Service Manual DC20DZ

DC20 (ROOF MOUNTED

Product Manual

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1. Product Profile

DC20 (HZ) is an electric rooftop mounted or wall back mounted A/C unit with one-piece integral structure.

Driven by DC12V or DC24V battery group, it is different from the traditional small air conditioners, which is energy-saving, low power consumption, low noise, no exhaust-gas discharge, high-efficiency and high-performance, etc.

The DC20 is small in size, compact in structure, and light in weight. It's streamlined outlook is compatible to vehicles body.

Besides, it's integral structure also saves many hoses connection and reduces the refrigerant leakage; and is easy for installation and maintenance.

In a word, The DC20 electric air conditioner will be your best choice for all kinds of construction and agricultural machinery, truck cabin, van, and commercial vehicles.

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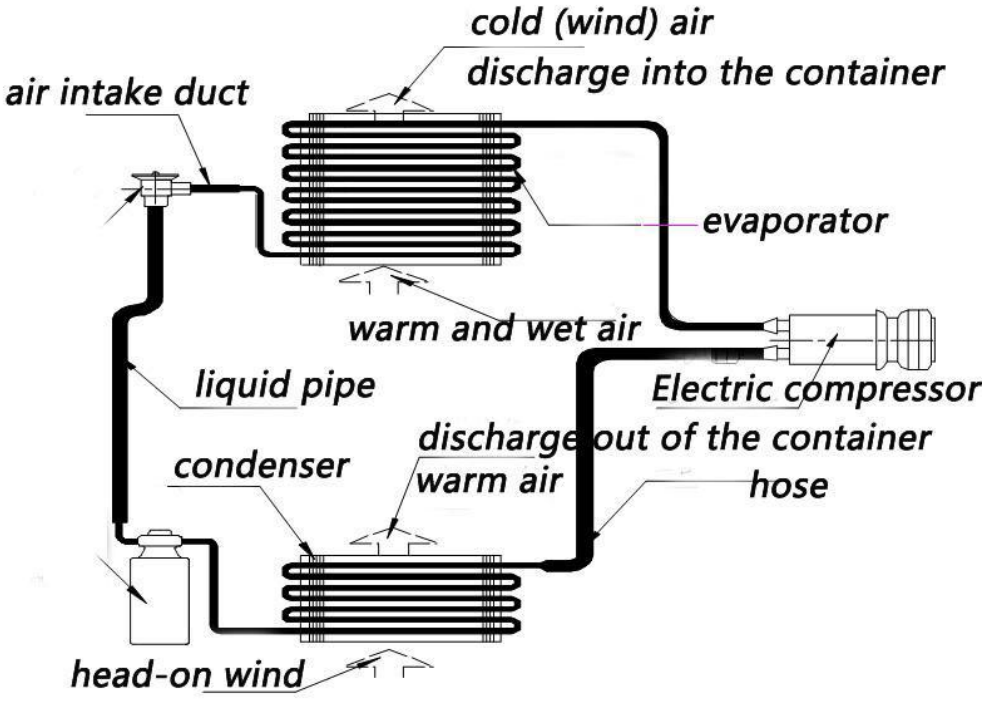
2. Working Principle

When A/C is powered on, the DC compressor starts to work and compress the overheated steam inhaled by it into the condenser unit through pipes and tubes. The overheated stream and the air exchange heat in the condenser and be condensed into sub-cooled liquid. Then it goes into the evaporator under the depressurization and throttling function of the expansion valve, and absorb heat inside the driver's cab, after which it enters into the compressor chamber and compressed into the next operating cycle. Again and again, the evaporator absorbs the heat in the cab continuously so as to make it cool in the cab.

Working Principle Diagram:



3. Features and Technical Parameters

* Adjustable cooling capacity;
* Environmentally friendly R134a refrigerant;
* Remote control, combined with instruction manual;
* Optional electric heating function; adjustable heating power;
* One-piece unit; rooftop mounted or back wall mounted;
* Full aluminum heat exchanger, high efficiency and light weight;
* Compressor: driven by brush-less DC motor, with adjustable rotate speed;
* Brush-less evap. blower and condenser fan, long lifetime, lower power consumption;
* Special for Ford, IVECO, vans; RV, tractor, construction machinery and cabs etc.

Model		**DC20**	
Refrigerant/Charge volume		R134a / 500g±20g	
Voltage		12V/24V	
Cooling capacity		1500W - 3000W	
Evaporator blower air vol.		600m3/h	
Condenser fan air vol.		1000m3/h	
Rated Power Consumption		500W ~ 1000W	
Compressor	Model	Electric scroll compressor	
	Displacement	18cc/r	
	Rotate Speed	1500 - 4500rpm	
	Voltage	DC12V, 24V, 48V, 60V, 72V, 96V, etc	
Battery group		100AH×4	
Setting temperature		15℃～32℃	
Heating capacity		DC12V	DC24V
		300W/600W	500W/1000W
Pressure protection		0.196～2.65MPa	
Dimensions		700*600*215mm	
Weight		30kg	
Control mode		Auto./Man.	
Remote control		Yes	

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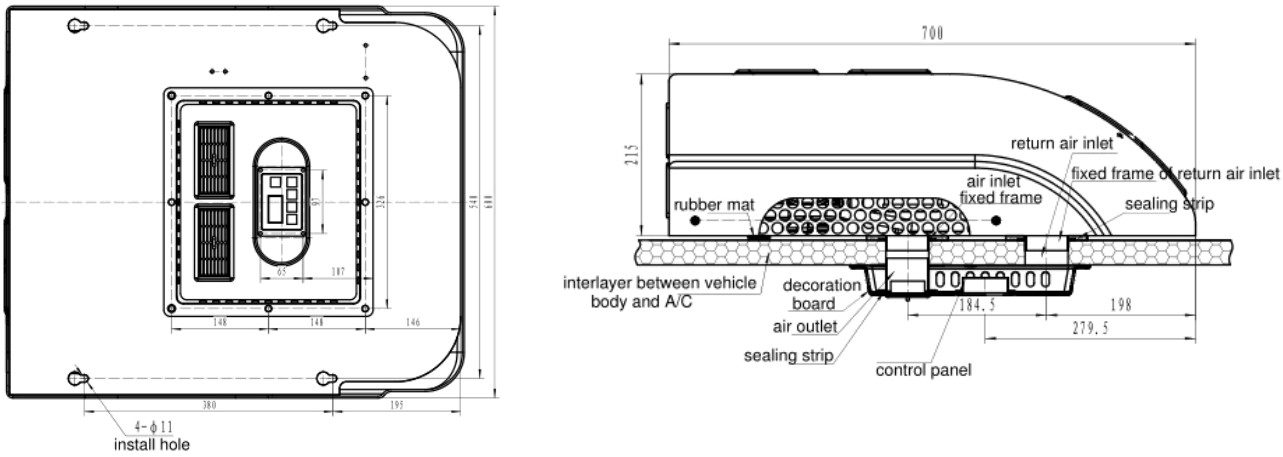
4.Installation Instruction

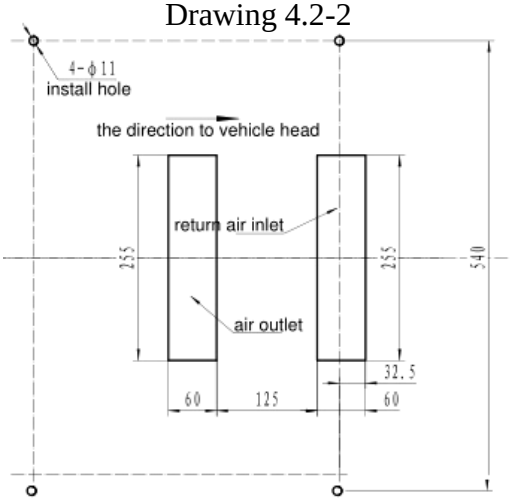
4.1 Make sure the vehicle voltage is the same with the A/C voltage.

4.2 Cutting holes(Drawing 4.2-3) on roof of the vehicle per to A/C outlook dimensions and hole size marked in the Outlook & Installation Sketch(Drawing 4.2-1; 4.2-2).

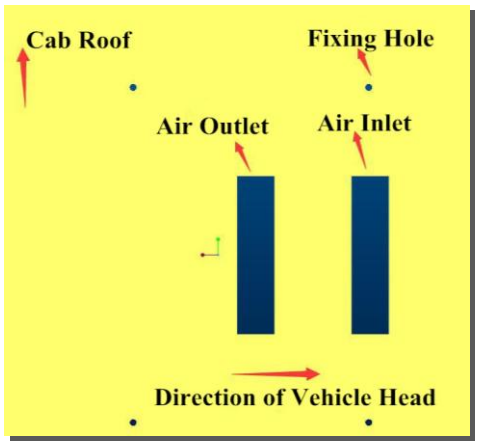
Drawing 4.2-1



Drawing 4.2-2

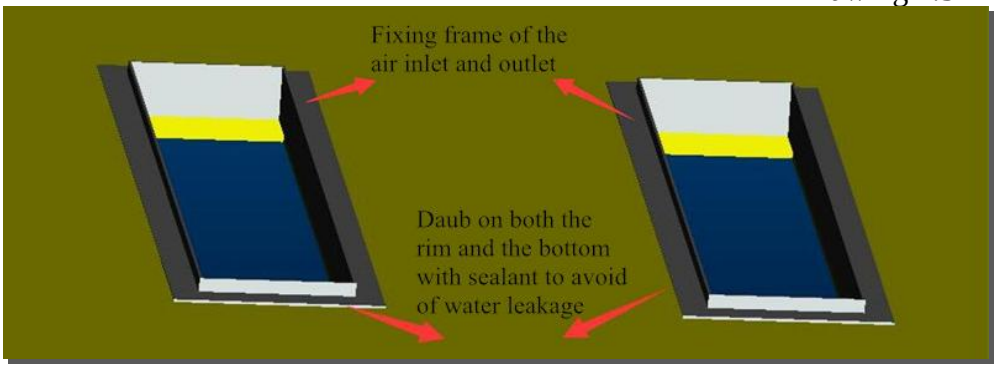


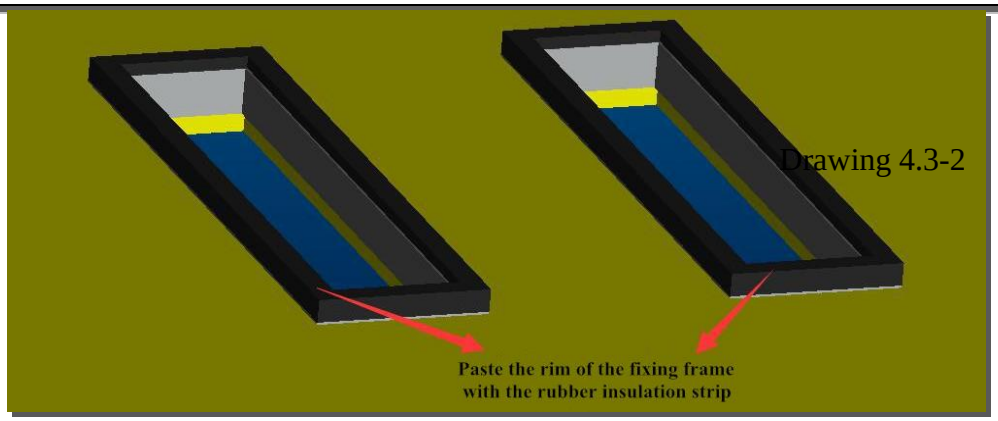
Drawing 4.2-3



4.3 Daub on the edge of the air inlet and outlet with sealant separately; then mount the fixing frame(black iron frame) of the air inlet and outlet in its place separately, and daub on the outside with a lap of sealant to avoid of water leakage(Drawing 4.3-1). Then paste the rim of the fixing frame with the sponge bars (Drawing 4.3-2).

Drawing 4.3-1

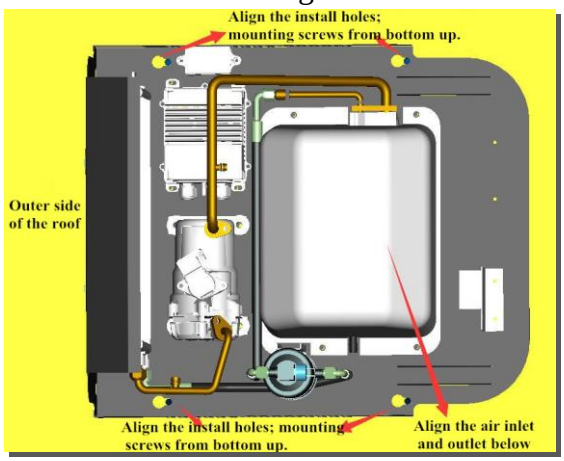




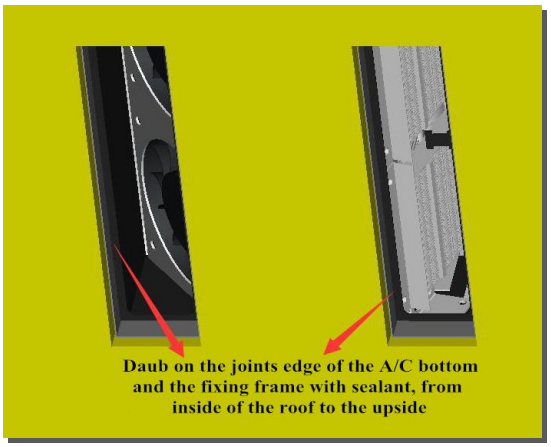
Drawing 4.3-2

4.4 Align the A/C air inlet and outlet with trepanning positions on the roof, and mount A/C with screws (Drawing 4.4-1); daub on the joints edge of the A/C bottom and the fixing frame with sealant, from inside of the roof to the upside (Drawing 4.4-2).

Drawing 4.4-1

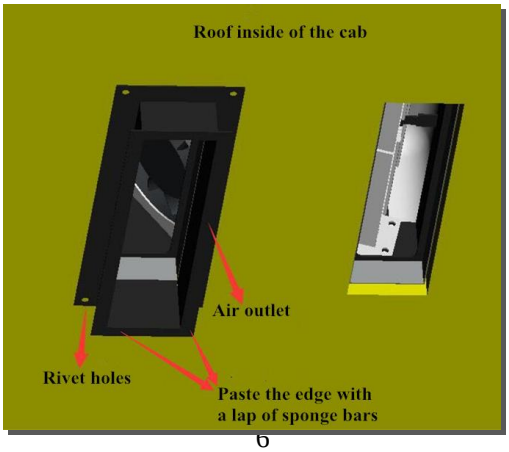


Drawing 4.4-2



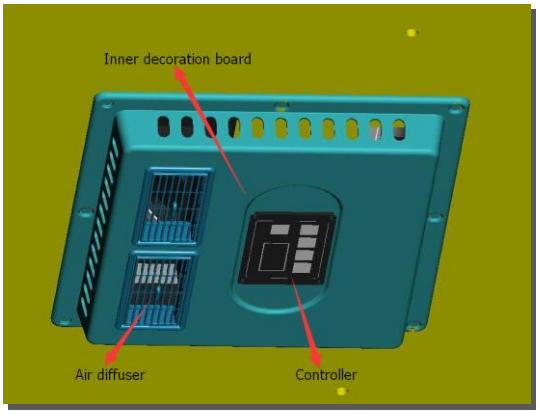
4.5 Fix the sheet metal air outlet(paste the air outlet with sponge bars)on the inside of the cab roof(corresponding to the A/C air outlet); drill rivet holes(φ 5.2) with a electric hand drill and fix with rivets(Drawing 4.5-1).

Drawing 4.5-1

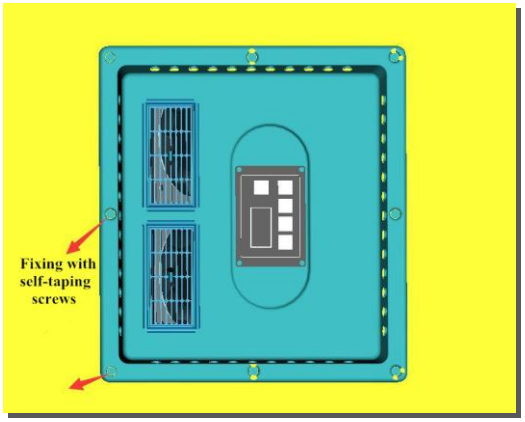


4.6 Bonding well interface of the A/C return air wire connector and the corresponding plug of the controller; align the two mobile air diffusers with the metal sheet air outlet, and fix them with self-taping screws.

Drawing 4.6-1



Drawing 4.6-1



4.7 Connect the transparent drain-pipe with the off-let tube of the A/C water pan,which is in the bottom of the A/C unit; fix the drain-pipe along the vehicle side wall down to the vehicle bottom for water draining. Besides, arrange the drain-pipe from high to low to avoid of water storage.

4.8 Connect one terminal of the power line to the inlet (Positive inlet)of the 100A fuse box, and connect the other terminal with the battery positive wiring terminal; Positive terminal of the A/C was already bonding, which is no need of connecting. Fix the power line along the vehicle side wall.

4.9 Vacuumize, charge refrigerant and test the A/C - It is instruction for A/C sold without refrigerant.

►**Vacuumizing:** Connect the A/C unit with the pressure gage, vacuumizing the A/C unit for 0.5~1 hour; Specific vacuumizing time is up to size of the vacuum pump. After vacuumizing, make sure to shut off the valve of the pressure gage for at least 2 hours, or even longer time. If the pressure is not rise, it shows that the installation, the pipe connection and the sealing job are all of no problems, which means it's ok to charge refrigerant.

►**Charging refrigerant:** take off the yellow manifold of the pressure gage from the vacuum pump, and connect it to the container connector of the R134a. Open the container valve and deflate the yellow manifold to drain off the air in the pipe. Then open the high pressure manifold of the pressure gage, and invert the R134a container to charge refrigerant for the A/C system. Observe the the sight glass of the A/C unit, the refrigerant is enough when there are bubbles passing by the sight glass occasionally every several seconds. If inverting the refrigerant container can not charge enough refrigerant, then turn upright the container, shut-off the high pressure manifold valve, open the air conditioner and the low pressure manifold valve, then keep on charging until it's enough.

It is suggested that the refrigerant charging volume should be 500g±20g. When finish the charging, take over the devices and remount the A/C shell.

►**Test the air conditioner.**

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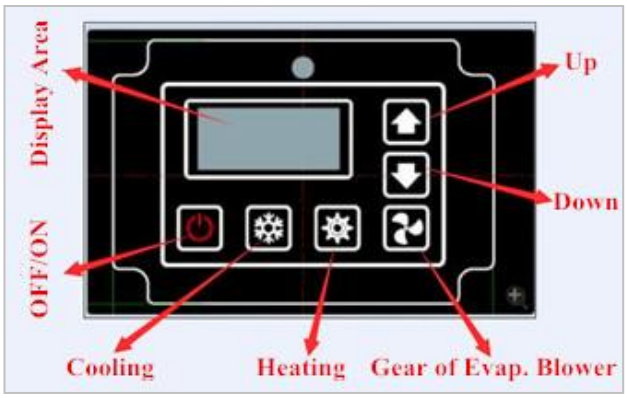
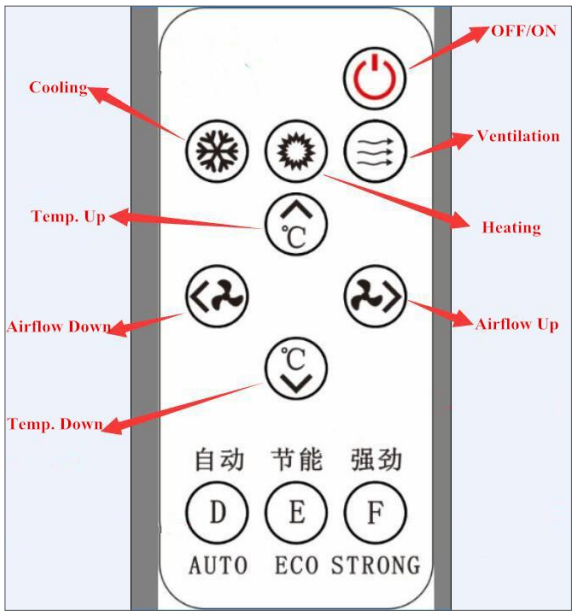
5. Instruction of controller and remote control

5.1 Instruction of controller



►**ON/OFF Key:** Control the turn-on or turn-off of the A/C unit.
►**Cooling Key:** Control the A/C unit is in cooling or ventilation mode; when the cooling icon is on, the unit is in cooling mode; or vice versa, it is in ventilation mode.
►**Heating Key:** Control the A/C unit is in heating or ventilation mode; when the heating icon is on, the unit is in heating mode; or vice versa, it is in ventilation mode.
►**Gear of Evap. Blower Key:** Control the rotation speed of the evaporator blowers. The evaporator blower has 6 grades, when adjusting, the screen show F1~F6(Cyclic adjusting); long press the airflow key for 3 seconds, the control panel shows modes adjustment, along with the "Up" or "Down"key, can adjust the running mode of the A/C. Long press the airflow key for 6 seconds, it can check the voltage. Press the "airflow" key and "up" key at the same time, you can adjust the running mode of compressor. (auto. speed or fixed speed).
►**Up Key:** When the control panel show current temperature, put "up" key, it will show current setting temperature, you can turn up the setting temperature; it support long press.
►**Down Key:** when control panel show current temperature, put " down" key, control panel will show setting temperature, you can turn down the setting temperature; it support long press.

5.2 Instruction of the remote control



5.2.1 Press “cooling” key, the unit into cooling mode, and it is divided into four modes:
►**Manual mode:** Compressor automatically change it’s rotation speed according to temperature difference, and the evaporator airflow can be adjusted manually. (It is the default mode if other three modes are not operated).
►**Auto mode:** Compressor automatically change it’s rotation speed according to temperature difference; the evaporator blowers adjust automatically, and manual adjust of the airflow is not available; pressing “airflow” key, it changes into the manual mode.
►**ECO mode:** The compressor is at the lowest speed; the airflow can be adjusted manually.
►**Strong mode**: Both the compressor and blowers are at the highest speed, and manual adjust of the airflow is not available.

5.2.2 Press “ heating” key, the unit into heating mode, and it is divided into four modes:
►**Manual mode:** The heating output adjust automatically according to temperature difference, and the evaporator airflow can be adjusted manually. (It is the default mode if other three modes are not operated).
►**Auto mode:** The heating output adjust automatically according to temperature difference, and the evaporator blowers adjust automatically, and manual adjust of the airflow is not available; pressing “airflow” key, it changes into the manual mode.
►**ECO mode:** It is in grade one heating; the airflow can be adjusted manually.
►**Strong mode:** It is in grade two heating, the evaporator blowers are at the highest speed, and manual adjust of the airflow is not available.

6. Quick Trouble Shooting and Disposal Guide

6.1 Not cooling or not heating

Not Cooling	Fan of evaporator don’t work, other parts work	In turn, check whether the connector of fans fall off, and if fans have damaged, if relay burn out, if relay is loose, if insurance is burn out, if switch of temp. Control is damaged, if fan of evaporator signal is output in control panel.
	Fan of condenser don’t work, other parts work	In turn, check whether the connector of fans fall off, and if fans have damaged, if relay burn out, if relay is loose, if insurance is burn out, if switch of temp. Control is damaged, if fan of evaporator signal is output in control panel.
	Compressor don’t work, other parts work	Check the compressor control signal line sequentially is off, the signal cable is output, if the power lines are off
	All parts don’t work, control panel show pressure alarm	In turn, checking whether the system refrigerant pressure switch wiring is off, the pressure switch is faulty.

Cooling capacity isn't enough	Fans and compressor both work	In turn, check if the reservoir connector is reversed, if expansion valve is blocked, if the refrigerant is not enough through sight glass, if evaporator is blocked.
	There are two fans for evaporator and condenser, check if one of fans don't work, or two fans turbine is inconsistent.	
Not heating	Fan of evaporator don't work, but heater work	In turn, check whether the connector of fans fall off, and if fans have damaged, if relay burn out, if relay is loose, if insurance is burn out, if switch of temp. Control is damaged, if fan of evaporator signal is output in control panel.
Heating capacity isn't enough	Fan of evaporator and heater both work	In turn, check if two fans of evaporator both work, two heater both work, and corresponding relay, insurance and connector of relay are damaged.

6.2 Other trouble shooting methods

	Phenomena	Reasons	Trouble shooting methods
1	Good cooling effect in the first usage period.Later on, the system can not provide enough cooling capacity, and there are bubbles exist in the observing hole of the reservoir. And both the HP and LP reading is a bit lower.	Often driving in the rough road, results in the connector loose and system leakage	Find out the leaking place with a leak detector then screw down the loosen part,and supply some R134a.
2	Wind from outlet isn't cold, the temp. Of compressor gradually increase. Low pressure gauge decrease rapidly, nearly to 0, high pressure gauge is high.	Cooling system has impurity, the filter net of expansion valve is blocked, and come thin defrosting or "water".	Intermittent open air-conditioning system, if the blocking isn't severe, it can eliminate the transient congestion. Remove the expansion valve and clean with alcohol, drain the system and then recharge.
3	Insufficient of cooling capacity. Evaporator frosting. HP&LP are a little low	The throttling orifice inside the expansion valve do not work.	Evacuate fully the system,exchange the expansion valve and recharge R134a.
4	The cooling capacity gradually decrease after a period of operation.HP reading is slightly low and the LP reading is below 0.4Mpa.	The drying agent in the filter drier is in saturation, and the expansion throttling hole is blocked by ice.	Evacuate fully the system, exchange the reservoir and recharge R134a.

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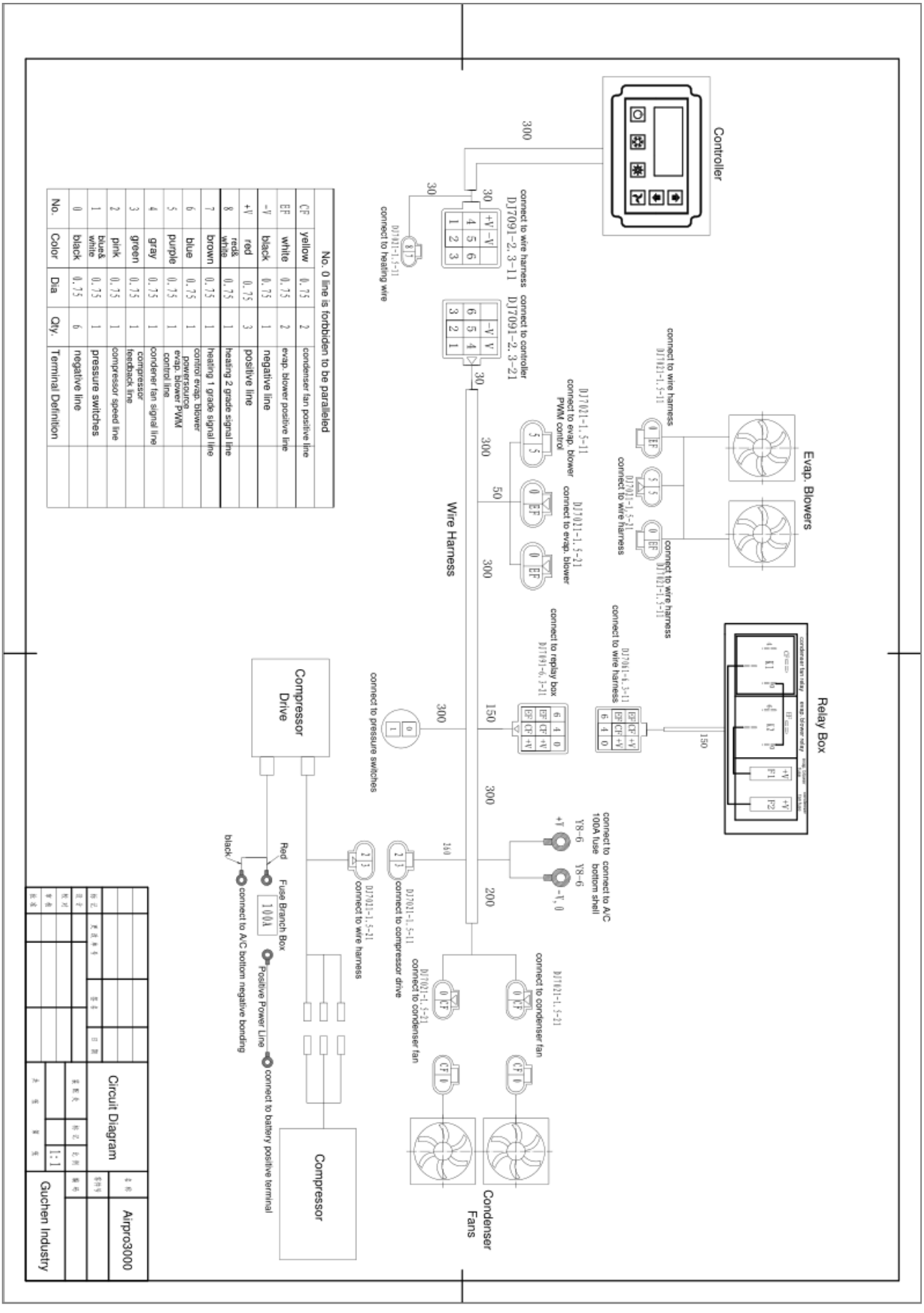
7. Circuit Diagram



No.	Color	Dia	Qty.	Terminal Definition
CF	yellow	0.75	2	condenser fan positive line
EF	white	0.75	2	evap. blower positive line
-V	black	0.75	1	negative line
+V	red	0.75	3	positive line
8	red& white	0.75	1	heating 2 grade signal line
7	brown	0.75	1	heating 1 grade signal line
6	blue	0.75	1	control evap. blower powersource
5	purple	0.75	1	evap. blower PWM control line
4	gray	0.75	1	condener fan signal line
3	green	0.75	1	compressor testback line
2	pink	0.75	1	compressor speed line
1	blue& white	0.75	1	pressure switches
0	black	0.75	6	negative line