# Specification

## Compact Liquid Chiller Module

### Model: DV3220E (24V)

# 1-Specification:

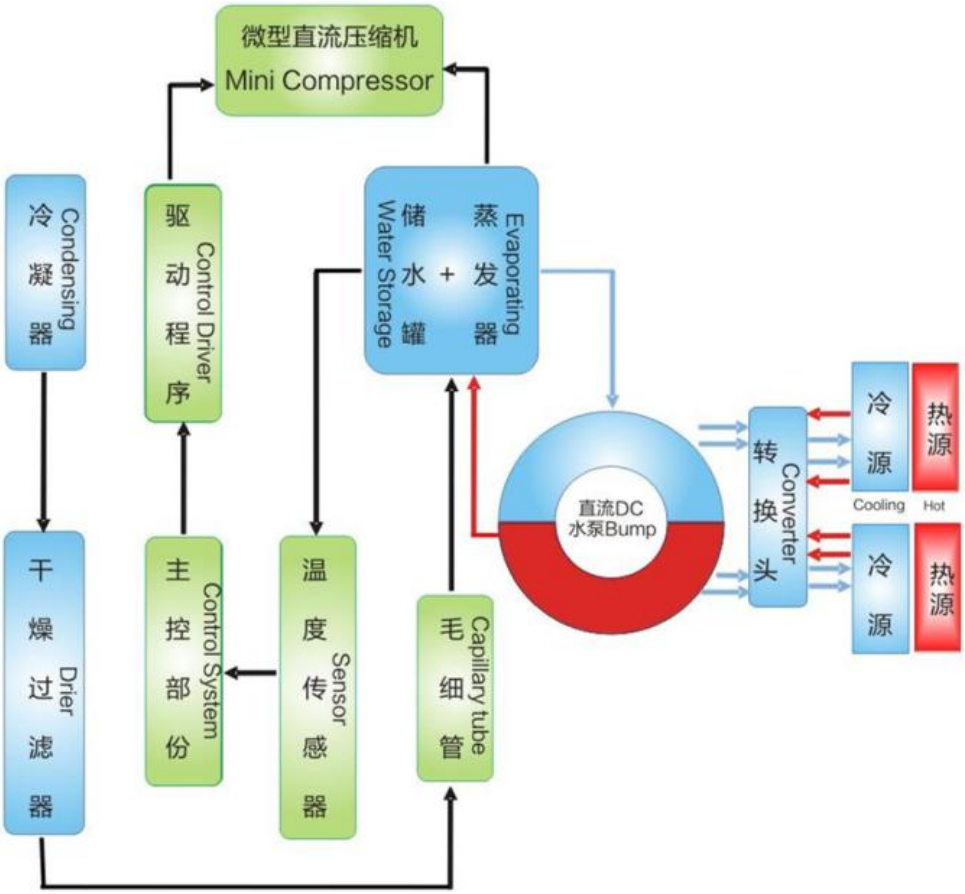
| | |
|---|---|
| Model Name | DV3220E |
| DC Compressor Model | QX3202VDL |
| Refrigerant | R134a |
| Rated Voltage | 24V |
| Voltage Range | 20 V - 32 V |
| Start-up Voltage | 20V |
| Temperature Range | -16C ~ 30C degree |
| Max Current | 12.5 A |
| Cooling Capacity | 100W~550 W |
| Capillary Tube | Φ2 * 0.8 m |
| Work Current Range | 2.1 ~ 10.3 A |
| Noise | 40↓dB(A) |
| Vibration | ≤0.65 m/s2 |
| N.W | 8.82lbs/4.0 Kgs |
| Motor Speed | 2000 ~ 4500rpm |
| Driver Board | Variable Frequency Controller |

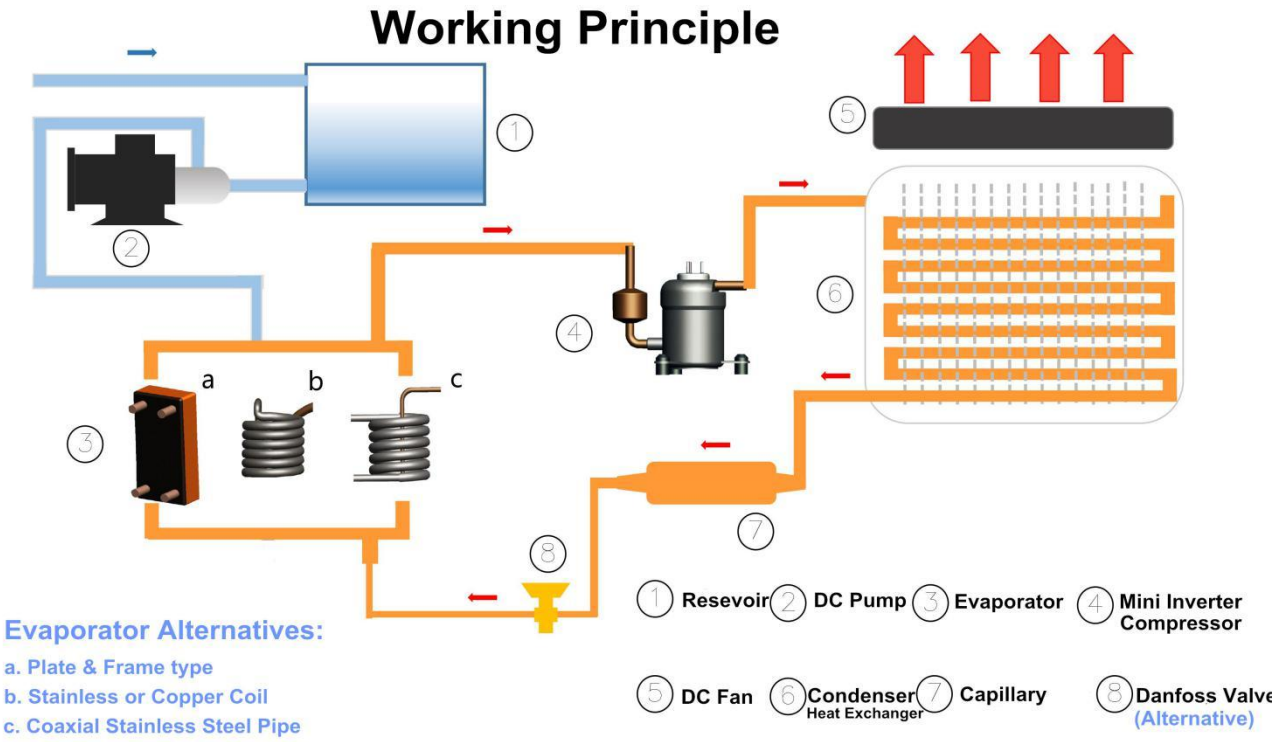
# 2-Other Parameters:

| Item | Standard | Overload | Note |
|---|---|---|---|
| Compression Ratio | ＜6 | ＜8 | Compressor will shut down for protection when temp reach to 105° degree |
| Discharge Temp | 84° degree | 105° degree | |
| Start-up Pressure | Only when system's high-low pressure under balance can operate compressor (Compressor has this built-in setting) | | |
| Water pressure test for strength and tightness (Low) | 7.45MPa (76 ㎏/㎠) | | |
| Water pressure test for strength and tightness (High) | 16.2MPa (165 ㎏/㎠) | | |
| Max Tilt Angle | 40° Degree | | |
| Compressor Protection | Controller Automatic Protection | | |

# 3. Small Water Circulating Cooling System

**The diagram are just for reference only. We're able to customize according to users' demand for whole system optimization.**






## 4. Controller Wire Connection

**A Positive wire Power " + "**

**B Negative wire Power " - "**

**① EN Switch EN, Enable terminal, reservation for EN.**

**② PWN speed control terminal (0~5V,1K~10KHz).**

**③ Fault alarm compressor failure alarm, high level-normal, low level-failure.**

**④ Connecting lines (Any direction connecting the compressor).**

**⑤ TTL communication port.**

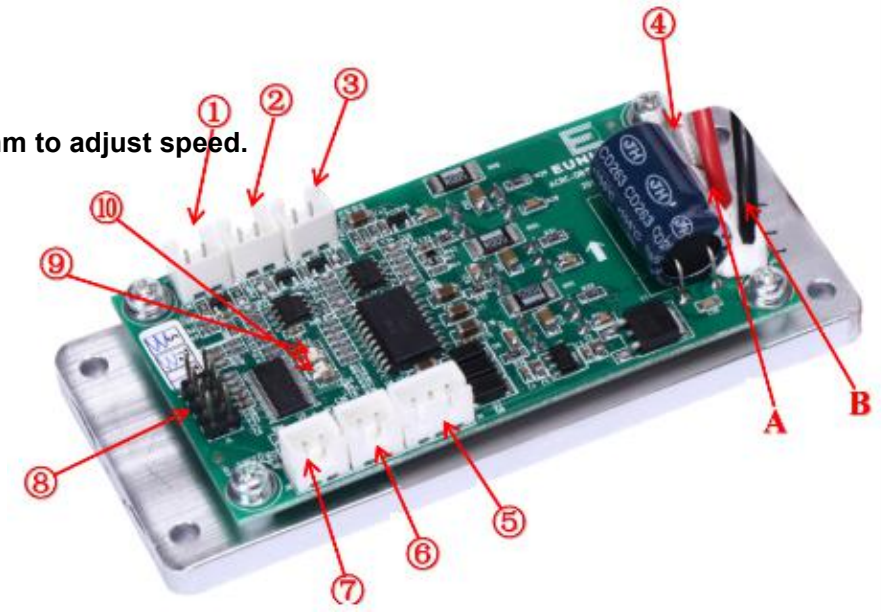
**⑥ 0~5V to adjust the speed.**

**⑦ Terminal for potentiometer with 50kohm to adjust speed.**

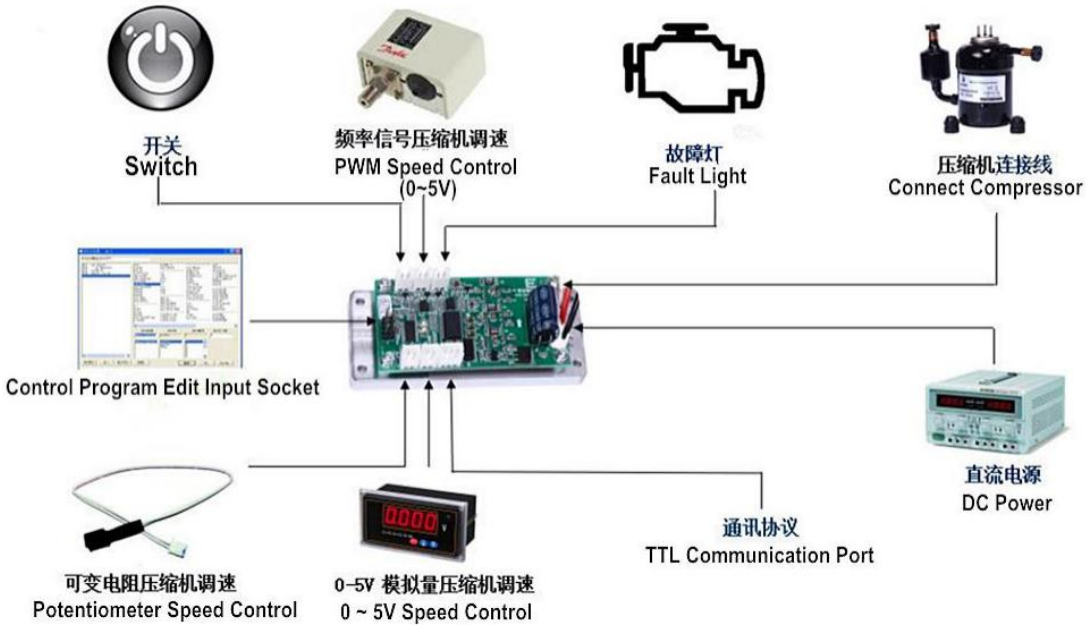
**⑧ Control program edit input socket.**

**⑨ Green LED.**

**⑩ Red LED.**



# The Driver Board Wiring Diagram




This controller has two LED lights (Red and Green), following are definitions:

| Definition of Red/Green LED indicator: | | |
|---|---|---|
| **Driver Status** | **Green LED** | **Red LED** |
| Motor Operating Normal | Green LED and Red LED blink alternately(On-0.25s,Off-0.25s) | |
| Standby | Blink(On-0.25s,Off-0.25s) | Off |
| Motor Failure | Off | Blink N times(On-0.25s,Off-0.25s), then off 2s, repeat as above cycle (N means Error Number, seen below definition.) |
| N-Number of Red LED blinks | Fault Type | State |
| 1 | Over-Current | Drive board will report over-current failure when current is over 30A. It will restore in 3 mins. Compressor needs to be restarted if current is overloaded up to 7 times within 1 hour. (1 RED LED blink) |
| 2 | Motor Stalled | Drive board will stop the output and alarm when the motor is stalled. And driver will try to restore to run 3 minute later. (2 RED LED blinks) |
| 3 | Temperature Sensor Failure | The driver will not work when disconnecting of temperature sensor is detected. (3 RED LED blinks) |
| 4 | MOSFET Over temperature | Stop the output when the temperature of MOSFET goes up to 105℃. Restore the output when the temperature of PIM goes down to 85℃. When over-temperature protection happens, the driver stops the output and then will try to restore in 3 mins. (4 RED LED blinks) |
| 5 | V_BUS Low Voltage | Drive board will alarm and stop the output when V_BUS is lower than 19V and restore when V BUS is higher than 20V and last more than 3 minutes. (5 RED LED blinks) |
| 6 | V_BUS Over Voltage | Drive board will alarm and stop the output when V_BUS is higher than 33V and restore when V_BUS is lower than 32V. (6 RED LED blinks) |
| 7 | Lack-phase | Drive board will alarm and stop the output if disconnecting between the driver and compressor. The driver will try to restore in 3 minutes. (7 RED LED blinks) |

## 5. Attentions:

1. Please check evaporator & condenser installation properly, when compressor is failed or poor refrigerating. Make sure the system is complete vacuum and no water inside. Refrigerant oil lacking also leads to poor refrigerating capacity.

2. Notice, Refrigerant oil will be released when we are charging refrigerant gas. Make sure the compressor has enough refrigerant oil (25g). Or compressor motor will face possible jammed or stuck due to oil lockage.

3. Important Functional Description:

3.1 The controller adopts analog signal control, set by communication mode. The control mode will not be saved.

3.2 Communication control mode please follows the communication protocol MODBUS RTU. (*** Details check the attached file.**)

3.3 Under analog signal control, there are 3 types of instructions: constant pressure simulation instruction, variable resistor speed and Variable frequency speed. The highest is priority. (The default input instruction is 0).

▲The corresponding relation between simulation instruction and speed is straight line. 0V-0.5V corresponds stop, it starts to work when instruction is more than 0.7V; 0.7V-5V corresponds 2000rpm ～ 6000rpm

▲The corresponding relationship between frequency instruction and speed is straight line. 300~500Hz corresponds stop and 1000Hz starts to work; 1000~10000Hz corresponds 2000rpm ～ 6000rpm

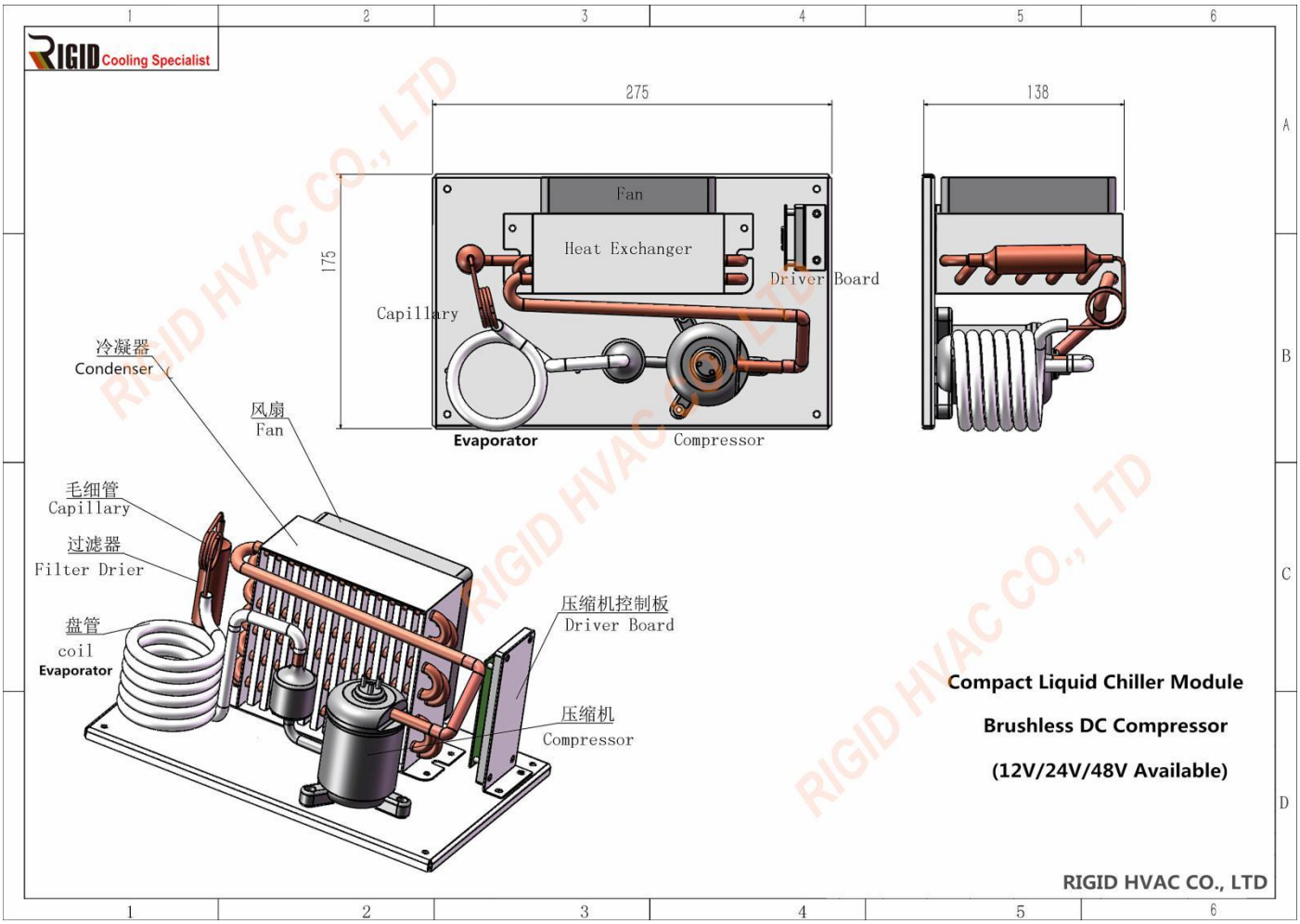
▲Variable resistance speed, 50k stops, 30k ~ 0k corresponds to 2000 RPM to 6000 RPM

# Troubleshooting

| Symptom | Possible Cause | Remedy |
|---|---|---|
| Compressor will not run when input voltage is applied | 1.On/Off switch wires are not twisted together | Keep On/Off switch wires twisted. |
| | 2.Loose wire or connection | Verify all connections between compressor and drive are in place and in the proper order. |
| | 3.Power supply too small, input voltage is not enough to start the compressor | Measure input voltage to drive board and stabilize the compressor input voltage at the rated voltage. |
| | 4.Compressor is in lock rotor condition | Check drive board for flashing red light. (2 RED LED blinks). |
| Compressor turns off intermittently | 1. Compressor overheating. | Check drive for flashing red light. When over-temperature protection happens, the drive stops the output and then will try to restore in 3 mins. (4 RED LED blinks). |
| | 2. Drive board overheating. | Check drive for flashing red light. The driver will not work when disconnecting of temperature sensor is detected. (3 RED LED blinks). |
| | 3. Loose wire or connection. | Verify all wiring connections. |
| | 4. Inadequate power supply. | Verify compressor is not drawing more power than power supply can deliver. |
| Compressor Overheating | 1. Ambient temperature too high | Increase airflow over compressor. |
| | 2. Inadequate airflow over compressor | |

# 6. Trouble Shooting Manual

| Signal | Fault Type | State |
|---|---|---|
| 1 | Over-Current | Controller will report over-current fault when current reaches 30A. It recovers after 3mins. Compressor need to be restarted if current is overloaded for 7 times within 1 hour. |
| 2 | Motor Block up | Controller will stop if motor block up, it will recover after 3mins. However, it takes 10mins to recover if motor block up 3 times continuously. |
| 3 | Temperature sensor failed | Controller won't work if temperature sensor fails to connection. |
| 4 | Inverter temperature overload | Power Module, Max temperature is 105℃， it will recover when temperature is 85℃， controller re-work after 3mins pause if temperature overloads several times. |
| 5 | Bus undervoltage | Bus will report default when voltage is less than 8.2V, controller stops. |
| 6 | Bus overvoltage | Bus will report default when voltage is over 17V and recover when voltage below 16V. Controller stop under voltage overloaded. |
| 7 | Output default phase | Compressor can't work if fails to connect the controller. Output default phase, will recover in 3mins. |

# 7. Outer Dimension:

***(275x175x138mm / 10.8x6.9x5.4 inch)***