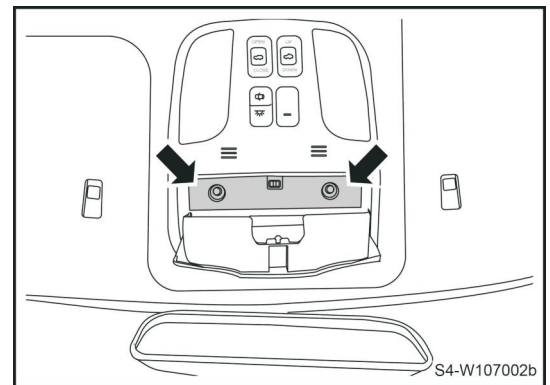


(II) installation

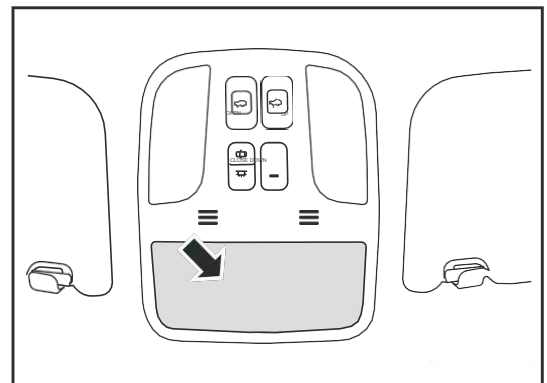
1. Install the front light assembly
 - 1). Connect the front roof lamp assembly wiring harness connector.



- 2). Clamp the front roof lamp assembly to the roof.
- 3). Tighten the 2 screws of the front roof lamp assembly. Tightening torque 1~3 N·m.



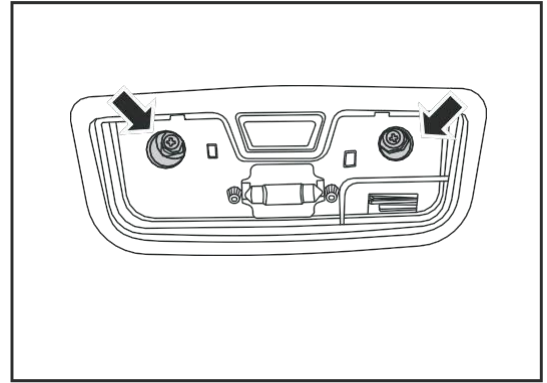
- 4). Close the glasses case.
2. Connect the battery negative cable.
3. Close engine compartment



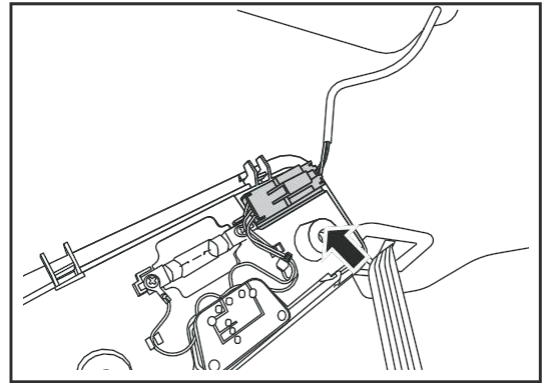
IV. Rear roof lamp assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the rear roof lamp assembly
 - 1). Pry up the rear roof lamp assembly cover.

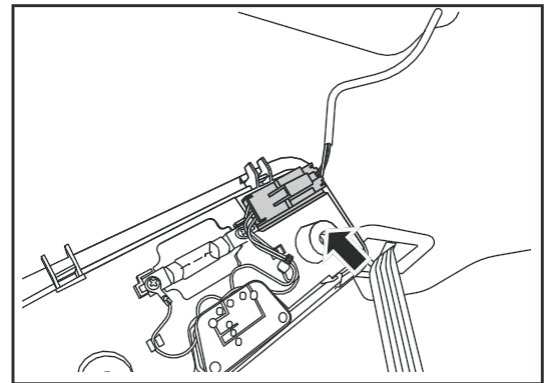


- 2). Remove the 2 screws of the rear roof lamp assembly.
- 3). **Disconnect the rear roof lamp assembly wiring harness connectors.**
- 4). Take down the rear roof lamp assembly.

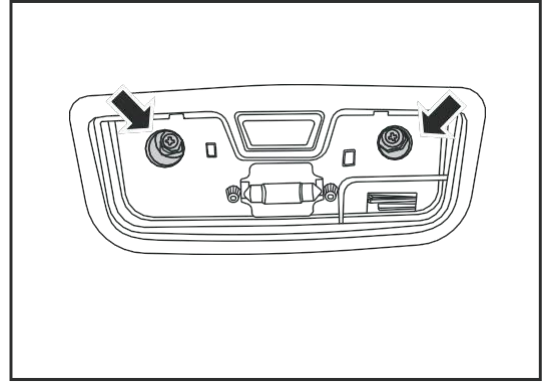


(II) installation

1. Install the rear roof light assembly
 - 1). **Connect the rear roof lamp assembly wiring harness connector.**



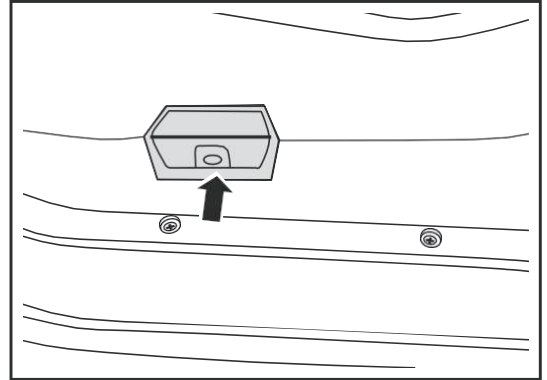
- 2). Clamp the rear roof lamp assembly to the roof, and tighten the 2 screws of the rear roof lamp assembly.
Tighten torque $1 \sim 3\text{N} \cdot \text{m}$
- 3). Install the rear roof lamp assembly
2. Connect the battery negative cable.
3. Close engine compartment



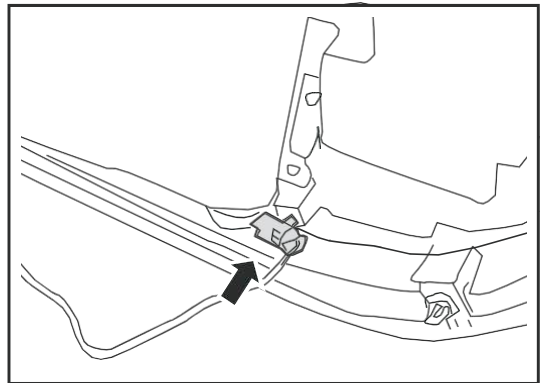
V. logo lamp assembly

(I) Removal

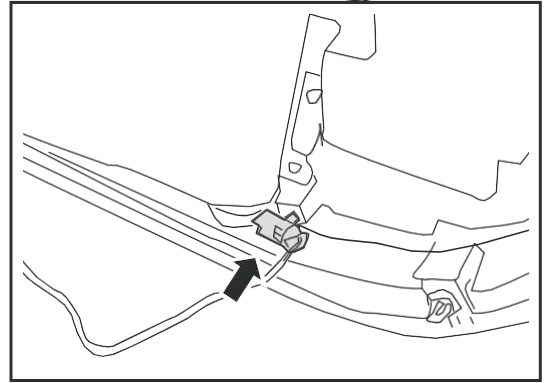
1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the door panel assembly See the door panel assembly
4. Remove the logo lamp assembly
 - 1). Pry off the logo lamp assembly.



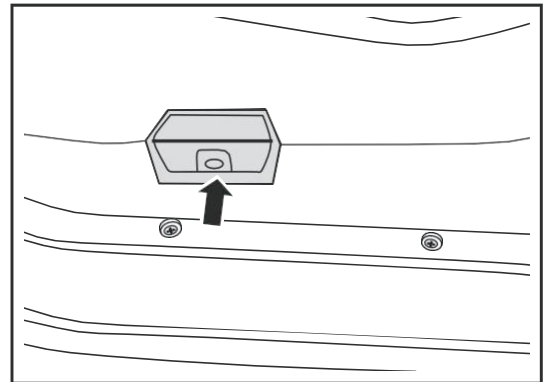
- 2). Disconnect the logo lamp assembly wiring harness connector, and take down the logo lamp assembly.



1. Install the logo lamp assembly
 - 1). Connect the logo lamp assembly wiring harness connector.



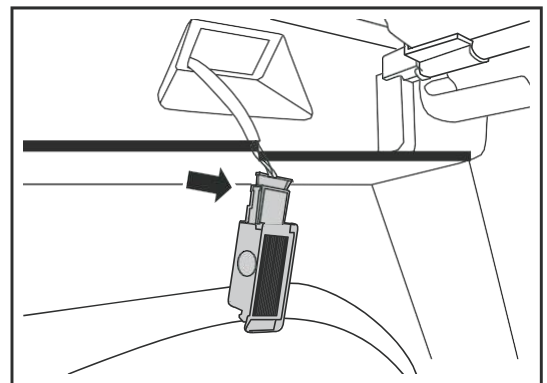
- 2). Install the logo lamp assembly to the vehicle door.
2. Install the door panel assembly
3. Connect the battery negative cable.
4. Close engine compartment



VI. Indoor small lamp

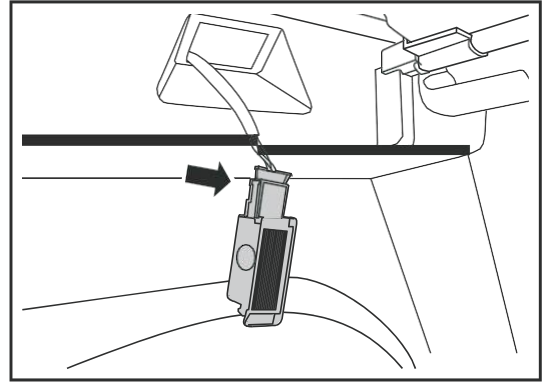
(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the indoor small lamp
 - 1). Pry out the indoor small lamp from the side guard panel assembly.
 - 2). Disconnect the indoor small lamp wiring harness connector.



(II) installation

1. Install the indoor small lamp
 - 1). Connect the indoor small lamp wiring harness connector.
 - 2). Install the indoor small lamp to the side guard panel assembly.
2. Connect the battery negative cable.
3. Close engine compartment

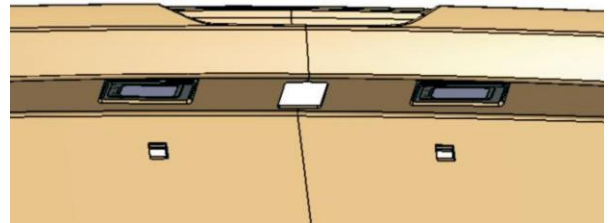


VII. License plate lamp assembly

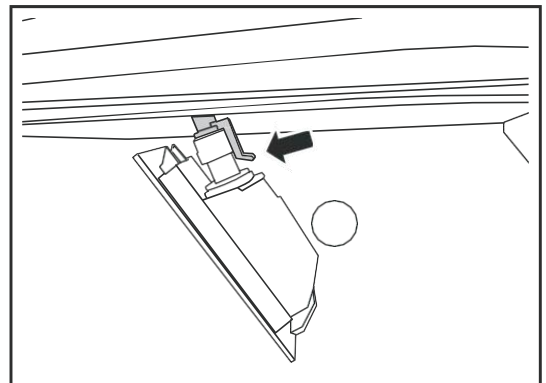
△Note Assembly and disassembly methods of left and right license plate lamps are similar.

1 Disassembly

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the license plate lamp assembly
 - 1). Pry out the license plate light assembly from the rear bumper assembly.

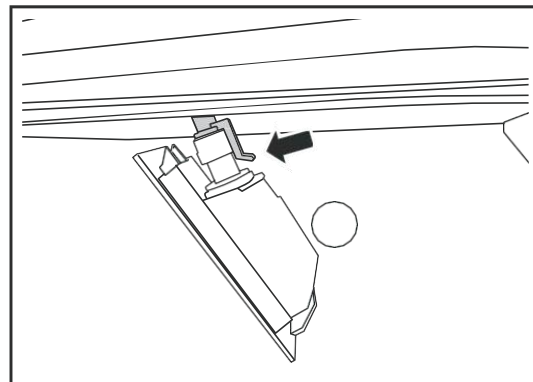


- 2). Disconnect the license plate lamp wiring harness connector.
- 3). Take down the license plate lamp assembly.



1. Install the license plate lamp assembly

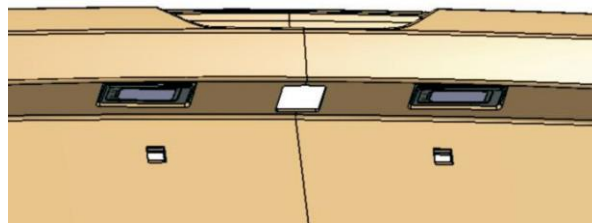
1). Connect the license plate lamp wiring harness connector.



2). Install the license plate lamp assembly to the rear bumper.

2. Connect the battery negative cable.

3. Close engine compartment

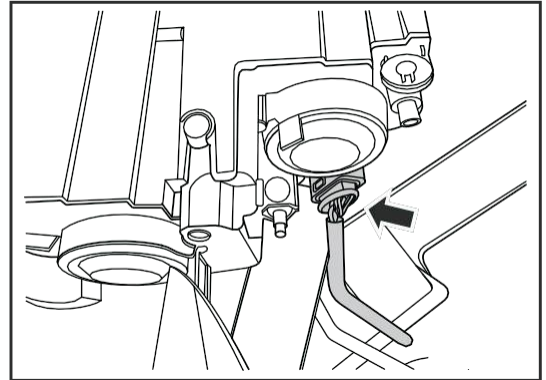


VIII. Front combination small lamp assembly

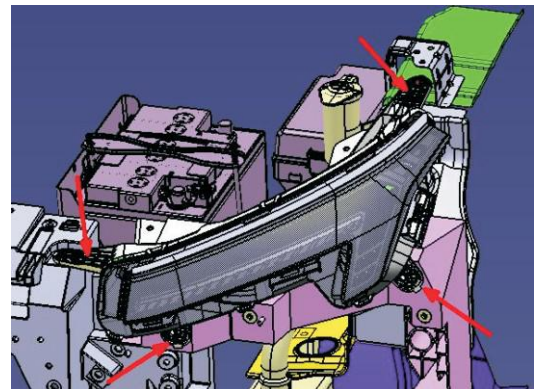
△Attention: Assembly and disassembly methods of left and right front combination small lamp assembly are similar.

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly See front bumper body assembly
4. Remove the front combination small lamp assembly
 - 1). Disconnect the front combination small lamp wire harness connector, and take down the front combination lamp assembly.

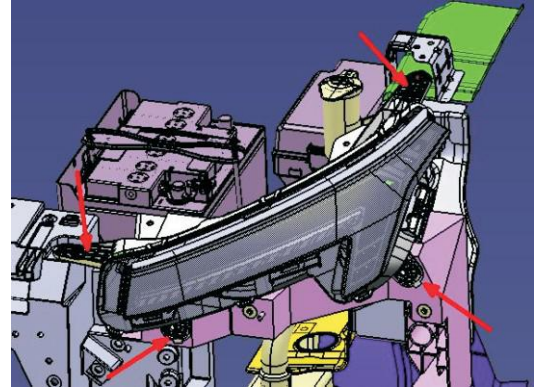


- 2). Remove the 4 bolts fixing the front combination small lamp assembly.

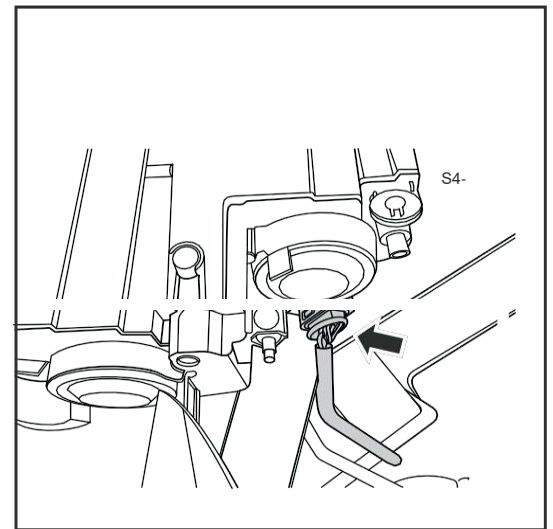
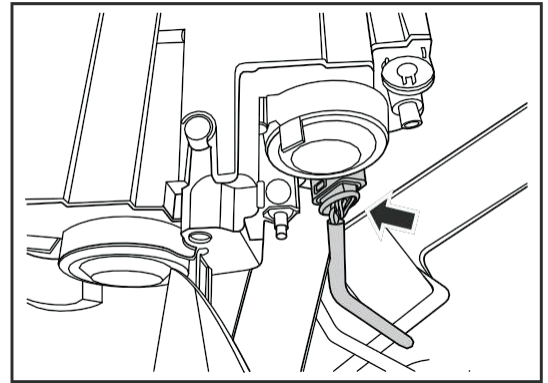


(II) installation

1. Install the front combination small lamp assembly
 - 1). Tighten the 4 bolts fixing the front combination small lamp assembly.
Tighten torque 3~5N·m



- 2). Connect the front combination small lamp assembly wiring harness connector.
2. Install the front bumper body assembly
3. Connect the battery negative cable.
4. Close engine compartment



IX. Front combination lamp assembly

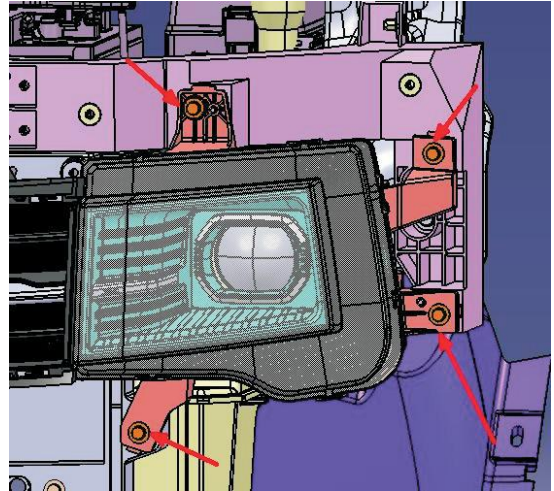
△Attention: Assembly and disassembly methods of left and right front combination lamp assembly are similar.

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove front bumper body assembly See front bumper body assembly
4. Remove the front combination lamp
 - 1) Disconnect the front combination lamp harness connector, and take down the front combination lamp assembly.
 - 2) Remove the 4 bolts fixing the front combination lamp assembly.

(II) Inspection

1. Confirm that all tires are under normal pressure
2. Place the vehicle and tester on the same flat surface.

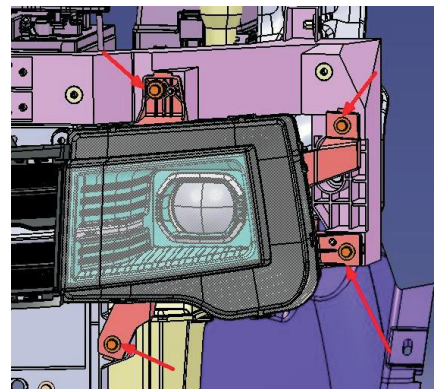


3. Verify that the vehicle is empty except for the driver (or placing equivalent weight at the driver's seat).
4. Turn on the combination lamp near beam.
5. Adjust the light using the adjusting screw.
 - 1). Low beam, high beam Adjust up and down in a dimming point, adjust the low beam, high beam up and down height; high beam, low beam left and right adjustment in a dimming point, adjust the low beam, high beam About height. If repairs were made to the front of the vehicle body and / or the front combination lamp assembly was replaced, check the light and adjust it in place with the light detector.
6. Follow the light on the light chart until it is in place.

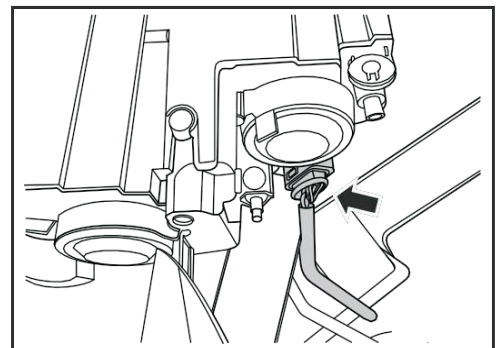
(III) Installation

5. Install the front combination lamp assembly
 - 1). Tighten the 4 bolts fixing front combination lamp assembly.

Tighten torque 3~5N·m



- 2). Connect the front combination lamp assembly wiring harness connector.
6. Install the front bumper body assembly
7. Connect the battery negative cable.
8. Close engine compartment

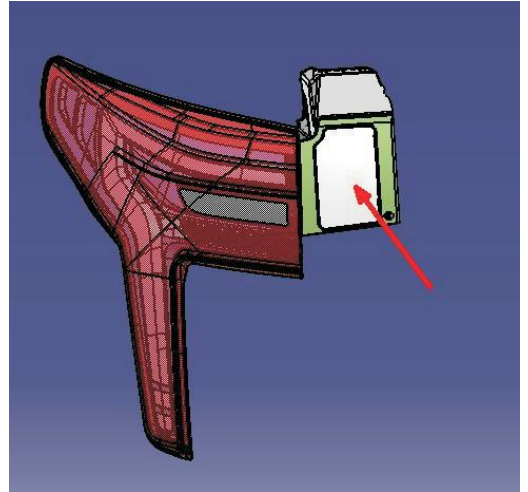


X. Rear side combination lamp assembly

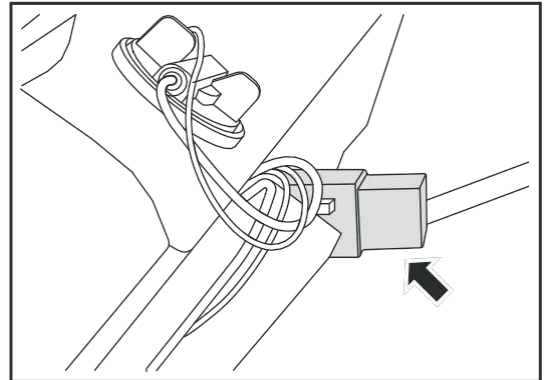
△ Note: Assembly and disassembly methods of left and right rear side combination lamp assembly are similar.

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. **Open the tailgate;**
4. Remove the rear side combination lamp assembly
 - 1). Remove the 1 plug cover and 2 screws of the rear side combination lamp assembly.



- 2). Disconnect the the rear side combination lamp assembly wiring harness connector, and take down the rear side combination lamp assembly.



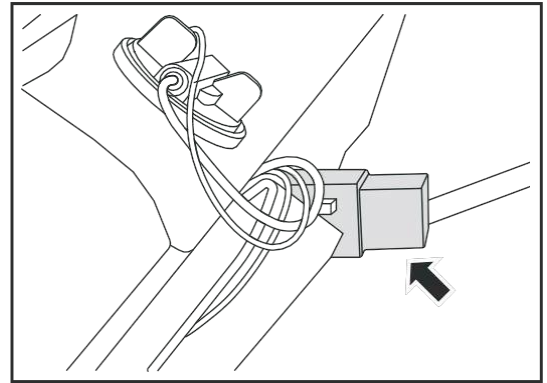
(II) Inspection

- 1). Check whether there are scratches on the surface of the lamp shade, whether the internal structure is loose and swaying, whether the wiring harness is fixed normally, whether there are defects on the surface of the decorative frame and the aluminized area of the reflector, and whether the external identification is correct.

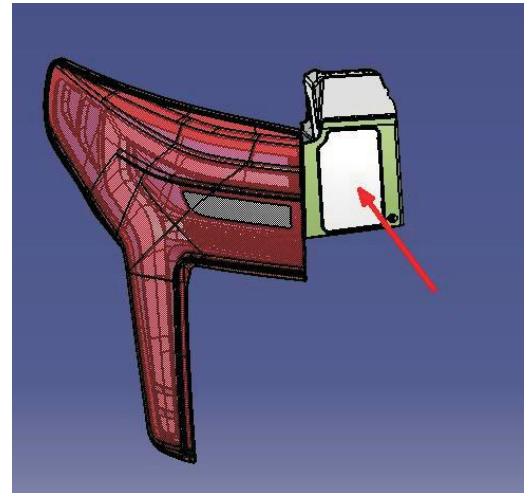
(III) Installation

1. Install the tail door combination lamp assembly
 - 1). Connect the rear side combination lamp assembly connector.

△Note Check if the tail lamp is installed in place, and the clearance between vehicle body is proper, if not in place or inappropriate, please re-install.



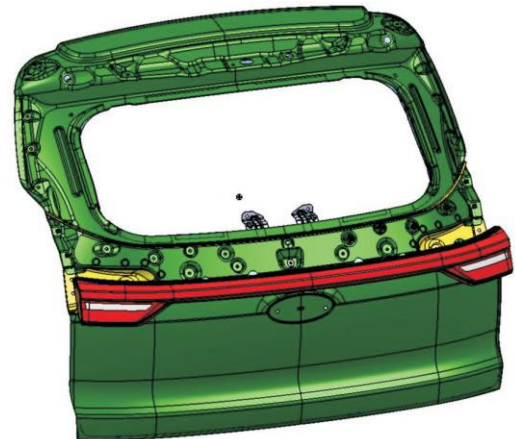
- 2). Tighten the 2 screws of the rear side combination lamp assembly, and cover the plug cover.
Tighten torque 1~3N·m
2. Close the tail door.
3. Connect the battery negative cable.
4. Close the engine compartment cover



XI. Throughout lamp assembly

(I) Removal

1. Open the engine cover
2. Disconnect the battery negative cable
3. Open the tailgate
4. Remove the tail door trim panel. Refer to the tail door trim panel.
5. Removing the tail door outer trim panel. See the tail door outer trim panel.
6. Remove the throughout lamp assembly
 - 1). Remove the fixing bolts of the tail door combination lamp assembly.
 - 2). Disconnect the throughout lamp connector

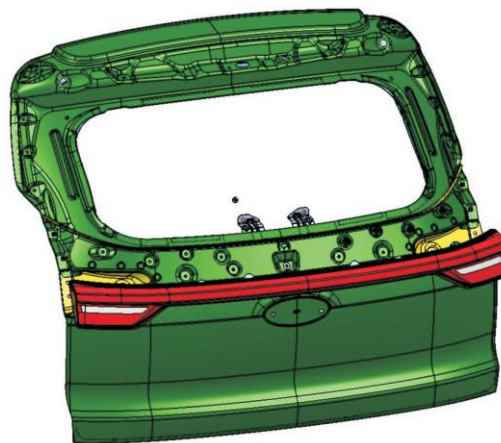


(II) Inspection

1. Check whether there are scratches on the surface of the lamp shade, whether the internal structure is loose and swaying, whether the wiring harness is fixed normally, whether there are defects on the surface of the decorative frame and the aluminized area of the reflector, and whether the external identification is correct.

(III) Installation

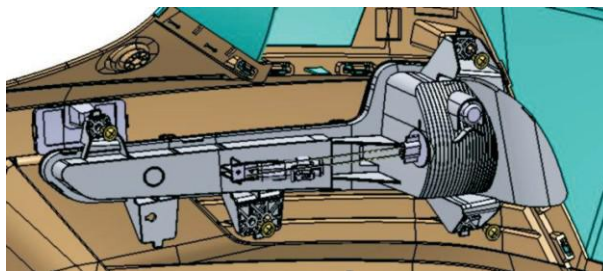
1. Install the throughout lamp assembly
 - 1). Install the fixing nuts of the tail door throughout lamp assembly
Tighten torque 7~9N·m
 - 2). Connect the connectors.
2. Install the tail door trim panel.
3. Install the tail door outer trim panel.
4. **Close the tail door.**
5. Connect the battery negative cable.
6. Close engine compartment



XII. Rear fog lamp and retro-reflector assembly

(I) Removal

1. Open the engine hood.
2. Disconnect the negative cable of the battery.
3. **Remove the Rear bumper assembly** See the rear bumper body assembly



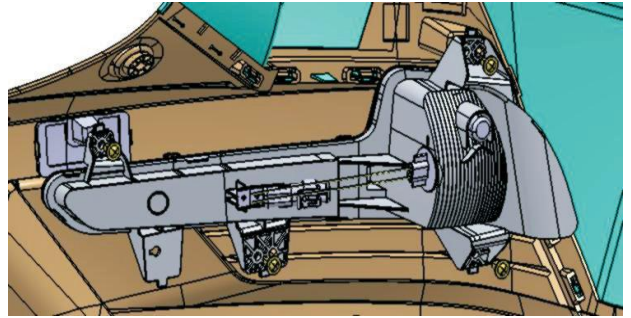
4. Remove the rear fog lamp and retro-reflector assembly
 - 1). Disconnect the rear fog lamp wiring harness connector.
 - 2). Remove the front fog lamp fixing screws and bumper trim strip.
 - 3). Take down the rear fog lamp.

(II) Inspection

1. Check if the rear fog lamp is intact before installation.
2. Do not damage the rear fog lamp during installation.
3. After installation, check if the rear fog lamp installation is in place and whether the gap with bumper is appropriate. If it is not in place or inappropriate, reinstall it.

(III) Installation

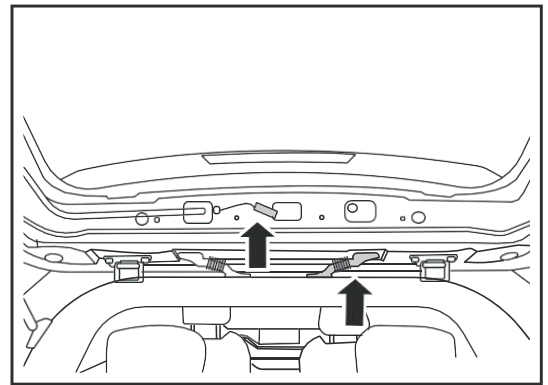
1. Install the rear fog lamp and retro-reflector assembly
 - 1). Install the rear fog light
 - 2). Tightening torque 1~3N·m
 - 3). Connect the wiring harness connector of the rear fog lamp.
2. Install rear bumper
3. Connect the battery negative cable.
4. Close the engine cover



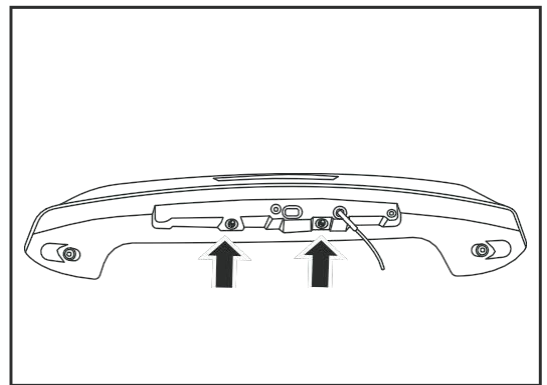
XIII. High position brake lamp assembly

(I) Removal

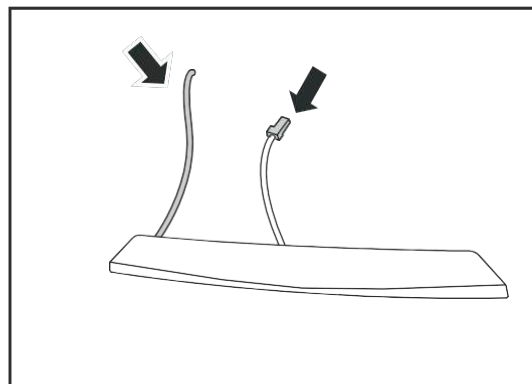
1. Open the engine cover
2. Disconnect the battery negative cable
3. Remove the tail door upper guard panel assembly refer to tail door upper guard panel assembly
4. Remove the high position brake lamp assembly
 - 1). Disconnect the high position brake lamp assembly wiring harness connector.



- 2). Remove the 2 bolts fixing the high position brake lamp assembly.

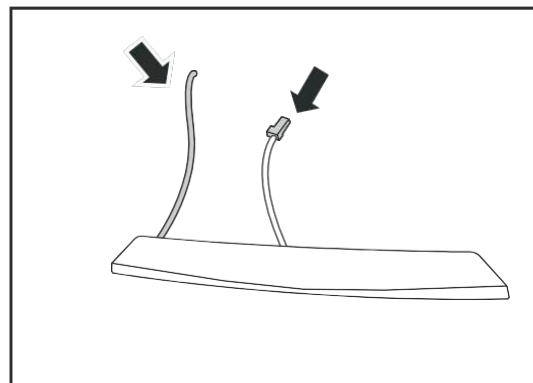


- 3). Unplug the rear washer hose assembly connected to the rear window nozzle, pry off the high position brake lamp assembly and the rear window nozzle.

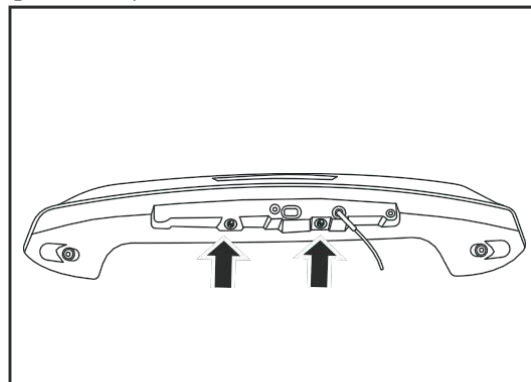


(II) installation

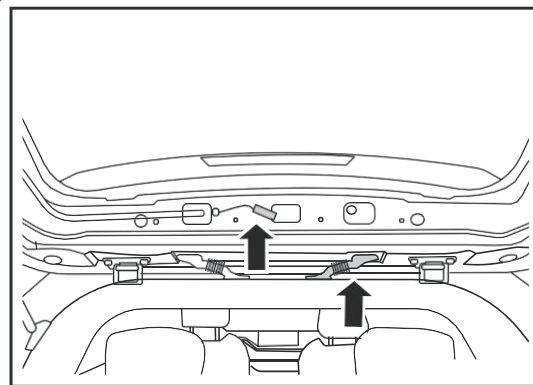
1. Install high brake light assembly
 - 1) Install the high position brake lamp assembly with the rear window nozzle on the tail fin assembly and connect the rear wash hose assembly to the rear window nozzle.



- 2 Tighten the 2 fixing bolts of the high position brake lamp assembly.
Tightening torque 2~4N·m

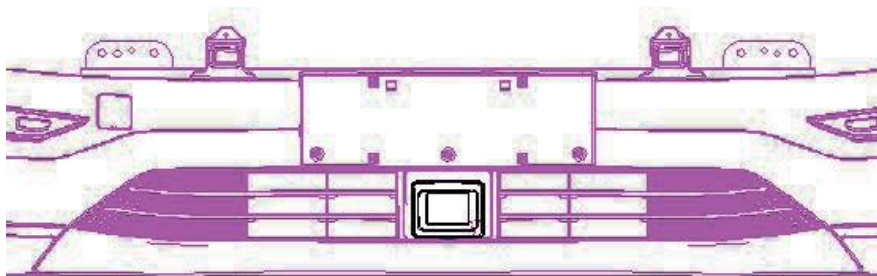


- 3 Connect the high position brake lamp assembly wiring harness connector.
2. Install tail door upper guard panel assembly
3. Connect the battery negative cable.
4. Close the engine compartment cover



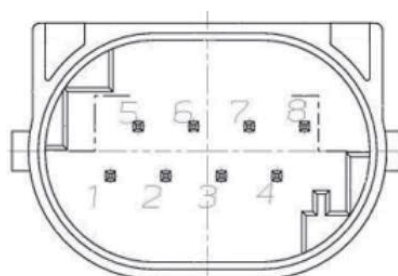
ACC

Front Millimeter Wave Radar System (3670001U3494)



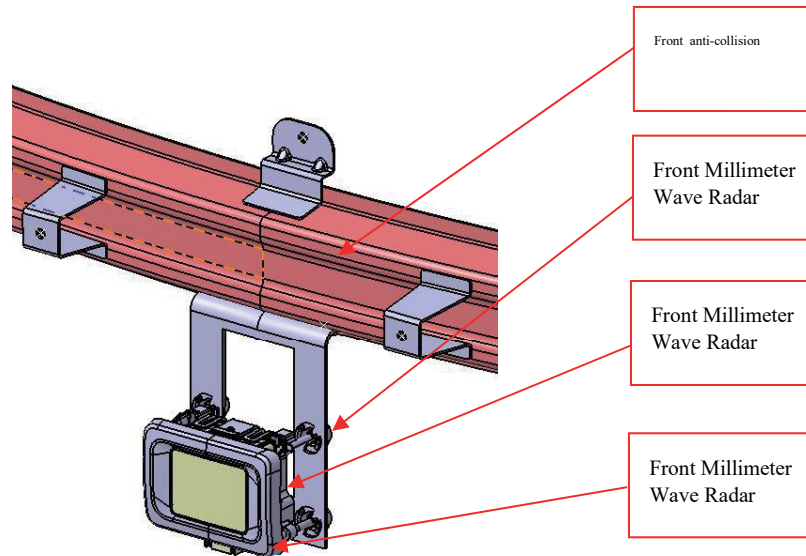
Assembly Position Diagram

Pin definition of the connector:



Replacement of parts:

Remove the front millimeter-wave radar cover, unplug the front millimeter-wave radar connector, and remove the front millimeter-wave radar from the buckles.



Common Malfunction Diagnosis:

The instrument indicates the fault of ACC system or ACC system failure lamp: use the diagnostic device to read the fault code and carry out the corresponding maintenance.

MRR Front Millimeter Wave Radar After-sale Calibration Procedure

1 Conditions Need Radar After-sale Calibration

After-sale calibration uses gradienter calibration and driving calibration. Firstly, calibrate the vertical direction with gradienter, and then calibrate the horizontal direction with the driving calibration service. Finally, the deviation between the driving axis and the radar axis is within a certain range. it needs to calibrate radar when there are the following conditions:

- When radar report error and read the fault code DTC_MRR_MISALIGNED;
- replace new radar assembly, such as replace the radar or radar bracket;
- When vehicle driving axis line is changed, such as vehicle do the 4-wheel alignment;

2, Calibration device

Radar calibration platform, including a calibrated vehicle, a gradienter (as shown in picture



1) and a calibration computer.

3, Calibration procedure

Main procedures of calibration:

Measure the inclination of the ground (refer to XX);

Park the vehicle in the horizontal area, remove the components around the radar and install the gradienter correctly. Adjust the calibration bolt in the vertical direction

(bolt in the lower right corner) to make the display value of the level gauge close to the ground inclination value, and ensure the error within ± 0.3 .

Carefully remove the gradienter to avoid the influence on the vertical angle during the disassembly process Install other components such as bumpers(with licenses) and check the condition of the vehicle to ensure safe driving on public roads.

8.Start the after-sales calibration service through the diagnostic equipment X431. Click "start driving calibration" in the diagnostic instrument and drive according to the requirements of driving mode (refer to 1.4.3) until the calibration progress bar reaches 100%.

△Attention: The calibration progress bar reaches 100% usually takes about 20 minutes.(depending on roads and targets quantity)

Adjust the horizontal calibration bolt (upper left corner bolt) according to the requirements of calibration result.

If the first result is out of tolerance, the driving calibration service shall be performed again after adjusting the calibration bolts to ensure the completion of the calibration. If the calibration is not successful after 45 minutes, it is necessary to check whether the calibration environment, driving conditions and installation position are correct,

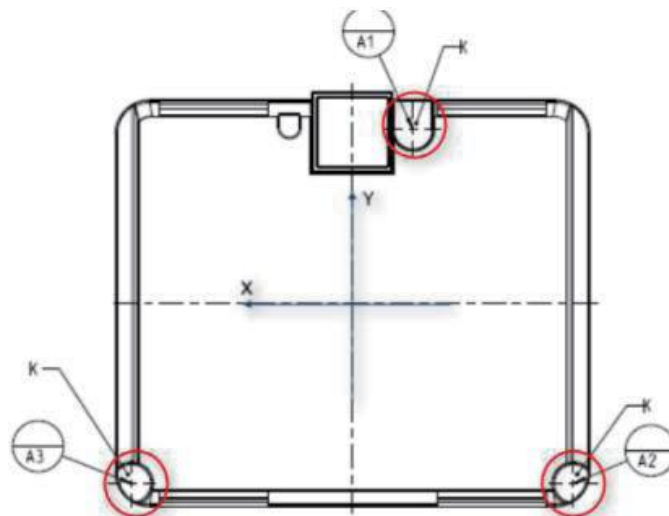
if follow the driving calibration requirements; Repeat the above steps after confirmation.

4 Calibration conditions

4.1 Environmental conditions for vertical calibration

The vertical calibration of radar is carried out by the gradienter, and the calibration requirements are as follows:

The calibration site of the parked vehicle must be level, and the inclination is $-0.3 \sim 0.3^\circ$, or the inclination of the calibration site can be measured; Ensure the



cleanliness of the radar surface, especially the positioning accuracy of the three mounting points of the gradienter (see Figure 2, point K).

Fig. 2 Stuck node of radar gradienter bracket

4.2 Environmental conditions for horizontal calibration

The horizontal calibration of radar is carried out by the gradienter, and the calibration requirements are as follows: The radar surface should be clean and there is no snow, soil and other coverings.

Avoid calibration in snow and rain.

Both sides of the road need static metal targets, such as lamp posts, road signs, etc., recommend high-speed or elevated road conditions with metal railings.

4.3 Driving conditions of driving calibration mode

When the driving calibration begins, the vehicle must run under certain conditions before the progress bar of driving calibration can be gradually increased to

100%, and the driving calibration process can be completed. The driving conditions of driving calibration are as follows:

Limit conditions	Threshold value	Out of tolerance prompt
Min. vehicle speed	40km/h	Speed too low
Max. vehicle speed	120km/h	Speed too high
Min. longitudinal acceleration	-0.5m/s^2	Longitudinal acceleration is too small
Max. longitudinal acceleration	1.0m/s^2	Longitudinal acceleration is too large
Max. lateral acceleration	2.0m/s^2	Lateral acceleration is too large
Max. turning curvature	0.001m/km	Turning curvature too large
ABS, ASR, ESP, MSR trigger		Vehicle dynamic condition interference

1.4.4 Cause of calibration failure

The calibration of the driving calibration service may fail if:

Driving conditions always do not meet the requirements:

surrounding reference, road conditions

The communication between the diagnostic device and the vehicle is interrupted during calibration; radar installation deviation too large;