

Industrial Water Chiller

user's manual

1. Installation requirements
2. Method of operation
3. Sequence of operation
4. Precautions
5. Maintenance
6. Trouble shooting guide
7. Thermostat instructions: parameter setting
8. Schematic diagram of air-cooled chiller
9. Schematic diagram of water-cooled chiller
10. Installation diagram of air-cooled chiller
11. Installation diagram of water-cooled chiller

1. Installation requirements

Choose a stable foundation for convenient installation and maintenance, it must be open surroundings, unobstructed, without corrosion, pollution, sun, rain. Choose a suitable cooling tower in accordance with the cooling capacity of the chiller.

Install the piping of the chiller according to the size of the Inlet and Outlet of the machine. Do not reduce the size of the cooling water pipe. This will cause high pressure overload, affect the cooling effect and increase power consumption.

The air-cooled chiller must be installed at a minimum distance of 1 meter against wall. For outdoor position, the rain-proof facilities must be provided.

Note: 1). The power load and grounding part should be constructed in accordance with relevant laws and regulations!

2). The chilled water pipe of the newly installed chiller must be covered with an insulation layer!

2. Method of operation

Before the trial run, make sure the following items are correct:

1). Whether the power supply voltage and the number of phase are in compliance with the model specifications, please refer to the nameplate. [Note that the power supply of chillers above 3HP adopts three-phase five-wire, and the voltage 380~415V/50HZ power phase lines are separately R, S, T, the neutral line (zero line) N, and the grounding wire is a two-color line represented by E; Chillers below 3HP use single-phase power, the voltage 220-240V/50HZ power phase line is L, the neutral line is N, and the ground line is E.

2). Whether the chilled water pipe and the cooling circulating water pipe are connected to the pipeline, and keep the valve open; (please refer to the installation diagram)

- 3). Fill the freezing water tank with water or other freezing medium before starting the water pump; (Note: Please choose the proper freezing medium as required)
- 4). Please pay attention to the running direction of the water pump and whether the water tower fan is reversed (if the water pump is three-phase, any two of the power phase lines must be exchanged for reversal, and then the switch should be closed after the connection is completed).

3. Sequence of operation

- 1). Turn on the power to the “ON” position;
- 2). Turn on the cooling switch. At this time, note that the cooling water inlet and outlet valve must be opened (Note: the air-cooled type does not need to be equipped with a cooling water tower).
- 3). Turn on the chilled water pump switch again. Please note that the inlet and outlet valves of the chilled water must be opened. The compressor will run automatically after the delay switch delays. Please check and adjust the required temperature.
- 4). Shut down in the reverse order.

4. Precautions

- 1). The chilled water pump cannot be operated without water in the water tank;
- 2). Please try to avoid frequent turning on/off the operating switch;
- 3). When the freezing water temperature reaches the set degree, the compressor will automatically stop running, which is a normal phenomenon;
- 4). Avoid setting the temperature switch below 5 ° C to prevent the evaporator from freezing; (except for low-temperature chillers)
- 5). In order to ensure the cooling effect and maintain the best condition, please

clean the condenser, evaporator and water filter regularly.

Note (1): Solutions for poor heat dissipation:

When the condenser heat dissipation is poor, the compressor efficiency is low and the operating current increases. When the air-cooled high-pressure rises to 24kg/cm², or the water-cooled high-pressure rises to 20kg/cm², the compressor trips under the protection of the high-pressure switch, and stops running. Upon poor heat dissipation, high pressure overload and fault code or fault indication, please check whether the circulating water of the cooling tower is normal, whether the cooling water temperature is too high, whether the cooling tower fan pump is running, and whether the cooling water valve is fully opened (please check for air-cooled type) Whether the radiator is dirty or blocked, after the above is normal, press the reset button (REST) or shut down and restart to operate normally. If high pressure overload occurs frequently, please arrange to clean the condenser as soon as possible.

Note (2): Solutions for insufficient refrigerant and low pressure:

A. When the water temperature is above 5 ° C and the pressure of the low pressure gauge is lower than 2kg/cm², it means that the refrigerant is insufficient. First, the leaking refrigerant should be repaired, and then the filter drier should be replaced to re-evacuate and refill with proper refrigerant.

B. When the leaking refrigerant is found to be immersed in water, please stop the operation of the freezer immediately, remove the water in the water tank as soon as possible, and notify the distributor/manufacturer to deal with and repair as soon as possible, so as to prevent the compressor from sucking water into the system and causing more serious damage.

Note (3): Is the high and low pressure normal?

When the water-cooled compressor is in normal operation, the high pressure display of 12~15kg/cm² is the best, (the air-cooled 13~17kg/cm² is the best) but not higher than 20kg/cm², when the water-cooled pressure is higher than 20kg /cm², or the air-cooled pressure is higher than 24kg/cm², please refer to Note (1) for high-pressure switch tripping. For low pressure, 2.5~4.5kg/cm² is the best, but not less than 2kg/cm². For 2kg/cm² low pressure trip, please refer to Note (2) for handling.

When the difference between the high pressure and the low pressure is very small or equal based on the running state of the compressor, it means that the valve of the compressor is damaged or broken. Please stop the operation immediately and notify the distributor or manufacturer.

Note (4): The compressor cannot start while the fault indicator and protection switch are in normal condition, please check:

- a. Whether the temperature switch is adjusted too high or damaged;
- b. Whether the switch is damaged;
- c. Whether the anti-freeze switch is damaged;
- d. Whether the pressure switch is tripped or damaged;
- e. Whether the compressor overload protector is damaged or tripped;
- f. Whether the coil of the electromagnetic relay is damaged or whether the overload protector is damaged;
- g. Whether the liquid level in the water tank is too low;
- h. Whether the frozen water flow switch is damaged.

The compressor cannot run if either of the above control switch or circuit is faulty.

5. Maintenance

- 1). Clean the condenser and evaporator regularly to keep the whole machine running well;
- 2). Keep the cooling tower cleaned regularly. Make sure no sundries or other obstacles in it;
- 3). For air-cooled chillers, please keep the surface of the radiator cleaned regularly to maintain good performance.

6. Trouble shooting guide

Problem	Reason	Solution
The power supply is normal The whole machine does not work	① Fuse blown ② Reverse relay failure	① Replace the spare fuse ② Replace the reverse relay
Power switch tripped	① The power load line is grounded or shorted ② Compressor, pump, motor fault grounding	① Renew; ② After inspection, if the fault is determined, replace or repair
Reverse phase	① Pump, compressor and fan reversal ② Lack of phase	① Exchange any two phases in the power phase line ② Use a multimeter to measure whether the three-phase power supply is normal and check whether the power cord is disconnected
Poor heat dissipation The indicator light is on	① High voltage switch tripped ② The high-voltage switch is damaged	① Clean the condenser, keep the air below 40°C, please follow the note (1) ② Replace with a new pressure switch
Low refrigerant indicator light is on	① Insufficient refrigerant and low pressure trip ② The evaporator freezes ③ The temperature controller is inaccurate or the sensor fails	① According to the note (2) ② Check whether the expansion tank is short of water and whether the circulating pump is running. After it is normal, manually reset the low-pressure switch or shut down and restart; ③ If the evaporator freezes, drain the ice water and refill warm water to melt the ice. ④ Renew or repair. Note: Do not hit ice with hard objects, such as breaking through the copper pipe and entering water, which will damage the compressor.

Overload indicator light is on	<ul style="list-style-type: none"> ① Abnormal voltage; ② The motor, pump, and compressor shafts are damaged; ③ Poor heat dissipation ④ The overload relay is too small or the adjustment value is too low; ⑤ Poor or loose line contacts 	<ul style="list-style-type: none"> ① Three-phase power supply voltage drop or voltage instability and lack of phase, please adjust the voltage and check the cause of the lack of phase; ② Replace with a new shaft or replace it with a new one; ③ Please follow the note (1); ④ Change to a larger value or increase it according to the normal value; ⑤ Lock
The fault indicator does not light up but the compressor cannot run	Protection device tripped	Please follow Note (4)
The water in the cold water tank is not cold Or low voltage trip	<ul style="list-style-type: none"> ① Insufficient capacity; ② Insufficient refrigerant; ③ Refrigerant is blocked; ④ The valve disc is broken; ⑤ The temperature switch setting is too high; ⑥ The temperature switch is faulty; ⑦ Poor heat dissipation ⑦ Sensor failure 	<ul style="list-style-type: none"> ① Increase the host capacity; ② According to the notes (3); ③ Replace blocked parts such as desiccant or expansion valve and vacuum treatment and then fill with refrigerant; ④ To replace the compressor, it shall be judged by the Note (3); ⑤ Turn down the temperature; ⑥ Renew; ⑦ Low efficiency, please follow the note (1); ⑧ Replace with new
Water shortage Insufficient water flow	<ul style="list-style-type: none"> ① Insufficient water in the water tank; ② The water flow in the pipeline is too small 	<ul style="list-style-type: none"> ① Fill water to the water tank; ② Check whether each valve is opened to the maximum

7. Thermostat instructions: parameter setting

Item name	Default value (maximum, minimum)	Parameter setting description
Pr-00	OFF (OFF~LOCK)	Set whether the factory parameter setting function is locked or not (OFF: not locked, LOCK: locked)
Pr-01	OFF (ON~OFF)	Phase detection normally open or normally closed setting (OFF: normally open, ON: normally closed)
Pr-02	OFF (ON~OFF)	Compressor high pressure (OFF: normally open, ON: normally closed)
Pr-03	OFF (ON~OFF)	Compressor low pressure (OFF: normally open, ON: normally closed)
Pr-04	OFF (ON~OFF)	Compressor overload (OFF: normally open, ON: normally closed)

Pr-05	OFF (ON~OFF)	Water level switch (OFF: normally open, ON: normally closed)
Pr-06	OFF (ON~OFF)	The refrigeration pump is overloaded (OFF: normally open, ON: normally closed)
Pr-07	OFF (ON~OFF)	Wire control switch (OFF: normally open, ON: normally closed)
Pr-08	OFF (ON~OFF)	Cooling water pump overload/cooling fan overload (OFF: normally open, ON: normally closed)
Pr-09	OFF (ON~OFF)	Antifreeze switch (OFF: normally open, ON: normally closed)
Pr-11	OFF (ON~OFF)	Set whether the temperature control function is locked or not (OFF: not locked, ON: locked)
Pr-12	OFF (ON~OFF)	Wire control switch type (OFF: toggle, ON: pulse), only valid when Pr-10 is set to ON
Pr-14	30.0°C (0°C~100.0°C)	The maximum value that can be set to control the temperature (only valid after entering the main interface)
Pr-15	5.0°C (-20.0°C~100.0°C)	The maximum value that can be set to control the temperature (only valid after entering the main interface)
Pr-16	0.0°C (-9.0°C~9.0°C)	Temperature compensation
Pr-17	4.0°C (-20.0°C~100.0°C)	Outlet water temperature is too low protection (temperature <this set value, alarm)
Pr-18	12.0°C (-20.0°C~100.0°C)	Set control temperature
Pr-19	1.0°C (0.0°C~100.0°C)	Control temperature difference (used in energy regulation)
Pr-20	0 (0~1)	Model options (0: air cooling, 1: water cooling)
Pr-21	2 (1~2)	Number of compressors
Pr-22	NO ()	Alarm output mode selection (NO: output if there is a fault, US: no output after silence)
Pr-23	NO ()	The use and setting of the self-start function of incoming calls (NO: not used, US: used)
Pr-25	10second (0second~255second)	Delay after the chilled water pump is started
Pr-26	10second (0second~255second)	Delay after cooling water pump/cooling fan starts
Pr-27	180second (0second~255second)	Compressor anti-frequent start delay
Pr-28	10second (0second~255second)	Insufficient water flow fault detection delay
Pr-29	2second (0second~255second)	General fault detection delay
Pr-30	2second (0second~	Phase failure detection delay

	255second)	
Pr-31	5second (0second~ 255second)	Energy adjustment period (interval period of energy adjustment)
Pr-32	10second (0second~ 255second)	Delay detection of water level switch time setting after the unit is started (when the unit is running at least this period Allow to detect the water level switch after time)

Fault code description

error code	Fault name	Description
1	Phase error protection fault	Three-phase power failure (wrong phase/leakage/reverse phase) to stop all loads
2	Compressor No. 1 high pressure	Stop compressor 1
3	Compressor No. 1 low pressure	
4	Compressor No. 1 is overloaded	
5	No. 2 compressor high pressure	Stop compressor 2
6	No. 2 compressor low pressure	
7	No. 2 compressor overload	
8	Water level switch	Stop all compressors and keep the water pumps off
9	Chilled water pump overload	The chilled water pump load is too large (shutdown group)
10	Cooling water pump overload (fan overload)	The load of the cooling pump is too large (stop all compressors and cooling pumps, the cooling pumps will not stop)
11	Outlet water temperature is too low	Protect the unit, when any one or several of these failures occur, stop all compressors and cooling pumps, and the refrigeration pumps will not stop
12	The water outlet probe is open	
13	Short circuit of water outlet probe	
14	Antifreeze failure	

Instructions

The power-on system starts a 6-Second countdown, the PV area on the panel displays the version, and the SV area displays the time. If the "SET" key is not pressed, then the main program starts to work.

- (1) After the main program starts, the PV area displays the actual temperature, and the SV area displays the set temperature. At this time, press "SET" to modify

the current set temperature, use "UP", "DOWN" to modify, and press "SET" after the change Key to exit.

(2) During the countdown, if you press "SET", you will enter the factory parameter setting state, enter the password "4561", press "UP" to switch the input sequence, press "DOWN" to modify the entered number, after the password is entered, press "SET" enters the parameter setting interface, the PV area displays "Pr00", which means item 0. At this time, use "UP" and "DOWN" to select the item to be modified. After selection, press "COMPI" to enter the modification of the item, use "UP" and "DOWN" to modify, after the modification, press "COMPI" Save and exit, press "SET" to exit the parameter setting interface. For the description of each item, see parameter setting.

(3) If there is a fault, "err" will be displayed in the PV area, and the fault code will be displayed in the SV area. Please find the corresponding fault in Table 2 according to the fault code. Press the "reset" button to silence the sound. After troubleshooting, press the "reset" button to reset the fault.

(4) "comp1" and "comp2" are the keys that allow press 1 and press 2 to be turned on respectively. If the press is allowed to be turned on, the LED indicator on the corresponding key is lit; if it is not allowed to be turned on, the corresponding press The machine will not turn on, and the led light on the button will not light up. The "comp1" and "comp2" keys are only valid when the unit is running. When the "comp1" and "comp2" are valid, press the key to correspond to The led light is on, and then press the led light to go out.

(5) Indicators: power indicator, run unit operating status, comp1 compressor 1 operating status, comp2 compressor 2, operating status, error means malfunction.

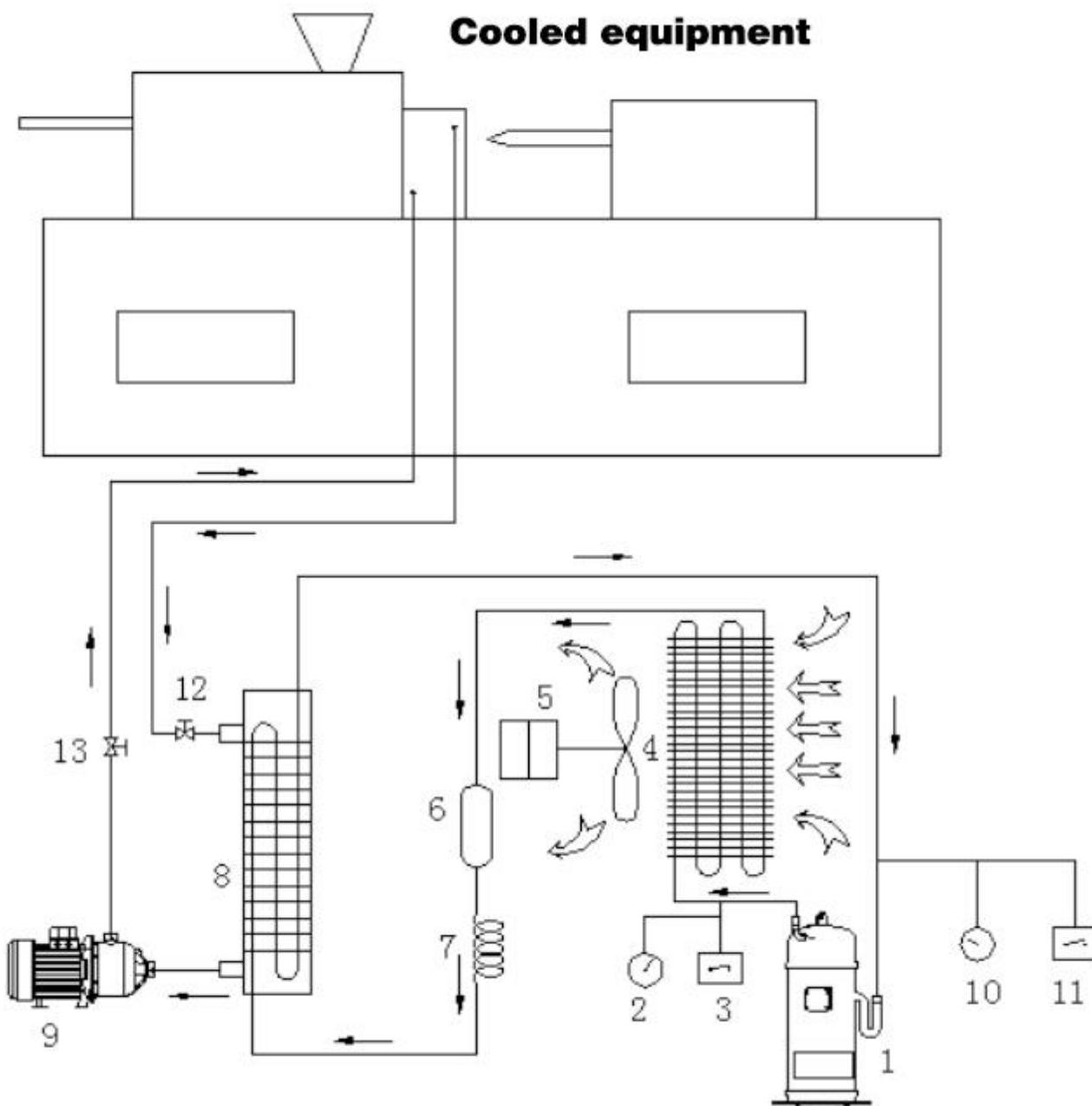
(6) In the main interface, long press "SET" to enter the setting item of setting

temperature function lock or not, enter the password "0021", see (2), then press "SET" to enter the setting interface, press "UP" and "DOWN" "Modify the parameters, "LOCK" means to lock, and "OFF" means not to lock. Press the "SET" key again to exit.

Energy regulation

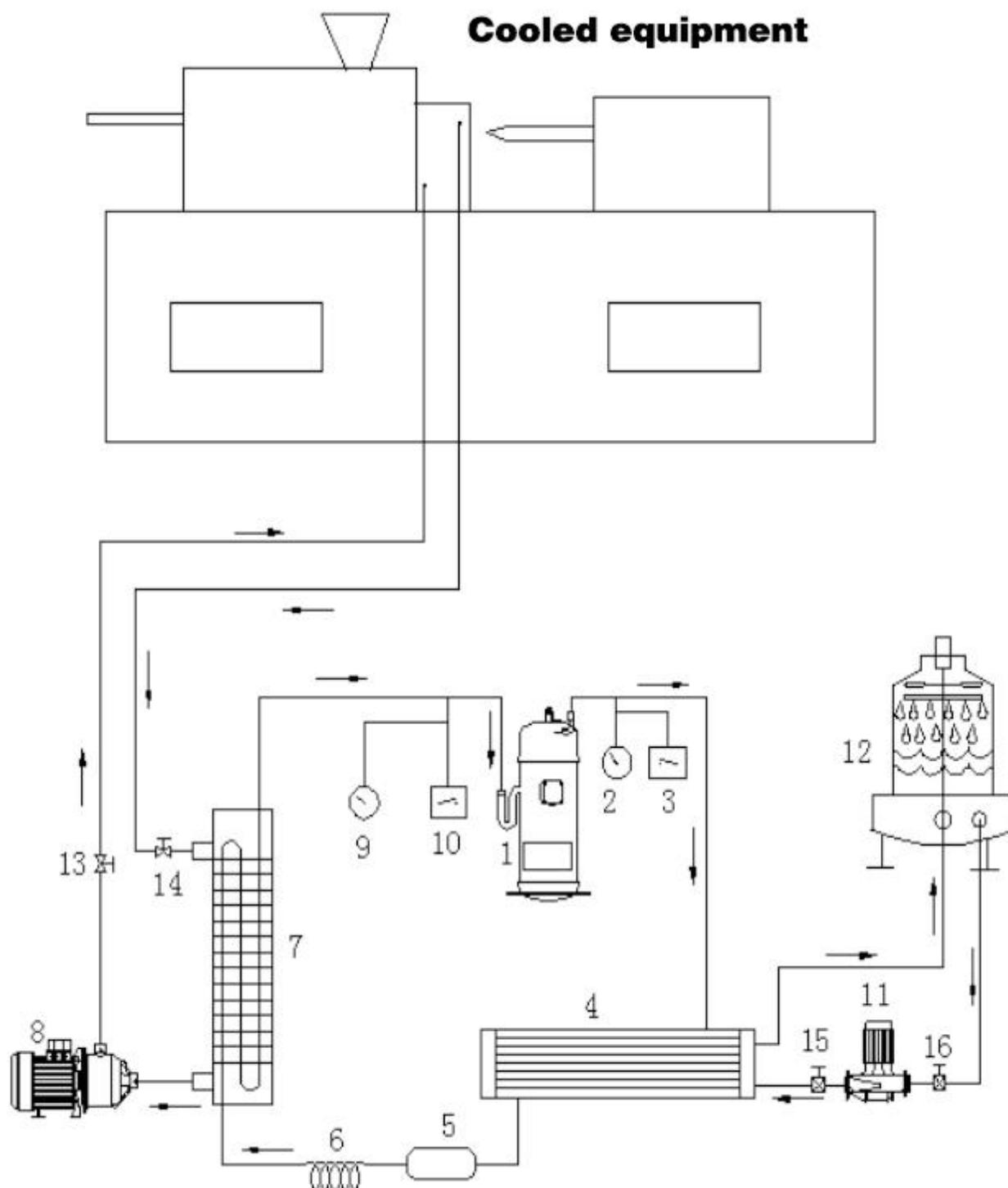
- (1) Turn on: Press the "**PUN**" key to start the machine: turn on the refrigeration pump ----- delay (time can be set)-turn on the cooling pump (cooling fan)-delay (time can be set) Set) ----- Adjust the compressor according to the energy.
- (2) Shut down: press the "**STOP**" button to stop the machine: turn off all compressors ----- delay (time can be set) ----- turn off the cooling pump (cooling fan)-delay (Time can be set) ---- Turn off the refrigeration pump.
- (3) Energy adjustment:
 - a) Only one compressor: during the heating process, start the compressor when $T \geq T_s + \Delta T$; during the cooling process, stop the compressor when $T < T_s + \Delta T$.
 - b) There are 2 compressors: during the heating process, when $T > T_s$, start one compressor, when $T \geq T_s + \Delta$, start two compressors, during the cooling process, when $T < T_s$, stop one compressor , When $T < T_s - \Delta T$, all stop.

8. Schematic diagram of air-cooled chiller



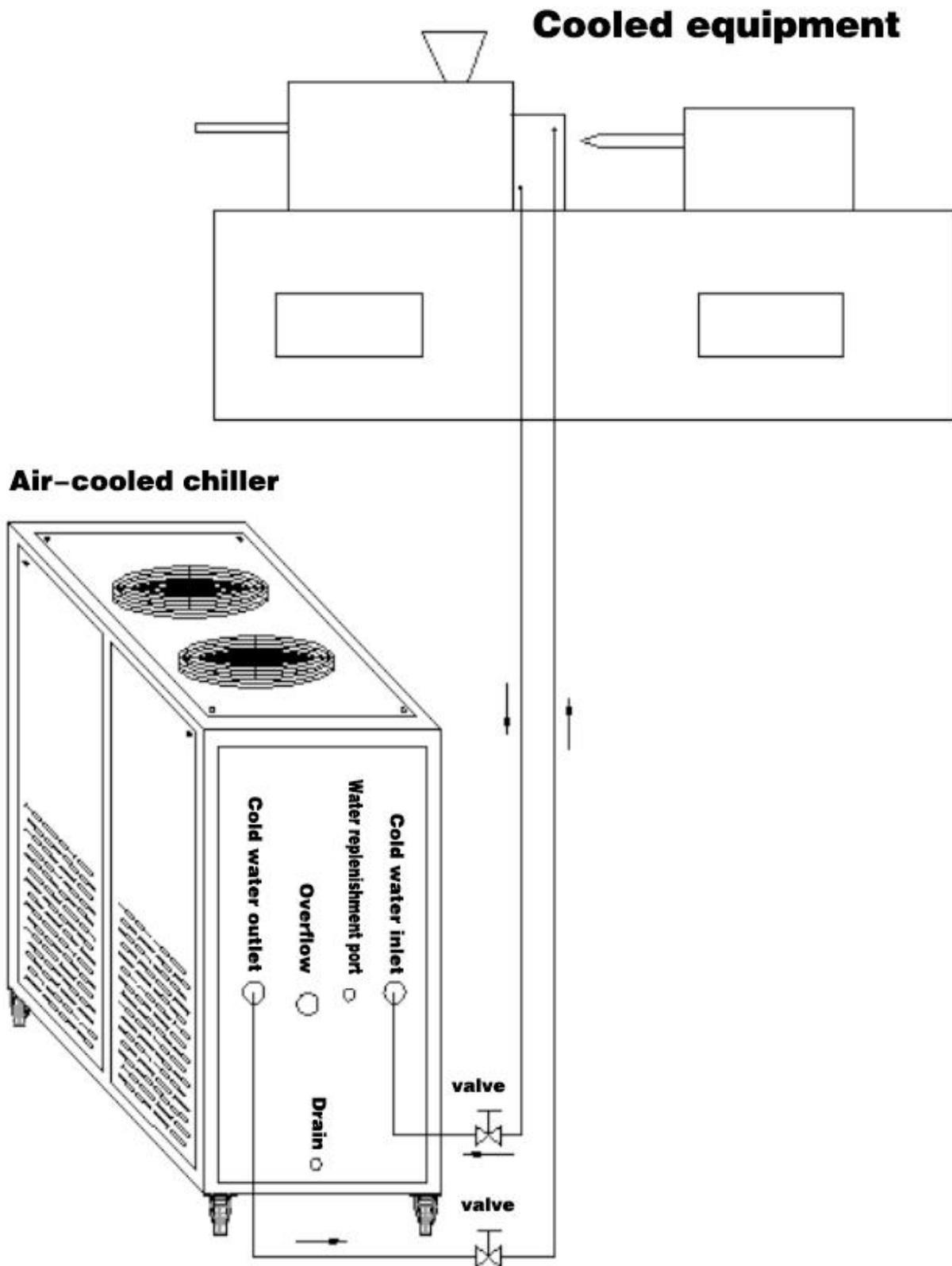
1. compressor
2. High pressure meter
3. High voltage protector
4. Condenser
5. Cooling fan
6. Filter drier
7. Capillary (expansion valve)
8. Evaporator
9. Water pump
10. Low pressure meter
11. Low voltage protector
- 12-13. Waterway valve

9. Schematic diagram of water-cooled chiller



1. compressor	8. Chilled water pumps
2. High pressure meter	9. Low pressure meter
3. High voltage protector	10. Low voltage protector
4. Condenser	11. Cooling water pump
5. Filter drier	12. cooling tower
6. Capillary (expansion valve)	13、14. Waterway valve
7. Evaporator	15、16. Waterway valve

10. Installation diagram of air-cooled chiller



11. Installation diagram of water-cooled chiller

