

USER MANUAL

Model: CS-MCQ-19241100



深圳市酷凌时代科技有限公司

Shenzhen Coolingstyle Technology Co., Ltd.

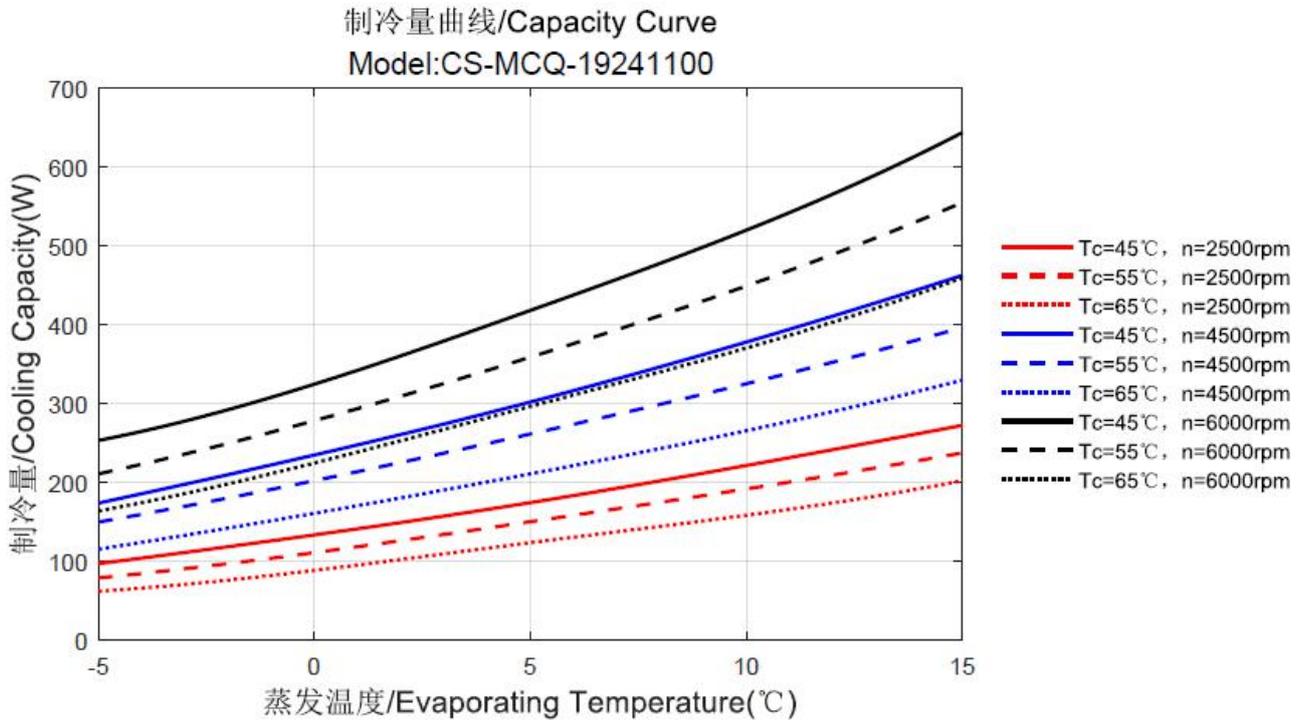
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1. Basic Parameters

Compressor Type	Rotary DC Timing Compressors
Rated Voltage	DC 24V
Voltage range	24V±10%
Rated Current	10A
Maximum Current	12A
Displacement	1.9cm ³ /rev
Motor Rotor Pole	6
Maximum Compression Ratio	8
Speed Range	2000~6000rpm
Cooling Capacity(at 6000 rpm)	440W(ASHRAE Conditions)
Refrigerant	R134a
Oil	RL68H
Oil Charge	50mL
Ambient Temperature	-5~55°C
Evaporating Temperature	-10~15°C
Condensing Temperature	45~76°C
Weight(Compressor Body Only)	0.85kg
Suction Tube(I.D)	6.5mm
Discharge Tube(I.D)	6.5mm

2. Cooling Capacity Curve



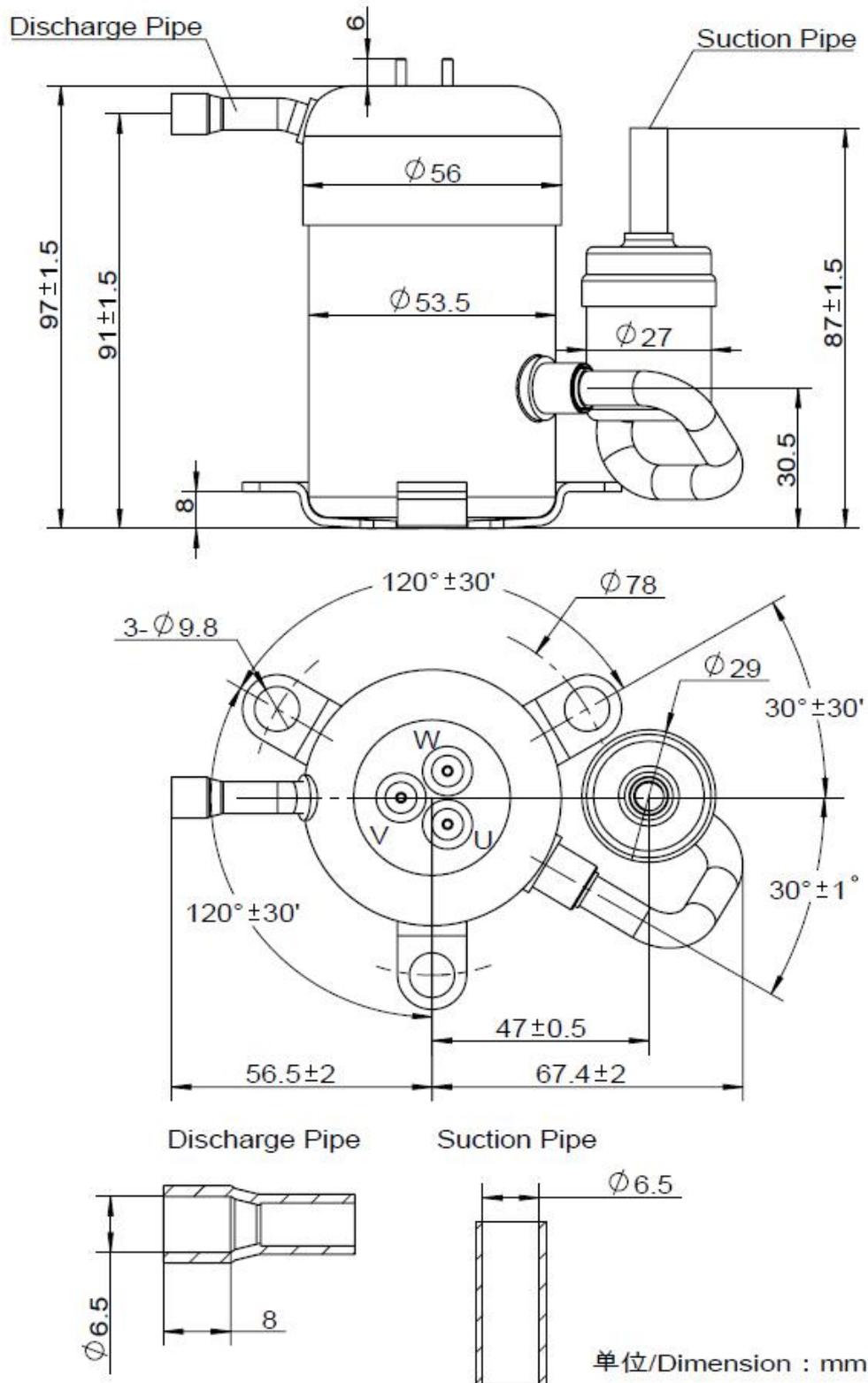
Tc: Condensation temperature; n: Compressor speed

3. Factory List

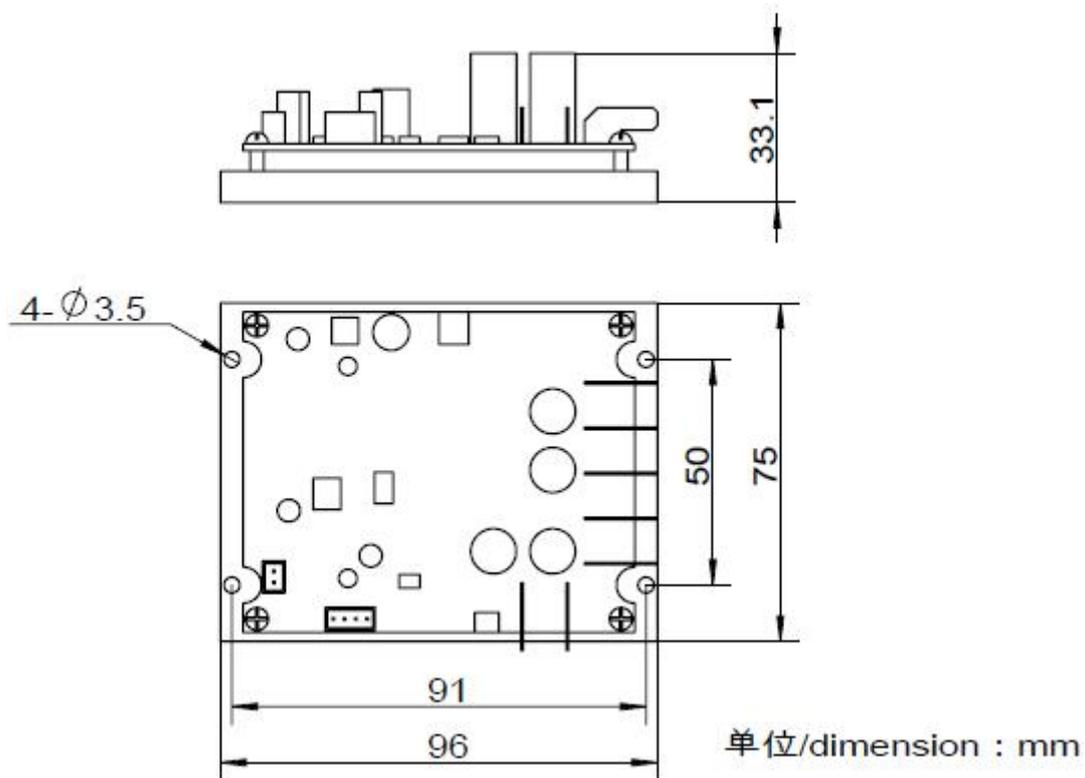
Item	Name	Unit	Qty
1	Compressor	pcs	1
2	Drive	pcs	1
3	Connection wire	pcs	1
4	Cusion	pcs	3
5	Metal pillar	pcs	3
6	Gasket	pcs	3

4. Size

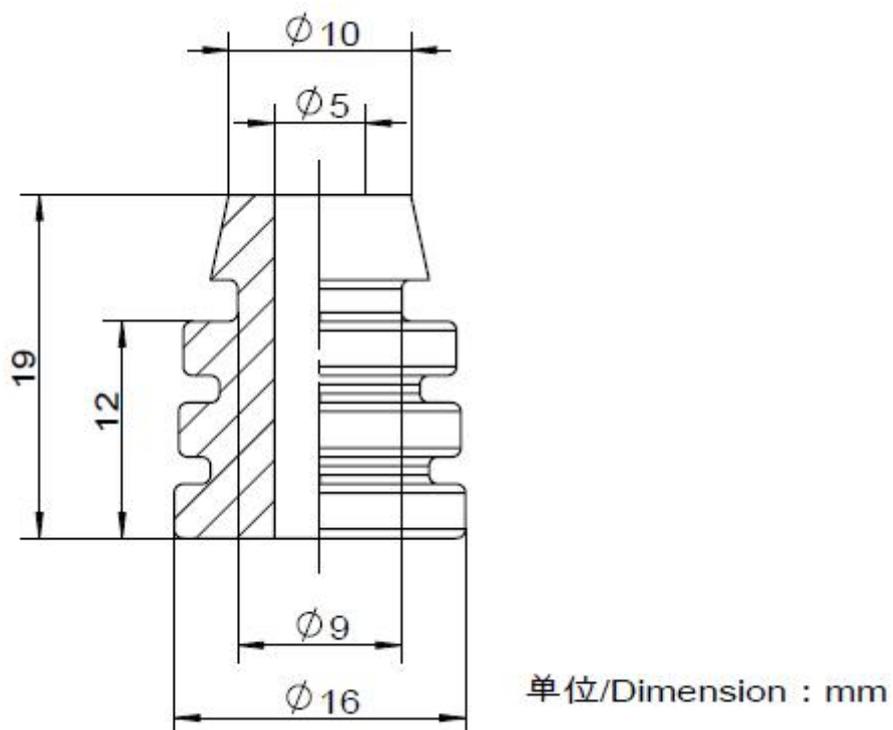
4.1 Compressor size



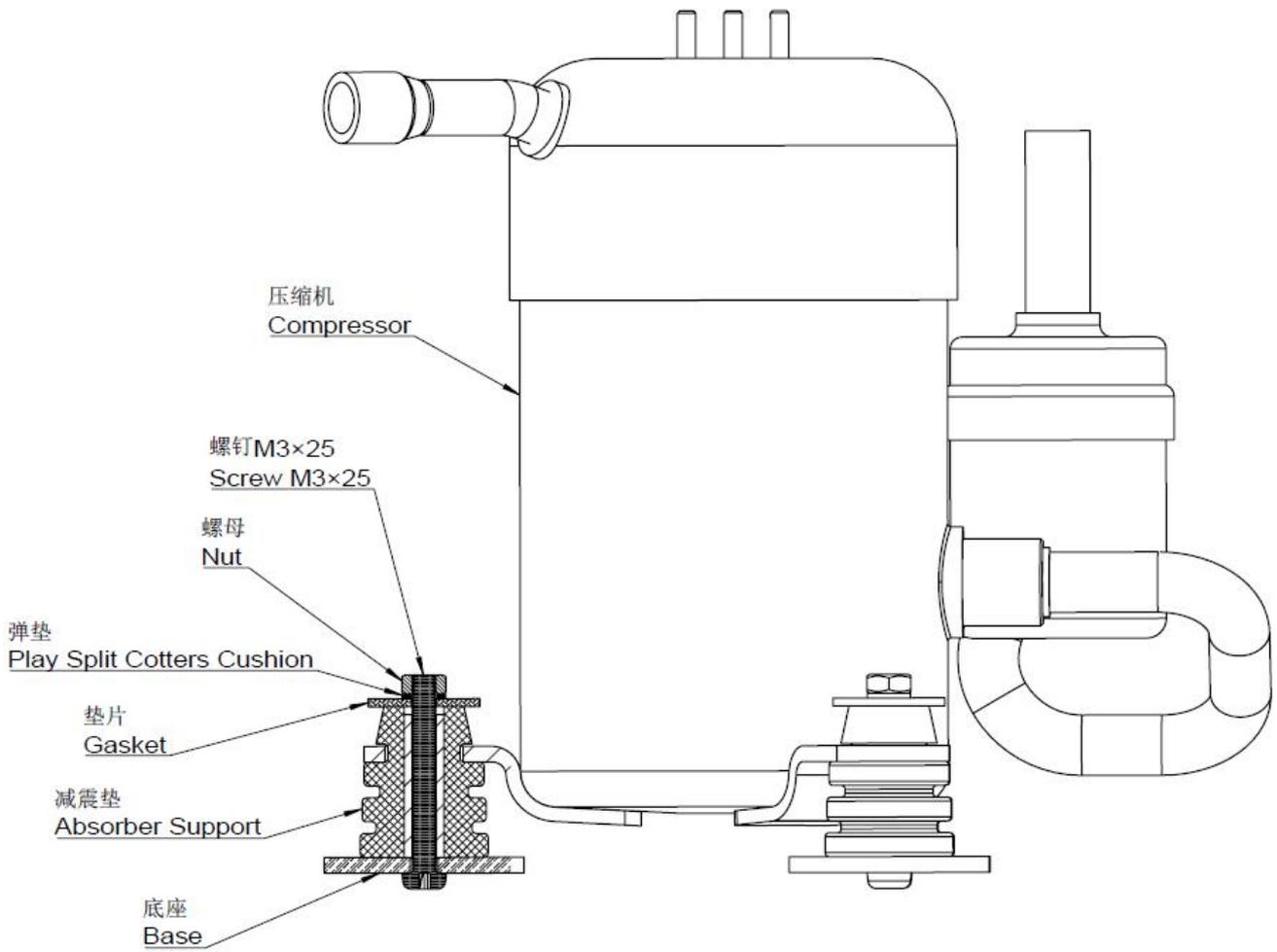
4.2 Drive size



4.3 Cusion size

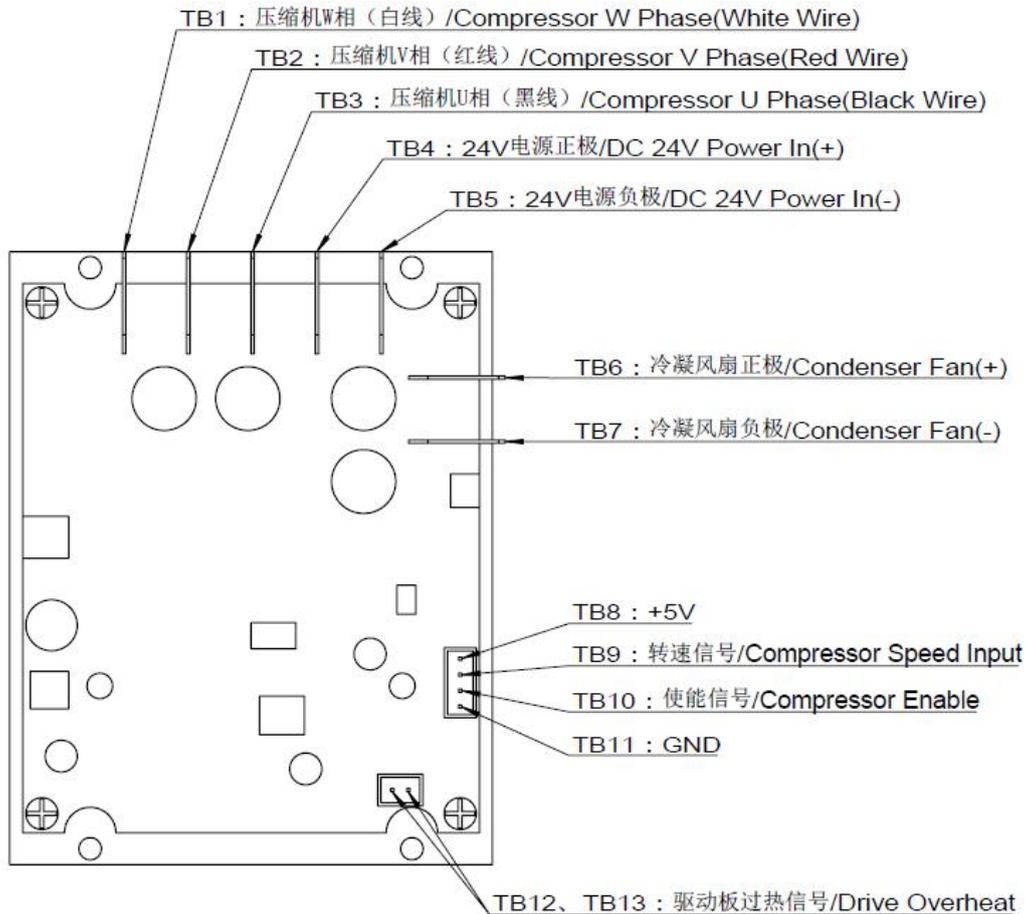


4.4 Installation



5. Driver board wiring instructions

The compressor must work with a matched drive. The drive interface is shown in the figure below.



5.1 Compressor Wiring Port (TB1, TB2, TB3)

The drive board and the compressor are connected by a dedicated three-core cable with the colors of white, red, and black. The white wire is connected to port TB1; the red wire is connected to port TB2; and the black wire is connected to port TB3. The other end of the three-core wire is a terminal block. When in use, the terminal block should be pressed on the three terminals on the top of the compressor with no order.

5.2 Power Supply Input(TB4, TB5)

The power supply voltage range of the drive is $24V \pm 10\%$. The port TB4 is positive and TB5 is negative.

5.3 Condenser Fan Output (TB6, TB7)

An output has been provided for running condenser fans from the drive by the port TB6 and TB7, where TB6 is positive and TB7 is negative. This ports have voltage output only when the compressor is running, the output voltage is 24V, and the maximum load is 3A.

5.4 5V voltage output port(TB8)

When the drive board is connected to the power supply, the port TB8 can output a voltage of 5V, which can be used to adjust the compressor speed, which will be described in detail later.

5.5 Compressor speed signal input port(TB9)

TB9 is a signal input port for controlling the speed of the compressor, which can receive voltage signals, and the range is 0~5V (relative to GND). The corresponding relationship between voltage value and compressor speed is shown in the following table (some individual differences).

Speed voltage U/V	Compressor speed N/rpm
0~1.4	0
1.4	2000
$1.4 < U < 4.5$	$1290 * (U - 1.4) + 2000$
$4.5 \leq U \leq 5$	6000

5.6 Compressor enable signal input port(TB10)

The compressor can work only when the enable signal input port TB10 is grounded. If TB10 is connected to high level or empty, the compressor will not work.

5.7 GND(TB11)

TB11 is mainly used to connect the control signal of the compressor. All voltage signals on the drive board are relative to GND. If an external circuit is used to control the compressor, the external circuit must also share the ground with the drive board.

5.8 Driver board overheating signal(TB12, TB13)

TB12 and TB13 can receive switch on/off signals, and the temperature switch that monitors the temperature of the drive board is connected by default. When the drive board is overheated, the fault

light will flash and the compressor will stop working.

5.9 Driver board failure indicator light description

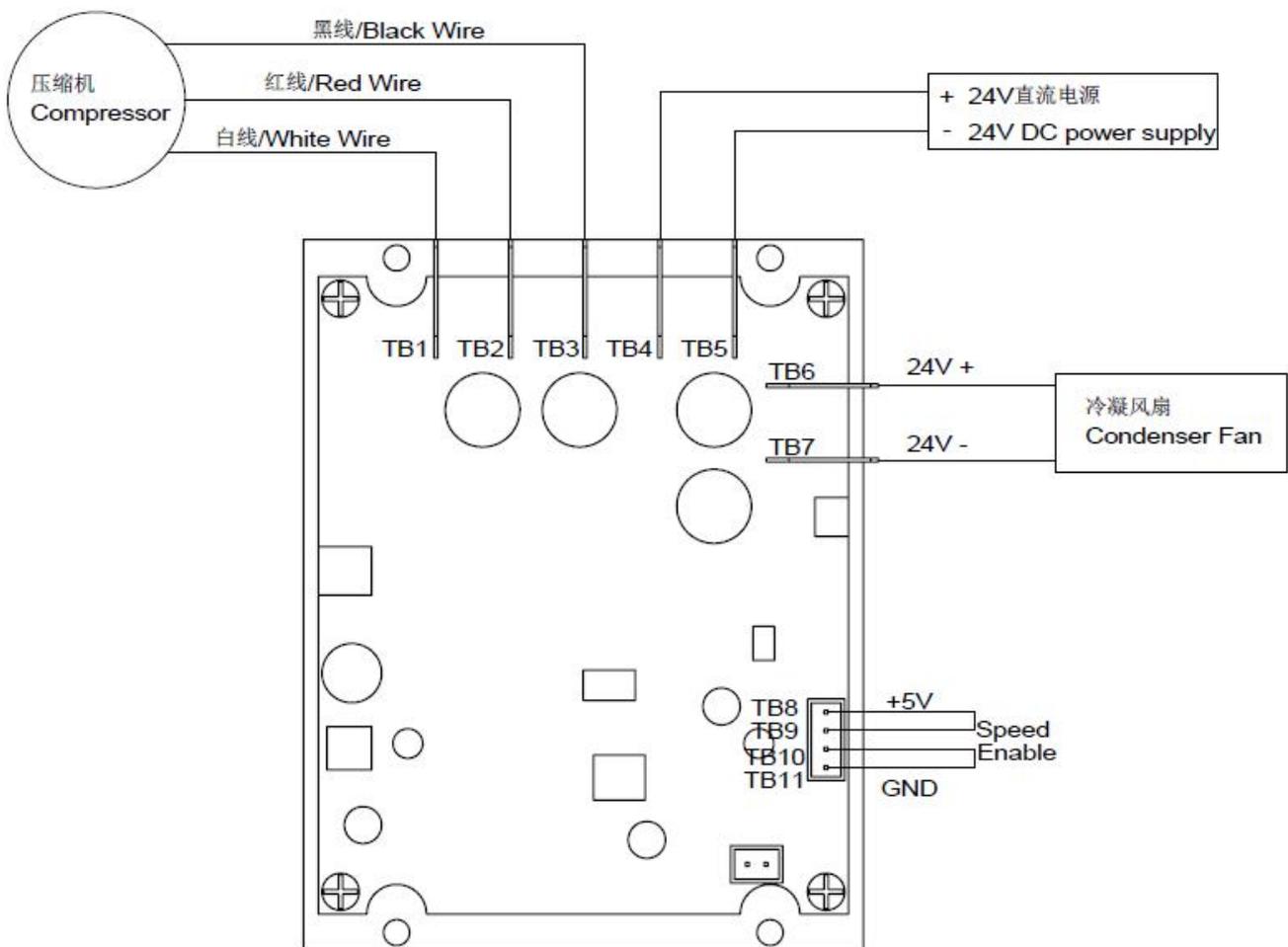
There are two indicators on the drive board, the green one is the power indicator, and the red one is the status indicator. The power indicator indicates the power status of the drive board, and it will light up as long as it is connected to the power source. The status indicator light indicates the compressor's working or fault status. The specific description is shown in the table below.

Status	Description	Status indicator lighting
Normal working		No light
Waiting to start	The driver is connected to power, but the compressor does not start.	Flashing at a constant speed
Driver over-voltage	The high-voltage protection is triggered when the input voltage of the driver is higher than 32V, and returns to normal when the voltage drops to 31.5V.	2 flash repeating
Driver under-voltage	When the input voltage of the drive board is lower than 20V, the low-voltage protection is triggered. When the voltage rises above 20.5V and maintains for 30 seconds, the drive board returns to normal, the red light goes out, and the compressor restarts.	3 flash repeating
Driver overheating	When the temperature of the drive board exceeds 80°C, the overheat protection is triggered. When the temperature drops below about 71°C and maintains for 30 seconds, the drive board returns to normal, the red light goes out, and the compressor restarts.	4 flash repeating
Driver failure	The internal circuit of the drive board is faulty and cannot be automatically restored to normal. The drive board needs to be overhauled.	6/7/8 flash repeating
Compressor phase loss	One or several of U, V, W is disconnected from the compressor. The drive board will restart the compressor every 30 seconds, and will not restart after 3 consecutive restarts.	Light is always on
Compressor phase wire short circuit	One of U, V, W is short-circuited. The drive board will restart the compressor every 30 seconds, and will not restart after 3 consecutive restarts.	Light is always on
Driver board overcurrent	When the input current of the driver board exceeds 14.5A, the overcurrent protection is triggered. 30 seconds after protection, the compressor restarts. If the over-current protection is quickly entered after 3 consecutive restarts, the drive board will no longer restart the compressor.	Light is always on

6. Typical wiring example

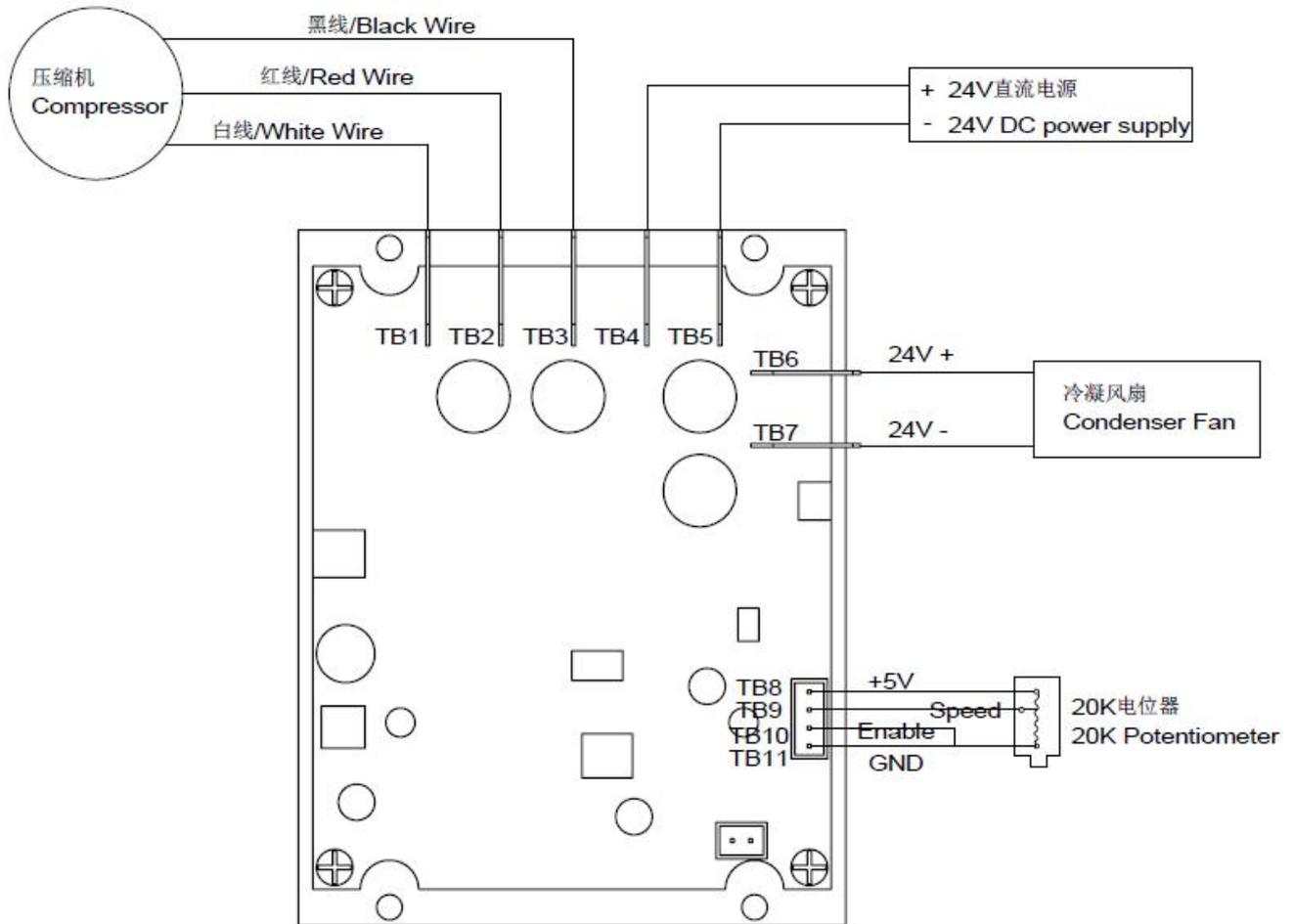
6.1 Example 1

Connect the enable signal TB10 directly to TB11, and short-circuit the 5V voltage port TB8 on the drive board with the speed signal input port TB9 (you can use the jumper cap) to make the compressor always work at the maximum speed. This wiring method cannot adjust the compressor speed, the wiring diagram is as follows:



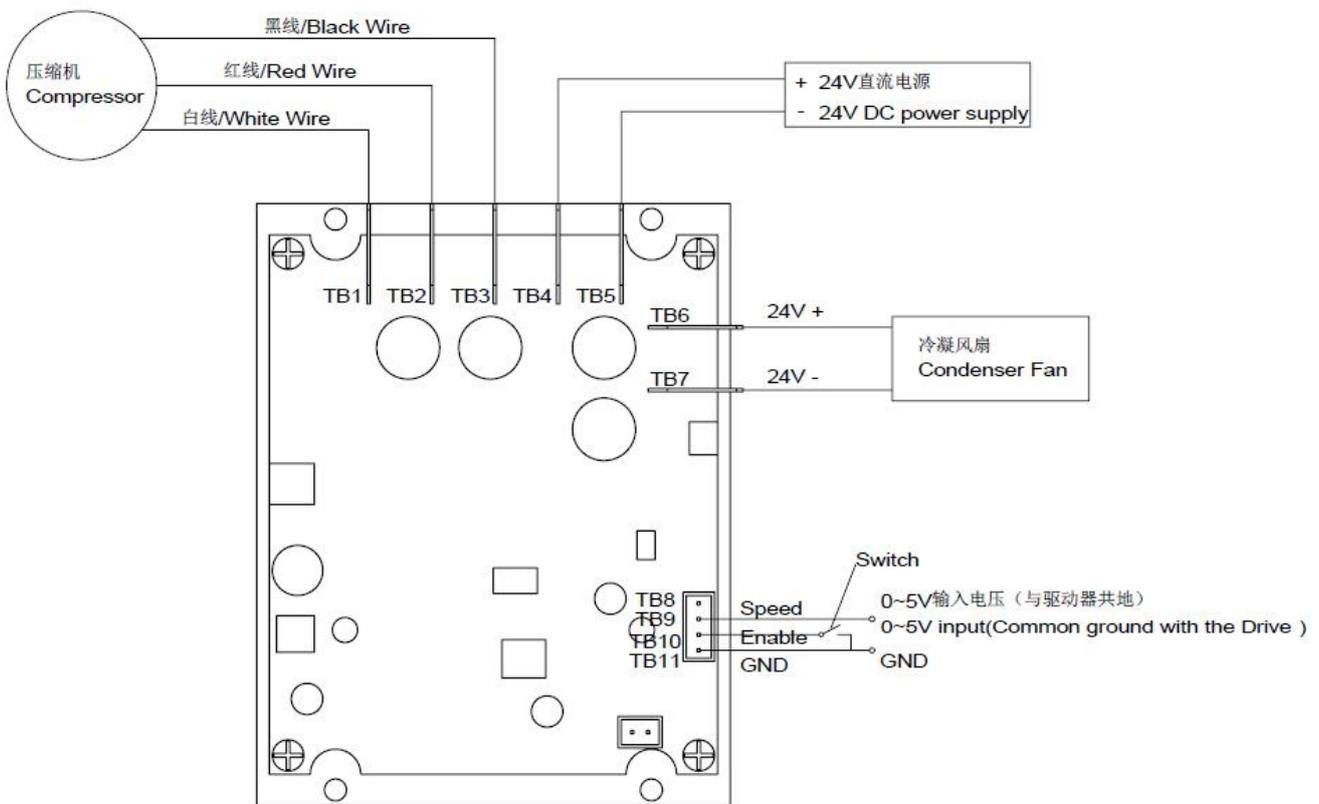
6.2 Example 2

On the basis of example 1, connect a 20K potentiometer between the +5V signal of the drive panel and the indicator signal, and adjust the compressor speed by adjusting the potentiometer, as shown in the figure below.



6.3 Example 3

Users can also use an external 0~5V voltage signal to control the compressor speed without using the +5V output voltage on the drive board, as shown in the figure below. The voltage signal must share the ground with the driver board. A switch or control program can be used to control the start and stop of the compressor by connecting or disconnecting the enable signal port TB10 and GND.



7. Notice

1. The compressor needs to be placed horizontally during operation, the maximum inclination angle cannot exceed 15°, and it cannot be inclined for a long time.
2. The compressor should not be tilted or turned upside down during storage and transportation to prevent oil overflow.
3. The compressor has been pre-filled with about 50cc of RL68H lubricating oil before

leaving the factory, which is sufficient for general refrigeration systems. For systems that have been charged and discharged with refrigerant for many times, appropriate amount of lubricant of the same type can be added as appropriate.

4. R134a must be used as a refrigerant.
5. When working, the driver should be installed in a location where it can easily dissipate heat.
6. Under any working conditions, the compression ratio of the compressor should be less than 6.
7. When the compressor starts, the pressure difference ΔP (discharge chamber pressure-suction chamber pressure) should be below 0.03MPa. After the compressor stops, you need to wait at least 30 seconds, and then start again after the pressure is balanced.
8. In order to protect the compressor, neither the rising rate nor the falling rate of the rotation speed should exceed 120rpm/s.
9. Depending on the different refrigeration system, the refrigerant charge should be between 30~90g, and the maximum should not exceed 100g.
10. The driver current should not exceed 14A, if it exceeds this value, it should stop working immediately.
11. Before charging the refrigerant, the internal pressure of the refrigeration system should be less than 20Pa, and the water content should be less than 40ppm. There should be no impurities, metal powders, and residual acids, alkalis, oils and cleaning agents in the manufacturing process in the refrigeration accessories and pipelines. During brazing, a shielding gas should be injected into the system to prevent the occurrence of oxide scale.
12. It is absolutely forbidden to operate the compressor with air or a mixture of air and working

fluid, as this may cause an explosion.

13. The suction pipe and exhaust pipe of the compressor are blocked with blind plugs, and they are allowed to be unplugged during use. After removing the blind plug, the inside of the compressor should not be exposed to the atmosphere for more than 5 minutes.
14. Before removing the blind plug, it is allowed to run the compressor directly for a short time to see if it is normal. After the refrigeration system is vacuumed, the compressor cannot be operated directly if the refrigerant has not been charged.
15. The wiring must be carried out in strict accordance with the wiring instructions, and the three phase wires of the compressor U, V and W cannot be connected wrongly. If it is connected incorrectly, the compressor may reverse and the compressor cannot be used after the reverse.
16. Do not keep the speed signal between 0.7V and 1.4V for a long time. In this interval, the compressor may be damaged due to repeated start and stop.
17. The maximum output power of the driver's 24V power supply should not be less than 300W.

8. Trouble Shooting

Symptom	Possible Causes	Method
The speed control signal is normal but the compressor does not rotate	<ul style="list-style-type: none"> • Enable signal is not grounded • Speed control voltage is lower than 1.4V • Wire is loose • Insufficient power, sudden voltage drop at startup • Compressor enters locked protection state 	<ul style="list-style-type: none"> ☞ Check the enable signal ☞ Check the speed signal ☞ Check whether the wiring sequence of the compressor and the drive board is correct and whether the wiring is loose ☞ Check the output power of the power supply; check whether the supply voltage drops below the minimum allowable voltage (especially at the moment of starting) ☞ Judge the cause of fault protection by flashing red LED
The compressor stops working instantly	<ul style="list-style-type: none"> • Drive board overheating or overcurrent protection • Wire or terminals are loose • Insufficient power supply (pay special attention to the battery) 	<ul style="list-style-type: none"> ☞ Judge the cause of fault protection by flashing red LED ☞ Check whether the wire or terminal is loose ☞ Check whether the power supply is insufficient
Compressor speed jump	<ul style="list-style-type: none"> • The drive board enters current protection mode • The drive board is close to high temperature protection 	<ul style="list-style-type: none"> ☞ Check the flashing of the LED indicator to determine the fault status
Compressor overheated	<ul style="list-style-type: none"> • The ambient temperature is too high • No air flow or insufficient air flow on the compressor surface • Return air temperature is too high 	<ul style="list-style-type: none"> ☞ Enhancing the airflow on the compressor surface ☞ Check the degree of over-heat, it is recommended to set the degree of over-heat between 4-6°C
Compressor overcurrent	<ul style="list-style-type: none"> • The condensing pressure is too high • Compressor liquid hammer 	<ul style="list-style-type: none"> ☞ Reduce condensing temperature/pressure ☞ Check the degree of over-heat, it is recommended to set the degree of over-heat between 4-6°C



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