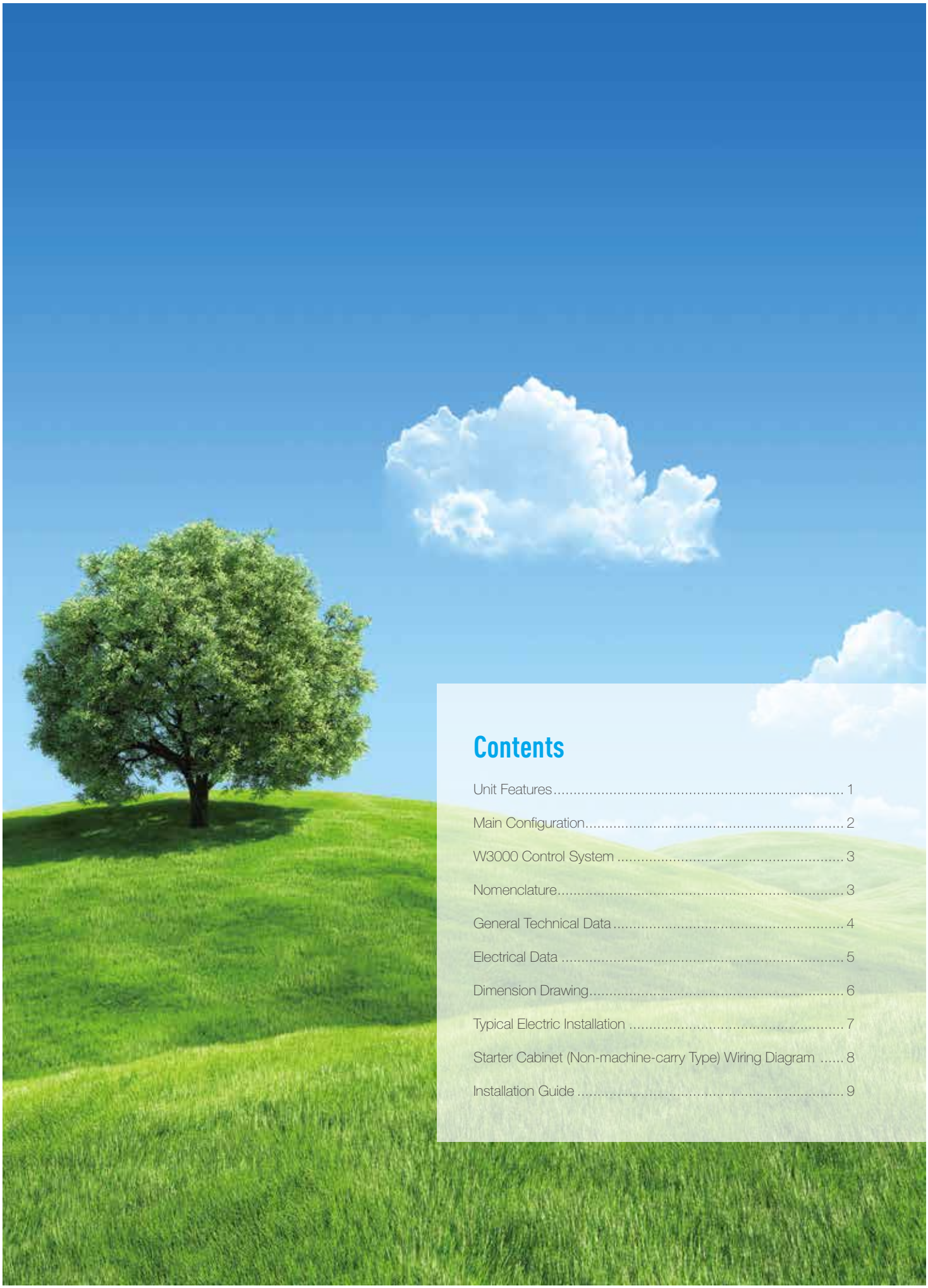
Water-cooled Centrifugal Chiller

1758-3000kW (500-850RT)

CENTRIFUGAL

r HFC R-134a

CLIMAVENETA



Contents

Unit Features

High Efficiency

Two stage centrifugal compressor with optimized impeller for R134a refrigerant promises high efficiency of unit, in the meanwhile, with low noise level and wide range of capacity, which permits stable operation even under 10% of full load.

Heat Exchangers adopt CLIMAVENETA dedicated highly effective compact flooded-type evaporator and tube-shell type condenser. The heat exchanger has the features of structure compact, high efficient heat exchange, and low water pressure drop, as a result of operation cost reduction.

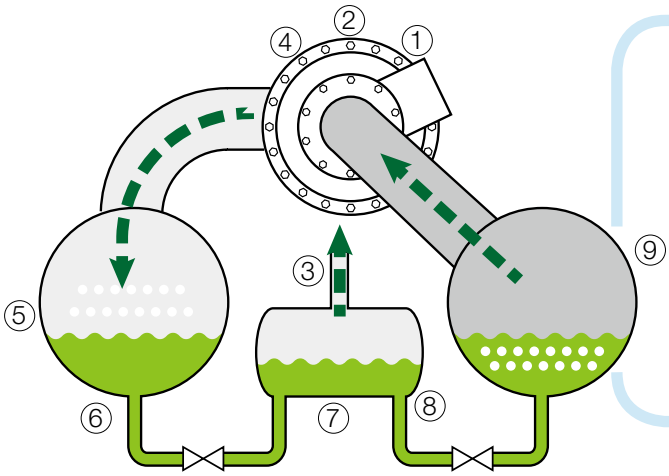
The unit, equipped with EXV and CLIMAVENETA patented throttle orifice-plate, coordinates with IGV to adjust the flow of refrigerant according to load changes and improves unit part load efficiency.

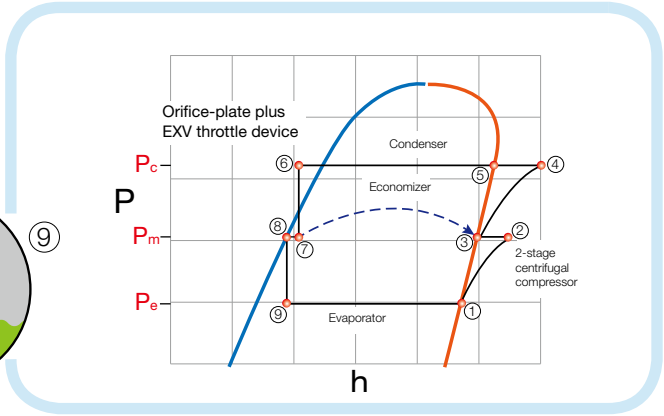
Advanced Design

Compact design theory is adopted in unit structure design, which effectively reduces unit dimension and saves installation space.

The motor is cooled when the middle pressure of compressor, avoiding condensation of compressor under lower temperature and ensuring stable operation of motor without additional insulation.

Standard configuration of refrigerant isolation valve enables storage of refrigerant in evaporator or condenser and favorable of on-site maintenance.





Reliable Operation

Semi-hermetic compressor eliminates the issue of shaft seal leakage for open-type compressor. The compressor, with build-in oil pump and outside refrigerant cooling oil cooler, makes sure oil temprature insusceptible of ambient temperature change. The motor is cooled by refrigerant with low operation temperature.

Easy Installation

Refrigerant and oil are charged in factory. Test and commissioning are conducted before delivery.

Starter cabinet of unit is non-machine-carry type. Only water connection and power supply shall be installed on site.

Standard Criteria

The unit is strictly designed, manufactured and tested based on international or national standard, such as AHRI、EN、UNI、JIS and GB/T18430.1.

The electric system is designed based on IEC60204-1/GB5226.1 standard. And the operation of unit is controlled and monitored by intelligent microcomputer system.

Each unit is fully tested by strict process for best reliability and to meet customer's request.

Main Configuration

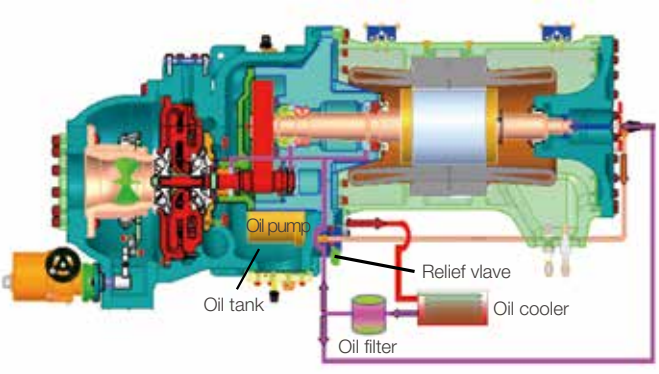
Two-stage centrifugal compressor

Two-stage centrifugal compressors are optimized according to the three-dimensional flow theory and the efficiency of HFC134a under both full load and part load condition. It can obtain an excellent operation performance, and dramatically reduce the unit operation surge point effectively as well.

High efficiency backward type fully enclosed impellers are adopted to avoid refrigerant broken flow, which makes the efficiency 6% higher than normal single stage compressor.

IGV of compressor is controlled by high precision stepper motor. It can precisely control the opening of IGV, therefore accurately adjust the cooling capacity of unit.

Semi-hermetic compressor, comparing with open-type, has no trouble of refrigerant leakage. The motor is well cooled by refrigerant as a result no more cooling system needed but ventilation equipment for the machine room.

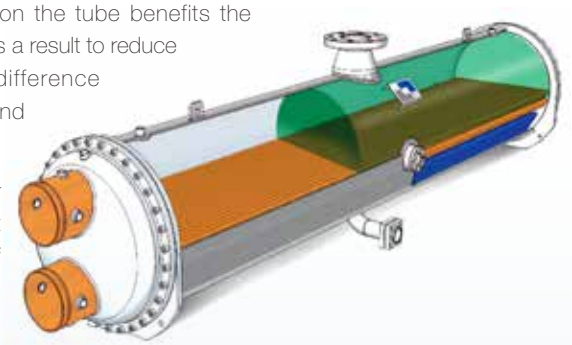


Two-stage centrifugal compressor section view

Flooded Evaporator

The copper tubes of flooded type evaporator are completely dipped inside the boiling liquid refrigerant. Thanks to this design, the unit performance and COP are enhanced obviously.

Super high efficiency copper tubes are designed with patent technology. The external screw on the tube benefits the evaporation of the refrigerant and as a result to reduce the heat transfer temperature difference between tube internal surface and external surface effectively.



In order to achieve perfect water perturbation and turbulent heat transfer, the internal surface of the copper tube is also special designed.

Chilled water flowing inside the tube, it's beneficial for clean and maintenance.

Economizer

Flash economizer, combining with two-stage compression technology, remarkably enhances the performance of unit.

The economizer is optimized with compact structure, which reinforces gas-liquid separation and reduces water pressure drop, as a result to improve the performance and reliability of economizer.

Shell and tube condenser

Shell and tube condenser with patented high efficiency heat exchanger tube, rolling thread outside of tube, enhances dropwise condensation of refrigerant and greatly decreases the heat transfer temperature difference, therefore improves C OP of unit.

Thread inside of tube reinforces water perturbation and turbulent heat transfer.

Cooling water flowing inside the tube, it's beneficial for clean and maintenance.

Throttle Device

The unit adopts patented orifice plate plus EXV throttle system to control refrigerant flow, which has the benefits of simple, reliable structure and is easy to maintain.

Orifice plate has the features of reliability and simple maintenance. Coupling with EXV's benefits of instant response, the dedicated throttle device is able to adjust refrigerant flow according to real-time load, ensuring stable and continuous regulation ranging from 10% to 100% of total load.

W3000 Control System

Information display

Real-time temperature, pressure profile
Historical temperature, pressure profile
Real-time alarm code information
Historical alarm code information
Unit status information
Chilled water inlet/outlet temperature
Cooling water inlet/outlet temperature
Compression ratio
Power input
Supply voltage
Current input
IGV position
Compressor discharge temperature, pressure
Compressor suction temperature, pressure
Motor winding temperature
Lubricating oil temperature

Capacity Regulation

Chilled water outlet temperature adjustment
Load and unload of the unit
IGV adjustment
EXV control
Economizer regulation

Control System

13" TFT LCD touch screen
Control system self-detection and diagnosis
Graphic display interface
Intelligent algorithm to guarantee optimal operation
Menu to display varieties of control and monitoring parameters
"Black Box" to record operation parameter before alarms
Display current status to assist fault diagnosis
Compatible with CLIMAVENETA ClimaPRO group-control system
Optional diversified BMS, like ModBus, LonWorks, BACnet etc.

Interlocking Control

Remote start-stop control
Water flow control
Start cabinet and compressor interlocking control

Shut-down Safety

High motor temperature
High oil tank temperature
High/low oil cooler temperature
Low oil pump pressure
High oil filter pressure difference
Incorrect phase sequence, total and partial phase loss
High compressor discharge temperature
Low compressor discharge superheat
Voltage unbalance
Over-current
Oil pump overload
Surge protection
Low evaporator pressure
High condenser pressure

Nomenclature

CCS 0600

- 0600 — Norminal cooling capacity (RT)
- CCS — CCS centrifugal chiller

CCS 0600
Centrifugal chiller of 600RT cooling capacity and supply voltage of 380V

WATER COOLED CENTRIFUGAL CHILLER

General Technical Data

CCS		0500	0550	0600	0650	0700	0750	0800	0850
Cooling performance									
Cooling capacity	kW	1758.0	1934.0	2110.0	2286.0	2462.0	2638.0	2814.0	3000.0
	RT	500	550	600	650	700	750	800	850
Power input	kW	305.1	329.6	361.5	392.1	423.0	450.5	479.4	513.7
Full load COP	kW/kW	5.76	5.87	5.84	5.83	5.82	5.86	5.87	5.84
Evaporator									
Water flow	m^3/h	302.5	332.8	363.0	393.1	423.4	453.7	483.9	515.9
Water pressure drop	kPa	33.3	40.3	40.2	38.5	37.7	39.4	39.5	39.3
Inlet/outlet pipe		8"	8"	8"	10"	10"	10"	10"	10"
Condenser									
Water flow	m^3/h	358.5	392.5	428.5	464.1	500.0	531.2	570.8	609.0
Water pressure drop	kPa	27.8	33.3	33.3	33.0	32.4	33.1	33.3	29.7
Inlet/outlet pipe		8"	8"	8"	10"	10"	10"	10"	10"
Control system		W3000 touch							
HFC-134a charged	kg	465	535	570	630	665	750	775	845
Oil	kg	38	38	38	38	38	57	57	57
Capacity regulating		10%-100%Stepless							
Dimension									
Length	mm	4470	4470	4470	4520	4520	4520	4520	4520
Width	mm	1860	1860	1860	1910	1910	2080	2080	2080
Height	mm	2180	2180	2180	2220	2220	2500	2500	2500
Unit weight	kg	8550	9000	9150	9450	9700	11600	11600	11950
Operation weight	kg	9650	10100	10250	10650	10900	13000	13000	13350

Remarks:

1. Cooling mode: evaporator inlet/outlet water temperature 12/7℃; Condenser inlet/outlet water temperature 32/37℃.
2. The standard water side pressure of evaporator and condenser is 1.0MPa, 1.6Mpa and 2.0Mpa as optional.
3. Unit equipped with spring isolator if special request.
4. Default of non-machine-carry Y-delta start, soft start optional; Unit with machine-carry starter cabinet if special request.
5. CLIMAVENETA provides custom-made design based on different capacity, working condition and efficiency requirements. For more detail, please refer to CLIMAVENETA local office.

Electrical Data

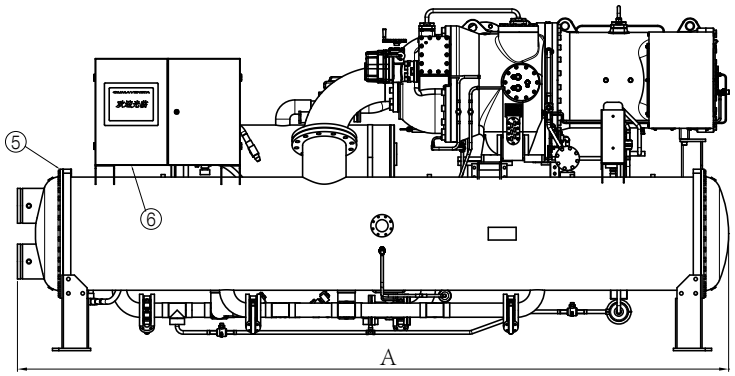
Unit model	Power supply	FLI	FLA	SA	Recommended cable current
CCS	[V/Ph/Hz]	[kW]	[A]	[A]	[A]
0500	380/3/50	393	535	947	684
0550	380/3/50	393	569	947	727
0600	380/3/50	393	624	947	798
0650	380/3/50	453	677	1173	866
0700	380/3/50	453	730	1173	934
0750	380/3/50	528	776	1271	995
0800	380/3/50	528	828	1271	1059
0850	380/3/50	608	887	1615	1135

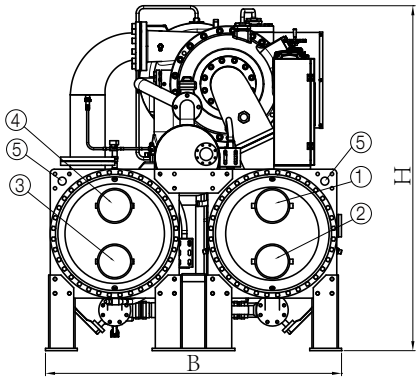
Remarks:

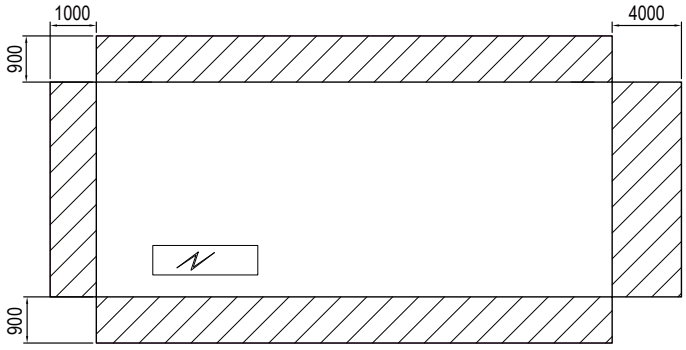
1. F.L.I Full load power absorption F.L.A Full load current S.A Locked-rotor current of star circuit
2. For other power supply voltage requirement, please consult local CLIMAVENETA office.

WATER COOLED CENTRIFUGAL CHILLER

Dimension Drawing



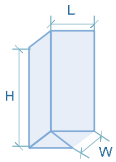




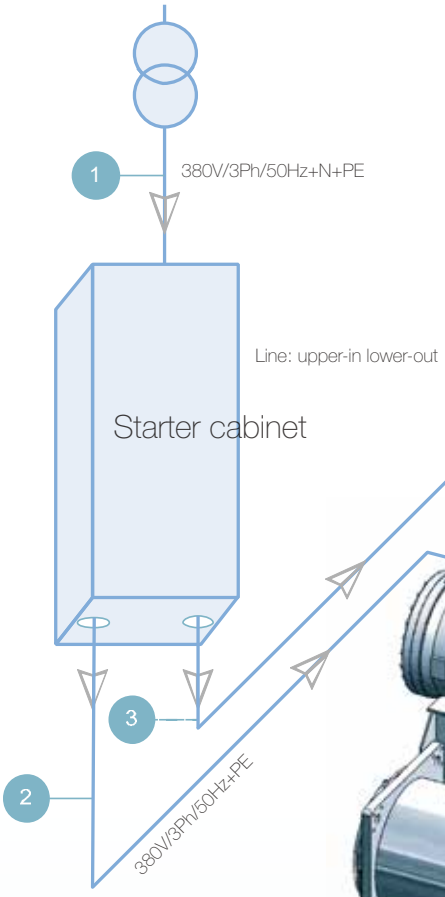
1. ①Chilled water inlet ②Chilled water outlet ③Cooling water inlet ④Cooling water outlet ⑤Lifting points ⑥Power inlet
2. Shadows are the maintenance clearance and pipe connector area.
3. Facing control screen, water pipe connection in left side is A direction, in right side B direction.
4. For detail drawing, please consult CLIMAVENETA local office.
5. R5 indicates the minimum maintenance space between roof and the unit top.

CCS	Dimension			Weight		Pipe size		Maintenance clearance				
	A(mm)	B(mm)	H(mm)	P./W.(kg)	L.W.(kg)	①/②	③/④	R1(mm)	R2(mm)	R3(mm)	R4(mm)	R5(mm)
0500	4470	1860	2180	9650	8550	8“	8“	4000	1000	900	900	1200
0550	4470	1860	2180	10100	9000	8“	8“	4000	1000	900	900	1200
0600	4470	1860	2180	10250	9150	8“	8“	4000	1000	900	900	1200
0650	4520	1910	2220	10650	9450	10"	10"	4000	1000	900	900	1200
0700	4520	1910	2220	10900	9700	10"	10"	4000	1000	900	900	1200
0750	4520	2080	2500	13000	11600	10"	10"	4000	1000	900	900	1200
0800	4520	2080	2500	13000	11600	10"	10"	4000	1000	900	900	1200
0850	4520	2080	2500	13350	11950	10"	10"	4000	1000	900	900	1200

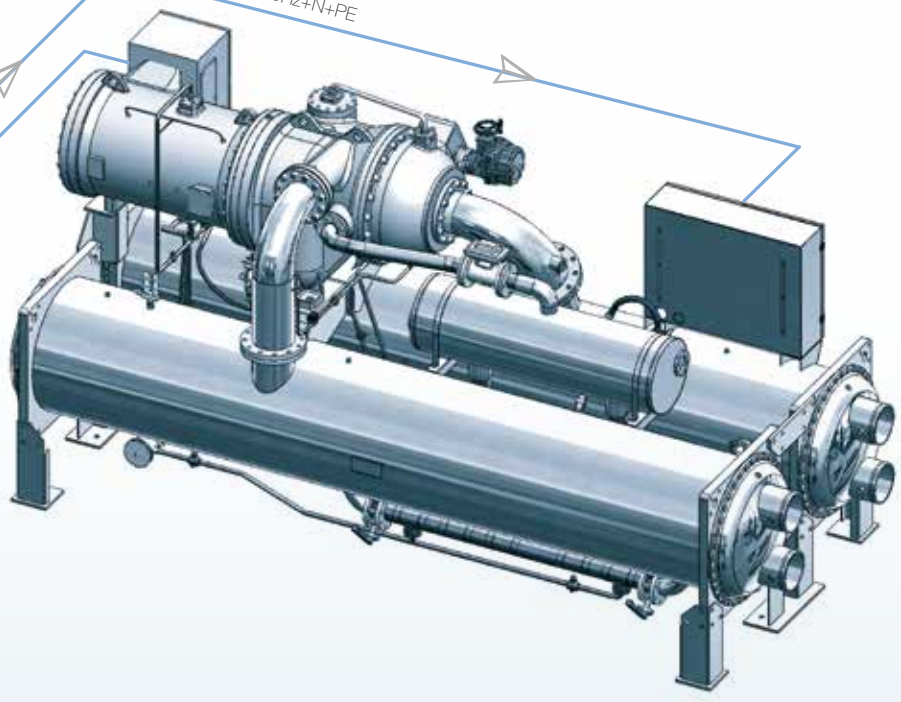
Typical Electric Installation



Starter cabinet dimension		
Length (mm)	Width (mm)	Height (mm)
850	600	2200

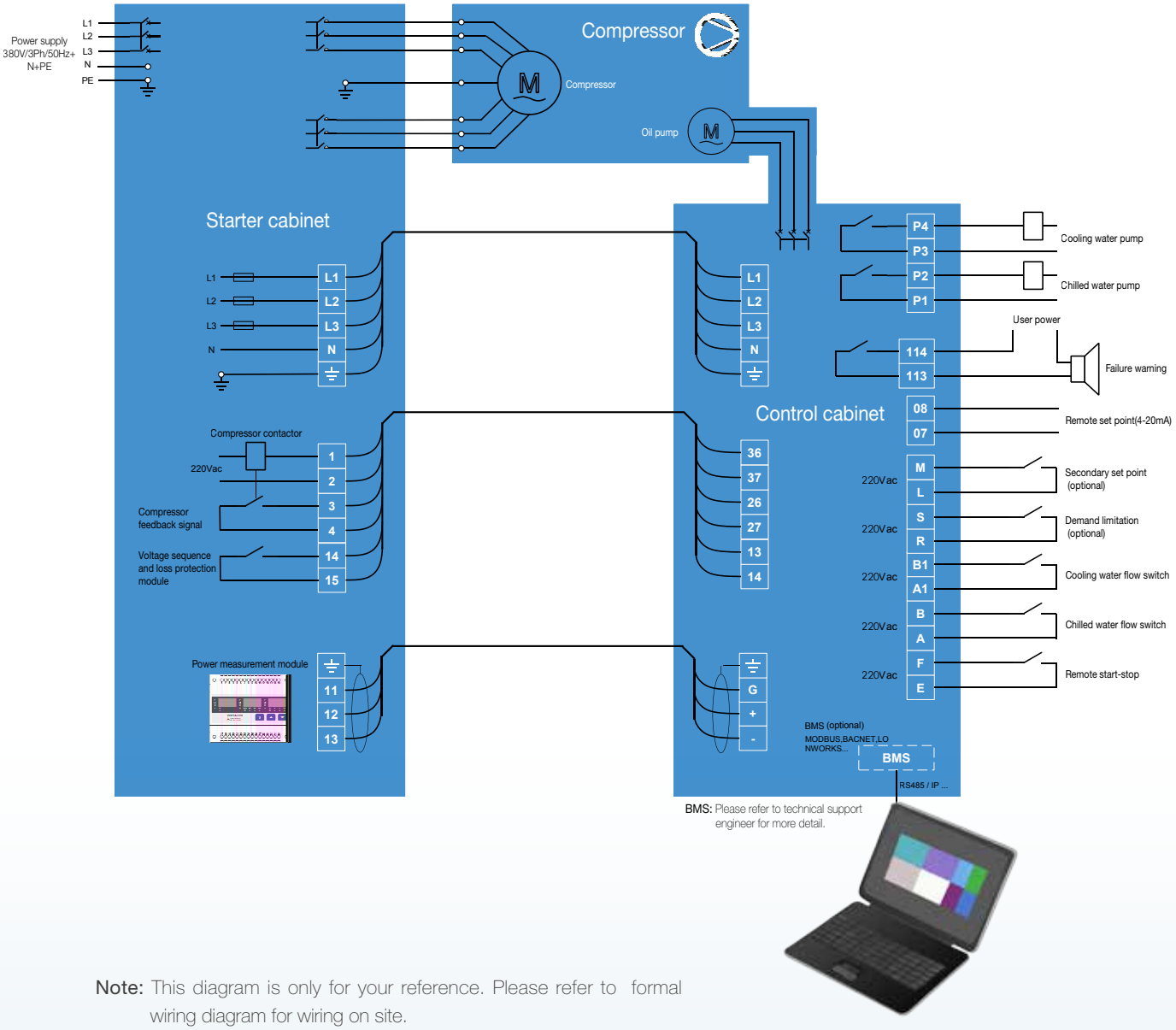


No.	Description	Cable
1	power supply	5wires (L1,L2,L3,N,PE)
2	Compressor motor power	4wires (L1,L2,L3,PE)
3	Control power	5wires (L1,L2,L3,N,PE)



Note: This diagram is only for your reference. Please refer to formal wiring diagram for wiring on site.

Starter Cabinet (Non-machine-carry Type) Wiring Diagram



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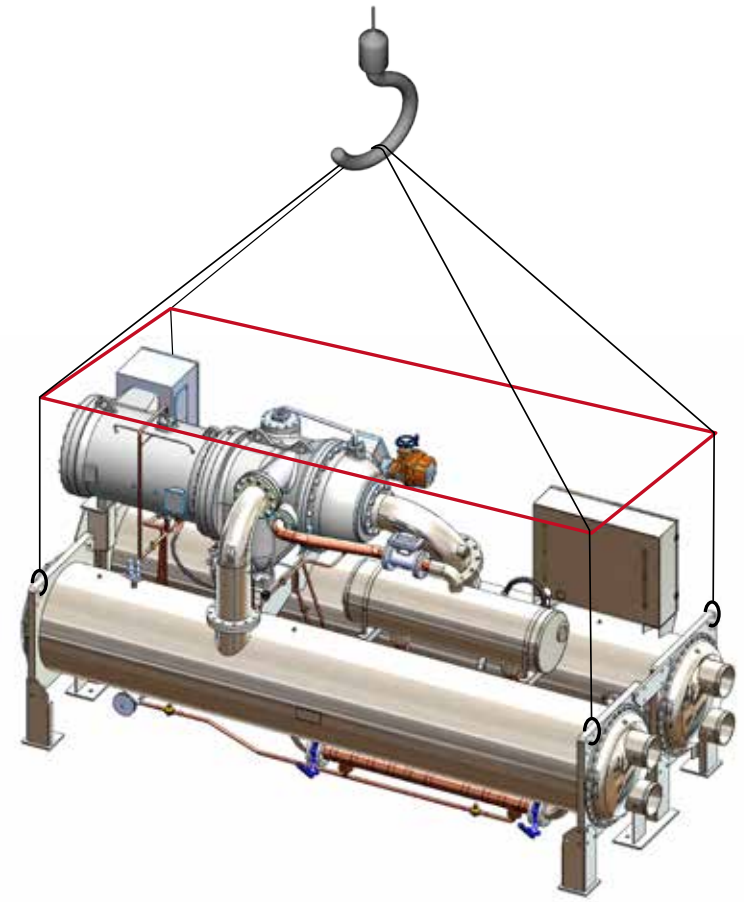
Installation Guide



- Water-cooled chiller should avoid closing to the fire and flammable. Please take care of heat radiation when adjacent to boiler.
- It is better to choose the space where the room temperature is under 45℃ and well ventilation.
- Choose the place of less dust.
- Field should be of good daylighting for better maintenance and inspection condition.
- There shall be a good drainage system around the unit and the entire room.
- It is recommended of unit to use steel tube to connect the safety valve port to the outside.
- In order to ensure safety and health of staff, installing oxygen detector in the room is recommended. Alert when oxygen is consumed or displaced to be less than 19.5% of oxygen content.
- Spring isolator device is optional, please consult local CLIMAVENETA office.

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