

Electrical System

General

I . Operation table

II. Electric diagram identification

1. Wire code identification:

2 . Electrical component identification:

III .Electrical designations and usages of the complete vehicle

1. Battery
2. Starter
3. Generator
4. Speed sensor
5. Electric preheating
6. Fuel cutoff solenoid valve
7. Wiper
- 8 .Washer
9. Headlamp
- 10 .Front small lamp
11. License lamp
12. Direction signal lamp and hazard warning lamp
13. Rear combination lamp
- 14 .Reversing lamp and switch
15. Interior lamp and switch 150
16. Brake lamp and switch
17. Parking brake lamp and switch
- 18 Fog lamp and switch
19. Electric horn
20. Vacuum alarm
- 21 .Various relays
- 22 .Combined switches
23. Combined instrument
- 24 .CD player
25. Idle speed boost device
26. Exhaust brake controller
27. Electrical device

Electrical System

General

I . Operation table

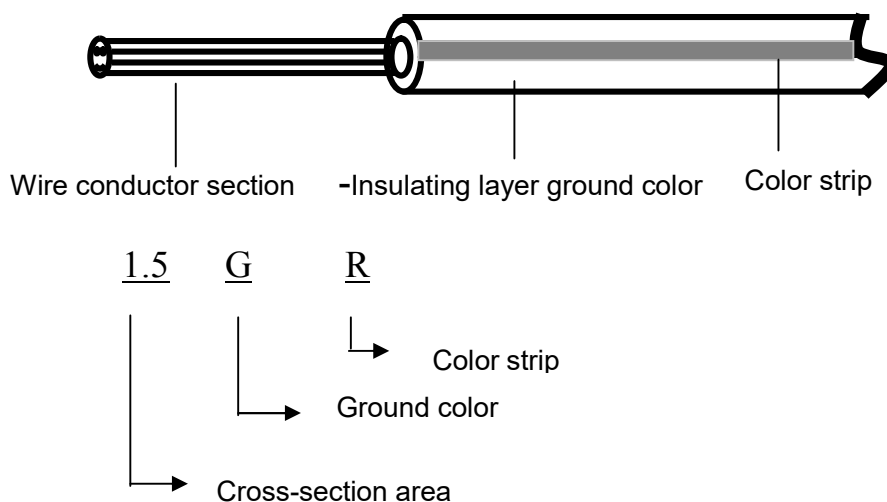
		12 V	
		4DA1-1	4DA1
Battery	6-QA-100D	B	B
Instrument	Speedometer	B	B
	Thermometer	B	B
	Fuel meter	B	B
Headlamp	Two abnormal shape crystal headlamps	B	B
Fog lamp		B	B
Illuminator	Speedometer	B	B
	Thermometer	B	B
	Fuel meter	B	B
	Meter board	B	B
Indicator and caution lamp	Direction indicator and hazard lamp	B	B
	Far beam indicator	B	B
	Parking brake indicator	B	B
	Brake liquid level indicator	B	B
	Heating plug indicator	B	B
	Oil pressure indicator	B	B
	Exhaust brake indicator	B	B
	Water separator indicator	B	B
Brake lamp and reversing lamp		B	B
Interior lamp	Three level lamp changes	B	B
	Intermittent wiper	B	B
Cigarette lighter		B	B
Horn		B	B
CD player and stereo radio cassette player		B	O
Buzzer	Vacuum warning buzzer	B	B
Warm air and air conditioner		B	O
Manually-operated door and window		B	B
Motor-driven door and window		O	O
Note: B: Standard equipment O: Optional			

1. Wire code identification:

E.g.: 1.5GR

G-----Color of insulating layer is green

R-----Color strip is red



Color codes of cables

Application circuit	Vinylon insulated wire					
Starter motor	Black (B)	Black - white (BW)	Black- yellow (BY)	Black- red (BR)		
Charging circuit	White (W)	White- red (WR)	White- black (WB)	White- blue (WL)	White- Green (WG)	
Lamp circuit	Red (R)	Red- white (RW)	Red- black (RB)	Red- yellow (RY)	Red- green (RG)	Red- blue (RL)
Signal circuit	Green (G)	Green- white (GW)	Green- red (GR)	Green- yellow (GY)	Green- black (GB)	Green- orange (GO)
Metering circuit	Yellow (Y)	Yellow- red (YR)	Yellow- black (YB)	Yellow- black (YB)		Blue - yellow (LY)
Wiper circuit	Blue (L)	Blue- white (LW)	Blue- red (LR)	Blue- black (LB)	Blue- orange (LO)	
Miscellaneous	Lamp green (Lg)	Lamp green - black (LgB)	Lamp green - red (LgR)			
	Brown (Br)	Brown- white (BrW)	Brown- red (BrR)	Brown- yellow (BrY)		

Electrical System

2 . Electrical component identification:

Electrical components in the JAC automobile electrical diagrams are indicated in common general signs. Refer to Common Automobile Electrical Signs for details.

Battery unit	Fuse	Relay	Flasher	Button switch
Solenoid valve	Electric horn	Illuminator, indicator	Speaker	Fuel gauge
Combination lamp	Buzzer	General hand switch sign	Radio cassette player	Thermometer
Motor	Voltage regulator	Semiconductor diode	Twin-filament lamp	Amperemeter

Fig. 2 Common automobile electrical signs

III .Electrical designations and usages of the complete vehicle

1. Battery

(1) Battery is a kind of reversible low voltage direct current power supply that can convert chemical energy into electric energy and vice versa. Lead acid battery is supplied by JAC, which is dry-charged battery.

(2) Electrolyte in the battery is prepared by pure sulfuric acid and pure distilled water in a certain proportion. Electrolyte purity is an important factor affecting the electrical performance and service life of the battery. As the industrial sulphuric acid and

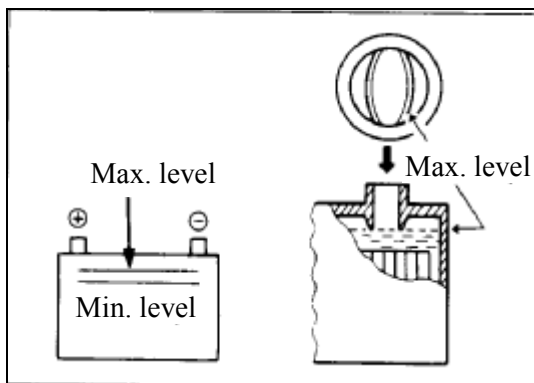
Electrical System

ordinary water contains foreign materials as copper and iron that accelerate the self discharge, it cannot be used in battery. The sulfuric acid and distilled water used must meet specialized standard.

(3) The battery is composed of six separate single cells that are connected in series with led rod. The voltage of a single cell is 2V, so the nominal voltage of one battery of six cells of series connection is 12V.

(4) The battery has charging hole that is sealed by plug screw. Charging hole plug screw has vent hole to release hydrogen and oxygen generated from chemical reaction. The vent hole must be kept clear in service. The shell may crack or explode if it is clogged.

(5) Battery inspection: a If the electrolyte level is too low, please add distilled water to the max. liquid level; b If the measured specific weight is under 1.23 (at 20°C), add or replace the electrolyte.; c Keep the terminals reliably connect, remove any corrosive marks and keep the battery terminal, power line and earth wire connection clean.



Battery inspection:

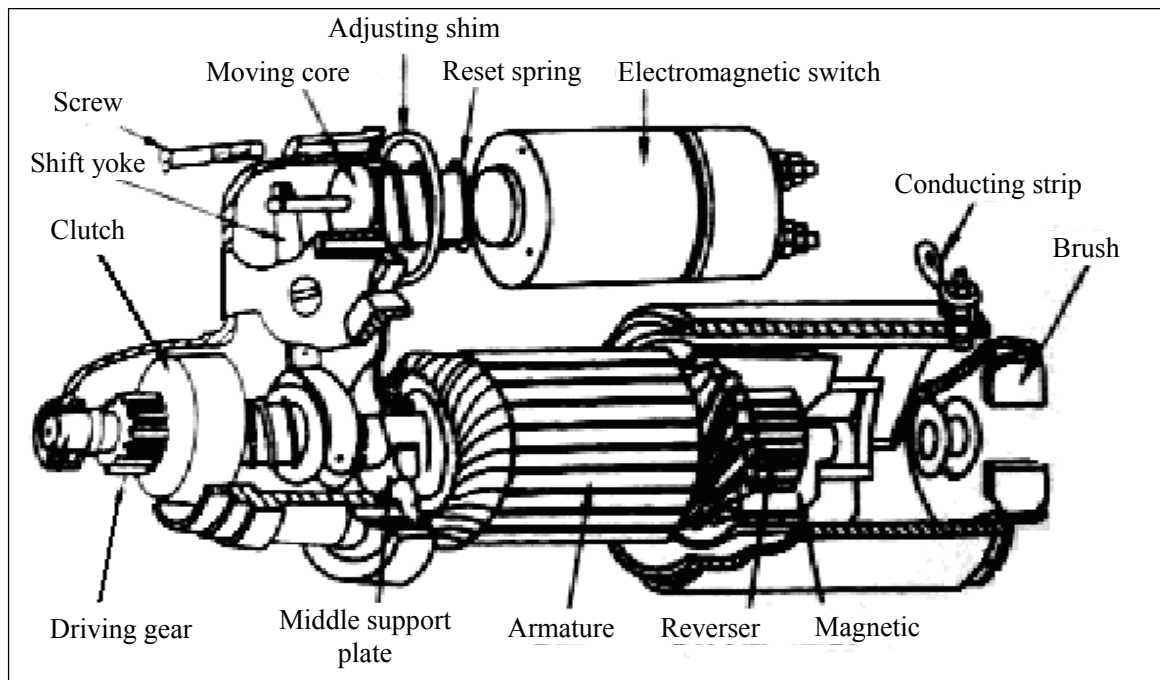
1. Check the terminal post for looseness and corrosion
Keep the connection reliable. Remove any corrosive mark and keep the connection clean.
2. Check the electrolyte level of the battery
If the electrolyte level is too low, please add distilled water to the max. liquid level

2. Starter

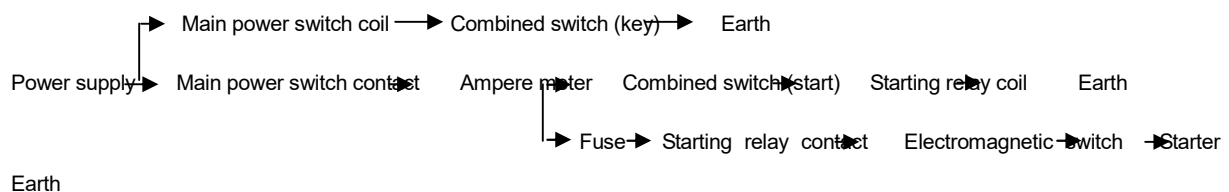
The function of starter is to convert the electric energy of battery into mechanical energy to drive the engine.

The starter used in this vehicle is 12V DC series excitation motor. It is composed of three parts: (1) DC series excitation motor: to convert the electric energy of battery into mechanical energy to generate torque; (2) Drive mechanism, also called engaging mechanism: To engage the driving gear of the starter into the engine flywheel toothed ring when the engine is started, so that the torque of starter is transmitted to the engine crankshaft, and to disengage the driving gear of starter and the engine flywheel toothed ring after the engine is started; (3) Control device: To connect and disconnect the starter and battery.

Starter structure:



Starter operating circuit:



The maintenance personnel should carry out inspection and repair for the lines indicated by the starter operating circuit diagram.

3. Generator

AC generator is the main power for the automobile. It is actually a self-exciting three-phase synchronous generator. There are three windings at an interval of 120° on the stator core of the generator. The ends of the three windings are connected, which are usually called star connection. The rotor has field winding on it. Magnetic field is generated when direct current passes the rotor winding. When the rotor is turned by the engine, relative cutting movement is generated between magnetic line of the rotor and three-phase winding of the fixed stator. Three phase alternating electromotive force, i.e., AC power, is generated in the three-phase winding. DC power is used in automobile circuit. So the AC power generated by the AC generator must be rectified before using. The rectifying is made mainly by the silicon rectifier in the generator. The three phase bridge full wave circuit composed of several silicon diodes commutates alternating current into direct current.

Silicon rectifying shunt excitation AC generator is adopted in this vehicle, which is

composed of three phase AC motor and silicon diode rectifier. Minus earth is adopted. Do not connect otherwise, or the generator may be damaged.

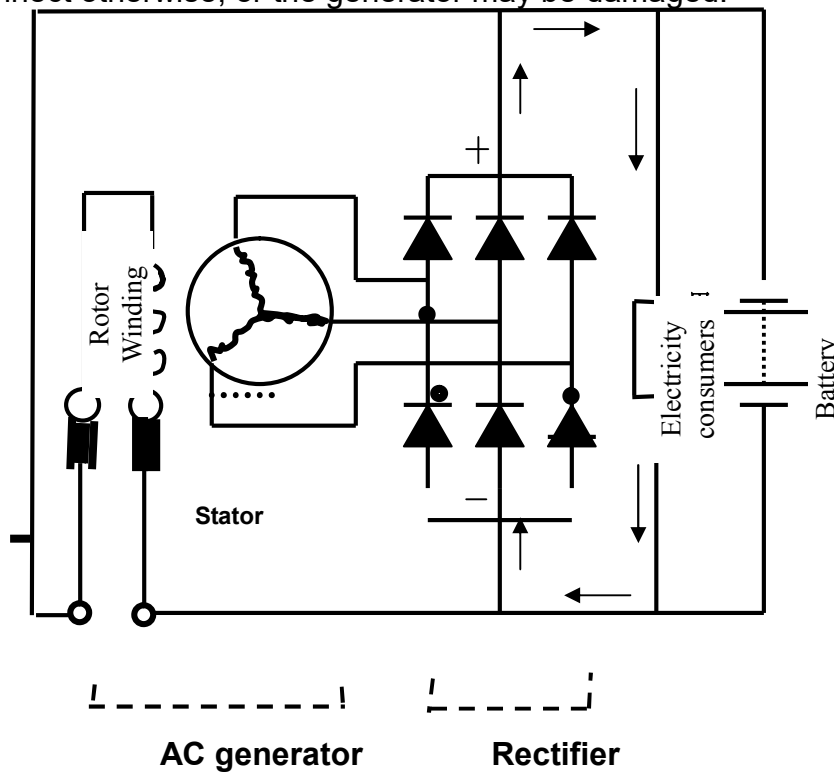


Fig. 1 AC generator wiring diagram

4. Speed sensor

Speed sensor is fit on the generator end. The signal is taken from generator speed signal terminal P. The number of pole pairs is 6. The generator and engine transmitting ratio is 82: 145. The sensor output waveform is regular square wave.

5. Electric preheating

Electric preheating for the engine is adopted in cold season for this vehicle. The heating wires should not be electrified for more than 30 sec., or they may be damaged.

If the preheating effect is not good, check if the circuit is switched on first. If the circuit is OK, use universal meter to check the heating wire and replace the burned-out electric heater.

6. Fuel cutoff solenoid valve

There is one electronic component on the rear end of the engine injection pump. Its function and wiring is as follows:

The electrical component is fuel cutoff solenoid valve. Its function is the same with that

of electric engine shut down device. The fuel cutoff solenoid valve is powered on when the engine is started. The electric magnet lifts up the seal iron, so the injection pump of the engine starts to supply oil and the engine starts normal operation. When the engine needs to be shut down, turn the key to shutdown position, so the fuel cutoff solenoid valve is power off and the seal iron cut the fuel path by the spring operation.

Power supply → Fuse → Ignition lock → LOCK (shutdown)

7. Wiper

The electric wiper of this vehicle is automatic reset type. For installation, the motor should be in reset state. Then connect the link rod and wiper blade (wiper blade position should be in reset state).

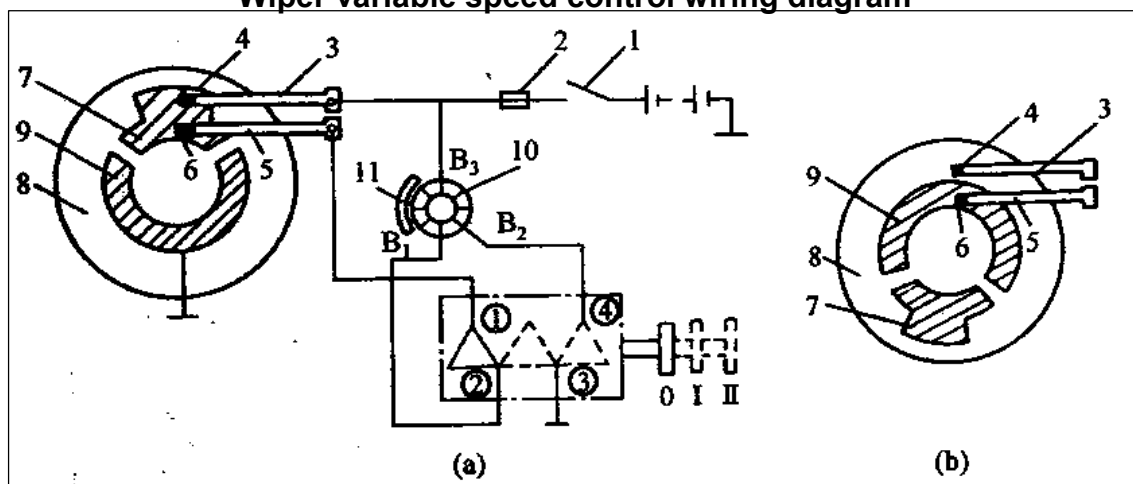
The variable speed switch controls the motor circuit to implement variable speed wiping. The variable speed control circuit is as shown in the figure. The control process is as follows:

a) Low speed wiping. When the power switch is ON and the variable speed switch is in I position, the current flow is as follows: battery positive pole → power switch → fusing element → brush B₃ → armature → brush B₁ → variable speed switch I position earth → battery negative terminal. As the brush B₂ has an offset angle, the wiper blade swings fast when the motor is running at high speed.

b) When the power switch is ON and the variable speed switch is in II position, the current flow is as follows: battery positive pole → power switch → fusing element → brush B₃ → armature → brush B₂ → variable speed switch II position earth → battery negative terminal. As the brush B₂ has an offset angle, the wiper blade swings fast when the motor is running at high speed.

c) Shutdown and reset. The automatic reset mechanism of motor wiper is as shown in Fig. 1—21 (b). The nylon impeller is embedded with copper ring 7 and 9. The copper ring has two parts. The larger copper ring 9 is connected to the casing to earth. Contact piece 3 and 5 is made of phosphorus copper or other elastic material.

Wiper variable speed control wiring diagram



1-Power switch; 2-Fusing element; 3、 5-Auto reset contactor; 4, 6-Contact;

7, 9-Auto reset slide ring (copper ring); 8-Worm wheel; 10-Armature; 11 - Permanent magnet

Contact 4 and 6 is riveted on one end. As contact 3 and 5 is elastic, when impeller 8 turns, contact 4 and 6 maintains contact with the end surface of impeller 8 (including copper ring 7 and 9).

When wiper variable speed switch is in "0" position, if the rubber brush does not stop at bottom edge of the windshield glass, the impeller turning will make contact 6 and copper ring 9 connect, so the current keeps flowing into the armature. Here the current forms a circuit from battery positive pole→power switch→fusing element→brush B1→variable speed switch→contact piece 5→contact 6→copper ring 9→earth→battery negative terminal. The motor runs at low speed until the impeller turns to the position shown in Fig. 1—21 (a) and contact 4 and 6 connects with copper ring 7.

When contact 4 and 6 is connected with copper ring 7, the motor cannot stop immediately owing to the inertia force of armature turning. Instead, electricity is generated with engine operation. As the direction of electromotive force generated by armature winding is opposite to that of external supply voltage, the current flows in the circuit of brush B3→contact piece 3→contact 4→copper ring 7→contact 6→contact piece 5→variable speed switch→brush B1. Torque is also generated (called brake torque) to make the motor stop immediately. Here the rubber brush is just reset to the bottom edge of the windshield.

The maintenance personnel can look for the fault of wiper circuit according to the wiper working principle and variable speed control wiring diagram.

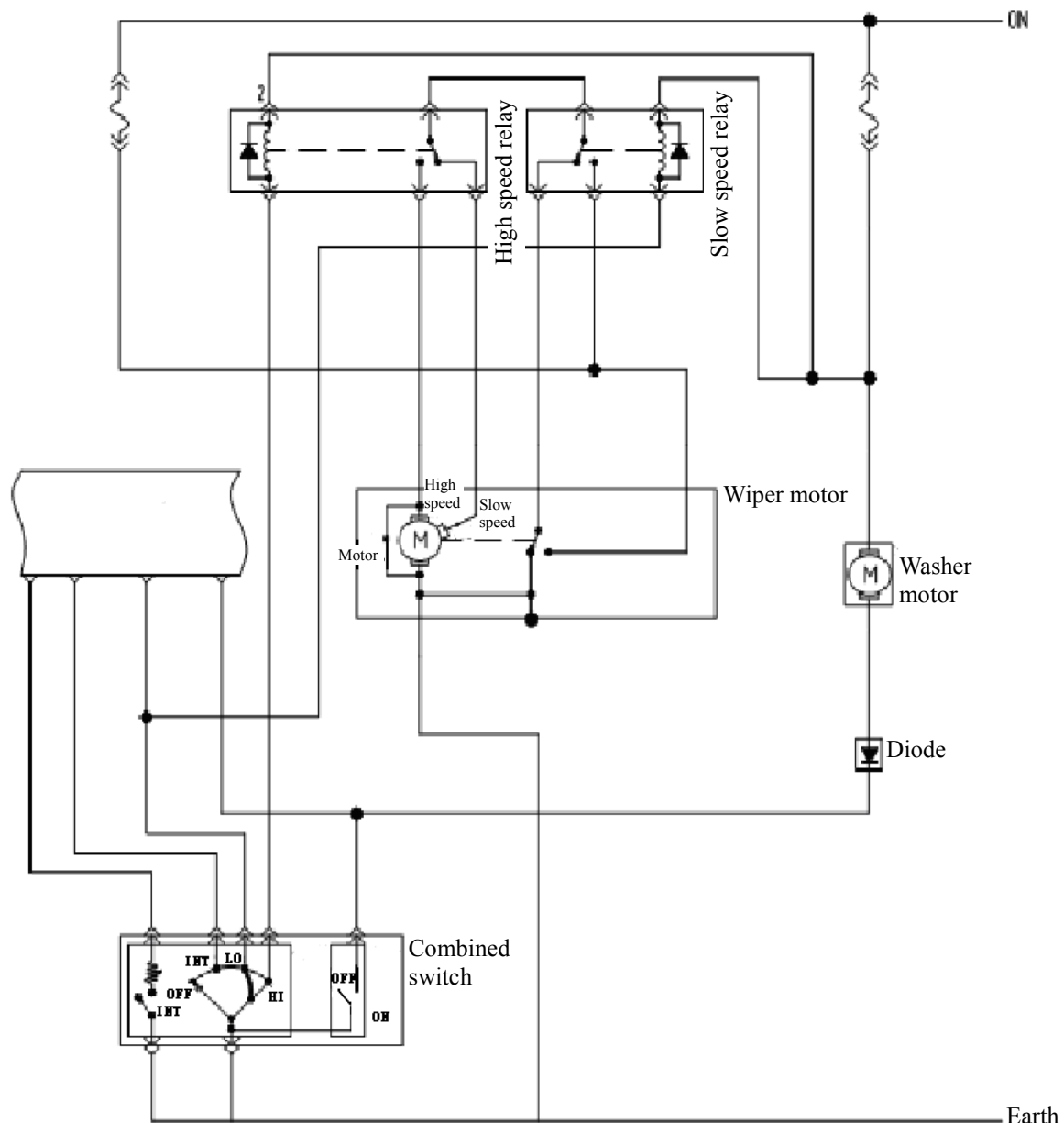
a. Main components

Designation	Quantity	Mounting position
Connecting rod assembly	1	Bottom edge of front windshield
Wipe rod and brush assembly (left)	1	Front windshield
Wipe rod and brush assembly (right)	1	Front windshield
Rain wiper motor assembly	1	Inside the cab
Washer jug assembly	1	Inside the cab
Water pipe assembly	1	Inside the cab
Nozzle assembly	2	Cab front panel
Control switch (combined switch)	1	On steering column
Wiper relay	2	Inside the cab fuse box

b. Functional requirements

- I. Three operation modes of high speed, low speed and intermittent
- II. Automatic reset function of wiper rod
- III. Interval of intermittent operation can be adjusted
- IV. Linked control of washer and wiper

c. Circuit design



8 .Washer

Dust or dirt may get onto the windshield glass during the driving. To ensure good sight of the driver, most vehicles have windshield glass washer.

When the washing engine armature is powered on, it turns in the permanent magnetic field. When the armature shaft turns, it drives the pump shaft via coupling, so the

Electrical System

pump rotor also rotates. The pump rotor pumps the washing liquid from the pot to the wind shield via the outlet hose and the nozzle. In the meantime, the wiper blade swings to remove the dirt on the wind shield glass.

To use the washer, switch on the washing pump before the wiper. The continuous work time of washing pump should not exceed 5s, interval not be less than 10s. When there is no washing liquid in the pot, do not switch on the washing pump. Otherwise, the motor may be damaged.

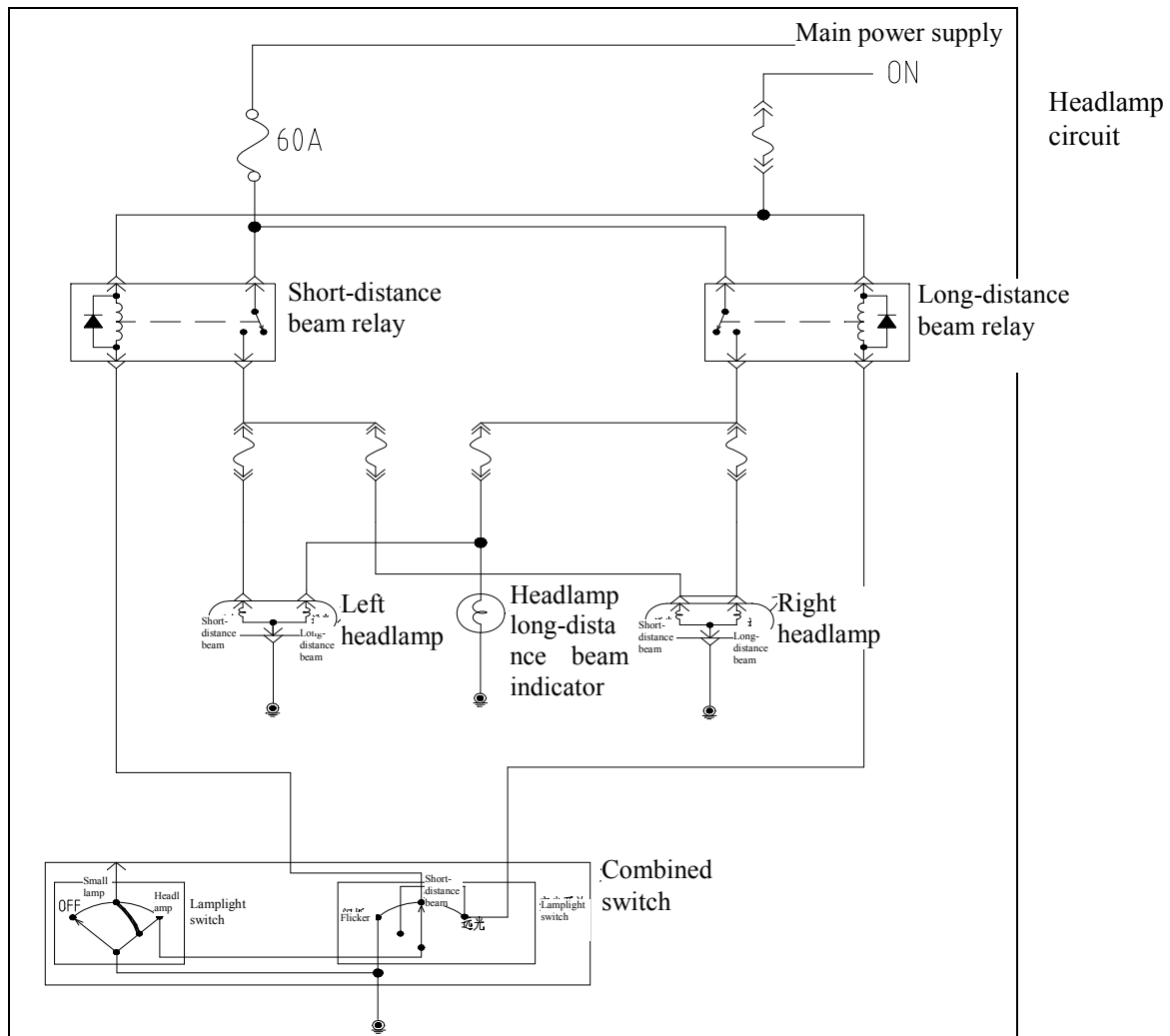
9. Headlamp

The headlamp of this vehicle is anti-glare combination lamp. The bulb is twin filament type (long-distance beam/short-distance beam). When long-distance beam is switched on, the long-distance beam indicator on the dashboard illuminates at the same time. Lamp switch and change is operated from the group switch.

If the lamp is not ON, please check in the following sequence.

Step	Inspection content	Method
1	Check if the fuse is blown	If the fuse is blown, replace it after the cause is found. If not, check the next item.
2	Check if the lamp relay operates normally	Turn on the lamp switch to see if the headlamp relay operates. Or use a universal meter to check if the relay terminal is OK.
3	Check the headlamp bulb	If the result of the above checks is acceptable, please check if the bulb is damaged. If not, check the next step.
4	Check if the wiring connectors are reliable	Check if all the terminals are reliably connected according to the wiring diagram.
5	Check the combined switch (lamp switch)	Check if the lamp switch on the group switch can be normally turned on

Electrical System



10 .Front small lamp

The front small lamp of this vehicle (width lamp) is combined lamp, i.e., front small lamp on the lower part and direction lamp on the upper part. Check for fault according to the small lamp operating circuit:

Power supply → Fuse → Relay coil → Combined switch → Earth
 → Relay contact → Front small lamp → Earth

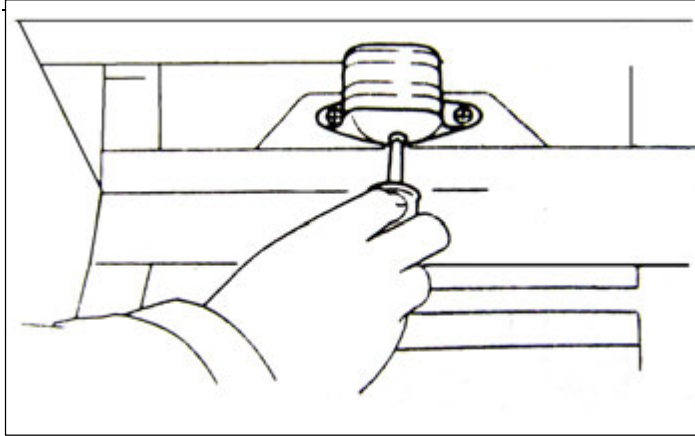
The trouble shooting method is the same with that of front lamp. The difference is that you need to check the small lamp relay when you check the relay.

11. License lamp

The license lamp is on the plate support on the rear of the vehicle. The license lamp is ON when the lamplight switch is in any position.

The trouble shooting method is the same with that of small lamp.

Electrical System



License lamp
To replace the bulb, remove one screw fixing the lens.

Check for fault according to the license lamp operating circuit:

Power supply → Fuse → Relay coil → Combined switch → Earth
→ Relay contact → License lamp → Earth

12. Direction signal lamp and hazard warning lamp

The direction lamp and front small lamp is combined. It is on the top of the combined lamp. The light color is yellow. The operating circuit of the direction lamp is shown below:

Power supply → Fuse → Flasher ----→ Combined switch ----→ Left and right direction lamp → Earth
-----→ Left and right direction lamp → Earth
-----→ Warning switch

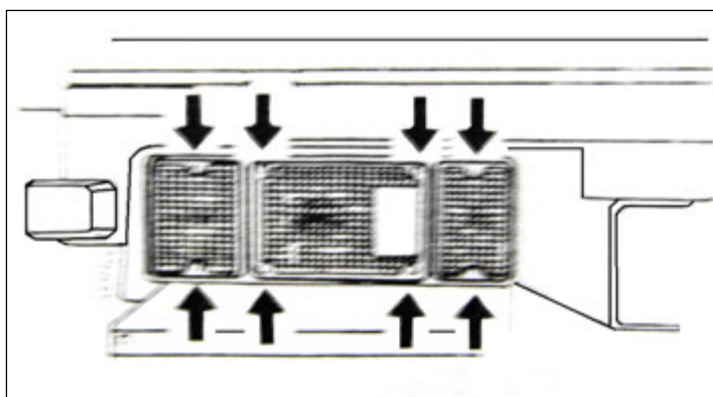
The direction lamp circuit should be checked according to the circuit diagram. When the vehicle is at fault or there is other danger, turn on the warning switch. The bulbs of the direction lamp flicker at the same time to give a warning. The trouble shooting method is the same as above.

13. Rear combination lamp

Rear lamp is a combined lamp with brake lamp, reversing lamp and direction lamp at the bottom of the rear of the vehicle on both left and right. The color is red. The rear lamp control switch is on the lamp switch of the combined switch. Its circuit is:

Power supply → Fuse → Relay coil → Combined switch → Earth
→ Relay contact → Rear lamp → Earth

Note: The rear lamp use the same relay with front small lamp. It also share the same fuse with front small lamp, license lamp, fog lamp and instrument lamp. The maintenance personnel should pay attention to this in maintenance. The trouble shooting method of rear lamp is the same with that of front small lamp.



Rear combination lamp
To replace the bulb, unscrew the four bolts fixing the lens.

Interior lamp switch position

ON ←OFF→ Door

16. Brake lamp and switch

Brake lamp position is the same with that of rear lamp. The brake lamp light is red and the brightness is higher than that of rear lamp. The brake lamp works together with the brake lamp switch mounted on the brake pedal. Its operating circuit is:

Power supply→ Fuse→Brake switch→Brake lamp→Earth

Note: the brake lamp shares the same fuse with reversing lamp and roof lamp. Please pay attention to this in maintenance and repair.

17. Parking brake lamp and switch

Parking brake switch is integrated with parking brake control lever. When the manual control lever is lifted, the parking brake switch is ON. Here the parking brake indicator on the dashboard turns ON. Let down the manual control lever, and the parking brake switch is OFF and the parking brake indicator is OFF. Its operating circuit is:

Power supply→Fuse →Parking brake indicator→Parking brake switch →Earth

Parking brake indicator sign on the dashboard



18 Fog lamp and switch

The fog lamp is combined with the headlamp and its light color is yellow. The working principle of fog lamp is: when you drive on a foggy day, first switch on any lamp on the combined switch and then press the fog lamp switch to turn it on. Turn off the lamp switch on the combined switch or the fog lamp switch to turn off the fog lamp.

Fog lamp operating circuit:

Power supply → Fuse → Relay coil→ Combined switch→Earth

→ Relay contact →Fog lamp switch →Fog lamp→ Earth

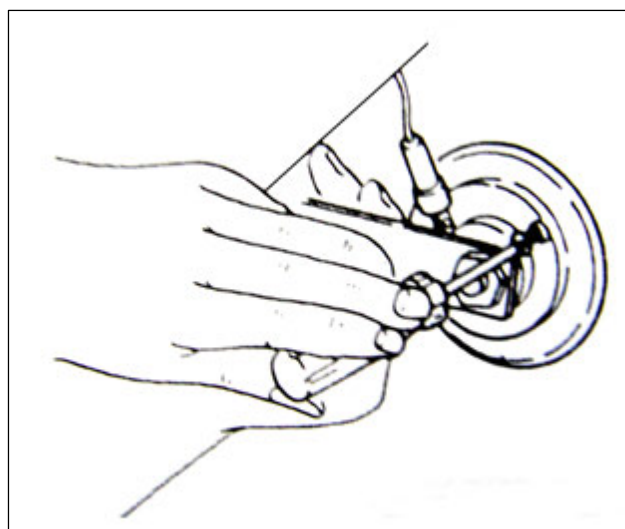
Note: The fog lamp shares the same fuse with the front small lamp, rear lamp, license lamp and instrument lamp. The maintenance personnel should pay attention to it in repair.

The electric horn of this vehicle is dual tone (high and low tone) electric horn. It is fitted on No. 1 girder on the chassis in the middle of the front bumper. Its operating circuit is:

Note: The contact of horn button is an elastic joint on the combined switch that keeps effective connection with the button contact iron ring on the steering wheel. Pay attention to the connection state of the contact in maintenance.

Wiring diagram

Structural shape	Diaphragm diameter mm	Sound level dB (A)	Base frequency range Hz	Volume range fitting (dual tone)
Disc type	>115	105~125	250~650	4: 5



1. Check if the fuse is blown. At the same time, check if the wire connection is tight.
2. If both the fuse and connector can operate in normal sequence, remove the horn from the steering wheel and short-circuit the horn switch guide line terminal and the steering shaft thread.

- a. No sound --- Poor contact between horn contact of the combined switch and the steering wheel bottom.
 - b. Sound --- The horn switch is at fault.
3. If the horn sounds without stop, the source of trouble may be the horn switch or bad reset contact ring.

20. Vacuum alarm

When the vacuum pressure in the vacuum cylinder exceeds certain value, the pressure contact on the vacuum horn closes to complete the circuit. The vacuum alarm buzzer and alarm lamp on the dashboard is switched on to warn the driver to find out the cause.

The vacuum abstraction is carried out by the vacuum pump on the generator. The maintenance personnel should pay attention to this in repair.

Alarm lamp identification:



21 .Various relays

The relays for this vehicle include lamp relay, horn relay, warm air relay, starting relay and preheating relay. As the lamp, horn and warm air does not consume high current, relay of the same specification is used for these current consumers. The solenoid switch of the starter and heating plug consumes high current, so they use special purpose relays that are installed in the chassis electric box. From left to right, starting, preheating, horn, air conditioner and braking relay.

22 .Combined switches

The combined switch is a switch integrating power, start, lamp, wiper, washer and direction lamp. There are many lines together, so faults are likely to occur here. It will help the maintenance personnel a lot to know about the structure of the combined switch in electric trouble shooting.

Combined switch structural diagram

1. Ignition switch working position conduction diagram

Contact code and power Working gear	B	ACC 220W	ON 240W	R 60W	ST 220W	P1 40W	P2 40W	B1	R1 60W	R2	Remarks
Wire color	B	L	BY	BR	BW	LY	LW	L	R	Y	
Specification mm ²	5.0	3.0	3.0	3.0	3.0	1.0	1.0	1.0	0.75	0.75	
LOCK						O	—	O			
ACC	O	—	O			O	—	O			

Electrical System

ON										
START										Automatic reset
Power switch	Key in									
	Key out									

2 Lamp switch beam selection and overtaking signal conduction diagram

Contact code		BT	E	J	B	BH	HU	
Rated power		80W		120W	10W	150W	150W	
Gear	OFF							Overtaking
	Small lamp							Overtaking
	Headlamp							
								Overtaking
	Long-distance beam							

Electrical System

3 Direction switch, warning switch, exhaust brake switch and horn conduction diagram

Contact code		TL	TB	TR	B1	F	B2	EX	ER	HO
Rated power		72W	144W	72W	120W		120W			120W
Warning switch	Direction switch									
OFF	L									
	OFF									
	R									
ON	L									
	OFF									
	R									
Exhaust brake switch	OFF									
	ON									
Horn										

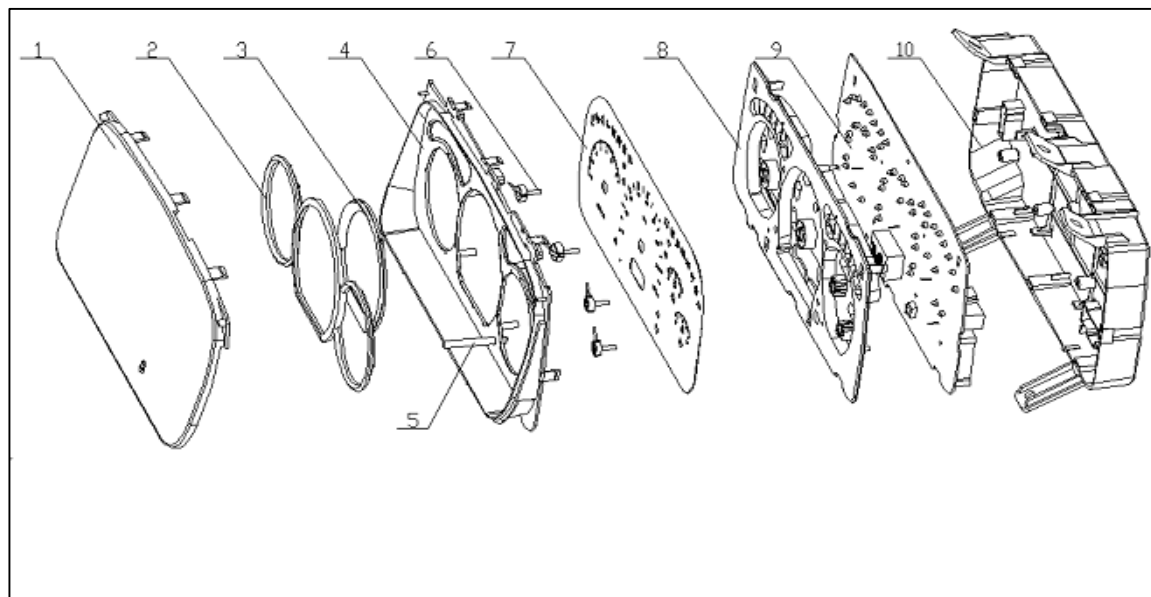
4 Wiper switch and water spraying switch

Water spraying	Wiping	11	E1	12	AS	L	H	E2	W	E3
OFF	OFF									
	INT									
	LO									
	HI									
ON	OFF INT LO HI									

23. Combined instrument

Instrument

Disassembling and reassembling



Disassembling sequence:

- | | |
|---------------------------------|------------------------|
| 1. Transparent top cover | 6. Pointer component |
| 2. Instrument decorative ring A | 7. Gauge plate |
| 3. Instrument decorative ring B | 8. Middle cover |
| 4. Black frame | 9. Circuit board parts |
| 5. Reset rod | 10. Bottom cover |

Disassembling sequence:

Follow the reverse order of disassembling to reassemble.

Electrical System

1 Instrument indicator:

No.	Designation	Function	Color
1	Engine oil pressure alarm lamp	ON when the engine oil pressure is too low	Red
2	Charging indicator	ON when the battery discharges	Red
3	Parking brake alarm lamp	ON when the parking brake is switched on	Red
4	Preheat indicator	ON during the preheating	Yellow
5	Exhaust brake indicator	ON when the exhaust brake is switched on	Yellow
6	Left/right direction indicator	ON when the direction lamp is switched on	Green
7	Beam indicator lamp	ON when the headlamp is switched on	Blue
8	Fog lamp indicator	ON when the fog lamp is switched on	Yellow
9	Hazard alarm lamp indicator	ON when the hazard alarm is switched on	Red
10	Fuel oil level alarm lamp	ON when the fuel oil level is low	Yellow
11	Small lamp indicator	ON when the small lamp is switched on	Yellow
12	Door open alarm lamp	ON when the door is open	Red
13	ABS alarm lamp	ON when the ABS system is at fault	Yellow
14	Brake fault alarm lamp	ON when the brake is at fault or the brake fluid is low	Red

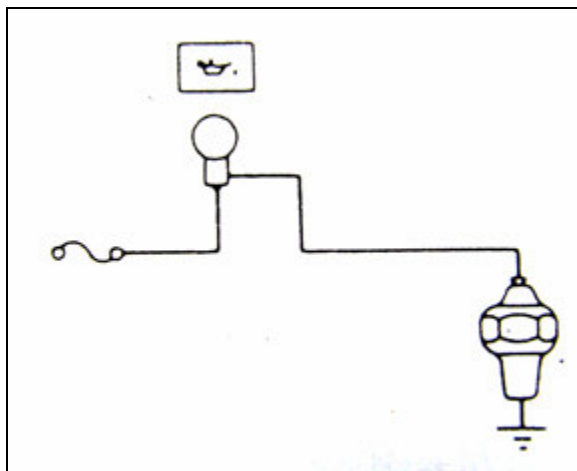
1) Main component installation

Main component	Model	Mounting position
Combined instrument	Stepping motor type	Under dashboard
Speed meter/odometer	Electronic	Middle of combined instrument
Odometer sensor		On gearbox output shaft
Engine oil pressure sensor	Varistor type	On engine oil pipe
Water temperature sensor	Thermister	On engine water inlet pipe

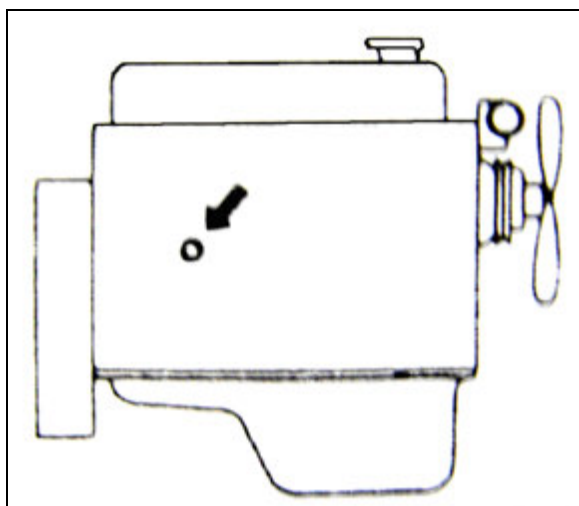
Electrical System

Fuel oil sensor	Varistor type	Inside oil tank
-----------------	---------------	-----------------

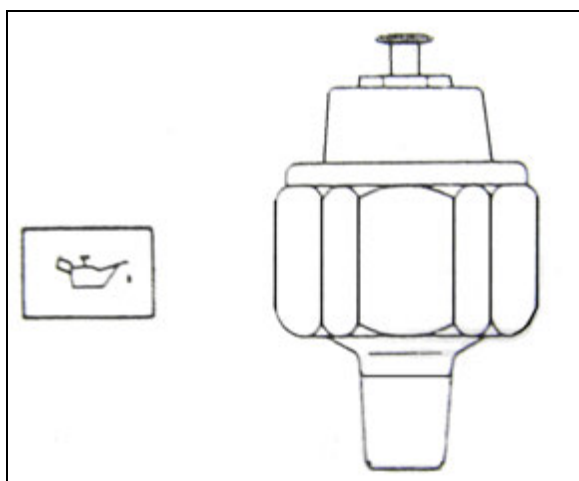
2) Indicator and warning switch:



Engine oil pressure indicator switch
Wiring diagram



Indicator switch position

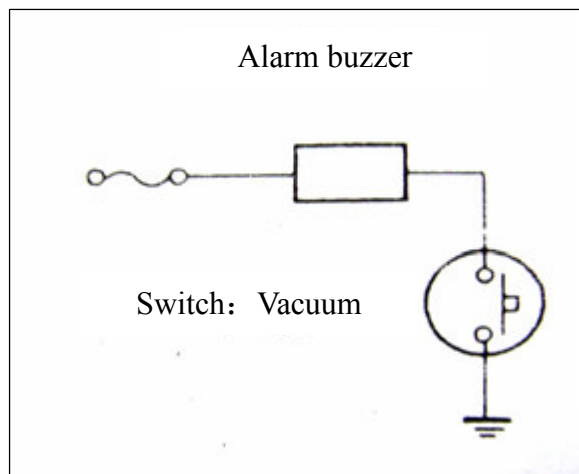


Switch specification

Working pressure: 0.3- 0.5 KSC.

When the oil pressure is as low as the switch action pressure, the indicator is ON.

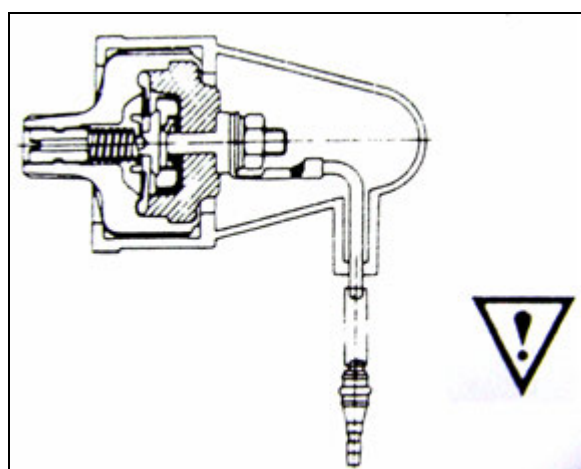
Electrical System



Vacuum alarm switch

Wiring diagram

Its position is the inner side of the left pedal in the cab.

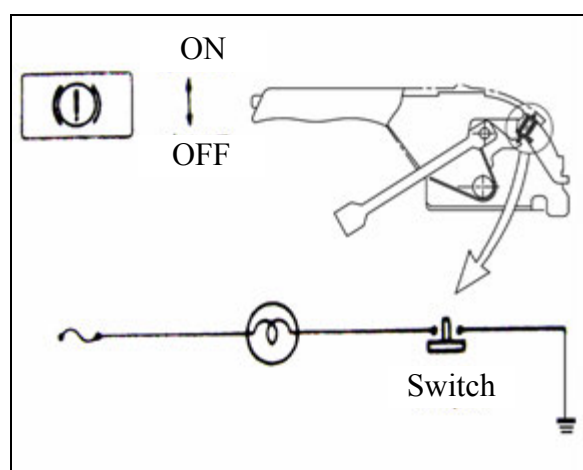


Switch specification

Stamping sign: 350

Negative pressure (mm hg): 320- 380

Note: The switch has working negative pressure mark. Make sure that you replace it with switch of the same negative pressure when necessary.



Parking brake switch

Wiring diagram

2 Technical requirements:

Technical requirements of combined instrument

3801910D800 Combined instrument assembly

The basic deviation requirements are as follows:

Basic deviation									
Speedometer (stepping motor type)	Indicated speed Km/h	20	40	60	80	100	120	140	160
	Allowable deviation Km/h	±3	+5 0	+5 0	+5 0	+5 0	+6 0	+7 0	—
	Transmitting ratio	1:637			Interface mode			Sensor type	
Fuel gauge (stepping motor type)	Indicated mark	E			1/2			F	
	Basic resistance (Ω)	97			32.5			6	
	Allowable deviation (Ω)	±16			±6.5			±3	
	Sensor	Designation		Fuel oil sensor		Model		RG1164B1	
Water temperature gauge (stepping motor type)	Indicated mark (°C)	C (50)			100			H (115)	
	Basic resistance (Ω)	230			40.4			26.4	
	Allowable deviation (Ω)	±30			±5			±1.5	
	Sensor	Designation		Water temperature sensor		Model		WG1371	

All alarm indication systems of 3801910D800 instruments conform to GB4094 - 1999 Signs of automobile controls, indicators and signal devices.

DJY7121-1.6-20;DJY7141-1.6-20;DJY7121A-1.6-20 combined socket is adopted for the instruments.

24 .CD player

A single disk dual track CD player is mounted on this vehicle. The L channel speaker is mounted in the left door and the R channel speaker is mounted in the right door.

If you find that some functions do not work, please read carefully the operation instructions in the manual first before you send it for repair. You can check the player according to the following table. It will help you fix the trouble.

Please send the player to the maintenance service station if the fault cannot be fixed.
Do not disassemble the player to repair it by yourself.

General situation

The player does not work and there is no display.

- Check the fuse connection of the player and vehicle
- Check the voltage.

The player works but there is no sound or the sound is very low

- Raise the volume.
- Check the front and rear, left and right balance setting of the horn.
- Check the antenna and connection.

Horn volume lowers by itself

- The internal safety circuit can prevent the internal temperature from exceeding certain value.
- Raise the volume after the temperature is lowered.

Reception

Cannot get the channel:

- Check if the antenna is fully drawn and if the connection is right.
- Check if the negative terminal (brown line) is grounded (chassis).
- Please use manual tuning if the signal is too weak.

Poor reception:

- Some vehicle (such as Volkswagon and SEAT) needs a 12 V antenna on the top. Please consult your dealer if there is 12 V power supply to this antenna.

CD

CD ERROR is displayed:

- Check if the CD is correctly inserted, and make sure that the CD is not broken or dirty.

Distortion of sound

- CD cannot be read, damaged or dirty.

CD player out of operation:

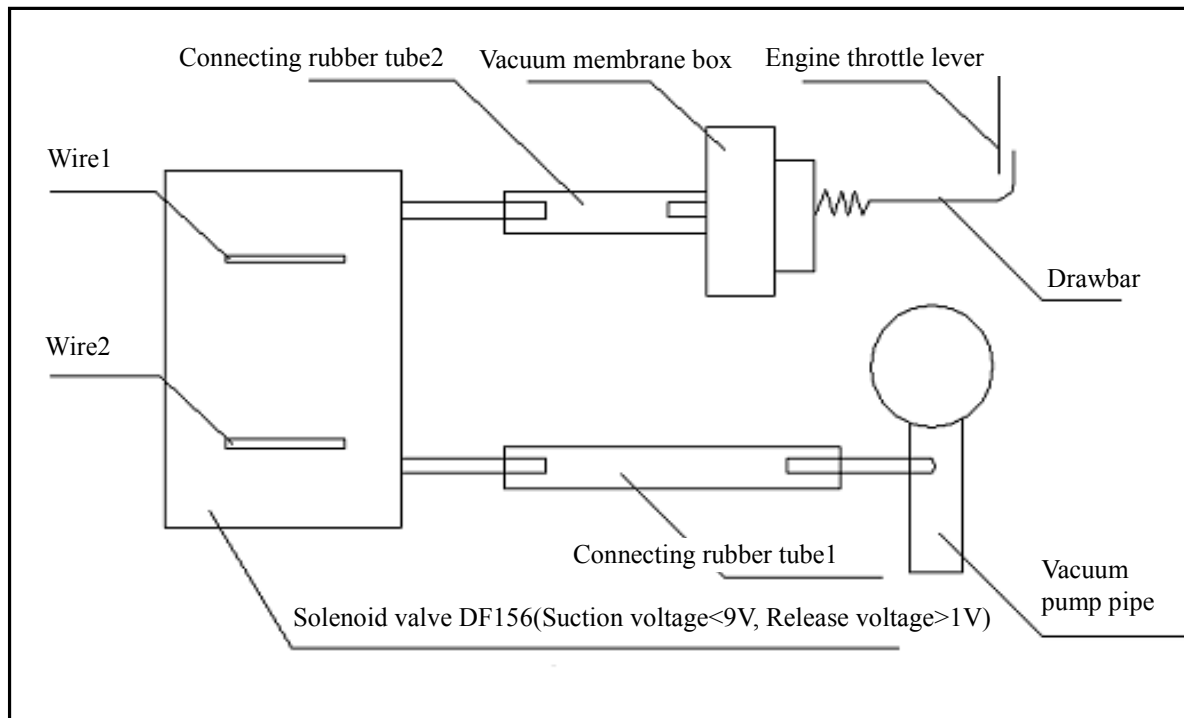
- Moisture may condensate on the laser magnetic head when it is very cold. Turn it to radio reception for about 5 minutes to let the moisture evaporate.

NO CD or NO DISC is displayed.

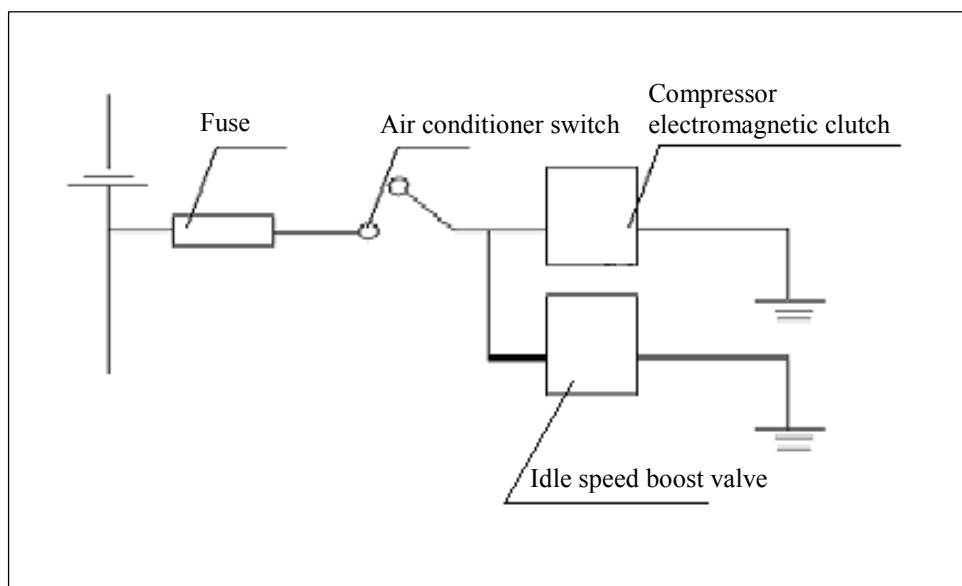
- Check if there is CD in the CD player.

25. Idle speed boost device

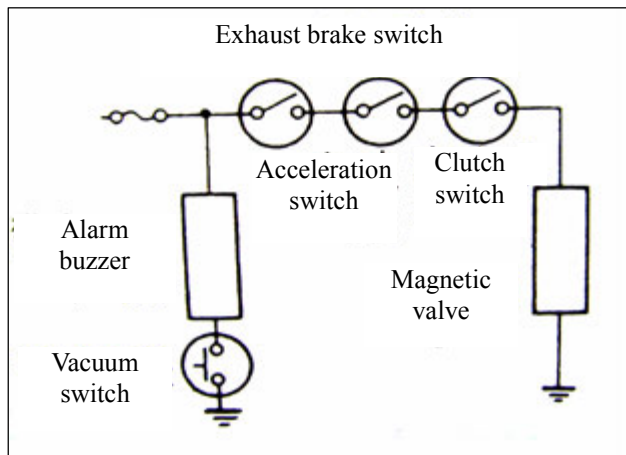
A solenoid valve called idle speed boost device is fitted on the rear end (left side of the chassis) of the vacuum pump on the engine. When the engine is at idle speed and the air conditioner is switched on, it boosts the idle speed of 700r/min to 850 ± 50 r/min, so that the power generation meets the requirements of the air-conditioner. Its functional diagram is as follows:



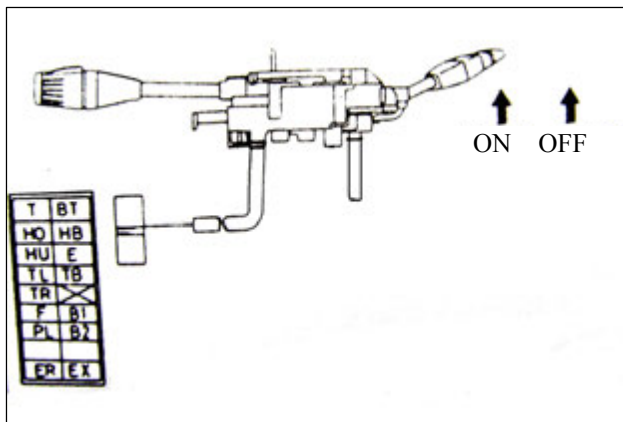
When the air conditioner is switched on, the solenoid valve of the idle speed boost device operates so that rubber tube 1 and rubber tube 2 is connected. With the vacuum membrane, the fuel up lever is pushed by the push rod to the fuel up direction, so that the engine idle is raised to 850 ± 50 r/min. The wiring diagram is as follows:



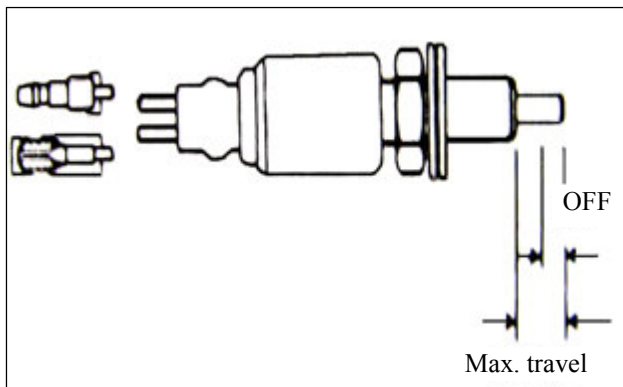
26. Exhaust brake controller



1. Wiring diagram



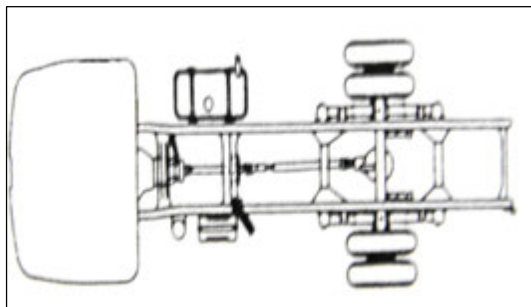
2. Switching diagram



3. Accelerator and clutch switch:

Maximum stroke: 4mm;

Working stroke: 2.0-2.8mm.



4. Position of exhaust brake solenoid valve (left arrow)

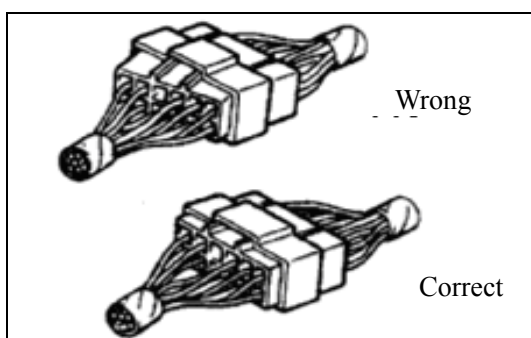
27. Electrical device



Disassembly of line bundle connector:

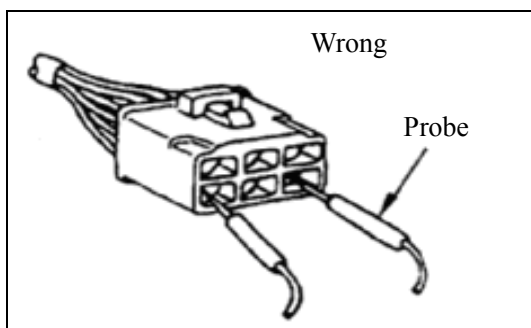
Please always use both hands to cut the connector. Drawing the connector with single hand will result in rupture of the wire terminal.

Note: press the lock plates on both sides before drawing out the connector to cut.



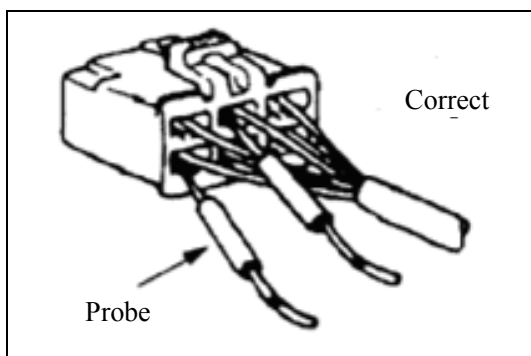
Connection of line bundle connector:

Clench both sides (male and female) of the connector and make sure that the connector terminal pins match and align with the holes. Press both sides of the connector carefully until you hear a clear click.

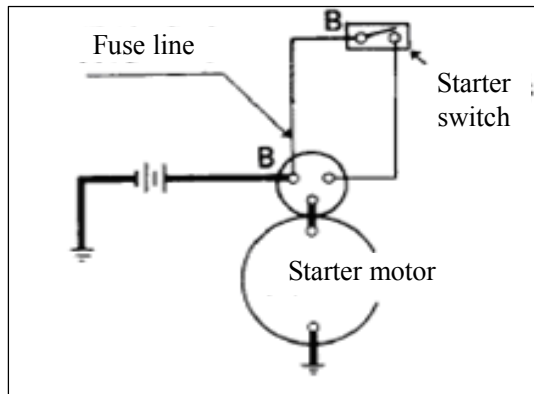


Inspection of line bundle connector:

Use circuit tester to check the connector continuity. Insert test probe from side of the connector wire

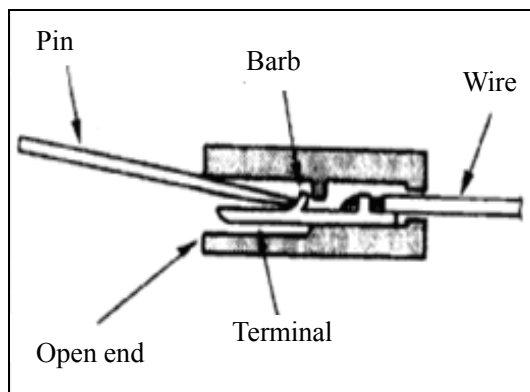


Do not insert the test probe in connector open end



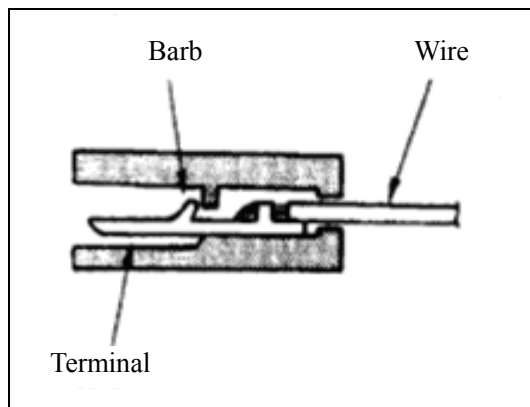
Inspection of fuse line:

The fuse line is fitted on battery positive terminal and starter switch B terminal. If there is over current, the fuse is blown to protect the main power supply from being overloaded. Please use universal meter to check the continuity of the circuit.



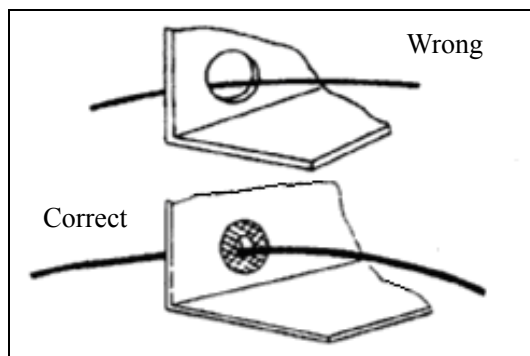
Disassembly of wire terminal

1. Insert a pin into the open end of the connector shell
2. Press the barb (facing the connector wire side) and pull the wire on the connector wire side.



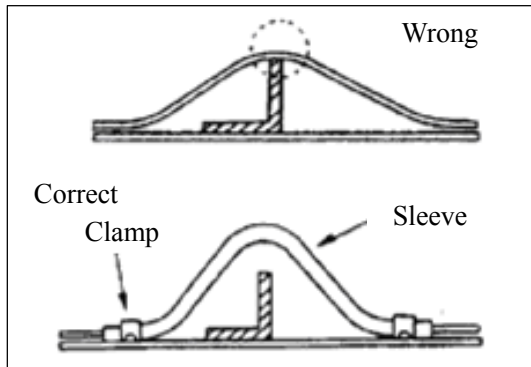
Insertion of wire terminal:

1. Check if the barb is completely open.
2. Insert the terminal from connector wire side and press it until the barb fixes it firmly.
3. Pull the wire gently to reset the terminal.

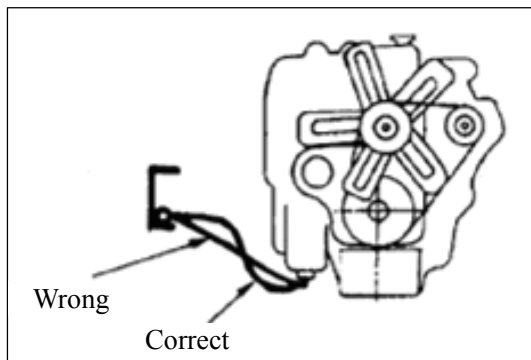


Precautions of line bundle arrangement:
Use jacket or sleeve to protect the line bundle and avoid direct contact with sharp edge or surface.

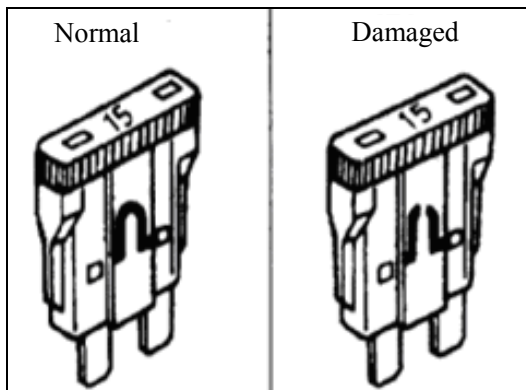
Electrical System



There should be sufficient clearance between the line bundle and bracket. Use ethylene sleeve and clip to protect the line bundle and avoid direct contact.



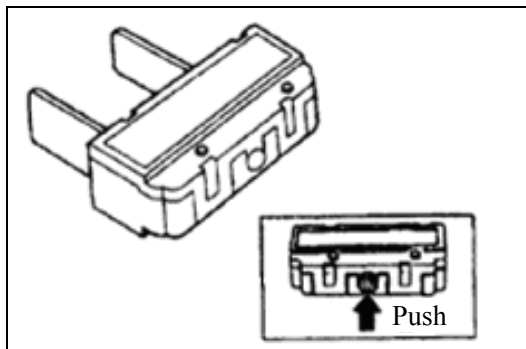
The line bundle between the engine and chassis should be long enough to avoid abrasion or damage owing to vibration.



Fuse:

Fuse is the most used circuit protection of vehicle circuit. When there is over current in the circuit, the fuse is blown to prevent the high current from damaging other parts in the circuit. Find out the cause of overload current and solve the problem before you replace the fuse.

Use new fuse of the same ampere to replace the original one. Otherwise, there will be line burning or other serious damage to the circuit.



Circuit breaker:

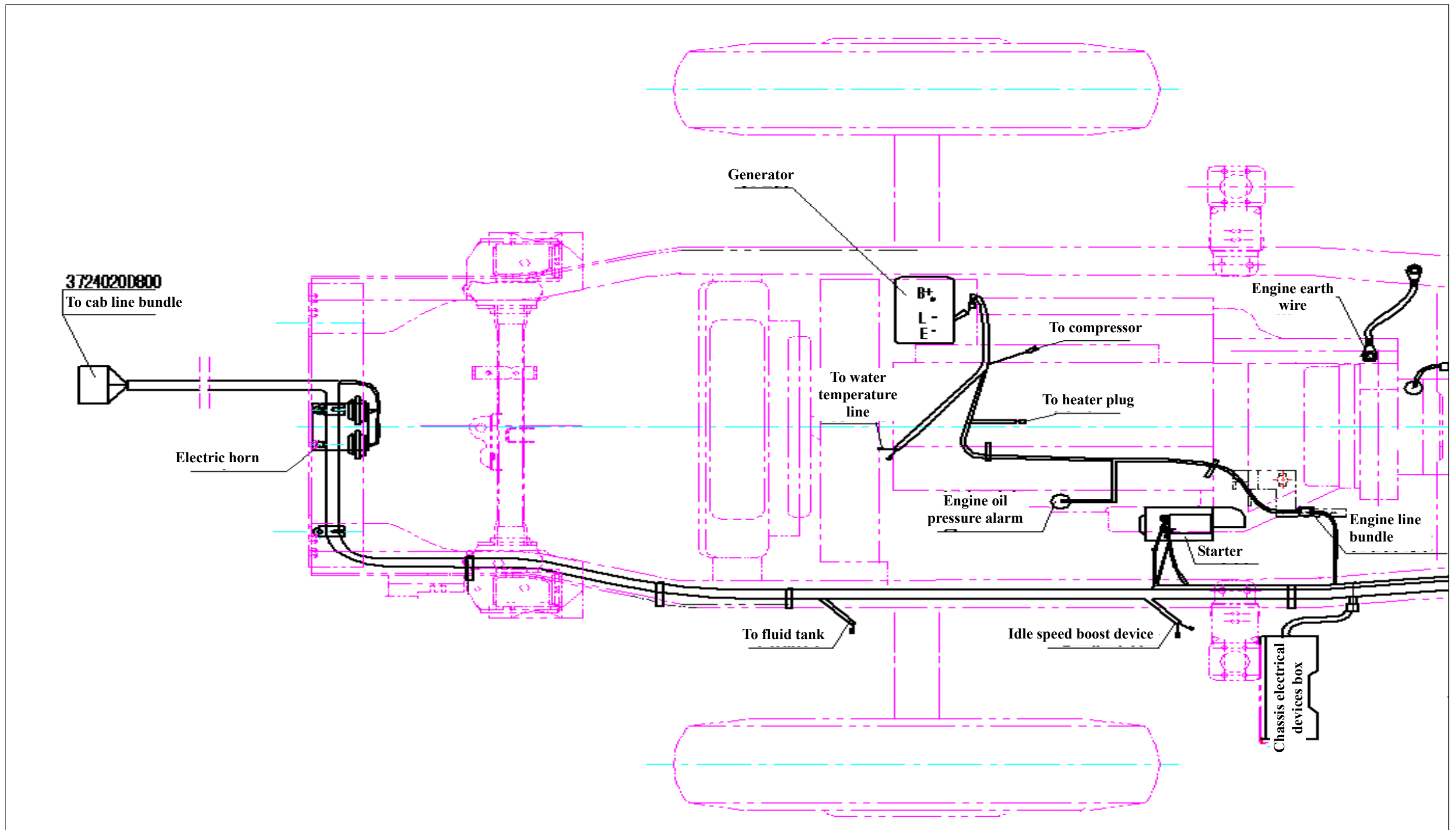
Breaker is a protective device to open the circuit when the load current exceeds the rated breaker capacity.

If there is short circuit or other form of overload, the over current will open the circuit on both sides of the breaker. When the circuit is open, the breaker button pops up.

Electrical System

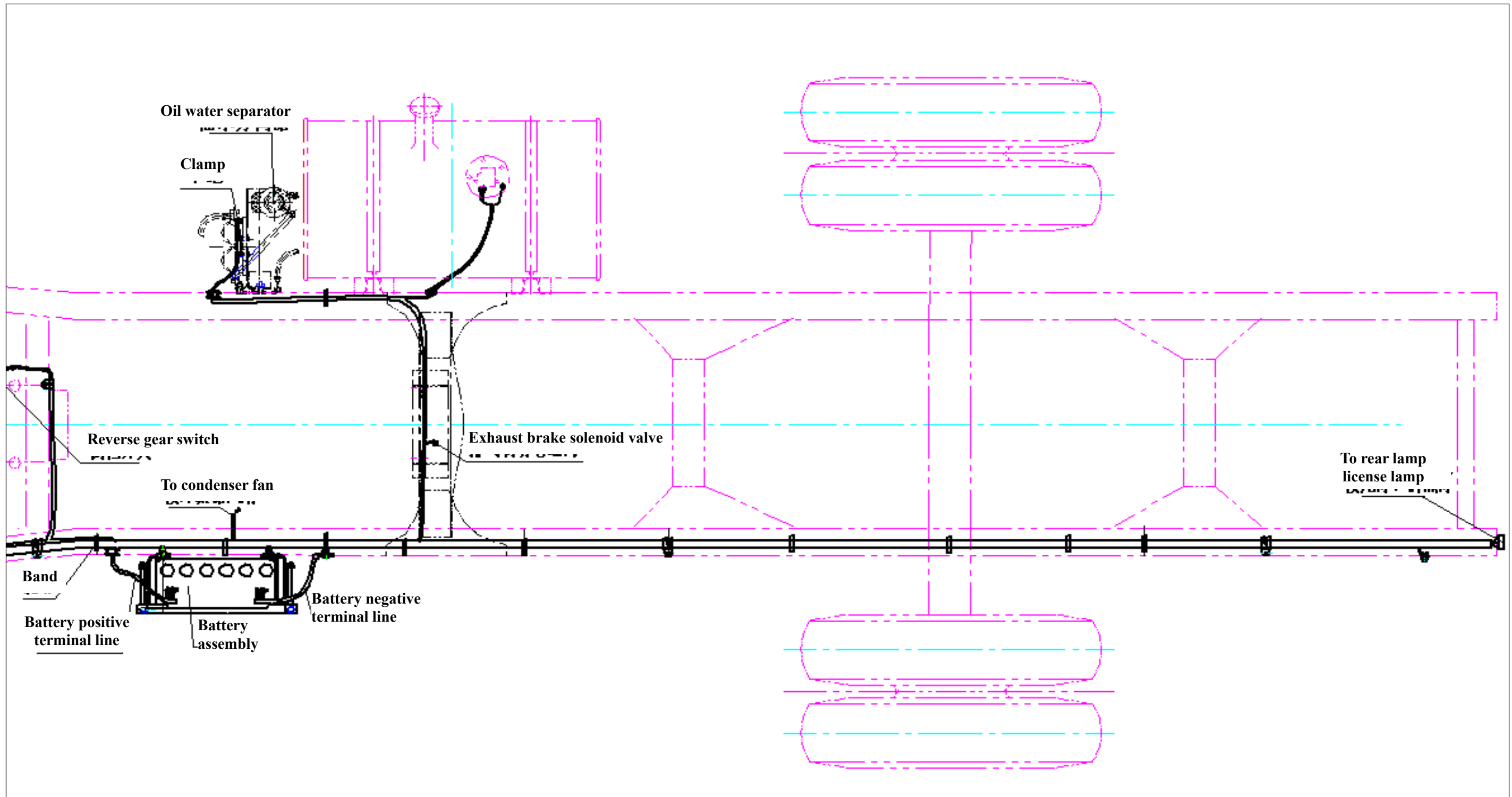
Chassis electrical device diagram:

Front side:



Electrical System

Middle and rear side:



Air heating & air conditioning equipment

Generator

Technical parameters

Disassembling and reassembling

Troubleshooting

General

1. Air conditioner refrigeration cycle

1.1 main parts of refrigeration system

Refrigeration cycle system of integrated air conditioner (warming and cooling) of JAC vehicle mainly consists of compressor, compressor exhaust hose, condenser assembly, reservoir, HP hose, F type expansion valve, evaporator assembly, and LP hose. The reservoir assembly includes internal drier and filter etc., as well as HP/LP pressure switches, sight mirror and fusible plug installed on casing.

1.2 Refrigerating principle

The compressor sucks in and compresses low temperature, low pressure refrigerant gas to generate high temperature, high pressure refrigerant gas, which will be sent to condenser via HP hose for condensing, releasing heat to air passing condenser and being condensed to high pressure medium temperature liquid. This liquid flows to the reservoir where impurities in refrigerant are filtered and water content is removed, and then flows to expansion valve via HP hose, where it is changed to low pressure, low temperature liquid-gas mixture by throttling and depressurizing effect of the valve, and then enters the evaporator. This mixed refrigerant will evaporate in the evaporator and absorb heat from air inside vehicle and flowing pass the evaporator to become superheated gas, which will enter compressor for next refrigeration cycle. Air inside vehicle passing the evaporator will discharge heat to the evaporator and become cold air. In addition, since temperature of evaporator surface is lower than air dew point, water vapor in air will condense to become dew that will be drained outside the vehicle, hence reducing temperature and humidity of air inside vehicle. Fig.1 shows air conditioning refrigeration schematic diagram.

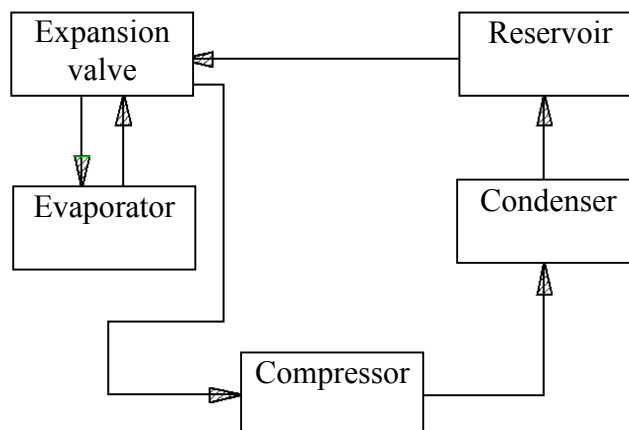


Fig.1 Air conditioning refrigeration schematic diagram

2. Air conditioning warming cycle

2.1 Main parts of warming system

Warming cycle system of integrated air conditioner (warming and cooling) of JAC vehicle mainly consists of warm air blower, engine, water pump, water valve, water tank and pipelines etc.

2.2 Warming principle

By means of a water pump, hot coolant of engine is pumped into warm air blower core, where heat exchange occurs to release heat to air inside vehicle. Later, this coolant returns to the water tank and enters next warming cycle.

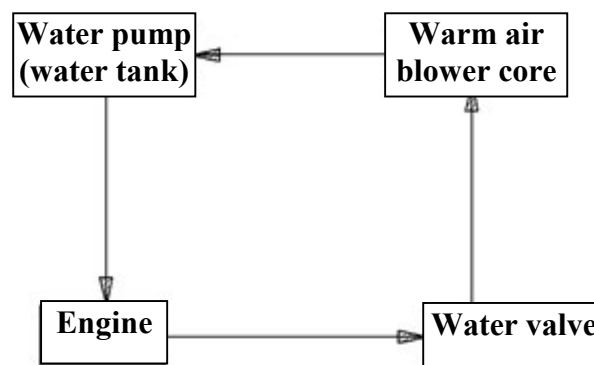


Fig.2 Air conditioning warming schematic diagram

3. Electric control

3.1 Main parts of electric control

The electric control mainly consists of power supply switch, electromagnetic clutch, controller, defrosting thermistor, defrosting temperature controller, HP/LP pressure switches, electric control box, governing resistor, and connection harness etc.

3.2 Electric control principle

The controller is the control center of air conditioning (refrigerating and warming parts). Electronic elements in the electric control box are used to control On/Off of refrigerating and warming, and adjustment of AC fan rotation speed and temperature.

The power supply switch is used to control driving power of the air conditioning. This switch is a main part of the controller and functions to turn AC on or off (also referred to as A/C switch). At gears 1, 2, 3 and 4, refrigeration will be executed.

3.2.1 Temperature control

The defrosting thermistor is a control element that senses temperature of discharged air from evaporator. It directly converts temperature to electric signal and transmits

Electrical System

this signal to the defrosting temperature controller inside electric control box. The defrosting temperature controller receives electric signal from defrosting thermistor and control On/Off of compressor EM clutch according to set parameters (i.e. On/Off of air conditioning refrigeration cycle), so as to control temperature inside the vehicle.

The electric control box is the execution center of air conditioning control. It receives commands from controller and feedback electric information from defrosting thermistor, and uses internal relays to control On/Off of compressor clutch.

3.2.2 Pressure protection control

The HP/LP pressure switch is a safety part used to ensure safe operation of refrigeration system. When the high pressure is $\geq 3.14\text{MPa}$ or low pressure is $\leq 0.2\text{MPa}$, this switch will be turned off, disengaging compressor clutch and stopping the refrigeration system. When system high pressure falls to 2.5MPa or system low pressure rises to 0.23MPa , this switch will be turned on, engaging compressor clutch and starting the refrigeration system.

Technical parameters

1. Technical parameters

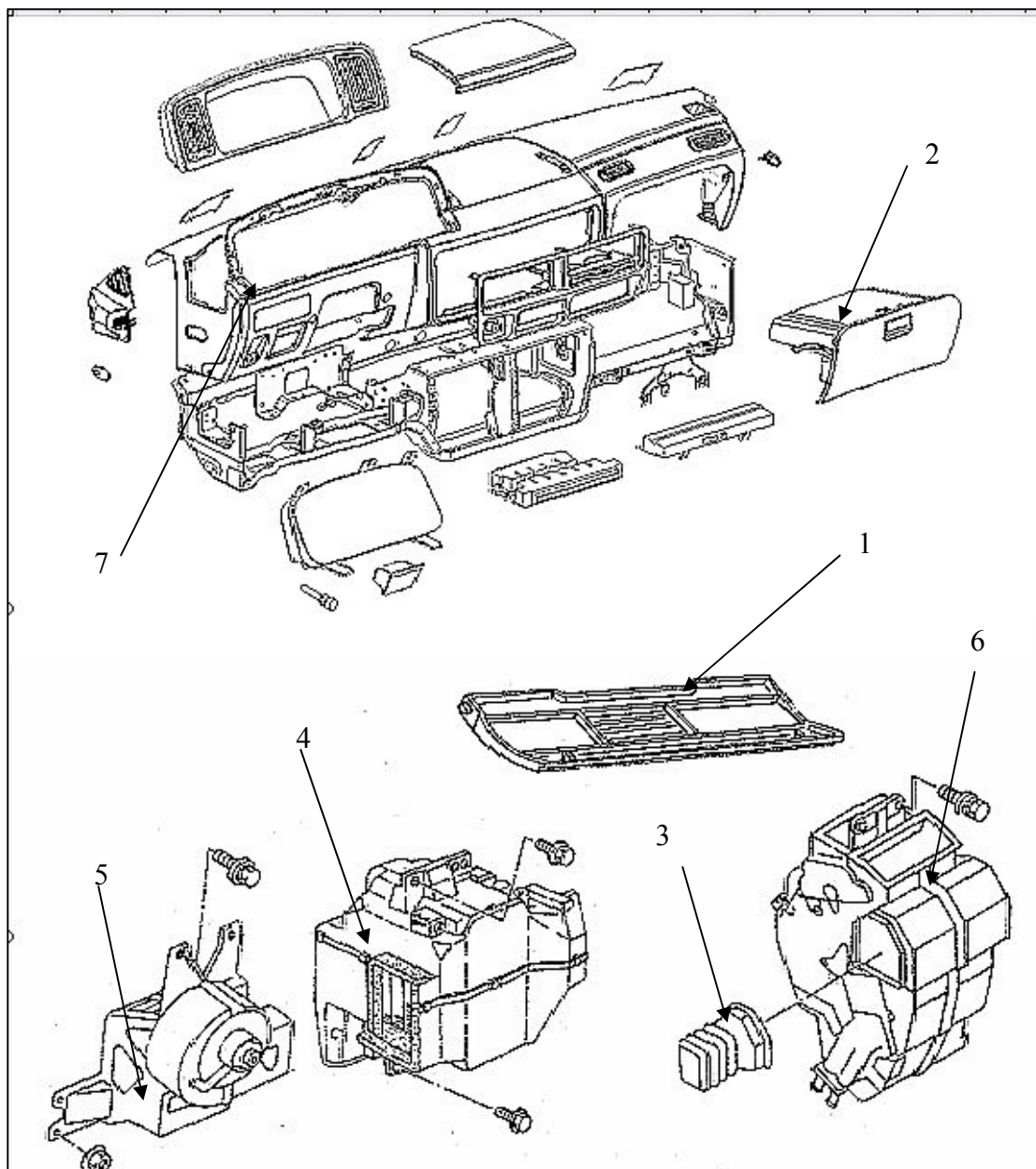
S/N	General item	Sub-item	Parameter
1	Cooling medium	Code	R134a
		Amount of filling	0.85kg
2	Refrigerating oil	Code	PAG56
		Amount of filling	150g
3	Compressor	Model	5H14
		Voltage	12V
		Displacement	$138\text{cm}^3/\text{r}$
4	Condenser with reservoir assembly	Condenser heat sinking capacity	9000W
		Voltage	12V
		Maximum current	15A
		Air flow	$1800\text{m}^3/\text{h}$
5	Front evaporator/heater assembly	Refrigerating capacity	3900W
		Heating capacity	4000W
		Voltage	12V
		Maximum current	18A
		Air flow	$350\text{m}^3/\text{h}$
7	2-state pressure switch	High pressure protection characteristics	Disconnected at $\geq 3.14\text{Mpa}$ Connected at $\leq 2.5\text{Mpa}$
		Low pressure protection	Disconnected at

Electrical System

		characteristics	$\leq 0.2\text{Mpa}$ Connected at $\geq 0.23\text{Mpa}$
--	--	-----------------	--

2. Structure of main parts of air conditioning

2.1 Heating equipment, blower equipment and evaporator



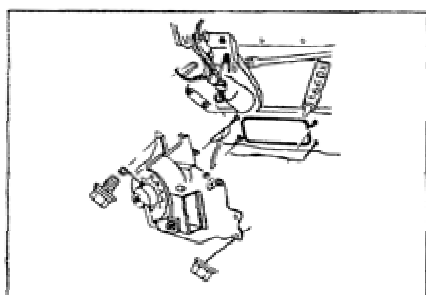
1. Lower cover; 2. Fuse and relay box; 3. Ventilating air duct; 4. Evaporator; 5. Blower; 6. Heating equipment; 7. Instrument stand

For removal of heating equipment, blower and evaporator from instrument stand, follow this sequence: 1. lower cover 2. fuse and relay box 3. →ventilating air duct→ 4. evaporator →5. blower → 6. heating equipment.

Electrical System

Sequence of assembling is the reverse of this sequence. For tightening torques, refer to the table below:

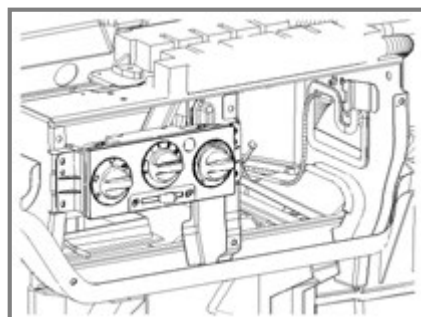
Diameter of thread (mm)	Pitch (mm)	Tightening torque (N·m)		
		Standard value	Maximum	Minimum
6	1	9	12	6
8	1.25	23	26	16
8	1	25	28	17
10	1.5	59	75	37
10	1.25	63	79	45
10	1	64	80	46
12	1.75	95	111	73
12	1.5	97	113	75
12	1.25	99	115	78



Important operation-assembling

- To assembly blower, prevent water leakage.

Sealant	Butyl rubber (none-dry type)
---------	------------------------------

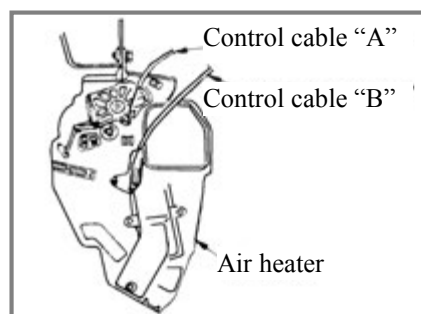


Air conditioning panel

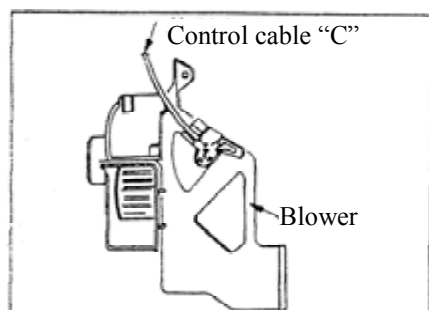
- Turn mode handle to left most (FACE direction);
- Turn temperature lever to left most (COLD direction);
- Turn inner/outer air control lever to left most (INSIDE direction)



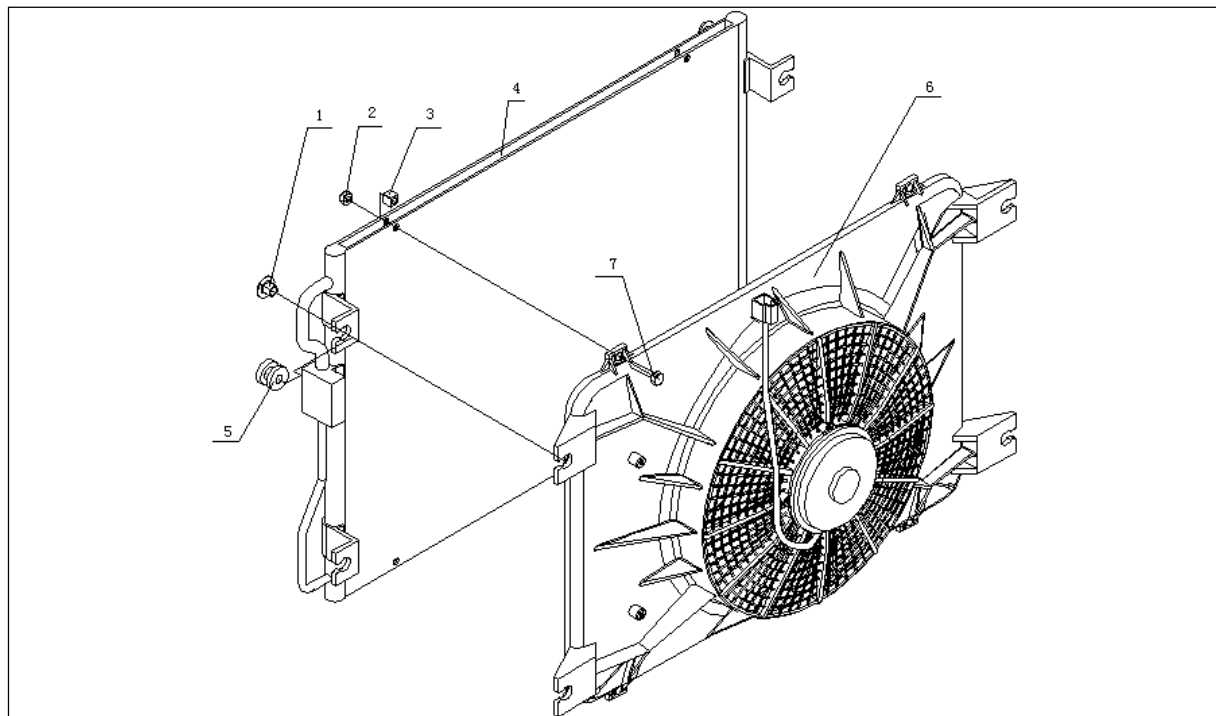
- Hang control cable "C" on blower clip, press butterfly nut to bottom and fix cable on clip;
- Hang control cable "B" on heater clip, press butterfly nut to bottom and fix cable on clip.



- Hang control cable "C" on blower clip, press butterfly nut to bottom and fix cable on clip



2.2 Structure of condenser assembly

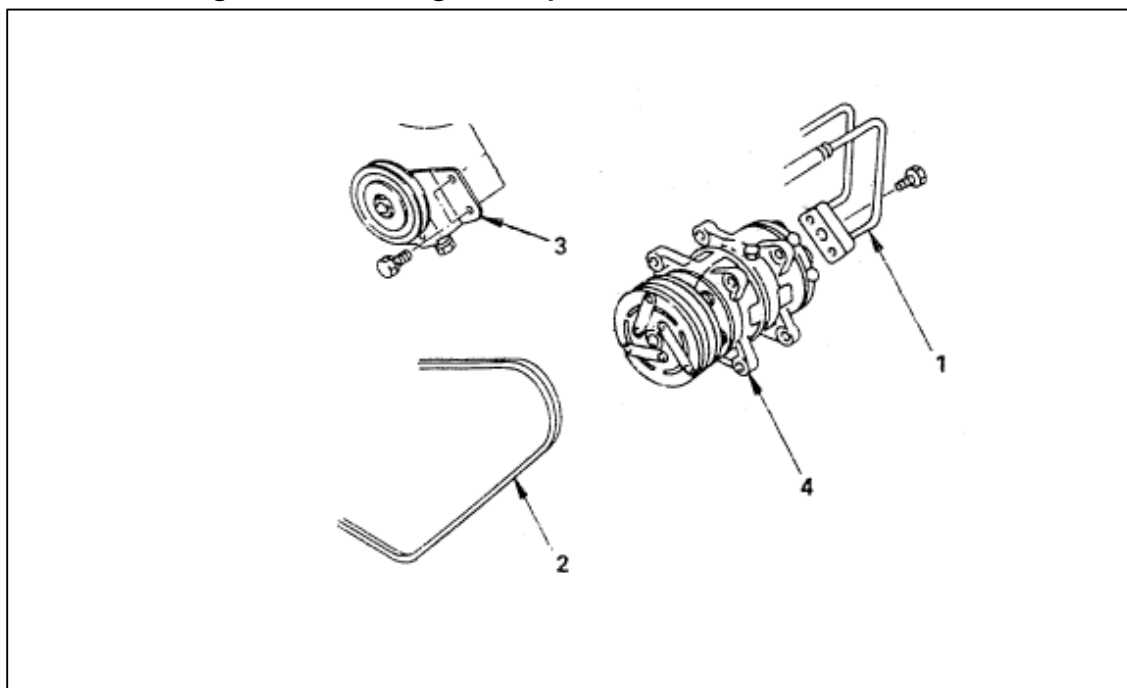


- | | |
|----------------------------------|-----------------------------|
| 1. Condenser damping pad sleeve; | 2. Hex flanged face nut; |
| 3. Pad; | 4. Condenser core; |
| 5. Condenser damping pad; | 6. Condensing fan assembly; |
| 7. Bolt combination | |

Important operations

1. When removing pipe from each device, avoid damaging connecting nut or the pipe.
2. Cover pipe port with plastic cloth to avoid ingress of dust in pipe.

2.3 Disassembling and assembling of compressor



Disassembling sequence:

1. Pipe
2. Belt
3. Idler
4. Compressor

Assembling sequence:

4. Compressor
3. Idler
2. Belt
1. Pipe

Important operations

1. To remove pipe from each device, avoid damaging connecting nut or the pipe.
2. Cover pipe port with plastic cloth to avoid ingress of dust in pipe.

Operation prompts

- 1.1 To avoid accidents and ensure safety of relevant personnel, non-discipline personnel must not perform disassembling or repair.
- 1.2 Use of open flame or smoking is prohibited.
- 1.3 Always wear working clothes during working. Ensure intact protective devices.
- 1.4 Perform operation in a well ventilated environment.
- 1.5 Before starting the engine, confirm that there is no tool, measuring instrument or other part on moving and rotating parts, and parts through which electric current flows.
- 1.6 Before start of engine, blow horns to warn operating workers and confirm safety.
- 1.7 To check electric lines, take care not to touch terminals or other parts through which electric current flows; otherwise short circuit may occur due to human body or

other part.

1.8 Use fuses of rated capacity. Avoid burning of electric devices such as relay and fire.

1.9 When using hose and hard pipeline, take care to avoid leakage of gas.

1.10 Thoroughly clean dust at hose or hard pipeline connecting part and inside pipelines; prevent gas leakage and abnormal operation.

1.11 Avoid water or oil etc. on fan, fan motor or V belt, so as to prevent damage and fire.

1.12 Before shutdown of air conditioner is confirmed, do not touch belt or fan to avoid injury.

1.13 Do not place refrigerant cans on engine or radiator, so as to prevent serious accident.

1.14 Do not subject refrigerant cans to direct sunshine, moisture, or temperatures exceeding 40°C, so as to prevent serious accident. Store these cans at a cool and dry place.

1.15 Store refrigerant cans where no fierce collision with other hard matter or iron ware etc. will occur, so as to avoid serious accident.

1.16 When handling refrigerant gas, wear protective goggles to avoid injury of eyes. In case such gas enters the eye, timely wash with large amount of clear water to prevent frostbite; if serious, go to hospital at once.

Items that must be inspected before AC system maintenance or diagnosis

2.1 Visually check hoses for damage and friction.

2.2 Ensure that condenser fins are not blocked by insects, impurities and dirt etc.,

2.3 And that fins have no apparent falling.

2.4 Correct operating direction of condenser fan.

2.5 No overheating of engine water tank.

2.6 Check tension of driving belt and for damage.

2.7 Operation of compressor.

2.8 Check for clogging of evaporator drain hose.

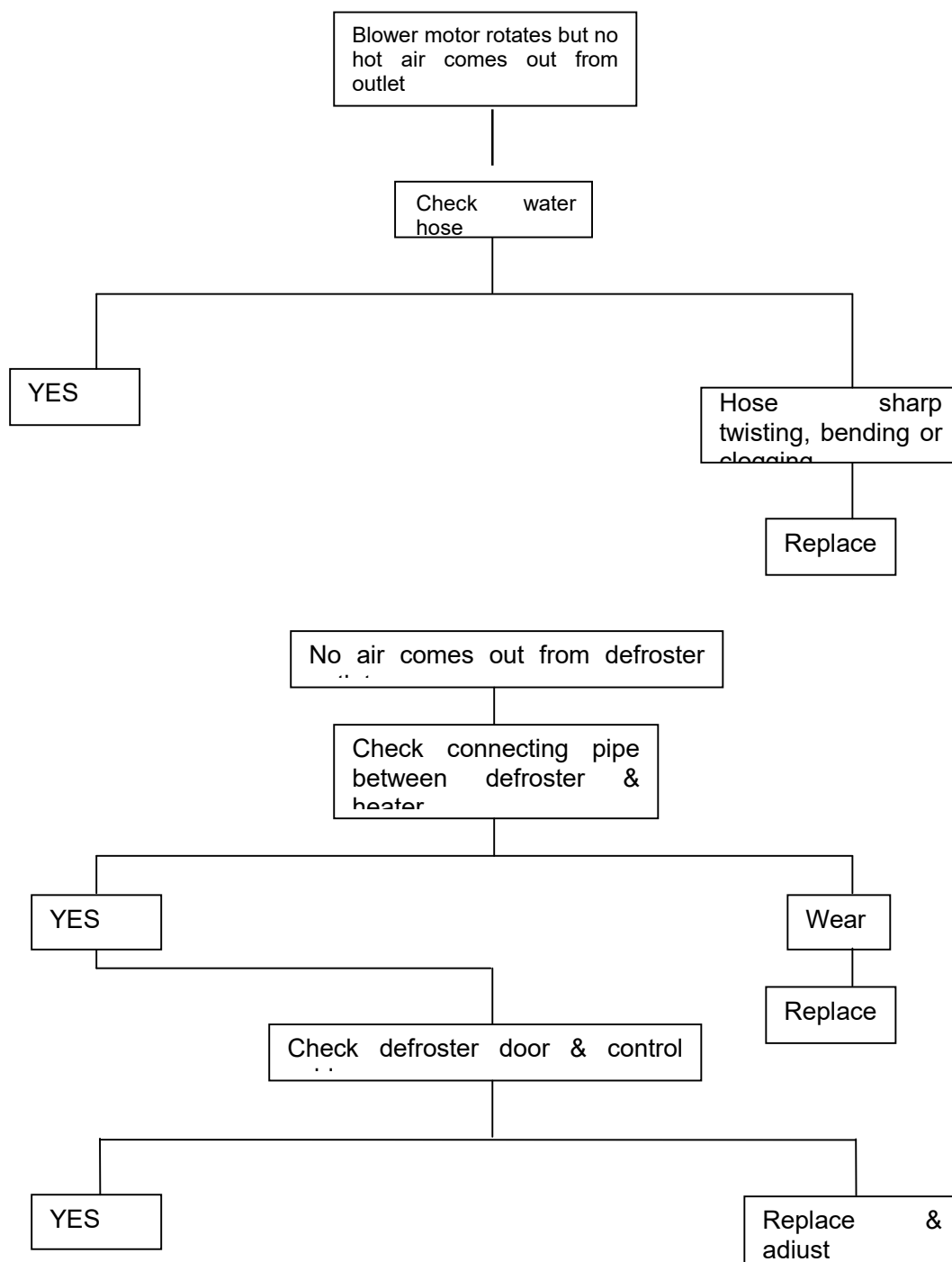
2.9 Check free action of switch at each air outlet.

2.10 Check if blower and evaporator fan can operate at specified fan speed.

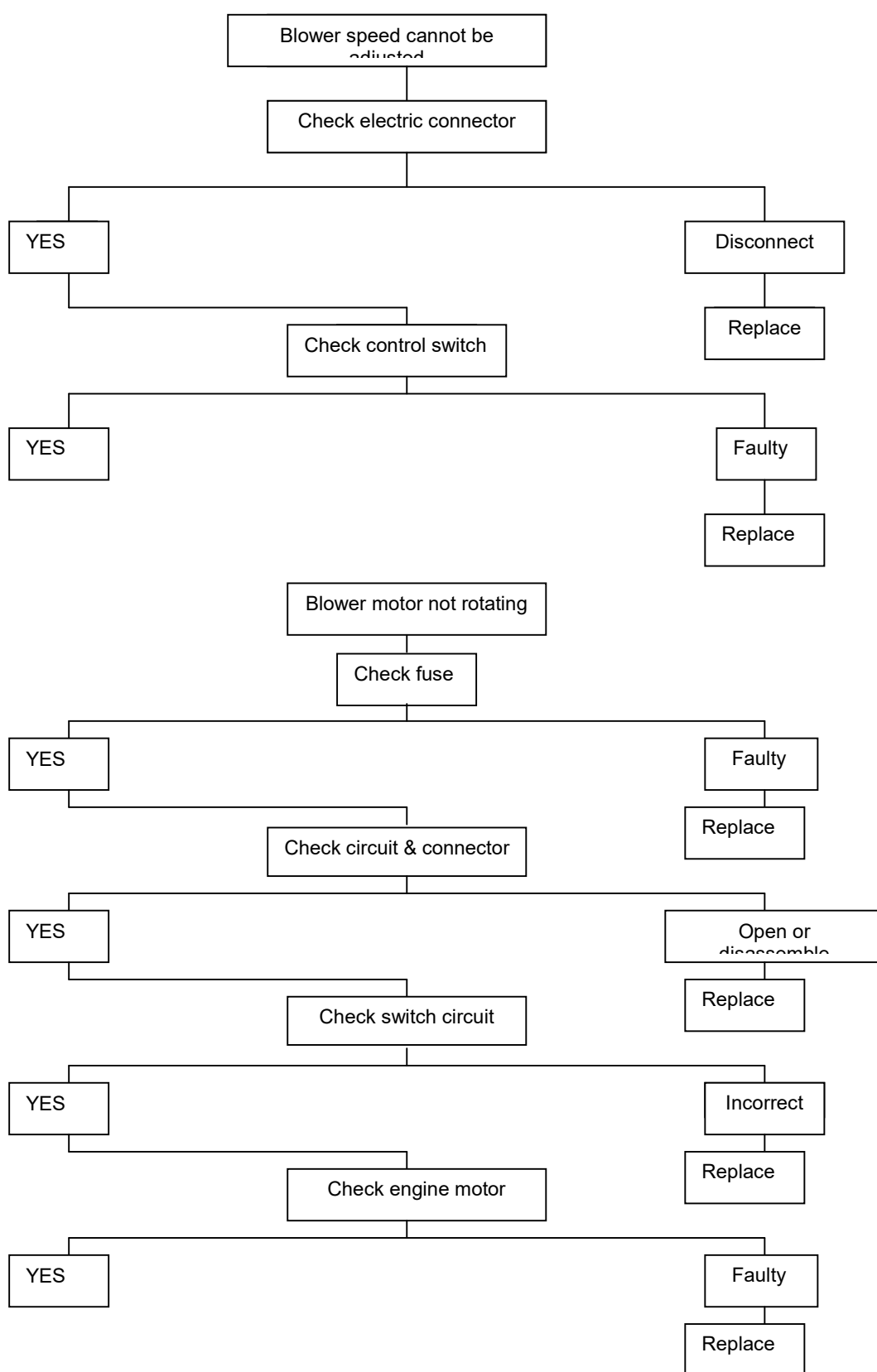
2.11 Check that there is no apparent refrigerant leakage or oily dirt on device or pipeline connector.

Electrical System

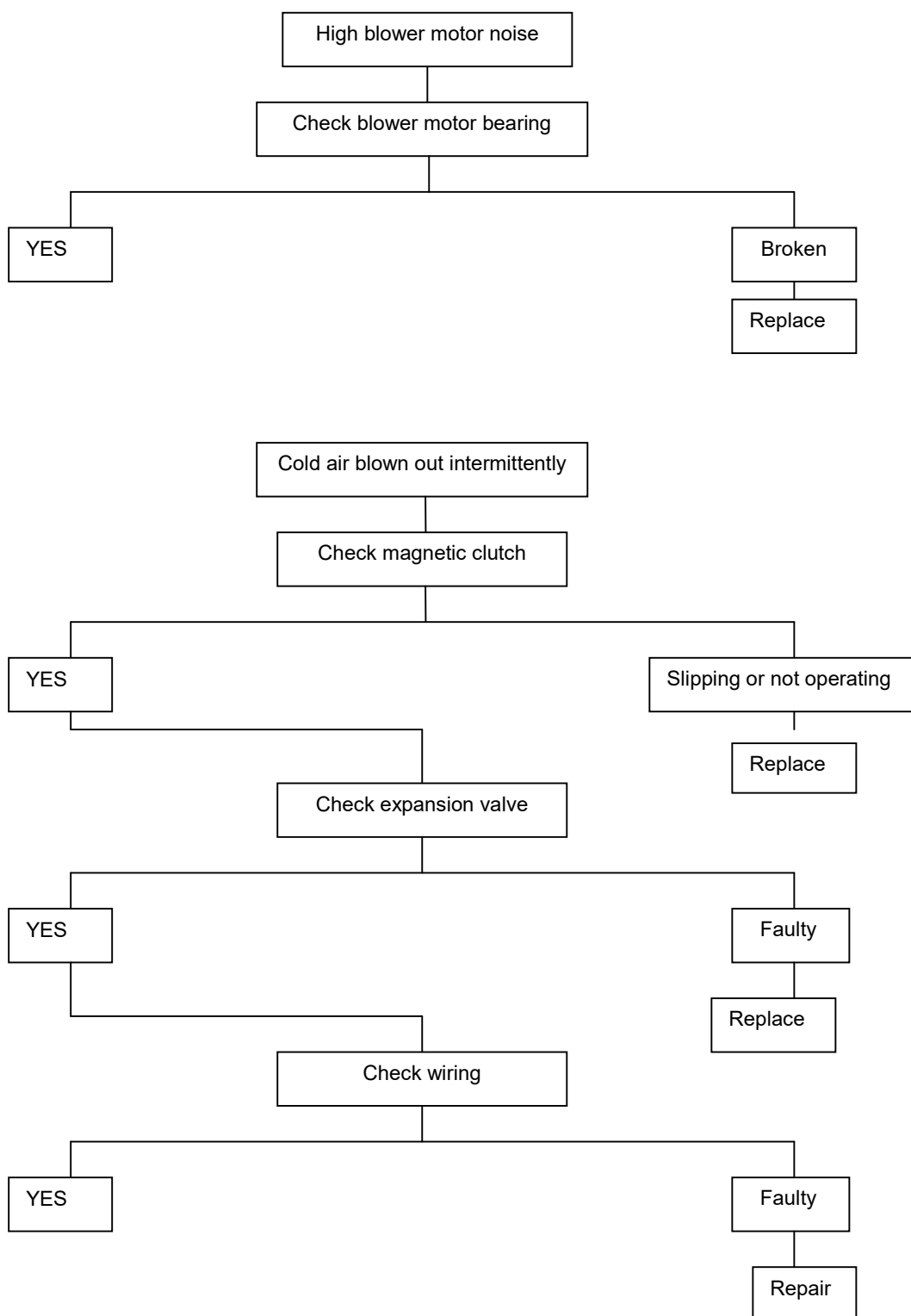
Troubleshooting



Electrical System



Electrical System



Electrical System

