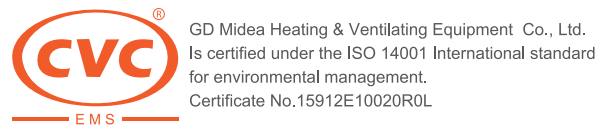
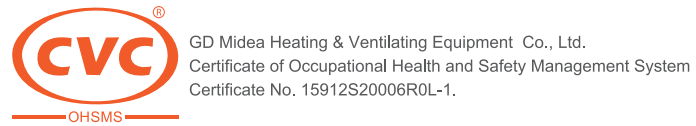


1403-4C1406



GD Midea Heating & Ventilating Equipment Co., Ltd.
Is certified under the ISO 9001 International standard
for quality assurance.
NO.01 100 019209



Dealer information

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Note: The data in this book may be changed without notice for further improvement
on quality and performance.

Ver.2014.06

Tropical air cooled chillers 50&60Hz

COMMERCIAL AIR CONDITIONERS

Tropical air cooled chillers 50&60Hz





Midea CAC (MCAC)

As a key subsidiary of Midea Group, the Midea Central Air Conditioner (MCAC) business unit has emerged as a leading supplier of commercial solutions. Since 1999 MCAC has contributed to the R&D and innovation of technologically-based commercial solutions. Cooperation with leading global enterprises coupled with independent R&D has enabled MCAC to implement thousands of commercial air-conditioning projects worldwide.

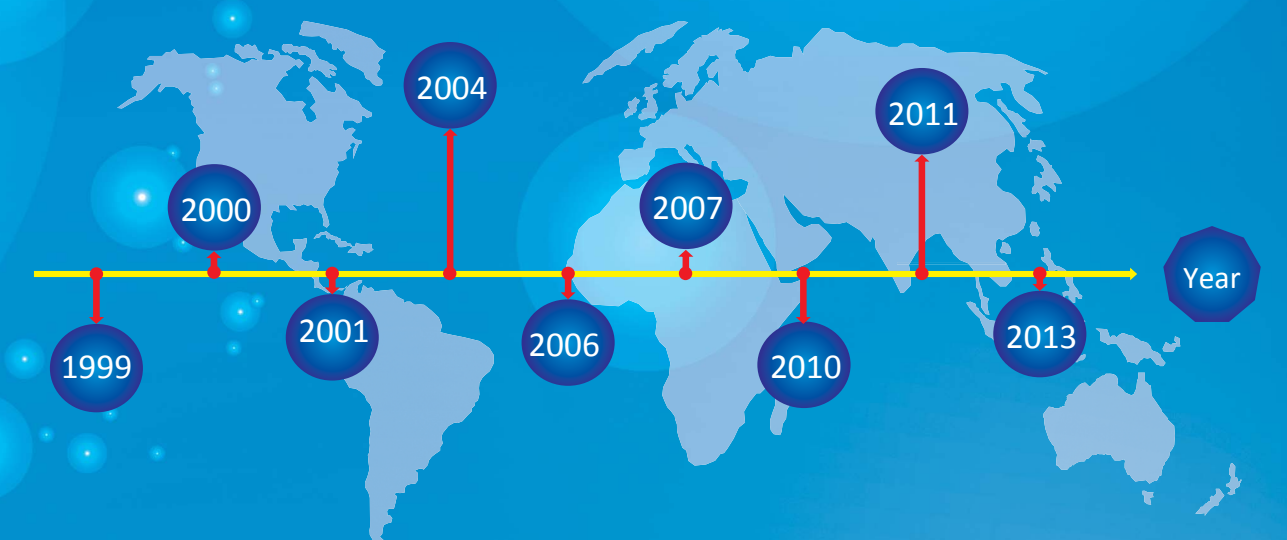
At present, MCAC is one of the globally leading product suppliers, underpinned by a mature marketing, sales, and project design framework.

There are three production bases in Shunde, Chongqing and Hefei.

MCAC Shunde: 38 product lines focusing on VRF (DC inverters and digital scroll products), split products, heat pump water heaters, and AHU/FCU.

MCAC Chongqing: 14 product lines focusing on water cooled centrifugal/screw/scroll chillers, air cooled screw/scroll chillers, and AHU/FCU.

MCAC Hefei: 11 product lines focusing on VRF, chillers, and heat pump water heaters.



- 2013 Launched the super high efficiency centrifugal chiller with full falling film technology
- 2011 Launched the DC inverter V4 Plus globally
- 2010 Built the 3rd manufacturing base in Hefei
- 2007 Won the first Midea centrifugal chiller project oversea
- 2006 Launched the first VSD centrifugal chiller
- 2004 Acquired MGRE entered the chiller industry
- 2001 Partnered with Copeland to develop the digital scroll VRF system
- 2000 Developed the first inverter VRF With Toshiba
- 1999 Entered the CAC field



Midea air cooled chillers

Midea tropical air-cooled chiller adopts air as the cooling/heating source and water as the cooling/heating medium to cooling/heating the indoor ambient temperatures through the indoor terminals (AHU/FCU). It includes air cooled scroll chiller and air cooled screw chiller. The capacity range is from 25kW to 1200kW for one unit. The max capacity output is up to 2000kW for combined air cooled scroll chiller,9600kW for combined air screw chiller. The chillers can be used in all types of climate,the wide selection of module makes it possible to build a system for any of the customers requirements.

Aqua Tempo Power Series Air cooled scroll chiller 25~250kW



Refrigerate:R410A
Compressor type: Digital scroll+fixed scroll
Max combined quantity: 16
Max combined capacity output:2000kW
Evaporator type: Double pipe&shell and tube

Aqua Force Series Air cooled screw chiller 380~1200kW



Refrigerate:R134a
Compressor type: Screw
Max combined quantity: 8
Max combined capacity output:9600kW
Evaporator type: Shell and tube

Contents

- ▶ **05 Aqua Tempo Power Series**
Air cooled scroll chiller
- ▶ **49 Aqua Force Series**
Air cooled screw chiller

Aqua Tempo Power Series

Air cooled scroll chiller

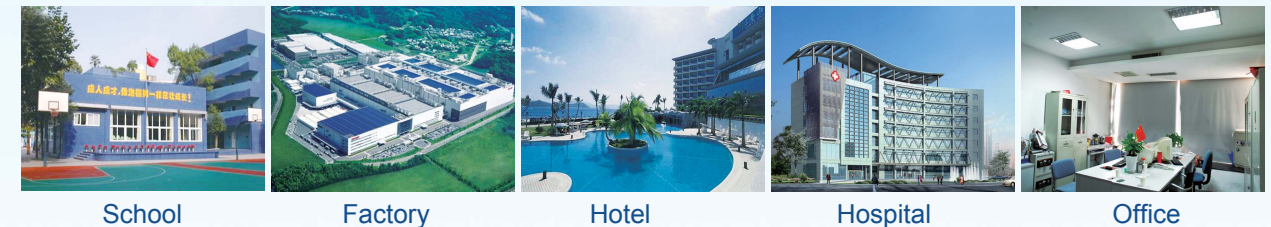
Contents

- 06 Product introduction
- 06 Nomenclature
- 07 Product lineup
- 08 Features
- 11 Mechanical specifications
- 13 Standard features/options
- 13 Accessories
- 14 Specifications
- 19 System sketch drawing
- 22 Application range
- 22 Water pressure drop
- 23 Glycol factors
- 25 Performance data
- 27 Electrical data
- 29 Dimensions
- 33 Typical schematic wiring diagram
- 35 Control system
- 42 Rigging instructions
- 43 Installation clearance
- 45 Mounting location
- 46 Load distribution
- 47 Typical piping

Product introduction

Midea air-cooled scroll chiller adopts air as the cooling/heating source and water as the cooling/heating medium to cooling/heating the indoor ambient temperatures through the indoor terminal (AHU/FCU). Air cooled chiller typically have a lower initial investment and maintenance cost than water cooled system, it does not require a cooling tower, condenser water pump and associated condenser water chemical treatment system.

Modular design concept makes the application from single unit to multiple form systems to several thousand tons of installed capacity. Adopting high reliable and excellent efficiency system, Midea air cooled scroll chiller becomes one of the best choice for all kinds of air cooled projects. With the latest modular design technology, high efficiency V shape heat exchanger and precise gas flow control technology and digital compressor application, Midea air cooled scroll chiller system always work at the most high efficiency stage. Modular and compressor operation are adjusted by the real load requirement intelligently to keep the most economical working status. They are widely applied in school, hospital, shopping mall, office as well as the factory and manufacturing processing area.



Nomenclature

M G C T - F 30 W / R N1

- **Refrigerant type**
N1: R410A Omit for R22
- **Power Supply**
R: 380~415V, 50Hz, 3Ph
D: 220V, 60Hz, 3Ph
P: 380V, 60Hz, 3Ph
- **Air cooled type**
- **Rated cooling capacity (kW)**
- **The special function code**
D: Digital scroll
F: Fixed scroll
- **Omit for T1 condition**
T: T3 condition
- **The heat exchanger type**
B: Shell and tube or double pipe
C: Double pipe
- **Light chiller system**
- **Midea**

Product lineup

Model	Heat exchanger type	Compressor quantity(pcs)		Electrical controller quantity	Maximum combinations	Maximum output(kW)	Wired controller
		Digital	Fixed				
MGBT-F25W/RN1	Double pipe	0	2	1	16	400	KJRM-120D/BMK-E
MGBT-D25W/RN1	Double pipe	1	1	1	16	400	KJRM-120D/BMK-E
MGBT-F30W/RN1	Double pipe	0	2	1	16	480	KJRM-120D/BMK-E
MGBT-D30W/RN1	Double pipe	1	1	1	16	480	KJRM-120D/BMK-E
MGBT-F60W/RN1	Shell and tube	0	2	1	16	960	KJRM-120D/BMK-E
MGBT-D60W/RN1	Shell and tube	1	2	1	16	960	KJRM-120D/BMK-E
MGBT-F120W/RN1	Shell and tube	0	4	2	8	960	KJRM-120D/BMK-E
MGBT-F180W/RN1	Shell and tube	0	6	3	5	900	KJRM-120D/BMK-E
MGBT-F250W/RN1	Shell and tube	0	8	2	8	2000	KJRM-120D/BMK-E
MGCT-F30W/PN1	Double pipe	0	2	1	16	480	KJRM-120D/BMK-E
MGCT-D30W/PN1	Double pipe	1	1	1	16	480	KJRM-120D/BMK-E
MGBT-F60W/PN1	Shell and tube	0	2	1	16	960	KJRM-120D/BMK-E
MGBT-F120W/PN1	Shell and tube	0	4	2	8	960	KJRM-120D/BMK-E
MGBT-F180W/PN1	Shell and tube	0	6	3	5	900	KJRM-120D/BMK-E
MGBT-F25W/DN1	Double pipe	0	2	1	16	400	KJRM-120D/BMK-E
MGBT-D25W/DN1	Double pipe	1	1	1	16	400	KJRM-120D/BMK-E
MGBT-F30W/DN1	Double pipe	0	2	1	16	480	KJRM-120D/BMK-E
MGBT-D30W/DN1	Double pipe	1	1	1	16	480	KJRM-120D/BMK-E
MGBT-F60W/DN1	Shell and tube	0	2	1	16	960	KJRM-120D/BMK-E
MGBT-F120W/DN1	Shell and tube	0	4	2	8	960	KJRM-120D/BMK-E
MGBT-F180W/DN1	Shell and tube	0	6	3	5	900	KJRM-120D/BMK-E

External appearance

25/30kW module



60kW module



120kW module



180kW module



250kW module



Features

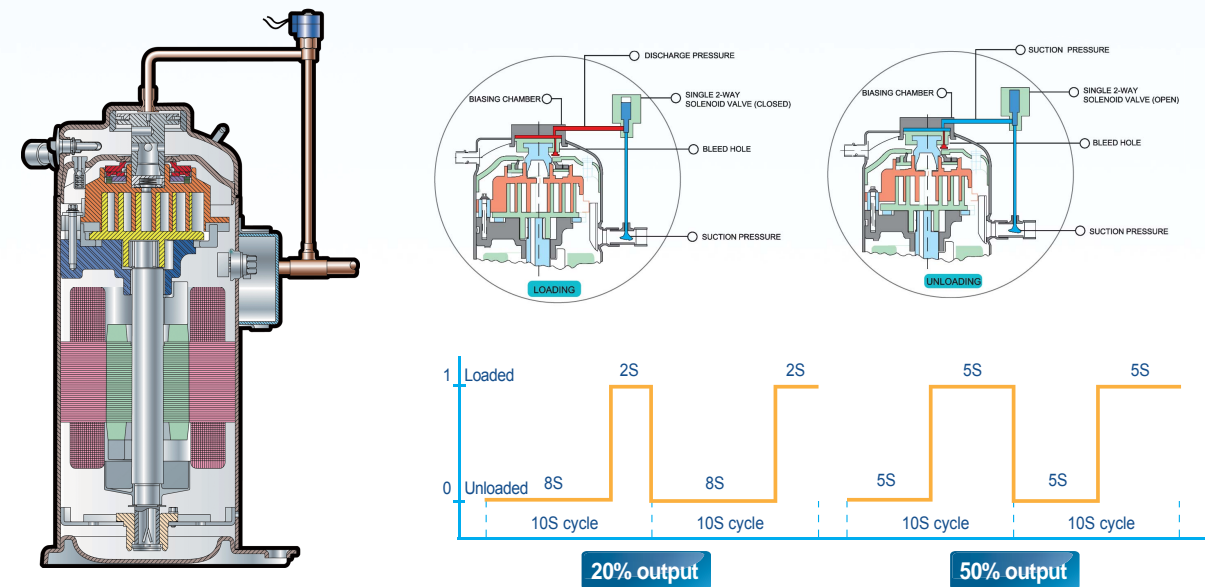
Modular design

Modular design and mass production makes the stoke possible to short the delivery time to the project. Free capacity add-on in the future stage. Whole system reliability by the backup modular. Master controller oversees operation of all connected modules. Low starting current without any inrush to the power supply.



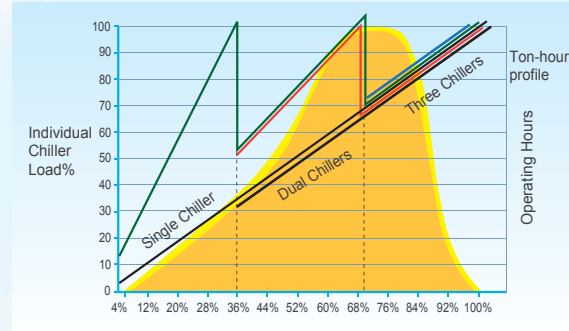
Digital scroll technology

Digital scroll technology, provide maximum reliability, high efficiency and quiet operation. The widest capacity output can be achieved, comfort room temperature, efficiency of the whole system can be improved significantly. Advanced digital scroll technology for small modules (25/30/60kW) maximizes reliability, ensures efficient and silent operations, optimizes capacity output, and provides a comfortable room temperature.

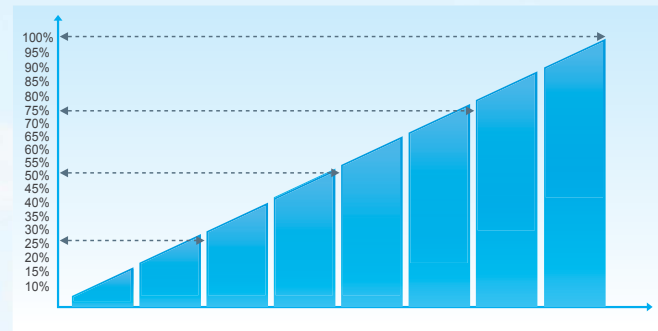


Energy saving

In system the output capacity is proportional to the load of the building. In the partial load condition the single chiller system will operate at 10% to 70% which is a very low efficiency for a system and lead to a very low IPLV/NPLV. In a multiple system the system output capacity is not proportion to the load of the building and only one chiller will operate in the low efficiency area and other chiller will work in the high efficiency area. The IPLV/NPLV will be increased significantly by the modular design.



Example of three chillers operation profile



Stepless capacity control

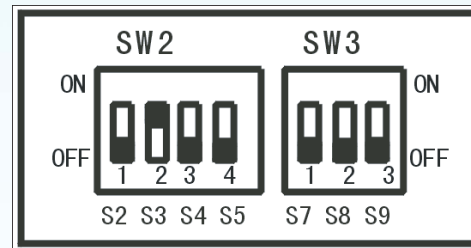
Wide output water temperature

Cooling: 5~17°C (Set in factory), 0~17°C can be available by switch the S5 on PCB, the antifreeze must be put into pipeline.

Heating: 40~50°C (Set in factory), 22~50°C can be available by switch the address.

(Available for the module with the wired controller KJR-120A/MBE)

Mode		Outlet water temp.
Cooling	•Low outlet water temp. (S5 address ON)	0~17°C
	Normally (S5 address OFF)	5~17°C
Heating	Low outlet water temp. (S4 address ON)	22~50°C
	Normally (S4 address OFF)	40~50°C

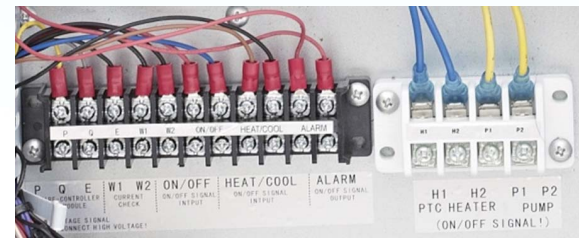


User friendly remote control

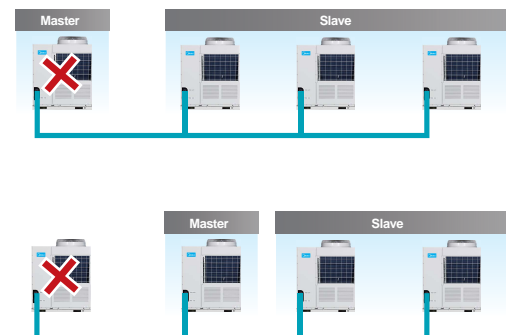
Switch the S7 address on the PCB to ON to enable the following remote control operations:

- Remote ON/OFF.
- Remote mode selection for heating and cooling.
- Remote alarm.

Note:
When use the remote control function, the wired controller will be invalid.



Backup functions

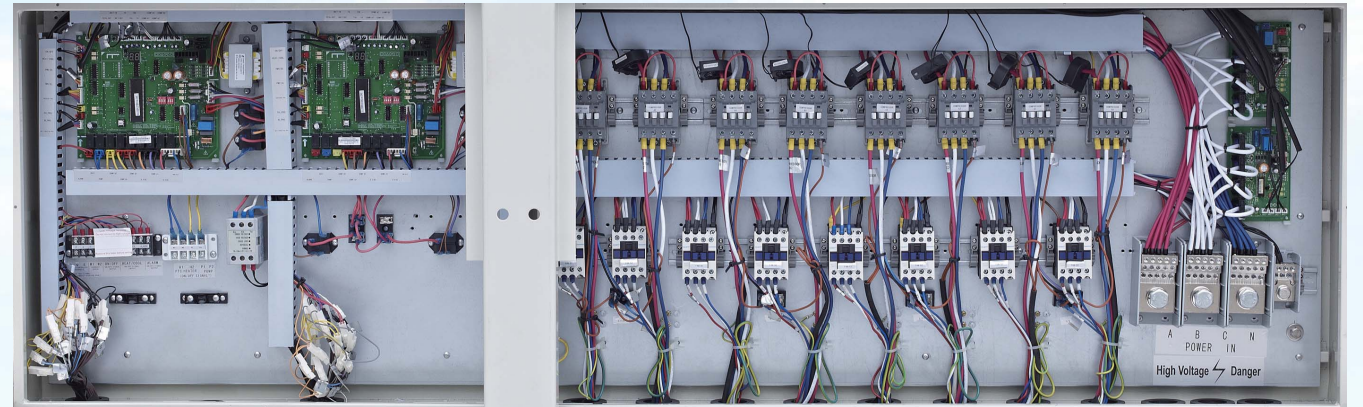


When unit is failed.

- If master unit fails, all the units will stop.
 - If one slave unit fails, this unit will stop but the others will keep running.
 - When the master unit fails, any of the slave one can be set as the master unit by manual setting.
 - When unit is under protection.
 - If master unit's protection happens, this unit will stop but the others will keep running.
 - If slave unit's protection happens, this unit will stop but the others will keep running.
 - (Except PE, P9 protection happens)
- PE: Low-temperature protection of evaporator.
P9: Outlet and inlet water temperature difference protection.

Optimized electrical design

The standardized hardware and program design efficiently manages raw materials via programming parameters written onto a EEPROM chip, which enables after-sales modifications, customization and troubleshooting. The electrical panels provide a clear visual representation of the wiring scheme completed during assembly.



Mechanical specifications

General information

All Midea air-cooled scroll chillers are factory tested by computer for ambient and water conditions and control operations.

Units are shipped with a full load of Zero Ozone Depletion Potential refrigerant R410a and oil.

Compressors, heat exchangers, condenser fans, piping and the control unit must be mounted on a heavy-gauge steel frame. Electrical controls, contactors, and relays are installed in each module.

Exposed steel surfaces are finished with a coat of powder paint, and all modules come with a heavy-gauge, galvanized steel power enclosure for outdoor installation.



R-410A



COOLING HEATING



EXV CONTROL



HERMETIC SCROLL



RELIABILITY

Unit casing & construction

Unit cases are made from fabricated heavy-gauge galvanized steel. Each steel sheet panel is zinc coated and galvanized using the hot dip process to reach a lock-forming quality that complies with ASTM A 653 commercial weight G-90, and is then backed with an electrostatic polyester dry powder coat.

Condensing units come installed with refrigerant compressors, a condenser coil, propeller fans, control wiring, and piping.

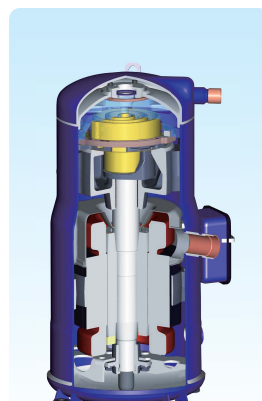
The unit includes a weather-resistant control panel ready for field connection to enable remote control functionality.

Compressors

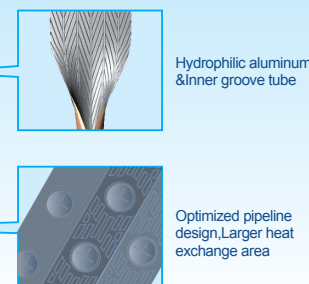
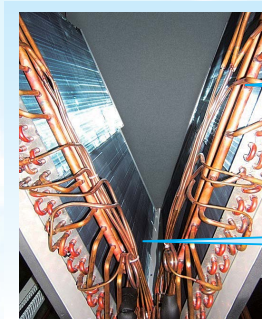
Standard hermetically sealed scroll compressors are used in all Midea air-cooled scroll chillers. Each compressor features internal motor protection, factory installed crankcase heaters, and rubber vibration isolators to ensure silent and efficient operations.

Each scroll compressor is cast in an iron frame and comes equipped with cast iron scrolls, three teflon bearings, and three oil filtration devices. The orbiting scrolls contact with just enough force to create a seal to ensure no friction exists between plates. Both the fixed and orbiting scrolls are made from high-strength cast iron to minimize thermal distortion and leaks and maximize efficiency.

Built-in vibration isolation, oil sump heating and a heat overload cut-out function, each compressor provides smooth and highly efficient functionality.



Condenser coils



Hydrophilic aluminum & inner groove tube

Optimized pipeline design, Larger heat exchange area

The enhanced louvered fin and tube type V-shape condenser coils are seamlessly constructed to a diameter of 7.94mm.

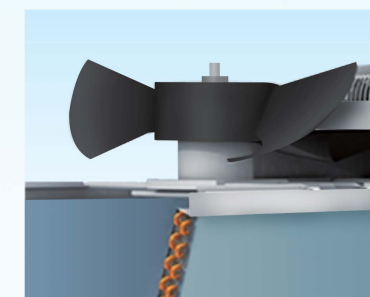
Inner-grooved copper tubes are mechanically bonded to aluminum fins for maximum heat transfer efficiency.

Each fin's self-spacing collar completely covers each tube, and the staggered tube design maximizes thermal efficiency.

The supporting end plates are heavy-gauge galvanized steel with extruding collars that optimize tube support and structural strength.

Each coil is pressure tested in the factory at not less than 450psi air pressure.

Condenser fans



All fans are statically and dynamically balanced to operate at minimum noise and vibration. Fan blades are designed at an appropriate pitch angle to maximize airflow through the condenser and provide maintenance-free bearings for outdoor installation.

The fans are directly driven by a waterproof motor to ensure continuous operations. Each complies with the IP 54 safety class for long-term outdoor use. The fan guards are constructed of heavy gauge, rust-resistant, coated steel.

Condenser fan motor

The condenser fans, impeller and motors form an integral unit. The fan motors are three-phase and provided with class F winding insulation and ball bearings for high ambient application.

Crankcase heaters

Compressors with crankcase heaters remain powered-on during the de-energize process to protect the system against refrigerant migration, oil dilution and potential compressor failure.

Evaporator



- Smaller modules under 35kW use a double pipe heat exchanger to minimize size; 60kW to 250kW models adopt shell and tube heat exchangers for easy maintenance.

- High efficiency, direct-expansion type coolers with refrigerant in tubes provide chilled liquid through the baffled shell without the oil return issue found in flood-type evaporators.

- Water baffles are fabricated from corrosion-resistant galvanized steel to resist corrosion. Water vents and drain connections are included.

- 20mm-thick insulation covers all low-temperature surfaces including the evaporator, water boxes, oil return lines and chilled water flow switch pipes.

Standard features/options

Description	Standard features	Options
Hermetic scroll compressor	●	
Compressor crankcase heaters	●	
Compressor circuit breakers	●	
Compressor overload protection	●	
Condenser fan-direct drive, axial type	●	
Condenser fan(Plastic)	●	
Condenser fan guard	●	
Condenser motor circuit breakers		●
Aluminum fins condenser coils	●	
Low pressure switch	●	
High pressure switch	●	
Wired controller KJRM-120D/BMK-E	●	
Wired controller KJR-120A/MBTE		●
BMS gateway(Lonworks)		●
Remote control input	●	
Alarm signal output	●	
Anti-freezing protection	●	
Over-load protection	●	
Power phases sequence protection	●	
Anti-corrosion fins		●
Water flow switch		●
Three phase power protector		●

Accessories

Item	Name of accessory	Type	Qty	Shape	Usage
1	Installation and owner's manual	---	1		Installation and using instruction.
2	The total outlet water temperature test kit	LSQWRF65M/A-C.ZL.10	1		Inspection the temperature of total outlet water.
3	Wired controller	KJRM-120D/BMK-E	1		Control the system.

Specifications

Model		MGBT-F25W/RN1	MGBT-D25W/RN1	MGBT-F30W/RN1	MGBT-D30W/RN1
Cooling Capacity (*1)	kW	28	28	30	30
	US Ton	8.0	8.0	8.5	8.5
Cooling Capacity (*2)	kW	24.9	24.9	25.8	25.8
	US Ton	7.1	7.1	7.3	7.3
Heating Capacity		kW	29.5	32	32
Power input	Cooling (*1)	kW	9.3	9.3	10.0
	Cooling rated current (*1)	A	14.6	14.6	16.3
	Cooling (*2)	kW	11.16	11.16	12
	Cooling rated current (*2)	A	17.52	17.52	19.56
	Heating	kW	9.2	9.2	9.8
Heating rated current		A	14.3	16.0	16.0
Power supply		V/Ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50
Power supply	Manual switch	A	50	50	50
	Fuse	A	36	36	36
Max. Input consumption		kW	12.6	12.5	12.5
Max. Current		A	21.8	21.5	21.5
Type		Fixed scroll	Digital scroll+fixed scroll	Fixed scroll	Digital scroll+fixed scroll
Brand		Copeland		Copeland	
Model		ZP61KCE-TFD-522	ZPD61KCE-TFD-532/ ZP61KCE-TFD-522	ZP61KCE-TFD-522	ZPD61KCE-TFD-532/ ZP61KCE-TFD-522
Compressor	Quantity	Pieces	2	1+1	2
	Capacity	Btu/h	5000	50500/5000	5000
	Input	W	4750	4930/4750	4750
	Rate current	A	8.3	8.5/8.3	8.3
	Locked rotor Amp	A	64	64/64	64
Refrigerant oil		ml	1685	1685/1685	1685
Refrigerant	Type	R410A		R410A	
	Refrigerant control	EXV		EXV	
	Weight	kg	3.1×2	3.1×2	3.1×2
Condenser (Air side)	Type	Fin-coil		Fin-coil	
	Quantity of fan motor	Pieces	1	1	1
	Air flow	m³/h	12000	12000	12000
	Fan motor model	YDK400-8-YA		YDK400-8-YA	
	Fan motor rated current	A	3.1	3.1	3.1
Fan motor input		kW	0.4	0.4	0.4
Evaporator (Water side)	Type	Double pipe		Double pipe	
	Water pressure drop	kPa	60	60	60
	Water inlet/outlet pipeline inside diameter	mm	DN40	DN40	DN40
	Water flow	m³/h	4.8	4.8	5.2
	Max. design pressure	MPa	1	1	1
Water pipe connection type		Flexible joint		Flexible joint	
Dimension	Net(D×H×W)	mm	1514×1865×841	1514×1865×841	1514×1865×841
	Packing(D×H×W)	mm	1590×2065×995	1590×2065×995	1590×2065×995
Weight	Net weight	kg	380	380	380
	Operation weight	kg	420	420	420
Connection wiring	Power wire	mm²×No.	10×4+6×1	10×4+6×1	10×4+6×1
	Signal wire	mm²×No.	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding
Control type		Wired controller		Wired controller	
Safety protection device		1) Protection for over-high discharge pressure. 2) Protection for over-low suction pressure. 3) Power supply phase sequence protection. 4) Anti-freezing protection in cooling mode. 5) Anti-freezing protection in Winter. 6) Protection for compressor over current. 7) Protection for compressor overload. 8) Outlet and inlet water temperature difference protection. 9) Compressor discharge temperature protection. 10) Water flow cut-off protection. 11) Sensor malfunction protection.		2) Protection for over-low suction pressure. 4) Anti-freezing protection in cooling mode. 6) Protection for compressor over current. 8) Outlet and inlet water temperature difference protection. 10) Water flow cut-off protection. 12) Low-temperature protection of shell and tube heat exchanger.	
Noise level		dB(A)		65	
Operation water temp		°C		Cooling: 5~17 Heating: 45~50	
Ambient temp		°C		Cooling: 10~52 Heating: -10~21	

Note: Specifications are based on the following conditions:

- Cooling : (*1) chilled water inlet/outlet: 12°C/ 7°C, and outdoor ambient temp. of 35°C DB.
(*2) chilled water inlet/outlet: 12°C / 7°C, and outdoor ambient temp. of 46°C DB.
- Heating : warm water inlet/outlet: 40°C/ 45°C, and outdoor ambient temp. 7°C DB/6°C WB.
- Water side fouling factor: 0.086m²·°C/kW.
- 1m away in open field(sound pressure).

Model		MGBT-F60W/RN1	MGBT-D60W/RN1	MGBT-F120W/RN1	MGBT-F180W/RN1
Cooling Capacity (*1)	kW	60	60	120	180
	US Ton	17.0	17.0	34.1	51.1
Cooling Capacity (*2)	kW	51.6	51.6	103.2	155.8
	US Ton	14.7	14.7	29.3	44.2
Heating Capacity	kW	64	65	128	195
Power input	Cooling (*1)	kW	19.3	19.4	38.5
	Cooling rated current (*1)	A	33.6	33.6	68.8
	Cooling (*2)	kW	23.16	23.28	46.2
	Cooling rated current (*2)	A	40.32	40.32	82.56
	Heating	kW	19.8	20.4	41.5
	Heating rated current	A	34.3	35.1	71.8
Power supply	V/Ph/Hz	380-415/3/50	380-415/3/50	380-415/3/50	380-415/3/50
Power supply	Manual switch	A	125	250	350
	Fuse	A	100	200	300
Max. Input consumption	kW	29.5	29	55.5	78.3
Max. Current	A	54.4	54.6	93.8	133.4
Compressor	Type	Fixed scroll	Digital scroll+fixed scroll	Fixed scroll	Fixed scroll
	Brand	Copeland	Copeland	Copeland	Copeland
	Model	ZP137KCE-TFD-522	ZP137KCE-TFD-522 / ZPD72KCE-TFD-433 / ZP67KCE-TFD-420	ZP137KCE-TFD-522	ZP137KCE-TFD-522
	Quantity	Pieces	2	3	4
	Capacity	Btu/h	111771	111231/57485/55274	111771
	Input	W	10200	10200/5750/5200	10200
	Rate current	A	17.8	17.8/9.8/9.1	17.8
	Locked rotor Amp	A	118	118/82.4/74	118
	Refrigerant oil	ml	3200	3200/1893/1685	3200
Refrigerant	Type	R410A	R410A	R410A	R410A
	Refrigerant control	EXV+capillary	EXV+capillary	EXV+capillary	EXV+capillary
	Weight	kg	6.0×2	6.5×2	6.0×6
Condenser (Air side)	Type	Fin-coil	Fin-coil	Fin-coil	Fin-coil
	Quantity of fan motor	Pieces	2	2	4
	Air flow	m³/h	24000	24000	48000
	Fan motor model		YS700-6F	YDK550-6E	YS700-6F
	Fan motor rated current	A	1.8×2	4.5×2	1.8×4
	Fan motor input	kW	0.7×2	0.55×2	0.7×6
Evaporator (Water side)	Type	Shell and tube	Shell and tube	Shell and tube	Shell and tube
	Water pressure drop	kPa	15	15	25
	Water inlet/outlet pipeline inside diameter	mm	DN100	DN100	DN65
	Water flow	m³/h	10.3	10.3	20.6
	Max. design pressure	MPa	1	1	1
	Water pipe connection type		Flexible joint	Flexible joint	Flexible joint
Dimension	Net(D×H×W)	mm	2000×1880×900	2000×1880×900	2000×2090×1685
	Packing(D×H×W)	mm	2090×2055×985	2090×2055×985	2090×2240×1755
Weight	Net weight	kg	580	600	1150
	Operation weight	kg	650	670	1270
Connection wiring	Power wire	mm²×No.	25×4+16×1	16×4+10×1	35×3+16×2
	Signal wire	mm²×No.	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding
Control type		Wired controller	Wired controller	Wired controller	Wired controller
Safety protection device		1) Protection for over-high discharge pressure. 3) Power supply phase sequence protection. 5) Anti-freezing protection in Winter. 7) Protection for compressor overload. 9) Compressor discharge temperature protection. 11) Sensor malfunction protection.		2) Protection for over-low suction pressure. 4) Anti-freezing protection in cooling mode. 6) Protection for compressor over current. 8) Outlet and inlet water temperature difference protection. 10) Water flow cut-off protection. 12) Low-temperature protection of shell and tube heat exchanger.	
Noise level	dB(A)	65	67	70	74
Operation water temp	°C	Cooling: 5~17 Heating: 45~50	Cooling: 0~17(Less than 5°C must add antifreeze) Heating: 22~50	Cooling: 5~17 Heating: 45~50	Cooling: 5~17 Heating: 45~50
Ambient temp	°C	Cooling: 10~52 Heating: -10~21			

Note: Specifications are based on the following conditions:

- Cooling : (*1) chilled water inlet/outlet: 12°C/ 7°C, and outdoor ambient temp. of 35°C DB.
(*2) chilled water inlet/outlet: 12°C / 7°C, and outdoor ambient temp. of 46°C DB.
- Heating : warm water inlet/outlet: 40°C/ 45°C, and outdoor ambient temp. 7°C DB/6°C WB.
- Water side fouling factor: 0.086m²·°C/kW.
- 1m away in open field(sound pressure).

Model		MGBT-F250W/RN1	MGBT-F25W/DN1	MGBT-D25W/DN1	MGBT-F30W/DN1
Cooling Capacity (*1)	kW	250	28	28	30
	US Ton	71.0	8.0	8.0	8.5
Cooling Capacity (*2)	kW	216	24.9	24.9	25.8
	US Ton	61.3	7.1	7.1	7.3
Heating Capacity	kW	270	29.5	29.5	32
Power input	Cooling (*1)	kW	78.3	9.3	10.0
	Cooling rated current (*1)	A	141.9	25.3	28.3
	Cooling (*2)	kW	86.3	11.16	12
	Cooling rated current (*2)	A	170.3	25.3	30.36
	Heating	kW	80	9.2	9.2
	Heating rated current	A	146	24.7	
Power supply	V/Ph/Hz	380-400/3/50	220/3/60	220/3/60	220/3/60
Power supply	Manual switch	A	450	70	70
	Fuse	A	350	50	50
Max. Input consumption	kW	104.9	13.7	14.7	13.7
Max. Current	A	194.6	39.9	43.7	39.9
Compressor	Type	Fixed scroll	Fixed scroll	Digital scroll+fixed scroll	Fixed scroll
	Brand	Copeland	Sanyo	Copeland / Sanyo	Sanyo
	Model	SH120A4ALC	C-SBP160H36A	ZPD51K5E-TF5-532/ C-SBP160H36A	C-SBP160H36A
	Quantity	Pieces	8	2	1+1
	Capacity	Btu/h	111231	16100	15100/16100
	Input	kW	10275	5500	4810/5500
	Rate current	A	20.88	18.1	20/18.1
	Locked rotor Amp	A	177	114	110/114
	Refrigerant oil	ml	3300	1700	1242/1700
Refrigerant	Type	R410A	R410A	R410A	R410A
	Refrigerant control	EXV+ capillary	EXV	EXV	EXV
	Weight	kg	15×4	3.0×2	3.0×2
Condenser (Air side)	Type	Fin-coil	Fin-coil	Fin-coil	Fin-coil
	Quantity of fan motor	Pieces	8	1	1
	Air flow	m³/h	96000	12000	12000
	Fan motor model		YS700-6F-1/YS700-6F-2	YDK600-6	YDK600-6
	Fan motor rated current	A	1.8×8	4	4
	Fan motor input	kW	0.7×8	0.88	0.88
Evaporator (Water side)	Type	Shell and tube	Double pipe	Double pipe	Double pipe
	Water pressure drop	kPa	40	60	60
	Water inlet/outlet pipeline inside diameter	mm	DN100	DN40	DN40
	Water flow	m³/h	43	4.8	4.8
	Max. design pressure	MPa	1	1	1
	Water pipe connection type		Flexible joint	Flexible joint	Flexible joint
Dimension	Net(D×H×W)	mm	3800×2130×2000	1514×1865×841	1514×1865×841
	Packing(D×H×W)	mm	3900×2200×2100	1590×2065×995	1590×2065×995
Weight	Net weight	kg	2450	380	380
	Operation weight	kg	2600	420	420
Connection wiring	Power wire	mm²×No.	185×4+70×1	25×4+16×1	25×4+16×1
	Signal wire	mm²×No.	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding
Control type		Wired controller	Wired controller	Wired controller	Wired controller
Safety protection device		1) Protection for over-high discharge pressure. 3) Power supply phase sequence protection. 5) Anti-freezing protection in Winter. 7) Protection for compressor overload. 9) Compressor discharge temperature protection. 11) Sensor malfunction protection.		2) Protection for over-low suction pressure. 4) Anti-freezing protection in cooling mode. 6) Protection for compressor over current. 8) Outlet and inlet water temperature difference protection. 10) Water flow cut-off protection. 12) Low-temperature protection of shell and tube heat exchanger.	
Noise level	dB(A)	74	65	65	65
Operation water temp	°C	Cooling: 0~17(Less than 5°C must add antifreeze) Heating: 22~50	Cooling: 5~17 Heating: 45~50	Cooling: 5~17 Heating: 45~50	Cooling: 5~17 Heating: 45~50
Ambient temp	°C	Cooling: 10~52 Heating: -10~21			

Note: Specifications are based on the following conditions:

- Cooling : (*1) chilled water inlet/outlet: 12°C/ 7°C, and outdoor ambient temp. of 35°C DB.
(*2) chilled water inlet/outlet: 12°C / 7°C, and outdoor ambient temp. of 46°C DB.
- Heating : warm water inlet/outlet: 40°C/ 45°C, and outdoor ambient temp. 7°C DB/6°C WB.
- Water side fouling factor: 0.086m²·°C/kW.
- 1m away in open field(sound pressure).

Model		MGBT-D30W/DN1	MGBT-F60W/DN1	MGBT-F120W/DN1	MGBT-F180W/DN1
Cooling Capacity (*1)	kW	30	60	120	180
	US Ton	8.5	17.0	34.1	51.1
Cooling Capacity (*2)	kW	25.8	51.6	103.2	154.8
	US Ton	7.3	14.7	29.3	44.0
Heating Capacity	kW	32	65	130	195
Power input	Cooling (*1)	kW	10.0	19.5	39
	Cooling rated current (*1)	A	28.3	63	126
	Cooling (*2)	kW	12	23.4	46.8
	Cooling rated current (*2)	A	33.96	75.6	151.2
	Heating	kW	9.8	20	40
	Heating rated current	A	27.7	65.5	130
Power supply	V/Ph/Hz	220/3/60	220/3/60	220/3/60	220/3/60
Power supply	Manual switch	A	70	175	350
	Fuse	A	50	150	300
Max. Input consumption	kW	14.7	26.2	54.5	80.4
Max. Current	A	43.7	87.2	164.7	252
Compressor	Type	Digital scroll+fixed scroll		Fixed scroll	Fixed scroll
	Brand	Copeland / Sanyo		Danfoss	Danfoss
	Model	ZPD51K5E-TF5-532C-SBP160H36A	SH105A3ALC	SH105A3ALC	SH105A3ALC
	Quantity	Pieces	1+1	2	4
	Capacity	Btu/h	15100/16100	110057	110057
	Input	kW	4810/5500	9957	9957
	Rate current	A	20/18.1	32.9	32.9
	Locked rotor Amp	A	110/114	267	267
	Refrigerant oil	ml	1242/1700	3300	3300
	Refrigerant	Type	R410A	R410A	R410A
	Refrigerant control	EXV	EXV+capillary	EXV+capillary	
	Weight	kg	3.0×2	6.5×2	
Condenser (Air side)	Type	Fin-coil		Fin-coil	Fin-coil
	Quantity of fan motor	Pieces	1	2	4
	Air flow volume	m³/h	12000	24000	48000
	Fan motor model		YDK600-6	YS650-8B	YS650-8B
	Fan motor rated current	A	4	3.7×2	3.7×4
	Fan motor input	kW	0.88	0.65×2	0.65×4
Evaporator (Water side)	Type	Double pipe		Shell and tube	Shell and tube
	Water pressure drop	kPa	60	12	25
	Water inlet/outlet pipeline inside diameter	mm	DN40	DN100	DN65
	Water flow	m³/h	5.2	10.3	20.6
	Max. design pressure	MPa	1	1	1
	Water pipe connection type	Flexible joint		Flexible joint	Flexible joint
Dimension	Net(D×H×W)	mm	1514×1865×841	2000×1880×900	2000×2090×1685
	Packing(D×H×W)	mm	1590×2065×995	2090×2055×985	2090×2240×1755
Weight	Net weight	kg	380	580	1180
	Operation weight	kg	420	650	1270
Connection wiring	Power wire	mm²×No.	25×4+16×1	35×4+10×1	70×3+25×2
	Signal wire	mm²×No.	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding
Control type		Wired controller	Wired controller	Wired controller	Wired controller
Safety protection device		1) Protection for over-high discharge pressure. 3) Power supply phase sequence protection. 5) Anti-freezing protection in Winter. 7) Protection for compressor overload. 9) Compressor discharge temperature protection. 11) Sensor malfunction protection.		2) Protection for over-low suction pressure. 4) Anti-freezing protection in cooling mode. 6) Protection for compressor over current. 8) Outlet and inlet water temperature difference protection. 10) Water flow cut-off protection. 12) Low-temperature protection of shell and tube heat exchanger.	
Noise level	dB(A)	65	67	70	74
Operation water temp	°C	Cooling: 5~17 Heating: 45~50			
Ambient temp	°C	Cooling: 10~52 Heating: -10~21			

Note: Specifications are based on the following conditions:

- Cooling : (*1) chilled water inlet/outlet: 12°C/ 7°C, and outdoor ambient temp. of 35°C DB.
(*2) chilled water inlet/outlet: 12°C / 7°C, and outdoor ambient temp. of 46°C DB.
- Heating : warm water inlet/outlet: 40°C/ 45°C, and outdoor ambient temp. 7°C DB/6°C WB.
- Water side fouling factor: 0.086m²·°C/kW.
- 1m away in open field(sound pressure).

Model		MGCT-F30W/PN1	MGCT-D30W/PN1	MGCT-F60W/PN1	MGCT-F120W/PN1	MGCT-F180W/PN1
Cooling Capacity (*1)	kW	30	30	60	120	180
	US Ton	8.5	8.5	17.0	34.1	51.1
Cooling Capacity (*2)	kW	25.8	25.8	51.6	103.2	154.8
	US Ton	7.3	7.3	14.7	29.3	44.0
Heating Capacity	kW	32	32	65	130	195
Power input	Cooling (*1)	kW	10.0	10.0	19.7	39.4
	Cooling rated current (*1)	A	16.3	16.3	63	126
	Cooling (*2)	kW	12	12	23.64	47.28
	Cooling rated current (*2)	A	19.56	19.56	75.6	151.2
	Heating	kW	9.8	9.8	19.9	39.8
	Heating rated current	A	16.0	16.0	65.5	130
Power supply	V/Ph/Hz	380/3/60	380/3/60	380/3/60	380/3/60	380/3/60
Power supply	Manual switch	A	50	125	200	350
	Fuse	A	36	36	100	150
Max. Input consumption	kW	14.8	13.8	26.9	51.44	76.5
Max. Current	A	25.3	24.2	48.7	95	140
Compressor	Type	Fixed scroll		Digital scroll+fixed scroll	Fixed scroll	Fixed scroll
	Brand	Copeland		Copeland	Danfoss	Danfoss
	Model	ZP57K3E-TF7-522		ZPD51K5E-TF7-532/ ZP57K3E-TF7-522	SH105A9ALC	SH105A9ALC
	Quantity	Pieces	2	1+1	2	4
	Capacity	Btu/h	58000	50400/58000	97060	97060
	Input	kW	5.48	4.71/5.48	9.1	9.1
	Rate current	A	10.1	9.6/10.1	21.4	21.4
	Locked rotor Amp	A	94	65.6/94	160	160
	Refrigerant oil	ml	1685	1242/1685	3300	3300
	Refrigerant	Type	R410A	R410A	R410A	R410A
	Refrigerant control	EXV	EXV	EXV+capillary	EXV+capillary	
	Weight	kg	3.1×2	3.1×2	6.5×4	
Condenser (Air side)	Type	Fin-coil		Fin-coil	Fin-coil	Fin-coil
	Quantity of fan motor	Pieces	1	1	2	4
	Air flow	m³/h	12000	12000	24000	48000
	Fan motor model		YDK550-8B	YDK550-8B	YS650-8C	YS650-8C
	Fan motor rated current	A	4	4	2.1×2	2.1×4
	Fan motor input	kW	0.85	0.85	1.03×2	1.03×4
Evaporator (Water side)	Type	Double pipe		Double pipe	Shell and tube	Shell and tube
	Water pressure drop	kPa	60	60	15	25
	Water inlet/outlet pipeline inside diameter	mm	DN40	DN40	DN100	DN65
	Water flow	m³/h	5.2	5.2	10.3	20.6
	Max. design pressure	MPa	1	1	1	1
	Water pipe connection type	Flexible joint		Flexible joint	Flexible joint	
Dimension	Net(D×H×W)	mm	1514×1865×841	1514×1865×841	2000×1880×900	2000×2090×1685
	Packing(D×H×W)	mm	1590×2065×995	1590×2065×995	2090×2095×985	2090×2240×1755
Weight	Net weight	kg	380	380	590	1180
	Operation weight	kg	400	400	650	1270
Connection wiring	Power wire	mm²×No.	10×4+6×1	10×4+6×1	16×4+10×1	35×3+16×2
	Signal wire	mm²×No.	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding	0.75×3-core with shielding
Control type		Wired controller	Wired controller	Wired controller	Wired controller	Wired controller
Safety protection device		1) Protection for over-high discharge pressure. 3) Power supply phase sequence protection. 5) Anti-freezing protection in Winter. 7) Protection for compressor overload. 9) Compressor discharge temperature protection. 11) Sensor malfunction protection.		2) Protection for over-low suction pressure. 4) Anti-freezing protection in cooling mode. 6) Protection for compressor over current. 8) Outlet and inlet water temperature difference protection. 10) Water flow cut-off protection. 12) Low-temperature protection of shell and tube heat exchanger.		
Noise level	dB(A)	67	67	67	70	74
Operation water temp	°C	Cooling: 0~17(Less than 5°C must add antifreeze) Heating: 22~50				
Ambient temp	°C	Cooling: 10~52 Heating: -10~21				

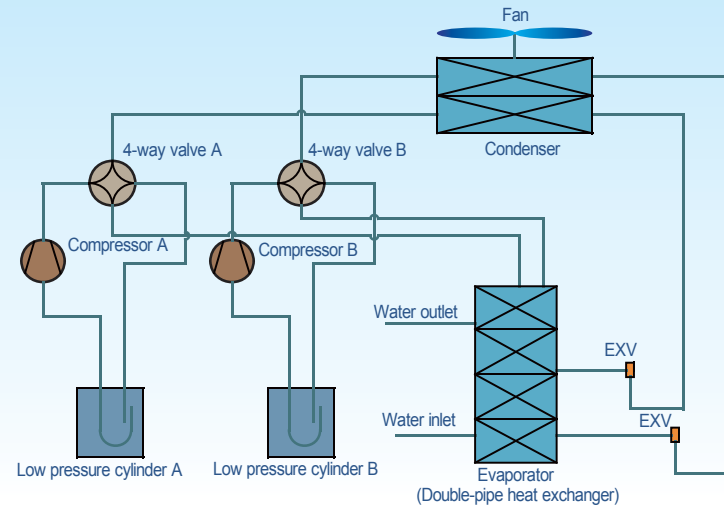
Note: Specifications are based on the following conditions:

- Cooling : (*1) chilled water inlet/outlet: 12°C/ 7°C, and outdoor ambient temp. of 35°C DB.
(*2) chilled water inlet/outlet: 12°C / 7°C, and outdoor ambient temp. of 46°C DB.
- Heating : warm water inlet/outlet: 40°C/ 45°C, and outdoor ambient temp. 7°C DB/6°C WB.
- Water side fouling factor: 0.086m²·°C/kW.
- 1m away in open field(sound pressure).

System sketch drawing

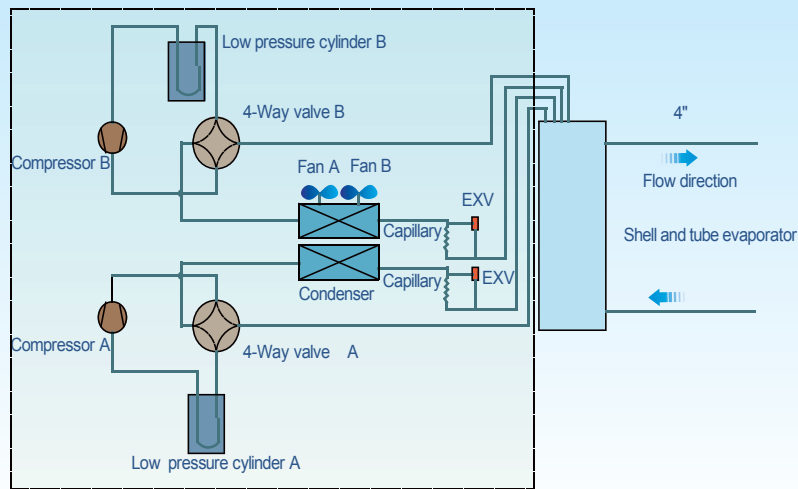
25/30kW module

Each module has two compressors with one separate unit, one double-pipe evaporator for two refrigerant systems.



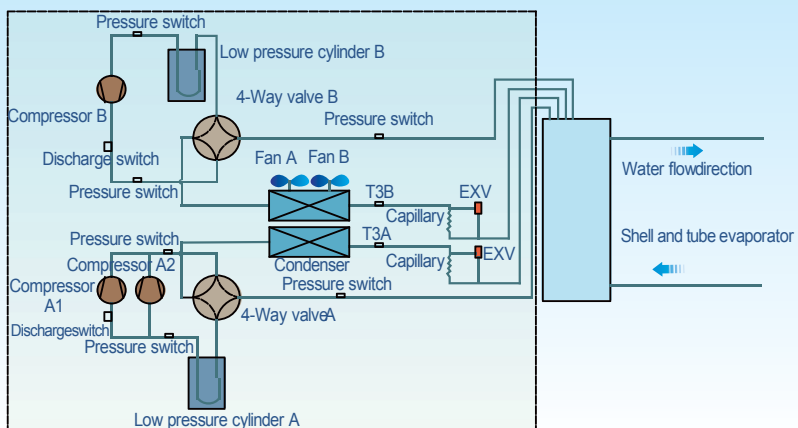
60kW module (Fixed speed)

Each module has two compressors with one separate unit, one shell and tube evaporator for two refrigerant systems.



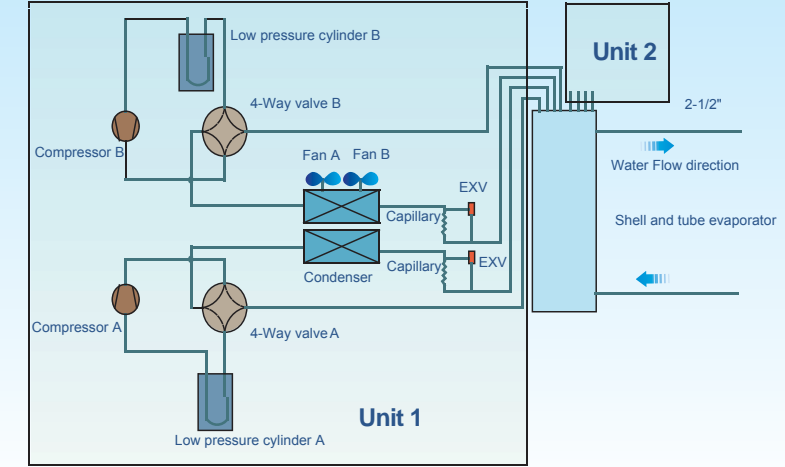
60kW digital module

Each module has three compressors with one separate unit, one shell and tube evaporator for two refrigerant systems.



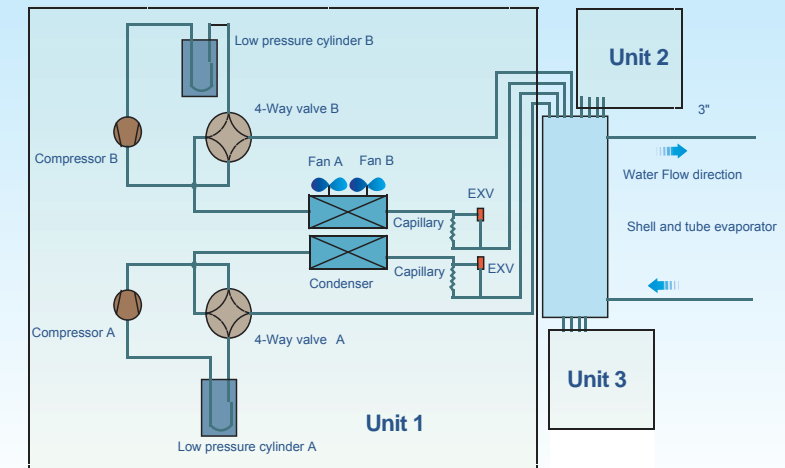
120kW module

Each module has four compressors with two separate units, one shell and tube evaporator for four refrigerant systems.



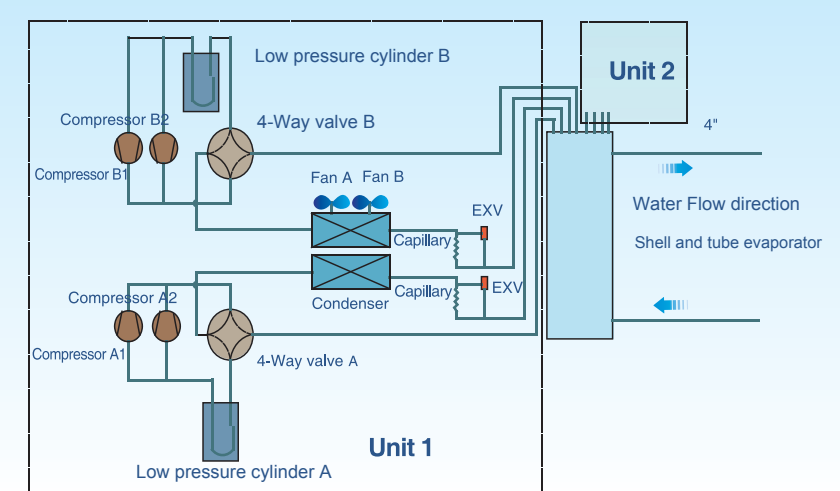
180kW module

Each module has six compressors with three separate units, one shell and tube evaporator for six refrigerant systems.



250kW module

Each module has eight compressors with two separate units, one shell and tube evaporator for four refrigerant systems.

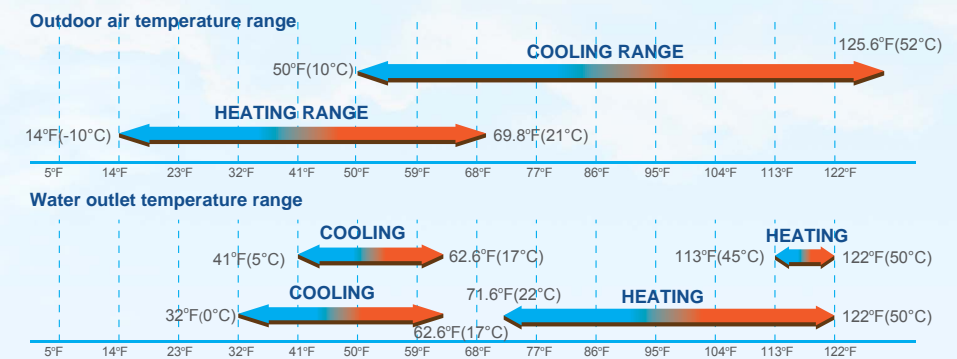




Application range →

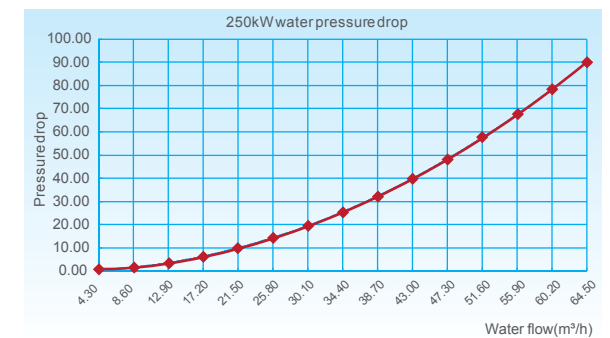
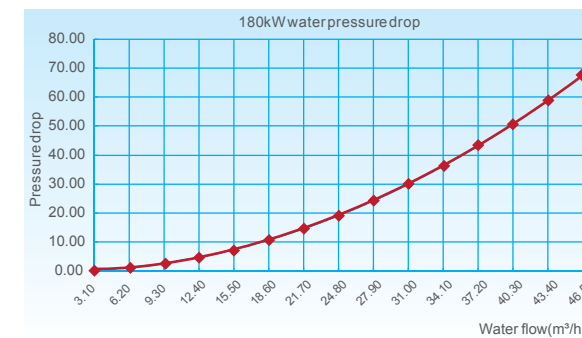
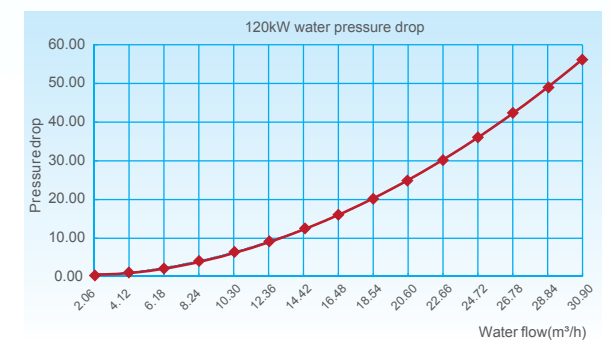
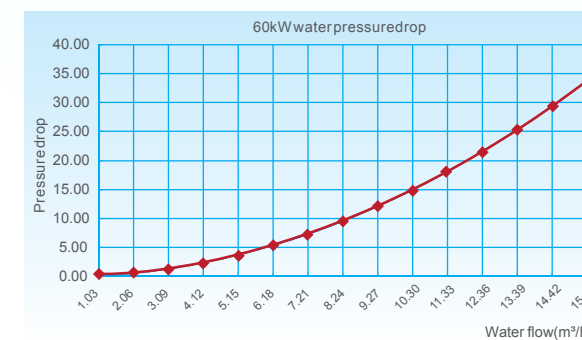
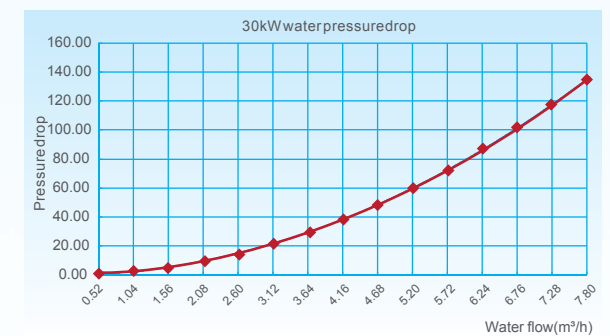
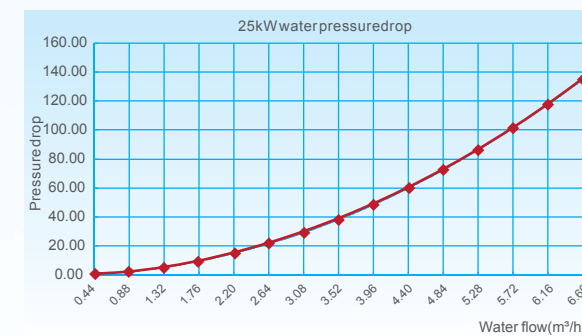
Application range

Operation temperature range



Model	Outdoor air temperature range	Water outlet temperature range
Cooling	50°F~125.6°F(10°C~52°C)	41°F~62.6°F (44.6°F is default)/5°C~17°C (7°C is default) 32°F~62.6°F/0°C~17°C (The antifreeze must be added)
Heating	14°F~69.8°F(-10°C~21°C) 14°F~69.8°F(-10°C~21°C)	113°F ~ 122°F (113°F is default)/45°C ~ 50°C (45°C is default) 71.6°F~122°F (113°F is default)/22°C ~ 50°C (45°C is default)

Water pressure drop



Aqua Tempo Power Series
Air cooled scroll chiller

Glycol factors

A glycol solution is required when the unit with condition as mentioned. The use of glycol will reduce the performance of the unit depending on concentration.

Ethylene glycol

Quality of glycol (%)	modification coefficient				Freezing point °C
	Cooling capacity modification	Power modification	Water resistance	Water flow modification	
0	1.000	1.000	1.000	1.000	0
10	0.984	0.998	1.118	1.019	-4.000
20	0.973	0.995	1.268	1.051	-9.000
30	0.965	0.992	1.482	1.092	-16.000
40	0.960	0.989	1.791	1.145	-23.000
50	0.950	0.983	2.100	1.200	-37.000

Propylene glycol

Quality of glycol (%)	Modification coefficient				Freezing point °C
	Cooling capacity modification	Power modification	Water resistance	Water flow modification	
0	1.000	1.000	1.000	1.000	0
10	0.976	0.996	1.071	1.000	-3.000
20	0.961	0.992	1.189	1.016	-7.000
30	0.948	0.988	1.380	1.034	-13.000
40	0.938	0.984	1.728	1.078	-22.000
50	0.925	0.975	2.150	1.125	-35.000

Units operating with glycol solutions are not included in the ARI Certification Program.

Fouling factor

Fouling refers to the accumulation of unwanted material on solid surfaces, most often in an aquatic environment. The fouling material can consist of either living organisms (biofouling) or a non-living substance (inorganic or organic). Fouling is usually distinguished from other surface-growth phenomena in that it occurs on a surface of a component, system or plant performing a defined and useful function, and that the fouling process impedes or interferes with this function.

Other terms used in the literature to describe fouling include: deposit formation, encrustation, crudding, deposition, scaling, scale formation, slagging, and sludge formation. The last six terms have a more narrow meaning than fouling within the scope of the fouling science and technology, and they also have meanings outside of this scope; therefore, they should be used with caution.

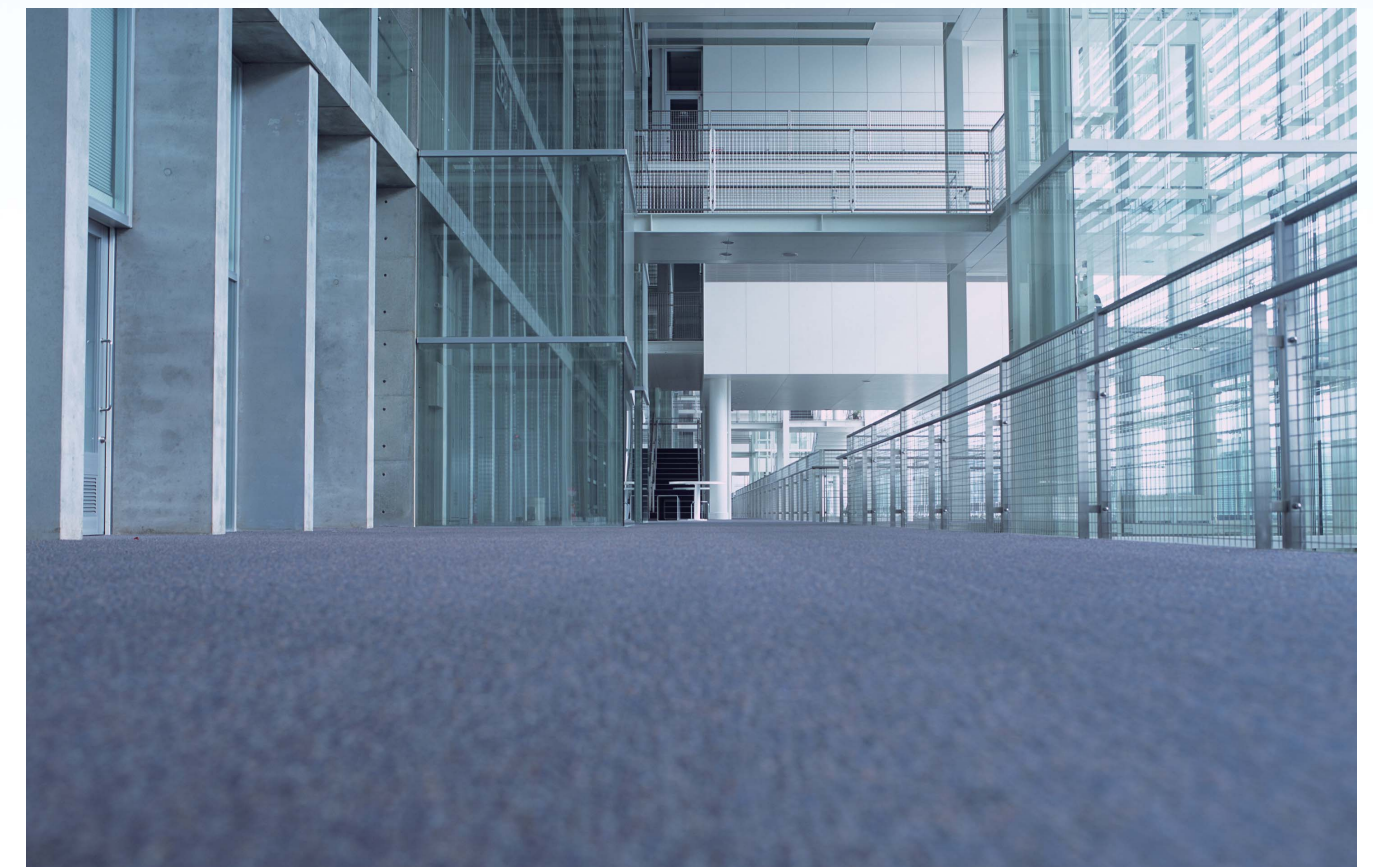
Fouling phenomena are common and diverse, ranging from fouling of ship hulls, natural surfaces in the marine environment (marine fouling), fouling of heat-transfer components through ingredients contained in the cooling water or gases, and even the development of plaque or calculus on teeth, or deposits on solar panels on Mars, among other examples.

Foreign matter in the chilled water system will adversely affect the heat transfer capability of the evaporator, and could increase the pressure drop and reduce the water flow. To provide optimum unit operation, proper water treatment must be maintained. Refer to the table as following.

Fouling factor

ALTITUDE (m)	Difference of water inlet and outlet temp (°C)	Fouling Factor							
		0.018 °C /kW		0.044m 2 °C /kW		0.086m 2 °C /kW		0.172m 2 °C /kW	
		C	P	C	P	C	P	C	P
Sea level	3	1.036	1.077	1.019	1.076	0.991	0.975	0.963	0.983
	4	1.039	1.101	1.022	1.080	0.994	0.996	0.971	0.984
	5	1.045	1.105	1.028	1.086	1.000	1.000	0.977	0.989
	6	1.051	1.109	1.034	1.093	1.006	1.004	0.983	0.994
600	3	1.024	1.087	1.008	1.064	0.980	0.984	0.951	0.991
	4	1.027	1.111	1.011	1.068	0.983	1.005	0.959	0.992
	5	1.034	1.115	1.017	1.074	0.989	1.009	0.965	0.997
	6	1.043	1.115	1.026	1.084	0.998	1.009	0.973	0.999
1200	3	1.013	1.117	0.996	1.052	0.969	1.011	0.942	1.002
	4	1.015	1.118	0.998	1.055	0.971	1.012	0.948	1.003
	5	1.023	1.122	1.006	1.063	0.979	1.015	0.955	1.005
	6	1.031	1.125	1.015	1.072	0.987	1.018	0.962	1.007
1800	3	1.002	1.128	0.986	1.042	0.959	1.021	0.935	1.007
	4	1.005	1.129	0.989	1.045	0.962	1.022	0.941	1.010
	5	1.012	1.132	0.995	1.051	0.968	1.024	0.945	1.012
	6	1.018	1.134	1.001	1.058	0.974	1.026	0.949	1.014

C--Cooling capacity P--Power

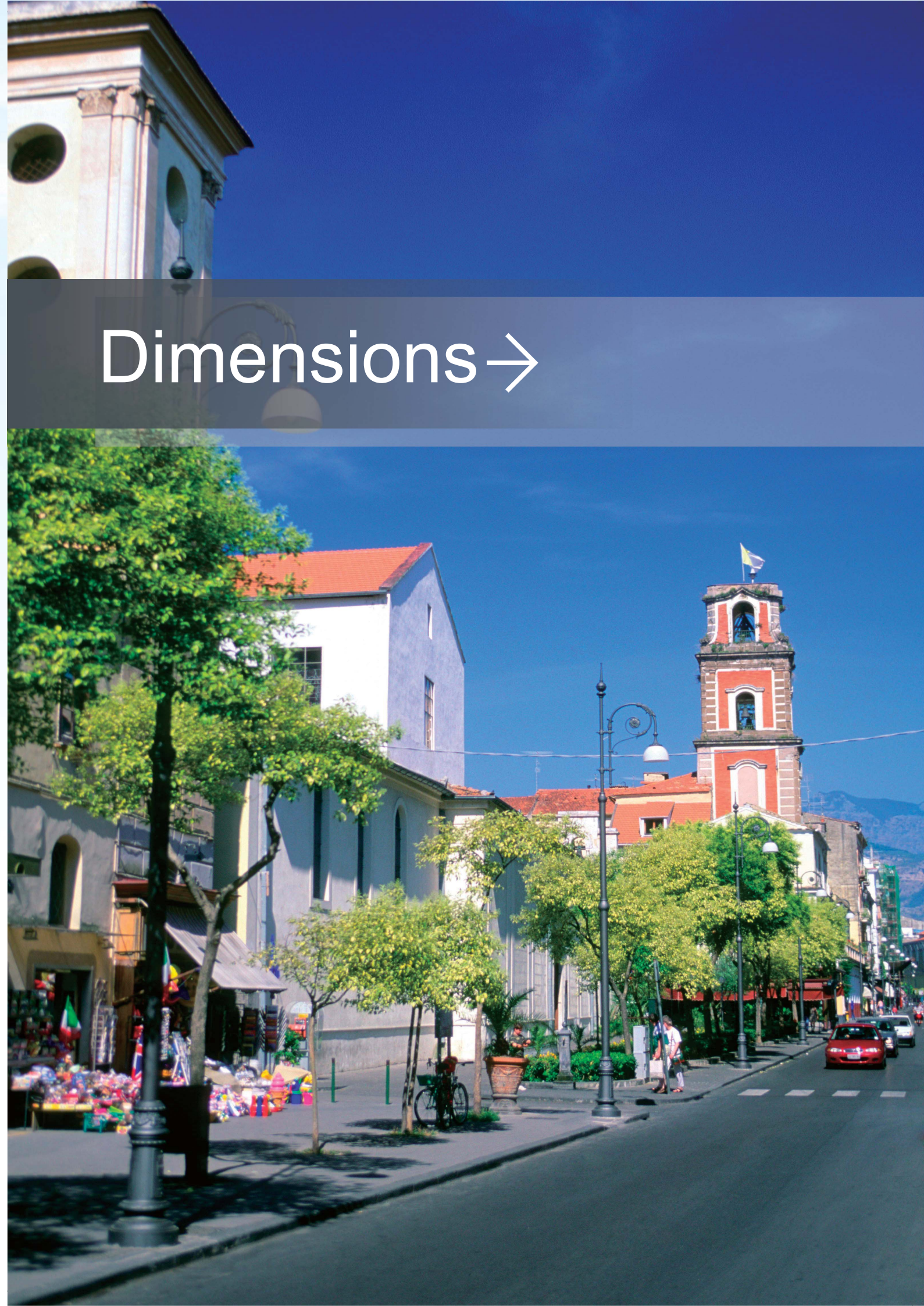


Electrical data

Model	Outdoor Unit				Power		Compressor Type-1					Compressor Type-2					OFM			CRANKCASE			
	Hz	Voltage	Min.	Max.	TOCA	MFA	SC	MRC	RC	RP	Qty	SC	MRC	RC	RP	Qty	IP	FL	FC	Qty	Voltage	TW	TA
MGBT-F25W/RN1	50	380-415	342	456	25	36	64	16	8.3	4.75	2	/	/	/	/	/	0.66	6	3	1	220	60	0.3
MGBT-D25W/RN1	50	380-415	342	456	25	36	64	16	8.3	4.75	1	64	16	8.5	4.93	1	0.66	6	3	1	220	60	0.3
MGBT-F30W/RN1	50	380-415	342	456	25	36	64	16	8.3	4.75	2	/	/	/	/	/	0.66	6	3	1	220	60	0.3
MGBT-D30W/RN1	50	380-415	342	456	25	36	64	16	8.3	4.75	1	64	16	8.5	4.93	1	0.66	6	3	1	220	60	0.3
MGBT-F60W/RN1	50	380-415	342	456	52	100	142	29	16.93	9.462	2	/	/	/	/	/	0.88	8.1	4.05	2	220	60	0.36
MGBT-D60W/RN1	50	380-415	342	456	52	100	118	29	17.8	10.2	2	82.4	18	9.8	5.75	1	0.88	8.1	4.05	2	220	100	0.45
MGBT-F120W/RN1	50	380-415	342	456	90	200	142	29	16.93	9.462	4	/	/	/	/	/	0.88	8.1	4.05	4	220	80	0.36
MGBT-F180W/RN1	50	380-415	342	456	135	300	142	29	16.93	9.462	6	/	/	/	/	/	0.88	8.1	4.05	6	220	80	0.36
MGBT-F250W/RN1	50	380-400	342	440	191	380	142	29	16.93	9.462	8	/	/	/	/	/	0.965	3.6	1.8	8	220	80	0.36
MGCT-F30W/PN1	60	380	342	418	25.3	36	94	18	9.9	5.48	2	/	/	/	/	/	0.87	8	4	2	220	60	0.3
MGCT-D30W/PN1	60	380	342	418	25.3	36	94	18	9.9	5.48	1	65.6	16	8.5	4.71	1	0.87	8	4	2	220	60	0.3
MGBT-F60W/PN1	60	380	342	418	54.5	100	160	26	18.99	9.957	2	/	/	/	/	/	0.103	4.2	2.1	4	220	80	0.36
MGBT-F120W/PN1	60	380	342	418	130	200	160	26	18.99	9.957	4	/	/	/	/	/	0.103	4.2	2.1	4	220	80	0.36
MGBT-F180W/PN1	60	380	342	418	160	180	160	26	18.99	9.957	6	/	/	/	/	/	0.103	4.2	2.1	6	220	80	0.36
MGBT-F25W/DN1	60	220	198	242	25.3	36	114	29	17.8	5.45	2	/	/	/	/	/	0.87	8	4	1	127	60	0.48
MGBT-D25W/DN1	60	220	198	242	25.3	36	114	29	17.8	5.45	1	110	25	13.8	4.81	1	0.87	8	4	1	127	60	0.48
MGBT-F30W/DN1	60	220	198	242	25.3	36	114	29	17.8	5.45	2	/	/	/	/	/	0.87	8	4	1	127	60	0.48
MGBT-D30W/DN1	60	220	198	242	25.3	36	114	29	17.8	5.45	1	110	25	13.8	4.81	1	0.87	8	4	1	127	60	0.48
MGBT-F60W/DN1	60	220	198	242	54.5	100	267	43	31.28	9.957	2	/	/	/	/	/	0.105	7.4	3.7	2	127	80	0.62
MGBT-F120W/DN1	60	220	198	242	130	200	267	43	31.28	9.957	4	/	/	/	/	/	0.105	7.4	3.7	4	127	80	0.62
MGBT-F180W/DN1	60	220	198	242	160	180	267	43	31.28	9.957	6	/	/	/	/	/	0.105	7.4	3.7	6	127	80	0.62

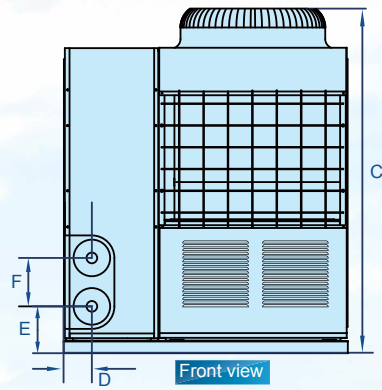
TOCA: Total Over-current Amps. (A) MFA: Max. Fuse Amps. (A) SC: Start current/A(each)
MRC: Max. running current/A(each) RP:Rated power/KW (each) RC:Rated current/A(each)
IP: Input power KW(each) FL: Fan full load amps(each) FC: Fan Circuit Amps(each)
TW: Total Watts TA:Total Amps

Dimensions →

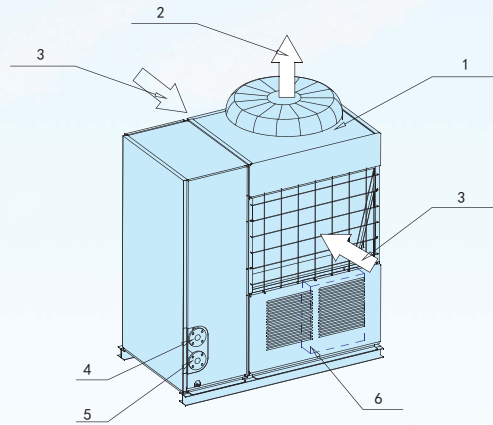
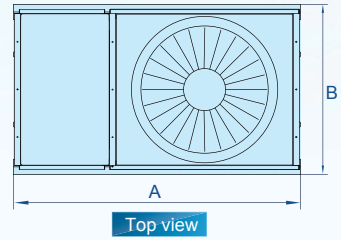


Dimensions

25/30kW module

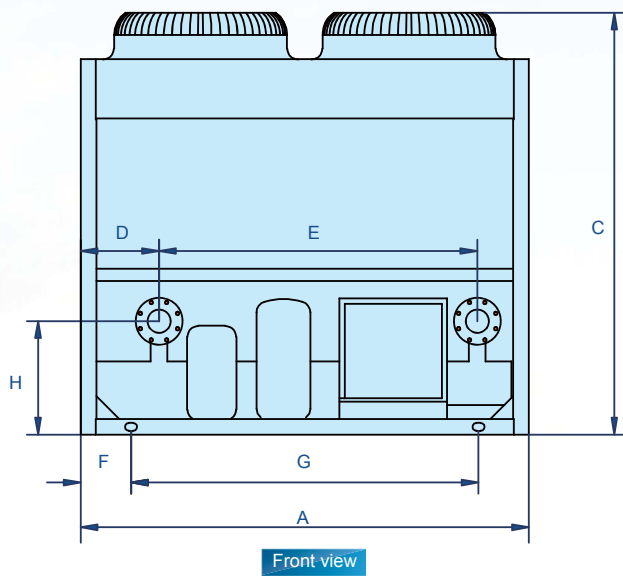


Model	Unit	A	B	C	D	E	F
MGBT-F(D)25W/RN1	mm	1514	841	1865	115	315	172
MGBT-F(D)30W/RN1							
MGCT-F(D)30W/PN1							
MGBT-F(D)25W/DN1	inch	59.6	33.11	73.43	4.53	12.4	6.77
MGBT-F(D)30W/DN1							

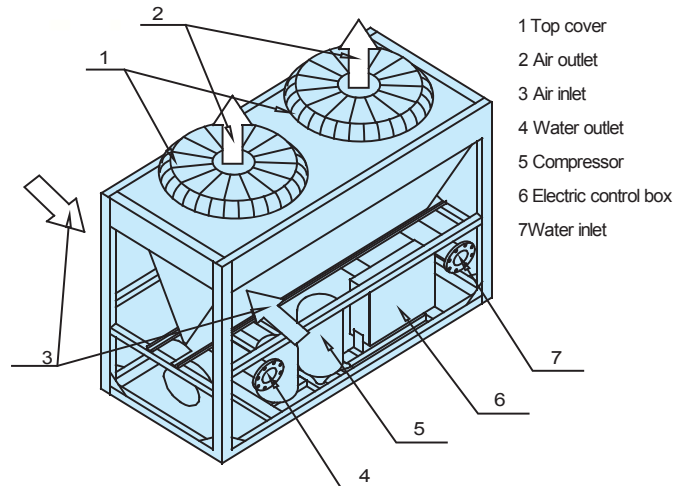
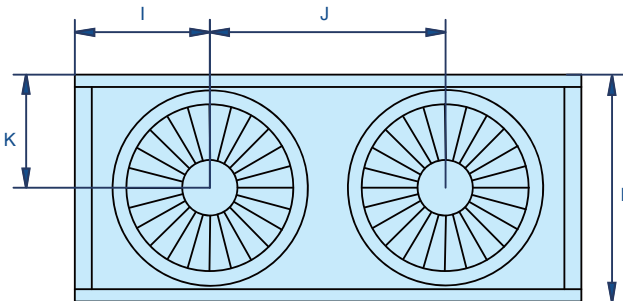


- 1 Top cover
- 2 Air outlet
- 3 Air inlet
- 4 Water outlet
- 5 Water inlet
- 6 Electric control box

60kW module



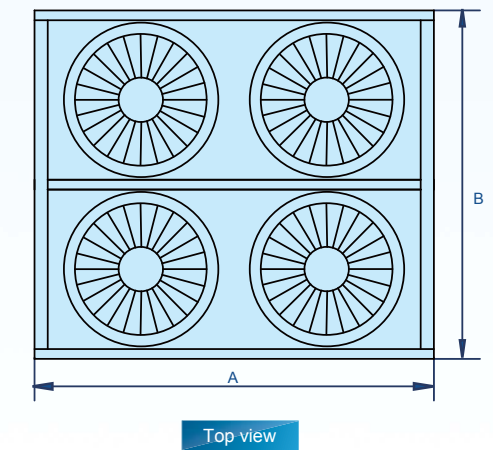
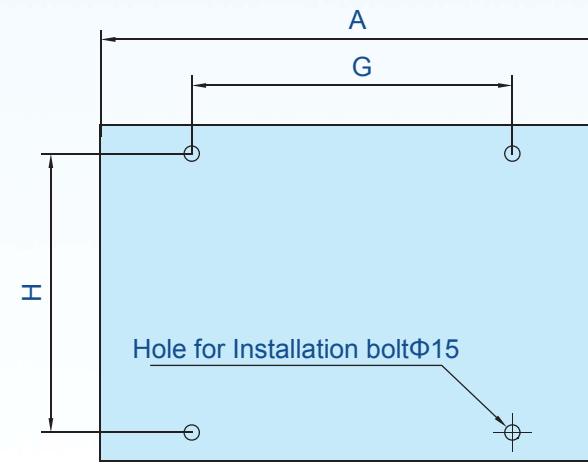
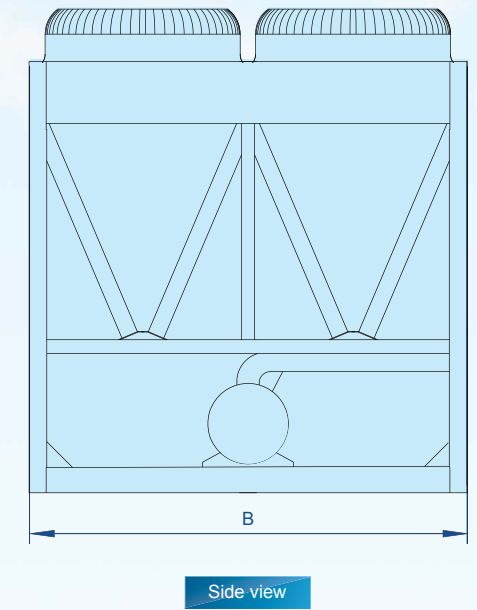
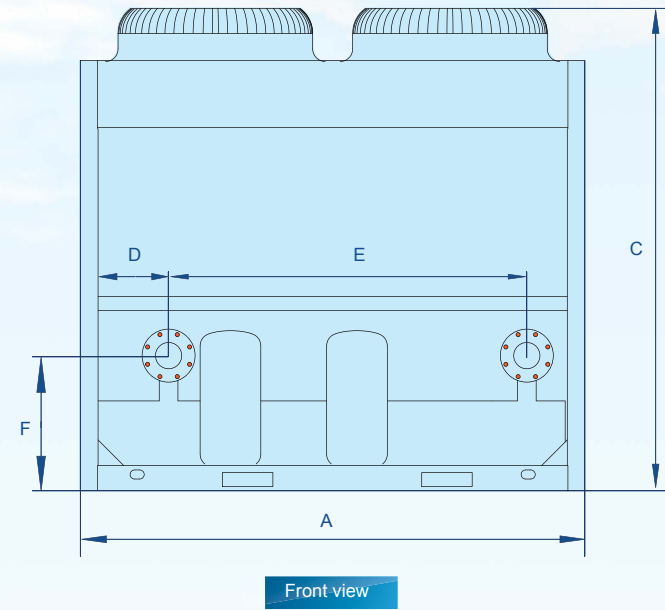
Model	Unit	A	B	C	D	E	F	G	H	I	J	K
MGBT-F60W/RN1	mm	2000	900	1880	350	1420	225	1500	506	530	930	450
MGBT-D60W/RN1												
MGBT-F60W/PN1												
MGBT-F60W/DN1	inch	78.74	35.4	74	13.78	55.91	8.86	59.06	19.92	20.87	36.61	17.72



- 1 Top cover
- 2 Air outlet
- 3 Air inlet
- 4 Water outlet
- 5 Compressor
- 6 Electric control box
- 7 Water inlet

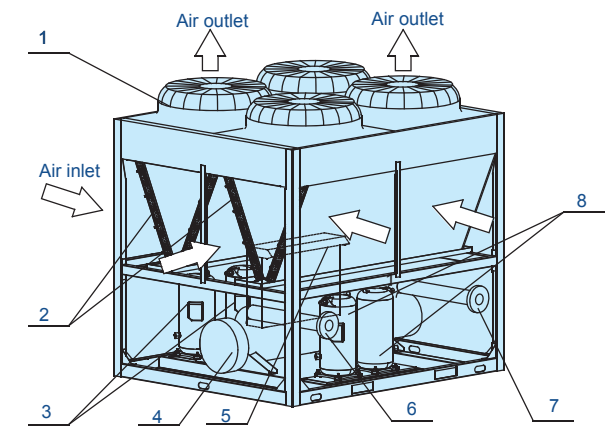
Top view

120kW module



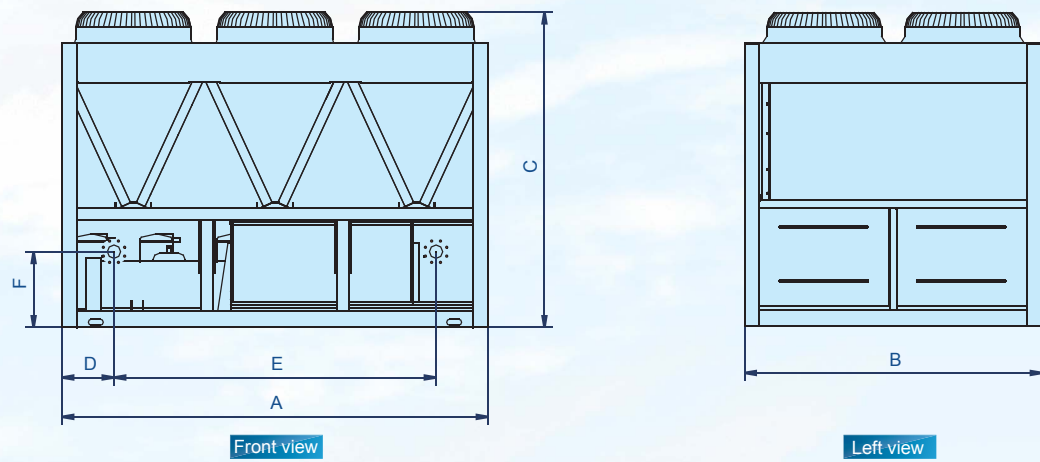
Installation hole

- 1 Top cover
- 2 Condenser
- 3 Compressor
- 4 Evaporator
- 5 Electric control box Air inlet
- 6 Water outlet
- 7 Water inlet
- 8 Compressor

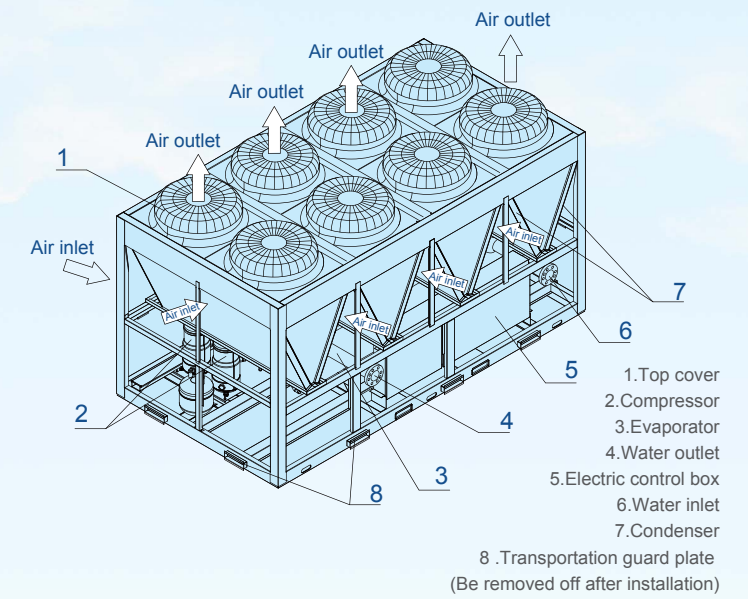
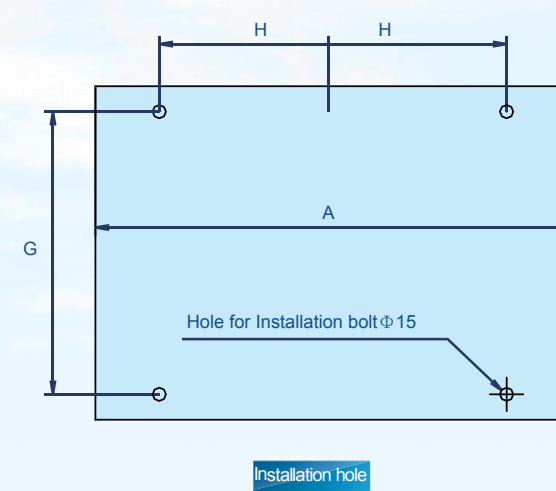


Model	Unit	A	B	C	D	E	F	G	H
MGBT-F120W/RN1	mm	2000	1685	2080	350	1420	506	1550	1586
MGBT-F120W/PN1									
MGBT-F120W/DN1									
	inch	78.74	66.34	81.89	13.78	55.91	19.92	61.02	62.44

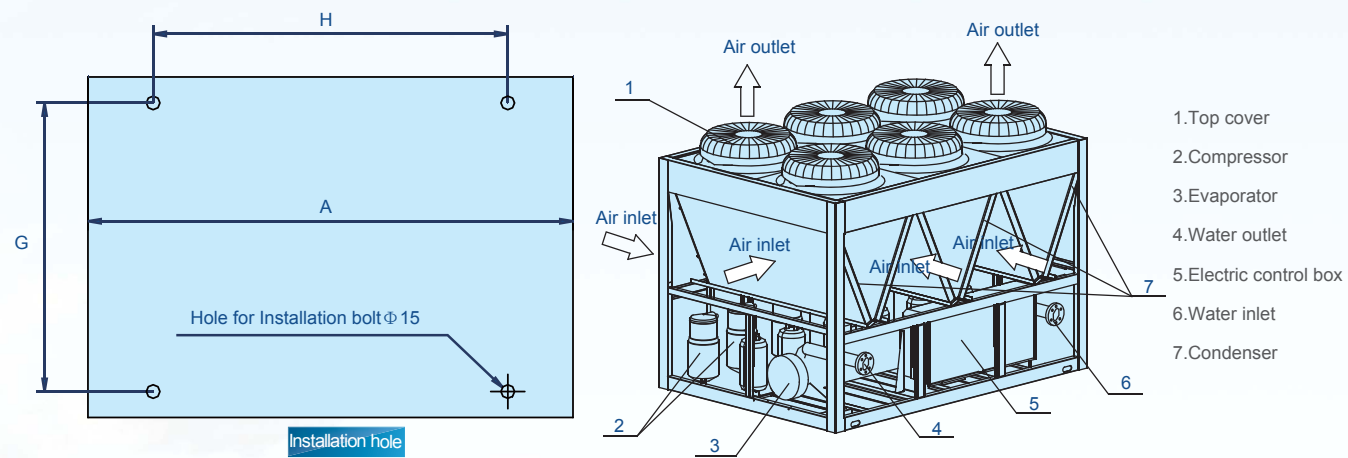
180kW module



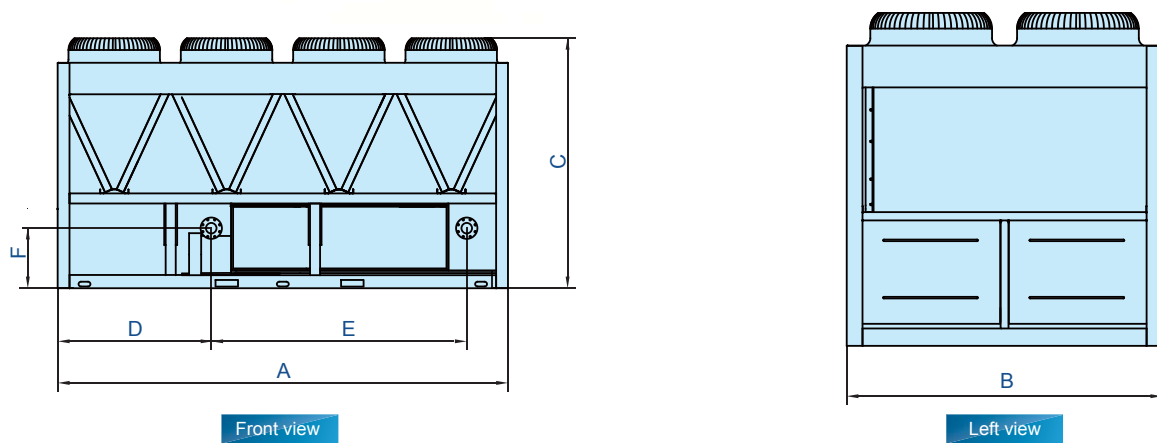
Model	Unit	A	B	C	D	E	F	G	H
MGBT-F180W/RN1 MGBT-F180W/PN1 MGBT-F180W/DN1	Mm	2850	2000	2110	3470	2156	506	1888	2388
	inch	112.2	78.74	83.07	136.61	84.88	19.92	74.33	94.02



Model	Unit	A	B	C	D	E	F	G	H
MGBT-F250W/RN1	Mm	3800	2000	2130	1235	2156	573	1888	1551
	inch	149.6	78.74	83.86	48.62	84.88	22.56	74.33	61.06



250kW module

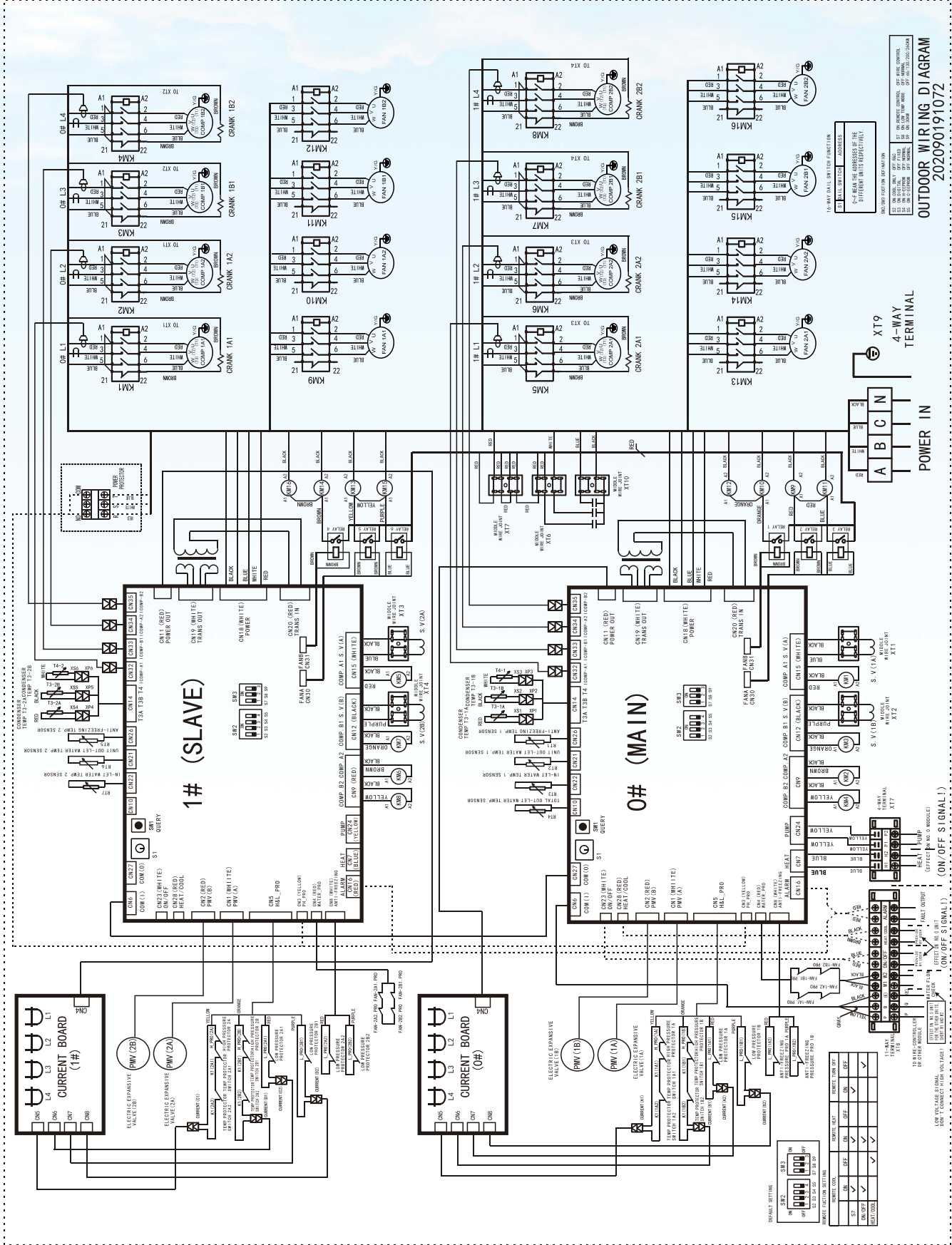
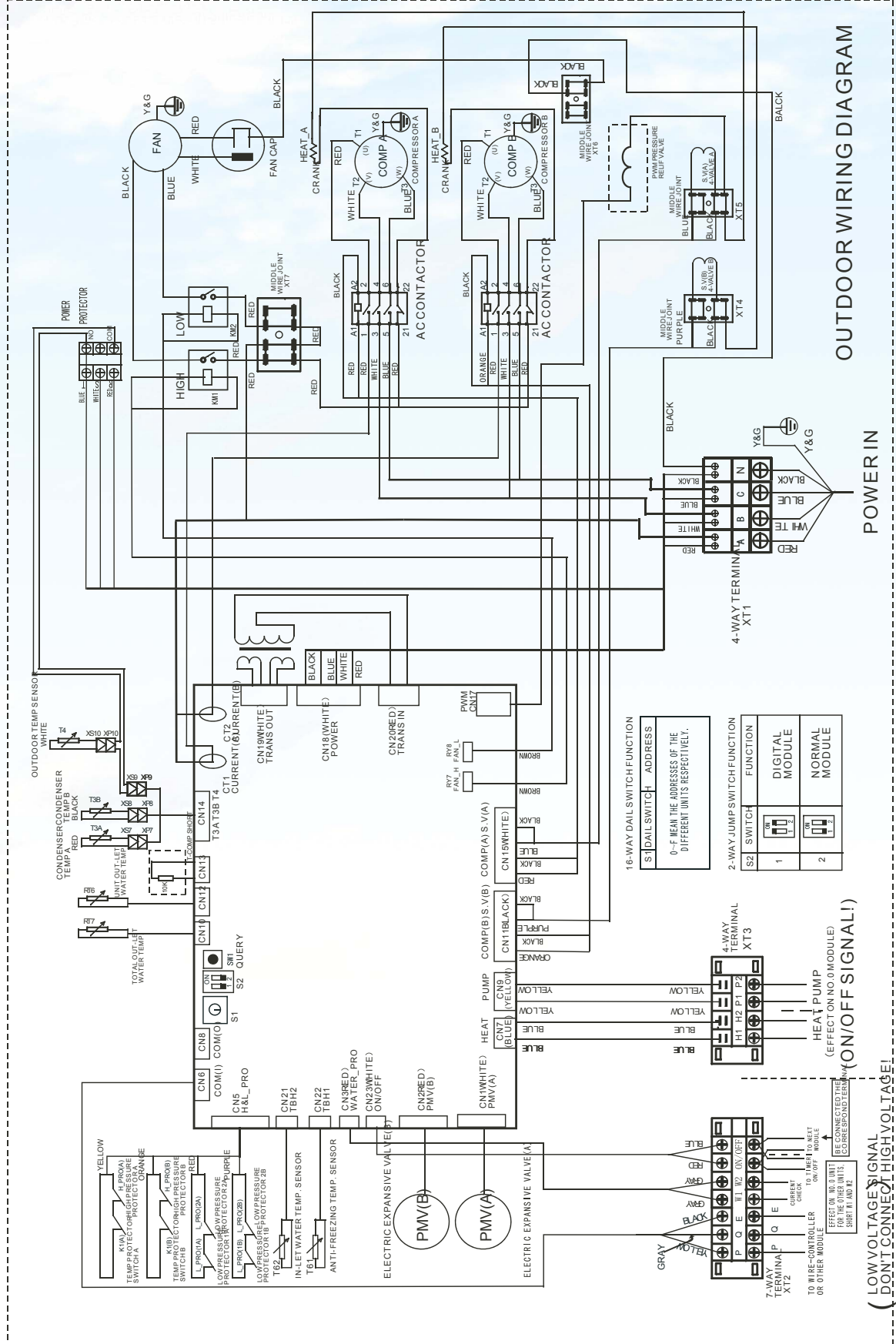


Typical schematic wiring diagram

25/30kW module

250kW module

Attached Drawing (I) Electric Drawing of Main Unit and Auxiliary Unit





Control system →

Control system

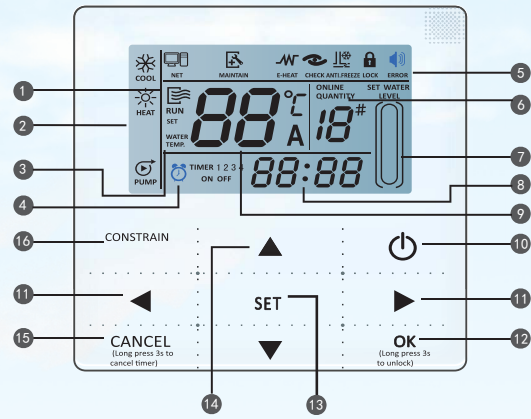
Control Devices

Type	Function Descriptions	
Wired Controller	 <p>KJRM-120D/BMK-E</p>	<p>(Standard)</p> <ul style="list-style-type: none"> ■ Parameter setting and display. ■ Real time clock control. ■ Malfunction manual reset. ■ Hysteresis temp. setting. ■ Touch key operation <p>It can connect max. 16PCBs. MODBUS gateway is available by communication port X Y E in wired controller, it can be customized.</p>
	 <p>KJR-120A/MBTE</p>	<p>(Optional)</p> <ul style="list-style-type: none"> ■ Parameter setting and display. ■ Real time clock control. ■ Malfunction manual reset. ■ Hysteresis temp. setting. ■ Weekly timing function. <p>It can connect max. 16PCBs.</p>
LONWORKS Gateway		<p>(Optional)</p> <ul style="list-style-type: none"> ■ Operation mode setting. ■ Outlet water temperature setting. ■ Hysteresis setting. ■ Alarm clear setting. <p>It can connect max. 16PCBs.</p>
Network Control Software		<p>(Optional)</p> <ul style="list-style-type: none"> ■ Control operation mode in the refrigeration system. ■ Query real-time operating parameter in the main system and subsystem. ■ Set up the weekly timing that could realizes the schedule management for the refrigeration system. ■ Record refrigeration system error. It can connect max. 16 wired controllers by ar5485/232 converter, each wired controller can connect max. 16 PCBs.
Modbus gateway		<p>(Optional)</p> <ul style="list-style-type: none"> ■ Parameter setting and display. ■ Real time clock control. ■ Malfunction manual reset. ■ Hysteresis temp. setting. ■ Touch key operation <p>One system can connect max. 16 Modbus gateway, each gateway can connect max 16PCBs.</p>

Wired controller KJRM-120D/BMK-E(Standard)

The setting and operation order can be send to the main board and the running condition can be displayed by the wired controller. It can connect max. 16PCBs. It is available for all Midea air cooled scroll chillers.

The MODBUS gateway can be customized,it is available by communication port X,Y and E in wired controller.



Item	Description	Item	Description
1	Operation icon	9	Water temp.
2	Mode area	10	ON/OFF Key
3	Setting temperature	11	Right, Left Key
4	Timing On/Off	12	OK key
5	Function Icon	13	Setting key
6	On-line Unit Qty. Indication	14	Add, Reduce key
7	Reserved	15	Cancel key
8	Clock	16	Reserved. key

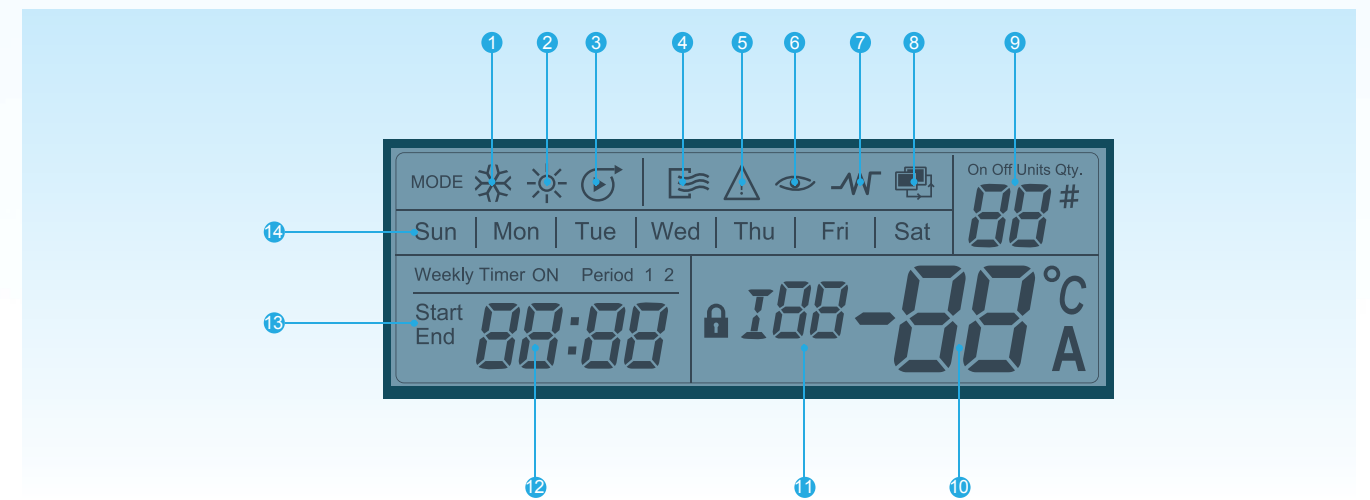
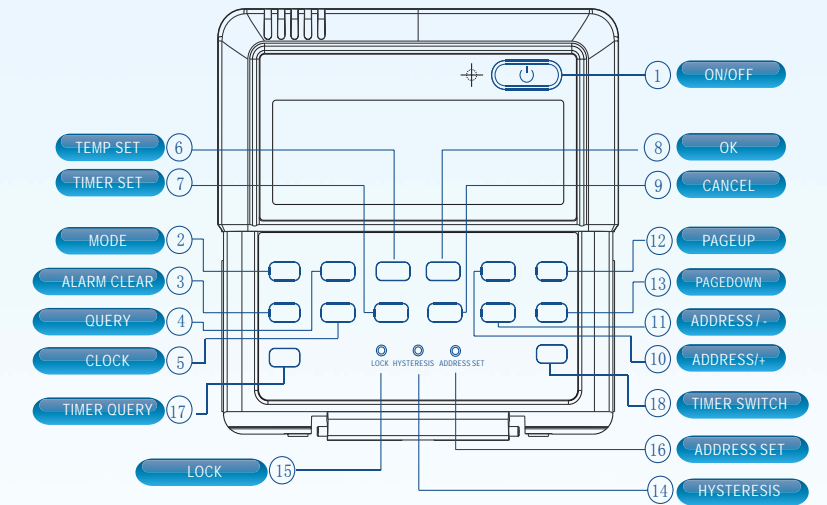
Function comparison of wired controller:

Function	Wired controller	KJR-120A/MBTE	KJRM-120D/BMK-E
Parameter setting and display		●	●
Real time clock control		●	●
Malfunction manual reset		●	●
Long-distance control icon display		●	●
Weekly timer function		●	
Hysteresis temp. setting		●	
Touch key operation			●
Network control software		●	
MODBUS gateway			●
LONWORKS gateway		●	●

Wired controller KJR-120A/MBTE(Optional, with weekly timer)

The wired controller KJR-120A/MBTE is functional design, it is available for all Midea cooled scroll chiller, it can automatically adjust the module which is new or old to execute the related indicator. The main functions as following:

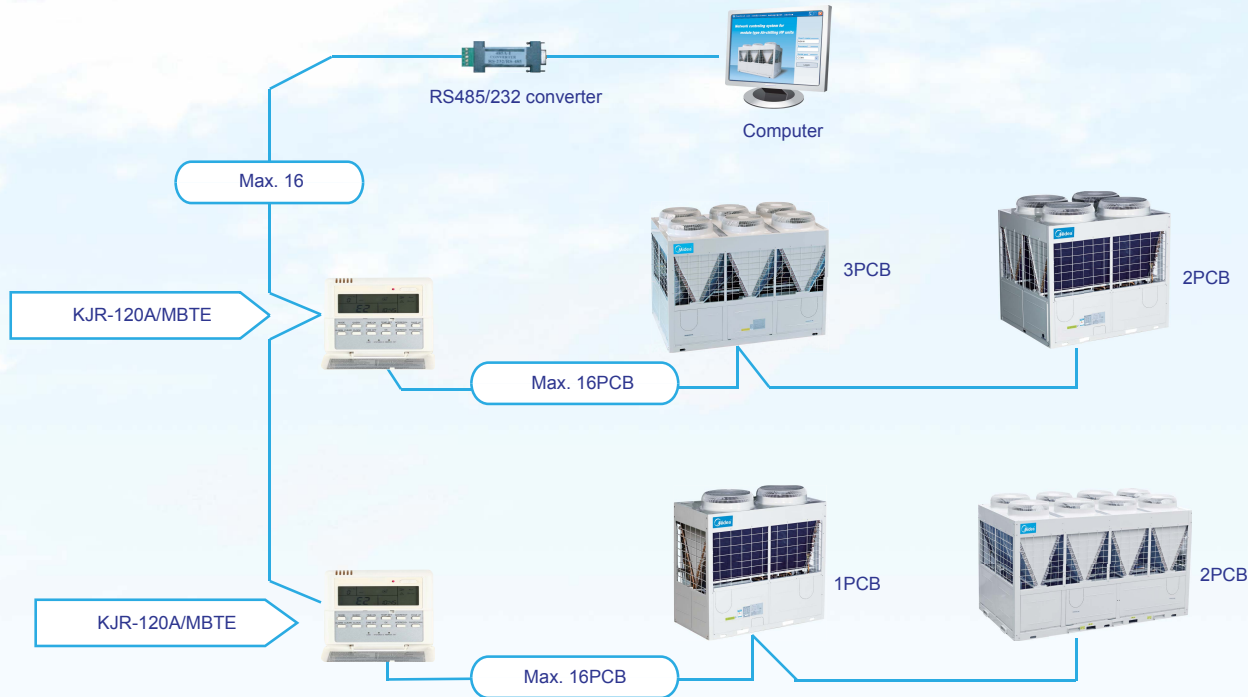
- Provide the timing startup function.
- The temp. difference between start up temperature and setting temperature (It can be adjusted,the range is 2,3,4,5°C (2°C is default)).
- Real-time timer function instead of relative time.
- Operation parameter checking button.
- Remote control icon display function.
- Malfunction manual reset.



Item	Description	Item	Description
1	Cooling mode.	8	Remote control is on or off.
2	Heating mode.	9	Display the units quantity on line/ON,OFF state.
3	Pump mode.	10	Display temp.,current,error codes,protection codes.
4	Normal running, the light is on.	11	Display the checking parameters(IA/IB/T3A/T3B).
5	The unit has error, the light is on.	12	Real time display./Week timing check and query display.
6	When querying, the light is on.	13	Display the week timing state. / The week timing set period display.
7	The electric heater works, the light is on.	14	Set week timing.

Network control system

The intelligent network control system of the Midea air-cooled scroll chiller mainly comprises the RS485/232 converter, which can connect max. 16 wired controllers, each wired controller can control max. 16 PCBs.



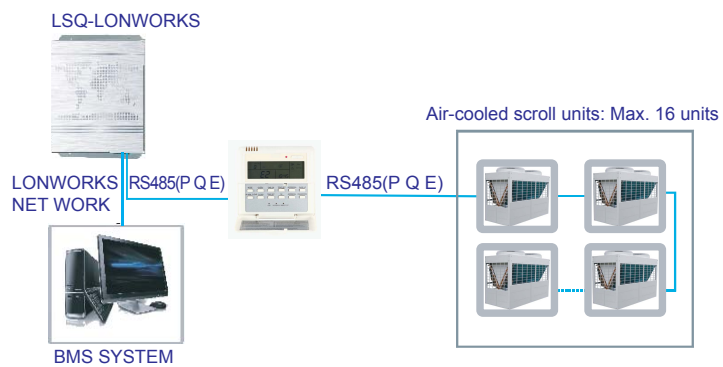
Main functions:

- Controls the refrigeration system's operating mode.
- Queries operation parameters in the main and subsystems in real time.
- Provides a weekly timer for managing the refrigeration system.
- Records refrigeration system errors.

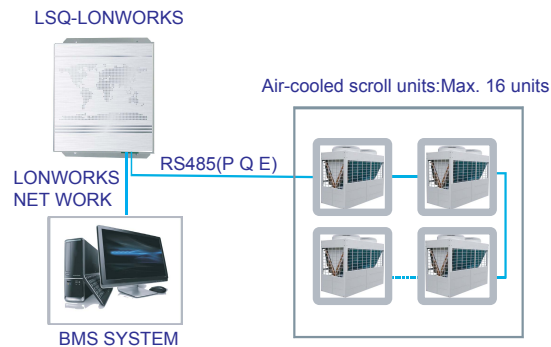
LONWORKS gateway

The unit's LONWORKS gateway controls the central A/C to facilitate the building management system (BMS). LONWORKS provides four settings to control the air-cooled modules: Operation Mode, Outlet Water Temperature, Hysteresis, and Clear Alarm.

Connection 1

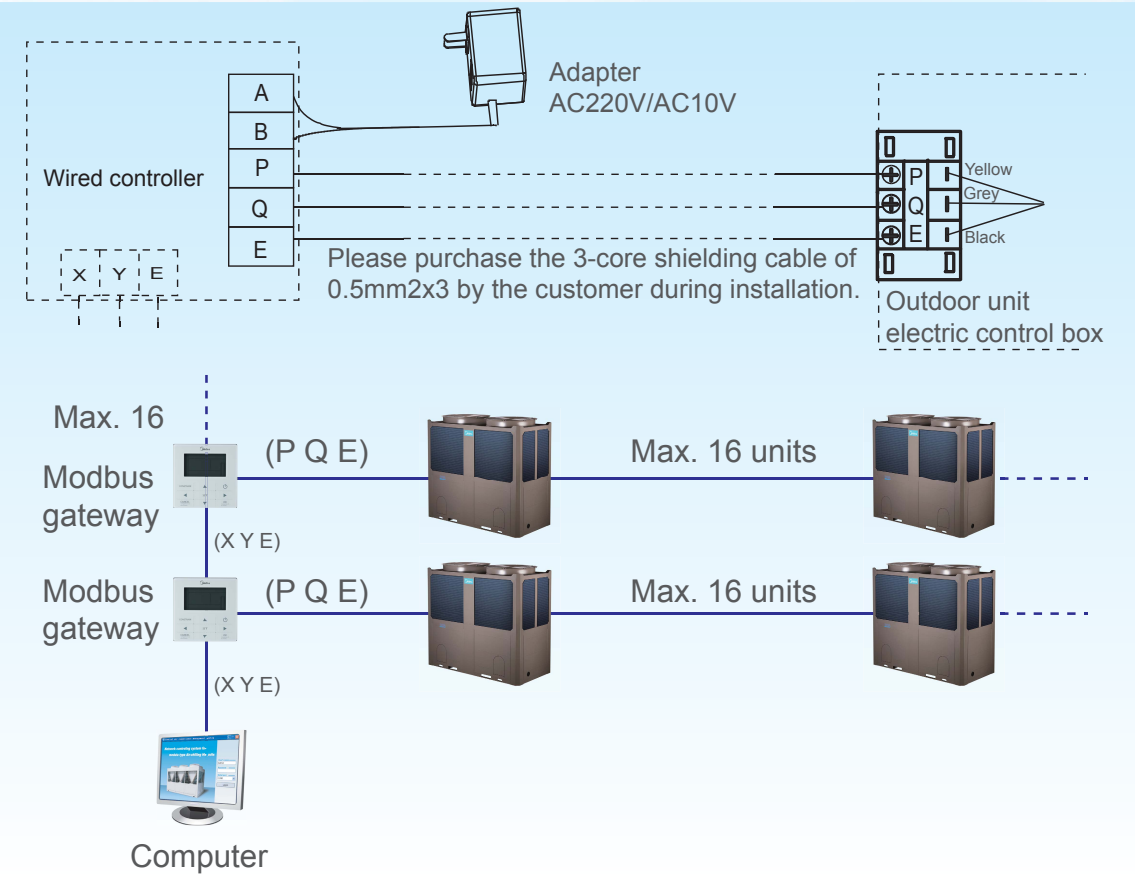


Connection 2



MODBUS gateway

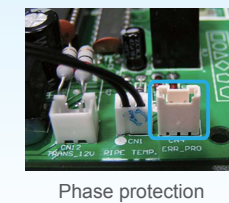
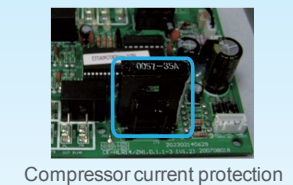
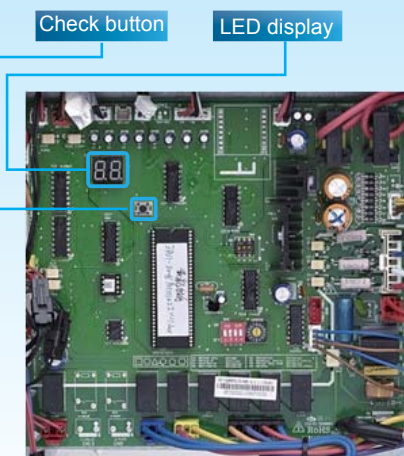
The Modbus gateway can be customized, it realizes intelligent network control by X Y E ports. It can connect max. 16 wired controllers, each wired controller can control max. 16 PCBs.



Protection

The main board's LED shows all alarm and protection information. The chiller controller continually performs self-diagnostic checks; monitors the system's temperature, pressure and protection devices; it will automatically shut down faulty compressors, refrigerant circuits or the entire unit if a fault occurs.

- Users can press Check on the LED to display the system's operational status.
- The LED displays protection or error codes if either condition occurs.



Error codes for fixed mouldle

No	Code	Trouble	No	Code	Trouble
1	E0	Water flow detection error (The third time)	18	P0	High pressure or air discharge temperature protection in system A
2	E1	Power phase sequence error	19	P1	Low pressure protection in system A
3	E2	Communication error	20	P2	High pressure or air discharge temperature protection in system B
4	E3	Total water outlet temperature sensor error	21	P3	Low pressure protection in system B
5	E4	Outlet water temperature sensor error in shell and tube exchanger	22	P4	Current protection in system A
6	E5	Pipe temperature sensor error in condenser A	23	P5	Current protection in system B
7	E6	Pipe temperature sensor error in condenser B	24	P6	Condenser high pressure protection in system A
8	E7	Outdoor ambient temperature sensor error	25	P7	Condenser high pressure protection in system B
9	E8	Air discharge temperature sensor error in digital compressor in system A	26	P8	Air discharge temperature sensor protection in digital compressor in system A
10	E9	Water flow detection error (The first and second times)	27	P9	Outlet and inlet water temperature difference protection
11	EA	Main unit detected that auxiliary unit's quantity have decreased	28	PA	Starting protection of low-temperature cooling
12	EB	Anti-freezing temperature sensor 1 error in shell and tube exchanger	29	Pb	System anti-freezing protection
13	EC	Wired controller did not find out any on-line module unit	30	PC	(Reserved failure code)
14	ED	Wired controller and module unit communication error	31	PE	Low-temperature protection of shell and tube heat exchanger
15	Ed	1-hour consecutive 4-times PE protection	32	F1	EEPROM failure
16	EE	Wired controller and computer communication error	33	F2	Failure of reduction of wired controller number at parallel connection of multiple wired controller (reserved)
17	EF	Inlet water temperature sensor error			

Error codes for digital module

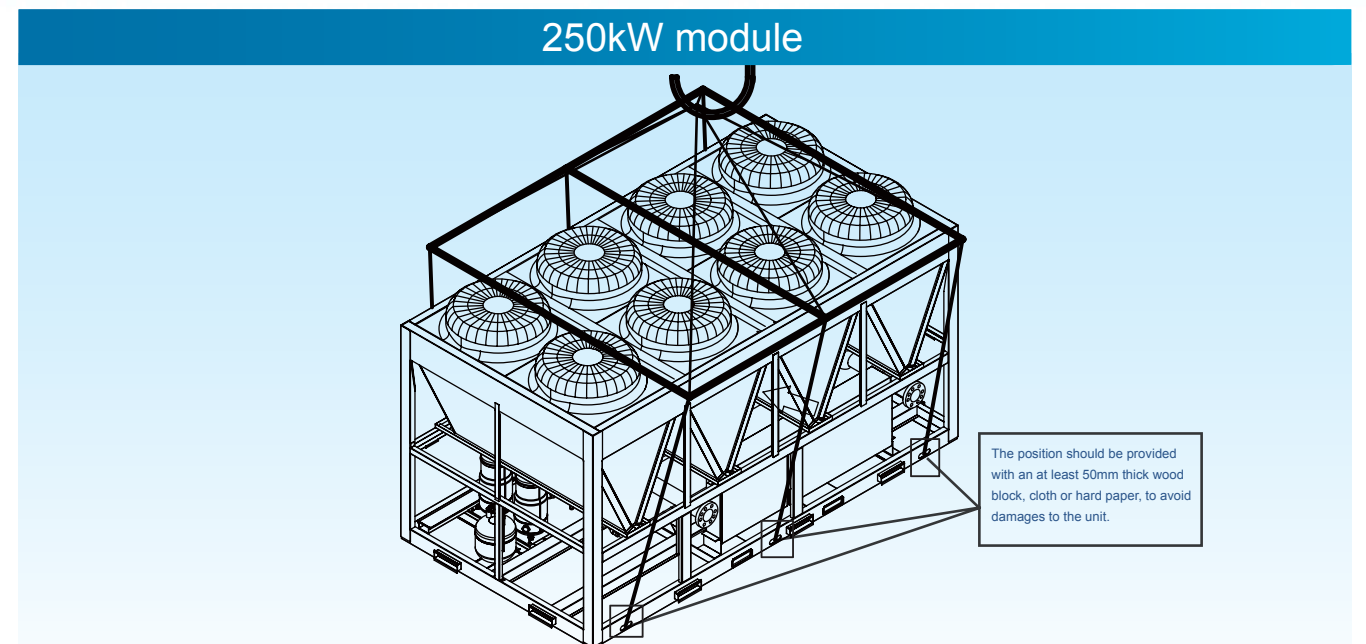
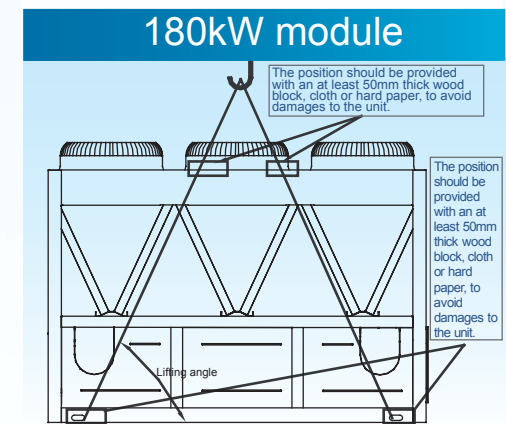
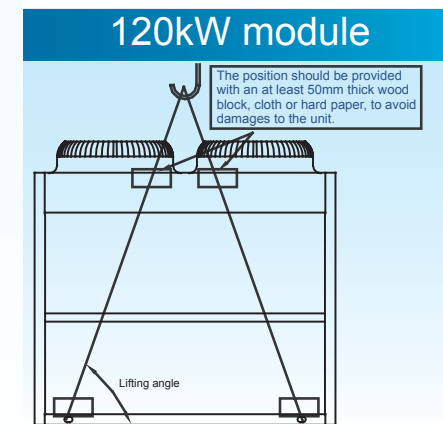
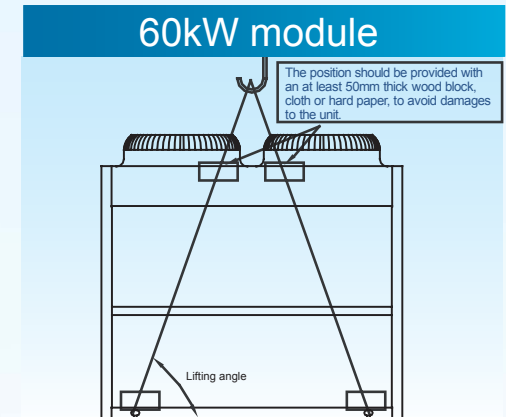
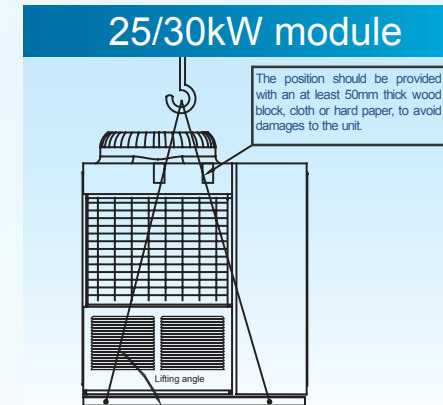
No	Code	Trouble	No	Code	Trouble
1	E0	EEPROM error	16	P0	High pressure or air discharge temperature protection in system A
2	E1	Power phase sequence error	17	P1	Low pressure protection in system A
3	E2	Communication error	18	P2	High pressure or air discharge temperature protection in system B
4	E3	Total water outlet temperature sensor error	19	P3	Low pressure protection in system B
5	E4	Outlet water temperature sensor error in heat exchanger	20	P4	Current protection in system A
6	E5	Pipe temperature sensor error in condenser A	21	P5	Current protection in system B
7	E6	Pipe temperature sensor error in condenser B	22	P6	Condenser high pressure protection in system A
8	E7	Outdoor ambient temperature sensor error or power supply protection	23	P7	Condenser high pressure protection in system B
9	E8	Output error of the power protector	24	P8	(Reserved failure code)
10	E9	Water flow detection error	25	P9	Outlet and inlet water temperature difference protection
11	EA	(Reserved failure code)	26	PA	Low ambient temperature drive-up protection
12	Eb	Anti-freezing temperature sensor 1 error in shell and tube exchanger	27	Pb	System anti-freezing protection
13	EC	Wired controller detected that the units on-line have decreased	28	Pc	Anti-freezing pressure protection in system A
14	Ed	(Reserved failure code)	29	Pd	Anti-freezing pressure protection in system B
15	EF	Inlet water temperature sensor error	30	PE	Low-temperature protection of shell and tube heat exchanger

Rigging instructions

The angle of inclination should not be more than 15° when carrying the unit, to avoid overturn of the unit.

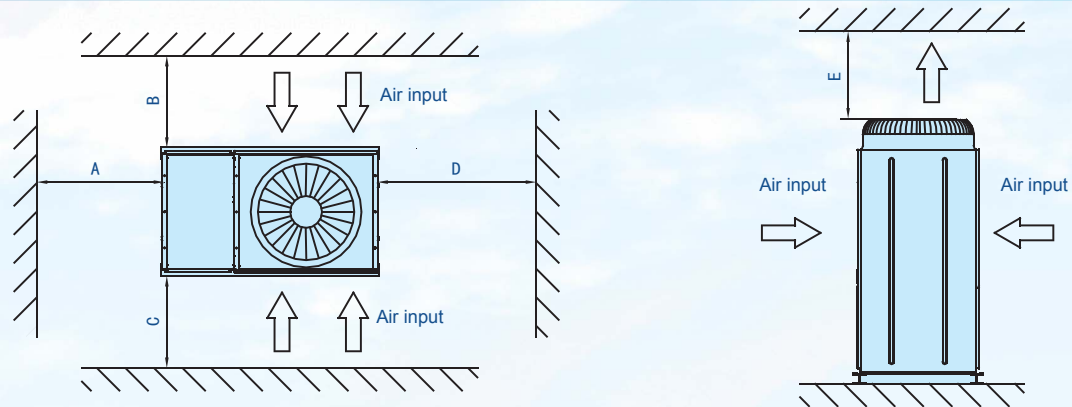
a. Rolling handling: several rolling rods of the same size are placed under the base of the unit, and the length of each rod must be more than the outer frame of the base and suitable for balancing of the unit.

b. Lifting: the strength lifting rope (belt) can bear should be 4 times the weight of the unit. Check the lifting hook and ensure that it is firmly attached to the unit, and the lifting angle should be more than 60°. To avoid damages to the unit, the contact position of the unit and lifting rope should be provided with an at least 50mm thick wood block, cloth or hard paper. Any person is not allowed to stand below the unit when lifting it.

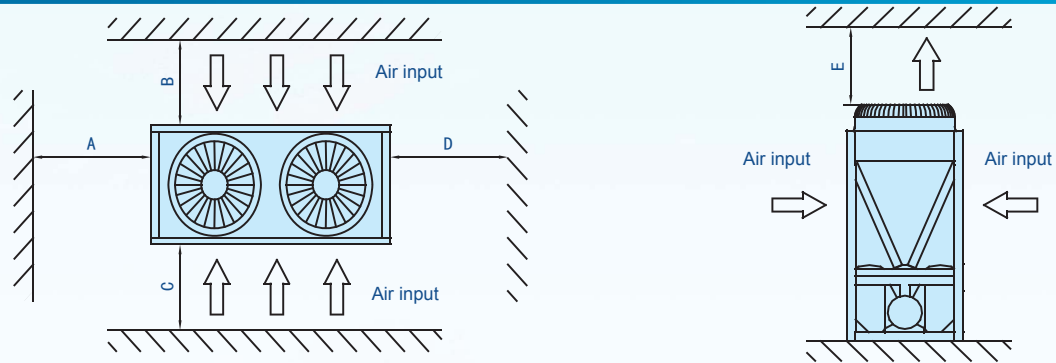


Installation clearance

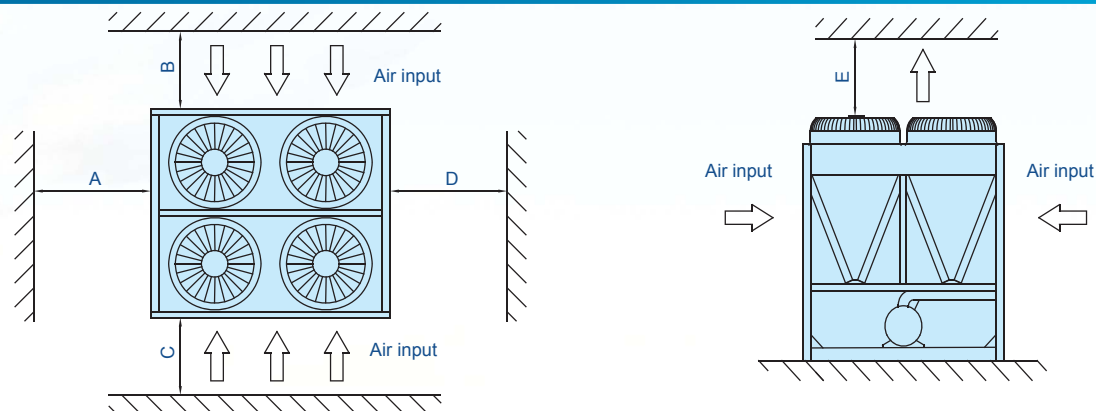
25/30kW module



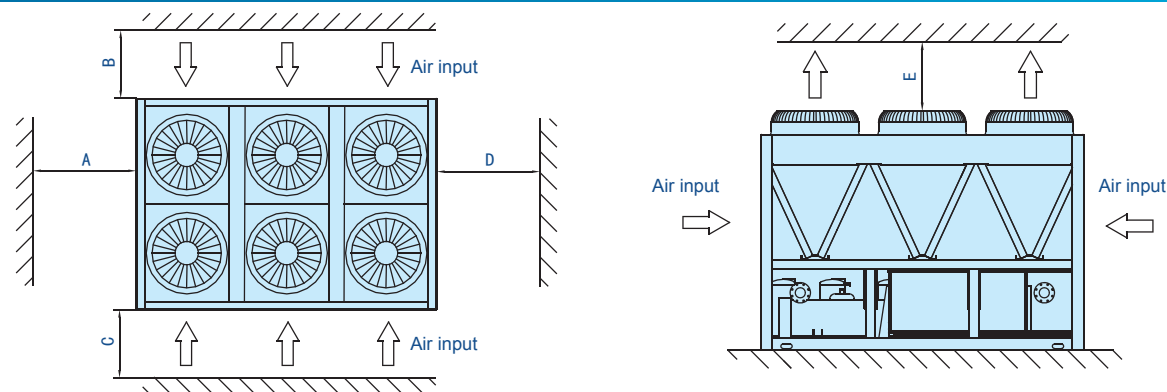
60kW module



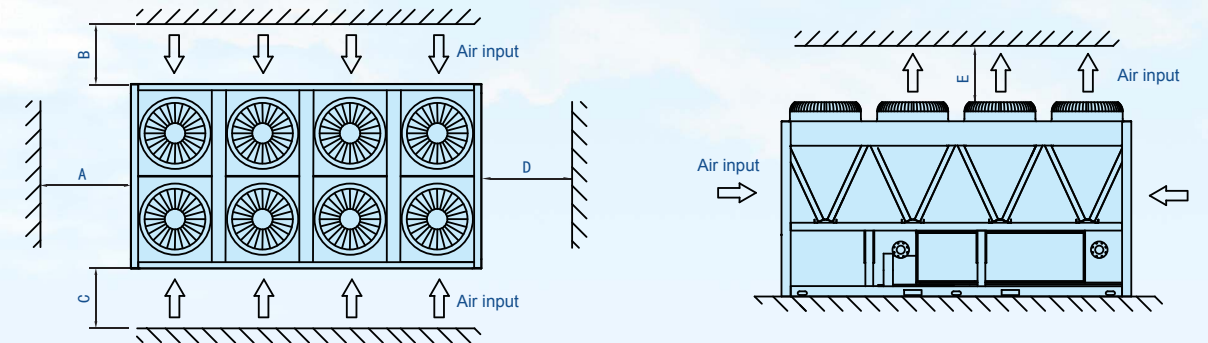
120kW module



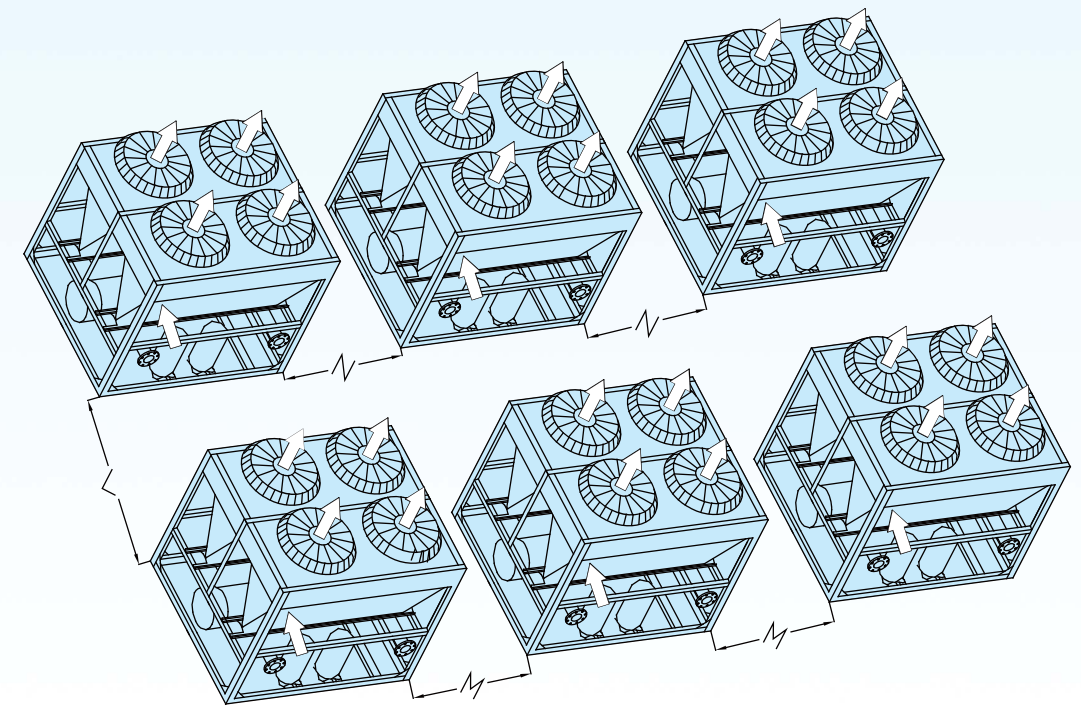
180kW module



250kW module



Modules combination



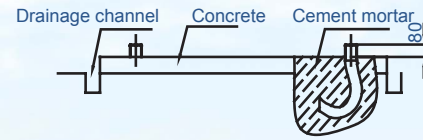
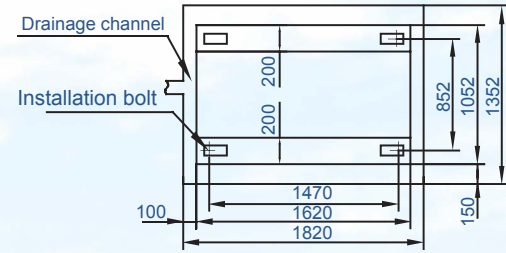
The recommend space parameter:

No	Model	Max unit combined quantity	A(mm)	B(mm)	C(mm)	D(mm)	E(mm)	L(mm)	M(mm)	N(mm)
1	MGBT-F(D)25W/RN1	16	≥1500	≥2000	≥2000	≥1500	≥8000	≥ 600	≥ 300	≥ 300
2	MGBT-F(D)25W/DN1	16						≥ 600	≥ 300	≥ 300
3	MGBT-F(D)30W/RN1	16						≥ 600	≥ 300	≥ 300
4	MGCT-F(D)30W/PN1	16						≥ 600	≥ 300	≥ 300
5	MGBT-F(D)30W/DN1	16						≥ 600	≥ 300	≥ 300
6	MGBT-F(D)60W/RN1	16						≥ 600	≥ 300	≥ 300
7	MGBT-F60W/PN1	16						≥ 600	≥ 300	≥ 300
8	MGBT-F60W/DN1	16						≥ 600	≥ 300	≥ 300
9	MGBT-F120W/RN1	8						≥ 600	≥ 300	≥ 300
10	MGBT-F120W/PN1	8						≥ 600	≥ 300	≥ 300
11	MGBT-F120W/DN1	8						≥ 600	≥ 300	≥ 300
12	MGBT-F180W/RN1	5						≥2000		
13	MGBT-F180W/PN1	5	≥ 600	≥ 300	≥ 300					
14	MGBT-F180W/DN1	5	≥ 600	≥ 300	≥ 300					
15	MGBT-F250W/RN1	8	≥ 600	≥ 300	≥ 300					
			≥ 600	≥ 300	≥ 300					

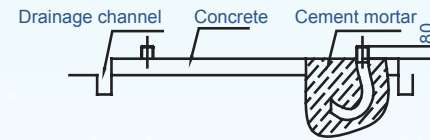
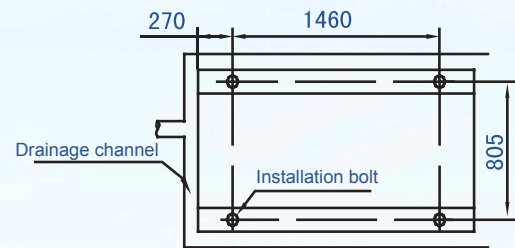
Mounting location

The unit should be located on the horizontal foundation, the ground floor or the roof which can bear operating weight of the unit and the weight of maintenance person.

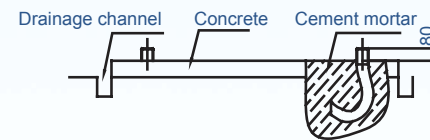
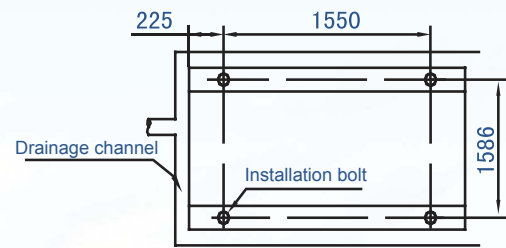
25/30kW module



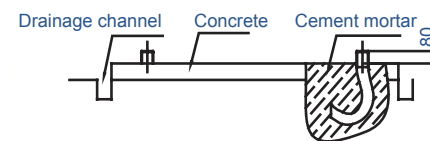
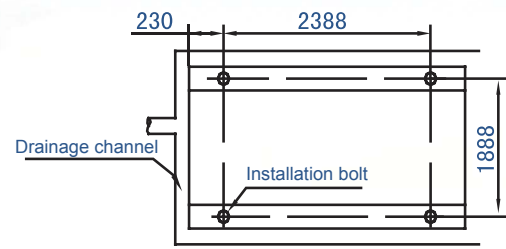
60kW module



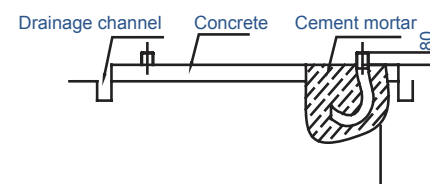
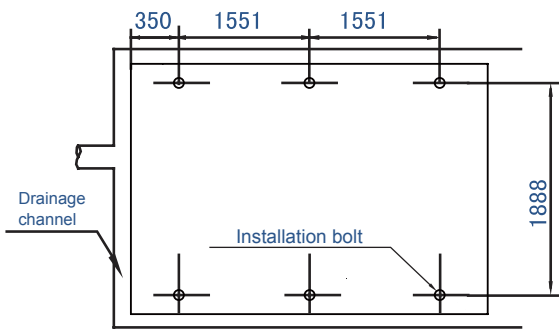
120kW module



180kW module



250kW module

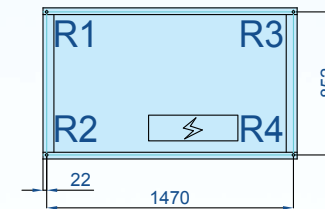


Load distribution

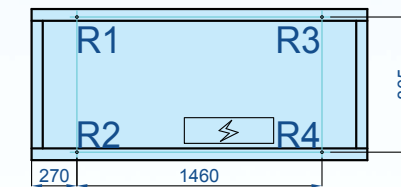
Unit:kg

No	Model	R 1	R 2	R 3	R 4	R 5	R 6
1	MGBT-F(D)25W/RN1	81	68	139	112	/	/
2	MGBT-F(D)25W/DN1	81	68	139	112	/	/
3	MGBT-F(D)30W/RN1	81	68	139	112	/	/
4	MGBT-F(D)30W/PN1	81	68	139	112	/	/
5	MGBT-F(D)30W/DN1	81	68	139	112	/	/
6	MGBT-F(D)60W/RN1	170	180	145	155	/	/
7	MGBT-F60W/PN1	170	180	145	155	/	/
8	MGBT-F60W/DN1	170	180	145	155	/	/
9	MGBT-F120W/RN1	350	340	295	285	/	/
10	MGBT-F120W/PN1	350	340	295	285	/	/
11	MGBT-F120W/DN1	350	340	295	285	/	/
12	MGBT-F180W/RN1	567	433	567	433	/	/
13	MGBT-F180W/PN1	567	433	567	433	/	/
14	MGBT-F180W/DN1	567	433	567	433	/	/
15	MGBT-F250W/RN1	373	344	487	462	539	395

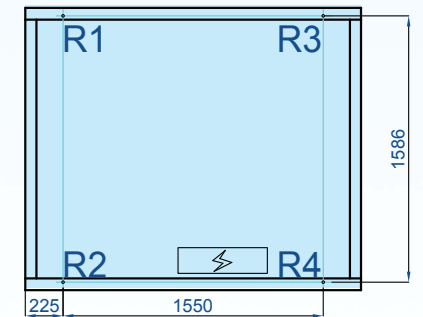
Dimension unit: mm



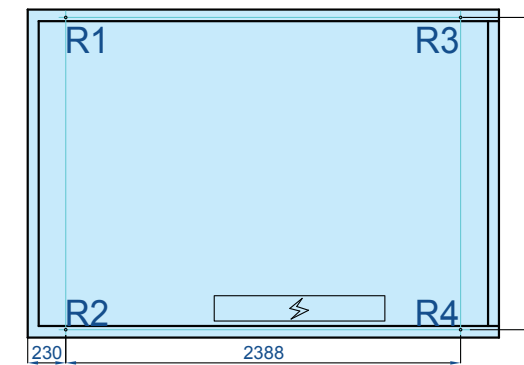
25/30kW module



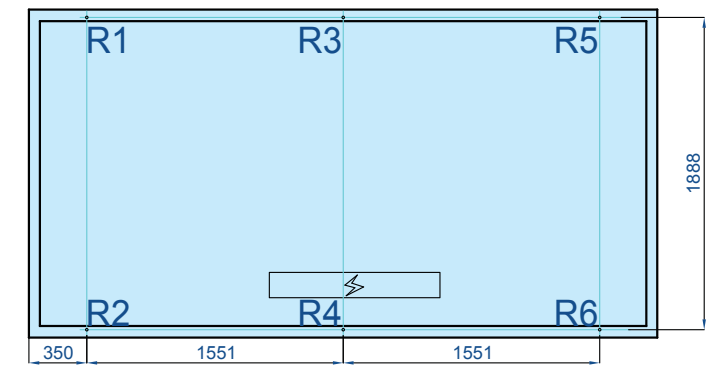
60kW module



120kW module



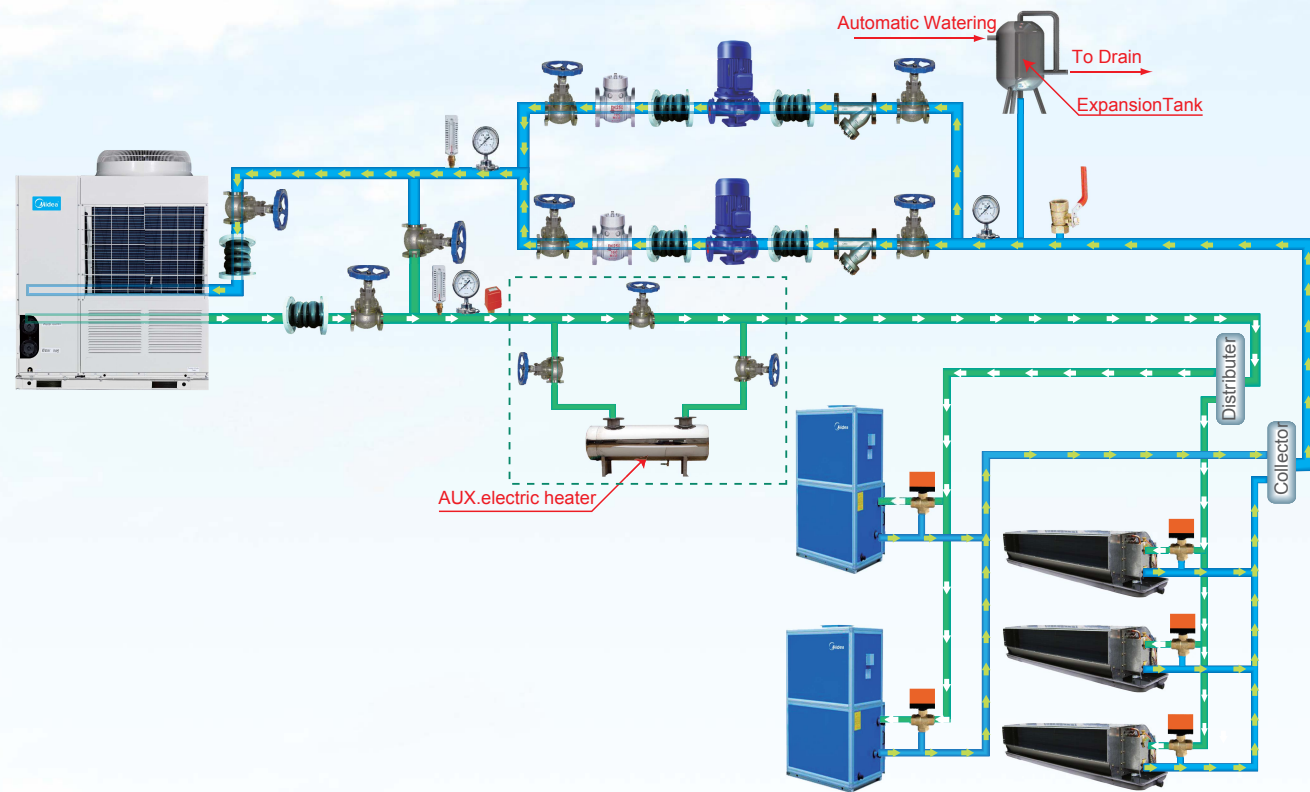
180kW module



250kW module

Typical piping

25/30kW module water pipeline sketch drawing

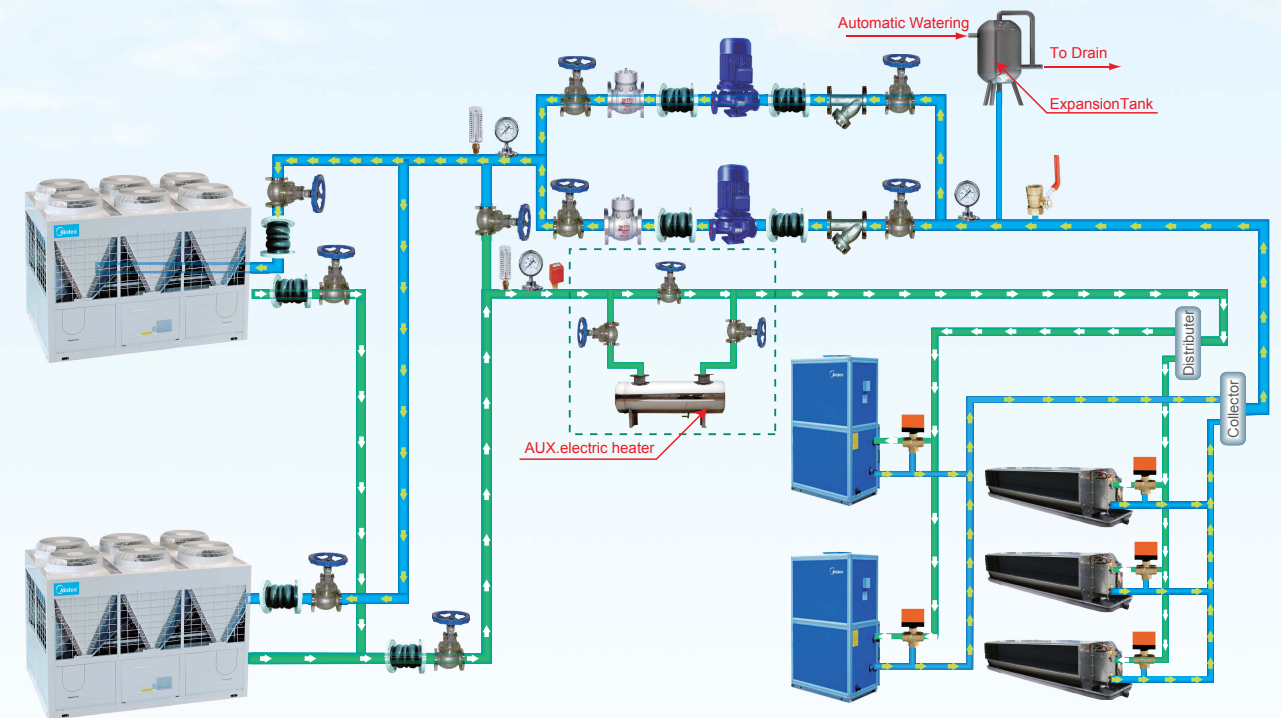


Aqua Tempo Power Series
Air cooled scroll chiller

■ The table below describes the symbols.

Symbol	Symbol Explanation	Symbol	Symbol explanation
	Stop Valve		Y-Shaped Filter
	Pressure Gauge		Thermometer
	Water Flow Switch		Water Pump
	3-Way Valve		Check Valve
	Soft Joint		Air Vent

180kW module water pipeline sketch drawing



Aqua Tempo Power Series
Air cooled scroll chiller

■ The table below describes the symbols.

Symbol	Symbol Explanation	Symbol	Symbol explanation
	Stop Valve		Y-Shaped Filter
	Pressure Gauge		Thermometer
	Water Flow Switch		Water Pump
	3-Way Valve		Check Valve
	Soft Joint		Air Vent

Aqua Force Series

Air cooled screw chiller

Contents

51 Product introduction	63 Electrical data
51 Nomenclature	64 Water pressure drop
52 Product lineup	65 Dimensions
53 Features and benefits	71 Typical schematic wiring diagram
55 Mechanical components	73 Application guidelines
58 Standard control & safety devices	75 Microprocessor controller
58 Options	76 Rigging instructions
59 Specifications	76 Installation clearance
60 Selection procedure	77 Mounting location
60 Applicable range	78 Load distribution
61 Performance data	79 Troubleshooting guide

With half century experience in chiller industry, Midea Chongqing chiller manufacturing base is becoming one of the largest chiller companies in China. It covers an area of 800 Mu (137 acre), with a registered capital of 12.5 million US \$ and a total investment of over 0.85 billion US\$. There are 6 product series and over 100 model products including centrifugal chillers, screw water chillers, scroll water chillers, water-cooled packaged units, and central air-conditioning indoor terminal devices(AHU/FCU). Five chiller manufacture shops with 14 flexible production lines lead a manufacturing capacity of 500 units centrifugal chillers, 1000 units of air cooled screw, 2000 units of water cooled screw and 200000 units of AHU products.

Strong R&D and manufacturing capacity makes Midea Chongqing general become the fastest developing company in chiller industry. The chiller test lab which is certified by China National Refrigeration Equipment Inspection Center gets the largest refrigeration test capacity in Asia. The engineer team with 100 top engineers and international chiller experts who are working many years in structure, electricity, and performance testing and software aspect make Midea the headship in chiller industry. In the year of 2011 Midea CAC invested another 150 million RMB for test lab as ARI test stand, big capacity air cooled screw life span testing room, 1500kW compressor motor test lab etc.

Concentrating on energy-saving and environment protection, Midea Chongqing chiller factory commits itself to the reliable and high efficiency products for the world. The chiller products are widely used in different countries and obtain good public praise from the clients. The solutions for the Beijing capital international airport, Jakarta international airport, China rapid transit station win good feedback and commendation. Continuing with the past and opening up the future, Midea chiller brand will go further and create an illustrious future.



Centrifugal chiller factory

Manufacturing capacity:
500 units/Year



Water cooled screw chiller factory

Manufacturing capacity:
2000 units/Year



Air cooled screw chiller factory

Manufacturing capacity:
1000 units/Year



8800kW water cooled chiller performance testing stand

The 8800kW water chilled chiller testing stand is one of the most advanced testing facilities in the world. It is able to simulate all the chiller running condition like Chinese National standard condition (7/12℃, 30/35℃). Chinese industry condition (7/12℃, 32/37℃). AHRI testing condition (6.7/12.2℃, 29.4/35℃). It provides all precise testing data for the IPLV and NPLV calculation. Every chiller will be tested in the stand before shipping.

1500kW motor performance testing center

The 1500kW compressor motor testing lab used to simulate all the working condition for the actual situation. Provide the electrical correct factor for all the compressors. The cooling capacity range rang from 1200kW to 8800kW. Evaporating temperature range from -20℃ to 40℃ and condensing temperature range from 25℃ to 80℃. It is one of the most advanced testing facility in China.



1200kW air cooled chiller performance testing lab

The 1200kW air cooled testing lab is one of the largest air cooled product testing lab. It can simulate all the actual ambient temperature range from -20℃ to 56℃. It ensure all the air cooled chiller product work reliably in all temperature condition. The 1200kW air cooled testing lab was certified by AHRI.



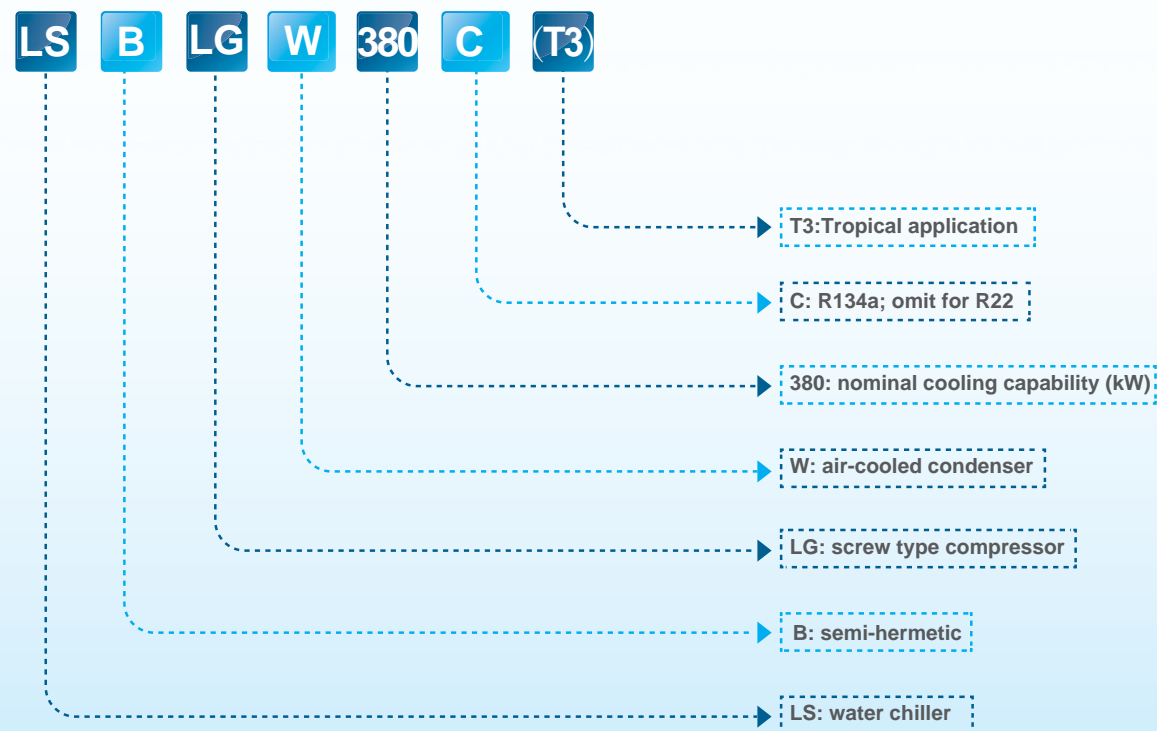
Product Introduction

Air cooled screw chiller is a kind of central air-conditioning unit which adopts air as the cooling or (Heating) source and water as the cooling or (heating) medium to cool down or (heat) the indoor ambient temperature through the indoor terminal(AHU/FCU). Midea air cooled screw chillers are the premium solution for industrial and commercial applications where installation contractors, consultants and building owners require optimal performances and optimized quality. Air cooled chiller typically have a lower initial investment and maintenance cost than water cooled system since it does not require a cooling tower, condenser water pump, and associated condenser water chemical treatment system.

Midea air cooled screw chillers are designed to meet current and future requirements in terms of reliability, energy efficiency and intelligent control. We use the best technologies available today :Twin-rotor screw compressors with a variable capacity valve are ideally matched to coolers and condensers optimally configured for superior heat transfer and unit efficiency. They are widely applied in school, hospital, shopping mall, office as well as the factory and manufacturing processing area.

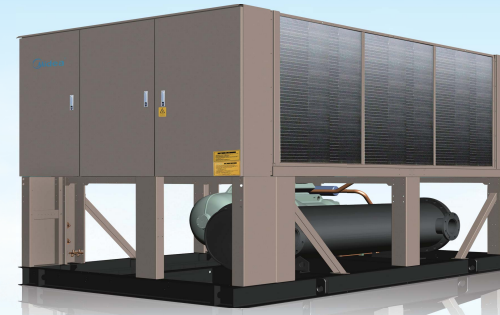


Nomenclature

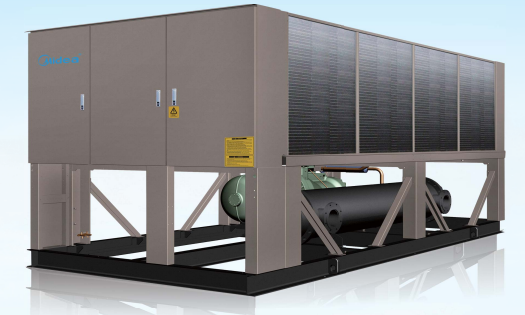


Product lineup

LSBLGW380/C (T3)



LSBLGW500/C (T3)



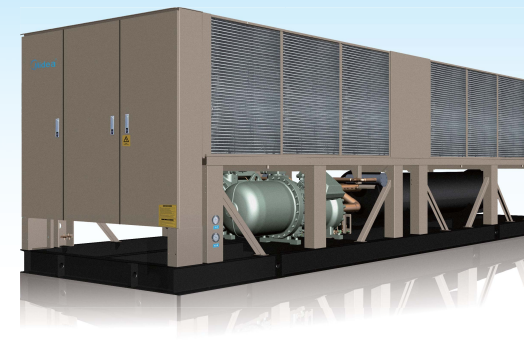
LSBLGW600/C (T3)



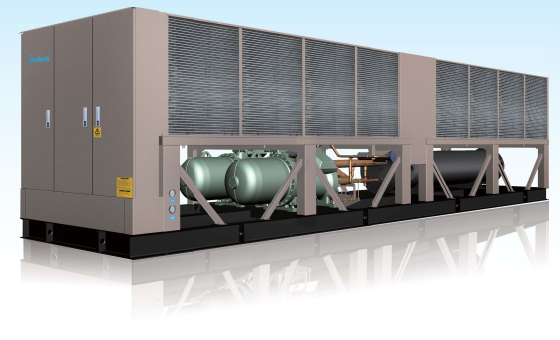
LSBLGW760/C (T3)



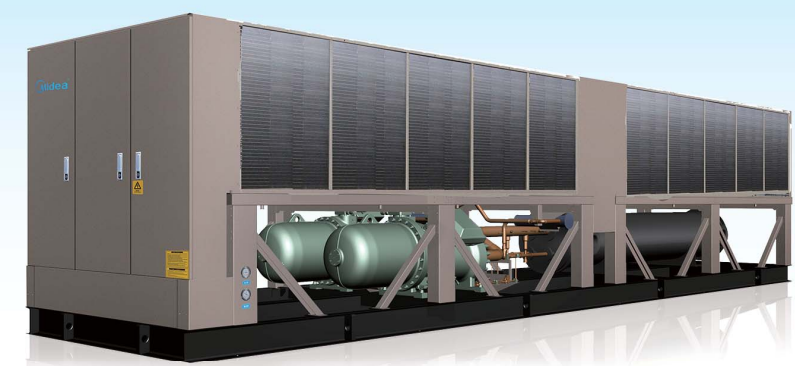
LSBLGW900/C (T3)



LSBLGW1000/C (T3)



LSBLGW1200/C (T3)



Features and benefits

Environmental Care

- R134a environmental- friendly refrigerant
Refrigerant of the HFC R134a group with zero ozone depletion potential.
Very low GWP (Global Warming Potential)



Lower refrigerant charge through the use of high-efficiency heat exchangers

- Leak-tight refrigerant circuit
Reduction of leaks as no capillary tubes and flare connections are used.
Verification of pressure sensors and temperature sensors without transferring refrigerant charge
Discharge shut-off valve for simplified maintenance.

Low operating sound levels

- The twin-screw compressor adopts the strong points of gapless-loss, high- efficiency cubage, low-noise, few easy workout parts. Double-wall structure not only compensates the pressure, but also significantly reduces the noise. Cast iron casing and oil separator can reduce the noise significantly.
- Low-noise fans, made of a composite material are even quieter and do not generate intrusive low-frequency noise. Rigid fan mounting is preventing start-up noise.
- Multiple direct drive dynamically balanced propeller fans operate at low tip speeds for maximum efficiency and minimum noise and vibration. A heavy-gauge vinyl-coated fan guard protects each fan.

Design flexibility

- Six basic capacity modules, wide array of module combination.
- Standard module for flexible stock and fast delivery.
- Field-coupled to meet large project tonnage requirements.
- Low initial investment and maintenance cost.

User-friendly

- Touchable screen display , Color coded, easy for operation.
- Three status indicators on the screen which include power, status and communication .
- Liquid crystal 40 character display with text provided on two lines and light emitting diode backlighting for outdoor viewing



High accuracy micro-control

- The newest advanced microprocessor controller. This controller monitors analog and digital inputs to achieve precise control & protective functions of the air cooled water chiller units. This microprocessor controller is complete with all the hardware and software necessary to control the chiller unit and ensure its efficiency and reliability.
- Intelligent control: The unit is controlled by micro-controller(PLC) with has the automatic control functions of fault diagnosis, energy management and anti-freezing monitoring ensure the high-efficiency operation and more convenient in use.
- The unit with RS485 open protocol communication interface is BMS compatible. The startup and shutdown of each unit is controlled by the host computer, reducing the running cost to the lowest.
- Complete and safe control system: All electrically control elements are designed and selected with stable quality and reliable function; The unit designed with multiple security measures ensure the safe and reliable running
- The sensors related to control and other assemblies are equipped by factory and strictly tested.

Absolute reliability, very economical operation

- Bizer brand twin-rotor screw compressor equipped with a high-efficiency motor
- Electronic expansion device permitting operation at a lower condensing pressure and improved utilisation of the cooler heat exchange surface (superheat control)
- Fully factory testing of all the units ensures a trouble free start-up. The unit has passed full factory test before being delivered to ensure the reliable working on the site.

Easy and fast installation

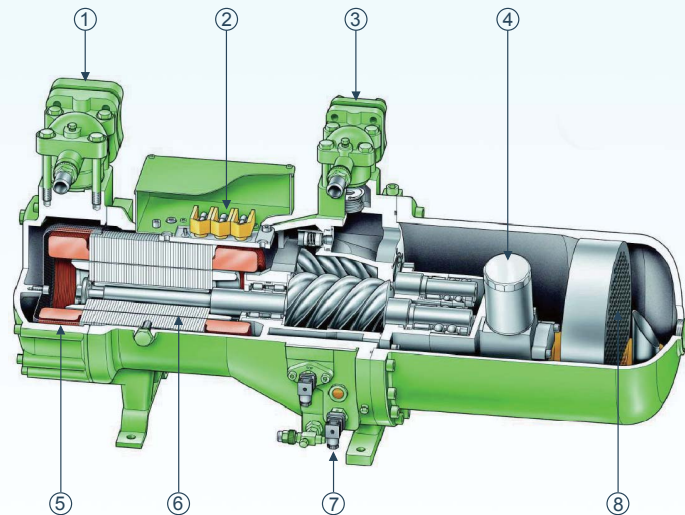
- Compact size and module design save the transportation, lifting and installation cost
- The unit can be placed in service after being connected with power supply and water supply during field installation .



Mechanical components

Advanced twin-rotor screw compressor

- Midea® air screw chiller is equipped with the 3rd generation industrial semi-hermetic screw compressor which with the latest advanced 5-6 asymmetry dentiform rotors. The rotors are processed by high-precision CNC and each part is well-proportioned and none-gap matching, which minimizes the friction resistance and clearance lost, guarantees quiet running and good duration.
- The compressor motor is direct drive type with two poles to operate at 2960 rpm (50HZ) input speed. It is non-reversing, squirrel cage induction type suitable for the voltage shown on the equipment schedule. Compressors combined an balance piston with separated radial and axial force bearings, oil cooler connector, liquid injection & economizer connector, PTC motor coil protection and discharge temperature & it's controller, oil level switch and oil pressure differential switch, oil sight glass, oil strainer, crank case heater and other accessories. The bearing of compressor is from SKF, Sweden gurantee the continuously runing more than 60,000 hours.



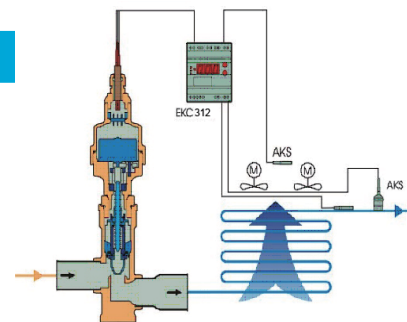
- ① Suction cut-off valve
- ② Solenoid valve
- ③ Discharge cut-off valve
- ④ Oil filter
- ⑤ Suction filter net
- ⑥ Motor
- ⑦ Oil heater
- ⑧ Oil separator filter net

Condenser

- Air cooled condenser coil consist of staggered rows of seamless inner groove copper tube, mechanically expanded onto the die formed aluminum fin to ensure optimum heat exchange capability.
- Grooved condenser fin and tube condenser coils of seamless, internally enhanced, high condensing coefficient, corrosion resistant copper tubes arranged in staggered rows and mechanically bonded to corrosion resistant aluminum alloy fins with full height fin collars.
- The fins have full self spacing collars which completely cover each tube. Blue fin and black epoxy-coated aluminum fin are options.

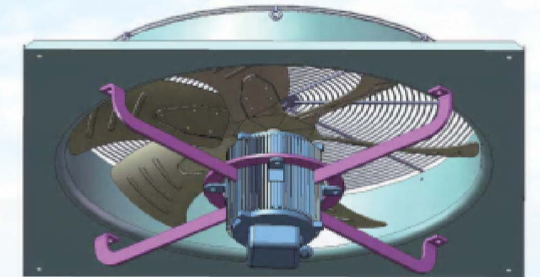
Throttling device

- Famous brand electronic expansion valve which control by drive module control.
- The drive module controller controls the valve according to cooler suction superheat.
- PID arithmetic control the open degree of the valve.



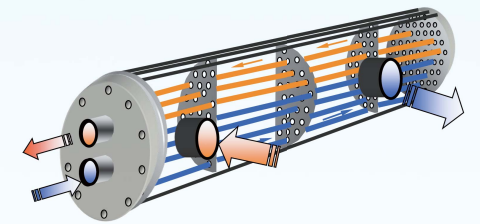
Fan

- The adoption of advanced new-type low-speed blade profile and quantic load distribution in the blade design, which improves the cross section and radial shape of the blade. Compared to the performance of the blade products of commonly used profile, the blade of fans is of relatively larger lift coefficient and lift-drag ratio, and the fan offers higher wind pressure, larger air delivery and obviously higher efficiency.
- Condenser Fans with low noise, full airfoil cross section for maximum efficiency, statically and dynamically balanced for low vibration operation, and positioned in extended, formed steel orifices for low sound and maximum efficiency.
- All fan motors shall be three phase with class "F" winding insulation and ball bearings for high ambient application.



Evaporator

- Cooler is shell-tube heat exchanger design, with internally-finned copper tubes roller expanded into the tube sheet. Units are fabricated with high-performance tubing, steel shell & tube sheets. Water boxes are nozzle-in-head type with victaulic for easy connections.
- High efficiency, direct-expansion type cooler with refrigerant in tubes and chilled liquid through the baffled shell.
- Water baffles fabricated from galvanized steel to resist corrosion. Removable heads allow access to internally-enhanced, seamless, copper tubes. Water vent and drain connections including.
- The 20MM thickness insulation covers all low temperature surfaces include the cooler, water box, oil return line, chilled water flow switch piping etc.



Shell and tube heat exchanger (cooler)	Water side		Refrigerant side	
	Design pressure, (bar/psig)	Test pressure, (bar/psig)	Design pressure, (bar/psig)	Test pressure, (bar/psig)
Standard	10/147	12.5/188	18/265	19.8/291
Option	16/235	20/294	18/265	19.8/291

Refrigerant circuit

- Independent refrigerant circuit per compressor, each using copper refrigerant pipe formed on computer controlled bending machines. Less piping brazed joints result in a highly reliable and leak resistant system.
- Liquid line components include: Manual shut-off valve with charging port, high adsorption removable core filter-drier, solenoid valve, sight glass with moisture-indicator, and reliable electronic expansion valves for R134a.

Microprocessor controls

The microprocessor controller on the state of art microprocessor technology. This controller monitors analog and digital inputs to achieve control & safety functions of the unit. The control system is module-designed, easy for installation and maintenance. The chiller which reserved with RS485 port can be interfaced with BAS (Building Automation system). The remote monitoring and control of the chiller is possible.

Touch screen information

The display of control regulation and operating parameters, diagnostics, and error messages is a 7 inch, 65636 colors TFT displayer with 800 X 480 distinguish ability. The screen can display error codes, settings of various set points, specified temperature and pressure values, and the status of operating parameters and options.

>>> Power-down memory function

When power-down, the chiller will maintain preceding running mode and parameter set point.

>>> Weekly operation scheduling

The user can set the chiller operation schedule in the weekly timetable to run and stop the chiller automatically. If a sudden power outage, the chiller will not restart until manual reset.

>>> Data acquisition & storing

Max. 256 records of latest alarms and 500 seconds chilled/cooling water temperature trend display.

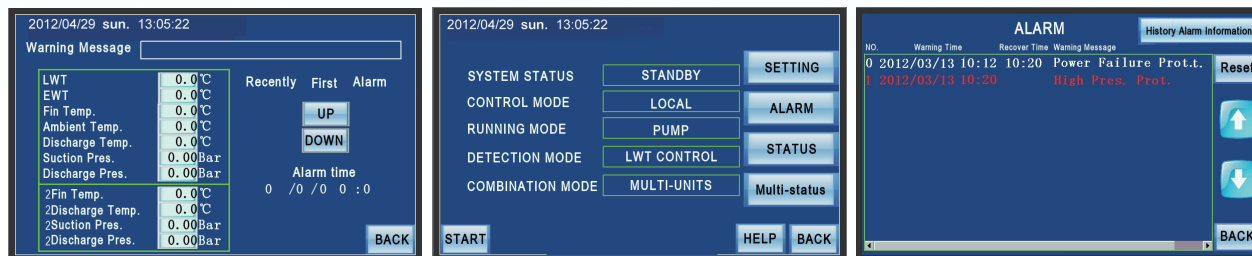
>>> Self-diagnosis

Self-diagnosis is always performed before start-up to enable safe operation. Only all the requirements get satisfied, the chiller will start.

Multiple self-protecting functions guarantee the safety of unit and running perfectly.

>>> Easily accessible measurements :

- Suction and discharge temperatures
- Suction & discharge pressures
- Compressor capacity adjustment status
- Ambient temperature
- Water inlet/Outlet temperatures
- Fan status



Multiple self-protections functions:

High/low pressure protection	Guarantee the Comp. running in the right range and its lifespan
Anti-freezing protection under cooling mode	Protect the copper pipes of evaporator from damage due to water freeze
Frequent startup protection	Protect Comp. from getting burned by the overheated winding due to frequent startup
Overheat protection of compressor	Protect Comp. from damage due to lack of refrigerant or lubricant oil
Water flow protection	Protect Comp. from getting burned due to failure of heat-exchange

Standard control & safety devices

MICROPROCESSOR CONTROLLER: This controller monitors analog and digital inputs to achieve precise control & safety functions of the unit.

COMPRESSOR IN-BUILT PROTECTION DEVICE: Protects the compressor by monitoring:

- A) Motor winding temperature in case of overload.
- B) Discharge gas temperature in case of overheating.
- C) Phase reversal for direction of rotation.

CRANKCASE HEATERS: Each compressor has immersion type crankcase heater. The compressor crankcase heater is always on when the compressors are de-energized. This protects the system against refrigerant migration, oil dilution and potential compressor failure.

DUAL-HIGH PRESSURE SWITCHES: These switches provide an additional safety protection in the case of excessive discharge pressure.

UNDER VOLTAGE AND PHASE PROTECTION: Protects against low & high incoming voltage as well as single phasing, phase reversal and phase imbalance by de-energizing the control circuit. It is an automatic reset device, but it can be set up for manual reset.

MOULDED CASE CIRCUIT BREAKER: Protects against circuit fault. When tripped (automatically or manually), the breaker opens the power supply to total circuit quickly.

INDICATOR LIGHTS: Three lights indicates power ON, Status and Communication.

ELECTRONIC EXPANSION VALVE: Electronic expansion valve is used to regulate the refrigerant flow to the water cooler and maintain a constant superheat and load optimization.

FILTER DRIER (REPLACEABLE CORE TYPE): Refrigerant circuits are kept free of harmful moisture, sludge, acids and oil contamination particles by the filter drier.

SIGHT GLASS: A moisture indicating sight glass is installed in the liquid line. An easy-to-read color indicator shows moisture contents and provides a mean for checking the system refrigerant charge.

PRESSURE GAUGES: Suction & discharge pressures gauges.

Options

WATER FLOW SWITCH: Water flow switch to protect the evaporator need to connect for upright mounting in horizontal pipe. (Field mounted)

VIBRATION ISOLATION: Neoprene Isolation – Recommended for normal installations and provides good performance in most applications for the least cost. (Field mounted)

Spring Isolators – Level adjustable, spring and cage type isolators for mounting under the unit base rails. 1" nominal deflection may vary slightly by application. (Field mounted)

ANTI-CORROSION FINS CONDENSER : provide corrosion resistance comparable to copper-fin coils in typical seashore locations.

Specifications

LSBLGWXXX/C(T3)		380	500	600	760	900	1000	1200
Cooling capacity	kW	376	496	594	756	902	996	1203
Power input	kW	124	159	187	246	285	318	381
COP	kW/kW	3.03	3.12	3.17	3.07	3.16	3.13	3.157
Semi-hermetic screw compressor								
Circuit A	Quantity	1	1	1	1	1	1	1
Circuit B	Quantity	--	--	--	1	1	1	1
Oil recharge	Type	BSE170	BSE170	BSE170	BSE170	BSE170	BSE170	BSE170
Circuit A	L	30	30	30	30	30	30	30
Circuit B	L	--	--	--	--	30	30	30
Refrigerant	Type	R134a	R134a	R134a	R134a	R134a	R134a	R134a
Circuit A	kg	76	90	105	152	76	90	
Circuit B	kg	--	--	--	--	90	90	
Control Type		EXV	EXV	EXV	EXV	EXV	EXV	EXV
Evaporator	Type	Shell_tube heat exchanger(DX)						
Water content	L	222	308	340	550	620	600	770
Water flow	m³/h	65.4	86	103.2	130.7	154.8	172	206.4
Pressure drop	kPa	39	54	56	75	74	75	71
Max. design pressure	MPa	1	1	1	1	1	1	1
Pipe connection type		Victaulic Coupling						
Water inlet/outlet pipe dim.	mm	125	125	125	150	150	150	200
Condenser	Type	Fin-coil	Fin-coil	Fin-coil	Fin-coil	Fin-coil	Fin-coil	Fin-coil
Fan	Quantity	6	8	10	12	14	16	20
Total air flow	m³/h	23000*6	23000*8	23000*10	23000*12	23000*14	23000*16	23000*20
Fan speed	rpm	940	940	940	940	940	940	940
Unit length	mm	3810	4680	5800	5800	8800	9640	9640
Unit width	mm	2280	2280	2280	2280	2280	2280	2280
Unit height	mm	2370	2370	2370	2370	2430	2430	2430
Shipping weight	kg	3420	4460	5170	6630	7980	9160	9580
Running weight	kg	3640	4770	5510	7080	8600	9760	10350

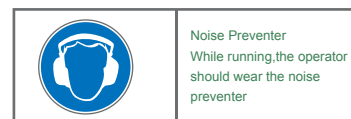
The following safety devices are equipped as standard.

- High pressure protection
- Low pressure protection
- Compressor overload protection
- Fans overload protection
- High discharge temp. protection
- Power failure protection
- Contact protection
- Water flow protection
- Motor protection
- Low oil level protection
- Differential pressure protection

Safety protection device

Notes:

- 1) Nominal cooling capacities are based on the following conditions: Chilled water inlet/outlet temp: 12°C/7°C; Outdoor temp (DB/WB):35°C/24°C.
- 2) The applicable ambient temperature range of R134a air-cooled screw units is 15°C ~ 52°C, please refer to the technical manual for detailed performance table.
- 3)The factory keeps the right to improve the product and parameter without notice. Please refer to the actual parameter on the nameplate.
- 4) Caution: noise preventer required.



Selection procedure

Design Requirements

The following design requirement must be known to select a proper package chiller.

- 1. Required cooling capacity in kilowatt (kW)
- 2. Leaving chilled water temperature in °C (LWT)
- 3. Chiller water flow rate
- 4. Design ambient temperature
- 5. Maximum and minimum ambient temperatures
- 6. Altitude
- 7. Electrical power supply

ELEVATION ABOVE SEA LEVEL(Meter)	CAPACITY CORRECTION FACTOR
0	1.000
300	0.997
600	0.994
900	0.990
1200	0.987
1500	0.983
1800	0.979

Sample selection

Select an air cooled chiller for the following conditions:

Required system capacity is 510kW at 7°C leaving chilled water. Design ambient temperature is 46°C. Altitude is 600 meter above sea level.

Water cooler fouling factor is 0.086. Power supply : 380V-3Ph-50Hz

>>> Step-1:unit selection

Enter the capacity performance data at given LWT and ambient temperature. LSBLGCW600/Q(T3) chiller unit at sea level will produce 516.8kW and 226.8 kW power input at 7°C leaving water temperature and 46°C ambient temperature. For the conditions required, the unit actual cooling capacity when corrected for altitude (0.994) Capacity = 516.8 × 0.994 = 513.7 kW, which then exceeds the requirements. So the selection is correct.

>>> Step-2:electrical

Refer to electrical data at 380V-3Ph-50Hz, the main power wire size for LSBLGCW600/Q(T3) is to be sized for a maximum running current of 534 Amps.

>>> Step-3:chilled water pump selection

For chilled water pump selection, add all pressure drop in the closed chiller water loop piping to the pressure drop.

Applicable range

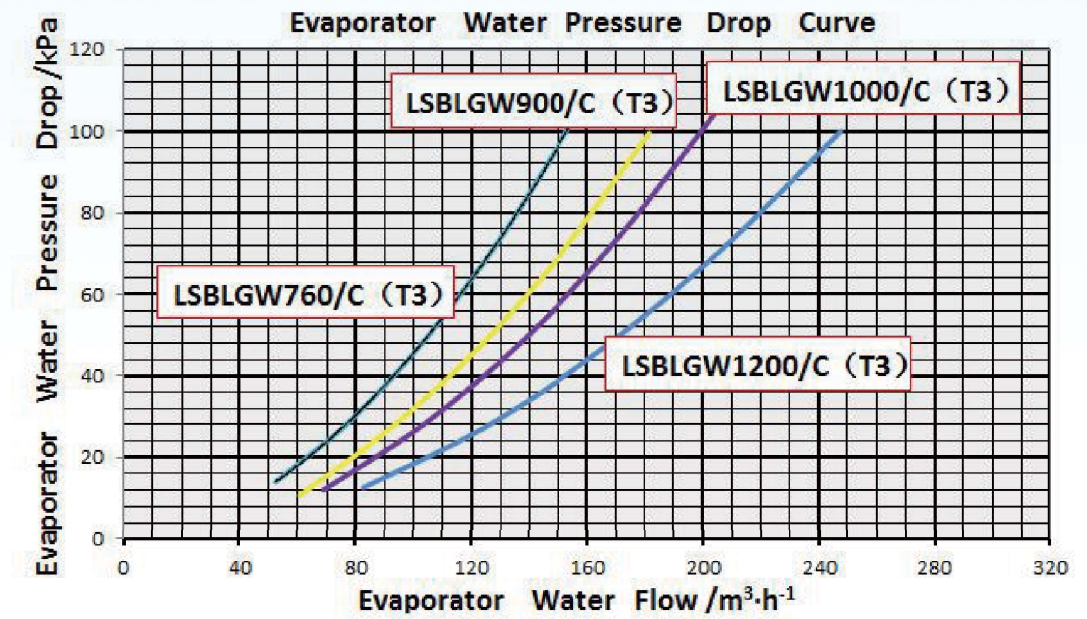
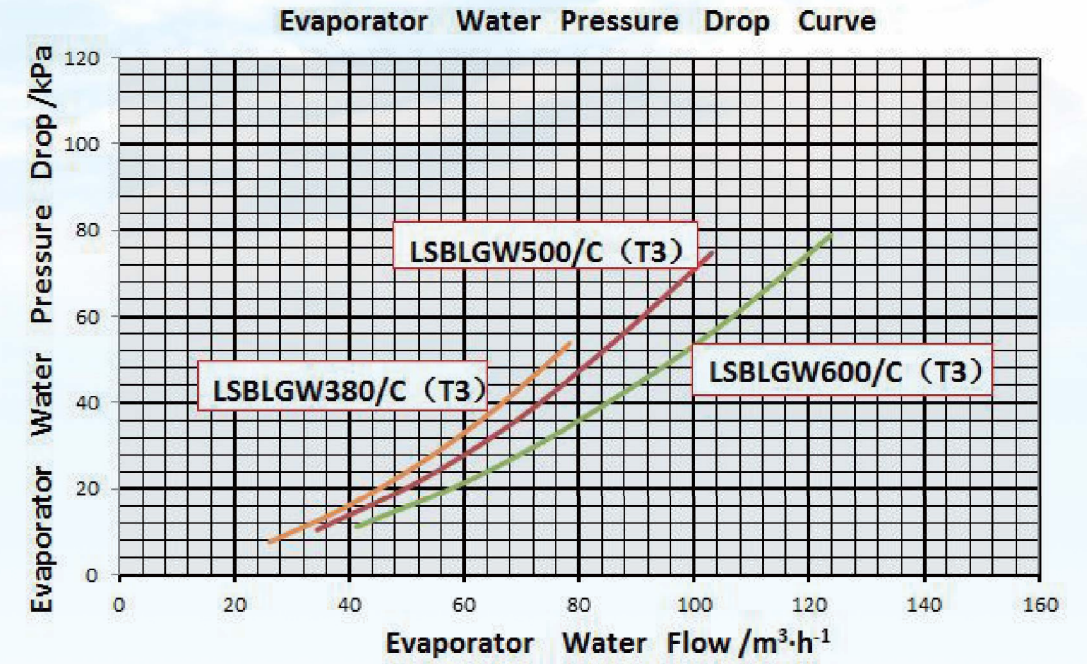
Content	Running range
Ambient TEMP.	Tropical Application: 15°C~52°C
Out water TEMP.	5°C~15°C
Max inlet/outlet water TEMP. difference	8°C
Voltage tolerance	Rating Voltage±10%
Power supply frequency	Rating frequency±2%
Compressor max. start count	4 times per hour
Environment quality	High corrosive environment and high humidity should be avoid.

Electrical data

LSBLGWXXX/C(T3)		380	500	600	760	900	1000	1200
Standard voltage	V	380V 3Ph 50Hz						
Voltage range	V	340~420						
Max. running current	A	287	368	412	574	655	736	824
Max. power consumption	kW	124	159	187	246	285	318	381
Rated current	A	212	271	319	424	483	542	638
Compressor A								
Locked rotor Amps.	A	586	805	805	586	586	805	805
Max. allowed current	A	370	450	450	370	370	450	450
Rated current	A	187	239	278	187	187	239	278
Rated power	kW	109.6	139.8	163	109.6	109.6	139.8	163
Compressor B								
Locked rotor Amps.	A	--	--	--	586	805	805	805
Max. allowed current	A	--	--	--	370	450	450	450
Rated current	A	--	--	--	187	239	239	278
Rated power	kW	--	--	--	109.6	139.8	139.8	163
Fan								
Full load Amps.(each)	A	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Power input(each)	kW	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Total input	kW	14.4	19.2	24	28.8	33.6	38.4	48
Crankcase heater								
Voltage	V	220	220	220	220	220	220	220
Total input	kW	0.3	0.3	0.3	0.6	0.6	0.6	0.6
Total Amps.	A	1.36	1.36	1.36	2.72	1.36	2.72	2.72

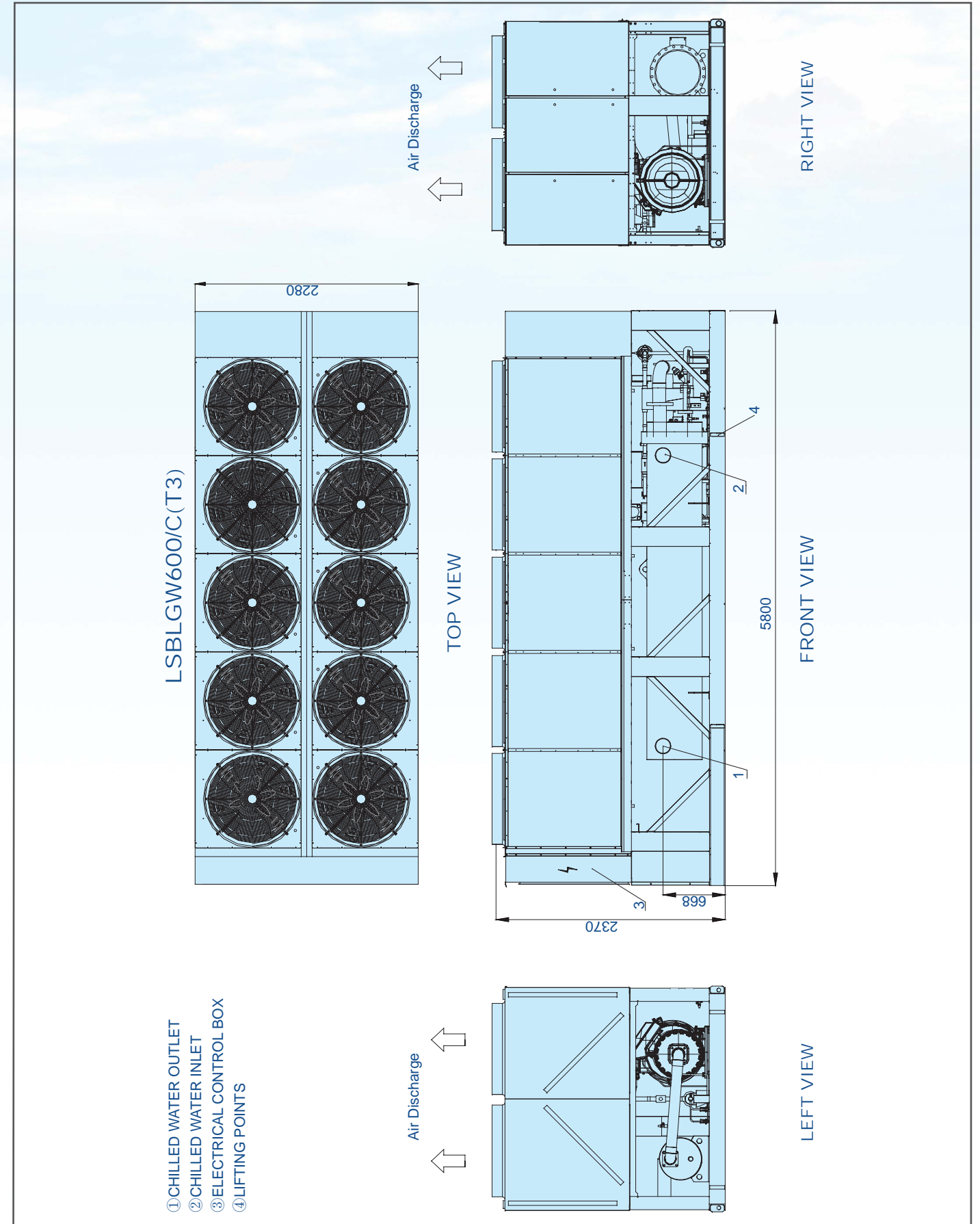
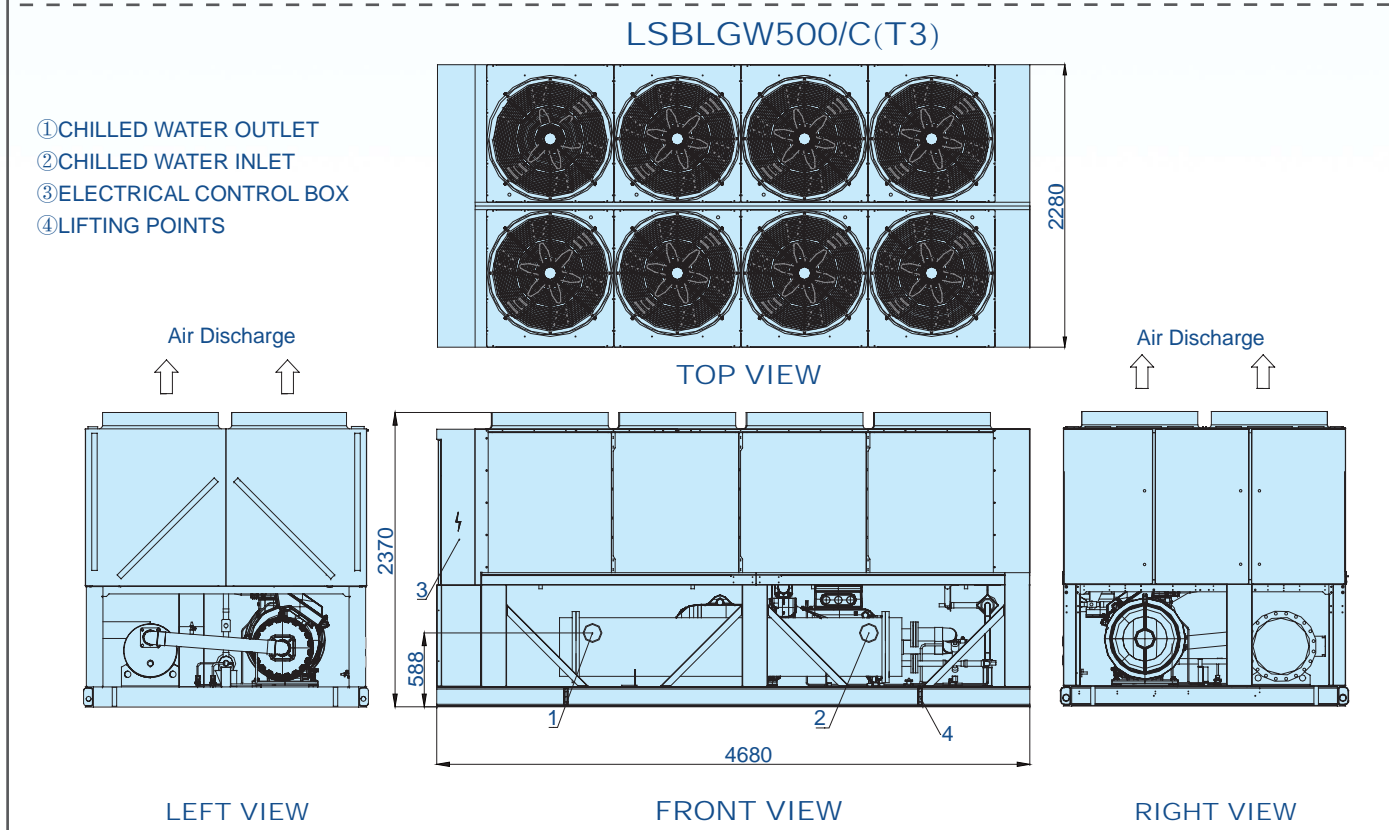
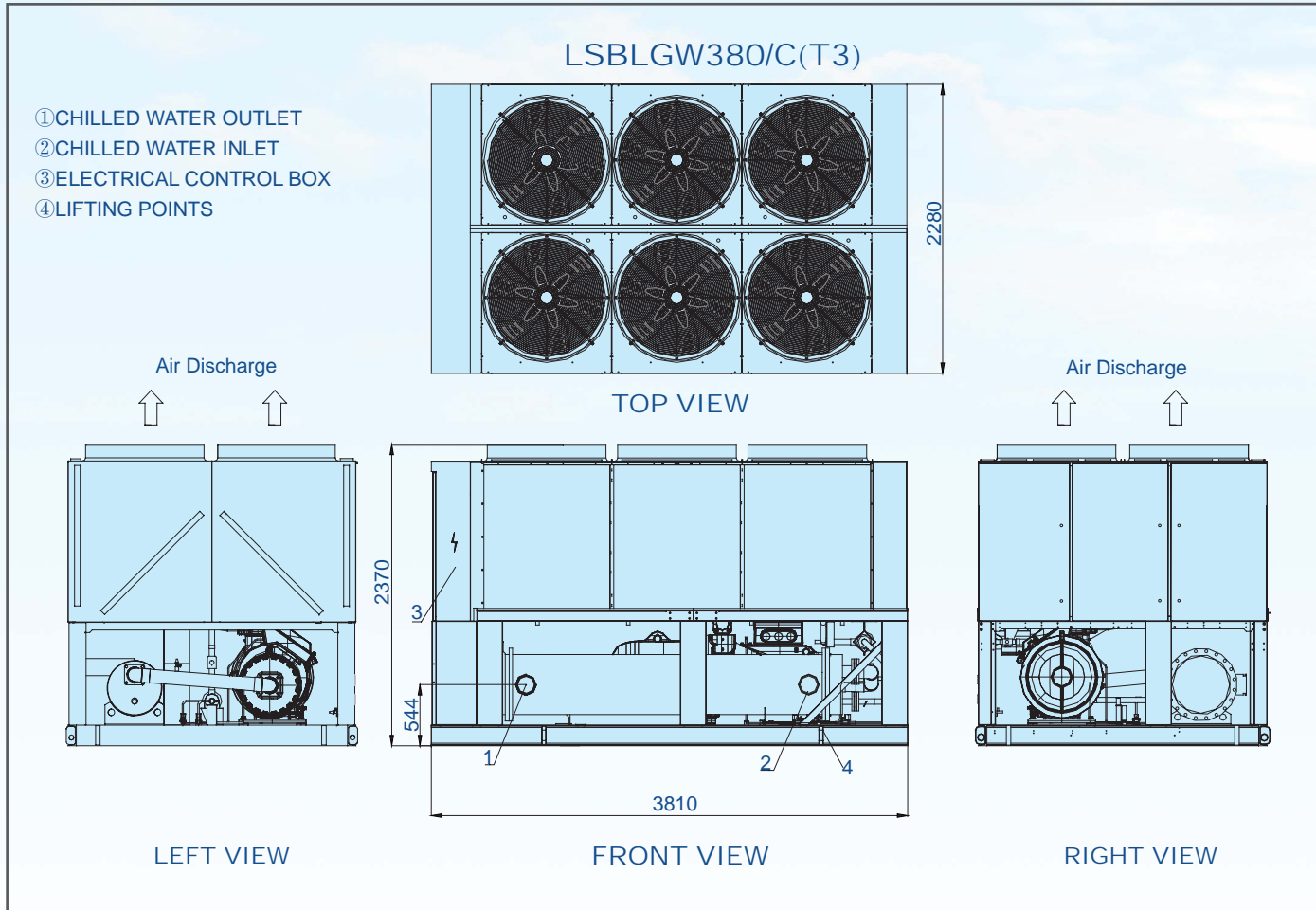
- "NOTE:
 1.Customer to specify the exact nominal power supply available at site so that electrical components are selected accurately.
 2.Main power must be supplied from a single field supplied and mounted fused circuit breaker.
 3.The compressor crankcase heaters must be energized for hours before the unit is initially started or after a prolonged power disconnection.
 4.All field wiring must be in accordance with local standards.
 5.Neutral line required on 380V-3Ph-50Hz(5 wires) power supply.
 6.Rated load Amps values are on nominal conditions.
 7.The ±10% voltage variation from the nominal is allowed for a short time only,not permanent."

Water pressure drop



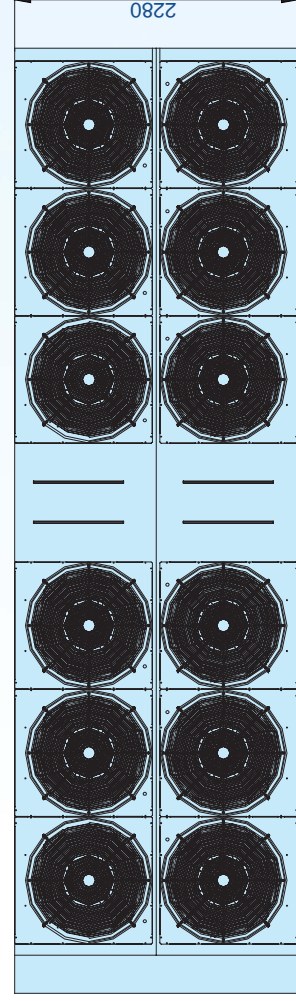
Unit Model	Min. Flow Rate		Max. Flow Rate	
	m³/h	GPM	m³/h	GPM
LSBLGW380/C(T3)	53	233	79	348
LSBLGW500/C(T3)	69	304	104	458
LSBLGW600/C(T3)	83	365	124	546
LSBLGW760/C(T3)	105	462	157	691
LSBLGW900/C(T3)	124	546	186	819
LSBLGW1000/C(T3)	138	608	207	912
LSBLGW1200/C(T3)	165	727	248	1092

Dimensions



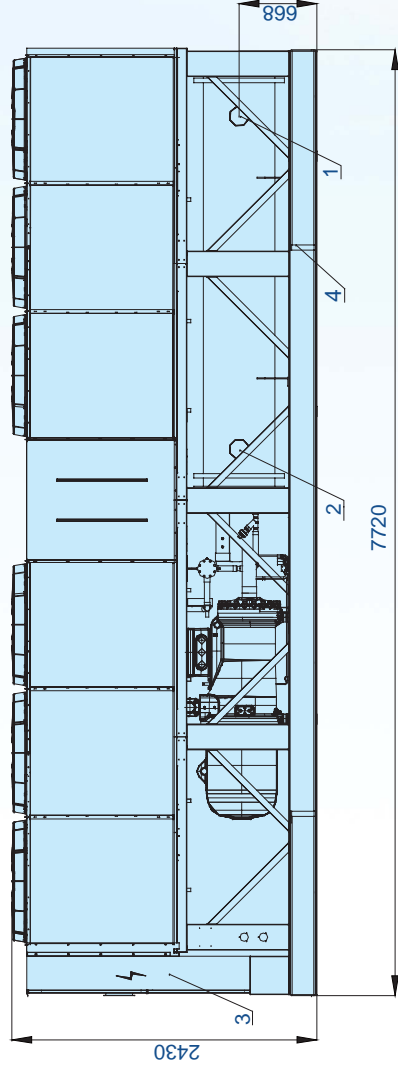
LSBLGW760/C(T3)

- ① CHILLED WATER OUTLET
- ② CHILLED WATER INLET
- ③ ELECTRICAL CONTROL BOX
- ④ LIFTING POINTS



TOP VIEW

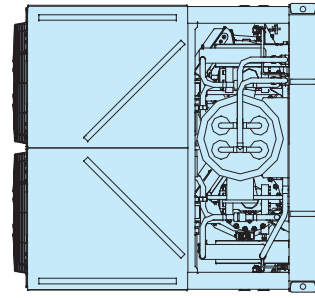
Air Discharge



FRONT VIEW

RIGHT VIEW

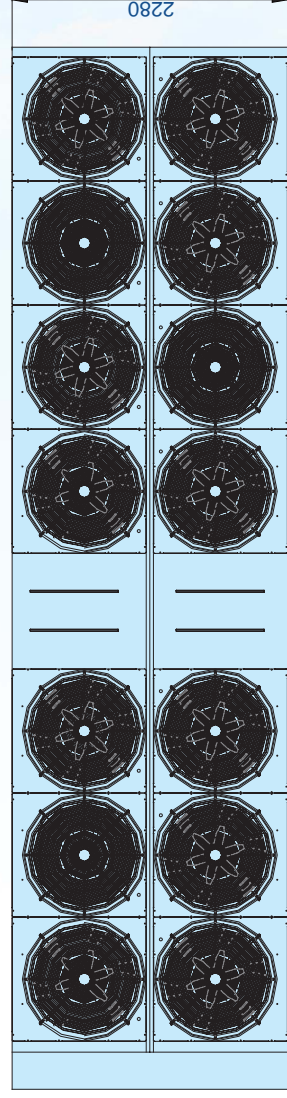
Air Discharge



LEFT VIEW

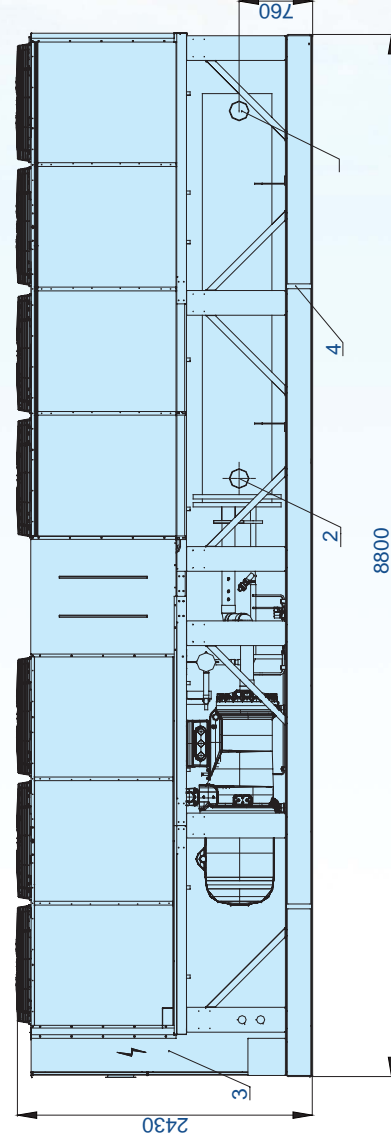
LSBLGW900/C(T3)

- ① CHILLED WATER OUTLET
- ② CHILLED WATER INLET
- ③ ELECTRICAL CONTROL BOX
- ④ LIFTING POINTS



TOP VIEW

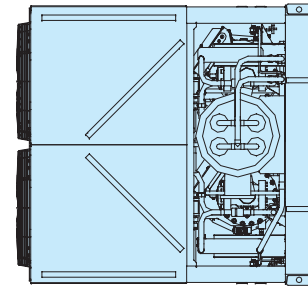
Air Discharge



FRONT VIEW

RIGHT VIEW

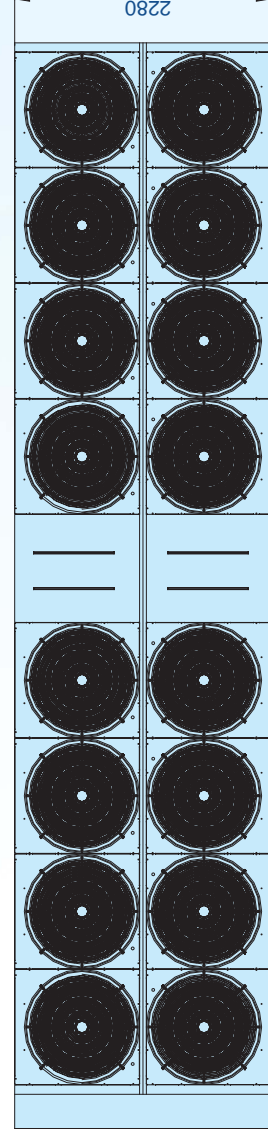
Air Discharge



LEFT VIEW

LSBLGW1000/C(T3)

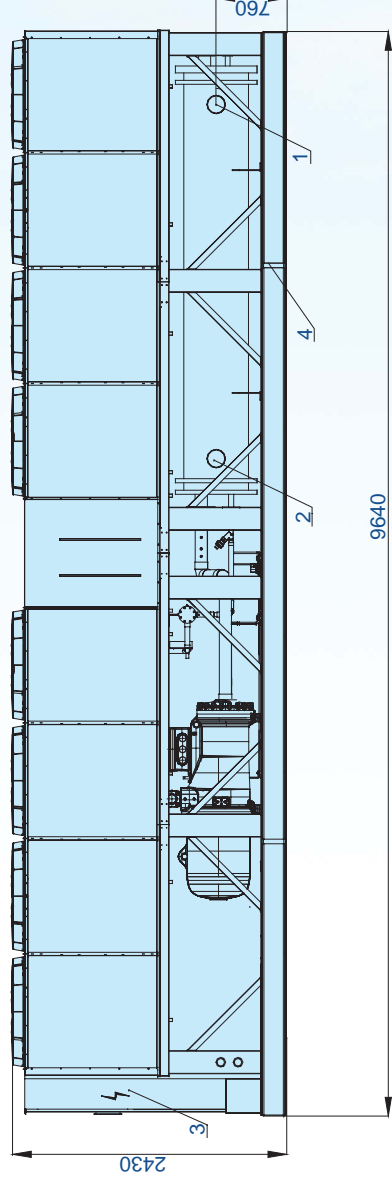
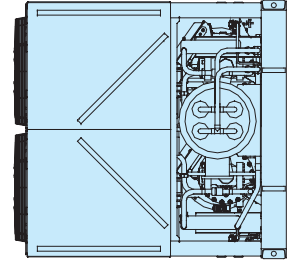
- ① CHILLED WATER OUTLET
- ② CHILLED WATER INLET
- ③ ELECTRICAL CONTROL BOX
- ④ LIFTING POINTS



TOP VIEW



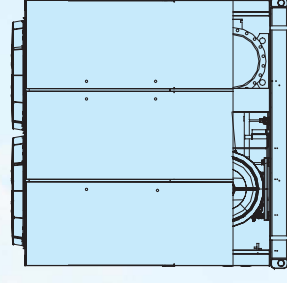
LEFT VIEW



FRONT VIEW

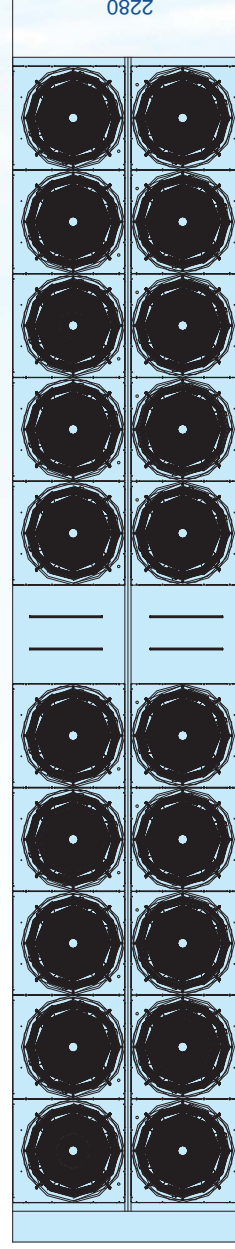


RIGHT VIEW



LSBLGW1200/C(T3)

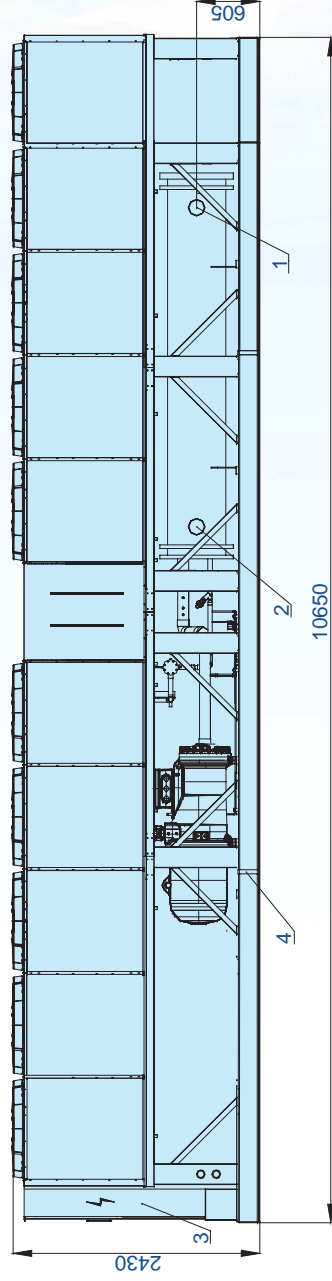
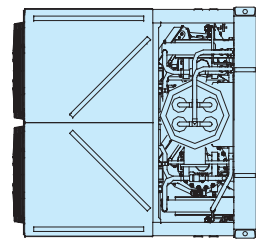
- ① CHILLED WATER OUTLET
- ② CHILLED WATER INLET
- ③ ELECTRICAL CONTROL BOX
- ④ LIFTING POINTS



TOP VIEW



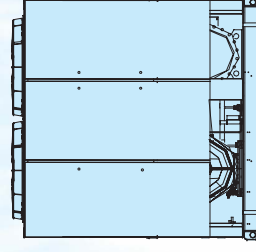
LEFT VIEW



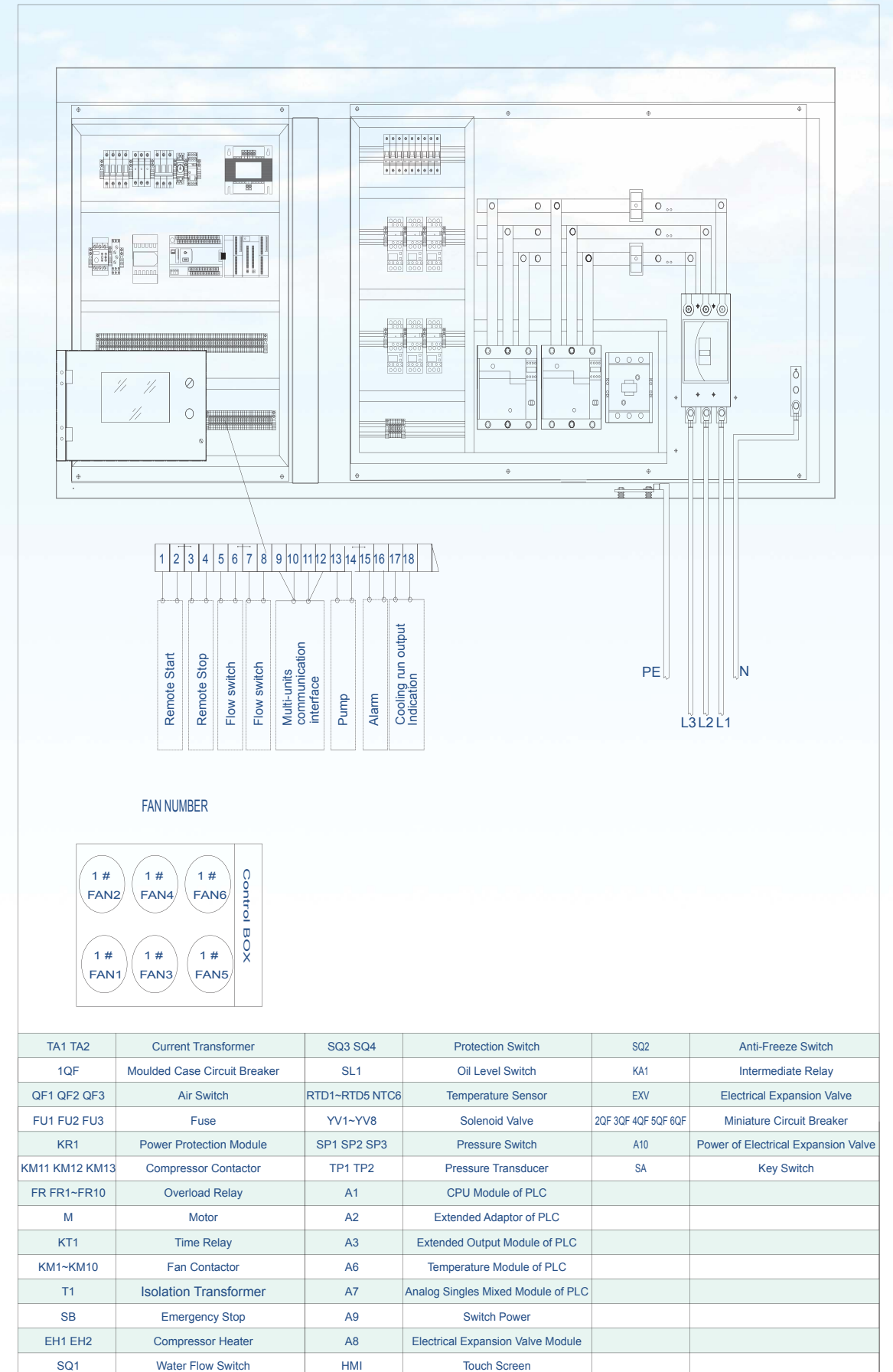
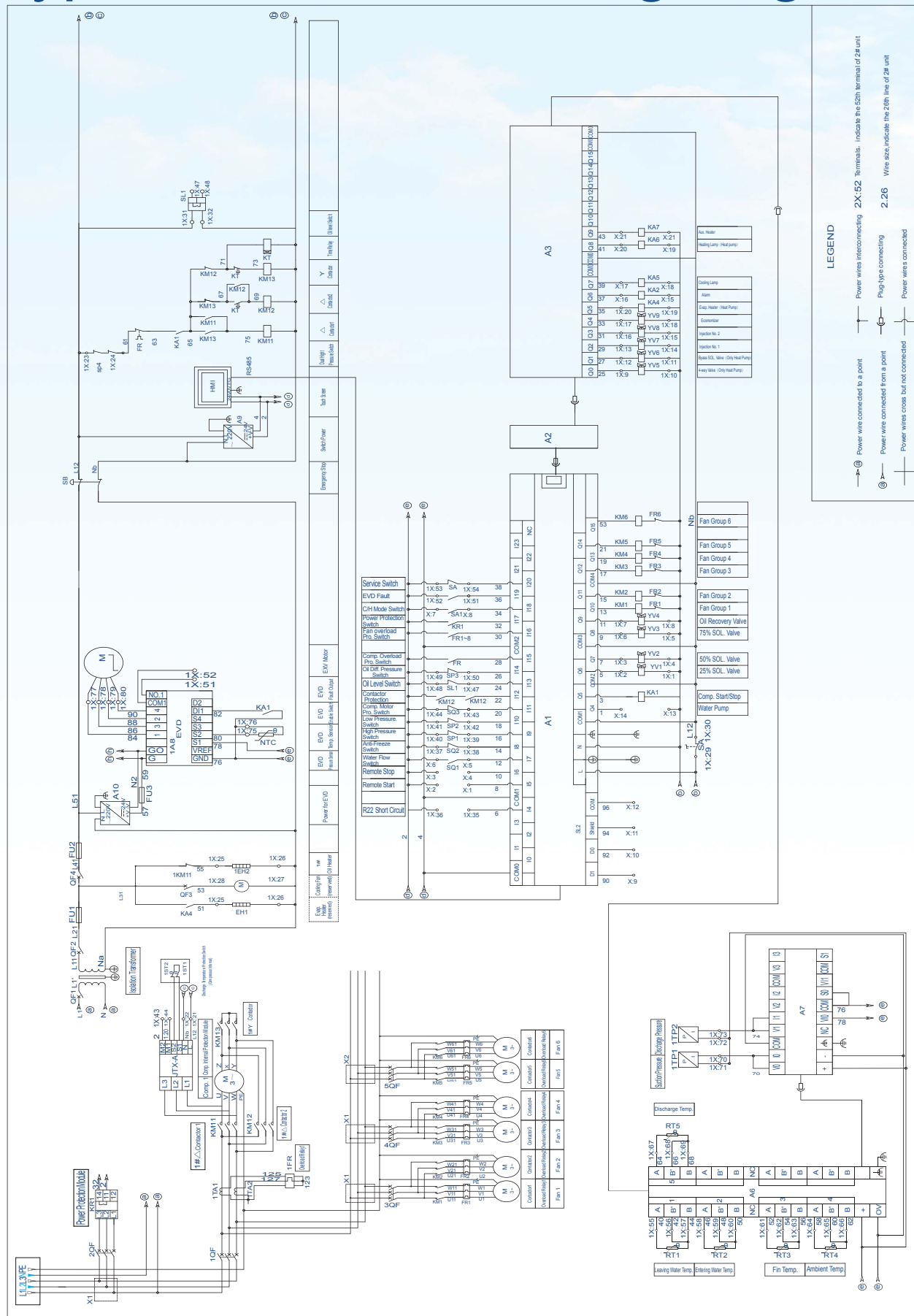
FRONT VIEW



RIGHT VIEW



Typical schematic wiring diagram



Application guidelines

Introduction

These guidelines should be considered when designing systems and their installation utilizing air-cooled chillers. Stable operation, performance and reliability of units is often dependent upon proper compliance with these recommendations.

Unit selection/ sizing

Unit selection procedure and capacities are provided in this catalog for proper selection. The electronic selection program may also be utilized for this purpose.

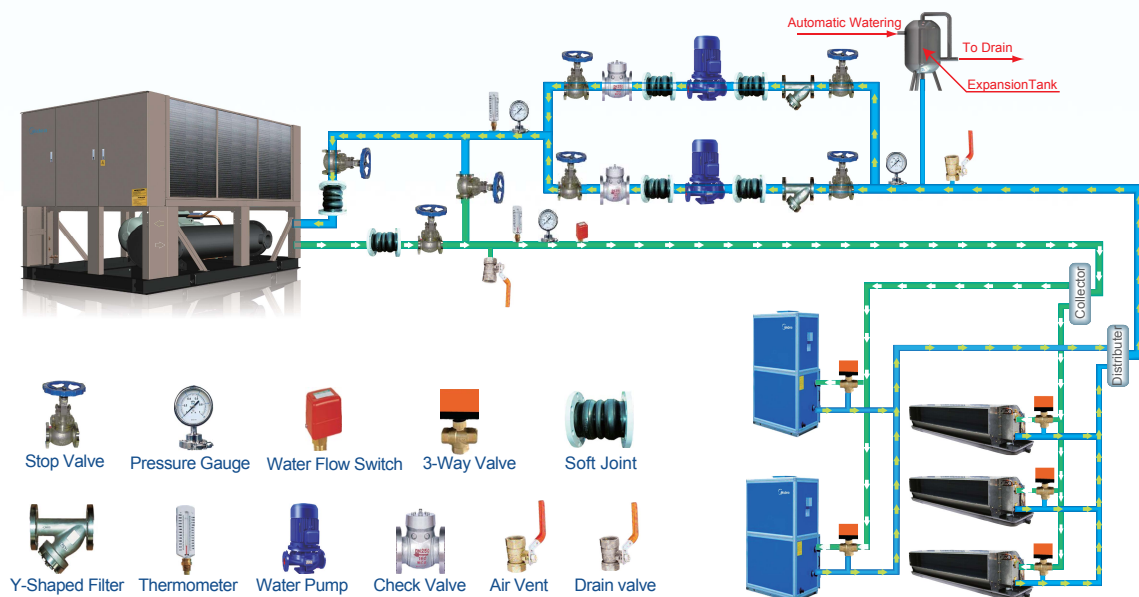
Over sizing chillers beyond a maximum limit of 5-10% in order to assure adequate capacity or considering future expansions is not recommended. Over sizing adversely affects the operating efficiency due to erratic system operation and excessive compressor cycling which also results in reduced compressor life. It should be noted that, units operate more efficiently when fully loaded rather than larger equipment operating at partial capacities. In addition, an oversized unit is usually more costly to purchase, install and operate.

Operation of two chillers at higher loading is preferred to operating a single chiller at or near its minimum possible capacity.

Effect of altitude on unit capacity

The tabulated performance data provided in this catalog are for use at or near sea level altitude application. At altitudes substantially above sea level, the decreased air density will reduce condenser capacity and therefore unit capacity. For unit selection at these higher altitudes, apply appropriate correction factor from the table provided in this catalog.

Typical water piping layout



Introduction

The following pertinent guidelines are served to ensure satisfactory operation of the units. Failure to follow these recommendations may cause improper operation and loss of performance, damage to the unit and difficulty in servicing and maintenance.

- Water piping must be connected correctly, water must enter from the inlet connection on the cooler and leave from the outlet connection.
- The flow switch must be arranged at the outlet pipe of the cooler and interlocked with the input contact in the control cabinet. The straight pipe section at each side of the flow switch shall have a length that is at least 5 times the pipe diameter; do not install it near the elbow, orifice plate or valve.
- The water system must be fitted with the water pump with appropriate displacement and pressure head, so as to ensure normal water supply to the unit. The soft connection shall be used between the water pump, unit and water system pipelines, and the bracket shall be provided to avoid stress on the unit. Welding work for installation shall avoid damage to the unit.
- The water filter must be installed before the water inlet pipeline of the unit, which shall be provided with a 40-mesh screen. This will aid in preventing foreign material from entering and decreasing the performance of the cooler.
- Each low point shall be fitted with a drain connection so as to drain the remaining water in the system.
- The auto discharge air valve shall be arranged between the high point of the pipeline and the expansion tank. Hand shut-off valves are recommended for use in all lines to facilitate servicing.
- The thermometer and pressure gauge are arranged on the straight pipe sections of the water inlet pipeline and drain pipeline, and their installation places shall be far away from the elbows.
- The flushing and insulation of the water pipelines shall be carried out before it is connected with the unit, so as to prevent dirt from damaging the unit.

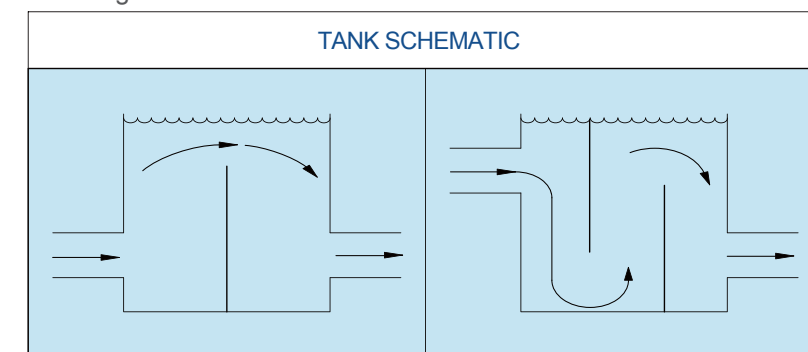
Chilled fluid volume requirement

The volume of water in a piping system loop is critical to the smooth and proper operation of a chilled water system. If sufficient volume of water is not there in the system, the temperature control can be lost resulting in erratic system operation and excessive compressor cycling.

$$V(\text{Liters}) = \text{CAP}(\text{kW}) \times N$$

Note: CAP -- Nominal cooling capacity (kW) N = 7.17

To achieve the aforementioned water volume requirements, it may be necessary to install a tank in the piping system loop to increase the volume of water in the system and therefore, reduce the rate of change of return water temperature. This tank should be provided on the return water side to the chiller and the tank should be baffled to ensure that there is no stratification and the entering stream thoroughly mixes with the tank water. See recommended tank design schematics below.



Microprocessor controller

Sequence of operation:

The following describes the sequence of operation for a two screw compressor chiller unit. Operation is similar for a one or more compressor unit. For initial start-up, the following conditions must be met:

- The power supply to the unit shall be energized for 8 hours in advanced.
- All safety conditions satisfied.
- Chilled water pump running and chilled water flow switch contact closed.
- Customer interlock contact closed, if any.

Stage - on sequence

Stage ON & OFF sequence, shall be accomplished by the Leaving water temperature control selection.

Stage # 1:

If the leaving water temperature is in loading area, the compressor # 1 electronic expansion valve shall be switched ON. Now the compressor is in the minimum or unloaded capacity. The compressor capacity is varied to achieve the full/part load capacity as per the load demand.

As discharge pressure of compressor # 1 rises, the corresponding fans are energize accordingly to the fan stage-ON set point. If the discharge pressure falls below the fan stage-OFF set point value, the corresponding fans will turn off.

Stage # 2:

If the compressor has loaded in 50% and entered capacity adjustment program, the leaving water temperature still be in loading area, the compressor #2 electronic expansion valve shall be switched ON. Now the compressor capacity is varied to achieve the full/part load capacity as per the load demand.

As discharge pressure of compressor # 2 rises, the corresponding fans are energize accordingly to the fan stage-ON set point. If the discharge pressure falls below the fan stage-OFF set point value, the corresponding fans will turn off.

Stage - off sequence

During the staging OFF, the first- in- first – out sequence is adopted.

As the applied load decreases and when the leaving water temperature falls in unloading area, the compressor #1 shall unload.

If the leaving water temperature still be in unloading area, the compressor # 2 shall unload.

If both of the two compressors have unloaded to 50% status, and the leaving water temperature still be in unload area, the compressor # 1 shall be turned off firstly.

Rigging instructions

Attention to riggers:

Hooking rigging sling thru holes in base rail, as shown below.

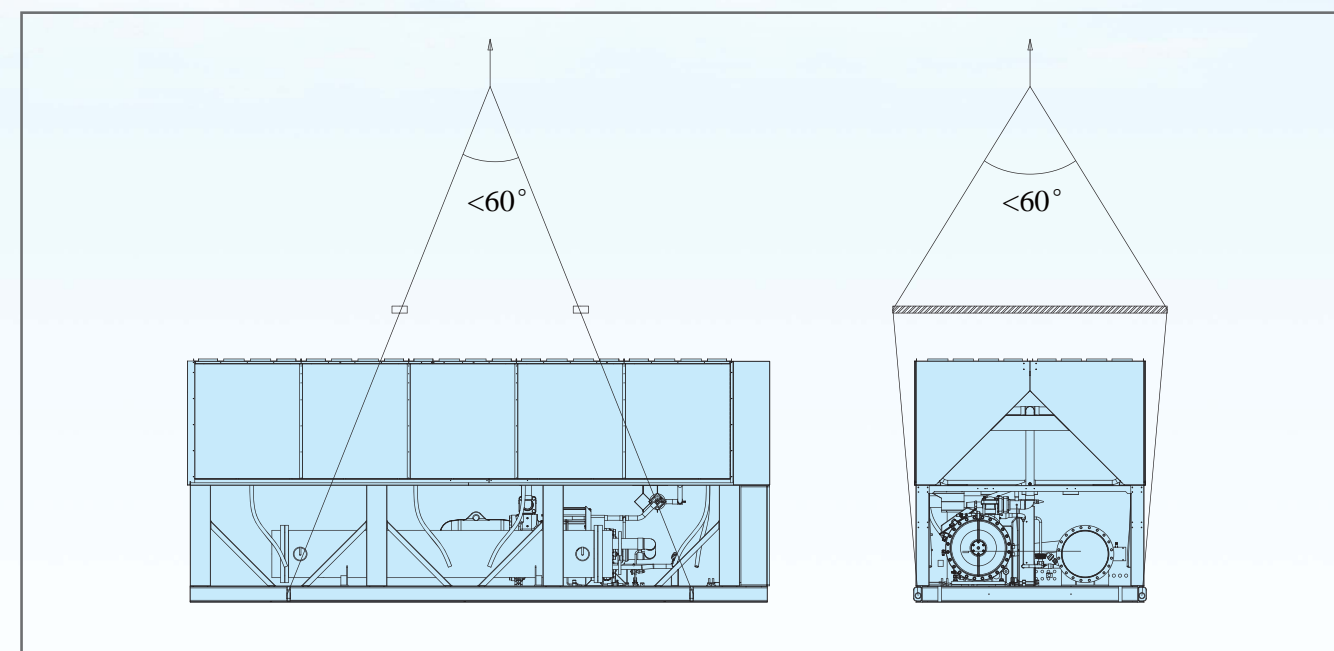
Center of gravity is not unit center line. Ensure center of gravity aligns with the main lifting point before lifting.

Use spreader bar when rigging, to prevent the slings from damaging the unit.

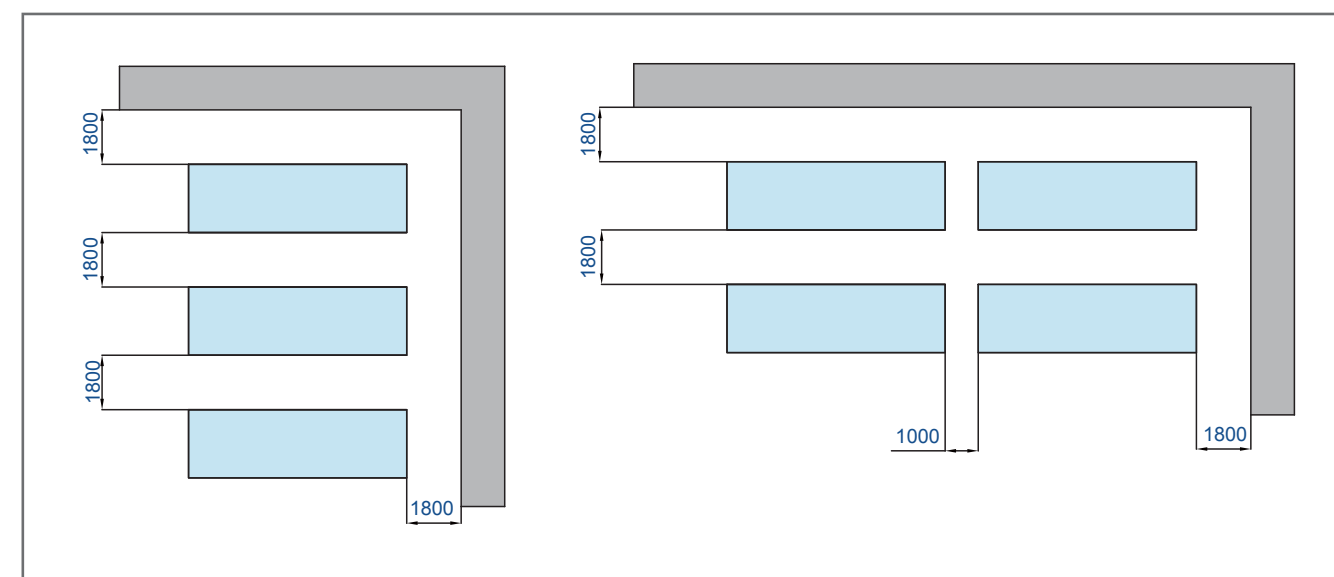
Caution:

All panels should be in place when rigging. Care must be taken to avoid damage to the coils during handling.

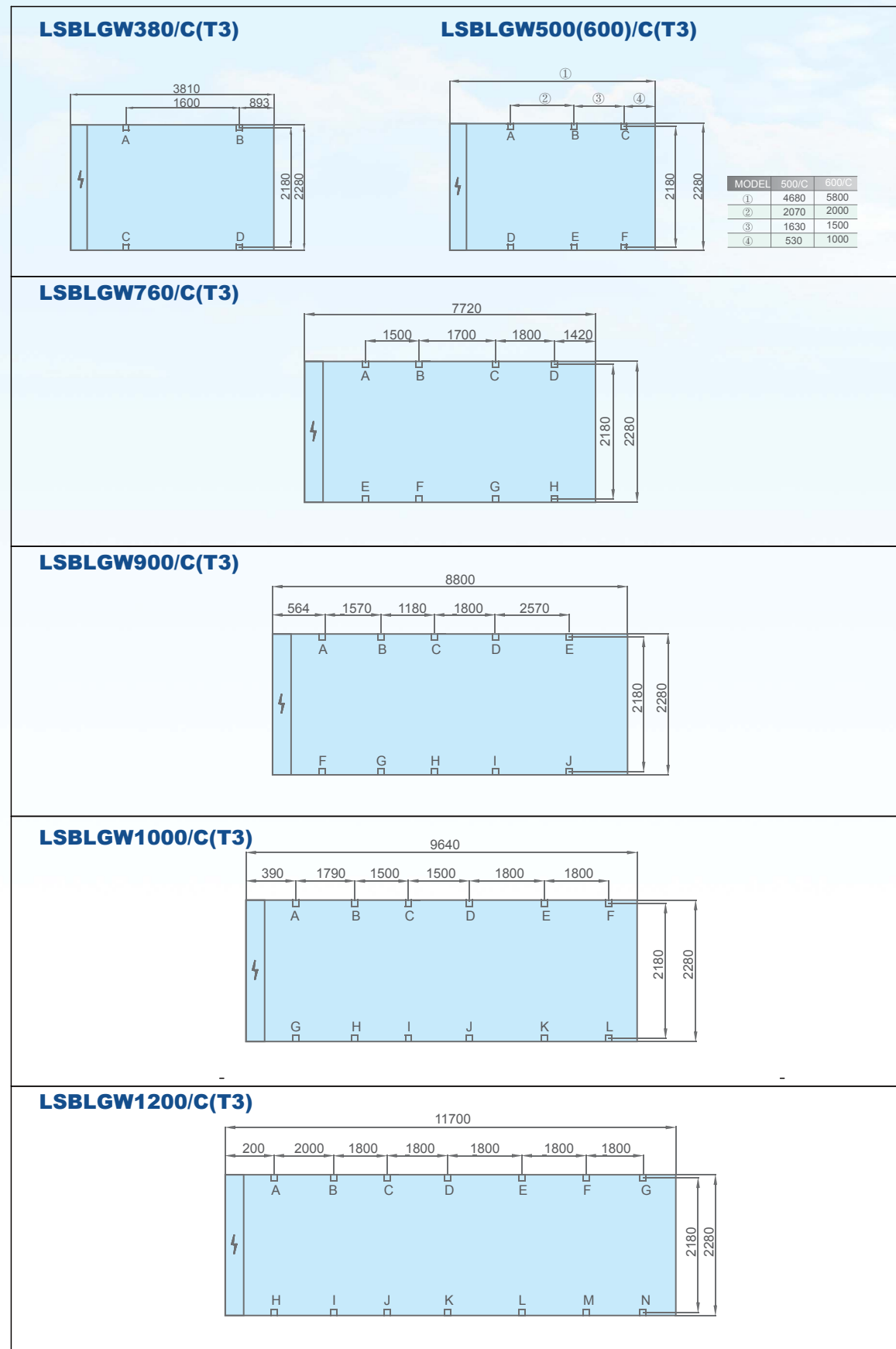
Insert packing material between coils & slings as necessary.



Installation clearance



Mounting location

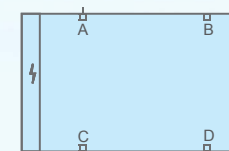


Note: All dimensions are in mm

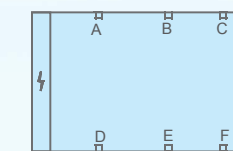
Load distribution

Unit:KG

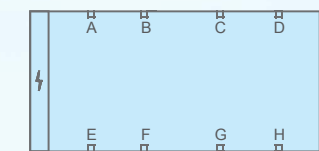
Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N
LSBLGW380/C(T3)	894	926	894	926	-	-	-	-	-	-	-	-	-	-
LSBLGW500/C(T3)	656	876	853	656	876	853	-	-	-	-	-	-	-	-
LSBLGW600/C(T3)	890	939	926	890	939	926	-	-	-	-	-	-	-	-
LSBLGW760/C(T3)	894	951	846	849	894	951	846	849	-	-	-	-	-	-
LSBLGW900/C(T3)	837	957	960	780	766	837	957	960	780	766	-	-	-	-
LSBLGW1000/C(T3)	761	923	933	758	752	753	761	923	933	758	752	753	-	-
LSBLGW1200/C(T3)	710	764	791	775	713	711	711	710	764	791	775	713	711	711



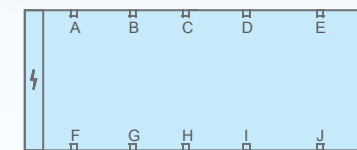
LSBLGW380/C(T3)



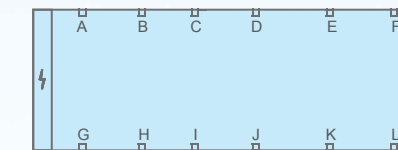
LSBLGW500(600)/C(T3)



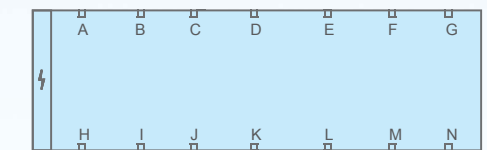
LSBLGW760/C(T3)



LSBLGW900/C(T3)



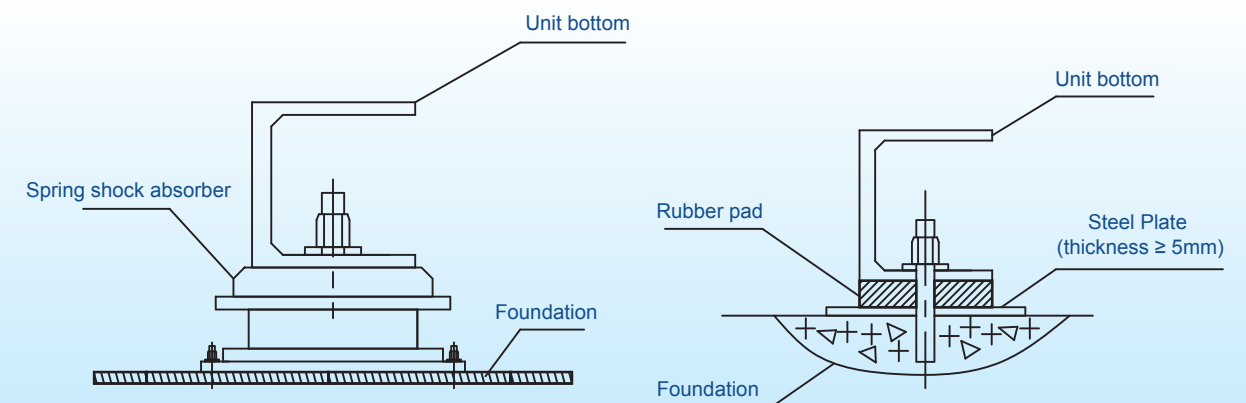
LSBLGW1000/C(T3)



LSBLGW1200/C(T3)

Installation requirements:

- 1. Be sure to take the base preparation and structure into consideration seriously during installation, especially avoid the intensity and noise of floor when the machine is installed on the top story of buildings. It is recommended to discuss with the building designer before conducting installation.
- 2. The surrounding of the base shall be equipped with drainage ditch and make sure it can dewatering freely for convenient in drain.
- 3. Anti-vibration pad shall be placed between the base frame and foundation in order to avoid transmitting vibration and noise during the runtime of the unit, and make sure the unit is acclinic during installation.



Troubleshooting guide

1. Unit Touch Screen Fault

- Check whether emergency switch (SB) is normal, has been reset.
- Check whether air switch (QF) be in "ON" status, the fuse is normal.
- Check whether the wiring of the power line and communication line are correct, and the bolt has been tightened.
- Check whether the wiring of isolation transformer is correct, and the component is normal.
- Check whether the switch power is normal.

2. Power Protection

- Check whether the setting parameters of the phrase relay are correct.
- Check whether the wiring of phase sequence relay is correct.
- Check the wiring of power is correct.
- Check the power quality.

3. Temperature Sensor Failure

- Check whether the wiring is correct
- Check whether the resistance of temperature sensor is normal.

4. Pressure Sensor Failure

- Check whether the wiring of suction and discharge pressure sensors is correct.
- Check whether the setting range on touch screen is corresponding with the range marked on the sensor.
- Check whether the correction value is correct.

5. Compressor Overload Protection

- Check whether the setting value of compressor thermal overload relay is correct.
- Check whether the overload relay itself is normal.
- Check the quality of power supply.
- Check whether the load is normal.
- Check whether supply oil system of compressor is normal.

6. Oil level Protection

- Check whether the oil level switch or connection is failure
- Check whether there is refrigeration oil leakage.
- Check whether the unit has run with liquid and some oil is taken away from the compressor.

7. Fan Overload Protection

- Check whether the setting value of fan thermal overload relay is correct.
- Check whether the relay is normal.
- Check whether there is bad ventilation around the unit.
- Check whether the fan load is too heavy.
- Check whether the power is normal.

8. High Discharge Pressure Protection

- Check whether discharge pressure sensor itself and setting values are normal.
- Check whether the ambient temperature has exceeded allowed running range.
- Check whether all of valves have been open fully.
- Check whether the condenser is normal.
- Check whether the fans are normal
- If all mentioned above are normal, but the alarm still exist. Maybe there exists non-condensable gas or too much refrigerant in the system.

9. Low Suction Pressure Protection

- Check whether all valves have been open fully, such as suction and discharge shutoff valves, angle valves or ball valves on two sides of the filter.
- Check whether the opening of EXV is normal.
- Check whether suction temperature sensor is normal and the installation meet the requirement.
- Check whether there is plugging in the filter.
- Check whether there is a leakage of refrigerant.
- Check whether the chilled water system is normal.

10. High Discharge Temperature Protection

- Check whether discharge temperature is normal.
- Check whether ambient or water temperature is excess allowed range.
- Check whether the injection system is normal.
- Check whether the filter is normal.
- Check whether EXV is normal.
- Check whether the refrigeration oil is normal.

11. Water Flow Fault Protection

- Check whether the type of water pump can meet the requirement;
- Check whether the water pump run normally and the wiring is correct;
- Check whether the water flow reaches to allowed range.
- Check the direction of the targets is normal and the installation of water flow switch meet the requirement.
- Check whether the wiring of water flow switch is normal.
- Check whether the chilled water system is normal.

12. Anti-freeze Protection

- Check whether chilled leaving water temperature is less than 3℃.
- Check whether the wiring and water flow switch itself is normal.
- Check whether the chilled water system is normal.

13. Contactor Protection

- Check whether the setting value of time relay is correct.
- Check whether the wiring of contactors are normal.
- Check whether physical construction is normal, Check whether the coil is normal and the contactor can be suctioned normally.