

Industrial Chiller

Global well-known industrial refrigeration equipment manufacturer



Let's Freeze The Industry!

Installation and operation manual



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In order to use the chiller correctly and efficiently, please read the following instructions in detail.

Please note: In order to avoid water freezing to damage the chiller, please make sure the temperature of water in the condenser and evaporator is above 1 degree Celsius.

Water/fluid in the condenser and evaporator must be drained completely when not in operation for extended periods.

I. Unit installation requirements

1.1 Installation

1. Put the chiller unit in a steady, ventilated and easy-installation place, avoid corrosion, pollution and weather-beaten.

2. Choose the proper cooling tower to match the chiller unit.

3. Pipeline should be installed according to the dimension of the chiller. Do not reduction the size of the hose, or it will affect the refrigeration effect and increase the power consumption.

4. The chiller unit must be installed more than 1 meter away from the wall, so that it is easy to install, maintain and adjust.

Remarks:

(1) Power source load and the grounding parts should be installed in accordance with the relevant construction regulations.

(2) The new installed refrigerating pipe should be covered with insulating layer.

1.2 Pipes connecting

Connect the chilled and cooling pipes after installing the chiller unit. The pipe should have enough deformation allowance and self-supporting, avoid the chiller unit subjected to deformation or vibration, have piping support and keep straight. A anti-vibration pad will be perfect.

1.3 Water-quality control

There will be scale, sand and other sediment in shell & tube evaporator if the water is not good, it will reduce the water flow, affecting heat exchange efficiency, even lead to freeze. Therefore, we suggest to filter the water in inlet, to soften the water will be perfect if you can

II. Operation method

For the first time to operate the machine, please confirm the following items

1. Check the nameplate to confirm the power supply and phase is correct.

(Note: 3 phase 4 wire is adopted, the phase line is R、S、T of the power 380V~415V/50HZ, N—neutral line, E- earth wire (double colored)

2. The voltage fluctuation of the power source should be $\pm 10\%$ and Voltage imbalance should be $\pm 2\%$.

3. Confirm the chilled water circulating hose connect to the pipeline, and the valves keep open. (Please

refer to the installation sketch map.)

4. Full fill the water or other secondary refrigerant in the water tank then start the pump; (Note: please choose the secondary refrigerant according to the requirement.)

5. Connect control circuit

(1) Connect the chilled pump, cooling pump, AC contactor control line of the cooling tower and water flow switch to the chiller electronic control system correctly. (The chiller control system has the output to control the chilled pump, cooling pump and tower. The user can control these systems through chiller or by the separate water cycle control system.)

(2) Turn on the power source 8 hours before start the chiller and keep it on during working days, to heat the compressor heating tape during it's off and volatilize liquid in compressor to eliminate the harmful effect to compressor.

(3) The chiller must be fitted with a reliable grounding

6. Pay attention to the running direction of the pump (if the pump is 3phase power and running reversely, please swap any two of the 3 phases, turn on the switch after connected well.)

III. Debugging and commissioning

After the installation, piping system connections, wiring connections, now entering debugging stage. All the related work should be done by qualified personnel only

Note:

The chilled pump, cooling pump, and cooling tower are controlled by chiller unit. Before debugging the system, it is prohibited to trial run the pumps by chiller, you can trial run them by connecting wire temporarily.

3.1 Machine-check before debugging

1. Installation inspections: check if the installed position, environment, maintenance space meet compliance requirements.

2. Water system inspections:

(1) Check if the thermal insulating of chilled water pipe and water quality situations meet compliance requirements.

(2) Check if the status of pump flow rate, globe valves, filter, drain valve, vent valve and flow switch meet compliance requirements.

(3) Check the pressure gauge and thermometer to see if the value to meet compliance requirements.

3. Wiring connection checks: Make sure the power supply is same as the required before installation. After wiring connections, please inspect according to the following steps.

(1) Check if the wire connections and breaker's spec. is correct.

(2) Check if installation of the circuit is correct.

(3) Check the security interlocks functions are working correctly.

(4) Check the electrical components and wires' insulates

(5) Check if the control unit and the initial value setting of protective elements are meet the requirements.

3.2 Testing and operation

1. Make sure give the power to the chiller first (don't start it), to preheat the compressor not less than 30 minutes.

2. Please adjust the flow control valve to make the flow rate meet the demands for utilization.

3. Please check error recording through the PLC, if you find still have error, check and clear it.

4. Start the unit when you confirm all settings are correct.
5. After starting the chiller, should check the rotation direction of compressor, if it is reversed, adjust the two wires in power line. Check the compressor oil through liquid lens to see if it keeps the correct oil level.
6. Testing run the chiller 30 minutes, set the temperature according to the actual conditions, make sure the chiller runs normally. Start again after it stop for 3 minutes, avoid starting frequently. Check all settings, testing is completed.

Note!

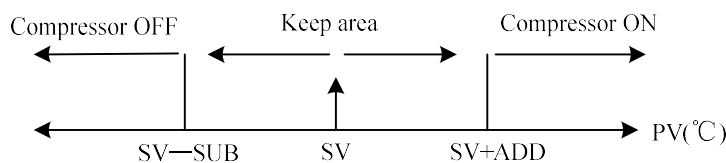
1. Don't start the chiller when washing the water system.
2. Don't start the chiller if the water system venting is not fully.

IV. Operation sequences

1. First open the pipe valves of frozen、cooling that to ensure the waterway unimpeded.
2. Turn on the power switch.
3. When the cooling tower and cooling pump out of control in main engine, please turn on the cooling tower and cooling pump first to ensure the normal cycle of cooling water.
4. After stand ready, press the "ON/OFF" button to start in operation panel, Chiller running automatically. Then press this button again to power off.
5. When the heating button, the compressor stops working, delay after the start of heating (Cold-hot dual-purpose machine has this function)
6. Single refrigeration heating stopped, automatic operation of the unit (Cold-hot dual-purpose machine has this function)
7. Independent heating, operation panel compressor to enable, prevent overheating (Cold-hot dual-purpose machine has this function)
8. Automatic operation, enable the heating and cooling at the same time, and the panel operation to enable, delay unit automatically (Cold-hot dual-purpose machine has this function)

V. Control principle

5.1 Single compressor:



Control logic:

The increase temperature process, the compressor ON when $PV \geq SV + ADD$.
 The decrease temperature process, the compressor OFF when $PV < SV - SUB$

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

5.2 Double compressors:

1.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 $PV < SV - SUB$.

2. If [Unload offset] is 0

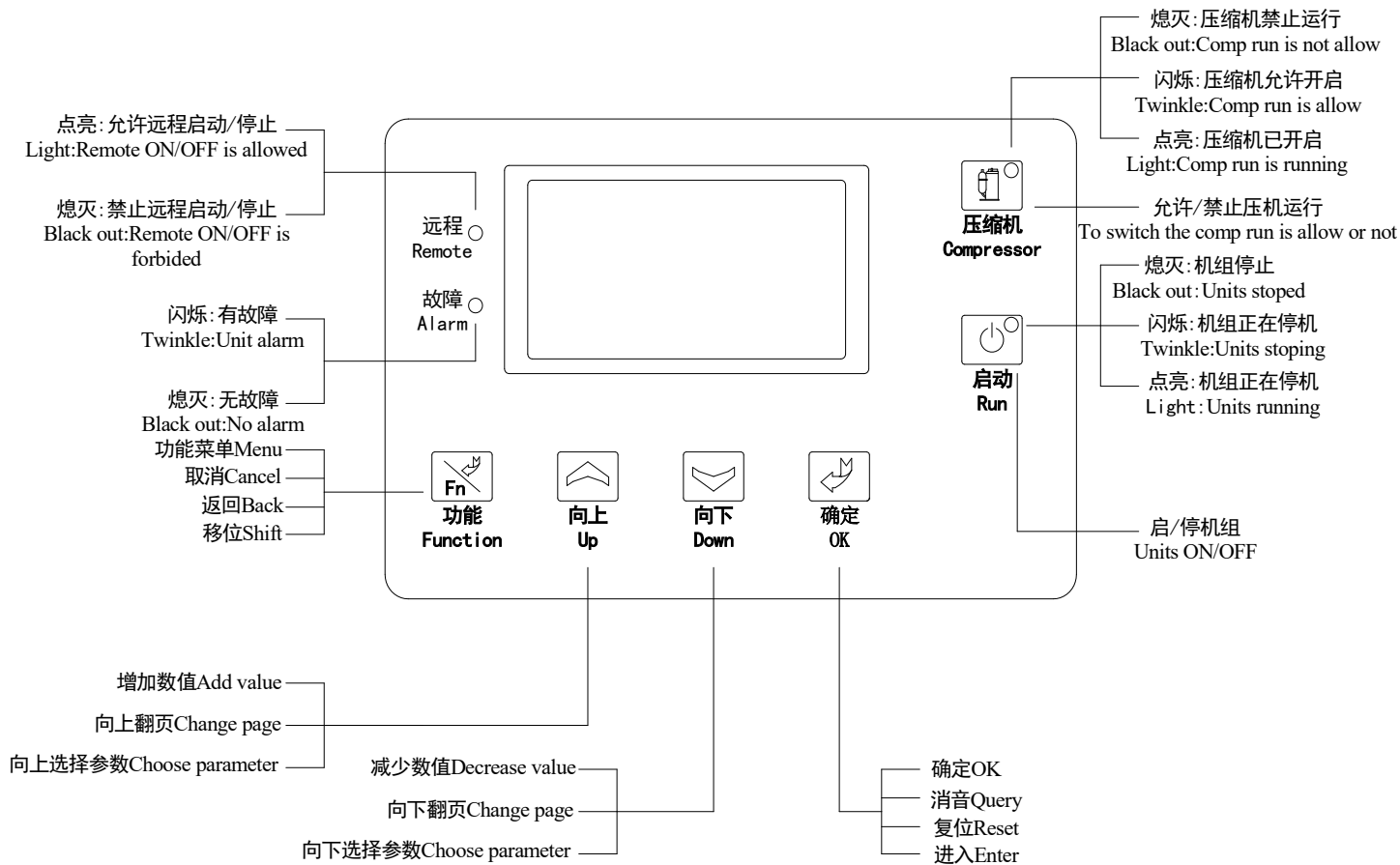
The heating process: one compressor ON when $PV \geq SV + ADD$; after the time of [Capacity ctrl], if $PV \geq SV + ADD$ remains, two compressors ON.

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

VI. Face plate sketch map and operating instruction

6.1 Panel Diagram



6.2 First Power-on

The controller needs to be configured when powered on for the first time. Refer to 8.4 Configuration Wizard for specific details.

6.3 Common Screens

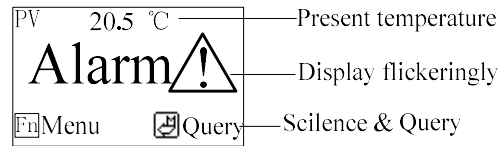
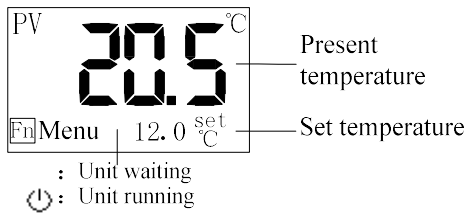
Frequently used screens include the main screen and the alarm screen.

1. Main Screen

The system enters the main screen after counting down, which displays as follows:

2. Alarm Screen

In case of unit fault, the alarm screen displays as follows:



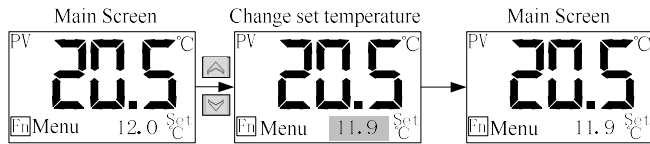
3. Change the display language quickly

Press + for 3 seconds on the main screen can change the language quickly.

6.4 Common Operation

1. Quick Modification of Set Temperature

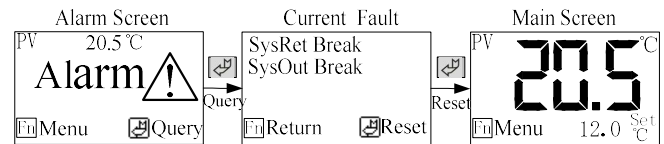
If the user parameter [Lock Temp.] is set to “No”, the set temperature can be modified directly on the main screen, with the following operation steps:



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

2. Query/Reset Fault

The alarm screen pops up automatically when unit errors occur. The operations of query and reset are as follows (The one occurred last shown on the top.):



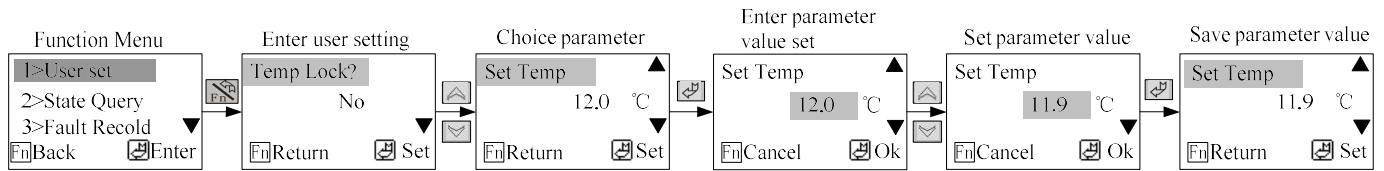
6.5 User Menu

Press the button to enter the User Menu, which includes eight items listed in the table below:

No.	Menu Item	Functions	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	
6	Communication Settings	The enactment communication wave checks with the rate, school a, mailing address.	The parameter 【 communication function choice 】 establishes for "forbid to use" the hour do not show that item. (GW531B does not have this function)

1. Parameter Operation

As to the modification of User Parameters, we take the modifying of Set temperature as an example:



2 User Parameters Table

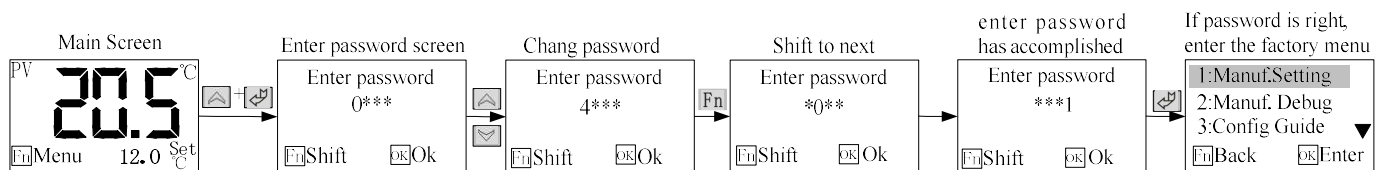
The implication of each user parameter is listed in the table below:

No	Name	Default	Set 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. (GW531B does not have this function)

6.6 Manufacturer Menu

Press + to access the Password Check screen and input the correct manufacturer password (default 4561, changing it is urgently recommended). Then you will enter the Manufacturer Function Menu, which includes five items.

1. Procedures of Entering Manufacturer Menu





2. Details of Manufacturer Menu

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

No	Menu Item	Function	Remarks
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	Not available during the unit operation.

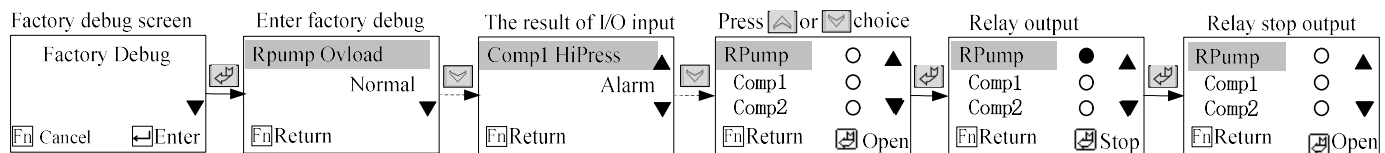
		operation of each electrical part of the unit	
3	Config Wizard	Commonly used parameters of config the unit	Not available during the unit operation. The screen will pop up when powered on for the first time.
4	Initialize	For initialize all parameters of the machine.	Refer to 10.5 Manufacture Parameters 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: Pressing  +  on the factory set screen for 3 seconds can clear the accumulative operation time of every compressor.

3. Manufacturer Debugging

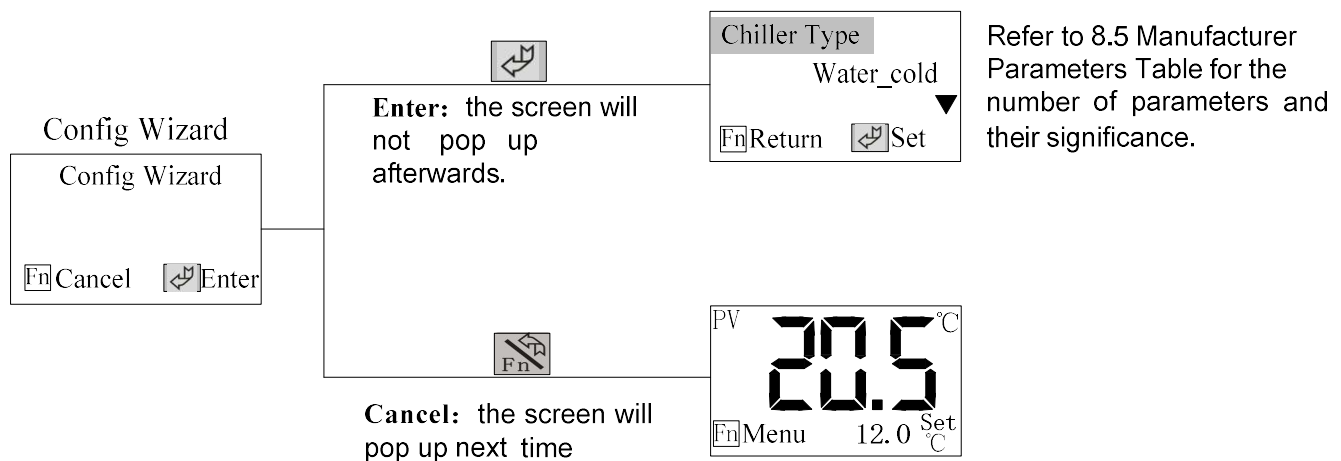
Manufacturer debug is mainly used to test whether the operation of each electrical part is normal, it is not accessible when unit running.

Method: Determining whether the unit is normal by testing three-phase power input, 21 alarm inputs and 10 relay outputs. For alarm input, it displays the test result. If the result is normal, the wiring is well in touch and parameter settings are correct; or it will display alarm characters, and you should make sure whether the external wiring is in touch and the parameter settings are correct.



4. Config Wizard

Configure the commonly used parameters of the machine, it is not available when unit running. For more details please refer to 8.5 Manufacturer Parameters Table.



5. Manufacturer Parameters Table

Meanings of the manufacturer parameters are listed in the table below: (the one prefixed with "*" is configuration wizard parameters; the one prefixed with "N" can't be changed when unit running.)

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 auto start is invalid.
	DO1 fuction(SF30 6000A does not have this option)	Alarm signal	Alarm signal; Run signal	
	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.
	DI5fuction(GW531B does not have this option)	Water switch	Water switch; Vent1 temp	Water switch: DI5 input for water level detection Vent1 temp: DI5 input for Vent1 temperature detection
	DI9fuction (GW531B does not have this option)	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 keep	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 keep	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	>0A	0~35.0A	0A: do not detect the current fault.	

rating			When [Current detect] is set "Forbid", those parameter is not displayed. The current value is set according to the actual calculation
*2#Comp.I rating(GW531B does not have this option)	>0A	0~35.0A	
*Pump. I rating	>0A	0~35.0A	
*Cool. I rating	>0A	0~35.0A	
*Phase monitor	IO_input	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 function] is set "Phase switch" .) Forbid: do not use three-phase power detection function.
DI1 input opt	Cool overload	Cool overload; Anti-freezing	Selection of switch DI1 input function
DI6 input opt(SF30600A does not have this option)	Comp overload	Comp overload; Cool W.flow	Comp overload: DI6 input for Comp overload detection Cool W.flow: DI9 input for cool water flow detection
*Comp number(GW531B does not have this option)	2	1~2	Selection of the number of compressor
*Machine type(GW531B does not have this option)	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
Temp.high AL (SF30600A does not have this option)	Pump keep	Pump stop ~ Pump keep	Pump stop: stop the cold pump in case of Temp.high fault; Pump keep: do not stop the cold pump in case of Temp. high fault.
DI3 input opt(SF30600A does not have this option)	Phase switch	Cold overload~ Phase switch	Selection of switch DI3 input function
communication function	Use	Forbid; Use	Use: the communication function of RS485 is used. Forbid: the communication function of RS485 is not

	choice(GW5 31B does not have this option)			used
Temperature Settings	Load offset	2.0°C	0~10.0°C	Temperature deviation of load the compressor
	Unload offset	2.0°C	0~10.0°C	Temperature deviation of unload the compressor
	T.setpoint max	40.0°C	-38.0~99.9°C	To limit the temperature of user set.
	T.setpoint min	5.0°C	-38.0~99.9°C	
	T.bias	0.0°C	-9.9~9.9°C	Compensation for the liquid temperature
	T.low protect	2.0°C	-40.0~99.9°C	Fault of “Temp.low AL” warning is reported when the liquid temperature is lower than the set value.
	T.high warn	50.0°C	0~99.9°C	Fault of “Temp.high warn” warning is reported when the liquid temperature is higher than the set value.
	T.high alarm	60.0°C	0~99.9°C	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°C	0~99.9°C	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 reset], the “Temp.high warn” fault is automatically reset;
Time Settings	Pump on delay	3 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	120 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	3 S	0~255 S	The time General fault stable.
	W.flow stab.	10 S	0~255 S	It is considered to be valid only when the water flow alarm continue for the time.
	LP detect dly	180 S	0~255 S	Compressor low-pressure fault input is allowed only when the compressor has run for the set time.
	LP stable	3 S	0~255 S	Low-pressure fault stable time
	LP stop pump	3 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(GW531 B does not have this option)	2 H	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	3 S	1~255 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(GW531 B does not have this option)	3 S	1~255 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	3 S	1~255 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	3 S	1~255 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.C	N.O ~ N.C	
	*Phase error	N.C	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.O	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 when remote switch input close and stop when it open

VII. Solutions for faults

7.1 system faults

Name	Description	Test Conditions	Actions	Reasons	Troubleshooting
1#Comp .P high	High pressure of compressor1	Test when the compressor button has pressed		<ol style="list-style-type: none"> Poor heat dissipation High pressure switch is damaged High pressure signal line fault “High pressure” setting is not right High pressure rate setting is not correct 	<ol style="list-style-type: none"> See Footnote (1). Replace the high pressure switch Check if the signal line is virtual open or not Check the settings Check high pressure switch and adjust the setting, see Footnote (3) and Footnote (5)
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.	Stop compressor1 only without affect other equipments to work. [Note1]	<ol style="list-style-type: none"> The dry filter got clogged. Expansion valve failure The low pressure setting is not right. Insufficient refrigerant. Low pressure switch signal failure. Low pressure switch is damaged Comp LoPress” setting is not right 	<ol style="list-style-type: none"> Replace new filters. Adjust or replace expansion valve. Check low pressure switch and adjust the setting and see Footnote (3) and Footnote (5) Charge refrigerant, see Footnote (2). Check if the signal line is virtual open or not Replace the low pressure switch Check the settings
1#Comp overload	The compressor1 overload	Compressor1 runs the test.		<p>Immediate Reason:</p> <ol style="list-style-type: none"> The setting of thermal overload relay is too low. Thermal overload relay signal failure Thermal overload relay damaged ” Comp Overload” setting is not right <p>Indirect Reason:</p> <ol style="list-style-type: none"> Poor heat dissipation 	<ol style="list-style-type: none"> Start unit to see if the compressor current is normal, if it is normal, adjusting the current setting appropriately. Check if the signal line is virtual open or not Replace the thermal overload relay Check the settings See Footnote (1).
1#Comp	The current of				Check if the rated current

.I high	compressor1 is too high				of compressor1 is input is reasonable.	
1#Comp .I low	The current of compressor1 is too low				Check if the measure tool of the compressor1 current is connect.	
1#T.Vent high	The vent temperature of compressor1 is too high				Check if the input is consistent with the switch setting.	
2#Comp .P high	High pressure of compressor2	Test when the compressor button has pressed		See “1#Comp.P high”	See “1#Comp.P high”	
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.		See “1#Comp.P low”	See “1#Comp.P low”	
2#Comp overload	The compressor2 overload		Stop compressor2 only without affect other equipments to work. [Note2]	See “1#Comp. overload”	See “1#Comp. overload”	
2#Comp .I high	The current of compressor2 is too high				Check if the rated current of compressor2 is input is reasonable.	
2#Comp .I low	The current of compressor2 is too low	Compressor2 runs the test.				Check if the measure tool of the compressor2 current is connect.
2#T.Vent high	The vent temperature of compressor2 is too high					Check if the input is consistent with the switch setting.
Temp.lo w AL	The liquid temperature is too low				1. The water temperature setting value is over low 2. “T.low protect” valve setting is so low 3. The setting temperature value is over low 4. System out probe failure	1.Stop chilling, reset it until the temperature is going up 2. Check the settings 3.Add the setting temperature value 4. Replace the probe
T.high warn	The liquid temperature is higher than the warn value.	Test after cold pump starts	Alarm only without affect other equipments to work.	1. The water temperature setting value is over high 2. “T.high warn” valve setting is so	1. Replace the new water , reset it until the temperature is going down. 2. Check the settings 3. Check if the heater is	

				low 3. The heater is keep running(Cold-hot dual-purpose machine has this function) 4.The chiller is not running or low refrigeration efficiency 5. System out probe failure	keep running. 4. Check if the chiller is well in working, or if the refrigeration efficiency is satisfy, or if the water temperature is abnormally high 5. Replace the probe
Temp.hi gh AL	The liquid temperature is too high		Stop the compressor and delay to stop the cool pump, and do not stop the cold pump.	See “T.high warn”	See “T.high warn”
Anti-freeze. AL	Antifreeze alarm				Check if the antifreeze input is consistent with the switch setting.
Probe break	The liquid temperature sensor is break	Power on to test	Stop all the compressor and cool pump, and do not stop the cold pump.	1.The probe break or damaged	Check if the temperature probe is in proper contact.
Probe short	The liquid temperature sensor is short			1.The probe short or damaged	
cool fan overload [Note3]	The cool pump or fan overload		Stop compressor1 and cool pump or fan only	1. The setting of thermal overload relay is too low. 2. Thermal overload relay signal failure 3. Thermal overload relay damaged 4.” Cool overload” setting is not right	1. Start chiller to see if the fans current is normal, if it is normal, adjusting the current setting appropriately. 2. Check if the signal line is virtual open or not 3. Replace the thermal overload relay 4. Check the settings
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	Lack of cool	Test after the cool pump	Stop		Check if the cool water

W.flow AL	water flow	starts for [Cool on delay] time	compressor1 and cool pump or fan only		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.	1. Chilled water flow rate is too low or water shortage or water flow switch setting rate too high. 2. Water flow switch damaged 3. Cold pump overload 4. Water flow switch signal line fault 5. “Cold W. flow” setting is not right	1. Check the water tank or pipe whether there is sufficient water, such as water shortage, add water to the tank. If the water flow is sufficient, check and readjust the flow switch, details see “ Water flow switch failure ” 2. Replace the water flow switch 3. See “ Cold pump Overload ” 4. Check if the signal line is virtual open or not 5. Check the settings Note: When the pump is not control by chiller, Please set the “Flow Switch” for NO to prevent alarm
cold pump overload [Note3]	The cold pump overload	Test after cold pump starts	Stop the unit	1. Cold pump current too high 2. Chilled pump’s signal line fault 3. Thermal overload relay damaged 4. “Freez overload” setting is not right	1. Check whether the thermal overload relay is trip out. If so, reset it and start the chiller to check whether the pump current is normal or not. If normal, adjust the thermal overload relay setting current. 2. Check if the signal line is virtual open or not. 3. Replace thermal overload relay 4. Check the settings
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 on to test	Stop the unit	1. Phase loss 2. Phase sequence errors	1-7 Check the Voltage size and volatility between two-phase. If all is normal,

	power input is alarm			3.Overhigh voltage 4.Undervoltage 5. Voltage unbalance 6.Wiring fault 7.Phase sequence is damaged 8. “Phase Swtich” setting is not right	check the wiring of the phase sequence (Including three-phase power input and the line of output).If it’s damaged, change a new one. 8.Check the settings
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.	1. Chilled water level rate is too low or water shortage. 2.Water level switch damaged 3.Water level switch signal line fault 4. “W.level switch” setting is not right	1. Add water to the tank until the water level is normal 2. Replace the water level switch 3. Check if the signal line is virtual open or not 4. Check the settings Note: When the pump is not control by chiller, Please set the “Level Swtich” for NO to prevent alarm
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	Cool 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

7.2 Hardware faults

Fault phenomenon	Reason	Troubleshooting
The power supply has power, and the switch is closed, but the controller does not respond	<ol style="list-style-type: none"> 1.The control transformer is damaged 2.The controller is damaged 3.The breaker is damaged 4.The control line failure 	<ol style="list-style-type: none"> 1.Check the voltage across the transformer 2.Replace the controller 3.Replace the breaker 4.Check the control line
The controller has pump running output signal, but the pump did not start for a long time without faults	<ol style="list-style-type: none"> 1. The contactor is damaged 2. The control line failure 3.The controller's output is damaged 4.The pump power line failure 5.The pump is damaged 	<ol style="list-style-type: none"> 1.Step: Check three-phase voltage of pump → Check contactor → Check controller's output 2. If checking pump has three-phase voltage, indicating that the pump has been damaged. If there is no voltage, check that if the contactor is pull or not; 3. If the contactor is pull, indicating that the main contact of the contactor is disconnected, you need replace a contactor. If not pull, check that if the contactor coil voltage is 220V or not; 4. If the contactor coil voltage is 220V, indicating that the contactor has been damaged. If no voltage, check that if the controller's output voltage is 220V or not; 5. If the controller's output voltage is 220, indicating that the control line is disconnected. If no voltage, indicating that the controller's output has been damaged. You need repair controller or replace a new controller
The controller has compressor running output signal, but the compressor did not start for a long time without faults	<ol style="list-style-type: none"> 1. The contactor is damaged 2. The control line failure 3.The controller's output is damaged 4.The compressor power line failure 5.The compressor is damaged 	The same as above
The controller has heating running output signal, but the heater did not start for a long time without faults	<ol style="list-style-type: none"> 1. The contactor is damaged 2. The control line failure 3.The controller's output is damaged 4.The heater power line failure 5.The heater is damaged 	The same as above

<p>The compressor is running, but the fans or cooling pump did not start for a long time without faults</p>	<ol style="list-style-type: none"> 1. The contactor is damaged 2. The control line failure 3. The controller's output is damaged 4. The fans or cooling pump power line failure 5. The fans or cooling pump is damaged 	<p>The same as above</p>
<p>The pump or fan or compressor displays overload alarm or stopped on the controller, but it's still running, not stopped</p>	<ol style="list-style-type: none"> 1. Contactor stuck 2. Control line error connection 3. Controller logic program error 	<ol style="list-style-type: none"> 1. Step: Contactor → Control line → Controller 2. Turn off the main power, turn on the electric box and observe the contactor. If the contactor stuck, it is not automatically rebound without power, then you must replace the new contactor. Otherwise, it is easy to burn out the motor. 3. If the contactor is automatically rebound, indicating that the contactor is good. Then check that if the control line is connecting right or not; 4. If the control line is connecting error, the control sequence is bound to be confused. Please check the sequence according to the control logic, and correct the control line. If the control line is connecting right, check that if the controller logic program is right or not; 5. If the controller logic program is error, then you must replace the new controller.
<p>Button operation is unresponsive</p>	<ol style="list-style-type: none"> 1. Button is damaged 2. Button line error connection 3. Controller inputs is damaged 4. Controller crash 	<ol style="list-style-type: none"> 1. Replace new button 2. Check button line 3. Repair controller or replace a new controller 4. Restart, The chiller must be grounded.
<p>The power supply is on, but the power indicator is not on</p>	<ol style="list-style-type: none"> 1. The power indicator is damaged 2. Power indicator line error connection 	<ol style="list-style-type: none"> 1. Replace a new power indicator 2. Check indicator line
<p>The chiller is running, but the run indicator is not on</p>	<ol style="list-style-type: none"> 1. The run indicator is damaged 2. Run indicator line error connection 	<ol style="list-style-type: none"> 1. Replace a new run indicator 2. Check indicator line
<p>The chiller alarm, but the alarm indicator is not on</p>	<ol style="list-style-type: none"> 1. The alarm indicator is damaged 2. Alarm indicator line error connection 	<ol style="list-style-type: none"> 1. Replace a new alarm indicator 2. Check indicator line

VIII. Operating attentions

8.1 Attentions

1. Do not run the chilled water pump, if no water in the tank;
2. Do not switch over the operating switches frequently.
3. The compressor will stop automatically while the chilled water temperature reached the set temperature. This is normal phenomenon.
4. Please do not set the temperature bellow 5°C for avoiding the evaporator freezing (Except the low temperature chiller).
5. To make sure the best refrigeration effect and keeping high-point, please clean the condenser, evaporator and the water filter regularly.

8.2 Water flow switch installation and attentions

1. Characteristic

- (1) It has flow protective effects.
- (2) Adjust the switch according to the different requirements.
- (3) It is SPDT micro switch, with accurate movement.
- (4)The case is designed in a structure of completely sealing, internal components adopt rustproof and rot-proof material to ensure it can working normally in almost any environment.

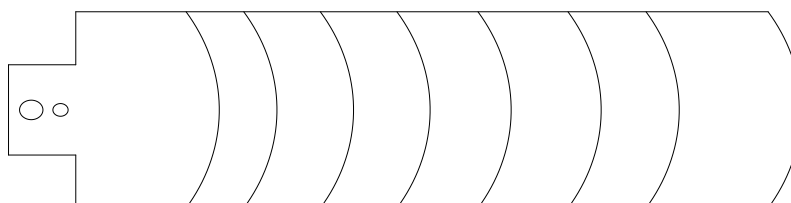
2 Water flow switch working principle

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Water flow switch internal schematic showed in picture. When no liquid in pipes, the motion screw push the switch and micro switch move to make 1&4 NC,1&2 NO at the same time. When the pipes has enough liquid, the motion screw release pressure to the switch and the micro switch move to make 1&4 NO and 1&2 NC.(Note: The default setting for normal water flow is 1&2 NC.)

3 Water flow switch contact clip adjustment

Adjustment of the block



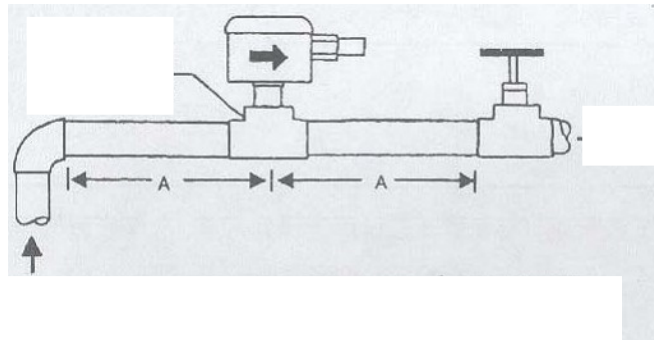
Note:

To make sure the switch to sense changes in flow velocity, it can't touch the pipes or any other throttling device.

4 Water flow switch installation location

The water flow switch must to be installed into a straight run of the line, both sides will be straight run for 5 times of the pipe diameter. The wiring terminal should be placed in where easy to wiring. It can be installed in horizontal pipelines or vertical pipes with the upward flow but not down flow and need to consider to the gravity effect.

Standard installation diagram as below:



Note: Flow switch can't suffer from water hammer. If its downstream has a quick closing valve, a suitable flow controller needed.

5. The step to adjust the water flow switch

- (1) Take off the housing.
- (2) Increase the flow value by adjusting the screw clockwise and reduce the flow value by adjusting the screw counterclockwise.
- (3) By pressing the main lever several times to check whether the flow switch setting is lower than the factory setting. If the lever without sound "clicking", adjust the screw clockwise till to it make sound "clicking"

Note: Danger of incorrect operation! Danger of equipment damaged!

The switch is setting at approximately the minimum flow value. Don't lower then factory reset, it may lead to the switch can't autoroll back to "No-flow" position. Don't change the mark of the "No-flow".

6. Water flow switch fault analysis.

Status /Problem	Solutions
1. The corrugated pipe damaged lead to water permeates into body.	1. Change a new one.
1. The switch doesn't work sucked by chippings.	1. Clean the chippings and test the switch till to recover.
1. Operating on the contrary 2. Water flow switch works but no signal.	1. Check the wiring according to the drawing. 1. Check the wiring.
1. The switch works when there's liquid, but can't autorollback when no liquid.	1. Check whether the switch adjusted too small and the spring works or not.
1. The switch doesn't work even bigger water flow.	1. Check whether the spring is fractured. If yes, need to change new one.

Footnote (1)

Poor heat dissipation and the solution

While the condenser heat dissipation is poor, the compressor will be in a low efficiency and the operating

current will be heightened; if the high pressure goes up to 20 kg/cm^2 , the compressor can be trip-out under the high pressure protection switch, and it will display fault code and fault indication, then please check whether the ambient temperature is too high, the fan of the cooling tower and the water pump is running and the condenser is dirty block. After all above stated is back to normal, then press “RESET” or restart the unit. If the high pressure overload state is a frequent occur, please clean the condenser as soon as possible.

Footnote (2)

Solutions to low pressure (because of the shortage of refrigerant)

1. While chilled water temperature is above 5°C and the pressure showed on the low pressure gauge is 2 kg/cm^2 , that indicates shortage of refrigerant.

Firstly deal with the leak point, and change a new filter dryer

Secondly, pump the unit into vacuum and recharge proper volume of refrigerant.

2. If the leaking point is immersed in water, stop the chiller unit immediately, and then drain the water in the tank. Avoiding damaged the compressor because of suck water, please contact the repairman of the supplier as soon as possible.

Footnote (3)

Check the low and high pressure

The best status is that the high pressure showed in the range of $13 \sim 17 \text{ kg/cm}^2$ and low pressure is in the range of $3.0 \sim 4.5 \text{ kg/cm}^2$ while the compressor running. While the high pressure is above 20 kg/cm^2 , high pressure switch will be trip-out, please deal with according to Footnote (1). If the low pressure is below 2 kg/cm^2 , the low pressure switch will be trip-out, please deal with according to Footnote (2).

If the pressure difference of high pressure and low pressure is very small or they are equal, it means the valves of the compressor were broken. Please stop the compressor immediately and contact the repairman of the supplier. Please be aware that the above conditions would happen when the compressor is running. While the compressor is off, it is normal that the high pressure and the low pressure come into equilibrium.

Footnote (4)

While all fault indicators and protection switches are normal, but cannot start the compressor, please check the following.

1. The temperature switch is set too high or broken;
2. The selector switch is damaged;
3. The anti-freezing switch is damaged;
4. The pressure switch is trip-out or damaged;
5. The overloading protector of the compressor is damaged or trip-out;
6. The electromagnetic relay coil is damaged or overload protector is damaged;
7. Water level in the tank is too low;
8. The chilled water flow switch is damaged;

The compressor cannot be running if the above control switches or the circuit is faulty.

Footnote (5)

Pressure switch adjust steps: Find the pressure switch(Picture 1), adjust the high & low pressure value(Picture 2&3) on the top. High pressure switch, to increase the pressure setting clockwise and lower it

by counterclockwise. Low pressure switch, to lower the pressure setting clockwise and increase it by counterclockwise.



Picture 1



Picture 2



Picture 3

IX. Maintenance

9.1 Main parts maintenance and precautions

1. In the process of operation should pay attention to exhaust and inhale pressure of the system. Pls find out the reasons and troubleshooting if any anomaly immediately.
2. Don't arbitrarily adjust the control and protective element set points.
3. Regularly check whether the electrical wiring and fasten it if any loosen.
4. Regularly check the reliability of electrical components and replace any one of failure or unreliable components

9.2 Descaling

After long-term operation, the heat transfer surface of the shell and tube exchanger will be deposited by calcium oxide or other minerals. These minerals will affect the heat transfer performance , lead to increased power consumption, exhaust pressure rise. Acid, citric acid, acetic acid and other organic acids can be used for cleaning.

9.3 Winter shutdown

When the winter shutdown, clean both inside and outside surface, and dry it. The drain must be open and drain all the water inside the shell and tube heat exchanger, to prevent freezing.

9.4 Start the machine

To start the unit after long time shutdown, please follow the steps below:

1. Thoroughly check and clean up the unit.
2. Clean water pipe system.
3. Check the water pump.
4. Tighten all line connectors.
5. Preheat the compressor according to the requirement.

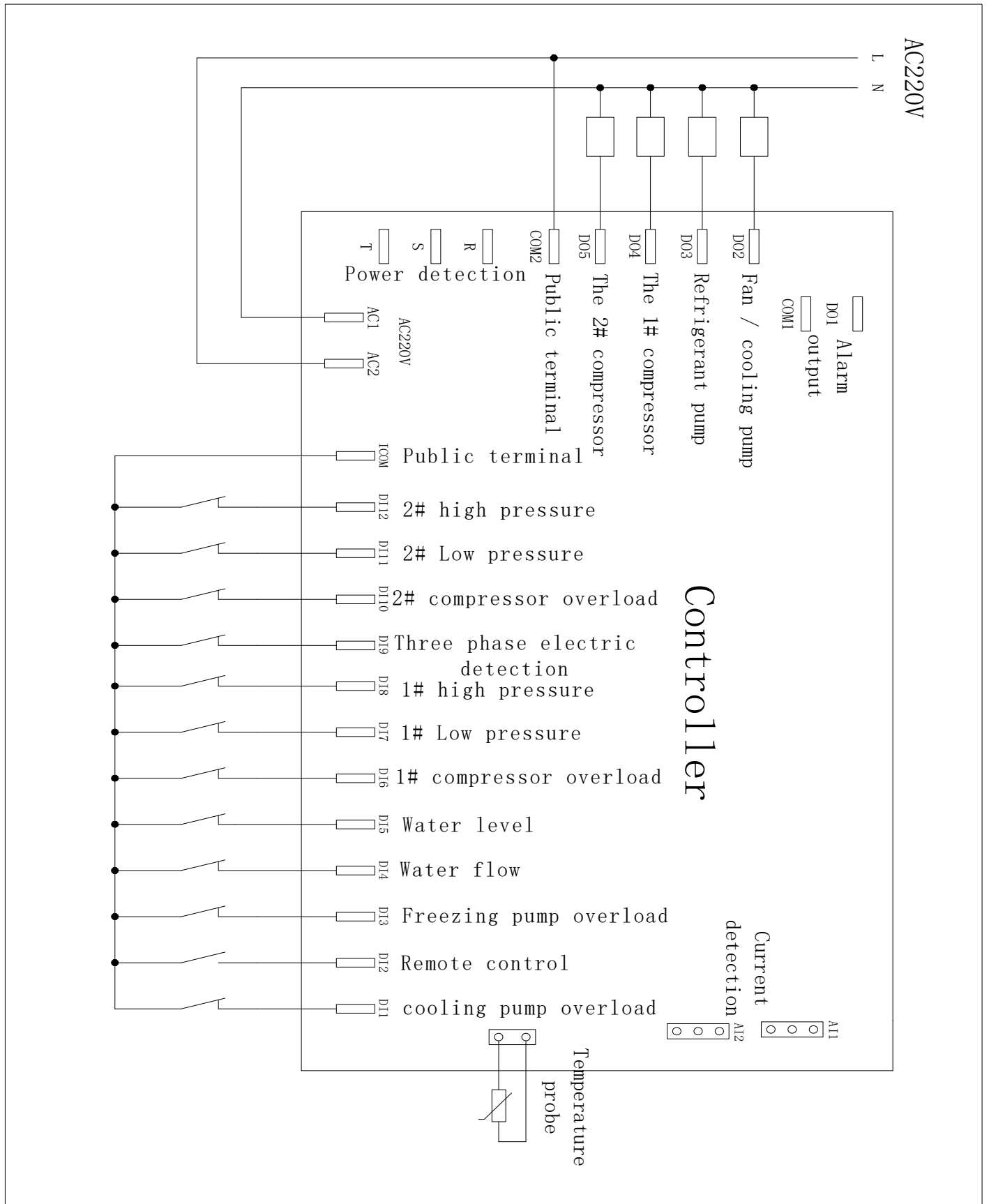
9.5 Clean the cooling tower regularly

For keeping the unit running well, please clean the condenser and the evaporator regularly. For keeping the cooling tower with good heat dissipation efficiency, please clean it regularly;

9.6 Maintenance cycle

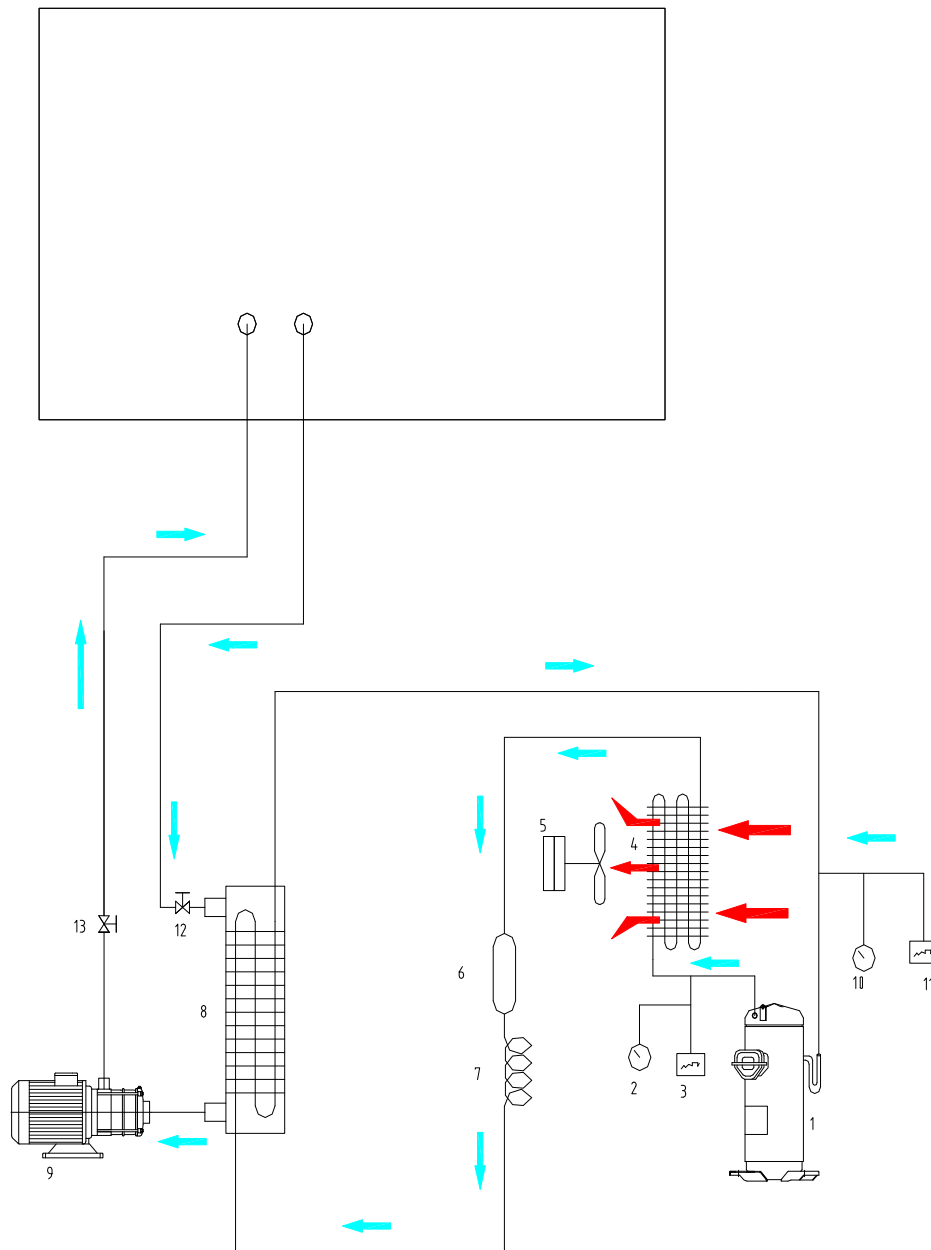
Check the water flow	monthly
Check the power supply	monthly
Check the electrical terminals and electrical insulation	monthly
Check the appearance and the running of the internal electric & external solenoid valve.	monthly
Check and adjust the setting temperature.	quarterly
Check the dry filter	quarterly
Check the compressor lubricating oil level	weekly
Change compressor oil filter	40000 hrs
Change compressor bearing	40000hrs

X. Control Module wiring diagram



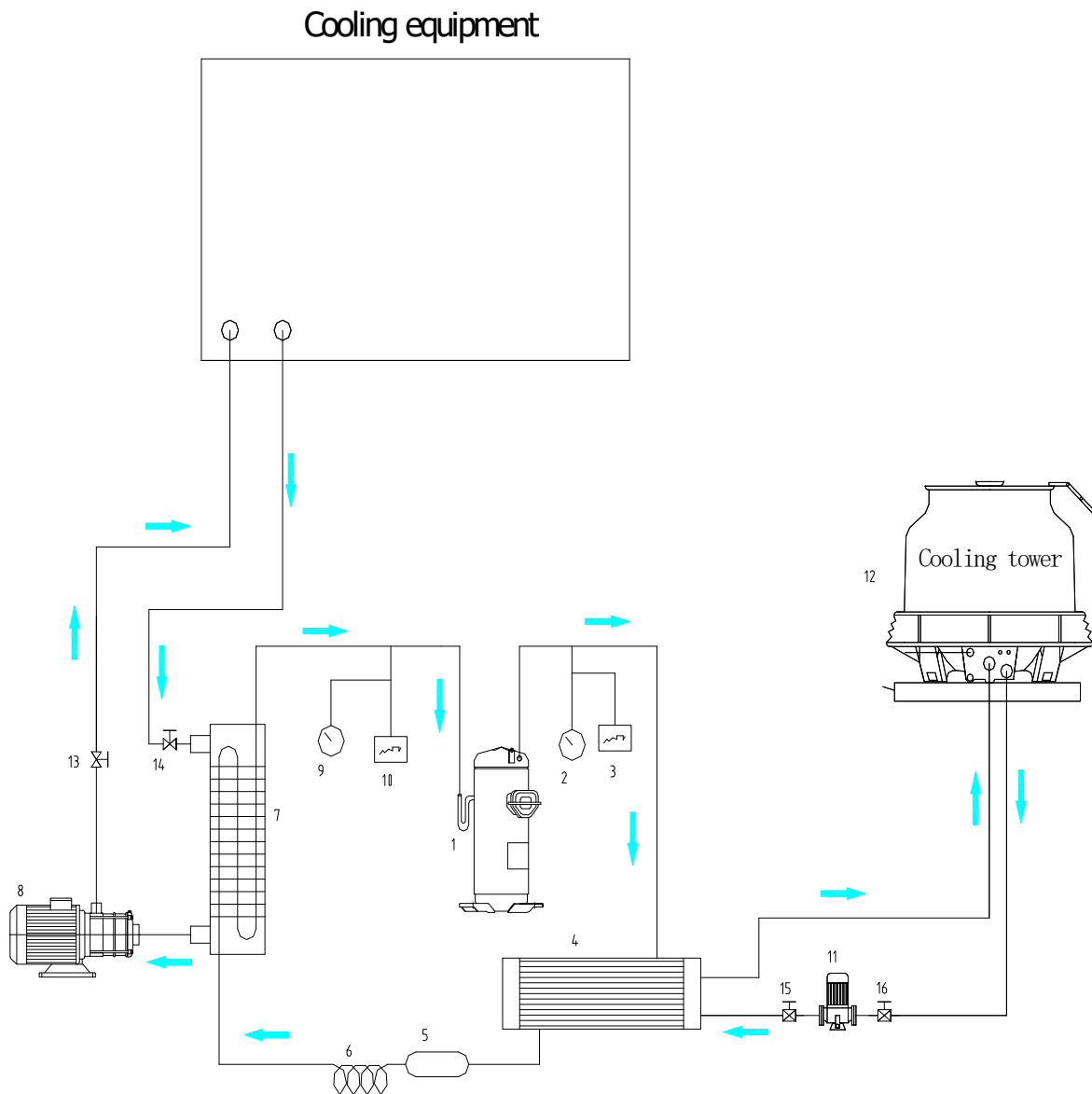
XI. Internal structure sketch map of the air cooled chiller

cooling equipment



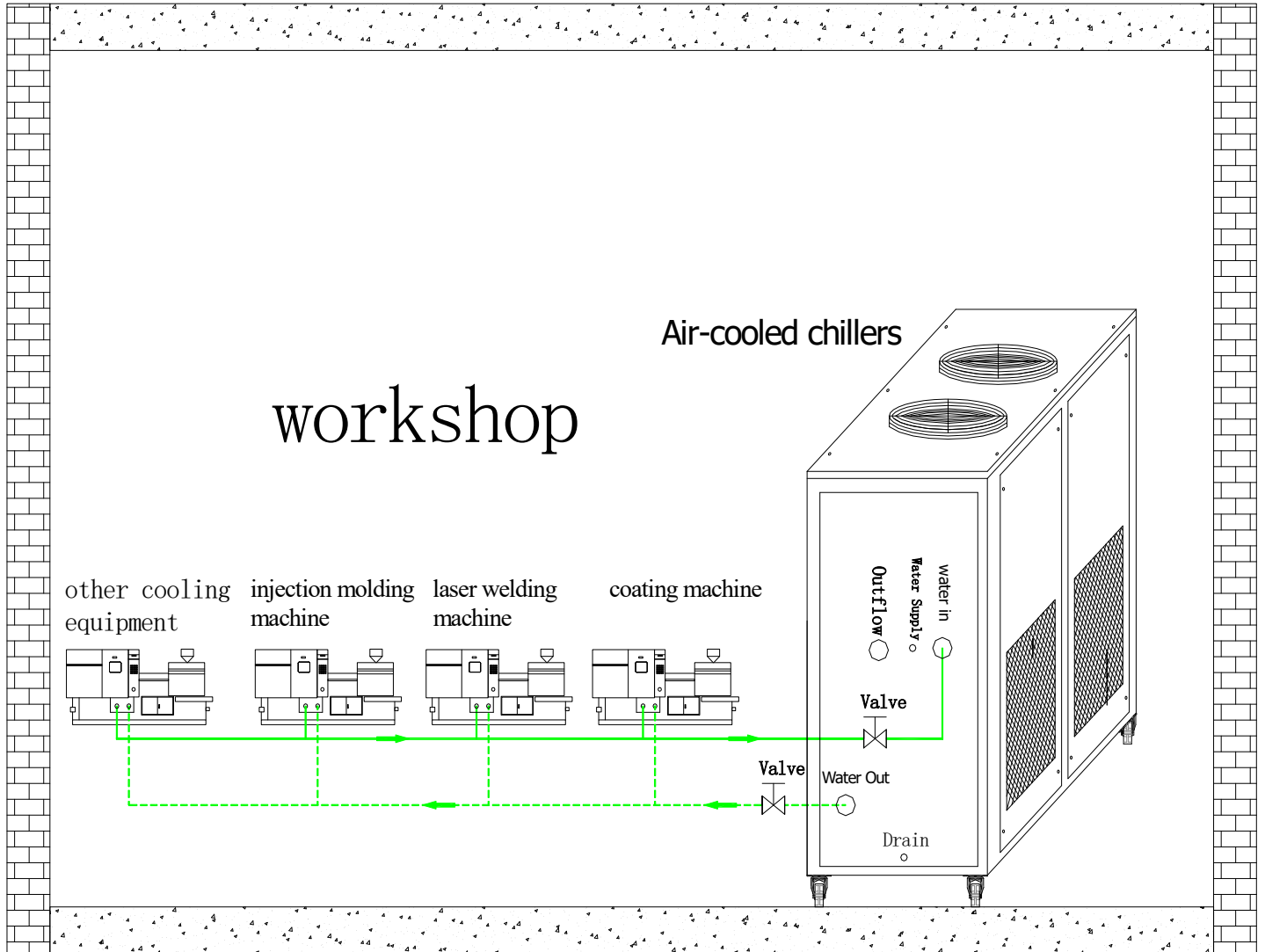
1. Compressor↵	7. Capillary (expansion valve)↵	↵
2. High pressure gauge↵	8. Evaporator↵	↵
3. High pressure protector↵	9. Water pump↵	↵
4. Condenser low table↵	10. Low pressure table↵	↵
5. Cooling fan low pressure protector↵	11. Low pressure protecto↵	↵
6. Dry and filtering device↵	12.13. Water valve switch↵	↵

XII. Internal structure sketch map of the water cooled chiller

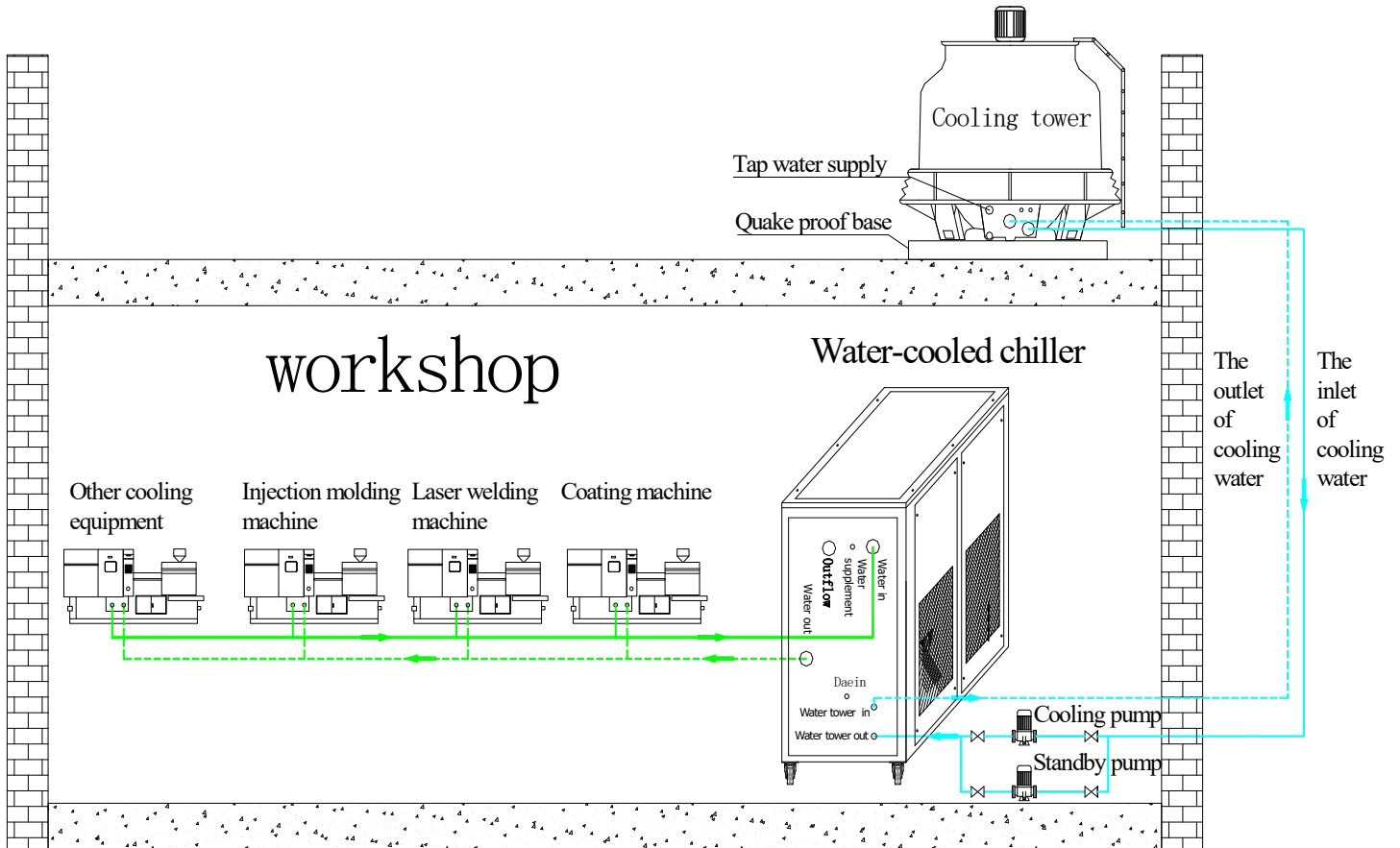


1. Compressor↕	8. Frozen water pump↕
2. High pressure table↕	9. Low table↕
3. High pressure protector↕	10. low pressure protector↕
4. Condenser cooling ↕	11. The cooling water pump↕
5. Dry filter unit↕	12. Cooling towers↕
6. Capillary (expansion valve)↕	13, 14, 15, 16. Water valve switch↕
7. Evaporator↕	↕

XIII. Installation sketch map of Air cooled chiller



XIV. Installation sketch map of Water cooled chiller



Major Products List

● Industrial chiller

● Laser chiller

● Screw type water chiller

● PCB chiller

● Plating chiller

● Oil cooling machine

● Heat and cold exchange Machine

● Open type cooling machine

● Low temperature chiller

● Mold temperature controller