



ECOW-F Series

Oil-free Water Cooled Chiller





Ecolite Cooling Technologies Co., Ltd. was originally incorporated in Hong Kong as a consulting company providing energy savings solutions for efficient energy management. Now Ecolite has made a business breakthrough from green solutions to green products supplier. With world leading technology and guaranteed energy-saving policy, Ecolite Cooling provides incomparable energy-efficient and zero-emission HVAC&R products to the world market since its creation in 2016.

Ecolite Cooling is technically supported and authorized by Danfoss and has become the recognized OEM Partner of Turbocor Danfoss. We have production base in Guangzhou , China. All products supplied are made based on proven technologies from the U.S. and are AHRI Certified. Ecolite green HVAC&R products can be used in a wide range of applications in large high-rise commercial buildings, factories, plazas, metros and various industrial refrigeration fields.

OIL-free Centrifugal Compressor

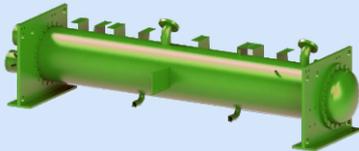
Oil-free compressors are the state-of-the-art compressors utilizing magnetic bearings as core components based on the principle of magnetic repulsion. The inner and outer parts of the bearing are designed to be homo-polar to prevent physical contact with each other. Motor driveshaft and centrifugal impellers are held up by the magnetic bearing and levitated without any immediate contact and are mechanically frictionless. In practical operation, there will be only air friction between the shaft and bearings. Air friction loss is only 2% of mechanical friction loss, which greatly reduces friction and noise as well as associated efficiency loss, vibration, etc.



Speed of an oil-free compressor can reach 18,000 ~ 48,000 RPM, comparing to the 8,000 RPM of a traditional compressor. Impellers are smaller in radius, which is only 5~8cm due to the high speed of the rotating shaft and is space-saving that the compressor can fit into modular chiller to make up a modular system with a single compressor and a plate heat exchanger. This design reduces chiller footprint significantly. Additionally, the oil-free system runs without oil pumps and oil supply system and thus eliminates adverse effects of lubricating oil on heat transfer efficiency of the heat exchangers. In a conventional compressor, only 96.5% oil can be separated from the refrigerant. The remaining 3.5% will result in at least 8% capacity loss. To make things worse, 90% compressors burn-out are caused by oil failure. In comparison, the oil-free compressor comes with dedicated internal motor cooling circuit to prevent from motor burn-out for long running or any loss caused by high temperature.

Main Components

HIGH EFFICIENCY FLOODED SHELL-TUBE HEAT EXCHANGERS



- Evaporator and condenser are built in shell and tube structure with refrigerant flowing outside the tubes and water inside.
- Wieland copper tubes, which feature stable quality and easy maintenance, are utilized to offer high efficiency of heat transfer.
- High efficiency flooded shell-tube heat exchangers and wide adjustable range of water flow rates are ideal for IT rooms.

Water flow rate ranges from 30% to 100%, perfectly matching the oil-free compressor.

HIGH PERFORMANCE PLATE HEAT EXCHANGER ECONOMIZER



- Stainless steel plates to ensure corrosion resistance
 - High turbulence to slow down the formation of fouling
 - Dedicated design for oil-free system to improve chiller efficiency
- High performance plate heat exchanger economizer that fits perfectly with the oil-free compressors is specially designed to increase sub-cooling and improve efficiency of the chiller.

CAREL ELECTRONIC EXPANSION VALVE (EXV)



- Accurate refrigerant metering based on compressor speed and load demand
- CAREL electronic expansion valve together with CAREL EVD series intelligent controller

Accurate and stable EXV control perfectly fits with oil-free compressor.

SMART CONTROLS

A powerful intelligent control system is used. The heart of the controller is a dedicated HVAC programmable logic control panel pCO⁵⁺ with patented chip and ASIC technologies to ensure flexibility of the control system. LCD touch screen panel is designed to provide operator, technical personnel and servicemen with real-time running information of the chiller, faults, load history, run log, historical data, etc.

Temperature Control

The control system compares the entering and leaving water temperature with its setpoint value to compute the capacity required and determine the compressor load. Variable speed drive will adjust capacity of the chiller based on the calculated value to make sure water temperature is confined to setpoint.

Compressor Balance and ON/OFF Limitations

The control system accumulates running hours of each compressor and hence establishes a working sequence to ensure each compressor runs for similar hours.

Minimum non-running hours, minimum running hours, re-start times limit and other settings allow the control of the compressor start and stop frequency, which can improve its life span.

Safeties

Control system monitors system faults and compressor faults. In the event of a compressor fault, the controller will shut off the faulty compressor. In the case of a system fault, the controller will shut off all compressors of the chiller.

Model Designation

<u>EC</u>	<u>O</u>	<u>W</u>	<u>125</u>	<u>F</u>
1	2	3	4	5

1: Ecolite

2: Oil-free Compressor

3: Water-cooled

4: Module Nominal Capacity (RT)

5: Flooded

Model

ECOW125F/ ECOW150F/ ECOW200F

ECOW250/ECOW300F/ECOW400F

ECOW450F/ECOW600F/ ECOW750F

ECOW800F/ECOW900F/ECOW1000F

ECOW1200F

Capacity: 120-1200RT (422-4220KW)

Technical Data

Model		Unit	ECOW125F	ECOW150F	ECOW200F	ECOW250F
Nominal Cooling Capacity		kW	422.0	510.0	685.8	861.7
Maximum Cooling Capacity		kW	475.0	555.0	736.0	948.0
Nominal Power		kW	72.2	86.0	112.7	152.8
COP		W/W	5.84	5.93	6.09	5.64
IPLV		W/W	9.85	10.30	10.36	9.87
Control System			Alpha Lite			
Dimensions	Length	mm	2,600	2,600	2,600	3,710
	Width	mm	980	980	1,085	980
	Height	mm	2,000	2,000	2,100	2,060
Estimated shipping weight		kg	2,170	2,470	2,920	4,330
Estimated operating weight		kg	2,320	2,620	3,120	4,730
Compressor Type			Magnetic Levitation Oil-free Centrifugal			
Compressor Number		Set	1	1	1	2
Capacity Control		%	30 ~ 100	30 ~ 100	30 ~ 100	15 ~ 100
Power Supply			380V-50Hz-3Ph (Other Power for optional)			
Refrigerant Type			R134a			
Refrigerant Charge			126	171	196	252
Evaporator	Type		Shell and Tube (Flooded Type)			
	CHW Flow Rate	m ³ /h	72.6	87.7	117.9	148.2
	Water Pressure Drop	kPa	98.2	92.4	90.2	60
	Fouling Factor	m ² *K/kW	0.018	0.018	0.018	0.018
	Max.Working Pressure (water)	MPa	1.0	1.0	1.0	1.0
	Connection Size		DN150	DN150	DN150	DN200
Condenser	Type		Shell and Tube (Flooded Type)			
	CW Flow Rate	m ³ /h	85	102.5	137.3	174.5
	Water Pressure Drop	kPa	65.1	64.6	76.7	50
	Fouling Factor	m ² *K/kW	0.044	0.044	0.044	0.044
	Max.Working Pressure (water)	MPa	1.0	1.0	1.0	1.0
	Connection Size		DN150	DN150	DN150	DN200

Notes:

- The nominal capacity is based on the following conditions
 Leaving/Entering Chilled Water Temp:7.0/12.0°C
 Leaving/Entering Cooling Water Temp:35.0/30.0°C
- Specifications in this sheet are subject to change without notice.

Technical Data

Model		Unit	ECOW300F	ECOW400F	ECOW450F	ECOW600F
Nominal Cooling Capacity		kW	1037.5	1364.6	1535.2	2046.9
Maximum Cooling Capacity		kW	1109.0	1468.0	1667.0	2225.0
Nominal Power		kW	177.2	224.9	259.5	345.2
COP		W/W	5.86	6.07	5.92	5.93
IPLV		W/W	10.48	10.66	10.45	10.54
Control System			Alpha Lite			
Dimensions	Length	mm	4,305	4,305	4,355	4,380
	Width	mm	980	1,085	1,915	2,025
	Height	mm	2,060	2,150	2,000	2,170
Estimated shipping weight		kg	4,930	5,330	6,840	9,140
Estimated operating weight		kg	5,330	5,830	7,550	9,950
Compressor Type			Magnetic Levitation Oil-free Centrifugal			
Compressor Number		Set	2	2	3	4
Capacity Control		%	15 ~ 100	15 ~ 100	10 ~ 100	7.5 ~ 100
Power Supply			380V-50Hz-3Ph (Other Power for optional)			
Refrigerant Type			R134a			
Refrigerant Charge			315	375	433	680
Evaporator	Type		Shell and Tube (Flooded Type)			
	CHW Flow Rate	m ³ /h	178.4	234.7	264.0	352
	Water Pressure Drop	kPa	79.2	77.3	71	72.2
	Fouling Factor	m ² *K/kW	0.018	0.018	0.018	0.018
	Max.Working Pressure (water)	MPa	1.0	1.0	1.0	1.0
	Connection Size		DN200	DN200	DN200	DN250
Condenser	Type		Shell and Tube (Flooded Type)			
	CW Flow Rate	m ³ /h	208.9	273.3	308.6	411.3
	Water Pressure Drop	kPa	54.9	65	53.4	50.9
	Fouling Factor	m ² *K/kW	0.044	0.044	0.044	0.044
	Max.Working Pressure (water)	MPa	1.0	1.0	1.0	1.0
	Connection Size		DN200	DN200	DN200	DN250

Notes:

- The nominal capacity is based on the following conditions
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 Leaving/Entering Cooling Water Temp:35.0/30.0°C
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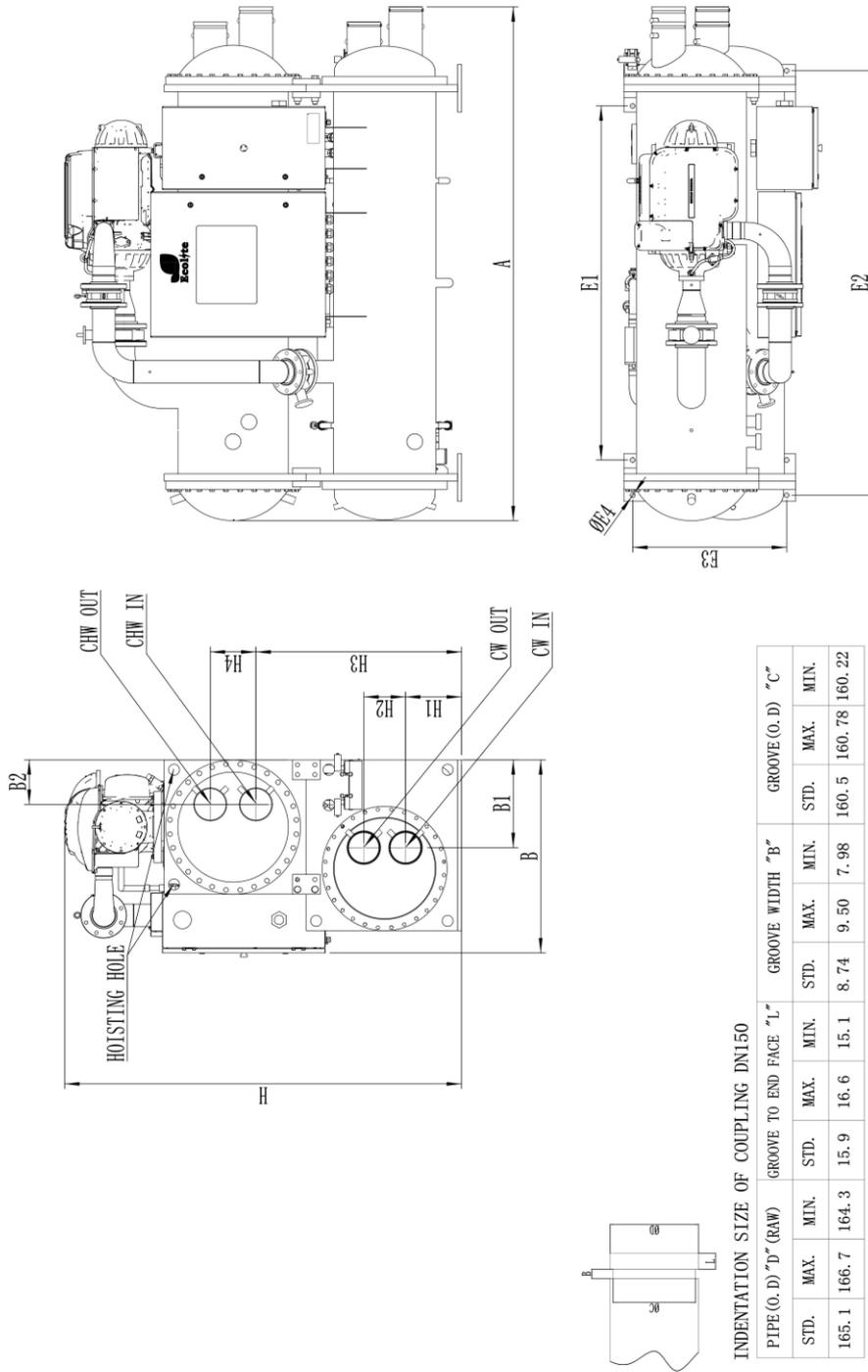
Technical Data

Model		Unit	ECOW750F	ECOW800F	ECOW900F	ECOW1000F	ECOW1200F
Nominal Cooling Capacity		kW	2558.6	2729.2	3070.3	3411.5	4093.8
Maximum Cooling Capacity		kW	2781.0	2949.0	3354.0	3684.0	4438.0
Nominal Power		kW	431.5	446.8	513.5	559.4	667.3
COP		W/W	5.93	6.11	5.98	6.10	6.14
IPLV		W/W	10.52	10.73	10.60	10.71	10.82
Control System			Alpha Lite				
Dimensions	Length	mm	4,365	4,435	4,935	4,460	4,960
	Width	mm	2,385	2,330	2,330	2,440	2,490
	Height	mm	2,180	2,210	2,230	2,230	2,230
Estimated shipping weight		kg	10,290	11,050	12,550	13,100	14,550
Estimated operating weight		kg	11,550	12,350	14,050	14,800	16,050
Compressor Type			Magnetic Levitation Oil-free Centrifugal				
Compressor Number		Set	5	4	6	5	6
Capacity Control		%	6~ 100	7.5 ~ 100	5 ~ 100	6 ~ 100	5 ~ 100
Power Supply			380V-50Hz-3Ph (Other Power for optional)				
Refrigerant Type			R134a				
Refrigerant Charge			775	875	980	1,050	1,165
Evaporator	Type		Shell and Tube (Flooded Type)				
	CHW Flow Rate	m ³ /h	440	469.3	528	586.6	704
	Water Pressure Drop	kPa	64.5	64.5	88.9	72	93.4
	Fouling Factor	m ² *K/kW	0.018	0.018	0.018	0.018	0.018
	Max.Working Pressure (water side)	MPa	1.0	1.0	1.0	1.0	1.0
	Connection Size		DN300	DN300	DN300	DN300	DN300
Condenser	Type		Shell and Tube (Flooded Type)				
	CW Flow Rate	m ³ /h	514.2	546.1	616.3	682.8	818.7
	Water Pressure Drop	kPa	49.8	44.3	61	52.8	73.2
	Fouling Factor	m ² *K/kW	0.044	0.044	0.044	0.044	0.044
	Max.Working Pressure (water)	MPa	1.0	1.0	1.0	1.0	1.0
	Connection Size		DN300	DN300	DN300	DN350	DN350

Notes:

- The nominal capacity is based on the following conditions
 Leaving/Entering Chilled Water Temp:7.0/12.0°C
 Leaving/Entering Cooling Water Temp:35.0/30.0°C
- Specifications in this sheet are subject to change without notice.

Physical Dimensions

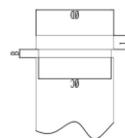
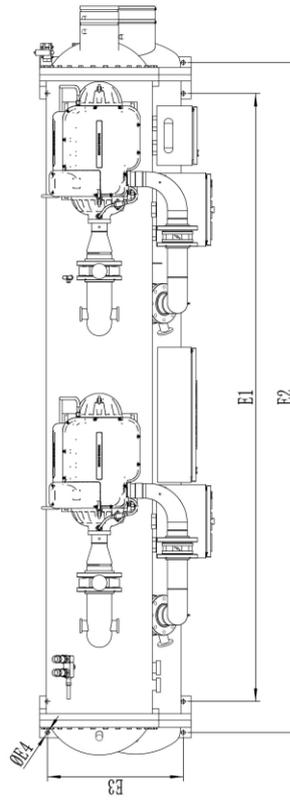
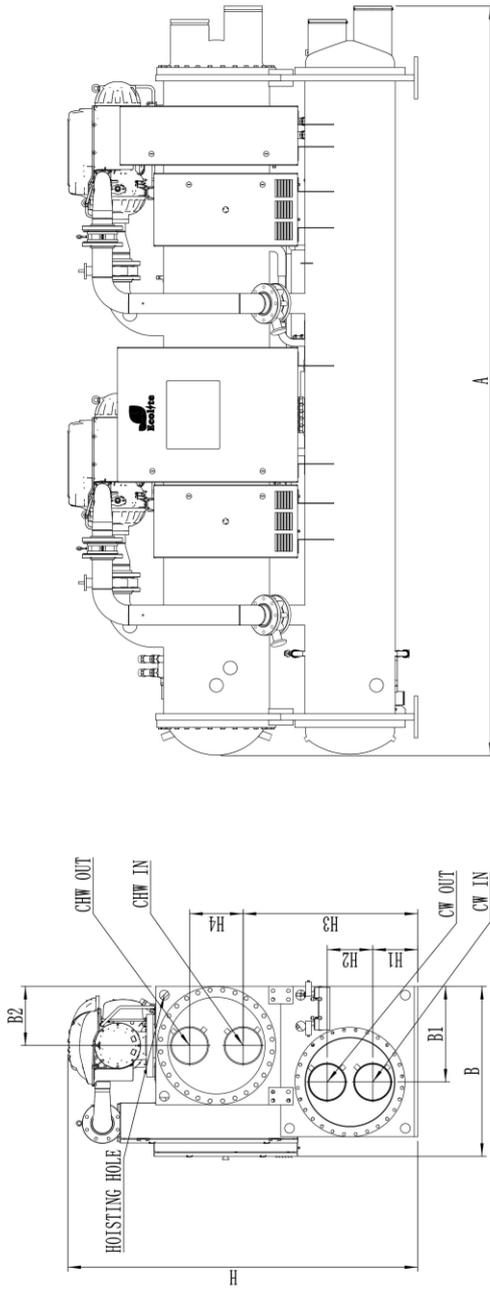


INDENTATION SIZE OF COUPLING DN150

STD.	PIPE (O.D) "D" (RAW)			GROOVE TO END FACE "L"			GROOVE WIDTH "B"			GROOVE (O.D) "C"		
	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.
165.1	166.7	164.3	15.9	15.1	8.74	9.50	7.98	160.5	160.78	160.22		

MODEL	LENGTH WIDTH HEIGHT		MOUNTING FOOT SIZE (mm)						HEADER POSITIONING SIZE (mm)						CONNECTION SIZE	WEIGHT (kg)
	A (mm)	B (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3	H4	B1	B2			
ECOW125F	2600	980	2000	1790	2146	775	25	272	230	1035	230	444	225	DN150	2170	
ECOW150F	2600	980	2000	1790	2146	775	25	272	230	1035	230	444	225	DN150	2470	
ECOW200F	2600	1085	2100	1790	2146	905	25	292	240	1105	240	549	250	DN150	2920	

Physical Dimensions

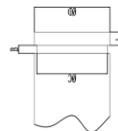
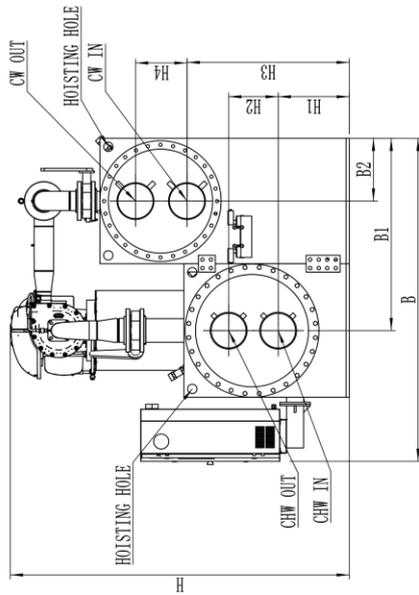
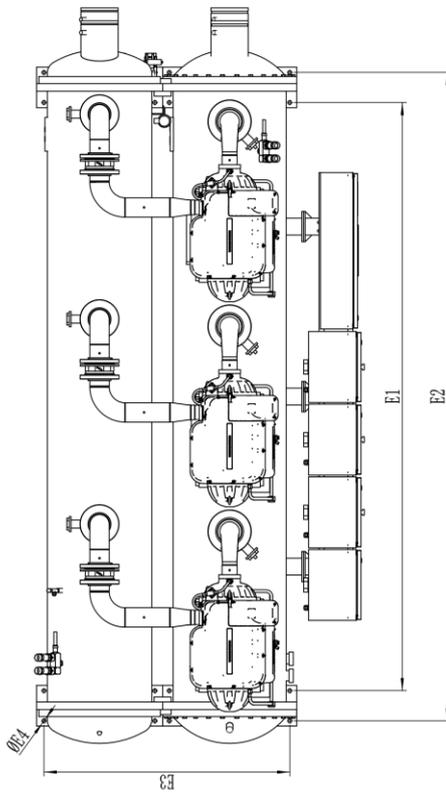
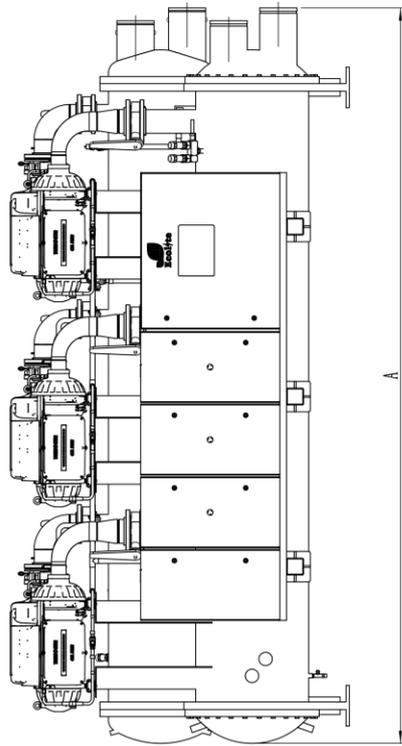


INDENTATION SIZE OF COUPLING DN200

PIPE (O.D) "D" (mm)	GROOVE TO END FACE "L"		GROOVE WIDTH "B"		GROOVE (O.D) "C"						
	MIN.	MAX.	MIN.	MAX.	STD.	MIN.					
219.1	220.7	218.3	19.1	19.8	18.3	11.91	12.67	11.15	213.3	213.70	212.98

MODEL	LENGTH WIDTH HEIGHT		MOUNTING FOOT SIZE (mm)				HEADER POSITIONING SIZE (mm)				CONNECTION SIZE	WEIGHT (kg)			
	A (mm)	B (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3			H4	B1	B2
ECCW250F	3710	980	2060	2896	3252	775	25	252	270	997	306	549	340	DN200	4330
ECCW300F	4305	980	2060	3490	3846	775	25	252	270	997	306	549	340	DN200	4930
ECCW400F	4305	1085	2150	3490	3846	905	25	287	290	1072	306	654	365	DN200	5330

Physical Dimensions

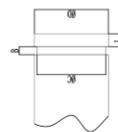
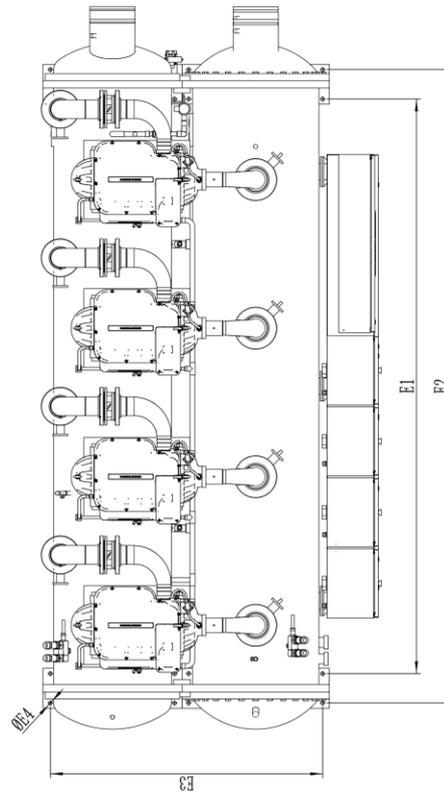
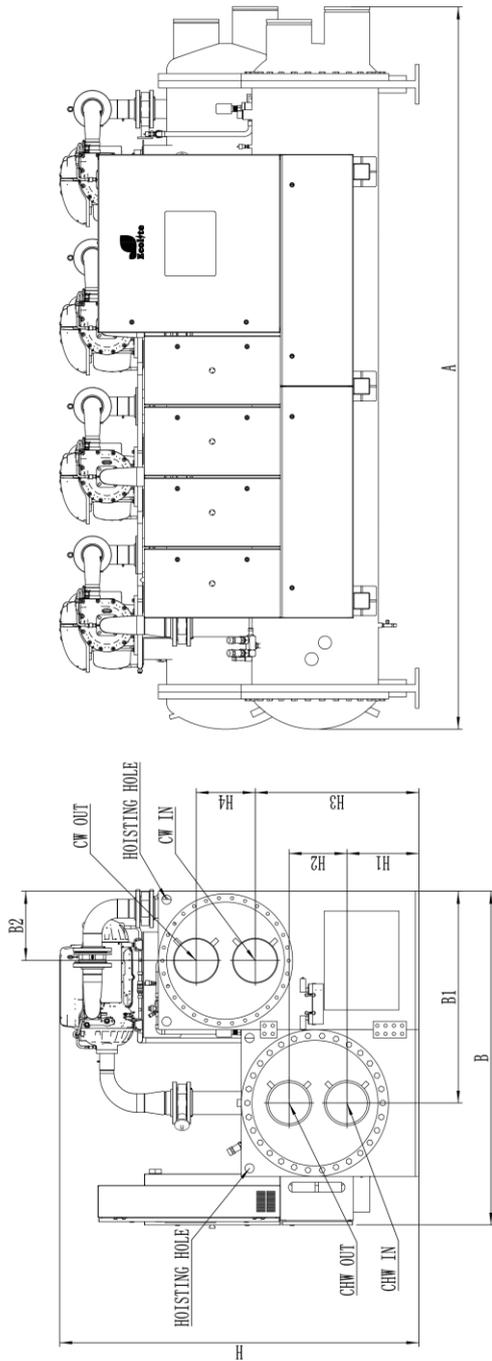


INDENTATION SIZE OF COUPLING DN200

PIPE (O.D.) "D" (mm)	GROOVE TO END FACE "L"		GROOVE WIDTH "B"		GROOVE (O.D.) "C"						
	STD.	MAX. MIN.	STD.	MAX. MIN.	STD.	MAX. MIN.					
219.1	220.7	218.3	19.1	19.8	18.3	11.91	12.67	11.15	213.3	213.70	212.98

MODEL	LENGTH WIDTH HEIGHT		MOUNTING FOOT SIZE (mm)				HEADER POSITIONING SIZE (mm)				CONNECTION SIZE	WEIGHT (kg)			
	A (mm)	B (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3			H4	B1	B2
ECOW450F	4355	1915	2000	3481	3837	1449	25	419	292	956	304	1138	372	DN200	6840

Physical Dimensions



INDENTATION SIZE OF COUPLING DN250

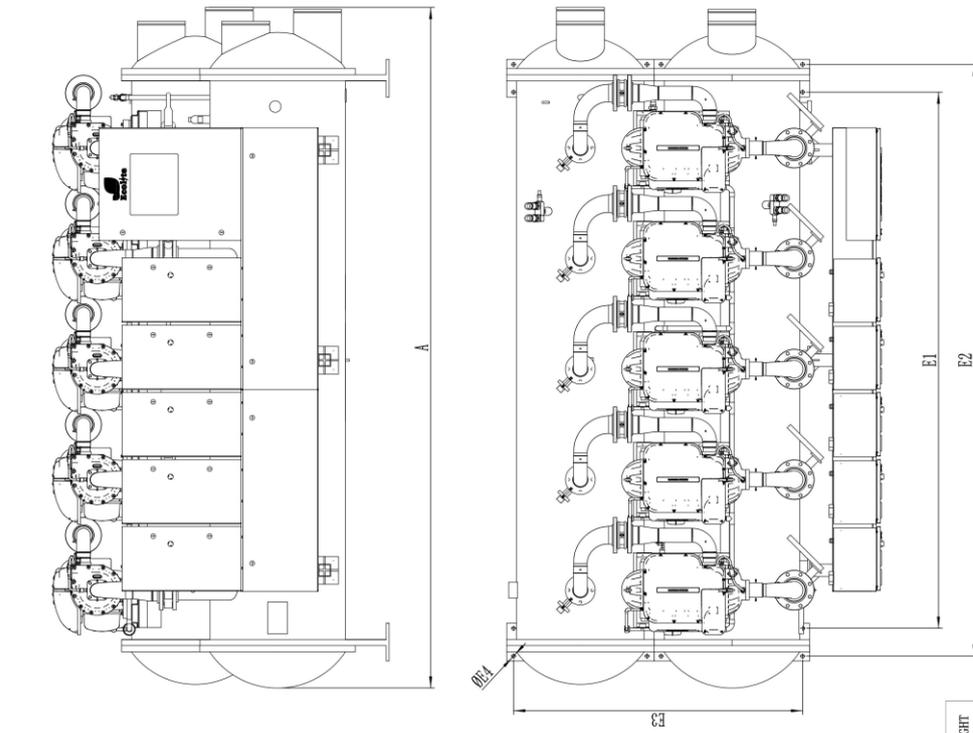
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	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.		
273.0	274.6	272.2	19.1	19.8	18.3	11.91	12.67	11.15	267.3	267.60	266.93

INDENTATION SIZE OF COUPLING DN300

PIPE(O.D) "D" (RAW)	GROOVE TO END FACE "L"			GROOVE WIDTH "B"			GROOVE(O.D) "C"				
	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.		
325	326.6	324.2	19.1	19.8	18.3	11.91	12.67	11.15	317.9	318.29	317.53

MODEL	LENGTH WIDTH HEIGHT		MOUNTING FOOT SIZE (mm)					HEADER POSITIONING SIZE (mm)					CONNECTION SIZE	WEIGHT (kg)	
	A (mm)	B (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3	H4	B1			B2
ECOW600F	4380	2025	2170	3481	3837	1643	25	433	349	987	356	1283	419	DN250	9140
ECOW800F	4485	2330	2210	3481	3837	1916	25	443	457	1015	420	1485	485	DN300	11050

Physical Dimensions



INDENTATION SIZE OF COUPLING DN300

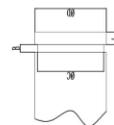
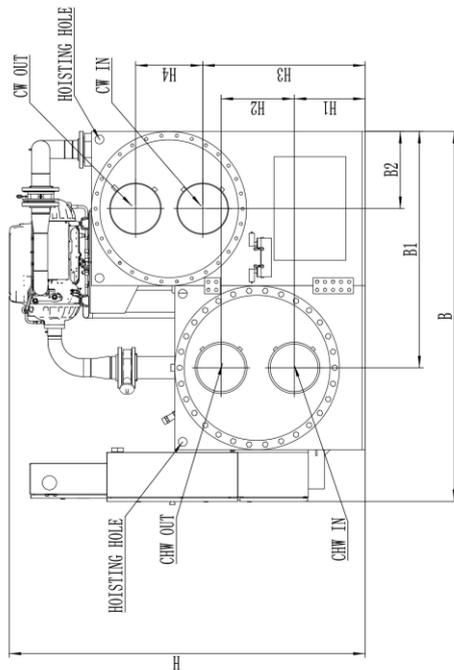
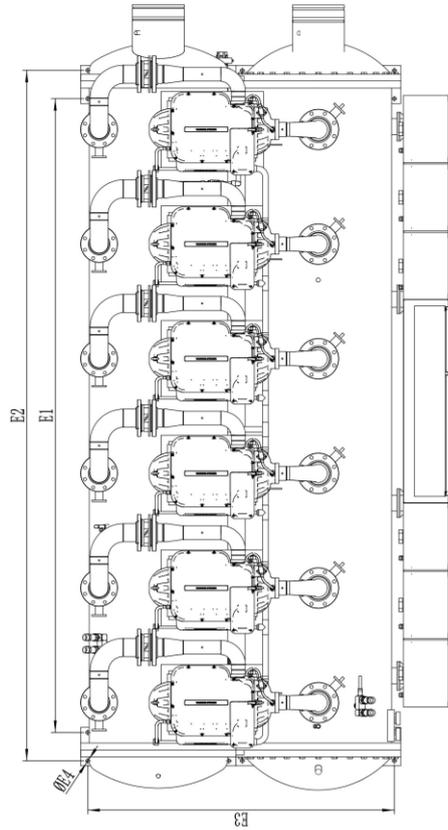
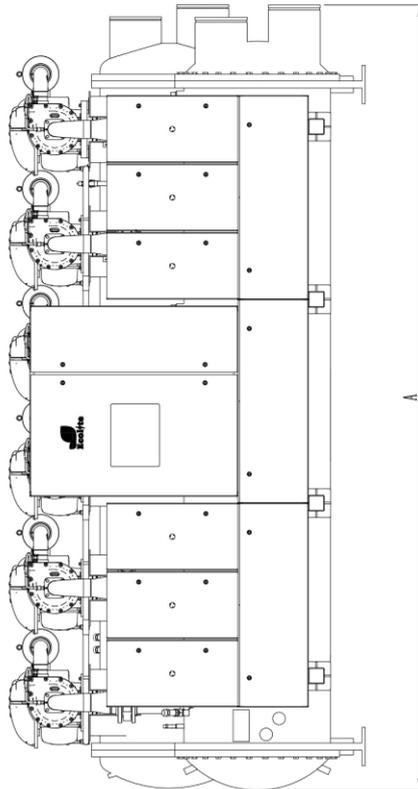
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	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.		
325	326.6	324.2	19.1	19.8	18.3	11.91	12.67	11.15	317.9	318.29	317.53

INDENTATION SIZE OF COUPLING DN350

PIPE (O.D.) "D" (RAW)	GROOVE TO END FACE "L"			GROOVE WIDTH "B"			GROOVE (O.D.) "C"				
	STD.	MAX.	MIN.	STD.	MAX.	MIN.	STD.	MAX.	MIN.		
377	378.6	376.2	23.9	24.7	23.1	12.7	13.5	11.9	371.5	372.3	370.7

MODEL	LENGTH		WIDTH HEIGHT			MOUNTING FOOT SIZE (mm)						HEADER POSITIONING SIZE (mm)		CONNECTION		WEIGHT (kg)
	A (mm)	B (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3	H4	B1	B2	SIZE	DN	
ECOWT50F	4365	2385	2180	3436	3791	1842	25	457	457	1019	432	1435	470	DN300	10290	
ECOWL000F	4460	2440	2230	3481	3837	2016	25	443	457	1010	460	1565	515	CW-DN300 CW-DN350	13100	

Physical Dimensions

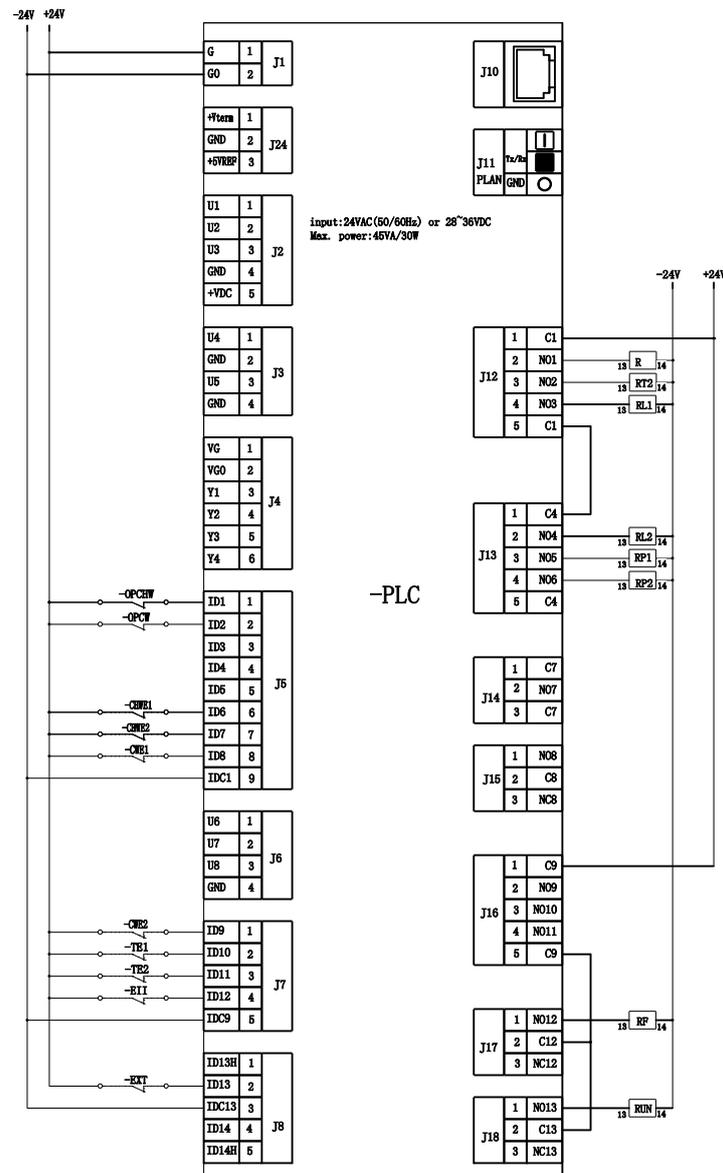


INDENTATION SIZE OF COUPLING DN300

PIPE (O.D.) "D" (RAW)	GROOVE TO END FACE "L"		GROOVE WIDTH "B"		GROOVE (O.D.) "C"						
	STD.	MAX. MIN.	STD.	MAX. MIN.	STD.	MAX. MIN.					
325	326.6	324.2	19.1	19.8	18.3	11.91	12.67	11.15	317.9	318.29	317.53

MODEL	LENGTH		WIDTH		HEIGHT		MOUNTING FOOT SIZE (mm)						HEADER POSITIONING SIZE (mm)			CONNECTION SIZE		WEIGHT (kg)
	A (mm)	B (mm)	A (mm)	B (mm)	H (mm)	H (mm)	E1	E2	E3	E4	H1	H2	H3	H4	B1	B2	DN300	
ECW900F	4935	2330	2230	3981	4337	1916	25	443	457	1015	420	1485	485	DN300	DN350	12550		
ECW1200F	4960	2490	2230	3981	4337	2066	25	443	457	1010	460	1590	515	DN300	DN350	14550		

Electrical System Wiring



Notes:

OPCHW: chilled water differential pressure switch, verifying water flows;

OPCW: CW pressure differential switch;

CHWE1~2: #1-#2 chilled water pump fault signal;

CHWE1~2: #1-#2 CW pump alarm input;

TE1~2: #1-#2 Cooling tower alarm input;

EXT: external remote start/stop input;

EI: external interlock signal;

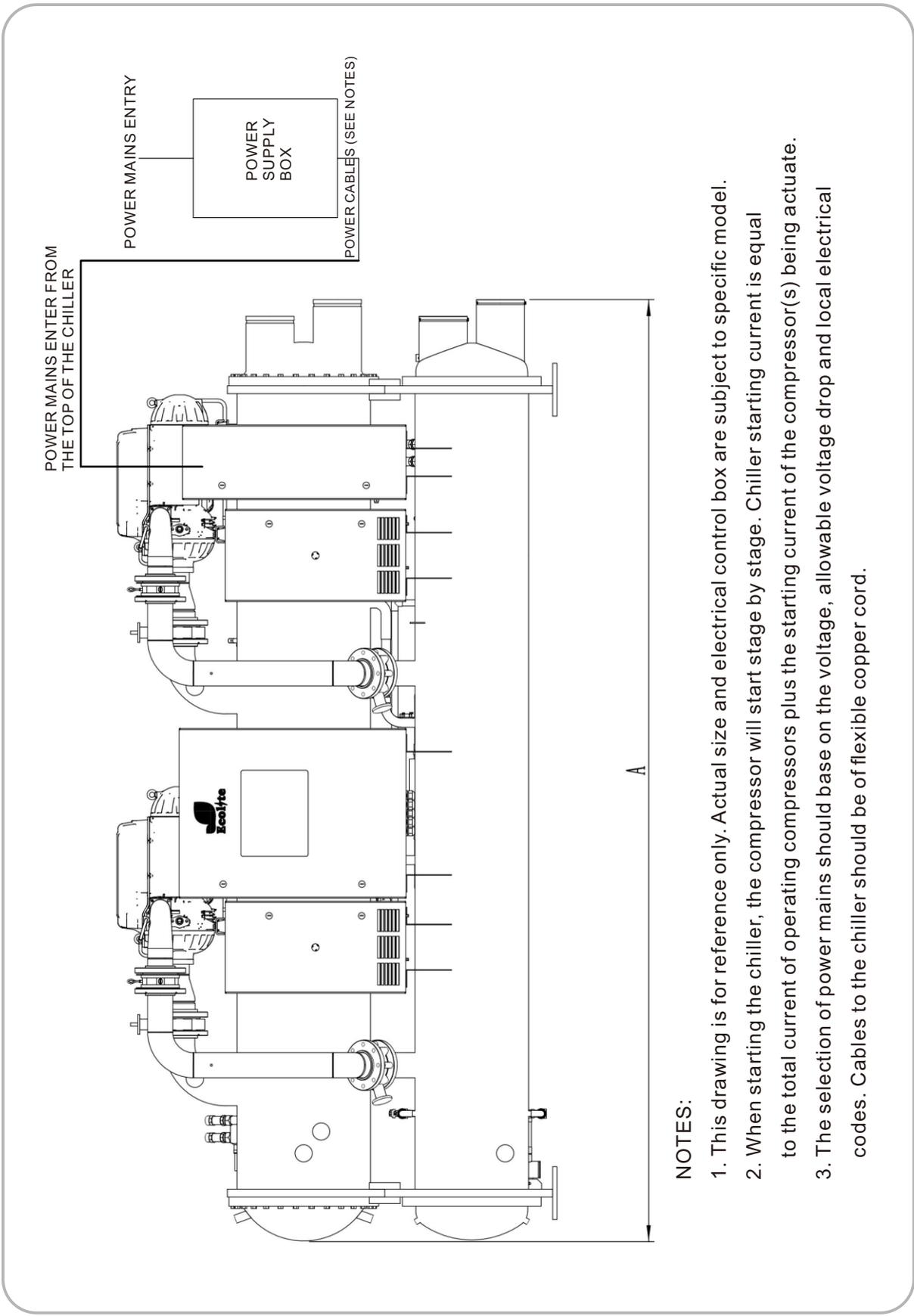
RL1~2: #1-#2 chilled water pump running signal output;

RT1~2: #1-#2 Cooling tower on/off relay;

RF: chiller fault status output;

RUN: chiller running status output.

Power Mains Connection



NOTES:

1. This drawing is for reference only. Actual size and electrical control box are subject to specific model.
2. When starting the chiller, the compressor will start stage by stage. Chiller starting current is equal to the total current of operating compressors plus the starting current of the compressor(s) being actuate.
3. The selection of power mains should base on the voltage, allowable voltage drop and local electrical codes. Cables to the chiller should be of flexible copper cord.

Electrical Data

Model	Compressor (Each)		Chiller	
	R.L.A (A)	F.L.A (A)	No. of Compressor	F.L.A (A)
ECOW125F	134	210	1	210
ECOW150F	151	170	1	170
ECOW200F	194	206	1	206
ECOW250F	137	210	2	420
ECOW300F	151	170	2	340
ECOW400F	194	206	2	412
ECOW450F	151	170	3	510
ECOW600F	151	170	4	680
ECOW750F	151	170	5	850
ECOW800F	194	206	4	824
ECOW900F	151	170	6	1020
ECOW1000F	194	206	5	1030
ECOW1200F	194	206	6	1236

R.L.A: Rated Load Amperage

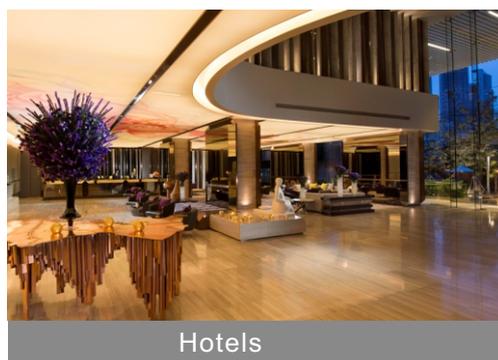
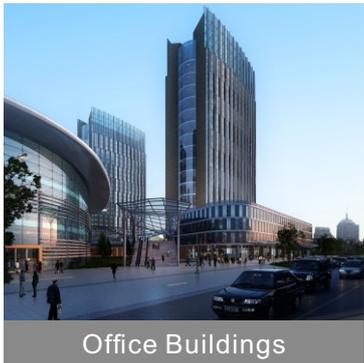
F.L.A. – Full Load Amperage

Power Supply: AC380V/50Hz/3Ph; Allowable Fluctuation Voltage: 10%; 3-Phase Voltage Imbalance: 3%

1. In order to reduce harmonic interference, the chiller should be equipped with special input line reactor to restrict the fluctuation of power grid or current surge in system operation. Spike impulse in smooth supply voltage or phase missing resulted from rectifier circuit commutation can block interference from the grid and reduce impacts on the grid caused by harmonic current of the rectifier unit.
2. Harmonic filter (optional) improves power transmission and utilization, further reducing local parallel harmonic or series resonant and noise created by electrical system, improving system capacity of the transformer, breaker and cables, etc. and ensuring normal functions of safeties and automatic devices. All these configurations comply with GB/T 14549. Total harmonic distortion (THD) is $\leq 5\%$ and automatic compensation power factor of the chiller can reach 0.95.

Wide Range of Applications

ECOLITE products are used in a wide range of applications in large high-rise commercial buildings, multi-story building complex, and various industrial refrigeration fields shown as below:



To offer eco-friendly HVAC&R products for a greener tomorrow.



**STANDARD REFRIGERATION &
ENGINEERING CO., LTD.**

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