



V5

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- **Air Condition System**

V5RM2I/2/1

# **Repair Manual for Brilliance V5**

**Air-conditioning System**

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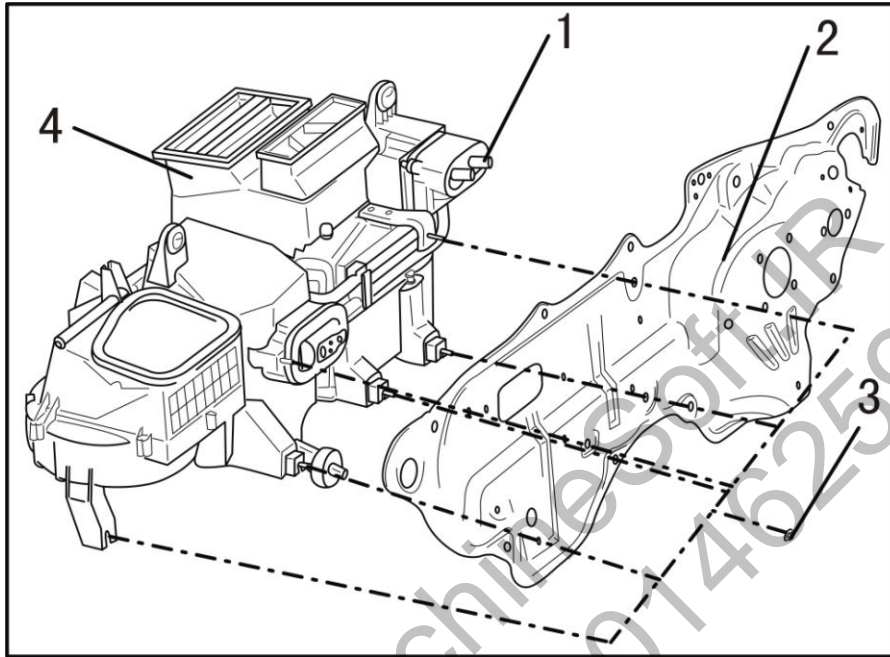
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## Air-conditioning System

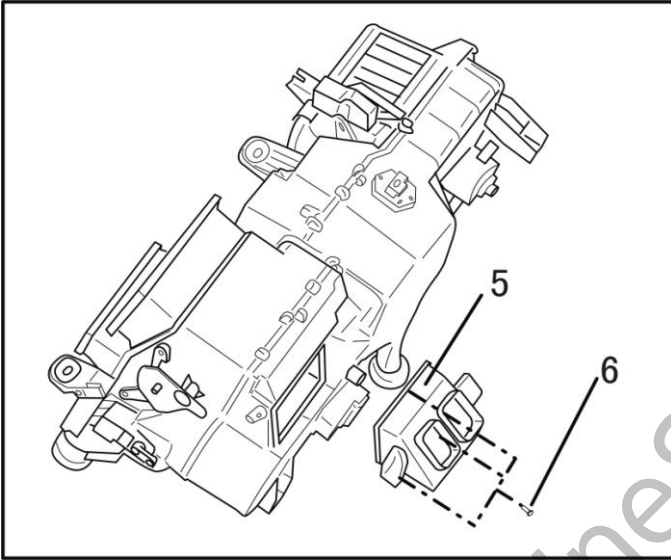
### I. Components and core of heater unit

Dismantling and mounting

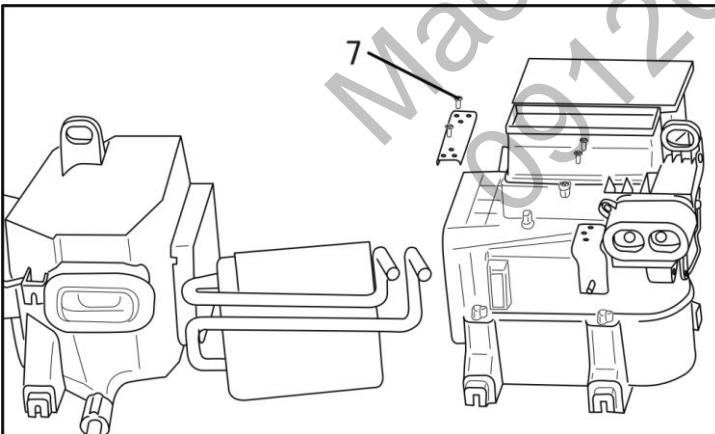


1. Dismantling procedures

- (1) Heater unit hose coupling
- (2) Firewall assembly
- (3) Air-conditioning system setting nut
- (4) Central ventilation pipe



- (5) Distributing pipe at foot
- (6) Air duct setting bolt at foot



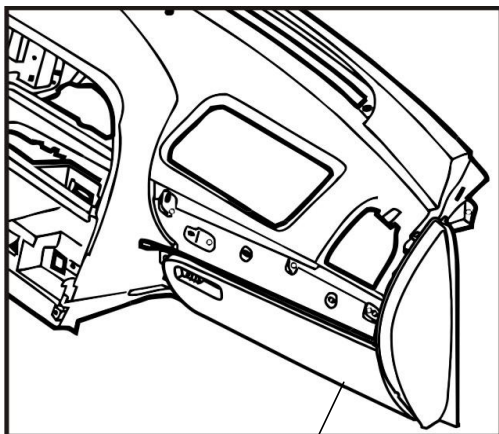
- (7) Heater unit setting nut
- (8) Core of heater unit

2. Operation after mounting

Filling coolant

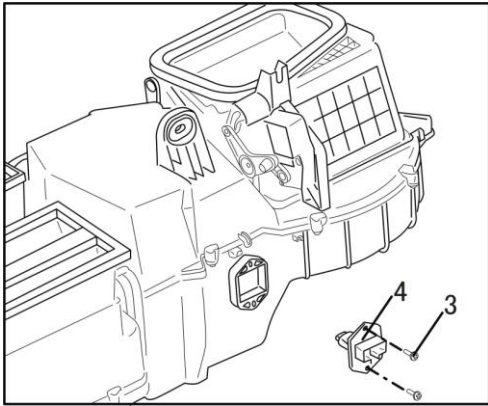
## II. Air blower and electric resistor of air conditioning system

### I. Dismantling and mounting



#### 1. Dismantling procedures

- (1) Blower motor      (2) Setting bolt

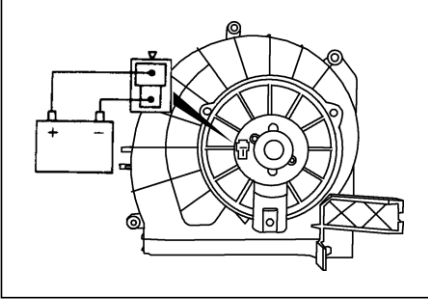


(3) Electric blower setting bolt

(4) Resistor

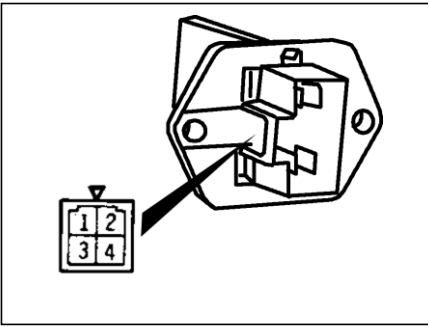
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## II. Check



### 1. Fan and motor of electric blower

Before apply power on each battery terminal, check whether motor rotates normally without abnormal noise.



### 2. Resistor

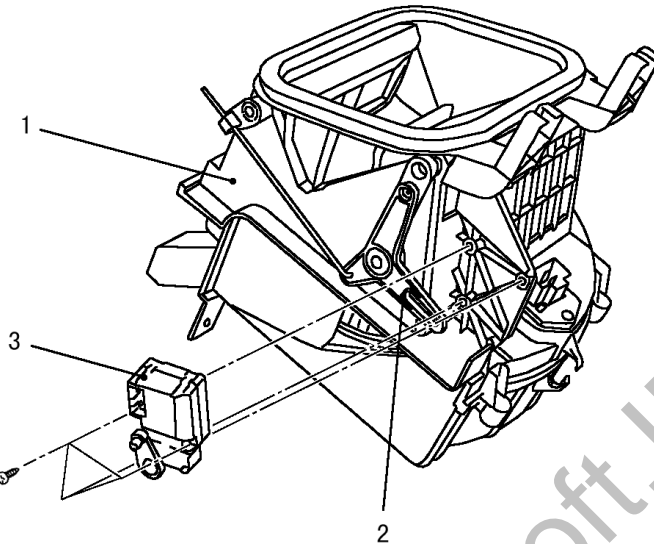
Use multimeter to measure resistor between every 2 terminals in table below. Check whether measured value is within specified range.

Measured terminal	Standard value ( $\Omega$ )
Between terminals 4 and 2 (1)	3.5
Between terminals 4 and 1 (2)	1.3
Between terminals 4 and 3 (3)	0.5



### III. Interior/exterior air shifting choke motor assembly

#### I. Dismantling and mounting

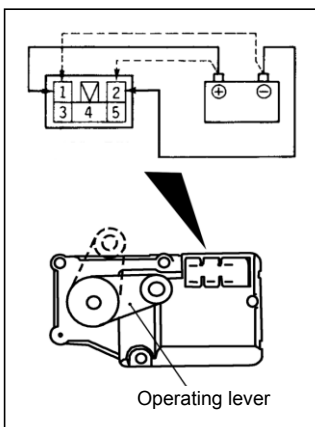


#### 1. Dismantling procedures

- (1) Manually/electrically operated air blower assembly
- (2) Operating lever
- (3) Interior/exterior air shifting choke motor assembly

(Mode choke motor and air conditioning choke motor in air conditioning system are also dismantled through above steps)

#### II. Check



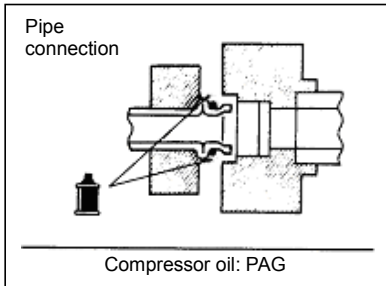
When battery power is applied between connector terminals 1 and 2 at motor assembly side, check the movement of operating lever. Also check whether operating level moves in opposite direction when polarity is changed.

#### Note

- i. Cut off power when choke is located at interior air or exterior air position.
- ii. After battery power is applied, if motor does not rotate, cut off power.

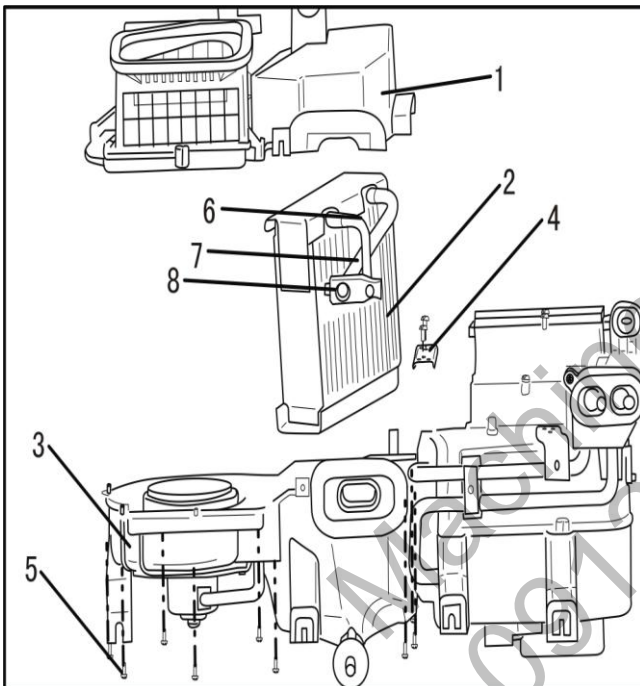
## IV. Evaporator

### I. Dismantling and mounting



#### 1. Preprocessing prior to dismantling

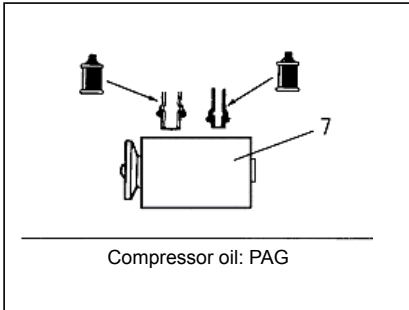
Discharge and refill coolant



#### 2. Dismantling procedures

- (1) Upper casing of air conditioning system
- (2) Core of evaporator
- (3) Lower casing of air conditioning system
- (4) Junction plate of air conditioning system
- (5) Casing setting bolt
- (6) High pressure pipeline
- (7) Low pressure pipeline
- (8) Expansion valve

## II. Dismantling and reassembling



## III. Tips for dismantling procedures

### 1. Dismantling of clip

Use flat head screwdriver head of which is wrapped by rag to dismantle clip to avoid damaging casing surface.

## IV. Check

### 1. Temperature sensor

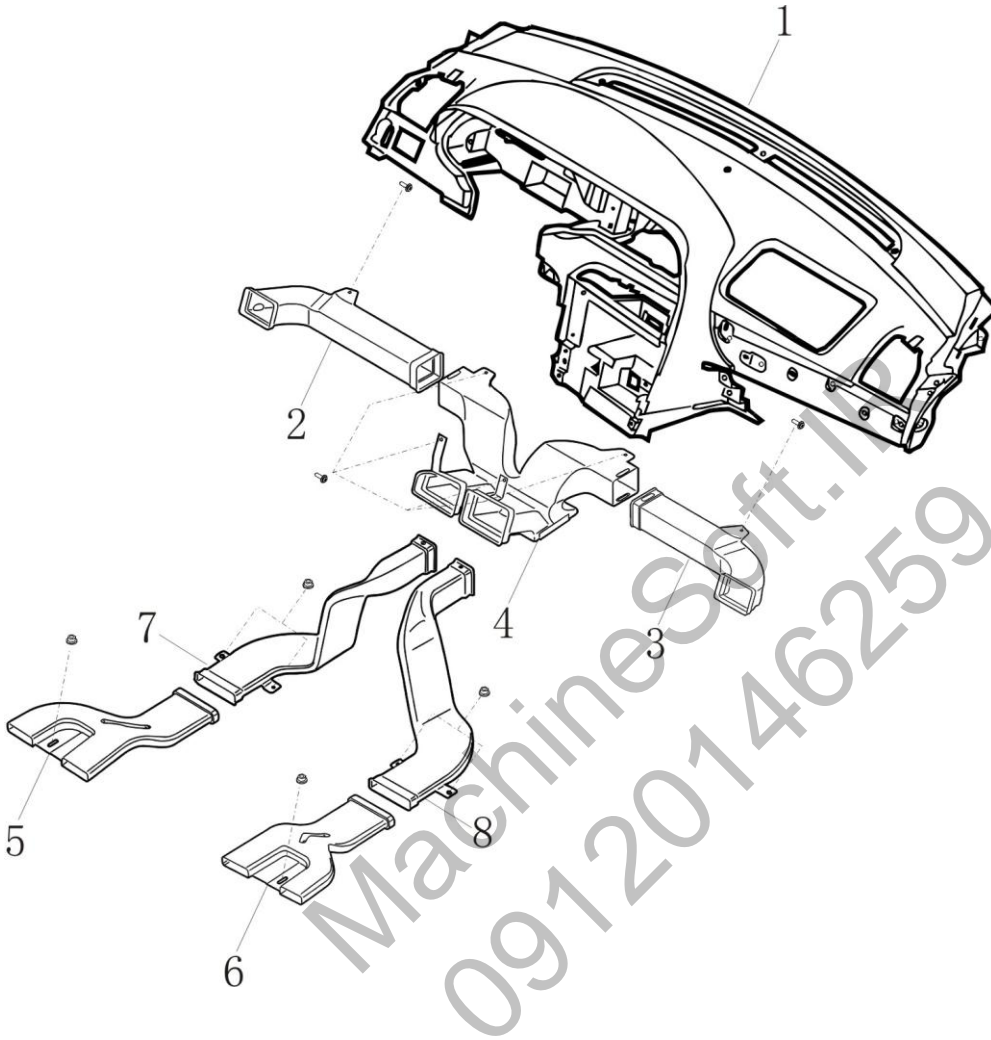
When sensor fails, air conditioning system fails and evaporator gets iced up.

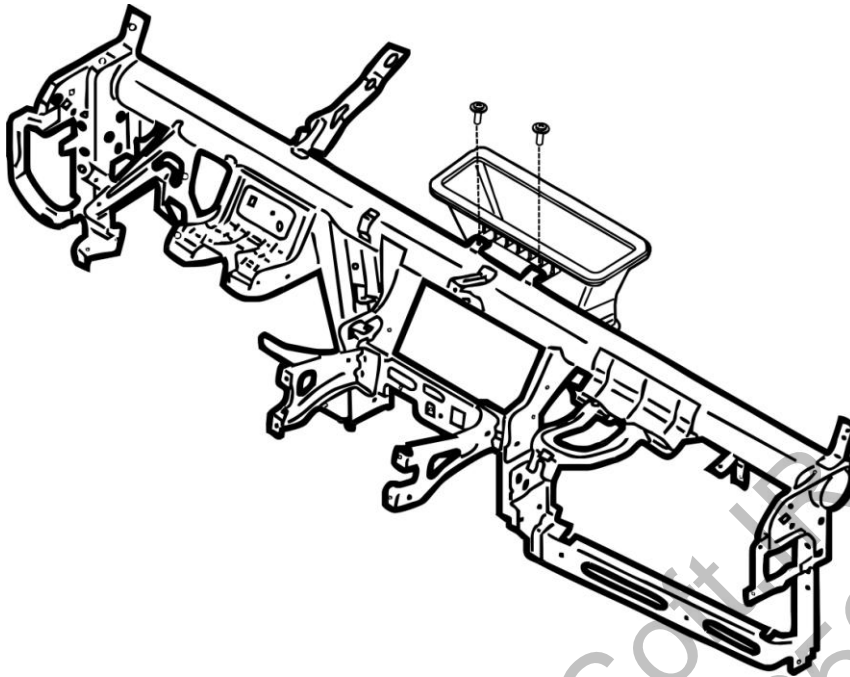
Temperature sensor shall meet performances in table below

Operation state	Setting temperature (°C)	Tolerance (°C)
Turn off air conditioning	+3	±0.20
Differential motion	+1.0	±0.20

## V. Ventilator

### I. Dismantling and mounting of air duct



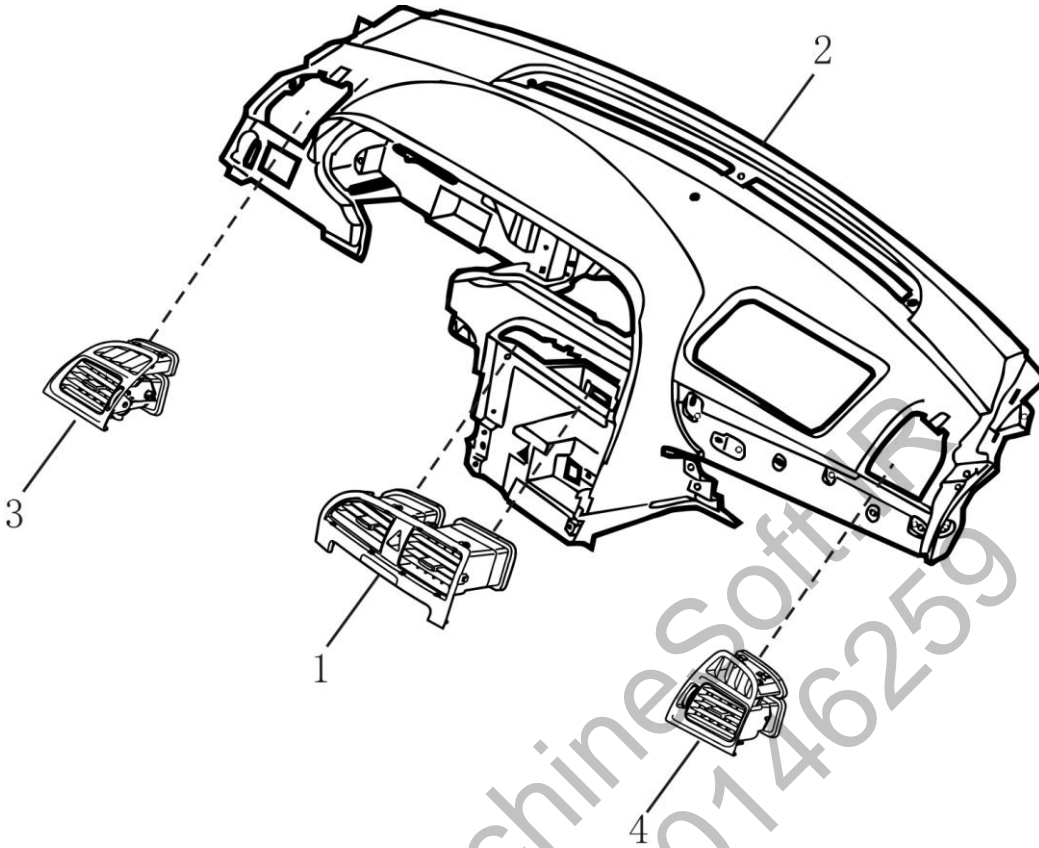


#### Dismantling procedures

- (1) Instrument board
- (2) Left air duct assembly of side blowing surface
- (3) Right air duct assembly of side blowing surface
- (4) Middle air duct assembly of blowing surface
- (5) Left foot blowing air duct 2 for back-seat passengers
- (6) Right foot blowing air duct 2 for back-seat passengers
- (7) Left foot blowing air duct 1 for back-seat passengers
- (8) Right foot blowing air duct 1 for back-seat passengers
- (9) Defroster coupler

Note: air duct for defrosting is welded on instrument board

## II. Dismantling and mounting of air outlet

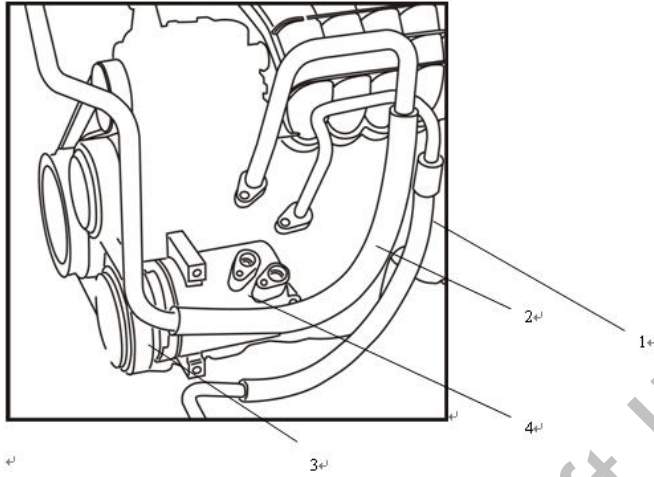


### Dismantling procedures

- (1) Central air outlet assembly
- (2) Instrument board
- (3) Left air outlet assembly
- (4) Right air outlet assembly

## VI. Compressor

### Dismantling and mounting of compressor



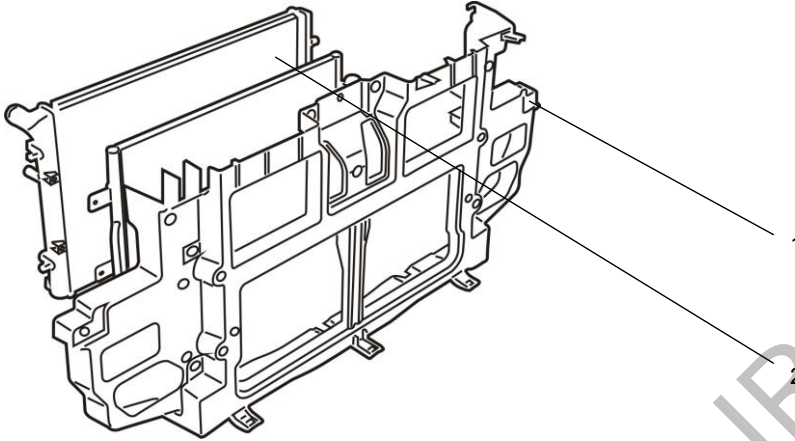
#### Dismantling procedures

- (1) Air conditioning exhaust pipe assembly
- (2) Air conditioning inhaling hose assembly
- (3) Compressor belt
- (4) Compressor

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## VII. Condenser

### Dismantling and mounting of condenser



#### Dismantling procedures

- (1) Front module
- (2) Dismantle condenser from coolant tank

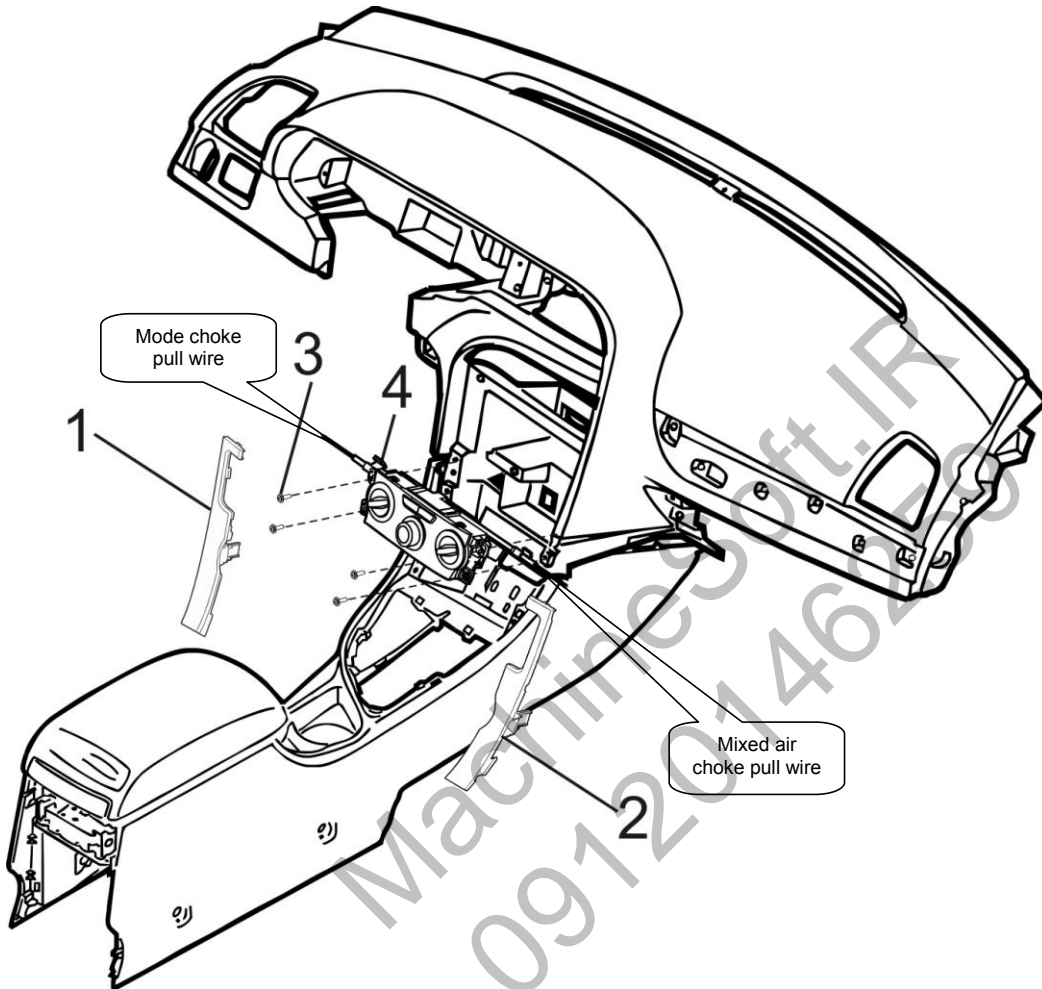
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## VIII. Air conditioning controller

### I. Dismantling and mounting of air conditioning controller

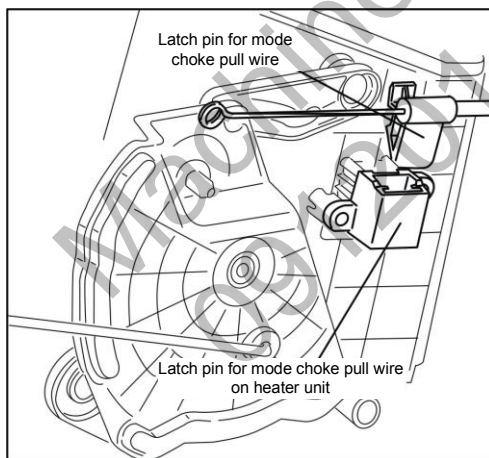
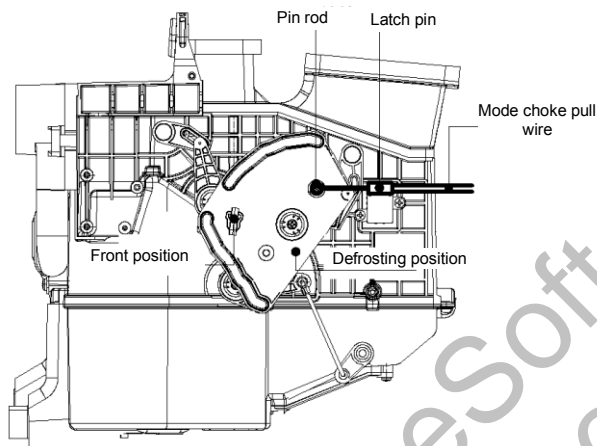
#### 1. Procedures for dismantling hand-operated air conditioning controller from car



- (1) Left trim strip of central controller
- (2) Right trim strip of central controller
- (3) Tapping screw ST4.2×16
- (4) Hand-operated air conditioning controller

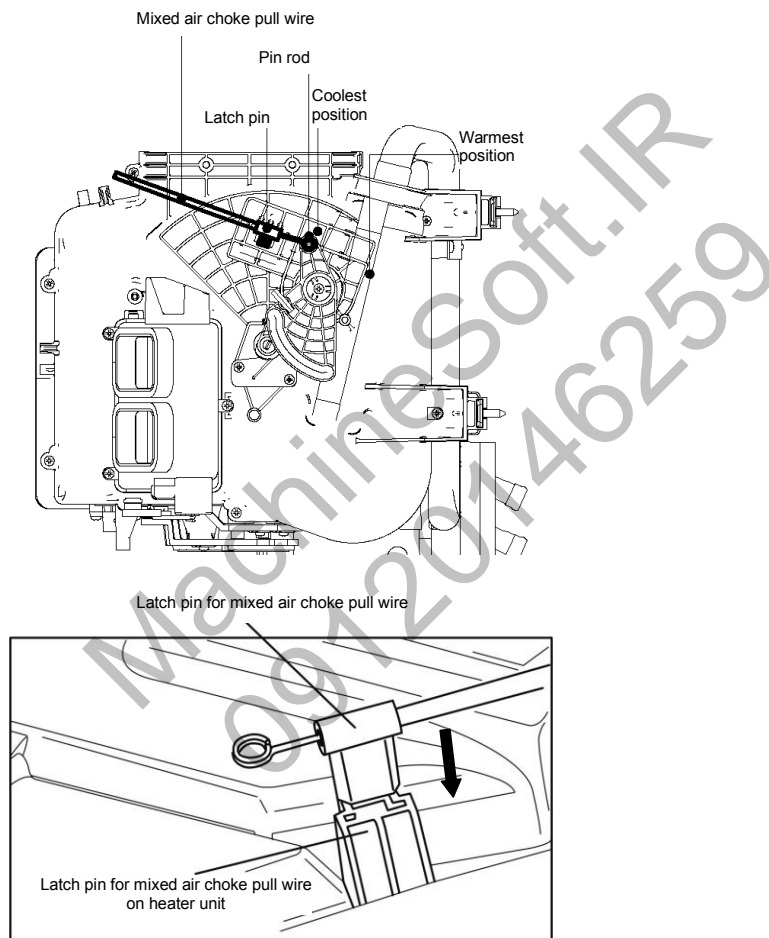
## 2. Procedures for mounting mode choke pull wire of hand-operated air conditioning controller

- (1) Set the mode choke control knob on hand-operated air conditioning controller to front defrosting position;
- (2) Set the mode choke stop lever at left side of hand-operated heater unit to front defrosting position and sleeve the suspension loop of mode choke pull wire onto pin rod corresponding to mode choke driving mechanism on heater unit;
- (3) Pull out the pull wire along arrow to slacken it. Then vertically insert the latch pin into corresponding slot on heater unit for firm latching.

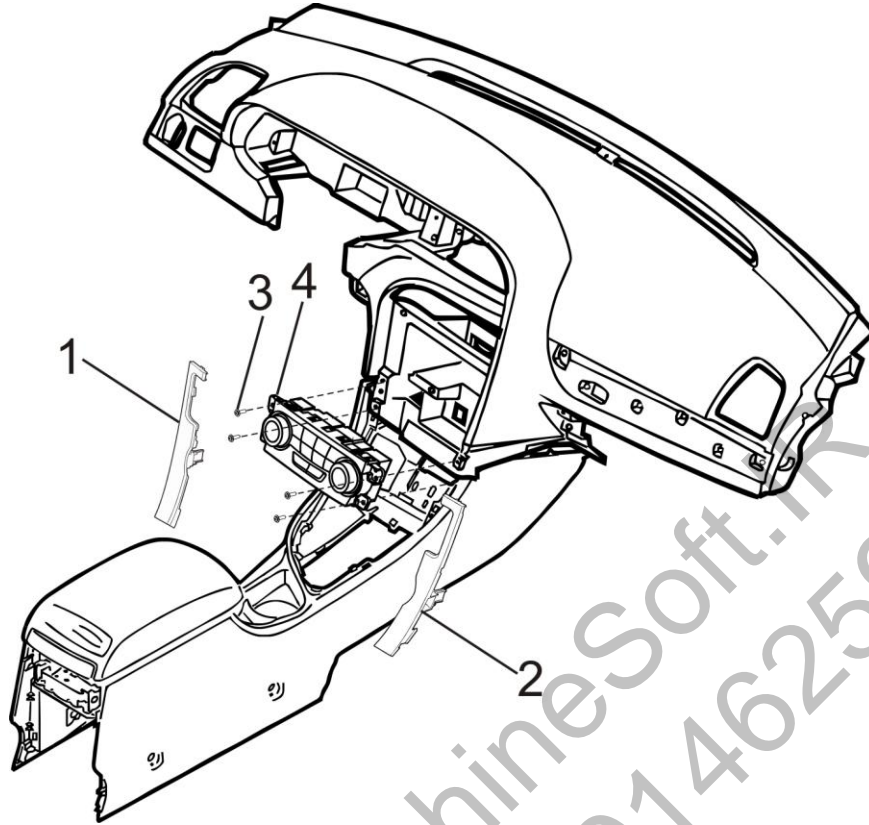


### 3. Procedures for mounting mixed air choke pull wire of hand-operated air conditioning controller

- (1) Set the temperature choke control knob on hand-operated air conditioning controller to coolest position;
- (2) Set the mixed air choke stop lever at bottom of hand-operated heater unit to coolest position and sleeve the suspension loop of mixed air choke pull wire onto pin rod corresponding to mixed air choke driving mechanism on heater unit;
- (3) Pull out the pull wire along arrow to slacken it. Then vertically insert the latch pin into corresponding slot on heater unit for firm latching.



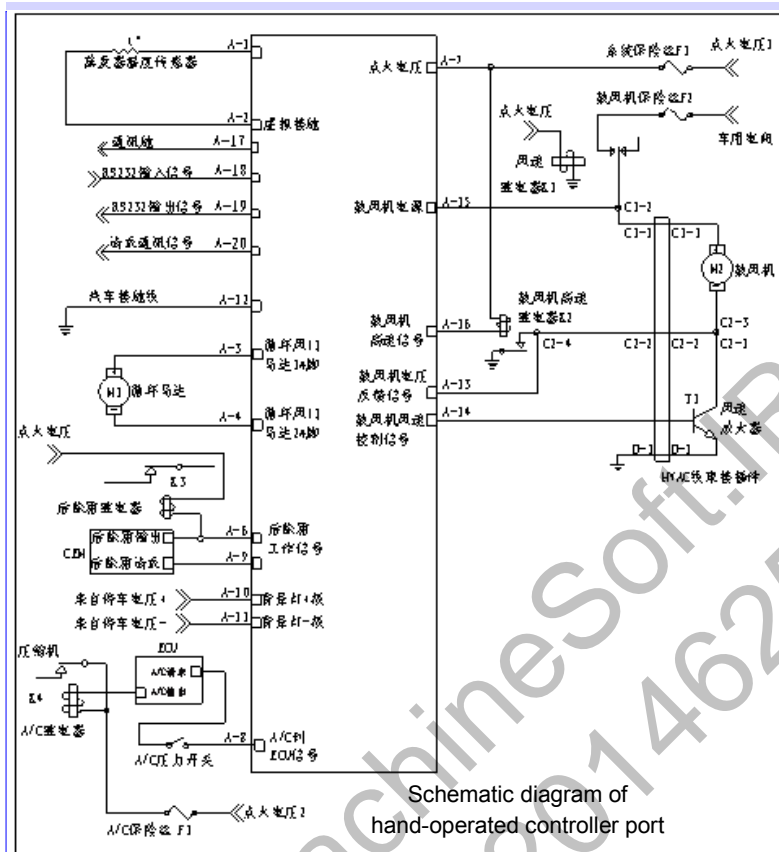
4. Procedures for dismantling electric air conditioning controller from car



- (1) Left trim strip of central controller
- (2) Right trim strip of central controller
- (3) Tapping screw ST4.2×16
- (4) Electric air conditioning controller

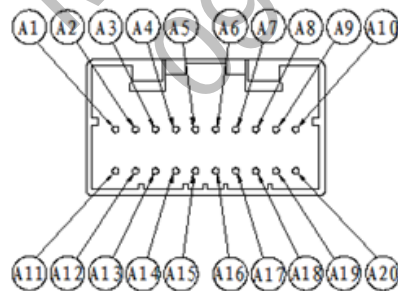
## II. Circuit diagram of air conditioning control system

### 1. Circuit diagram of hand-operated air conditioning controller

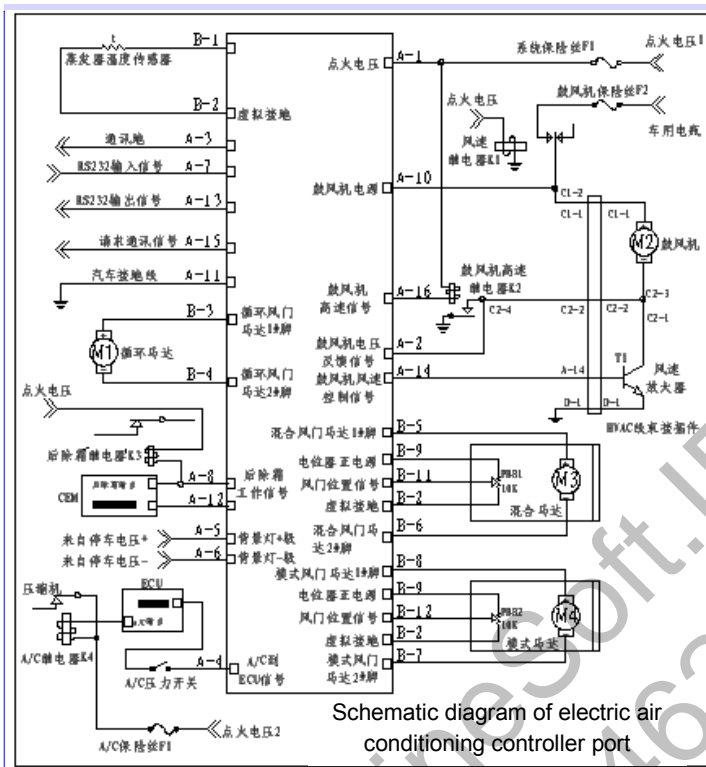


批注 [微软用户1]: 此图不清, 小字未译, 请客户核实

AMP 20-pin connector: 174977-2

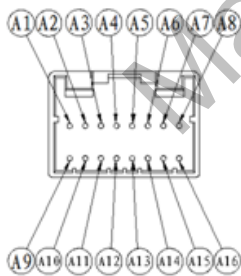


## 2. Circuit diagram of electric air conditioning controller

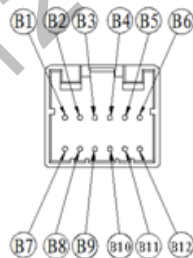


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AMP 16-pin connector: 174975-2



AMP 12-pin connector: 174973-2



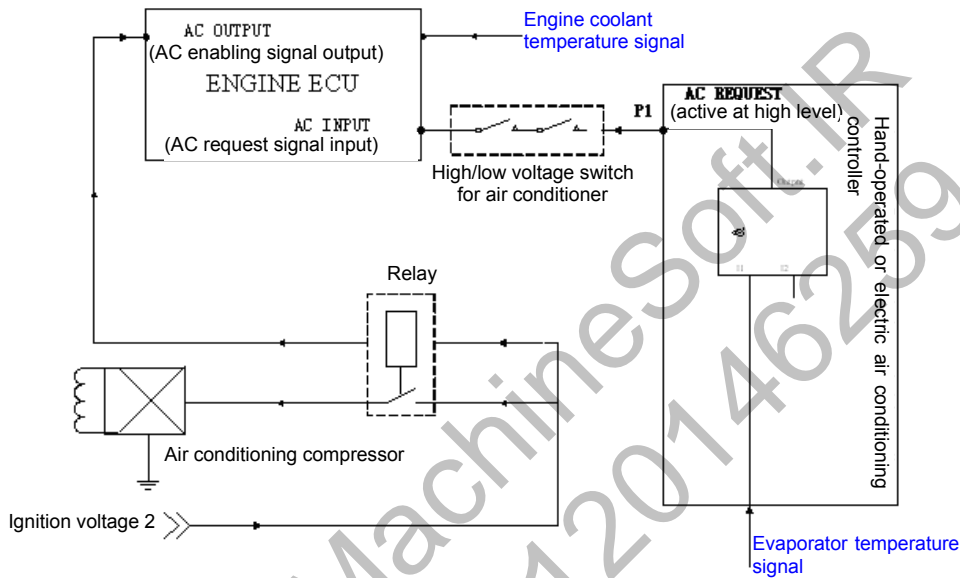
### III. Fault diagnosis of air conditioning controller

#### 1. Fault diagnosis of electric blower

- (1) If blower can only operate at high speed (level 4 on hand-operated air-conditioner, level 7 on electric air-conditioner), speed governing module or related wiring on blower would fail;
- (2) If blower can only operate at levels 1-3 (hand-operated) or levels 1-6 (electric) and does not operate at highest level, high speed relay or related wiring on blower would fail;
- (3) If blower can not be put into service, motor or related wiring on blower would fail.

#### 2. Actuation conditions for air conditioning compressor

To enable air conditioning system to perform cooling normally, air conditioning compressor shall be actuated.



When all parts in hand-operated or electric air conditioning system work normally, there are totally 3 prerequisites to ensure compressor actuation in hand-operated air conditioning system and compressor does not actuate unless those 3 prerequisites as follows are met:

- (1) Pipeline pressure in air conditioning system shown in Table 1;

Table 1 Pressure control point of high pressure loop in hand-operated or electric air conditioning system

Pipeline pressure	Pressure switch is turned from off to on	Pressure switch is turned from on to off
Low pressure	0.225 MPa	0.196 MPa
Medium pressure	1.77±0.08 Mpa (cooling fan rotates at high speed)	1.37±0.12 MPa (cooling fan rotates at low speed)
High pressure	2.55 MPa	3.14 MPa

(2) Evaporator temperature shown in Table 2;

Table 2 Temperature control point from evaporator temperature sensor to A/C system in hand-operated or electric air conditioning system

Operation state	Setting temperature (°C)	Tolerance (°C)
Turn off air conditioning	+3.0	±0.20
State maintaining range	+1.5	±0.20
Start air conditioner	+4.5	±0.20

(3) Engine coolant temperature.

### 3. Troubleshooting for evaporator temperature sensor

(1) Properties of evaporator temperature sensor shown in Table 3.

Table 3 Properties of evaporator temperature sensor

Temperature (°C)	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Rmin(Ω)	6031	5724	5434	5160	4902	4658	4428	4210	4004	3810	3626	3453	3288	3132	2985	2845
R(Ω)	6282	5962	5660	5375	5106	4852	4612	4385	4171	3969	3777	3597	3425	3263	3109	2964
Rmax(Ω)	6533	6200	5886	5590	5310	5046	4796	4560	4338	4128	3928	3741	3562	3394	3233	3083

(2) To determine whether evaporator temperature sensor fails, first power the air conditioning system for normal operation and connect the multimeter which is set at current level with measuring circuit of evaporator temperature sensor in series (do not dismantle the evaporator temperature sensor) to measure the circuit current I. Then use Ohm's Law  $R=U/I$  to calculate the resistance according to Table 7 ( $U=5V$ ).

Due to lagging of evaporator temperature sensor resistance variation and unmeasurable inside temperature, only temperature sensor resistance R can be used for determining the sensor quality, meaning resistance falls along with temperature rise:

- If variation trend is not correct, the evaporator temperature sensor fails;
- If variation trend is correct but compressor is still in operation when resistance is lower than 5100Ω, the controller fails;
- If temperature sensor resistance first rises but falls later and 4171Ω meaning 3°C is not reached (error in evaporator temperature sensor is taken into consideration), ice accumulates in core of evaporator and blocks it. To solve this problem, turn off A/C switch of air conditioner and keep blower running at high speed. After approximate 5 minutes, turn on A/C switch (blower still runs at high speed) and check change of temperature sensor resistance to determine whether sensor fails.

Ice blockage in evaporator would be caused by many reasons: sensor is mounted at a too high position; sensor fails; offset in compressor control valve.

(3) If short circuit or open circuit occurs in evaporator temperature sensor, the service indicator on "A/C" button on hand-operated or electric air conditioning controller flashes at cycle of 0.5s. At this time, compressor in air conditioning system can not work normally and the normal cooling function is not restored until this trouble is cleared, after which the service indicator on "A/C" button stops flashing.



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