Drummond™
DCW / Cool Water

AIR COOLED SCROLL CHILLERS

DLAS Series

COOLING CAPACITY: 32.4 - 650 KW

HEATING CAPACITY: 34.3 - 690 KW

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Features

Unit Characteristics

The DLAS series is a high-efficiency air-cooled module cold water (heat pump) unit from Drummond. It is designed and manufactured according to industry standards to ensure high performance and high reliability. The series products are compact in shape, reasonable in layout, convenient in use and maintenance. The whole series of units have reached the national energy-saving product standards, providing comfortable air- conditioning environment for villas, office buildings, factories, supermarkets and many other occasions.

The free cooling type unit directly obtains refrigerating capacity from the external low-temperature air in transition seasons and winters, so as to obtain low-temperature water. In the whole process, only the fan consumes electric energy, and the compressor runs under partial load or stops running completely, saving energy consumption by more than 90%, greatly reducing the operating cost of the unit and bringing higher economic benefits to customers. It can be widely used in data centers, communication rooms, metallurgy, electronics, pharmacy, chemical industries and other places that need refrigerating capacity all year round.

Nomenclature

D L AS C 33 HP D X Q

- D — DRUMMOND
- L — Liquid chiller
- AS — *(Type) AS-Air Cooled Scroll AX-Air Cooled Screw WS-Water Cooled ScrollWX-Water Cooled Screw
- C — *(Type) C-constant speed compressor V-Inverter compressor
- 33 — *(cooling Capacity KW)
- HP — Blank-cooling only HP-Heat Pump
- D — Power Supply
  - B- 220V/1P
  - C- 208-230V/3P
  - D- 380-415V/3P
  - E- 460V/3P
- X — HZ
  - X- 50Hz
  - Y- 60Hz
  - Z- 50Hz&60Hz
- Refrigerant Type
  - Blank-R410a
  - F-R32
  - R-R134a
- Climate Type
  - Blank-T1
  - T-Tropical T3
- Q — Special design

Efficient hermetic scroll compressor

World-renowned brand fully enclosed scroll compressor, unique axial and radial flexible design, efficient and stable operation;

Low-pressure chamber structure design, the crankcase is in the low temperature area, the refrigerant cools the motor and prolongs the service life;

By cycling off compressor operation to match building load, no energy is being wasted when room load requires lesser cooling capacity. No total shut down when servicing or repairing a faulty compressor.

High-intensity scroll design, strong resistance to liquid hammer;

Unique ASTP overheat protection design to prevent overheating and wear of the compressor and ensure the reliability of compressor operation;

Special DU bearing design, special surface coating, improve bearing surface strength, reduce running resistance, and greatly improve compressor mechanical efficiency.

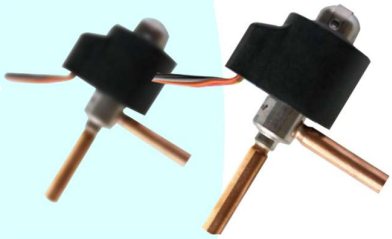
Environmental friendly

Drummond air cooled scroll chiller (heat pump) uses eco-friendly refrigerant R410A.Such chlorine-free refrigerant does not harm the ozone layer (Drummond-ODP), and is stable and nontoxic. Therefore, it is environmental friendly. In addition, it is good in heat exchanging, which could help boost the unit performance and lower energy consumption.

Optional with R32 new refrigerant gas.

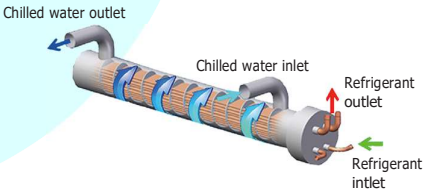
High-precision electronic expansion valve

The unit adopts the electronic expansion valve of premium brand for precise adjustment of refrigerant flow. An with Drummond's patented control technology, refrigerant in the system is dynamically adjusted to suit the load demands in a fast and accurate way, to greatly improve the unit energy efficiency.



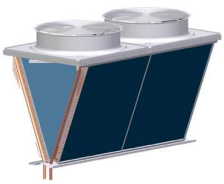
Efficient water-side shell-and-tube heat exchanger

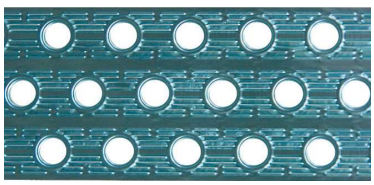
The water-side heat exchanger employs the efficient shell-and-tube heat exchanger. Compared with the plate heat exchanger, the shell-and-tube heat exchanger provides wider water-side channels and produces less water resistance and scale, with less possibility of being blocked by impurity. Therefore, the shell-and-tube heat exchanger raises lower requirements for water quality and is equipped with more powerful anti-freezing capability.



Efficient air-side heat exchanger

The unit uses the well-known hermetic efficient scroll compressor and the optimized scroll and sealing ring so that the refrigerant compressor features axial and radial flexibility. This not only effectively reduces refrigerant leakage, but also raises the volumetric efficiency of the compressor. Moreover, each compressor is equipped with a unidirectional discharge valve to avoid backflow of the refrigerant and ensure that the compressor can run stably in the full operating condition.





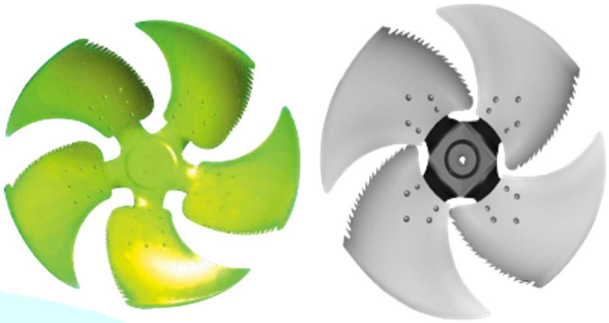
Low noise and high efficiency airfoil axial fan

•The use of aviation flap technology effectively reduces the vortex at the wing end, reduces eddy current noise, increases the strength of the impeller, reduces vibration, and improves the overall energy efficiency of the impeller and the fan;

•The trailing edge of the impeller is bionic-shaped, and the airflow is cut and combed to form an ideal airflow, which effectively reduces noise;

•Low-noise and high-efficiency airfoil axial flow fan, after strict static and dynamic balance experiments, obtain the best operating conuitions of the wind turbine;

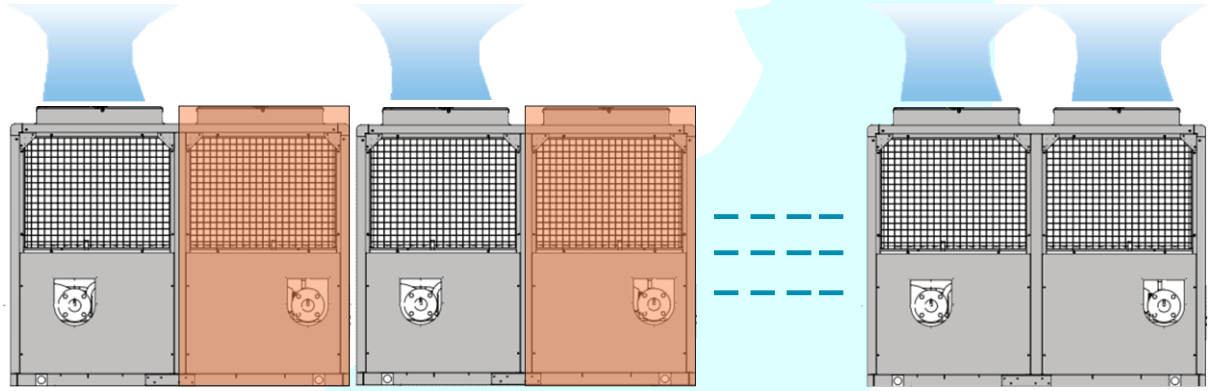
•The high-efficiency motor is adopted to optimize the design of the motor coil to effectively reduce the power consumption of the motor and improve the operation efficiency.



Intelligent defrost technology

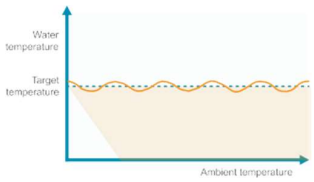
•When the unit is running in heat, the controller monitors the operating parameters of the system such as the wing temperature and the ring temperature in real time, intelligently determines the unit's entry time, intelligently defrosting the frost, and the frost is completely free of frost; at the same time, the manual defrost function can be realized.

•The single module can simultaneously defrost and heat, and the unit adopts multiple refrigerant systems to operate completely independently. It can realize single module side defrost and heat, and the winter heating operation is more stable. When multi-module is combined, the single module machine can be defrosted without affecting the normal heating operation of other modular machines. At the same time, each single-module machine can realize edge defrost heating to ensure the system heating effect.



Intelligent dynamic temperature control, stable and efficient operation

The new generation intelligent controller is used to intelligently control the outlet water temperature to stabilize at the target temperature value, accurately control the temperature, and protect the unit to operate stably and efficiently within the safe range.



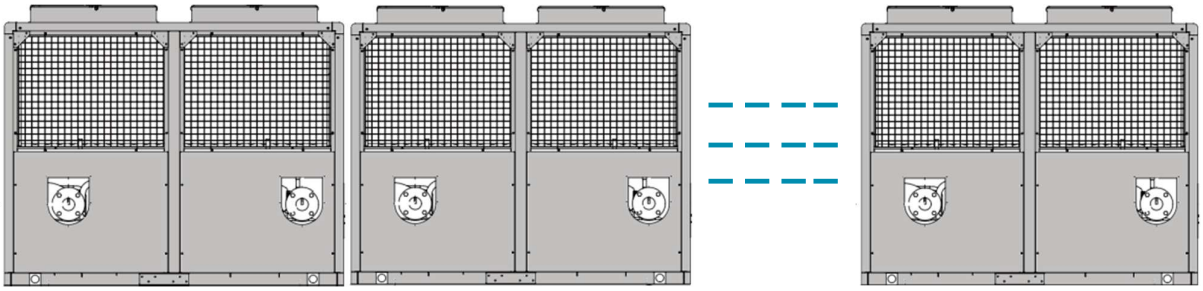
High efficiency & energy saving

According to the national authoritative detection institute, the EER of Drummond air cooled scroll chiller (heat pump) at full load is greater than 3.3,reaching and exceeding national grade 2 energy efficiency standard. Drummond air cooled scroll chiller (heat pump) has achieved the Energy Conservation Certification issued by the authoritative detection institute certified by China National Accreditation Service for Conformity Assessment (CNAS), and has been included into the energy-saving product procurement list of China.

The whole unit adopts air-cooled mode without the need of large external equipment such as boiler and cooling tower, thereby reducing initial investment and OPEx of users. Drummond air cooled chiller (heat pump) efficiently saves energy, having safe and eco-friendly characteristics.

Modular combination, flexible design

•A single module can be combined with 16 units to easily meet the needs of large cooling applications.

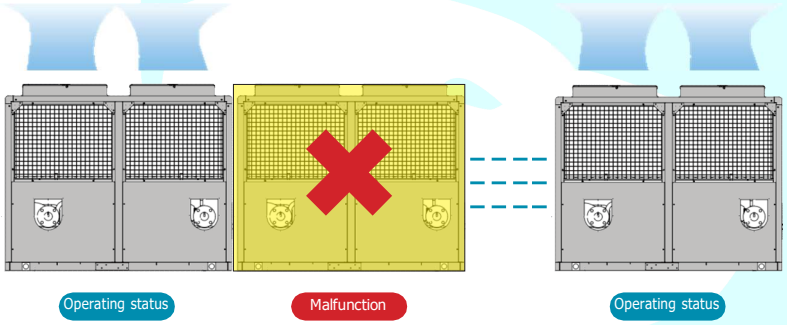


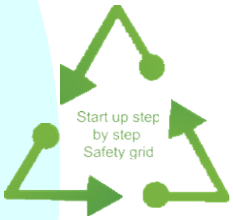
•Modular combination, multi-compressor multi-system design, multi-level capability adjustment, and comprehensive performance coefficient IPLV under partial load is more excellent.

•Each compressor is started step by step, reducing the starting current of the unit and reducing the impact on the grid.

•The units operate independently of each other, and one or several units fail, which does not affect the normal operation of other units, and only needs to be maintained for the faulty units.

•Compressor operation control at all times ensures that all compressors work in the same time and extend the service life of the machine.

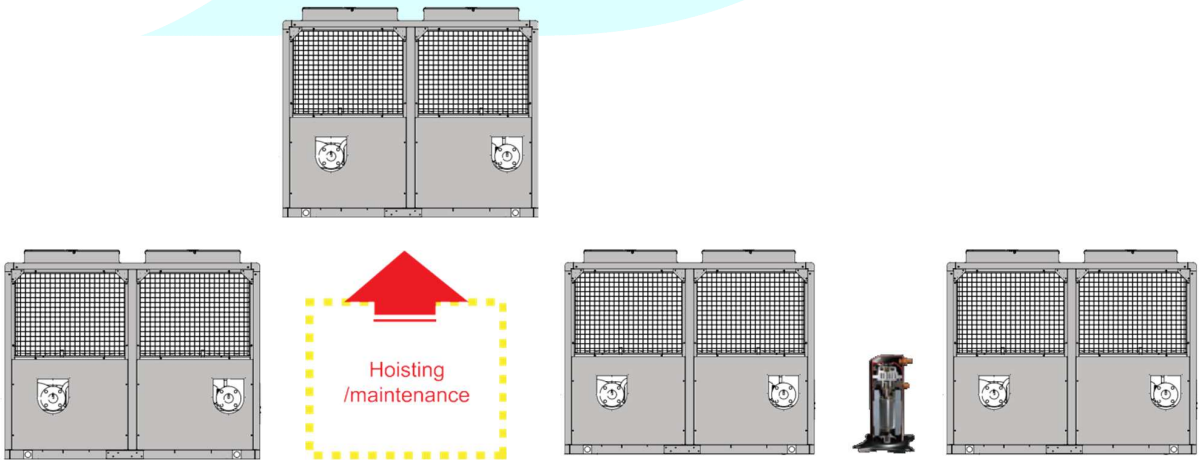




•The module combination is convenient for transportation and installation, and is convenient for maintenance.

•The following configurations are available according to customer requirements.

- •Flow switch
- •Water system filter
- •40mm evaporator insulation
- •Machine protection net
- •Rubber cushion
- •Spring cushion
- •Heat recovery configuration
- •Annual refrigeration unit
- •Annual heating unit



Multiple security protection

•System multiple security protection, software control and hardware combination, after a lot of experimental verification, and detection of extremely harsh conditions, to achieve smarter and more secure protection. (The following are some of the main protection features)

•Phase sequence protection
•Water temperature too high / too low protection
•Suction/exhaust pressure protection
•Water system filter
•Low water flow protection
•Frost protection
•Sensor fault protection
•Exhaust temperature protection
•Compressor and motor overload protection

Diversified control functions

Circulating water pump interlocking + Auxiliary electric heater interlocking + Fan coil interlocking.

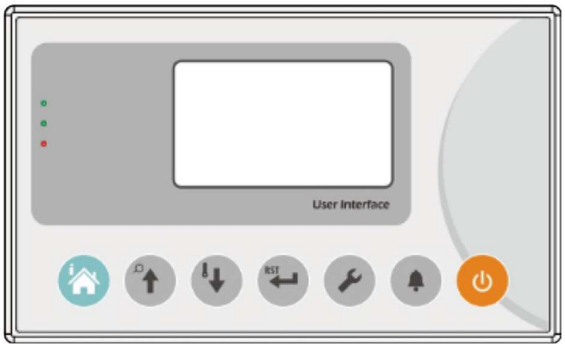
•The control panel of the unit reserves the water pump interlocking control interface, auxiliary electric heater interlocking control interface, and the external interlocking interface. The unit supports interlocking control of the master water pump to prevent the unit from being damaged due to asynchronous startup of the water pump and unit. In winter, when the unit runs in heating mode, the switch of the auxiliary electric heater is controlled based on the load demand and the unit running status. The unit supports interlocking control of fan coil, controls unit power-on/power-off and loading/unloading according to the usage of the air side devices, thus enabling automatic running.

Remote power-on/power-off/mode switchover + Remote centralized control + Building automatic control

•The control panel of the unit reserves the remote wired control switch/ mode switchover interlocking interface. By adjusting the DIP switch, enable remote power-on/power-off/mode switchover. The reserved remote communication interface of the unit helps enable remote monitoring of the unit running and switch control. The unit is equipped with an RS485 communication interface that supports Modbus protocol. The unit supports building automatic control (BAS) system to enable centralized control and smart management of multiple modules.

User-friendly control

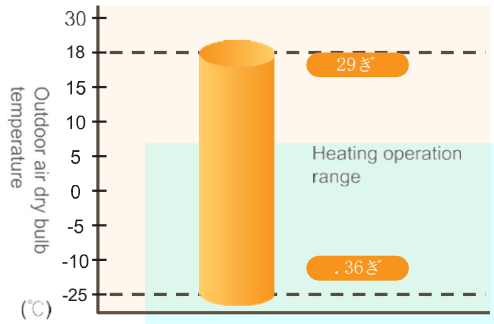
•The unit is equipped with a perfect control program, providing the following functions: balanced running of the compressor, standby operation, smart anti-freezing running, manual defrosting, automatic fault judgment, automatic fault handling, and automatic alarm display. Additionally, the control part can use a multi-functional centralized controller (with keys/7" touch screen). The centralized controller can be customized to provide multiple functions, such as scheduled power-on/ power-off, running on weekends/in holidays, memory upon power-off, and multi-level passwords.

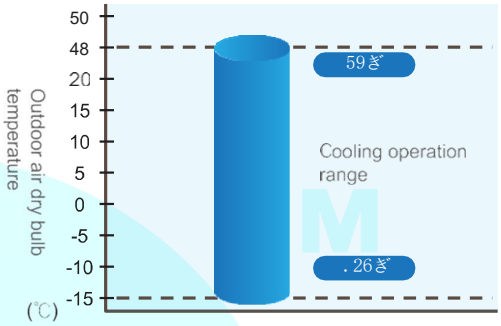


Standard Scroll Chiller

Wide operating range

The wide operating range and flexible response to the outdoor environment greatly enhance the stability and applicability of the unit. Unit standard operating ambient temperature is -12℃ ~ 18℃ in heating, 18℃ ~ 48℃ in cooling. With optional accessories, the ambient can reach -25℃ in heating, -15℃ in cooling.





Energy efficient

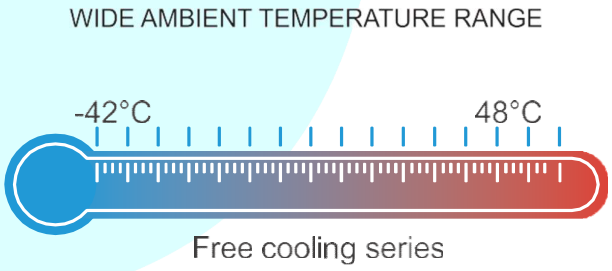
Drummond air-cooled module cold water (heat pump) unit, tested by authoritative organizations, and issued China's energy-saving product certification, and is listed as a government procurement list of China's energy-saving products, while saving energy and efficiency, more safe and environmentally friendly.

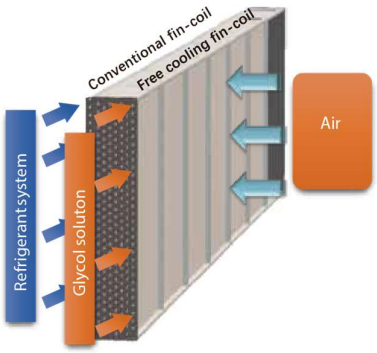
Free Cooling Option

For industrial or civil applications where cooling capacity required is stable in any outdoor condition and it is not affected by outdoor temperature, using solutions that exploit low outdoor temperatures for supplying cooling capacity for free is strongly suggested.

When the outdoor temperature is lower than the temperature of the system's return water, the free cooling system recovers cold from the external environment and reduces the operation of the compressors until they stop completely.

Solution is: Built-in free cooling heat exchanger, less space; Free cooling and compressor refrigeration sharing a set of fans, energy saving and easy maintenance.



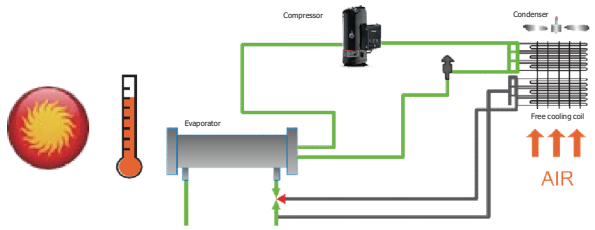


Antifreeze circulation scheme

Three operating modes

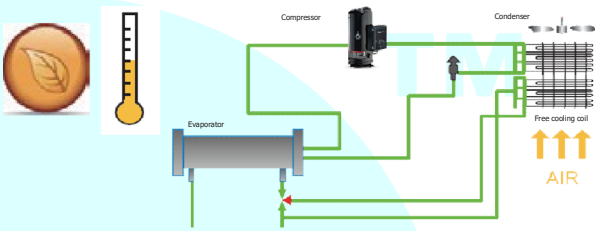
Summer 35° C

•In summer, the refrigeration is operated like a conventional air-cooled chiller, the compressor and fan are turned on, and the return water of the chilled water flows directly through the evaporator.



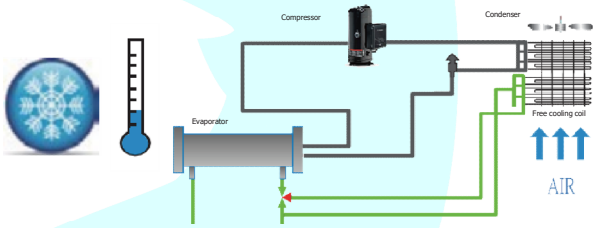
Transition season 10° C

•In transition season, when outdoor ambient temperature is lower than return water temperature of the chilled water, the free cooling function is on. The return water of the chilled water is pre-cooled by the free cooling coil, and then enters the evaporator (Compressor only outputs part of its capacity). The lower outdoor ambient temperature is, the greater the cooling capacity of free cooling.



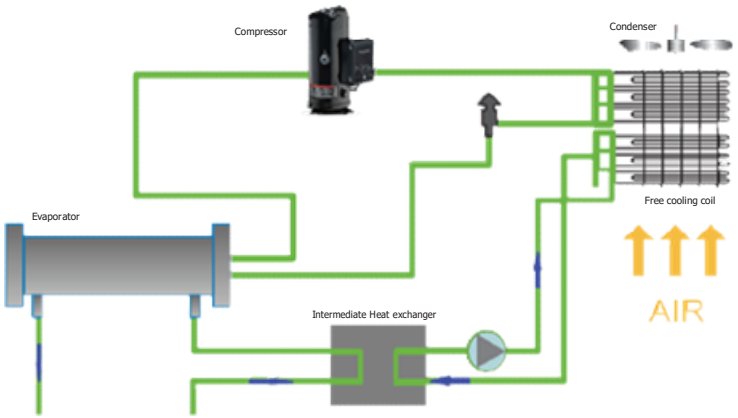
Winter 0° C

•In winter, when the outdoor ambient temperature is low enough for all indoor cooling capacity, the return water of the chilled water passes through the free cooling coil, and the chilled water is completely cooled by the outdoor cold air. At this time, the compressor is turned off and only a small amount of fan energy is consumed (compressor does no work), to 100% free cooling.



Non-antifreeze coolant circulation scheme

When the indoor circulation of ethylene glycol solution is not allowed, the indoor pure water circulation of chilled water can be selected. The natural cooling air-cooled scroll chiller adopts an integrated design. The unit has built-in natural cooling coils, intermediate heat exchangers (plate changers), glycol water pumps, expansion tanks and other natural cooling functional accessories, and the natural cooling coils in the outdoor host. The inner part has been filled with ethylene glycol solution before leaving the factory. The indoor chilled water (pure water) circulates and exchanges heat with the outdoor ethylene glycol solution through an intermediate heat exchanger (plate exchange).



Physical Specifications

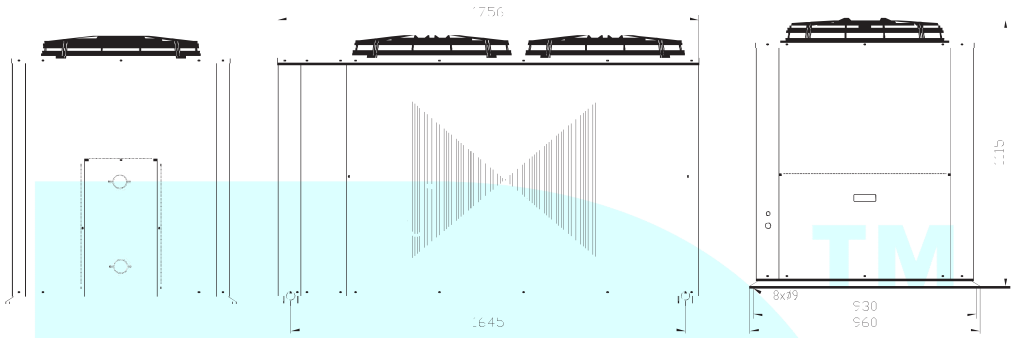
Model			DLASC33HPCY	DLASC65HPCY	DLASC100HPCY	DLASC130HPCY	DLASC170HPCY	DLASC200HPCY	DLASC260HPCY
Capacity		Ton	10	20	30	40	45	55	75
Cooling Capacity		kW	32.4	65	100	130	165	195	260
Heating Capacity		kW	34.3	70	107	138	175	207	276
Input power (Cooling)		kW	10.9	21.9	33.8	44.7	56.8	67.1	89.4
Input power (Heating)		kW	10.7	21.7	33.6	44.3	56.3	66.6	88.6
Power supply			230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A	R410A
Compressor		Type	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
		Qty	1	2	2	2	4	3	4
Condenser		Type	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin
Condenser Fan	Drive type		Direct drive	Direct drive	Direct drive	Direct drive	Direct drive	Direct drive	Direct drive
	Qty		2	2	2	2	4	4	4
	Air flow rate	m³/h	2x5700	2x12000	2x19000	2x21500	4x15000	2x21500+2x12000	4x21500
Evaporator	Type		Shell and tube	Shell and tube	Shell and tube	Shell and tube	Shell and tube	Shell and tube	Shell and tube
	Water pressure drop	kPa	45	48	52	53	55	58	60
	Fouling factor	m²•℃ /kW	0.086	0.086	0.086	0.086	0.086	0.086	0.086
	Pipe size	DN	40	50	65	65	80	80	100
	Water flow rate	m³/h	5.6	11.2	17.2	22.4	28.4	33.5	44.7
Dimension	Length	mm	1756	2054	2054	2260	2260	2430	2430
	Width	mm	960	1100	1100	1250	2050	2260	2260
	Height	mm	1115	2013	2125	2375	2375	2494	2494
	Weight	kg	320	640	870	1120	1450	1800	2300

Model			DLASC325HPCY	DLASC390HPCY	DLASC455HPCY	DLASC520HPCY	DLASC585HPCY	DLASC650HPCY
Capacity		Ton	90	110	130	150	170	185
Cooling Capacity		kW	325	390	455	520	585	650
Heating Capacity		kW	345	414	482	552	620	690
Input power (Cooling)		kW	112.1	134.1	156.9	178.8	201.7	223.5
Input power (Heating)		kW	110.8	132.9	155.1	177.2	199.1	221.5
Power supply			230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz	230V/3ph/60Hz
Refrigerant			R410A	R410A	R410A	R410A	R410A	R410A
Compressor		Type	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
		Qty	5	6	8	8	10	10
Condenser		Type	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin	Cu tube/Al fin
Condenser Fan	Drive type		Direct drive	Direct drive	Direct drive	Direct drive	Direct drive	Direct drive
	Qty		6	6	8	8	10	10
	Air flow rate	m³/h	4x21500+2x12000	6x21500	6x21500+2x12000	8x21500	8x21500+2x12000	10x21500
Evaporator	Type		Shell and tube	Shell and tube	Shell and tube	Shell and tube	Shell and tube	Shell and tube
	Water pressure drop	kPa	61	61	63	63	65	65
	Fouling factor	m²•℃ /kW	0.086	0.086	0.086	0.086	0.086	0.086
	Pipe size	DN	125	125	2*DN100	2*DN100	2*DN100	2*DN100
	Water flow rate	m³/h	55.9	67.1	78.3	89.4	100.6	111.8
Dimension	Length	mm	3610	3610	4790	4790	5970	5970
	Width	mm	2260	2260	2260	2260	2260	2260
	Height	mm	2494	2494	2494	2494	2494	2494
	Weight	kg	2900	3400	4050	4600	5200	5750

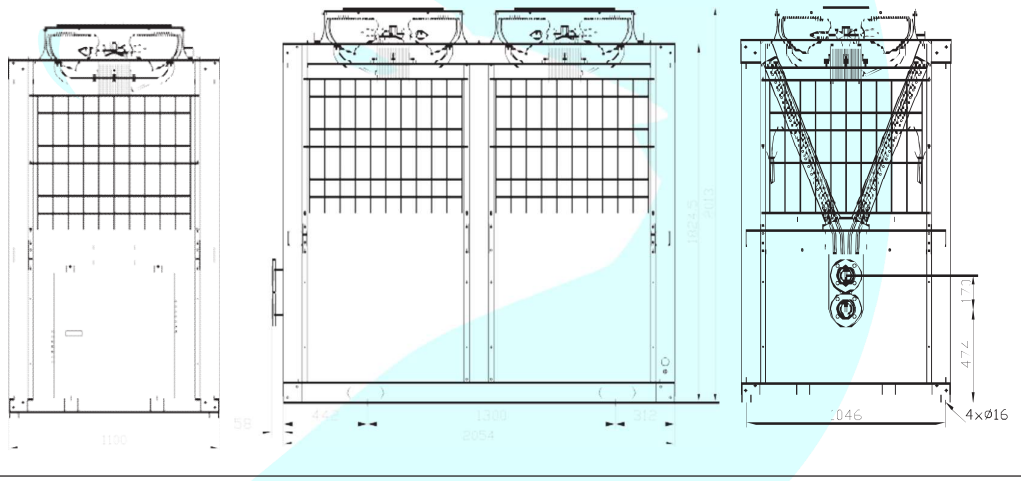
Notes:
The nominal cooling capacity and nominal cooling input power are tested at the rated water flow, water outlet temperature of 7°C , and outdoor drybulb temperature of 35°C .
The nominal heating capacity is tested at the rated water flow, water outlet temperature of 45°C , outdoor dry bulb temperature of 7°C or outdoor wetbulb temperature of 6°C .

Dimensional Data

DLASC33HPCY



DLASC65HPCY



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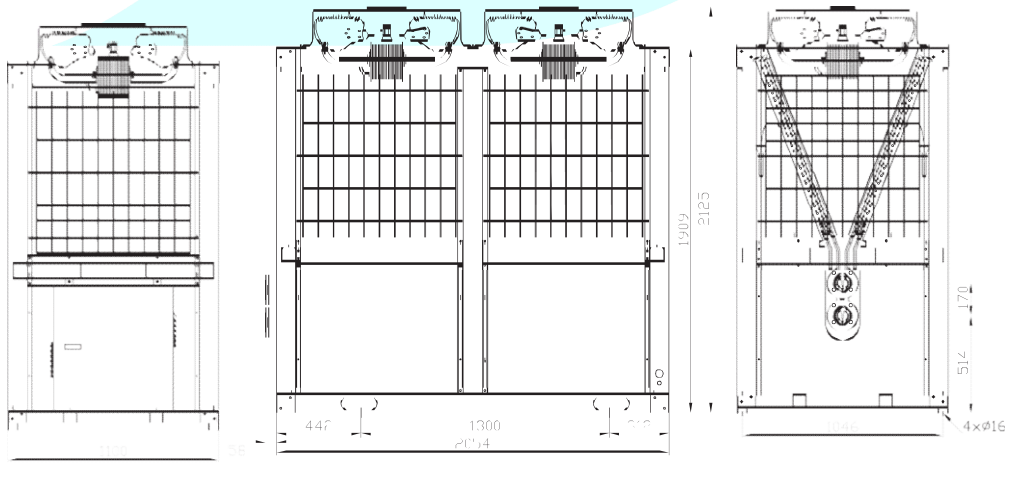
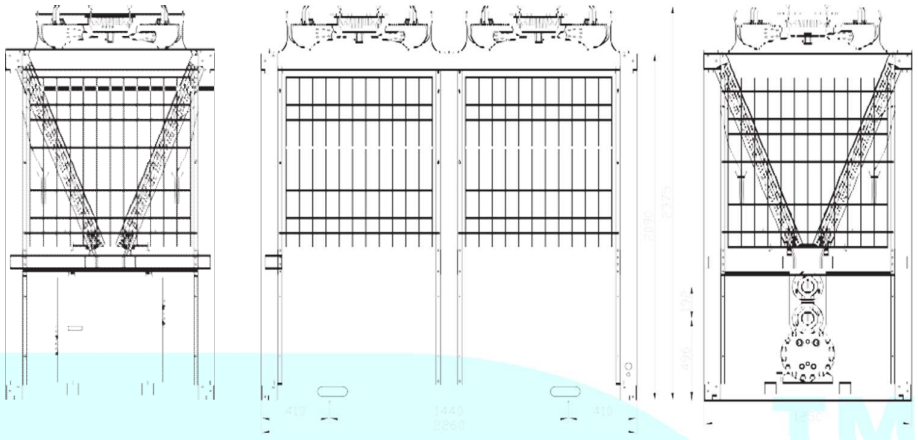
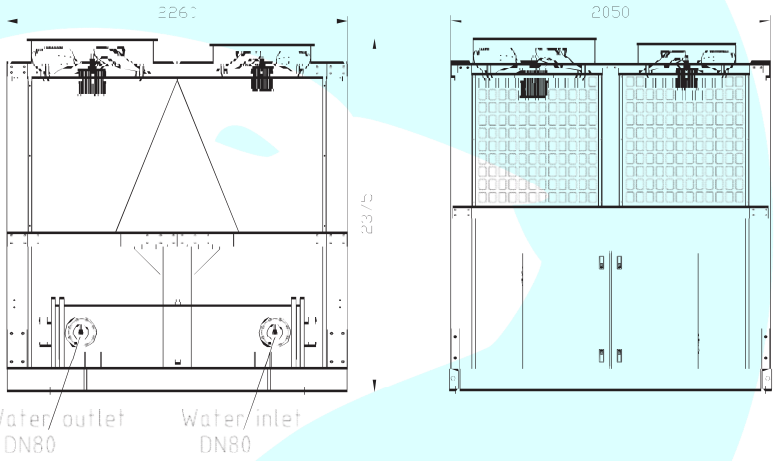


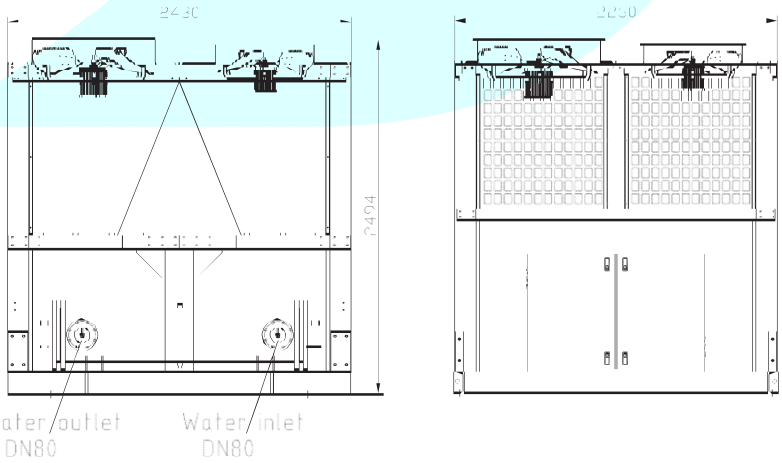
DLASC130HPCY



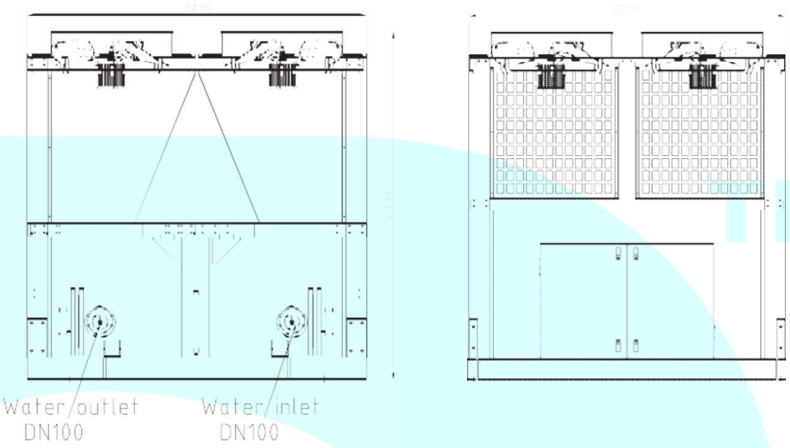
DLASC170HPCY



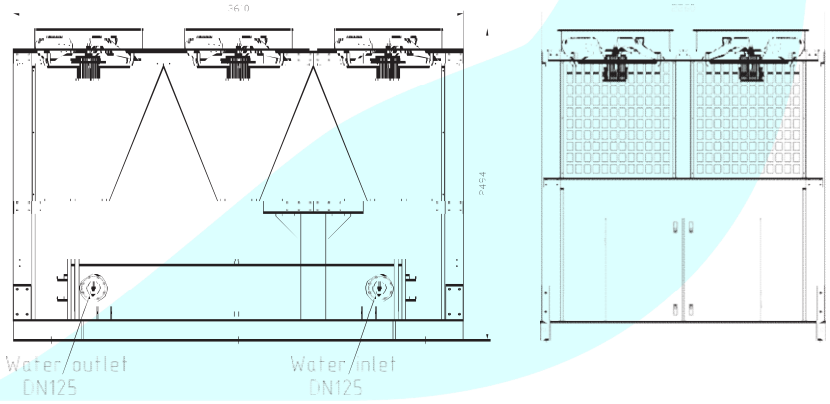
DLASC200HPCY



DLASC260HPCY



DLASC325HPCY / DLASC390HPCY



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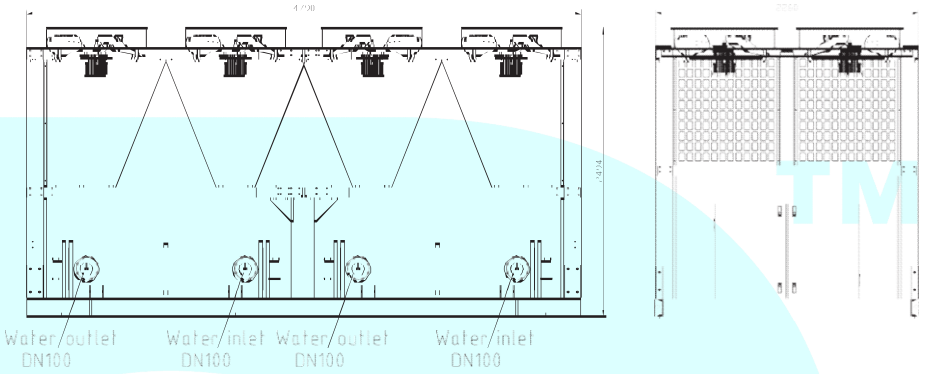

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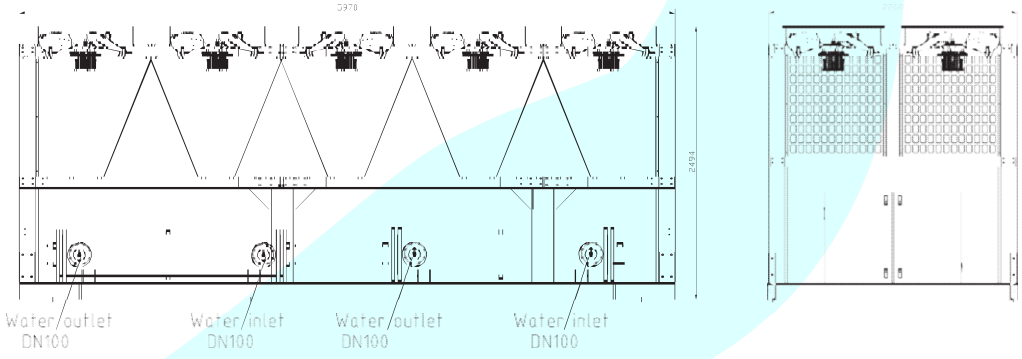
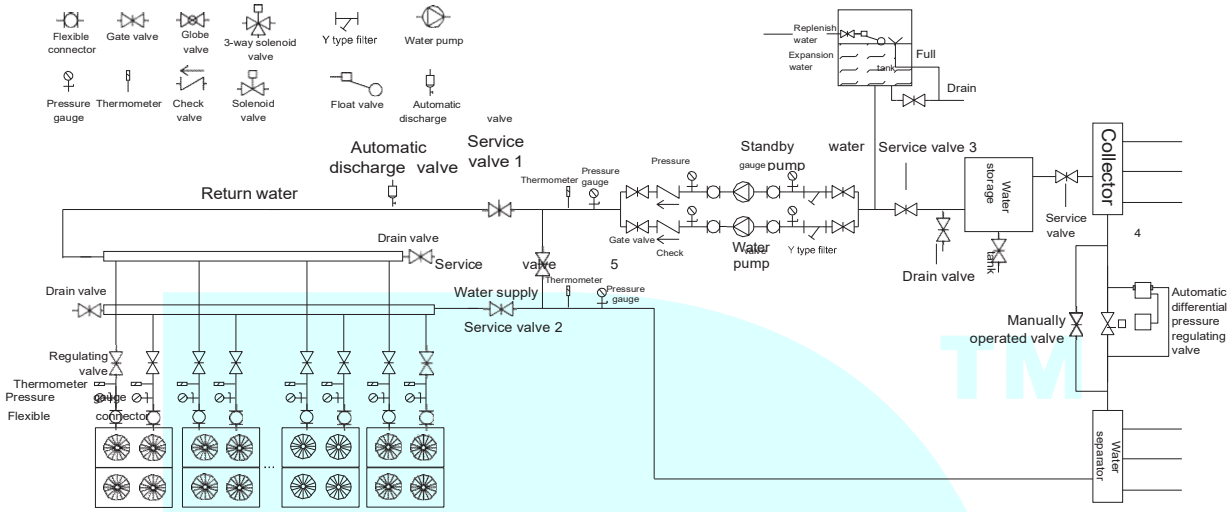


Water system installation diagram

Components of the water system



Notes:

•Water flow switches have been installed inside the unit and they do not need to be installed on site.

•When water systems of multiple systems are used in a large project, water supply is generally designed to be section-based. Overhauling or closing the water supply in a section may greatly change the load. In this case, turn off a unit at random to save energy.

•After the water systems of the unit are installed, close the overhaul valves 1and 2, and open overhaul valve 5. Run the water pump, and then clean the water filter. After water systems are cleaned, ensure that the unit can run normally after the water pipe is connected to the master unit.

•Select a water pump according to flow and the required lift. The water pump can be installed on the main water inlet/outlet pipe. When the pressure at the entrance to the unit is greater than 1.0 MPa, recommend installing the water pump on the water outlet pipe. The water pump control must be interlocked with the unit.

•The automatic differential pressure regulator can make the entire system work more stably.

•Manifold is used to distribute water flow of branch pipes more properly.

•For shell-and-tube units, a Y-type water fiter needs to be installed only on the main water inlet pipeline of the unit. (16-20 meshes/inch are commended.) After commissioning, clean the water filter.

•Install a water flow regulating valve on each water inlet branch pipe of the unit, to regulate the flow of water entering each unit to be consistent.

•If an auxiliary heat source such as an auxiiary electric heater is used, install it on the main water outlet pipe of the unit.

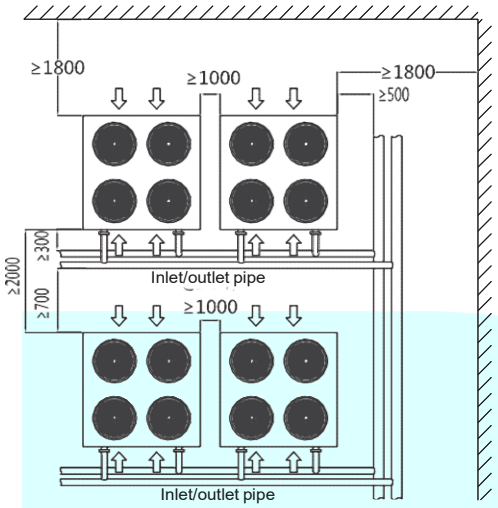
•To ensure water resistance balance, install water outlet/inlet pipes on the same side.

•Valves 1, 2, 3, and 4 are used as overhaul valves. Valve 5 is used when the system is commissioned for the first time and pipelines are cleaned or when water handing engineering is implemented at the air side products and pipelines. In this case, close valves 1 and 2 and open valves 3, 4, and 5, and enable the water pump.

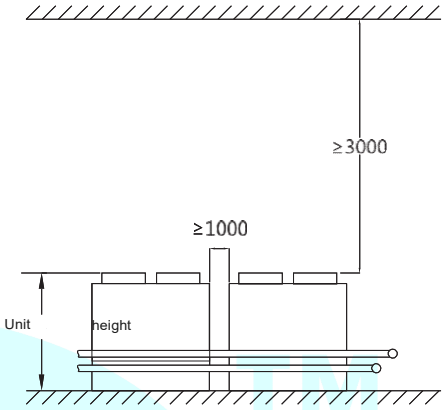
•The diameters of the water inlet and outlet collection pipes of the unit must subject to the following conditions: 1) the water flow rate is lowerthan 1m/s;2) the diameters of the water inlet and outlet collection pipes of the unit are greater than the water pipe diameters of the water system loops connected to these water collection pipes.

Unit installation requirements

Installation space requirements



Top view



Side view

Notes:

1. For the unit with less than 80 tons of cooling capacity, recommend DN100 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.

2. For the unit with cooling capacity between 80 tons and 160 tons, recommend DN125 as the main water outlet pipe and installing water outlet/ inlet pipes on the same side.

3. For the unit with cooling capacity between 160 tons and 240 tons, recommend DN150 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.

4. For the unit with cooling capacity between 240 tons and 500 tons, recommend DN200 as the main water outlet pipe and installing water outlet/inlet pipes on the same side.

5. The water outlet and inlet connection pipes of the unit: For the pipe connection dimensions of the unit, se the specifications table. The main water pipe is installed by the engineering personnel according to the actual situations.

Installation notes of hoisting

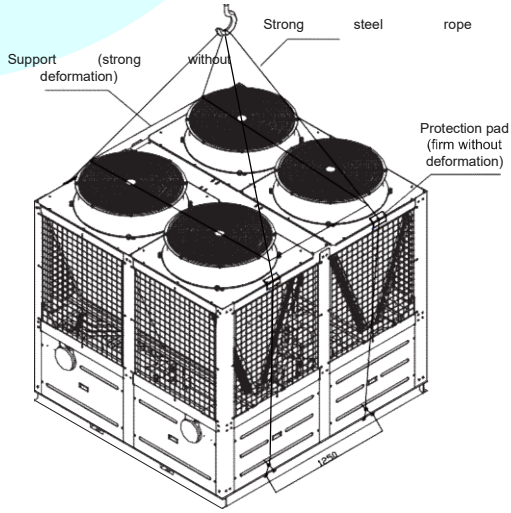
•After a unit body is delivered from the factory to the installation site, keep the proper package before hoisting.

•Handle the unit body with care and keep the unit body upright.

•When hoisting the unit, avoid hitting the unit on other objects to prevent sliding. No person is allowed to stand below or near the unit for the sake of safety.

•Use protection pads in places where steel ropes contact the unit, to prevent scratches or unit deformation. In addition, use supports between ropes to prevent the tightened ropes from damaging the unit.

•For the reference weight for choosing the ceiling-mounted steel pipes, steel ropes, and locomotives for hoisting, see the unit specifications. During hoisting, protect the outlet and inlet water pipes against collision.



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