Water-cooled Centrifugal Chiller

1758-3516kW (500-1000RT)

CENTRIFUGAL

r HFC R-134a

AHRI CERTIFIED®
www.ahridirectory.org
Water-Cooled Water Chilling and Heat Pump Water-Heating Packages
AHRI Standards 550/590 and 551/591

CLIMAVENETA

WATER COOLED CENTRIFUGAL CHILLER

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.

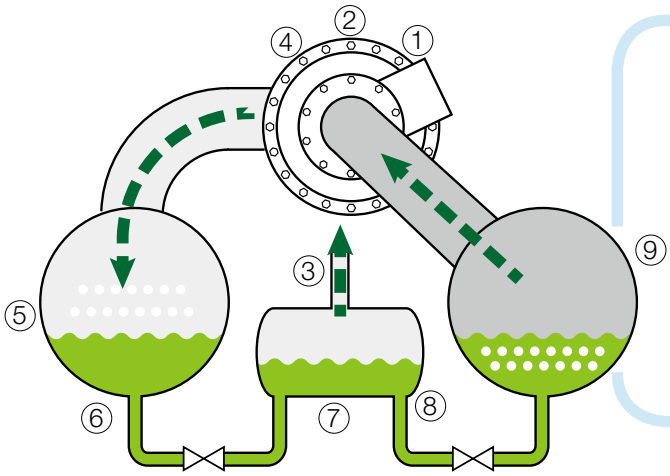
The unit, equipped with EXV and CLIMAVENETA patented throttle orifice-plate, coordinates with IGV to adjust the flow of refrigerant according to load changes and improves unit part load efficiency.

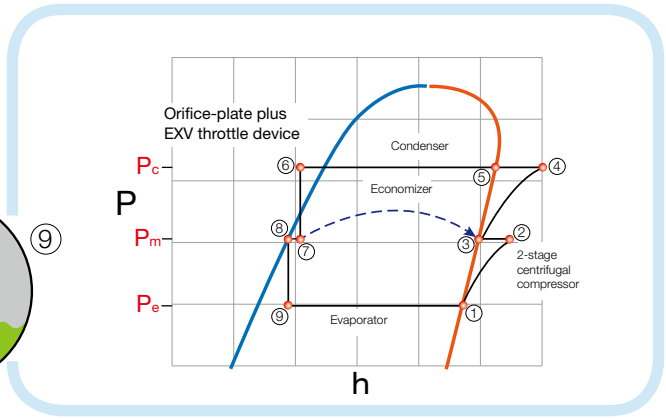
Advanced Design

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 default of 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

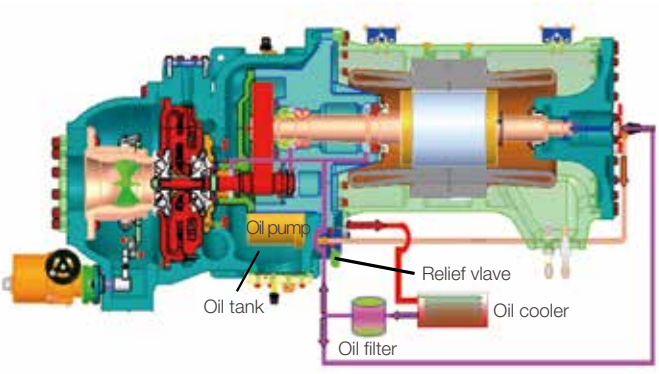
Two-stage Centrifugal Compressor

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.



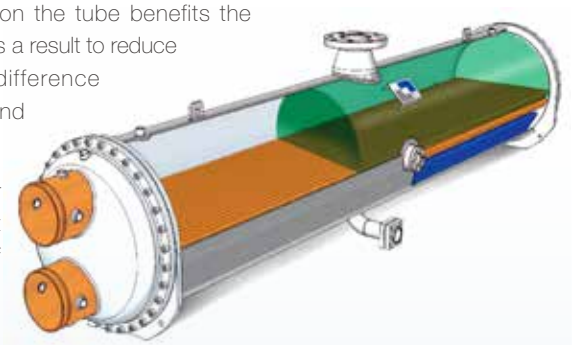
Two-stage centrifugal compressor section view

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.

WATER COOLED CENTRIFUGAL CHILLER

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 F1-INV-□

- **Power Supply:** Default: 380V/3Ph/50Hz
  -P3: 380V/3Ph/60Hz
- Default: Standard Unit; -INV: Inverter Driven
- F1: High Efficiency Type
- Nominal Cooling Capacity (RT)
- CCS Series Centrifugal Chiller

CCS 0600 F1-INV

High efficiency CCS series centrifugal chiller with nominal cooling capacity of 600RT, power supply of 380V, and inverter driven.

Selection Instruction

Evaporator Water Side Pressure: Standard of 1.0Mpa, with option of 1.6Mpa, 2.0Mpa, and other particular specifications.
Condenser Water Side Pressure: Standard of 1.0Mpa, with option of 1.6Mpa, 2.0Mpa, and other particular specifications.
Spring Isolator: With option of spring isolator for special application request.
Starting Cabinet: Standard of machine-carry type starting cabinet, with option of soft starter and inverter starter. Please consult with CLIMAVENETA office, if you have request of non-machine-carry type starting cabinet.

General Technical Data

Standard

CCS(-P3)		0500	0550	0600	0650	0700	0800	0850	0900	1000
Cooling Capacity	kW	1758.0	1934.0	2110.0	2286.0	2462.0	2814.0	3000.0	3164.0	3516.0
	RT	500	550	600	650	700	800	850	900	1000
Power input	kW	297.4	315.9	341.5	370.5	399.9	452.9	492.3	516.2	571.7
Full Load COP	kW/kW	5.91	6.12	6.18	6.17	6.16	6.21	6.09	6.13	6.15
Condenser										
Cooling Water Flow	m^3/h	339.3	371.5	405.0	438.5	472.7	539.3	576.7	607.7	675.0
Cooling Water Pressure Drop	kPa	24.9	29.8	29.8	29.5	28.9	29.8	26.6	29.6	42.3
Evaporator										
Chilled Water Flow	m^3/h	275.2	302.7	330.3	357.8	385.2	440.3	469.4	495.0	550.4
Chilled Water Pressure Drop	kPa	27.6	33.3	33.3	32.0	31.3	32.7	32.6	36.3	52.8
Controller		W3000 Touch								
HFC-134a Charged	kg	465	535	570	630	665	775	845	845	1000
Lubrication Oil	kg	38	38	38	38	38	57	57	57	57
Stepless Energy Regulation										
Energy Regulation		10%-100% Stepless Regulation								

Remarks:

1. Standard Cooling Condition: Chilled water (in/out)=12.2/6.7℃; Condenser water (in/out)=29.4/34.6℃;
2. The standard water side pressure of evaporator and condenser is 1.0MPa. and 2.0Mpa are as optional;
3. If soft start cabinet is needed, please consult with CLIMAVENETA local office;
4. CLIMAVENETA can provide tailored solutions for customers based on different capacity, working conditions and efficiency requirements. For more details, please consult with CLIMAVENETA local office.

General Technical Data

F1 Unit

CCS(-P3)		0500F1	0550F1	0600F1	0650F1	0700F1	0800F1	0900F1	1000F1
Cooling Capacity	kW	1758.0	1934.0	2110.0	2286.0	2462.0	2814.0	3164.0	3516.0
	RT	500	550	600	650	700	800	900	1000
Power input	kW	281.1	306.1	330.2	358.5	387.5	442.5	497.4	553.2
Full Load COP	kW/kW	6.25	6.32	6.39	6.38	6.35	6.36	6.36	6.36
Condenser									
Cooling Water Flow	m^3/h	336.7	370.1	403.2	436.7	470.5	537.8	604.8	672.1
Cooling Water Pressure Drop	kPa	20.6	21.0	21.1	19.5	17.8	23.2	34.0	47.8
Evaporator									
Chilled Water Flow	m^3/h	275.1	302.7	330.2	357.8	385.2	440.3	495.4	550.4
Chilled Water Pressure Drop	kPa	23.2	22.9	23.0	21.6	22.0	28.7	42.7	60.0
Controller		W3000 Touch							
HFC-134a Charged	kg	580	645	680	790	860	860	1000	1200
Lubrication Oil	kg	38	38	38	38	38	57	57	57
Stepless Energy Regulation									
Energy Regulation		10%-100% Stepless Regulation							

Remarks:

1. Standard Cooling Condition: Chilled water (in/out)=12.2/6.7℃; Condenser water (in/out)=29.4/34.6℃;
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General Technical Data

INV-Standard

CCS-INV(-P3)		0500	0550	0600	0650	0700	0800	0850	0900	1000
Cooling Capacity	kW	1758.0	1934.0	2110.0	2286.0	2462.0	2814.0	3000.0	3164.0	3516.0
	RT	500	550	600	650	700	800	850	900	1000
Power input	kW	291.8	317.6	345.1	375.7	405.6	457.4	496.4	519.7	579.9
Full Load COP	kW/kW	6.02	6.09	6.11	6.08	6.07	6.15	6.04	6.09	6.06
Condenser										
Cooling Water Flow	m^3/h	338.5	371.9	405.4	439.6	473.4	540	577.1	608.0	676.1
Cooling Water Pressure Drop	kPa	24.8	30.0	29.9	29.6	29.1	29.9	26.8	29.6	42.5
Evaporator										
Chilled Water Flow	m^3/h	275.2	302.7	330.3	357.8	385.2	440.3	469.4	495.0	550.1
Chilled Water Pressure Drop	kPa	27.6	33.4	33.4	32.0	31.3	32.8	32.7	36.3	52.8
Controller		W3000 Touch								
HFC-134a Charged	kg	465	535	570	630	665	775	845	845	1000
Lubrication Oil	kg	38	38	38	38	38	57	57	57	57
Stepless Energy Regulation										
Energy Regulation		10%-100% Stepless Regulation								

Remarks:

1. Standard Cooling Condition: Chilled water (in/out)=12.2/6.7℃; Condenser water (in/out)=29.4/34.6℃;
2. The standard water side pressure of evaporator and condenser is 1.0MPa. 1.6Mpa and 2.0Mpa are as optional;
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General Technical Data

INV-F1 Unit

CCS-INV(-P3)		0500F1	0550F1	0600F1	0650F1	0700F1	0800F1	0900F1	1000F1
Cooling Capacity	kW	1758.0	1934.0	2110.0	2286.0	2462.0	2814.0	3164.0	3516.0
	RT	500	550	600	650	700	800	900	1000
Power input	kW	281.7	308.3	334.3	364.0	393.3	447.4	502.1	558.7
Full Load COP	kW/kW	6.24	6.27	6.31	6.28	6.26	6.29	6.30	6.29
Condenser									
Cooling Water Flow	m^3/h	336.7	370.4	403.6	437.8	471.6	538.6	605.5	672.8
Cooling Water Pressure Drop	kPa	20.6	21.1	21.1	19.6	17.9	23.3	34.1	47.9
Evaporator									
Chilled Water Flow	m^3/h	336.9	302.7	330.2	357.8	385.2	440.3	495.0	550.4
Chilled Water Pressure Drop	kPa	20.6	22.9	23.0	21.6	22.0	28.8	42.7	60.1
Controller		W3000 Touch							
HFC-134a Charged	kg	580	645	680	790	860	860	1000	1200
Lubrication Oil	kg	38	38	38	38	38	57	57	57
Stepless Energy Regulation									
Energy Regulation		10%-100% Stepless Regulation							

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3. CLIMAVENETA can provide tailored solutions for customers based on different capacity, working conditions and efficiency requirements. For more details, please consult with CLIMAVENETA local office.

Electrical Data

CCS	FLI	FLA	SA		Recommended Cable Current
			3Default (380V/3Ph+N/50Hz)	-P3 (380V/3Ph/60Hz)	
	[kW]	[A]	[A]	[A]	[A]
500	332	580	1107	1150	684
550	366	640	1107	1150	727
600	400	700	1107	1150	798
650	435	760	1107	1150	866
700	435	760	1107	1150	934
800	526	920	1560	1555	1059
900	560	980	1828	1822	1135
1000	620	1080	1980	2002	1135
850	560	980	1828	1822	1220
0500F1	332	580	1107	1150	684
0550F1	366	640	1107	1150	727
0600F1	400	700	1107	1150	798
0650F1	435	760	1107	1150	866
0700F1	435	760	1107	1150	934
0800F1	526	920	1560	1555	1059
0900F1	560	980	1828	1822	1135
1000F1	620	1080	1980	2002	1220

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 with local CLIMAVENETA office.

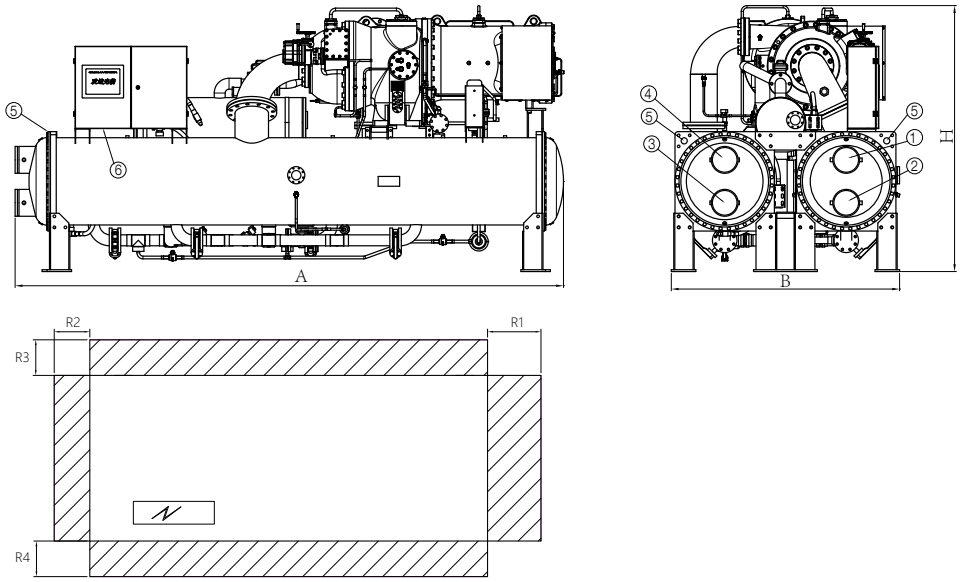
Electrical Data

CCS-INV(-P3)	FLI [kW]	FLA [A]	SA [A]	Recommended Cable [A]
500	332	580	580	684
550	366	640	640	727
600	400	700	700	798
650	435	760	760	866
700	435	760	760	934
800	526	920	920	1059
850	560	980	980	1135
900	560	980	980	1135
1000	620	1080	1080	1220
0500F1	332	580	580	684
0550F1	366	640	640	727
0600F1	400	700	700	798
0650F1	435	760	760	866
0700F1	435	760	760	934
0800F1	526	920	920	1059
0900F1	560	980	980	1135
1000F1	620	1080	1080	1220

Remarks:

1. F.L.I. Full load power absorption, F.L.A. Full load current, S.A. starting current;
2. Voltage: 380V/3Ph+N/50Hz, 380V/3Ph/60Hz;
3. For other power supply voltage requirement, please consult with local CLIMAVENETA office.

Dimension Drawing

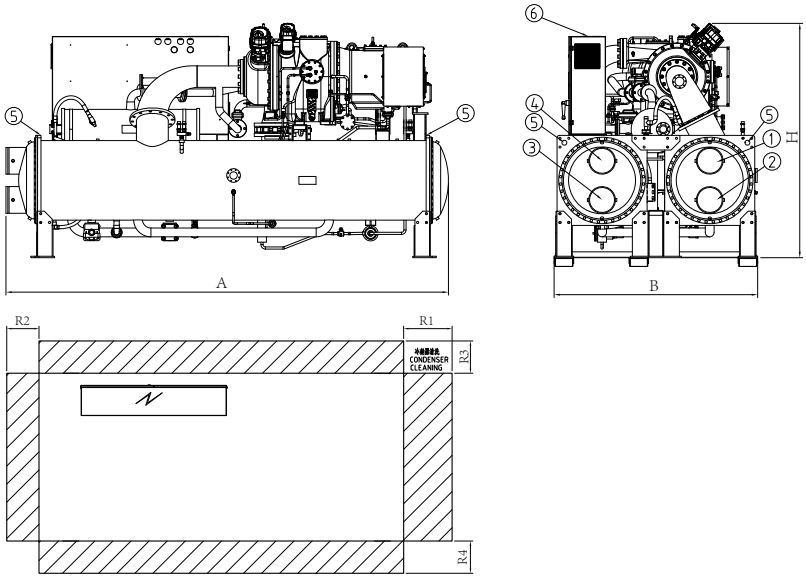


1. ①Chilled water inlet ②Chilled water outlet ③Cooling water inlet ④Cooling water outlet ⑤Lifting points ⑥Power inlet
2. Shadows are the maintenance clearance and pipe connector area.
3. Facing control screen, water pipe connection in left side is A direction, in right side B direction.
4. For detail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

CCS (-INV) (-P3)	Dimension			Weight		Pipe size		Maintenance clearance				
	A(mm)	B(mm)	H(mm)	Lifting Weight (kg)	Operating Weight (kg)	①/②	③/④	R1(mm)	R2(mm)	R3(mm)	R4(mm)	R5(mm)
0500	4470	1860	2240	8370	9430	8"	8"	4000	1000	900	900	1200
0550	4470	1860	2240	8790	9840	8"	8"	4000	1000	900	900	1200
0600	4470	1860	2240	8900	10050	8"	8"	4000	1000	900	900	1200
0650	4520	1910	2280	9340	10610	10"	10"	4000	1000	900	900	1200
0700	4520	1910	2280	9460	10830	10"	10"	4000	1000	900	900	1200
0800	4520	2080	2580	11320	12810	10"	10"	4000	1000	900	900	1200
0850	4520	2080	2580	11390	13080	10"	10"	4000	1000	900	900	1200
0900	4520	2080	2580	11390	13190	10"	10"	4000	1000	900	900	1200
1000	5500	2080	2580	13520	15560	10"	10"	4850	1000	900	900	1200
0500F1	4470	1860	2240	8910	10130	8"	8"	4000	1000	900	900	1200
0550F1	4520	1910	2280	9350	10630	10"	10"	4000	1000	900	900	1200
0600F1	4520	1910	2280	9470	10850	10"	10"	4000	1000	900	900	1200
0650F1	4520	2080	2420	10300	11850	10"	10"	4000	1000	900	900	1200
0700F1	4520	2080	2420	10370	12070	10"	10"	4000	1000	900	900	1200
0800F1	4520	2080	2580	11400	13090	10"	10"	4000	1000	900	900	1200
0900F1	5500	2080	2580	13370	15410	10"	10"	4850	1000	900	900	1200
1000F1	6200	2080	2580	14720	17360	10"	10"	5650	1000	900	900	1200

WATER COOLED CENTRIFUGAL CHILLER

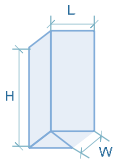
Dimension Drawing



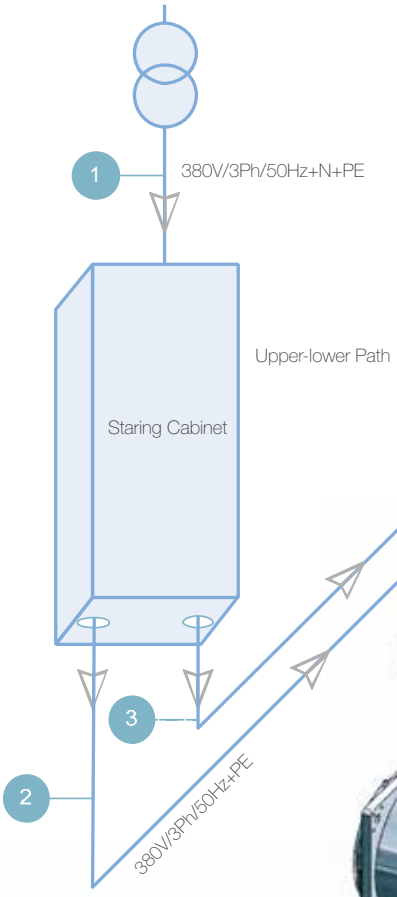
1. ①Chilled water inlet ②Chilled water outlet ③Cooling water inlet ④Cooling water outlet ⑤Lifting points ⑥Power inlet
2. Shadows are the maintenance clearance and pipe connector area.
3. Facing control screen, water pipe connection in left side is A direction, in right side B direction.
4. For detail drawing, please consult CLIMAVENETA local office.
5. R5 indicates the minimum maintenance space between roof and the unit top.
6. Above drawing is only available for CCS series unit with machine carry type starting cabinet. Machine carry type starting cabinet demand for INVERTER series, please consult CLIMAVENETA local office.

CCS (-P3)	Dimension			Weight		Pipe size		Maintenance clearance				
	A(mm)	B(mm)	H(mm)	Lifting Weight (kg)	Operating Weight (kg)	①/②	③/④	R1(mm)	R2(mm)	R3(mm)	R4(mm)	R5(mm)
0500	4470	1860	2240	8670	9730	8"	8"	4000	1000	900	900	1200
0550	4470	1860	2240	9090	10140	8"	8"	4000	1000	900	900	1200
0600	4470	1860	2240	9200	10350	8"	8"	4000	1000	900	900	1200
0650	4520	1910	2280	9640	10910	10"	10"	4000	1000	900	900	1200
0700	4520	1910	2280	9760	11130	10"	10"	4000	1000	900	900	1200
0800	4520	2080	2580	11620	13110	10"	10"	4000	1000	900	900	1200
0850	4520	2080	2580	11690	13380	10"	10"	4000	1000	900	900	1200
0900	4520	2080	2580	11800	13490	10"	10"	4000	1000	900	900	1200
1000	5500	2080	2580	13820	15860	10"	10"	4850	1000	900	900	1200
0500F1	4470	1860	2240	9210	10430	8"	8"	4000	1000	900	900	1200
0550F1	4520	1910	2280	9650	10930	10"	10"	4000	1000	900	900	1200
0600F1	4520	1910	2280	9770	11150	10"	10"	4000	1000	900	900	1200
0650F1	4520	2080	2420	10600	12150	10"	10"	4000	1000	900	900	1200
0700F1	4520	2080	2420	10670	12370	10"	10"	4000	1000	900	900	1200
0800F1	4520	2080	2580	11700	13390	10"	10"	4000	1000	900	900	1200
0900F1	5500	2080	2580	13670	15710	10"	10"	4850	1000	900	900	1200
1000F1	6200	2080	2580	15020	17660	10"	10"	5650	1000	900	900	1200

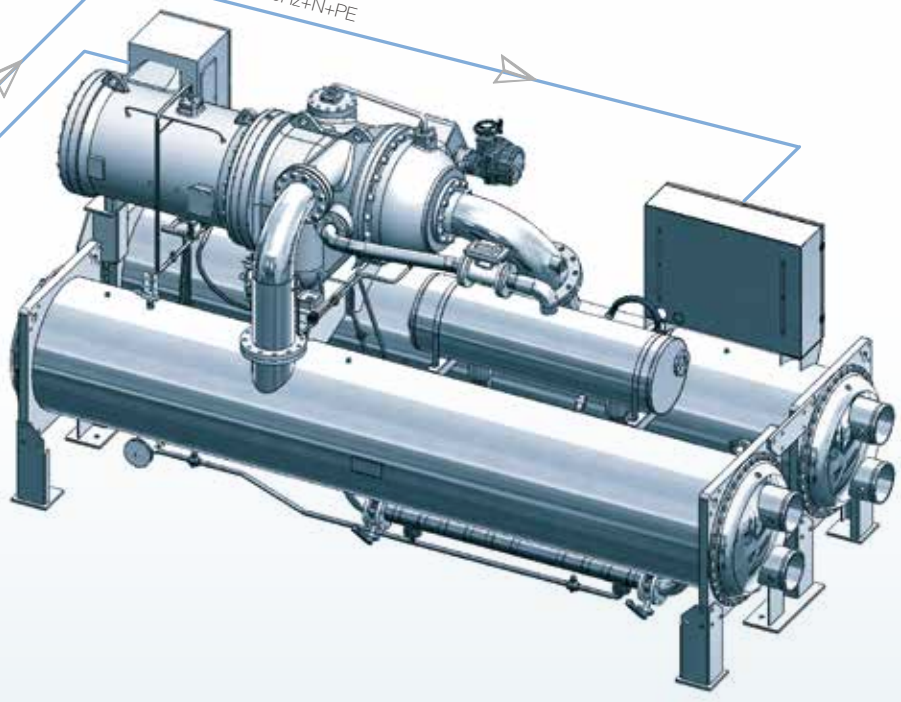
Electrical Installation



Starting Cabinet Dimension		
Length (mm)	Width (mm)	Height (mm)
850	600	2200



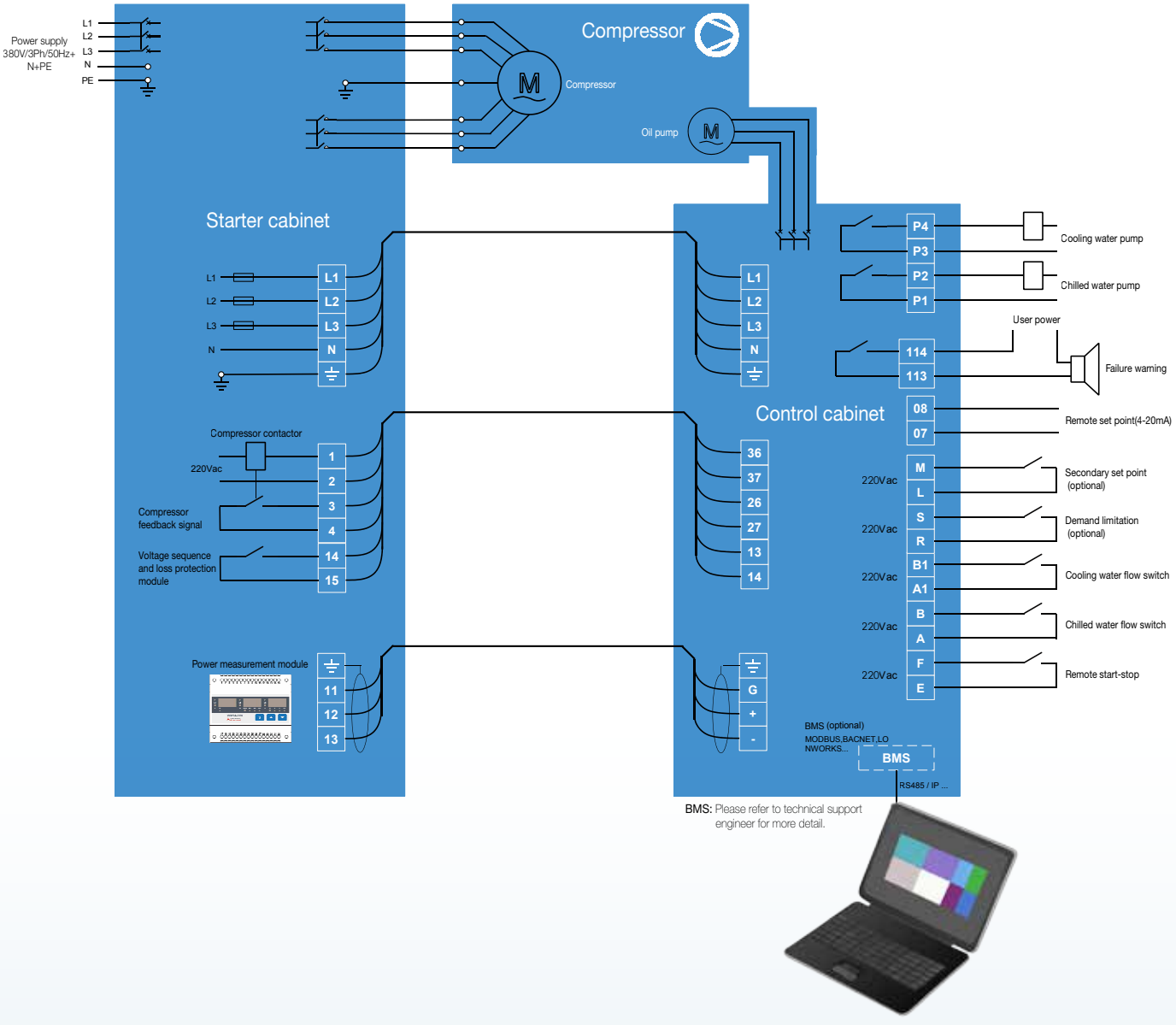
No.	Description	Cable
1	Power Supply	5Wires (L1,L2,L3,N,PE)
2	Compressor Motor Power	4Wires (L1,L2,L3,PE)
3	Control Power	5Wires (L1,L2,L3,N,PE)



Remarks:

1. Above diagram is for the wiring instruction of the unit with non-machine-carry type starting cabinet.
2. This diagram is only for your reference. Please consult with CLIMAVENETA office before wiring on site.

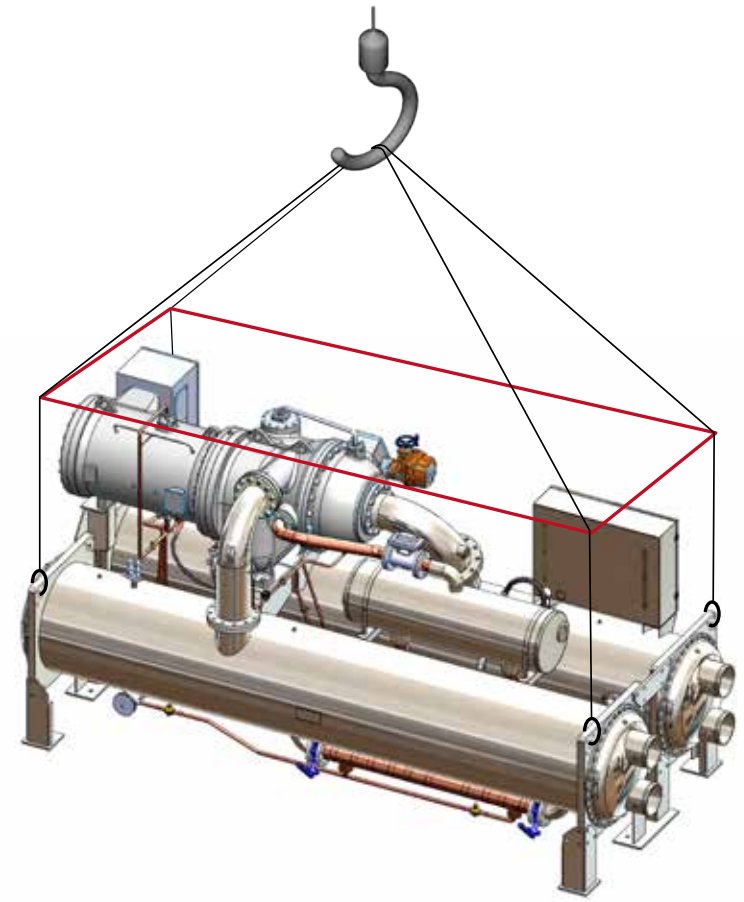
Starting Cabinet Wiring Diagram



Remarks:

1. Above diagram is for the wiring instruction of the unit with non-machine-carry type starting cabinet.
2. This diagram is only for your reference. Please consult with CLIMAVENETA office before wiring on site.

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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