

Air Cooled Chiller

Instruction Manual



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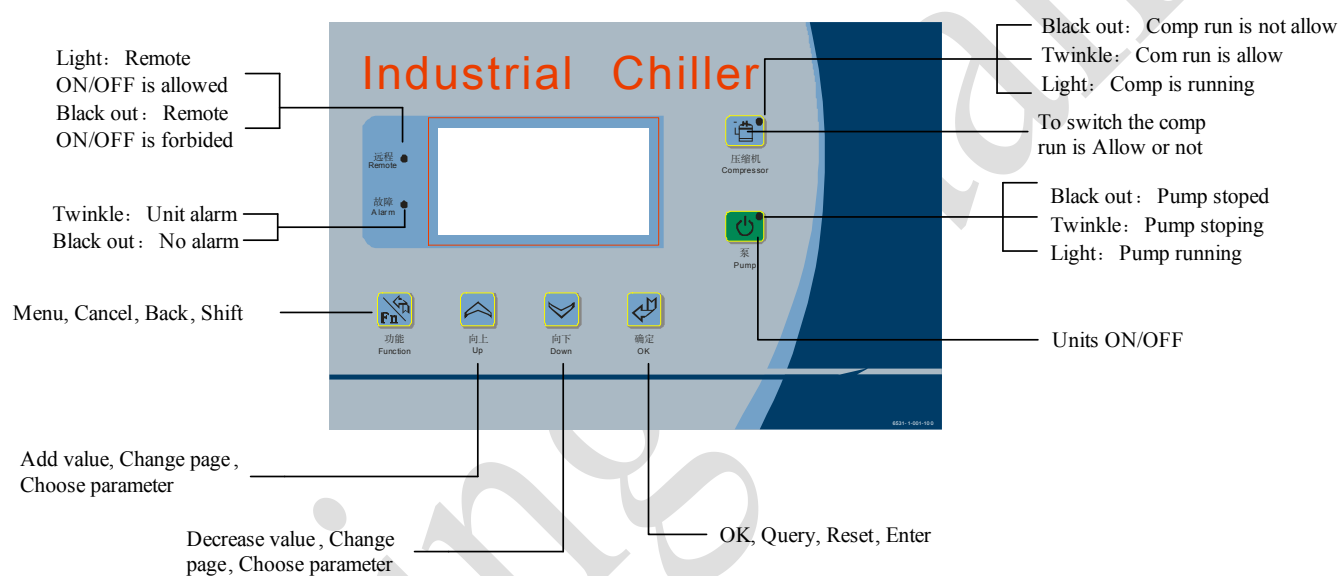
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1. Control system specifications

No.	Specification Parameter	Description	No.	Specification Parameter	Description
1	Power Supply	220V/AC±10% 50/60HZ	6	Switch Output	5 relays
2	Temperature Range	-40~100℃	7	Switch Input	12 passive signal inputs
3	Measurement Accuracy	0.1℃ @25℃	8	Analog Input	1 NTC temperature sensor
4	Working Environment	-20℃~70℃, ≤85%RH non-condensation	9	Current Input	4 ways of current (0.3~35A)
5	Storage Environment	-30℃~85℃, ≤85%RH non-condensation			

2. Panel Diagram



3. First Power-on

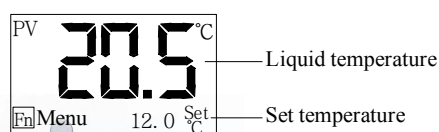
The controller needs to be configured when powered on for the first time. Please refer to 10.4 Configuration Wizard for specific operation.

4. Common Screens

Commonly used screens include the main screen and the alarm screen.

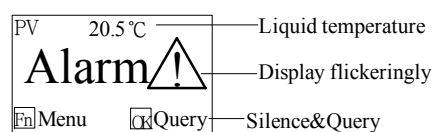
4.1 Main Screen

The system will enter the main screen after countdown, which displays as follows:



4.2 Alarm Screen

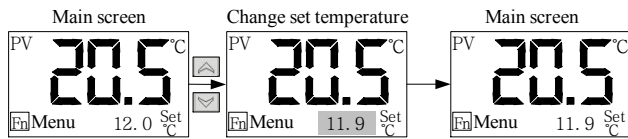
In case of unit failure, the alarm screen is as follows:



5. Common Operation

5.1 Quick Modification of Setting Temperature

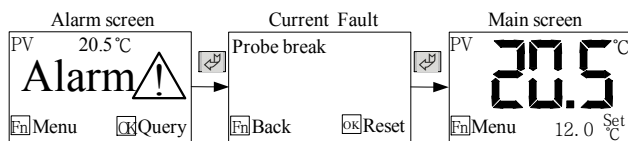
If the user parameter [Locked T.set] is set to "No", the setting temperature can be modified directly in the main screen, with operation details as follows:



Note: the setting temperature can also be modified in the user parameters.

5.2 Query/Reset Fault

In case of fault, the alarm screen will automatically pop up. The operation details of query and reset faults are as follows:



5.3 Cut over the Chinese-English quickly

Press at the same time + 3 seconds in the main screen cut over the Chinese-English quickly behind .

Note: The language establishes can also be modified in the user parameters.

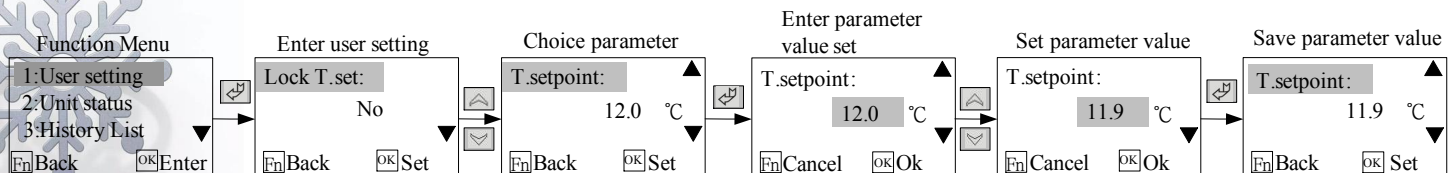
6. Function Menu

Press the button on the main screen to enter the Function Menu, which includes five items as the table below:

No.	Menu Item	Funtion	Remark
1	User Settings	To display user parameters	For number of user parameters and their implications, please refer to: 9 User Parameters Table.
2	Unit Status	To display the current operating status of the unit	Current value is not displayed when current module is not used.
3	History List	Allowing the query of the last 10 faults	Press for 2s to clear the fault history.
4	Comp Run Time	To display the cumulative operation time of the compressor	
5	Version	To check the current software version	

7. Parameter Operation

For the modification operation of parameter value, the user's modification of setting temperature will be described as an example.



8. User Parameters Table

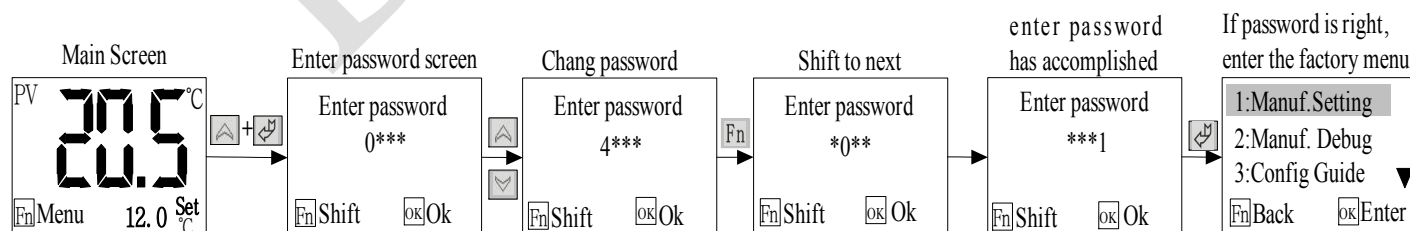
The implication of each parameter in the user parameters is listed in the following table:

No.	Parameter Name	Factory Default	Setting Range	Remark
1	Locked T.set	No	Yes ~ No	Yes: the set temperature can not be modified on the main screen when locked. No: the set temperature can be modified on the main screen.
2	T.setpoint	12.0°C	-38.0~99.9°C	Setting range is limited by the manufacturer parameters [setting upper temperature limit], [setting lower temperature limit].
3	Contrast	32	20~44	Adjust the LCD contrast
4	On/Off type	Local	Local / Local + Remote / Remote	Local: the unit can only start and stop locally. Local + Remote: the start and stop of the unit can be controlled both locally and remotely. Remote: the unit can only start and stop remotely.
5	Backlight On	0	0~255 minute(s)	0: backlight is not turned off.
6	Language	Chinese	Chinese~English	Select the display language.
7	Comp Select	Two Comp	1#Comp/2#Comp /Two Comp	Select the Comp to run.if select one comp the other does not work.The parameter is not listed for the single comp machine.

9. Manufacturer Menu

Press  +  in the main screen to enter the Enter Password screen and enter the correct manufacturer password (default 4561, which is recommended to change). Then enter the Manufacturer Function Menu, which includes five items.

9.1 Procedures of Entering Manufacturer Menu



9.2 Details of Manufacturer Menu

The details and function of manufacturer menu are shown in the following table:

No.	Parameter Item	Function	Remark s
1	Manuf.setting	To set the parameters commonly used by the manufacturer	Refer to 13 Manufacture Parameters for specific parameters.

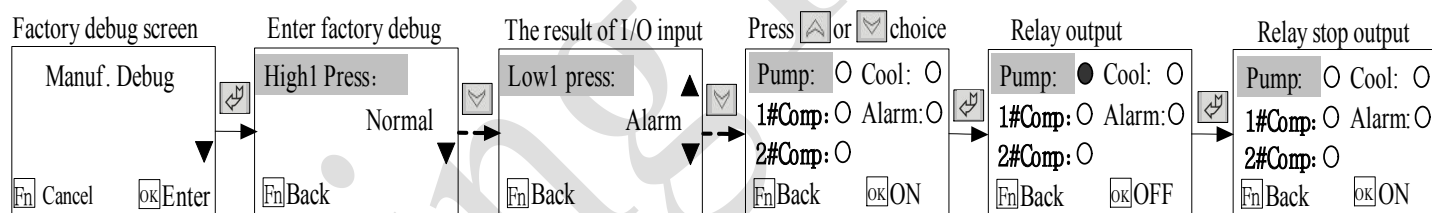
2	Manuf.Debug	To debug the abnormal operation of each electrical part of the unit	Not available during the unit operation.
3	Config Wizard	Commonly used parameters of config the unit	Not available during the unit operation. The screen will pop up when powered on for the first time.
4	Initialize	For initialize all parameters of the machine.	Refer to 10.5 Manufacture Parameters for the initial values of the parameters.
5	Password Set	To set the password to enter manufacturer menu.	The default value is 4561, which is recommended to change.

Note: Press  +  in the manufacturer menu for 2 seconds can reset the accumulative operation time of the compressor.

9.3 Manufacturer Debugging

Manufacturer debugging is mainly used to test whether the operation of each electrical part of the unit is normal, which is not available when the unit is under operation.

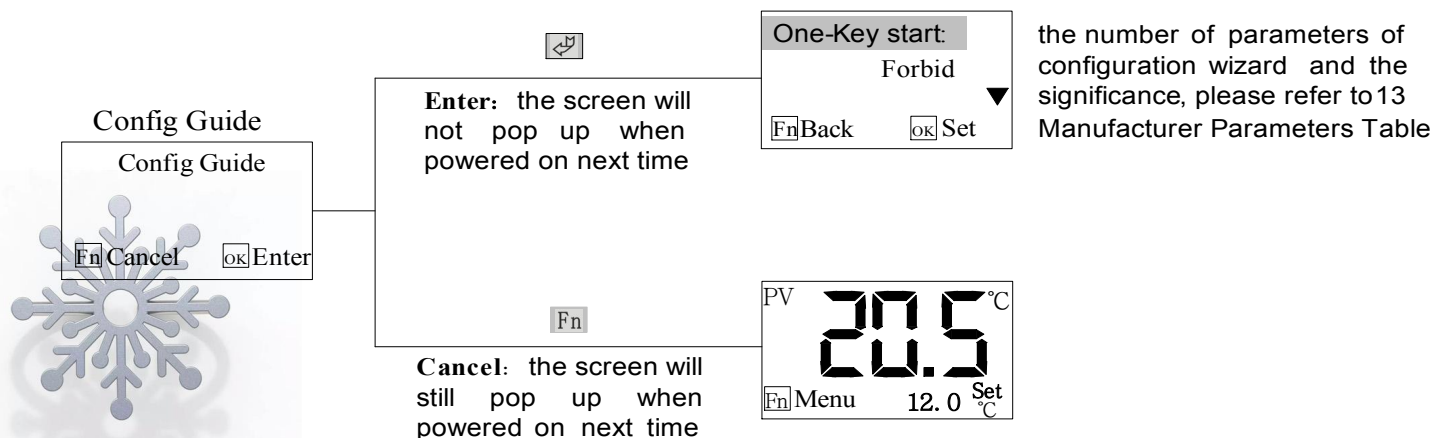
Method: to determine whether the unit is normal by testing three-phase power input, seven alarm inputs (10 alarm inputs for two compressors) and 5 relay outputs. For alarm input, it only displays the test result. If the result is normal the wiring is good and parameter settings are correct; if it alarms, with flashing display of alarm characters, then make sure whether the external wiring is good and the parameter settings are consistent.



9.4 Configuration Wizard

Configure the common parameters of the machine. For the number of parameters of configuration wizard and the significance, please refer to 13 Manufacturer Parameters Table. Access is not available during the unit operation.

Refer to the Parameter Operation for specific configuration method. The Configuration Wizard screen will pop up when powered on for the first time. And if you click “Cancel” operation without configuring at this point, the Configuration Wizard screen will still pop up when powered on next time. Once you have entered the Configuration Wizard, the Configuration Wizard screen will not pop up when powered on and you can only enter the Configuration Wizard through the Manufacturer Menu.



10. Fault List

Fault	Description	Test Conditions	Troubleshooting	Solution
1#Comp.P high	High pressure of compressor1	Test when the compressor button has pressed	Stop compressor1 only without affect other equipments to work. [Note1]	Check if the input is consistent with the switch setting.
1#Comp.P low	Low pressure of compressor1	If the [LP check delay] is 0, test when the compressor button has pressed; If the [LP check delay] is not 0, then compressor1 runs the test.		Check if the input is consistent with the switch setting.
1#Comp overload	The compressor1 overload	Compressor1 runs the test.		Check if the rated current of compressor1 is input is reasonable.
1#Comp.I high	The current of compressor1 is too high			Check if the measure tool of the compressor1 current is connect.
1#Comp.I low	The current of compressor1 is too low			Check if the input is consistent with the switch setting.
1#T.Vent high	The vent temperature of compressor1 is too high			
2#Comp.P high	High pressure of compressor2	Test when the compressor button has pressed	Stop compressor2 only without affect other equipments to work. [Note2]	Check if the input is consistent with the switch setting.
2#Comp.P low	Low pressure of compressor2	If the [LP check delay] is 0, test when the compressor button has pressed; If the [LP check delay] is not 0, then compressor2 runs the test.		Check if the input is consistent with the switch setting.
2#Comp overload	The compressor2 overload	Compressor2 runs the test.		Check if the rated current of compressor2 is input is reasonable.
2#Comp.I high	The current of compressor2 is too high			Check if the measure tool of the compressor2 current is connect.
2#Comp.I low	The current of compressor2 is too low			

2#T.Vent high	The vent temperature of compressor2 is too high			Check if the input is consistent with the switch setting.
Temp.low AL	The liquid temperature is too low	Test after cold pump starts	Stop the compressor and delay to stop the cool pump, and do not stop the cold pump.	Check if the Liquid temperature is lower than the set temperature of Liquid protection.
T.high warn	The liquid temperature is higher than the warn value.		Alarm only without affect other equipments to work.	Check if the Liquid temperature is higher than the set temperature of Liquid warn.
Temp.high AL	The liquid temperature is too high		Stop the compressor and delay to stop the cool pump, and do not stop the cold pump.	Check if the Liquid temperature is higher than the set temperature of Liquid protection.
Anti-freez.AL	Antifreeze alarm	Power on to test	Stop all the compressor and cool pump, and do not stop the cold pump.	Check if the antifreeze input is consistent with the switch setting.
Probe break	The liquid temperature sensor is break			Check if the temperature probe is in proper contact.
Probe short	The liquid temperature sensor is short			
cool fan overload [Note3]	The cool pump or fan overload	Test after Cool pump starts	Stop compressor1 and cool pump or fan only	Check if the fan1 overload input is consistent with the switch setting.
Cool.I high	The current of cool pump or Fan is too high			Check if the rated current of cool is input is reasonable.
Cool.I low	The current of cool pump or Fan is too low			Check if the measure tool of the cool current is connect.
Cool W.flow AL	Lack of cool water flow	Test after the cool pump starts for [Cool on delay] time	Stop compressor1 and cool pump or fan only	Check if the cool water flow input is consistent with the switch setting.
Cold W.flow AL	Lack of cold water flow	Test after the cold pump starts for [Pump on delay] time	If the [Lack of liquid] is set "Pump keep", Stop compressor and cool pump in case of fault. If the [Lack of liquid] is set "Pump stop", Stop the unit in case of fault.	Check if the cold water flow input is consistent with the switch setting.
cold pump overload [Note3]	The cold pump overload	Test after cold pump starts	Stop the unit	Check if the cold pump overload input is consistent with the switch setting.

Pump.I high	The current of cold pump is too high			Check if the rated current of cold is input is reasonable.
Pump.I low	The current of cold pump is too low			Check if the measure tool of the cold current is connect.
Phase AL	The three-phase power input is alarm	Power on to test	Stop the unit	Check if there is default phase or anti-phase in the three-phase power input and if the switch is correct.
Water level AL	The water level is low	Power on to test	If the [Low liquid lv] is set "Pump keep", Stop compressor and cool pump in case of fault. If the [Low liquid lv] is set "Pump stop", Stop the unit in case of fault.	Check if the water level input is consistent with the switch setting.
Need Maintain	The total time of compressor run over the allow value	Test after cold pump starts	The unit cannot start once stops (the accumulative operation time of compressor exceeds the set value).	

[Note 1]: In case of "1#Comp.P low " fault, if [LP stop pump] is not zero, the troubleshooting program is: to immediately stop all compressors and cool pump, delay the [LP stop pump] and stop the cold pump. If [LP stop pump] is zero, then the troubleshooting program is: to only stop compressor1 without affect other equipments to work.

[Note 2]: In case of "2#Comp.P low " fault, if [LP stop pump] is not zero, the troubleshooting program is: to immediately stop all compressors and cool pump, delay the [LP stop pump] and stop the cold pump. If [LP stop pump] is zero, then the troubleshooting program is: to only stop compressor2 without affect other equipments to work.

[Note3]:

Machine type	Cold Pump Overld	Cold Pump Overld
fan-cooled water chiller	Cold Pump Overld	Cool Fan Overld
water-cooled water chiller	Cold Pump Overld	Cool Pump Overld
fan-cooled fan cooler	Cold Fan Overld	Cool Fan Overld
water-cooled fan cooler	Cold Fan Overld	Cool Pump Overld

11. Control

Double compressor but select only one / Single compressor:

The heating process, the compressor ON when $PV \geq SV + ADD$.

The cooling process, the compressor OFF when $PV < SV - SUB$

Double compressors:

a) If [Unload offset] is not 0

The heating process, one compressor ON when $PV > SV$ and two compressors ON when $PV \geq SV + ADD$.

The cooling process, if two compressors ON currently, one compressor OFF when $PV < SV$ and two compressors OFF when $PV < SV - SUB$. If compressor ON currently, the compressor OFF when $PV < SV - SUB$.

b) If [Unload offset] is 0

The heating process, one compressor ON when $PV \geq SV + ADD$; after the time of [Capacity ctrl], if $PV \geq SV + ADD$ remains, two compressors ON.

The cooling process, the compressor OFF when $PV < SV$.

Note: PV: The liquid temperature SV: set temperature
ADD: load temperature difference SUB: unload temperature difference

12. Maintenance

Whichever program you use, here are 5 maintenance tips that apply to most centrifugal chillers, to help maintain high efficiency:

12.1. Keep tubes clean for efficient heat transfer

Heat transfer efficiency has the greatest single effect on chiller performance, so clean heat transfer is fundamental to maintaining high efficiency. Contaminants such as minerals, scale, mud, algae and other impurities increase thermal resistance and reduce overall performance. Approach temperatures are a good indicator of heat transfer efficiency. Higher approach temperatures are prime indicators that heat transfer efficiency is decreasing. Condenser tubes should be brush cleaned at least annually, or per your demand maintenance schedule to keep them free of contaminants.

12.2 Treat condenser water to prevent scale, corrosion

All condenser water loops using open cooling sources (such as atmospheric cooling towers) require water treatment of some sort to eliminate scale, corrosion and biological growth. All lead to fouling in the condensers and impede heat transfer and can decrease tube and piping effectiveness. Inspect chilled water loops once a year or regularly with remote monitoring for general water quality and evidence of corrosion.

12.3 Lower entering water temperature

Lowering the temperature of the entering condenser water will improve the chiller's efficiency. On some building systems, the operator will lower the chilled water set point to overcome air handler deficiencies such as dirty coils. This cures the symptom but not the problem, and makes the chiller work harder for the same net cooling effect.

12.4 Maintain adequate refrigerant charge

The actual amount of cooling a chiller provides depends on how much refrigerant it moves through the compressor. It is important to maintain the proper level of refrigerant for the conditions desired. Refrigerant leaks, as well as air and moisture introduced into the system, will decrease efficiency and the reliability of the system. A low refrigerant charge will cause the compressor to work harder for less cooling effect.

12.5 Check operation of starters and motors

For efficient operation of starters and motors, check the safety and sensor calibrations on microprocessor controls (consult manufacturer's guidelines). Then, check electrical connections, wiring, and switchgear related to the chiller for hot spots and worn contacts. To prevent insulation faults, test electrical motor windings for insulation resistance to ground and winding-to-winding. Check the shaft seal of open drive motors for possible refrigerant leaks, and clean motor cooling air vents to ensure maximum cooling effect.

13. Manufacturer Parameters Table

Parameters set by the manufacturer and parameter meanings are listed as follows: ("*" is for parameters of the configuration wizard)

Setting Item	Name of Parameter	Factory Default	Setting Range	Remark
Control Settings	*One-Key start	Forbid	Forbid ~ Use	Forbid: the compressor is allowed to ON only when press the compressor button; Used: the compressor allows ON when press the pump button.
	Auto start up	Forbid	Forbid ~ Use	Use: the unit starts automatically when powered on; Forbid: the unit doesn't start automatically when powered on; When the user parameter [On/Off type] is set to be "Remote", the electrical autostart is invalid.
	Alarm output	Keep when mute	Keep when mute; Stop when mute	Keep when mute: press the "alarm output" parameter to take action once a fault occurs; Stop when mute: press the "alarm output" parameter to take action in case of no fault after silencing.
	Alarm type	N.O	N.O~N.C	N.O: the alarm relay is ON in case of faults; N.C: the alarm relay is OFF in case of faults.
	DI5 fuction	Water switch	Water switch; Vent1 temp	Water switch: DI5 input for water level detection Vent1 temp: DI5 input for Vent1 temperature detection
	DI9 fuction	Phase swtich	Phase swtich; Vent2 temp; Cool W.flow	Phase swtich: DI9 input for phase sequence detection Vent2 temp: DI9 input for Vent2 temperature detection Cool W.flow: DI9 input for cool water flow detection
	*Low water lv.	Pump stop	Pump stop ~ Pump keep	Pump stop: stop the cold pump in case of low water level fault; Pump keep: do not stop the cold pump in case of low water level fault.
	*Lack of water	Pump stop	Pump stop ~ Pump keep	Pump stop: stop the cold pump in case of cold water flow fault; Pump keep: do not stop the cold pump in case of cold water flow fault.
	*Current detect	Use	Forbid ~ Use	Use: there is a current detection module; Forbid: no current detection module

	*1#Comp.I rating	0.3A	0~35.0A	0A: do not detect the current fault. When [Current detect] is set "Forbid", those parameter is not displayed.
	*2#Comp.I rating	0.3A	0~35.0A	
	*Pump. I rating	0.3A	0~35.0A	
	*Cool. I rating	0.3A	0~35.0A	
	*Phase monitor	On_board	On_board; Forbid; IO_input	Onboard: use the controller's own three-phase power protection; Switch input: use an external three-phase power protection. (The external three-phase power protection can only be used when [DI9 fuction] is set "Phase swtich" .) Forbid: do not use three-phase power detection function.
	DI1 input opt	Cool overload	Cool overload; Anti-freezing	Selection of switch DI1 input function
	*Comp number	2	1~2	Selection of the number of compressor
	*Machine type	AIR-WATER	4 machine models in total	Four models: fan-cooled water chiller, water-cooled water chiller, fan-cooled fan cooler and water-cooled fan cooler
Temperature Settings	Load offset	1.0℃	0~10.0℃	Temperature deviation of load the compressor
	Unload offset	1.0℃	0~10.0℃	Temperature deviation of unload the compressor
	T.setpoint max	30.0℃	-38.0~99.9℃	To limit the temperature of user set.
	T.setpoint min	5.0℃	-38.0~99.9℃	
	T.bias	0.0℃	-9.9~9.9℃	Compensation for the liquid temperature
	T.low protect	4.0℃	-40.0~99.9℃	Fault of "Temp.low AL" warning is reported when the liquid temperature is lower than the set value.
	T.high warn	50.0℃	0~99.9℃	Fault of "Temp.high warn" warning is reported when the liquid temperature is higher than the set value.

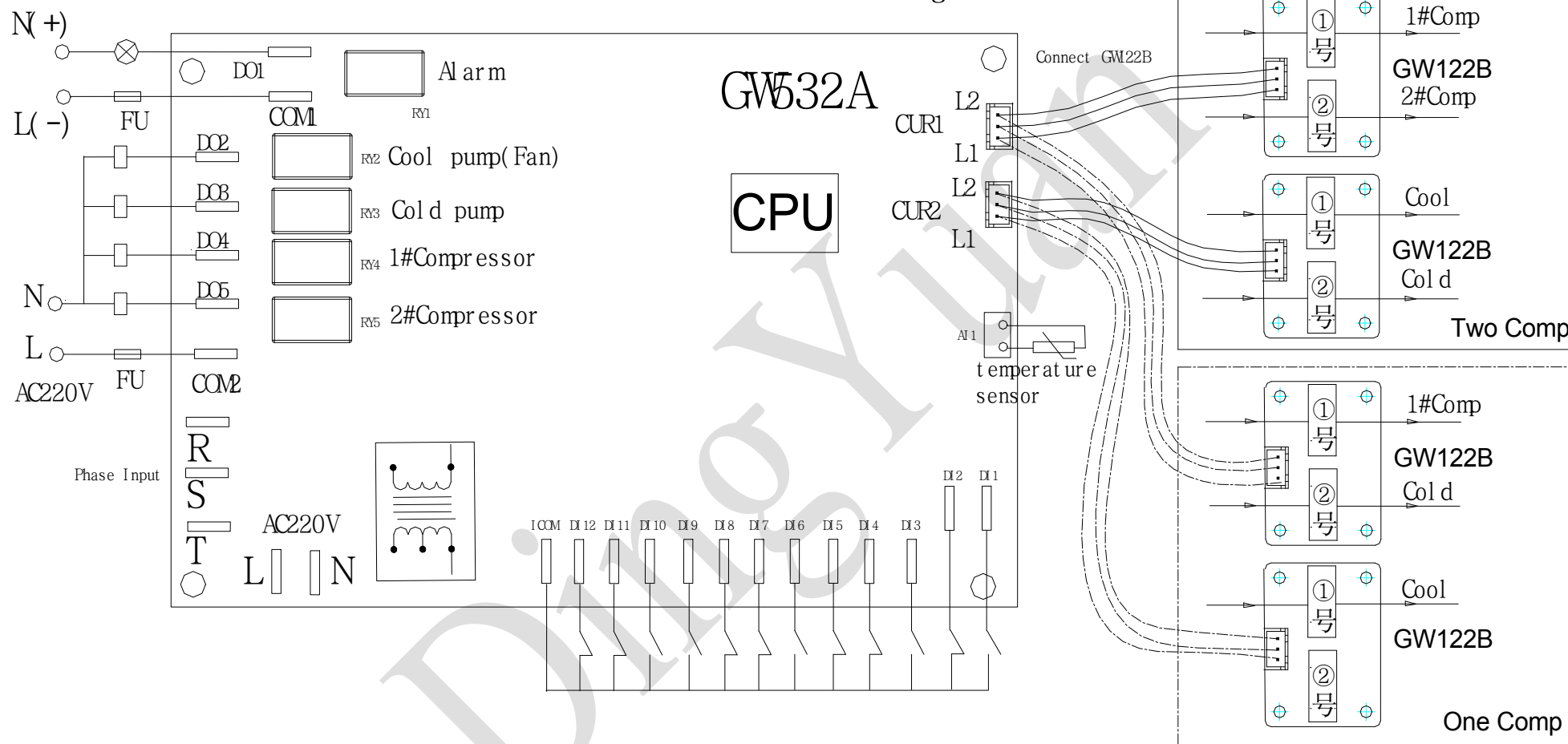
	T.high alarm	60.0℃	0~99.9℃	Fault of “Temp.high AL” warning is reported when the liquid temperature is higher than the set value. And Stop the compressor and delay to stop the cool pump.
	T.high reset	5.0℃	0~99.9℃	If liquid temperature<[T.high alarm]–[T.high reset], manual reset of “Temp.high AL” fault is allowed; If liquid temperature<[T.high warn]–[T.high rese], the “Temp.high warn” fault is automatically reset;
Time Settings	Pump on delay	10 S	1~255 S	Delay after cold pump startup.
	Cool on delay	10 S	1~255 S	Delay after cool pump startup.
	Capacity ctrl.	5 S	0~255 S	Control the compressor ON/OFF every [Capacity ctrl.] interval time; For double-compressor control, if the conditions of two compressors ON are satisfied, then one of the compressors ON and the other after the time of [Capacity ctrl.].
	Comp protect	60 S	0~255 S	To avoid frequent ON/OFF the compressor, the interval between the start of two compressors must be greater than the set value.
	Input stable	2 S	0~255 S	The time General fault stable.
	W.flow stab.	5 S	0~255 S	It is considered to be valid only when the water flow alarm continue for the time.
	LP detect dly	60 S	0~255 S	Compressor low-pressure fault input is allowed only when the compressor has run for the set time.
	LP stable	5 S	0~255 S	Low-pressure fault stable time
	LP stop pump	0 S	0~300 S	0: the parameter has no effect . Non-0: in case of low pressure fault of the compressor, immediately stop all compressors and cool pump, delay the [LP stop pump] and stop the cold pump.
	Comp operation	0 H	0~9999 H	0: this parameter has no effect. Non-0: the compressor cannot start when the accumulative operation time is greater than the set value.
	Comp shift	0 Min	0~255 H	0: the parameter has no effect ; Non-0: a compressor will automatically switch to another after it has run continuously for that time.

	1#Comp.I avoid	8 S	3~255 S	The current fault of 1#compressor can only be detected after 1# compressor has started for the set time. (When the [Current detect] is set “forbid”, the parameter is not displayed.)
	2#Comp.I avoid	8 S	3~255 S	The current fault of 2#compressor can only be detected after 2# compressor has started for the set time. (When the [Current detect] is set “forbid”, the parameter is not displayed.)
	Pump. I avoid	8 S	3~255 S	The current fault of cold pump can only be detected after it has started for the set time. (When the [Current detect] is set “forbid”, the parameter is not displayed.)
	Cool. I avoid	8 S	3~255 S	The current fault of cool pump can only be detected after it has started for the set time. (When the [Current detect] is set “forbid”, the parameter is not displayed.)
Switch Settings	*Freez overload	N.O	N.O ~ N.C	Selection of switch input mode N.O: switch off with no fault; N.C: the switch is closed with no fault.
	*Cold W.flow	N.C	N.O ~ N.C	
	*W.level switch	N.C	N.O ~ N.C	When [DI5 fuction] is " Vent1 temp", it is the place for N.O and N.C settings of vent1 temperature detection.
	*Comp overload	N.O	N.O ~ N.C	Selection of switch input mode N.O: switch off with no fault; N.C: the switch is closed with no fault.
	*Low pressure	N.C	N.O ~ N.C	
	*High pressure	N.O	N.O ~ N.C	
	*Phase error	N.O	N.O ~ N.C	When [DI9 fuction] is " Cool W.flow", it is the place for N.O and N.C settings of cool water flow switch. When [DI9 fuction] is "Vent1 temperature", it is the place for N.O and N.C settings of vent1 temperature detection.
	*Cool overload	N.C	N.O ~ N.C	When [DI1 input opt] is " Anti-freezing", it is the place for N.O and N.C settings of antifreezing switch.

[Note]: remote switch, if the remote control is used, the unit will start up when remote switch input is closed and stop when remote switch input is disconnected.

14. Electrical Connection Diagram

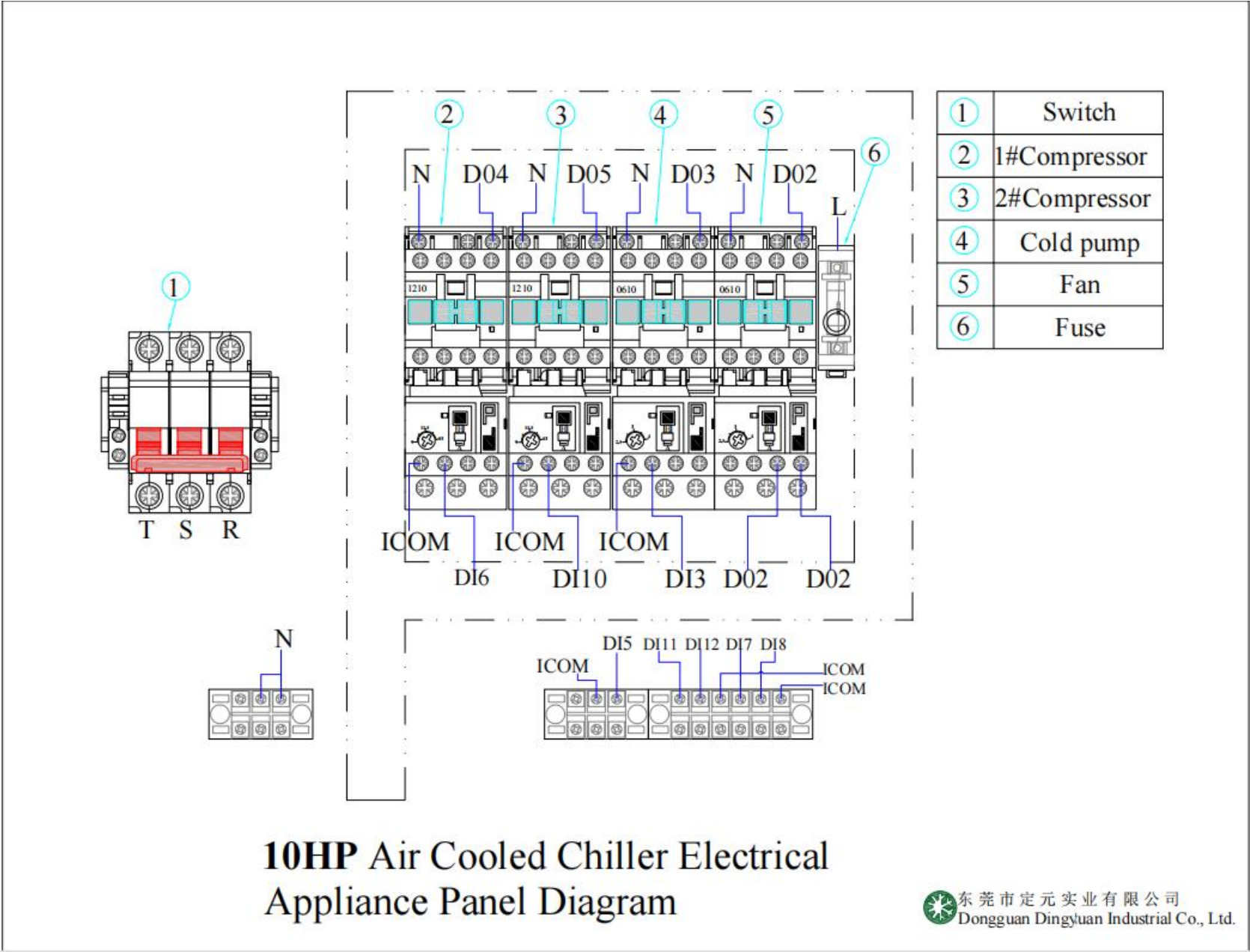
X1. GW532A TY. F01M Electrical Connection Diagram



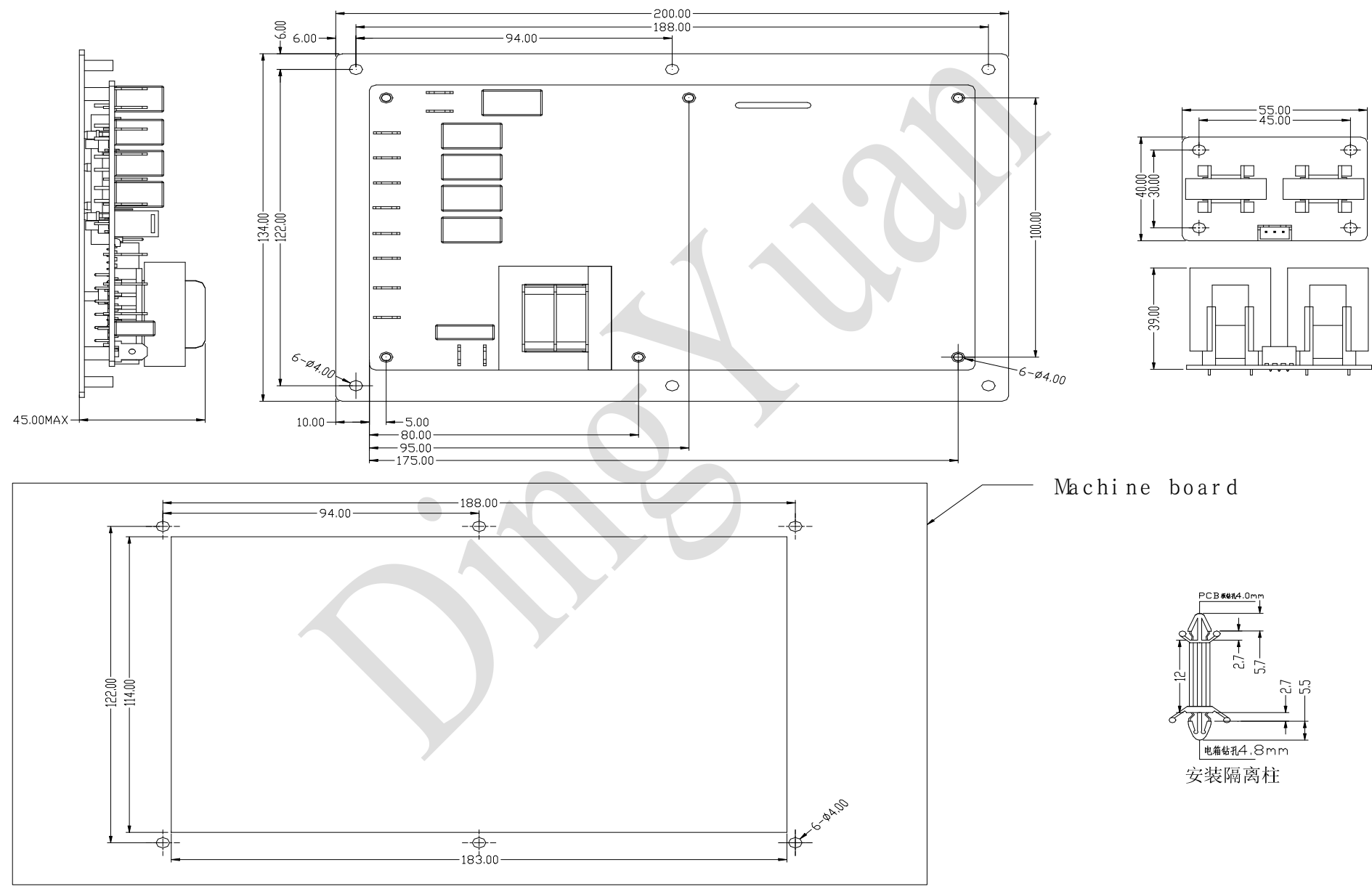
DI1: Cool overload/ Antifreezing switch
 DI2: Remote switch
 DI3: Cold Pump overload
 DI4: Cold Water flow switch
 DI5: Water level switch/ Vent 1 temperature
 DI6: 1#Compressor overload

DI7: Low pressure of 1#compressor
 DI8: High pressure of 1#compressor
 DI9: Cool flow switch/ Vent 2 temperature/ Phase switch
 DI10: 2#Compressor overload
 DI11: Low pressure of 2#compressor
 DI12: High pressure of 2#compressor

15. Electrical Appliance Panel Diagram



16. Installation Dimensions



17. The Guarantee of equipment

All equipment sold by **Dongguan Dingyuan Industrial Co.,Ltd** to _____.
provide one year warranty. Within 1 year from the date of equipment opening day or shipping the equipment day(whatever occurs first.).

1. **Within this guarantee period, except the situation listed in the Sixth, Labor cost and spare parts cost are payment by the Supplier.**

2. **Unscheduled maintenance during the guarantee period.**

- 1) we will send technical personnel to check the system operation.
- 2) Arrange some necessary examined, checked, and routine maintenance.

3. **Dongguan Dingyuan Industrial Co.,Ltd provide response-- 24 hours a day. Response content:**

- 1) According to the customer's specific requirements, the professional engineer provide solutions.
- 2) Know the fault condition.
- 3) Methods to solve the problem.
- 4) Notify professional engineers to arrive at the site for repair time: Unless anything turns up, engineers rushed to the scene within 12 working hours of the city. Arrived to the scene within 48 working hours in other provinces. Mutual agreements the time in long-distance customers.
- 5) This service is for 24 hour, 7 days a week, 365 days a year.

4. **After commissioning, providing basic operation/ maintenance training for user maintenance personnel.**

5. **After this guarantee period, Dongguan Dingyuan Industrial Co.,Ltd promises that will provide a pay-needed maintenance service for life. A variety of service methods for users to choose.**

- 1) After the expiration of this guarantee period, the user's demand for spare parts is provided by the **Dongguan Dingyuan Industrial Co.,Ltd** in the establishment of the customer service center. The spot supply does not exceed two weeks of delivery; the futures delivery period does not exceed 3 months, and the arrival notice is available before arrival.

2) **Dongguan Dingyuan Industrial Co.,Ltd** are provided to the user at a preferential price of original spare parts, to ensure the accuracy and supporting for the products, and the spare parts purchased by the customer

are guaranteed for 6 months.

3) Freely provide the technology information and provide information on new products of the **Dongguan Dingyuan Industrial Co.,Ltd.**

6. The free guarantee during the guarantee period does not include the following:

- 1) Failure caused by human accident or abuse due to improper use or inadvertent use;
- 2) The seller shall not be held liable for any problem in consequence of any Force Majeure incidents(Such as: typhoon, floods, fire, and earthquake, etc.)
- 3) Losses due to third party installation, wiring, repair and exchange;
- 4) Failure due to commissioning of not Dongguan Dingyuan Industrial Co.,Ltd engineer.
- 5) Due to the use of spare parts repair equipment not provided by our company, which causes equipment failure or equipment performance does not meet design specifications.

This guarantee shall become effective upon signing and sealing of the Dongguan Dingyuan Industrial Co.,Ltd.

Dongguan Dingyuan Industrial Co.,Ltd.

2024.01

