

GREE PRECISION INVERTER COOLER

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GREE INDUSTRY PRODUCTS

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CONTENTS

01 MACHINE OIL COOLER 02

- Product Features
- Product Parameters
- Product Operating Range
- Product Correction Ability
- Product Mounting Dimension
- Product Installation and Maintenance Requirements
- Product Supply Scope

02 MACHINE WATER COOLER 10

- Product Features
- Product Parameters
- Product Operating Range
- Product Dimension
- Product Mounting Dimension
- Product Installation and Maintenance Requirements
- Product Supply Scope



01

GREE MACHINE OIL COOLER

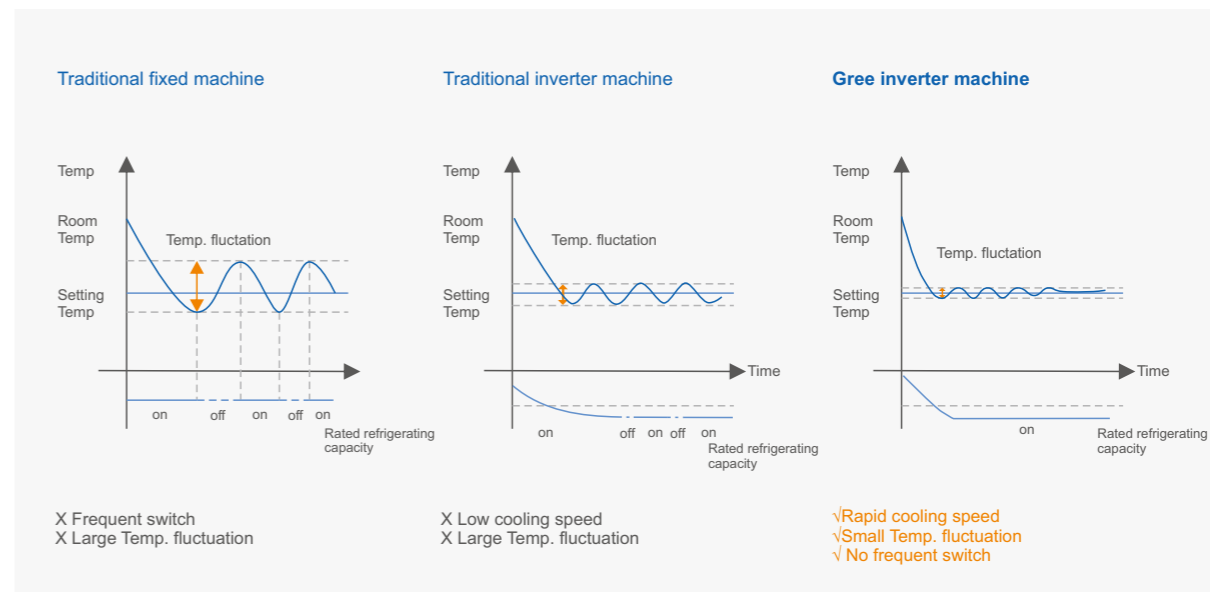
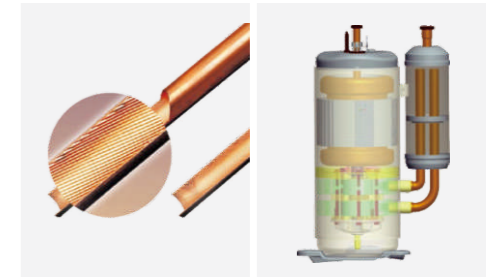
Gree Oil Cooler is a kind of special cooling equipment with the features of high efficiency, energy saving and environmental protection to provide cooling oil for various CNC machine tools (wire-cutting, grinder, machining center, etc.)

PRODUCT FEATURES

HIGH EFFICIENCY

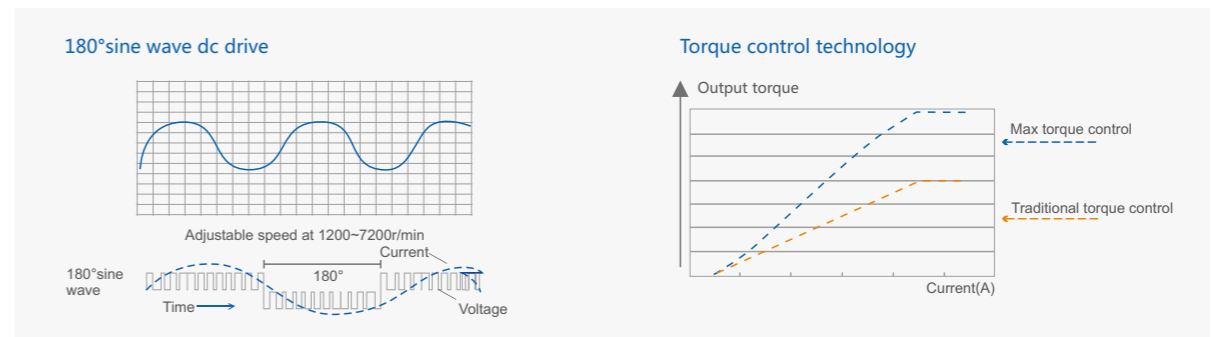
High-efficiency heat exchanger: Adopting slit hydrophilic aluminum foil fin and heat exchange copper pipe with internal thread to improve heat transfer coefficient and efficiency.

Compressor: Adopting switched inverter reluctance compressor to make full use of compressor reluctance torque, the efficiency can be increased by 5% with the under the same output capability.



Transmission technology of 180° sine wave: 180° current output smooth sine wave, with small harmonic content and torque ripple, wide adjustment range, stable motor running to meet the temperature requirements of various occasions, save energy and ensure user comfort.

Torque control technology: Adopting optimal control principle to minimize the torque output of the min current, reduce the loss of the motor winding and the intelligent power module to achieve energy-efficient operation.



HIGH RELIABILITY

inner tube, while the turbulence in the spiral tube inhibits the deposition of dirt on the surface, making the heat exchanger more efficient, compact and scale resistant.

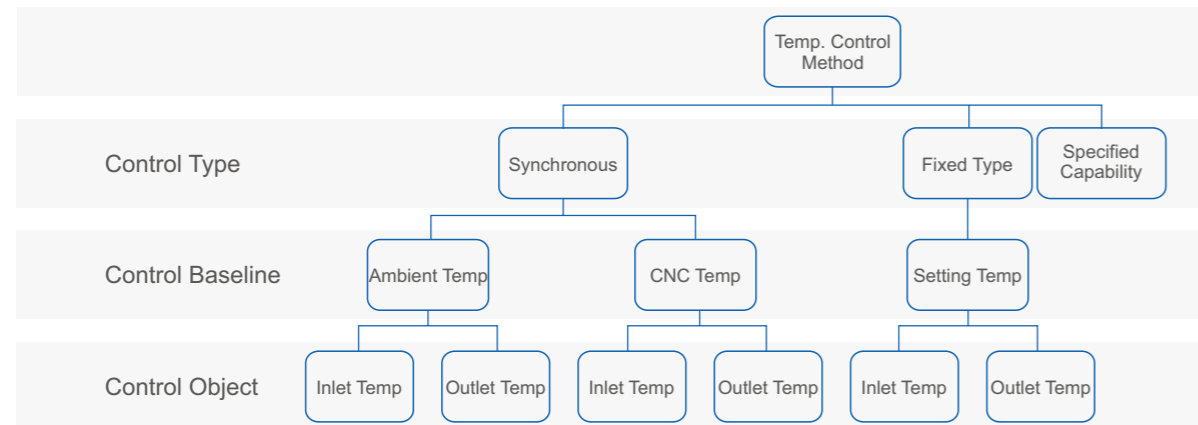


HIGH ADAPTABILITY

Oil cooler provides two temperature control methods.

Fixed type: Control the inlet or outlet oil temperature of Oil Cooler according to the customer needs.

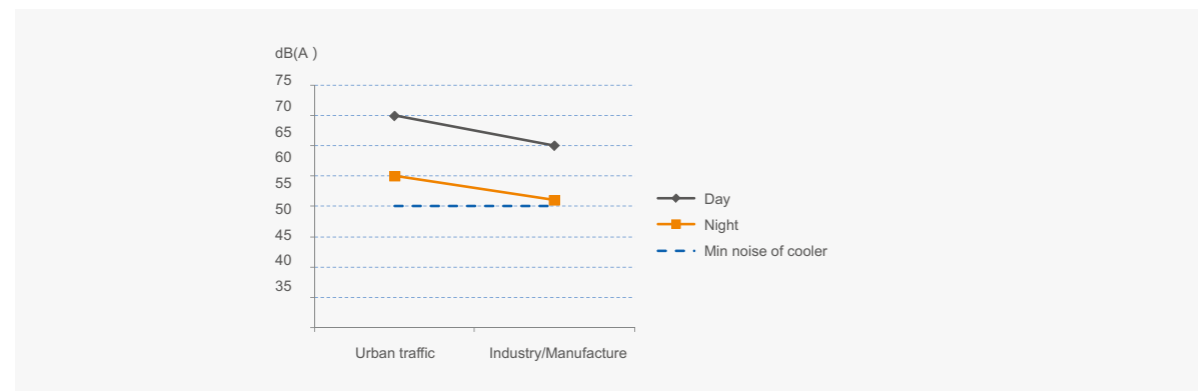
Synchronous type: The oil cooler can set the difference between oil temperature and ambient temperature (or machine temperature) to control the oil temperature.



LOW NOISE

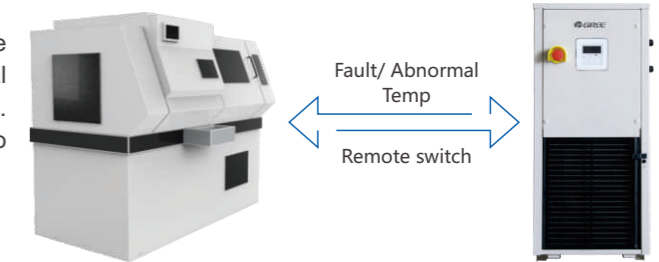
The large wind blade design can protect the air volume and greatly reduce the rotation speed and noise.

CFD simulated and designed a new type of high efficiency axial fan to optimize wind blade shape; while the blade edge curvature is more reasonable, more efficient, and less noise.



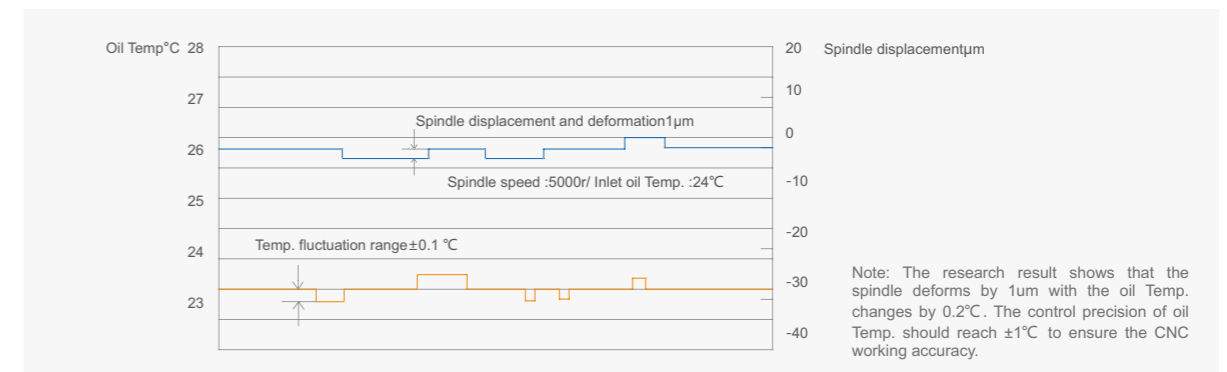
CNC LINKAGE

Connect the signal line to the machine through the alarm interface. Oil Cooler can send failure signal to the machine through signal line in case of fault. Reserve a remote switch interface for users to realize remote on-off control.



HIGH PRECISION

Gree Oil Cooler adopts inverter compressor and electronic expansion valve, and accurately controls oil temperature accuracy by $\pm 1^{\circ}\text{C}$ through PID control algorithm.



CONVENIENCE

- The front air inlet is used to remove and wash the screen
- The control panel is located on the front for user convenience
- The maintenance surface and the operation interface are on the same side for easy after-sales maintenance
- Customization can be adjusted according to customer power specification requirements



CLEANING. EASILY COPE WITH THE HARSH ENVIRONMENT OF THE MACHINE TOOLS, ALSO NOT AFRAID OF ALL KINDS OF COOLING MEDIA AND CHIP WASTE WITH STRONG ANTI-CORROSION ABILITY.

Add stainless steel filter to enhance structural strength while facilitating cleaning. Easily cope with the harsh environment of the machine tools, also not afraid of all kinds of cooling media and chip waste with strong anti-corrosion ability.

FULL PROTECTION



PRODUCT PARAMETERS

Model		LYQGE1.5F /NaAL	LYQGE2.5F /NaAL	LYQGE3.5F /NaAL	LYQGE5F /NaAL	LYQGE7F /NaAL	LYQGE9F /NaAL	
Refrigerating capacity	kW	1.5	2.5	3.5	5	7	9	
Rated refrigeration power	kW	0.7	0.95	1.25	1.6	2.5	4.0	
Power supply	3-phase AC 200-220V/380-400V 50/60Hz							
Safety protection	High-low voltage protection, Compressor over-current protection, Anti-freeze protection, Communication failure, Temp. wrap failure protection, Power reverse protection, High-low oil Temp. protection, High Temp. protection of displacement, High Temp. protection of condensation, Refrigerant leak detection, Inverter protection.							
Compressor	Type	Hermetic rotary compressor						
	Quantity	Set 1						
Oil system	Oil flow	m3/h 1.44/1.8			1.8/2.16			
	Oil-side heat exchanger	Plate heat exchanger /Casing heat exchanger						
	Max loading	Mpa 1						
	Inlet-outlet oil diameter	mm 20						
	Pipe connection method	R3/4"	R3/4"	R3/4"	R3/4"	R1"	R1"	
Air system	Air-side heat exchanger	Finned heat exchanger						
	Fan rated power	kW 0.045	0.089	0.089	0.19	0.19	0.22	
Accessories	Electric heating-H	kW 1 2 3 3 3 3 3						
	Oil pump -P	Flow	m3/h 1.44/1.8			1.8/2.16		
		Head	m -					
		Power	kW 0.75			1.1		
Oil tank-T	L	20	30	30	40	40	40	
Noise(with oil pump)	dB	55	55	55	58	58	58	
Temp. regulation	Synchronous type	Standard	Ambient Temp./ Machine Temp.					
		Temp. correction	Inlet oil Temp./ Outlet oil Temp.					
		Control object	K Relative to the reference Temp.: -10~10 (Factory default to 0)					
	Fixed type	Control object	Inlet oil Temp./ Outlet oil Temp.					
	Temp. correction	°C 5~50						
Dimensions	Standard machine	Width	mm 402	402	422	504	576	576
		Depth	mm 484	484	488	550	636	636
		Height	mm 980	980	1045	1157	1385	1385
	Tank module	Width	mm 402	402	422	504	576	576
		Depth	mm 484	484	488	550	636	636
		Height	mm 160	200	200	200	200	200
Net weight	Standard machine	kg 40	45	73	92	105	115	
	Oil pump module	kg 25	25	25	26	26	26	
	Tank module	kg 4	5	5	7	7	7.5	

Note: ①The design standard of this unit is GB/T 17758-2010. GB/T19576-2004.

②The unit performance parameters will change due to the product improvement, and The concrete parameters please refer to the product nameplate.

③Noise is the amount of half muffling room in accordance with the relevant standard test, and will change due to the ambient temperature.

PRODUCT OPERATING RANGE

Refrigeration operating range

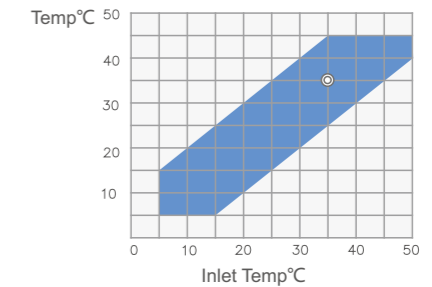
Inlet oil Temp (°C)

Ambient Temp (°C)

5~50

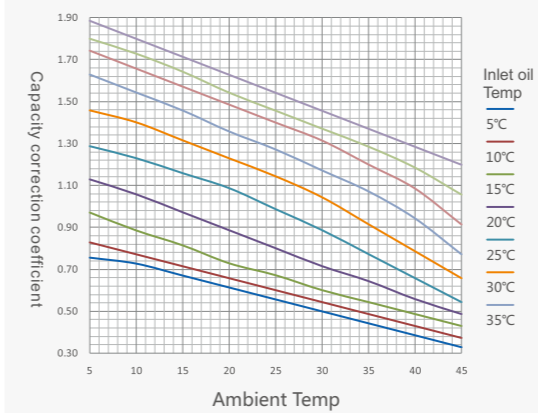
5~45

The range of the Oil Cooler is shown in the figure.
Please stop using if it is out of the range.

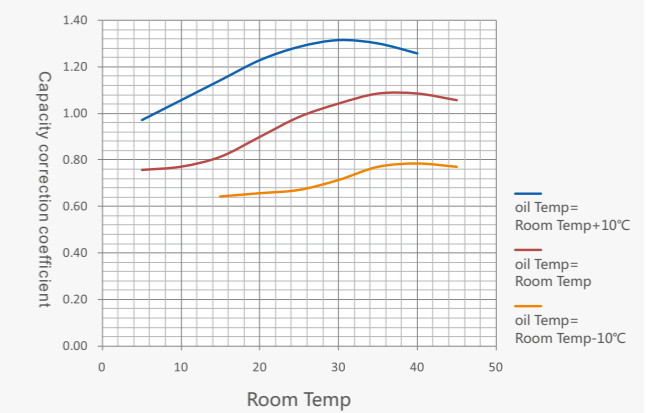


PRODUCT PERFORMANCE CORRECTION

Fixed type



Synchronous type



Product installation dimension

Model	Refrigerating capacitykW	Dimension(width x depth x height) mm
LYQGE1F/NaAL	1	402x484x980
LYQGE1.5F/NaAL	1.5	402x484x980
LYQGE2.5F/NaAL	2.5	402x484x980
LYQGE3.5F/NaAL	3.5	422x488x1045
LYQGE5F/NaAL	5	504x550x1157
LYQGE7F/NaAL	7	576x636x1385
LYQGE9F/NaAL	9	576x636x1385

PRODUCT INSTALLATION AND MAINTENANCE REQUIREMENTS

PRODUCT INSTALLATION PRECAUTIONS

Unit installation foundation

The installation foundation should be designed by the designer according to the site conditions. The unit installation foundation must be cement or steel structure and can bear its weight. The level must be horizontal and the allowable level error is 6mm/m.

Unit position and environment

The unit installation site should avoid the influence of fire, oil, mist, dust, combustible or corrosive gas. No unit can be installed outside.

Choose a place with good and smooth ventilation, and avoid the adverse effects of air exhaust and running radiography on others.

It is necessary to leave room for the installation, operation and maintenance of the unit.

Do not place anything obstructing ventilation within 500 meters of the inlet and outlet.

The installation should be guaranteed with the spare room for maintenance as shown in the following figure to ensure easy inspection work, smooth front air intake and upper exhaust.

Unit piping connection

External piping layout must comply with the relevant engineering requirements.

The logo is set near the inlet and outlet of the unit for the reference of piping connection.

Electrical installation

All electrical installations must be conducted by professionals in accordance with national and local laws and regulations.

The unit must be grounded reliably and comply with relevant requirements of GB 50169.

Please refer to the wiring diagram of the field connection.



MAINTENANCE

- The oil level in the mailbox should be kept in a normal position and prevent air intake.
- Clean the inside of the tank regularly.
- Confirm that the machine tubing is not blocked.
- Confirm that the tubing is not leaking.
- Confirm that the main power supply complies with the nameplate.
- Confirm that the compressor, fan and oil pump have no abnormal sound during operation.
- Confirm that the oil cooler has no abnormal vibration during operation.
- Clean the filter net every 3 months to prevent garbage blockage and cause low heat exchange efficiency of the condenser.
- Please use the brush and air gun for cleaning if there is serious dirt on the condenser. Do not use electric brushes, cleaning powder, laundry detergent, etc. (The sharp edges of the condenser fins are sharp, wear gloves when working)
- when the machine is shut down for a long time. Cut off the main power supply and ensure that there is no oily dirt and dust on the condenser surface of the oil cooler.

SUPPLY SCOPE

S=standard parts O=user self-provided parts P=user purchase parts

Supply Content	Type
Machine Cooler	S
Communication line	S
Power connection	S
Oil pump	P
Oil tank	P
Oil filter	O
Signal line	O



02

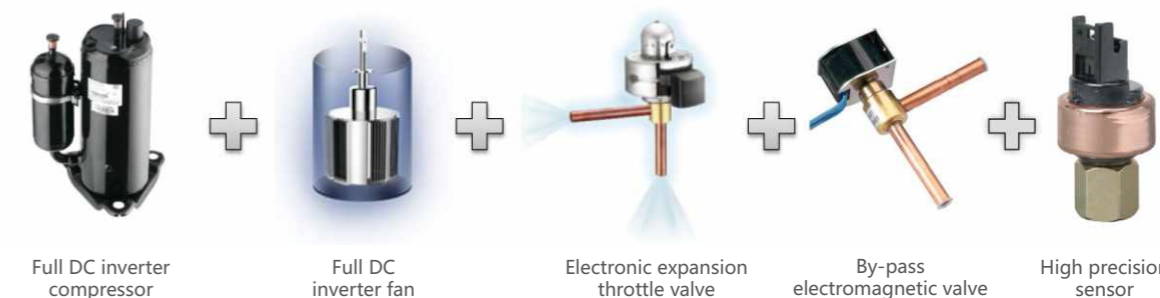
GREE MACHINE WATER COOLER

Gree Water Cooler is a kind of special cooling equipment with the features of high efficiency, energy saving and environmental protection to provide cooling water for various CNC machine tools(wire-cutting, grinder, machining center, etc.)

PRODUCT FEATURES

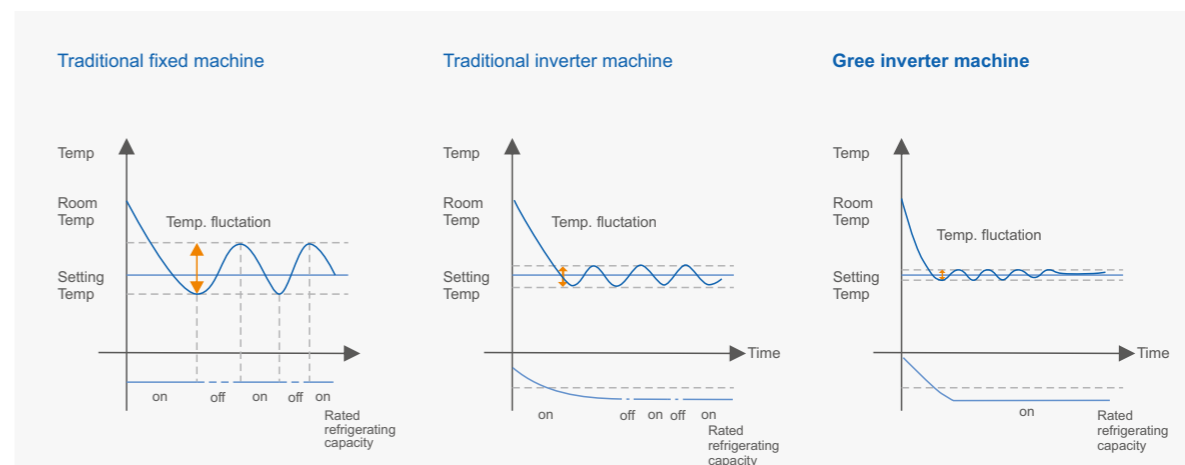
PRECISE CONTROL

The Temp. control precision of the unit can be up to 0.1°C with DC inverter control technology.



EFFICIENT ENERGY-SAVING AND ECONOMIC OPERATION

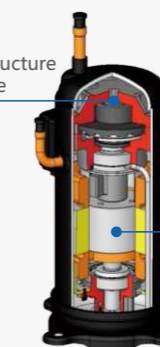
DC inverter compressor



Product Introduction—Naming Rules

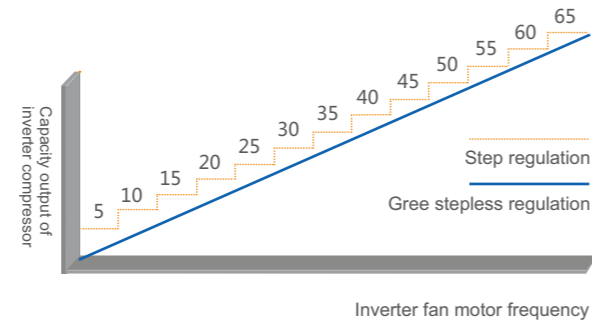
S/N	Code description	Meaning
1	Carrier coolant No.	LS- Water chiller
2	Compressor unit	Q- Enclosed
3	Compressor type	G- Single-rotor type, SG-Double-rotor type
4	Power types	D- Single phase 220V Default-Three phase 380V
5	Rated refrigerating capacity	Unit: kW
6	Cooling method	F- Air cooling
7	Refrigerant code	Na-R410A
8	S/N	Arranged by A, B, C, etc.
9	Supplementary structural code	H- Electric heating, L- Slide castor support, P- Water pump, T- Tank Z- Bracket support, Default-dose not contain the above categories. Coexist in alphabetical order

New high pressure cavity structure improves band performance

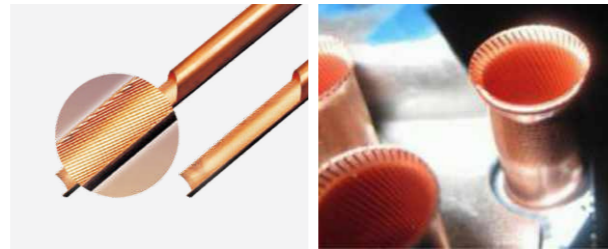


New DC motor(Concentrated winding) improve low band performance

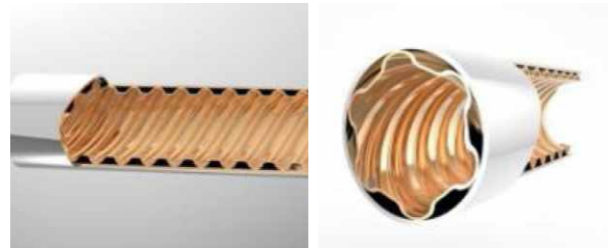
DC inverter fan motor: Adopting DC inverter fan with high-reflective electromotive force, as well as small operating current, low input power of motor, more than 30 % higher than ordinary motor efficiency.



High efficiency heat exchange tube/Finned condenser: Copper pipe adopts quality material and special internal screw structure, which improves laminar flow state in the system, makes circulation stable and efficient, and greatly improves heat exchange efficiency.

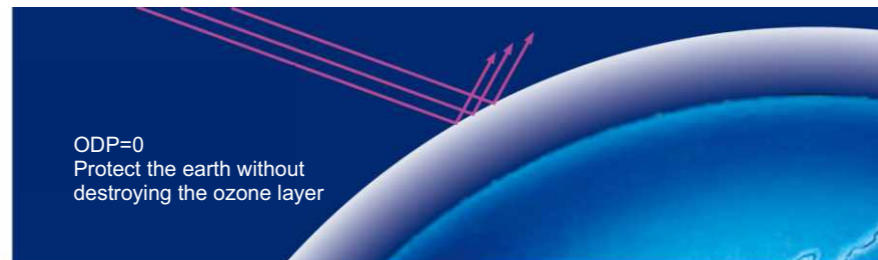


Coaxial casing evaporator: The heat exchanger pipe has better heat transfer efficiency and lower pressure loss with multi-head spiral inner tube, while the turbulence in the spiral tube inhibits the deposition of dirt on the surface, making the heat exchanger more efficient, compact and scale resistant.



ENVIRONMENTAL PROTECTION REFRIGERANT

R410A Environmental Protection Refrigerant is more energy-saving, with excellent refrigeration effect and no damage to the atmosphere.

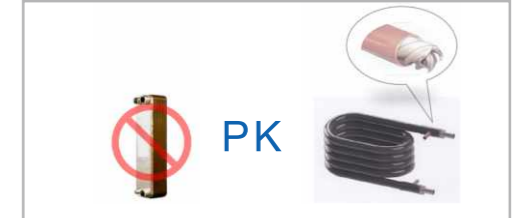


SAFE AND RELIABLE OPERATION

COAXIAL CASING HEAT EXCHANGER OF TITANIUM TUBE

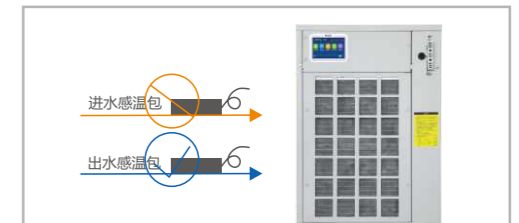
Coaxial casing structure has strong anti-dirty blocking ability. Even if the filter is damaged, it will not cause damage to the cooler.

Compared with copper tube, titanium tube has higher corrosion resistance and abrasion resistance, which can easily cope with various cooling media and chip wastes, ensuring the durability of the heat exchanger and service life of the cooler.



Equivalent replacement of control parameters

The main control parameters can be equivalently replaced, such as water inlet thermal sensor and effluent sensor. When the water inlet thermal sensor fails, the unit will switch to the outlet water temperature control while sending a fault signal to the machine tool to ensure that it can still work normally and remind the customer to carry out maintenance.



High quality parts

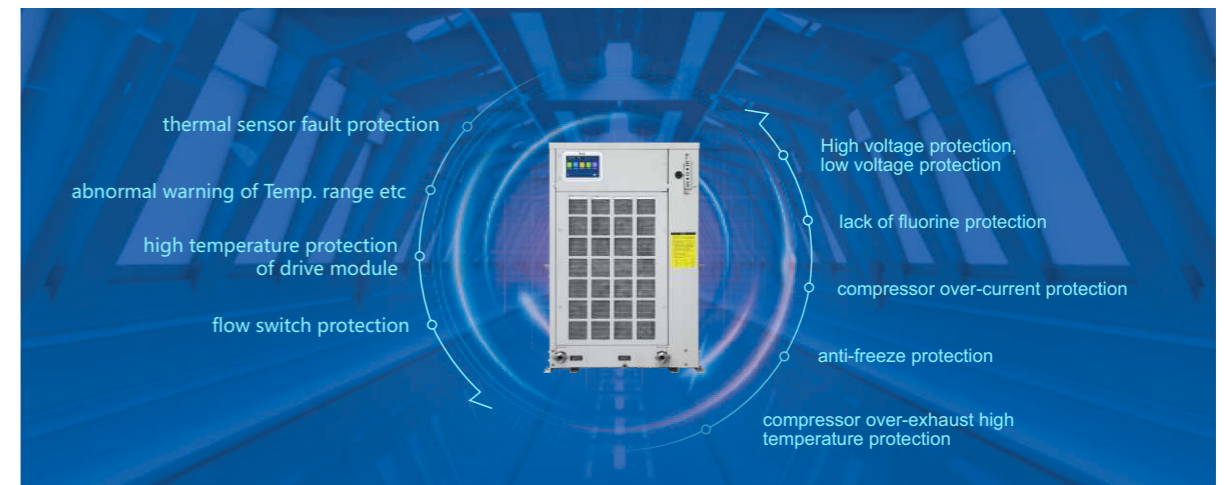
a. Improve the protection level of the electric control box for the use of environmental problems, it can up to Ip54. Locking joints are used for the internal wiring of the unit, the power supply line, and the machine tool linkage line to ensure that oil, dust, etc. cannot cause pollution inside the electric cabinet.

b. The high-precision throttling and adjusting mechanism is controlled by electronic and characterized by full range adjustment and rapid response, which can effectively adapt to the wide range of operating conditions of the unit and ensure the stable operation of the unit.



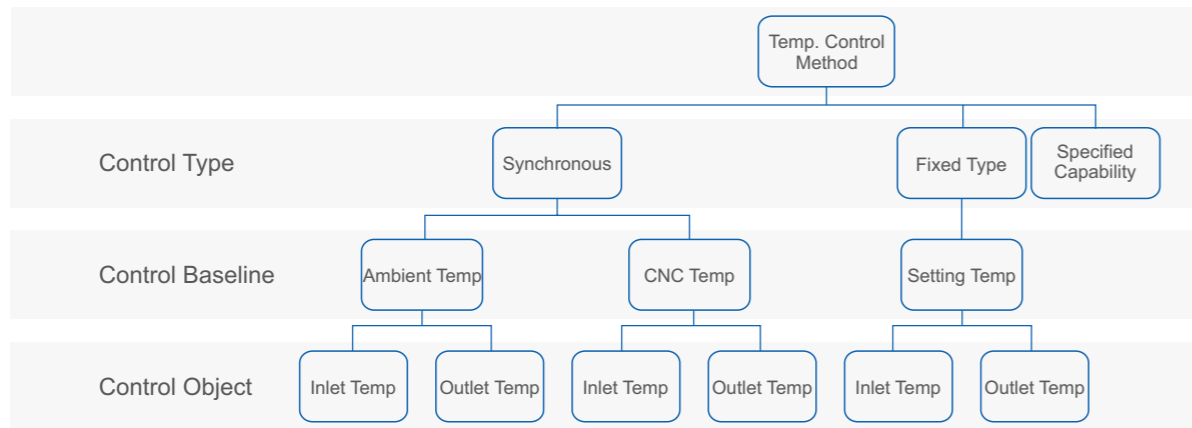
Complete system protection

Adopting microcomputer control system, the unit has over ten protection measures such as high-low voltage protection, lack of fluorine protection, compressor over-current protection, exhaust high temperature protection, anti-freeze protection, high temperature protection of drive module, flow switch protection, communication failure, thermal sensor fault protection, abnormal warning of Temp.range etc. to completely solve the hidden troubles of operation failure and ensure the safe operation of the unit.



HIGH ADAPTABILITY TO MEET WIDE RANGE

Various temperature control methods



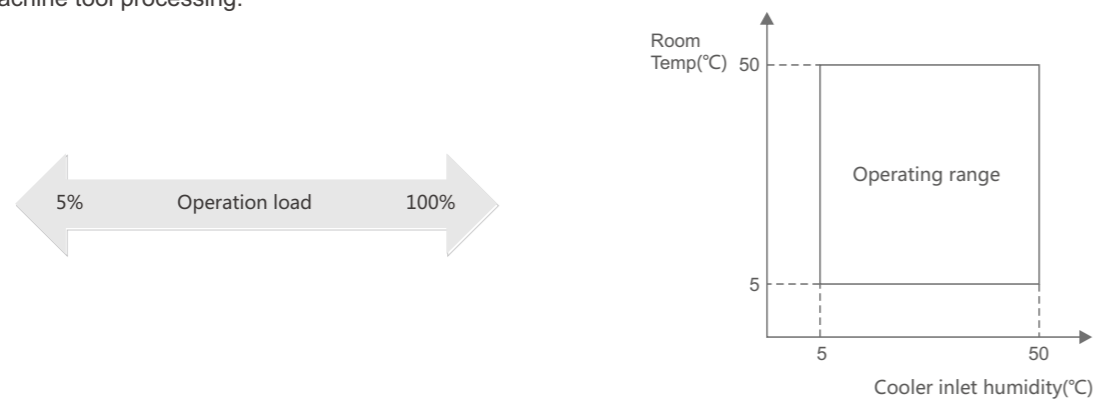
Multiple voltage adaptation



Wide load adjustment range

The mini load can reach 10% of the rated cooling capacity, which meets the various speeds of the machine tool processing.

Normal and reliable operation at room temperature of 5~52°C and inlet water temperature of 5~52°C.



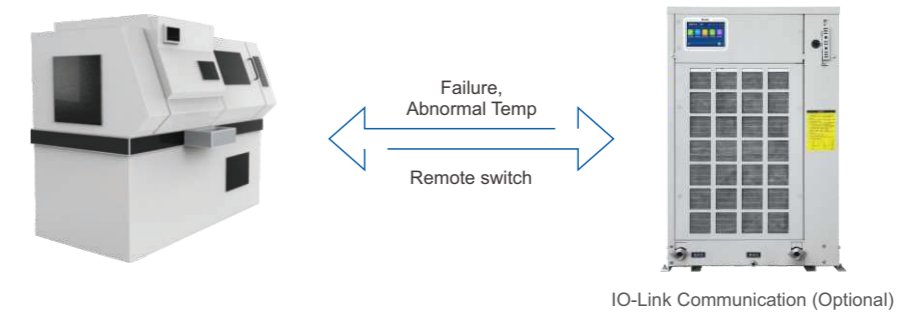
A variety of optional accessories

Hydraulic module(Water tank/ Water pump), Castor slide, Auxiliary electric heating, Communication switching board, Pressure differential bypass valve, etc.



MACHINE LINKAGE ACHIEVE REAL-TIME PROTECTION

Multiple alarm interfaces with remote switch interface. The machine tool carries on the linkage control with the actual request.



IO-Link Communication (Optional)

INTELLIGENT CONTROL, FAST AND CONVENIENT

Follow our WeChat Official Account, you can see the cooler from the mobile phone anytime and anywhere, which is convenient, fast and intelligent control.

With standard key display board and LCD touch screen operator, which can make clear design, easy operation and obvious Temp. display.



GPRS monitoring module facilitates centralized management of units, greatly reducing management costs, labor costs and labor intensity.



EASY MAINTENANCE (Optional stainless steel filter)

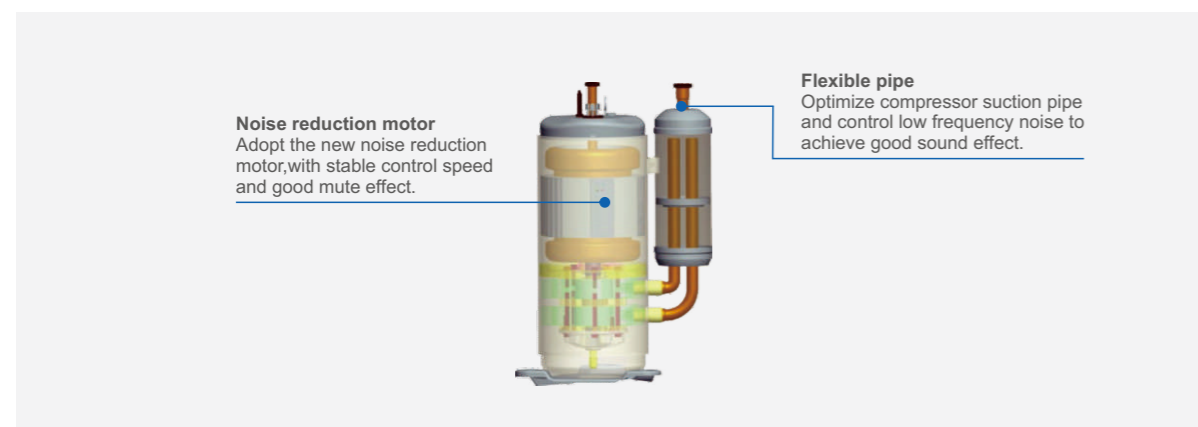
- Nylon screen for official match, with optional stainless steel filter. Easily cope with the harsh environment of the machine tools, also not afraid of all kinds of cooling media and chip waste with strong anti-corrosion ability.

- The integral water tray allows the unit to prevent condensate from splashing around during the process, eliminating the installation process and facilitating after-sale maintenance.



LOW NOISE

- Adopt noise reduction motor and optimize the compressor suction pipe to control noise and sound quality.
- CFD simulated and designed a new type of high efficiency axial fan to optimize wind blade shape; while the blade edge curvature is more reasonable, more efficient, and less noise.



PRODUCT PARAMETERS

Model		LSQGD1.5F /NaAZ	LSQGD3.5F /NaAZ	LSQGD5F /NaAZ	LSQSGD7F /NaAZ	LSQSGD9F /NaAZ		
Refrigerating capacity	kW	1.5	3.5	5	7	9		
Rated refrigeration power	kW	0.37	0.87	1.2	1.7	2.2		
Power supply	220V ~ 50Hz							
Safety protection	High-low voltage protection, lack of fluorine protection, compressor over-current protection, exhaust high temperature protection, anti-freeze protection, high temperature protection of drive module, flow switch protection, communication failure, thermal sensor fault protection, abnormal warning of Temp.range							
Compressor	Type	Hermetic rotary compressor						
	Quantity	Set	1					
Water system	Water flow	m ³ /h	0.26	0.60	0.86	1.20	1.55	
	Water resistance loss	kPa	20					
	Water-side heat exchanger	Casing heat exchanger						
	Max load	Mpa	1					
	Inlet-outlet water diameter	mm	Φ16	Φ16	Φ22	Φ32	Φ32	
	Pipe connection method	G1/2 External thread		G1 External thread				
Air system	Air-side heat exchanger	Finned heat exchanger						
Noise	dB	54	56	56	58	60		
Temp. regulation	Synchronous type	Standard	Ambient Temp./ Machine Temp.					
		Control object	Inlet water Temp. (Outlet water Temp.)					
		Temp. correction	K	Relative to the reference Temp.: -10~10 (Factory default to -3)				
	Fixed type	Control object	Inlet water Temp. (Outlet water Temp.)					
		Regulating range	°C	5 ~ 50 (10~50)				
Directly specified ability		10~100%						
Dimension	Standard machine	Width	mm	430	430	590	650	650
		Depth	mm	395	395	480	620	620
		Height	mm	860	860	910	1090	1090
Net weight	Standard machine	kg	55	55	71	105	105	

Note:① Refrigeration test conditions: water intake temperature is 25t, water flow rate is 0.172m³/(h.kw), and air side dry bulb temperature is 25t.

② Noise is the amount of half muffling room in accordance with the relevant standard test, and will change due to the environment temperature.

③ The unit performance parameters will change due to the product improvement, and there is no other notice. The concrete parameters please refer to the product nameplate.

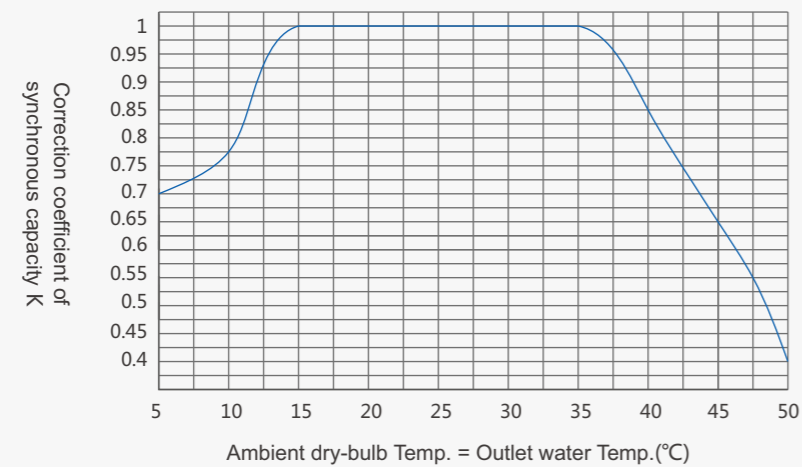
④ Suitable for refrigerant: water soluble cutting fluid, water holing grinding and industrial water.

⑤ Please connect the unit temperature sensitive package when the unit temperature is used as a standard.

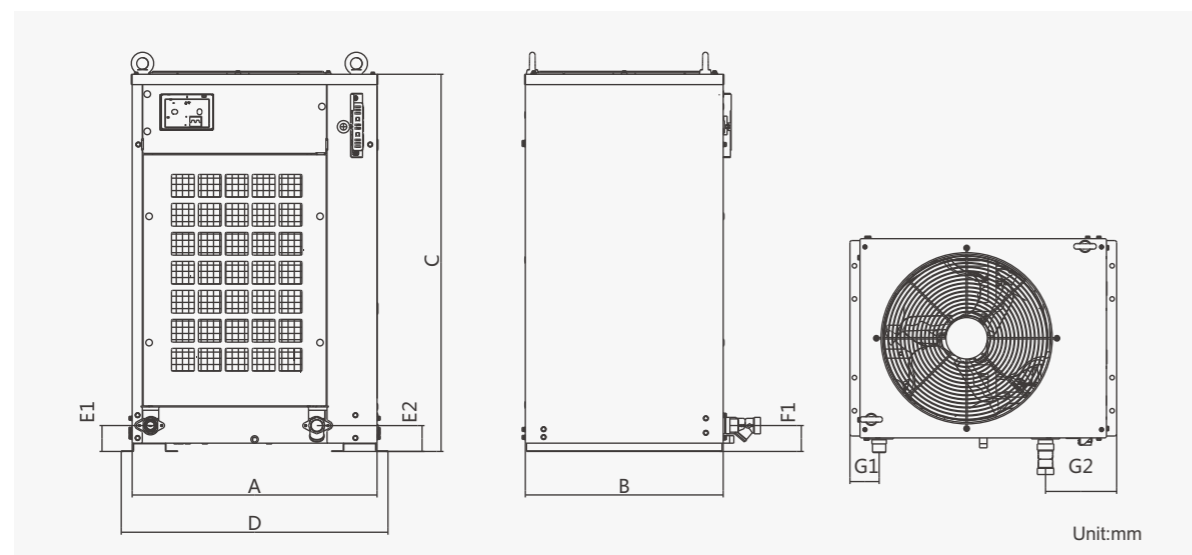
PRODUCT OPERATING RANGE

Refrigeration operating range	
Inlet water Temp (°C)	Ambient Temp (°C)
5~50	5~50

PRODUCT CAPABILITY CORRECTION CURVE



PRODUCT DIMENSIONS



Size parameters									
Model	A	B	C	D	E1	E2	F1	G1	G2
LSQGD1.5F/NaAZ	430	395	860	485	70	70	70	70	150
LSQGD3.5F/NaAZ	430	395	860	485	70	70	70	70	150
LSQGD5F/NaAZ	590	480	910	640	60	60	60	70	170
LSQGD7F/NaAZ	650	620	1090	700	60	60	60	80	180
LSQGD9F/NaAZ	650	620	1090	700	60	60	60	80	180

PRODUCT INSTALLATION AND MAINTENANCE REQUIREMENTS

Product installation precautions

Unit installation foundation

The installation foundation should be designed by the designer according to the site conditions. The unit installation foundation must be cement or steel structure and can bear its weight. The level must be horizontal and the allowable level error is 6mm/m.

Unit position and environment

The unit installation site should avoid the influence of fire, oil, mist, dust, combustible or corrosive gas. No unit can be installed outside. Choose a place with good and smooth ventilation, and avoid the adverse effects of air exhaust and running radiography on others. It is necessary to leave room for the installation, operation and maintenance of the unit. Do not place anything obstructing ventilation within 500 meters of the inlet and outlet. The installation should be guaranteed with the spare room for maintenance as shown in the following figure to ensure easy inspection work, smooth front air intake and upper exhaust.

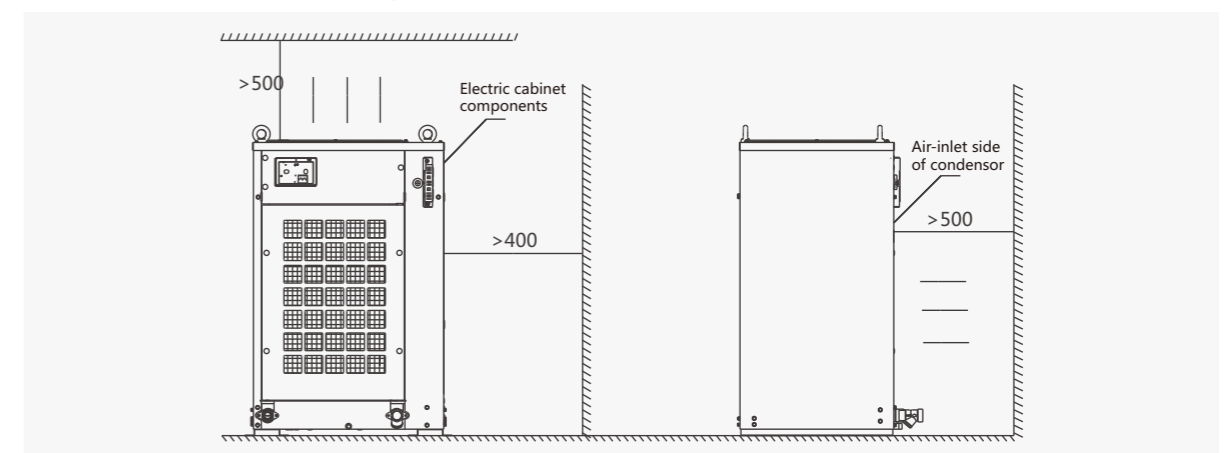
Unit piping connection

External piping layout must comply with the relevant engineering requirements. The logo is set near the inlet and outlet of the unit for the reference of piping connection.

Electrical installation

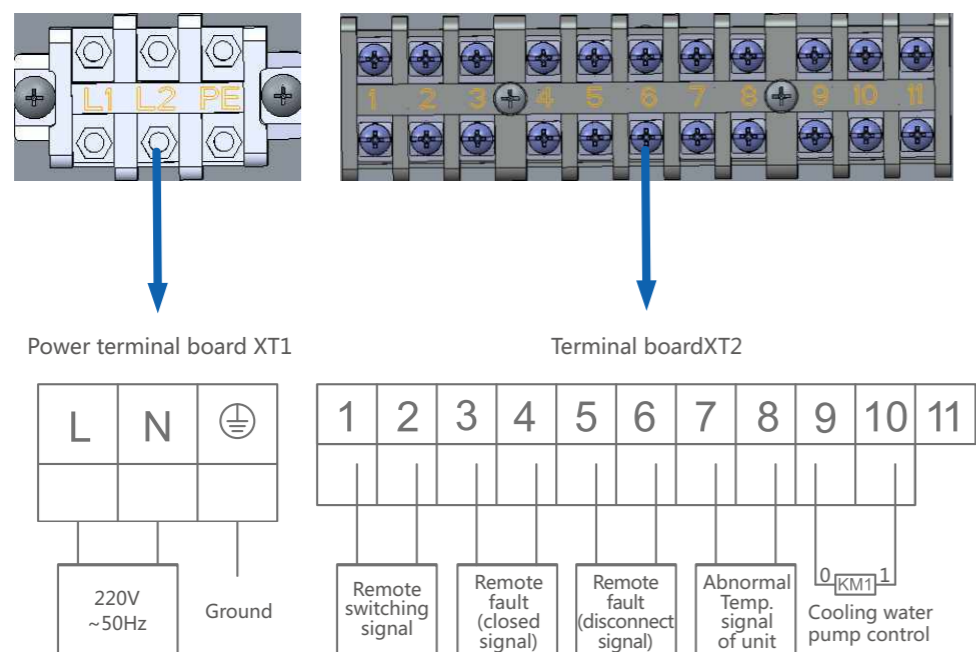
All electrical installations must be conducted by professionals in accordance with national and local laws and regulations. The unit must be grounded reliably and comply with relevant requirements of GB 50169. Please refer to the wiring diagram of the field connection.

PRODUCT DIMENSION/ INSTALLATION AND MAINTENANCE SPACE

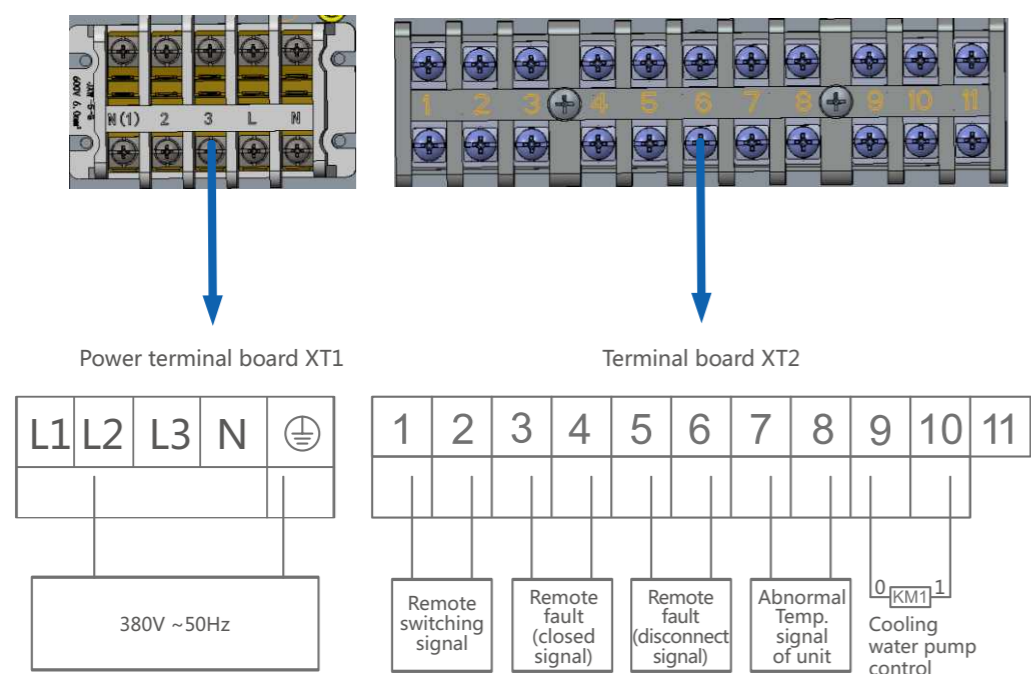


ELECTRICAL INSTALLATION

External wiring diagram : External connection of single-phase cooler



External wiring diagram : External connection of three-phase cooler



AIR SWITCH AND POWER CORD SELECTION

Model	Power type	Air switch capacity(A)	Min sectional area of power cord (mm ²)		
			Fire wire	Zero wire	Ground wire
LSQGD1.5F/NaAZ	AC 220V~50Hz	10	1.5	1.5	1.5
LSQGD3.5F/NaAZ		10	1.5	1.5	1.5
LSQGD5F/NaAZ		10	1.5	1.5	1.5
LSQGD7F/NaAZ		32	6.0	6.0	6.0
LSQGD9F/NaAZ		32	6.0	6.0	6.0
LSQG1.5F/NaAZ	380V 3N~50Hz	10	1.5	1.5	1.5
LSQG3.5F/NaAZ		10	1.5	1.5	1.5
LSQG5F/NaAZ		10	1.5	1.5	1.5
LSQSG7F/NaAZ		20	4.0	4.0	4.0
LSQSG9F/NaAZ		25	4.0	4.0	4.0

Note:①The selection of air switch and power cord specifications in the above table are based on the max power of the unit(max current), the power cord specification in the above table is suitable for 40°C, and working temperature of the cable is 90 (YJV copper core polychlorinated sheathed power cable). It is concluded that (GB/T16895.15). If the using conditions are different, please adjust according to the national standard.

②If the length of the power is greater than 15 meters, please increase the cross section of the power properly to avoid accidents due to overload.

③The empty capacity and power doesn't need the auxiliary electric heater.

④The air switch specification in the above table is based on the environment temperature of 40 when it is working, and if the using conditions are different, please check and adjust according to the specification of it.

PRODUCT SUPPLY SCOPE

S=standard parts O=user self-provided parts P=user purchase parts

Supply content	Type
Machine Cooler	S
Filter	S
Water pump	P
Transformer	P
Water tank	P
Communication line	P
Castor slide	P
Communication switch board	P
Power connection	O
Control connection	O
Drain pipe D	O
Pressure gage	O
Thermometer	O