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

STANDARD REFRIGERATION & ENGINEERING CO., LTD.
立 德 工 程 有 限 公 司
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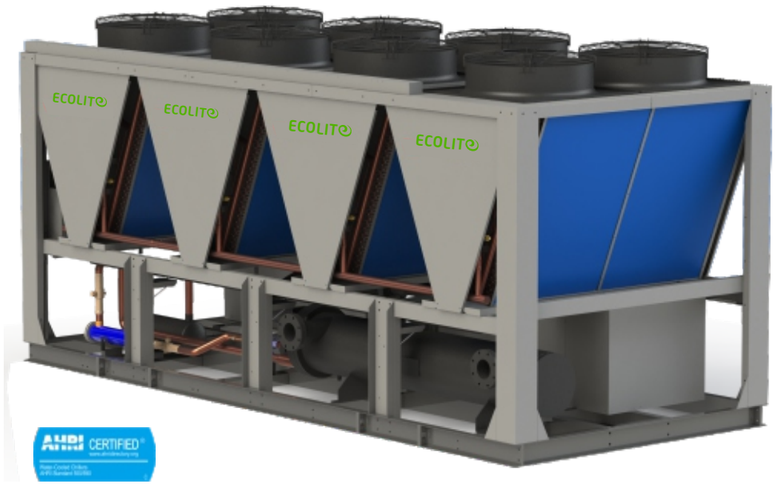
ECOLITE ECVA 2024.09 V1

ECOLITE

ECVA Series

VSD Air Cooled Screw Chiller



COMPANY PROFILE

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.

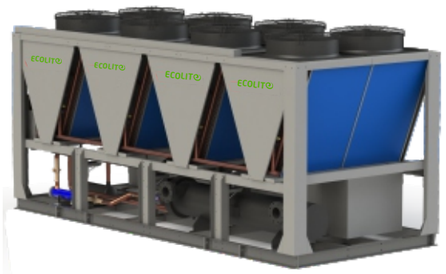
DESIGN FEATURES

ECOLITE ECVA series VSD Air cooled screw Chiller use high efficiency variable frequency screw compressors, shell and tube evaporators and cutting-edge MS One control system to achieve best energy efficiency ratio at both full load and part loads and reduce operating costs significantly. ECOLITE ECVA series chillers play an important role in environmental protection and energy conservation.

Cooling capacity of each unit is 70RT-350RT , which is ideal for applications in hotels, restaurants, movie theaters, shopping malls, office buildings, residential buildings, hospitals, etc. as well as industrial process refrigeration, such as plastic chemical and precision instrument industries.

Electronic expansion valve (EXV) is used for metering the supply of liquid refrigerant for the shell and tube evaporator. The packaged unit has already been factory-charged with refrigerant and factory-tested, requiring only pipelines and power-lines connections while eliminating complicated pump-down and refrigerant charge during field installation to ensure reliable operation of the equipment.

Ecolite’s new generation of MS One programmable control system not only provides the most powerful protection and control over the chiller, but also enables remote monitoring with its powerful communication function.The chillers are designed to be compact, space saving and installation cost saving.



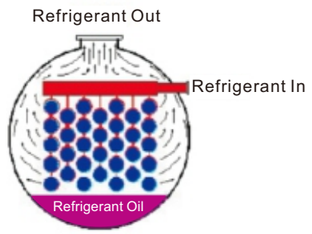
STRUCTURE FEATURES

ECOLITE ECVA series VSD Air cooled screw chillers are of packaged design. Main parts include screw refrigeration compressor, variable speed drive (VSD) on compressor, air cooled condenser, falling film evaporator (optional flooded evaporator), filter drier, EXV and control system. To make sure consistent ex-factory performance, chillers have been pumped down, charged with refrigerant and lubrication oil and run-tested in the factory. Field works only remain water pipes installation and power lines connection.

VI Series VSD Compressor

Semi-hermetic screw refrigeration compressor has a motor and screw rotor installed in the same housing. The screw rotor is directly driven by the motor without any mechanical driving device, thus avoiding efficiency loss and reducing vibration and noise. This structure and directly driven design eliminate the use of shaft seal and avoid associated refrigerant and oil leakage as well as shaft seal change due to wear and tear.

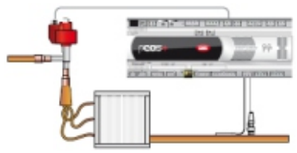
With excellent volumetric efficiency and minimum clearance, the 5~6 tooth profile wound-rotor design has been patented in the U.S.A., Japan and China. Pressure ratio is adjustable based on actual operating conditions and operation loss can be reduced to achieve better capacity control range and more accurate temperature control. Motor and discharge temperature safeties, oil level control, oil heater, oil cooling and anti-slugging functions ensure reliable and stable operation of the compressor.



Evaporator

Falling film evaporator is utilized in the chiller. Theoretical heat transfer coefficient of falling film evaporation outside evaporator tubes is 30% higher than that of pool boiling of a flooded type evaporator. Liquid refrigerant can be distributed more evenly and forms a film outside the tubes to ensure better heat transfer. Falling film evaporator has relatively lower internal liquid level and is less influenced by hydrostatic column. Lubrication oil is concentrated together which enables easier compressor oil return.

Optional flooded evaporator features high heat exchange efficiency and reliable operation after continuous product improvement.



Advanced Refrigerant Control

EVDEVO driver and super capacitor module are integrated in pCO5+ without the need of solenoid valve. EXV is used to fast and precisely meter refrigerant flow to keep a stable evaporator leaving water temperature.

MS ONE CONTROL SYSTEM

ECOLITE ECVA series VSD Air cooled screw chillers use MS One control system. The control core is a programmable pCO^5+ logic controller dedicated for HVAC products. The patent chip of pCO^5+ makes advantage of ASIC technology to ensure flexibility of the control system. LCD touch screen provides operators, factory technicians and service personnel with current operation data of the chiller, faults, load history, start/stop history, etc.

Temperature Control

MS One Control System compares the entering and leaving water temperature with its setpoint value to compute the capacity required and determine the compressor load. The inverter will adjust cooling capacity of the chiller based on the previous calculated value and keep the water temperature within set point.

Compressor Balance and Start/Stop Restriction

MS One accumulates running hours of each compressor and hence establishes a working sequence to well balance the running hours of the two compressors of the chiller.
Minimum non-running hours, minimum running hours, restart times limit and other settings allow the control of start and stop frequency of the compressor, which can improve its life span.

Failsafe

Control system can monitor the following faults. In the event of a compressor fault, the controller will close the faulty compressor. In the case of a system fault, the controller will close all compressors of the chiller bank.
Compressor Faults: High discharge pressure, low suction pressure, discharge temperature fault, compressor overload, inverter fault, motor faults, etc.
System Faults: Low chilled water flow, low condenser water flow, low leaving chilled water temperature, high leaving condenser water temperature, system pressure Fault, external interlock fault/protection, pump fault, cooling tower fault, etc.

Remote Communication

MS One Control System is fitted with Ethernet, RS485, RS232 and USB ports to realize remote communication and integrated controls via connection between the Building Automation System (BAS) or Distributed Control System (DCS) and various protocols. These protocols can also work with DDC and other different types of controllers to build a control network.

Password Security

MS One has three levels of security access – User, Service and Factory. The three-level security accesses ensure that only authorized personnel can modify chiller control and protection settings to avoid any unwanted change that may result in chiller failure by an unauthorized person.

NOMENCLATURE

ECVA	070	C
1	2	3

1 — Product Series

ECVA: ECVA series VSD Air cooled screw chillers

2 —Cooling Capacity Code

3 — Cooling only

TECHNICAL DATA

Model			ECVA070C	ECVA105C	ECVA140C	ECVA175C
Cooling Capacity		kW	246	355	492	615
		TR	70	101	140	175
Nominal Power		kW	76.2	109.2	153.3	195.2
COP			3.23	3.25	3.21	3.15
IPLV			5.52	6.02	5.71	5.77
Control System			PLC Controller			
Compressor Type			VSD Screw Compressor			
Capacity Control		%	40%-100%	25%-100%	20%-100%	20%-100%
Power Supply		V/Phase/Hz	380V-50Hz-3Ph			
RLA		A	138.9	185.3	270.8	345.8
Refrigerant Type			R134a			
	Refrigerant Charge	kg	70	105	140	175
Evap.	Type VSD Axial Fan		Shell & Tube Evaporator			
	CH.W. Flow	m^3/h	42.3	55.5	84.6	105.8
	Pressure Drop	kPa	48.5	55.7	55.5	65
	Fouling Factor	m^2K/kW	0.018	0.018	0.018	0.018
	Max. Working Pressure (Water Side)	MPa	1			
	Passes		2			
	Connection Size	mm	125	125	150	150
Condenser	Type		Air Cooled Fin Tube Heat Exchanger			
	No. of Fans		4	6	8	10
	Power per Fan	kW	1.715			
	RLA per Fan	A	2.65			
Dimensions	L	mm	2600	4200	5200	6500
	W	mm	2200	2200	2200	2200
	H	mm	2500	2500	2500	2500
Shipping Weight		kg	3000	4500	4800	5900
Operating Weight		kg	3100	4600	4900	6000

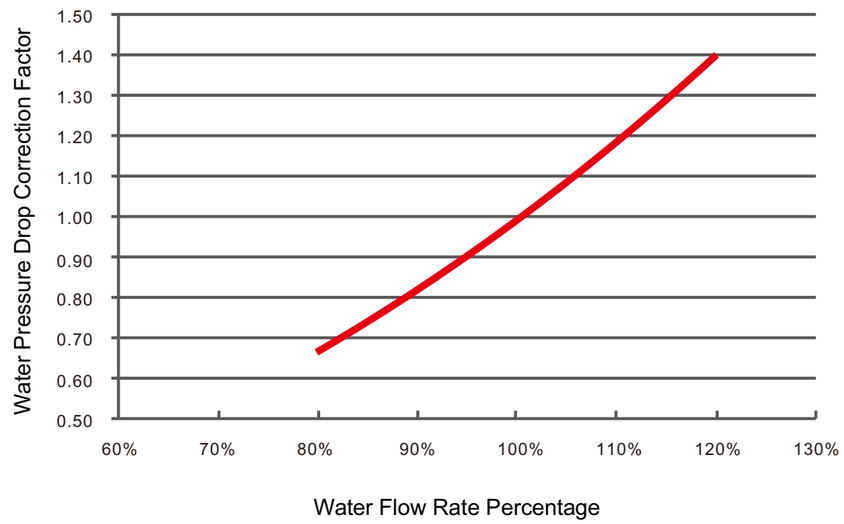
TECHNICAL DATA

Model			ECVA210C	ECVA280C	ECVA350C
Cooling Capacity		kW	700	985	1231
		TR	200	280	350
Nominal Power		kW	217.2	306.9	379.9
COP			3.22	3.21	3.24
IPLV			6.11	5.95	5.89
Control System			PLC Controller		
Compressor Type			VSD Screw Compressor		
Capacity Control		%	25%-100%	20%-100%	20%-100%
Power Supply		V/Phase/Hz	380V-50Hz-3Ph		
RLA		A	358.3	541.7	692.4
Refrigerant Type			R134a		
Refrigerant Charge		kg	210	280	350
Evap.	Type		Shell & Tube Evaporator		
	CH.W. Flow	m^3/h	109.4	169.2	211.7
	Pressure Drop	kPa	70.6	55.5	65.1
	Fouling Factor	m^2K/kW	0.018	0.018	0.018
	Max. Working Pressure (Water Side)	MPa	1		
	Passes		2		
	Connection Size	mm	150	150	150
Condenser	Type		Air Cooled Fin Tube Heat Exchanger		
	No. of Fans		10	16	20
	Power per Fan	kW	1.715		
	RLA per Fan	A	2.65		
Dimensions	L	mm	6500	10400	13000
	W	mm	2200	2200	2200
	H	mm	2500	2500	2500
Shipping Weight		kg	7800	9600	11800
Operating Weight		kg	8000	9800	12000

CORRECTION FACTOR TABLE

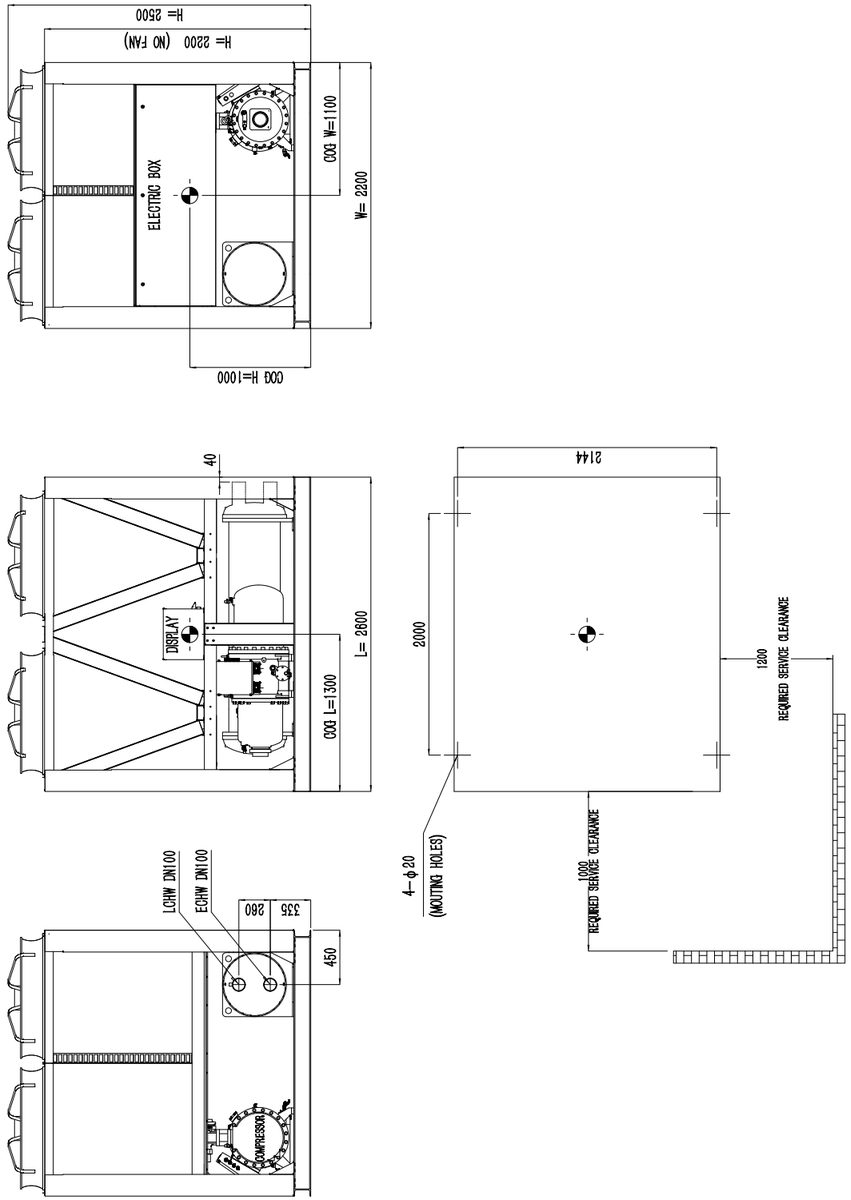
LCHWT℃	ECWT℃									
	15		20		25		30		35	
	Capacity	Power	Capacity	Power	Capacity	Power	Capacity	Power	Capacity	Power
5	1.04	0.58	1.01	0.74	0.97	0.87	0.92	1.00	0.87	1.13
7	1.12	0.56	1.09	0.72	1.05	0.87	1.00	1.00	0.95	1.13
9	1.21	0.53	1.17	0.70	1.13	0.86	1.08	1.00	1.02	1.13
11	1.30	0.50	1.26	0.68	1.22	0.85	1.17	0.99	1.11	1.14
13	1.40	0.47	1.36	0.66	1.31	0.83	1.26	0.99	1.19	1.14

WATER PRESSURE DROP CORRECTION CURVE



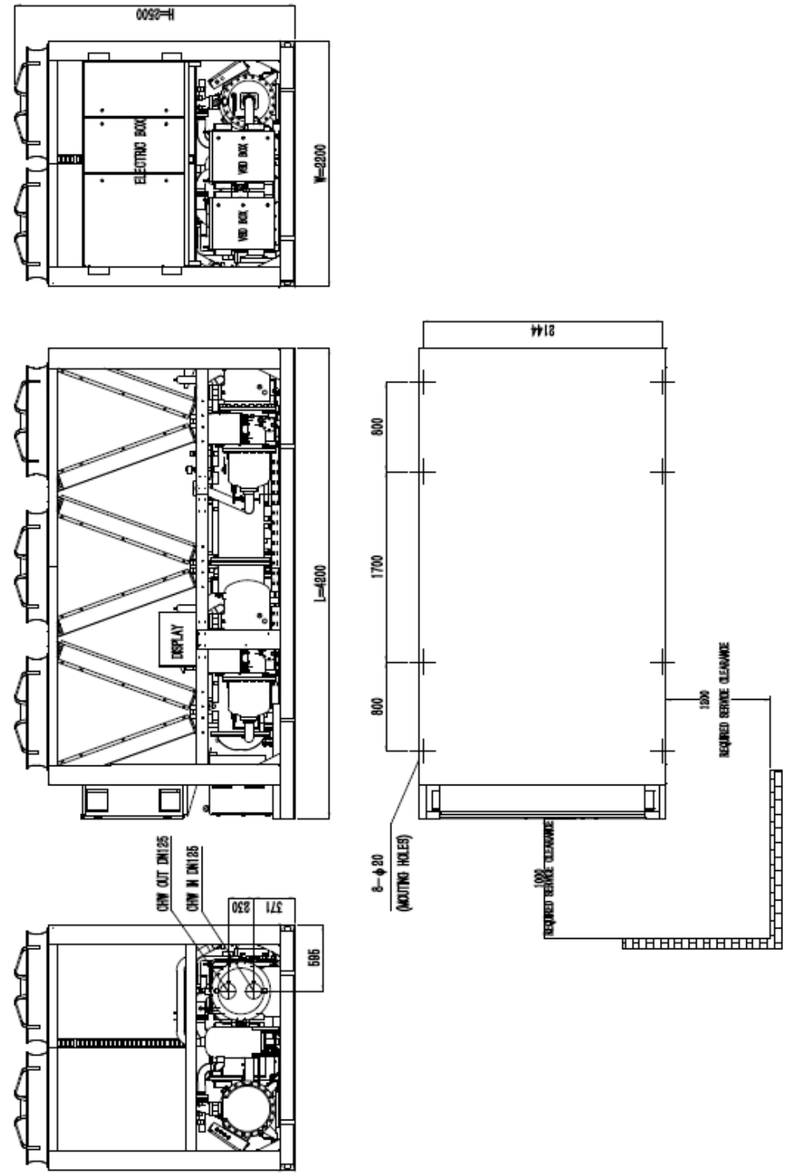
PHYSICAL DIMENSIONS

ECVA070C



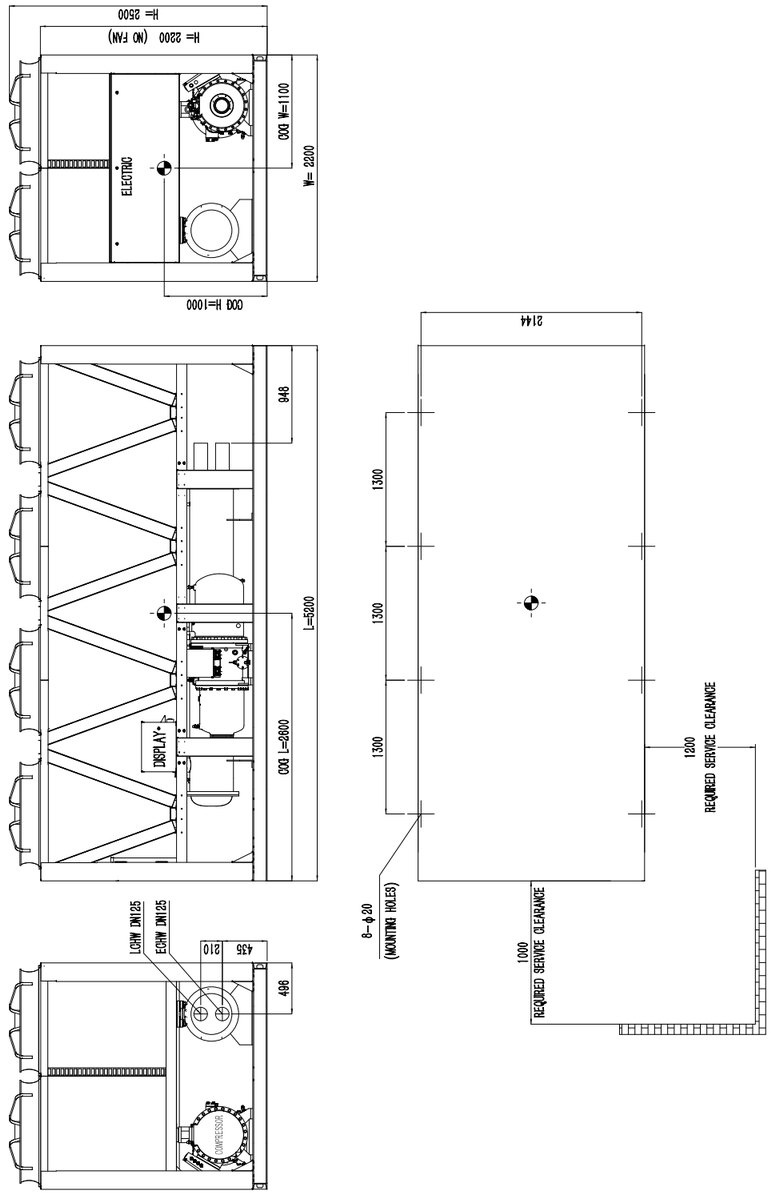
PHYSICAL DIMENSIONS

ECVA105C



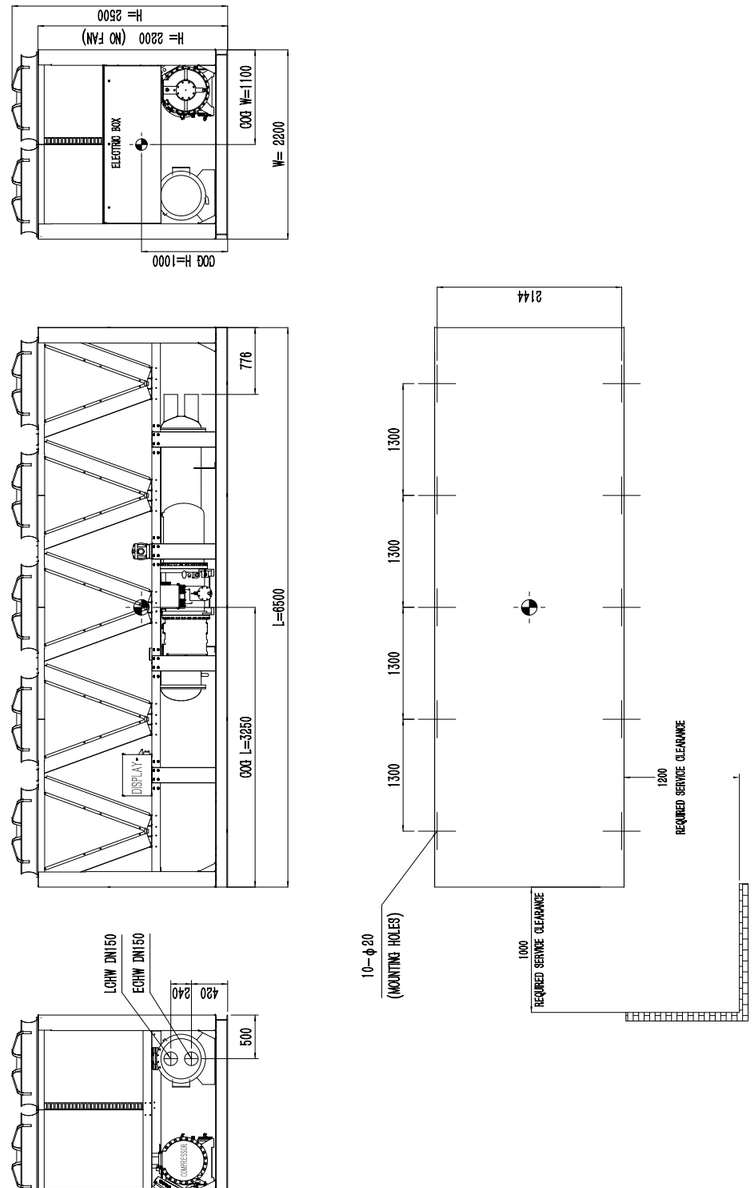
PHYSICAL DIMENSIONS

ECVA140C



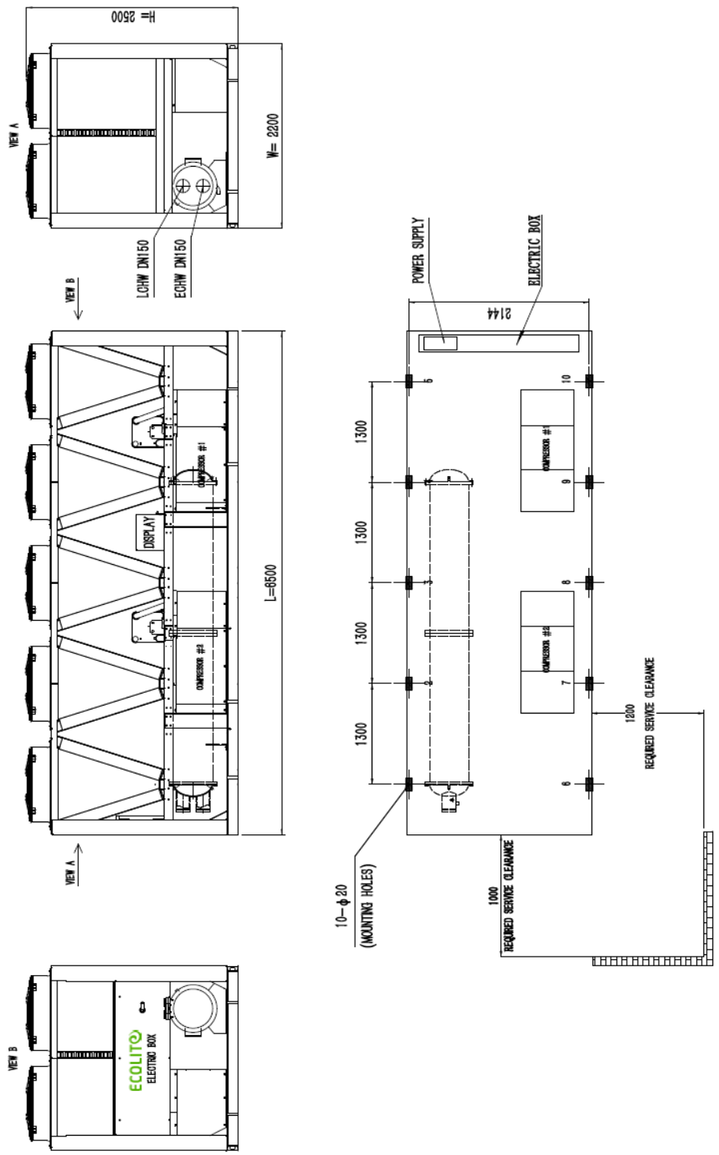
PHYSICAL DIMENSIONS

ECVA175C



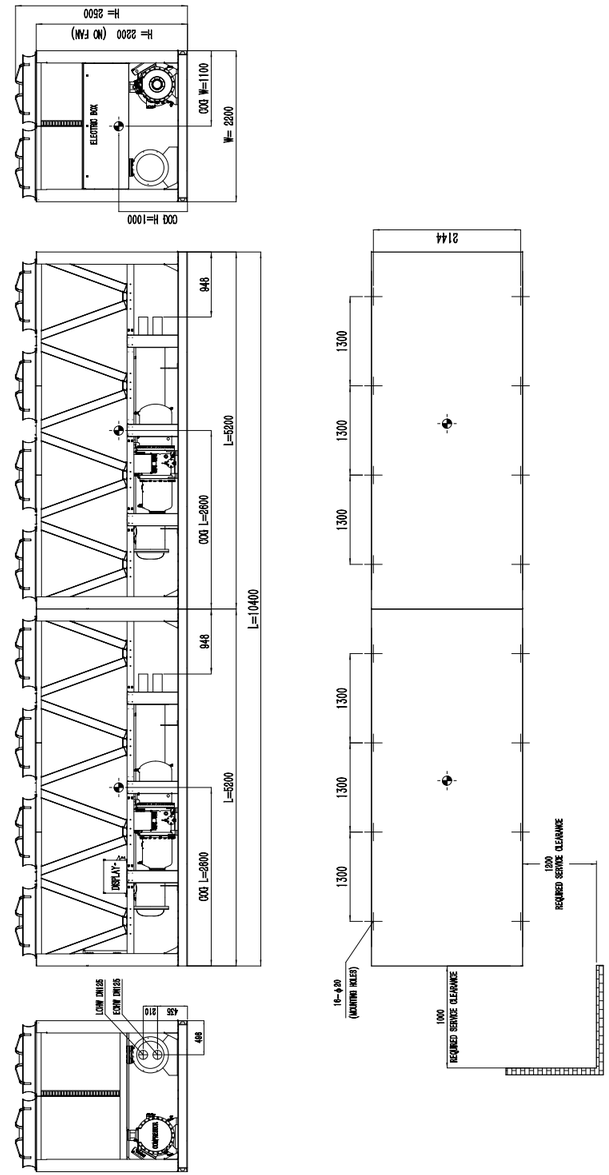
PHYSICAL DIMENSIONS

ECVA210C



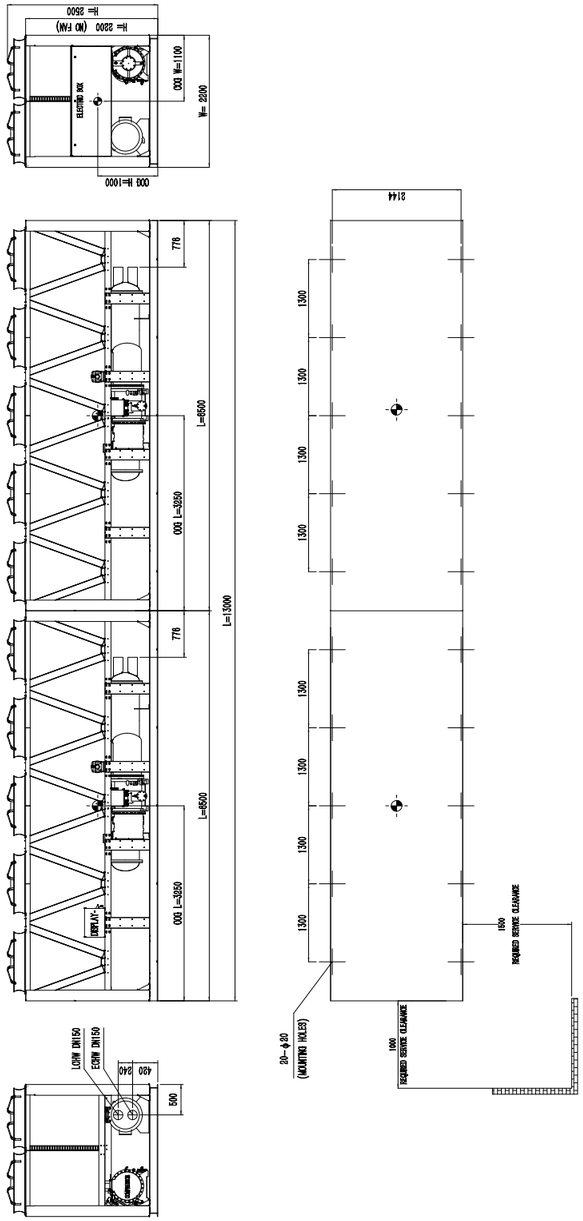
PHYSICAL DIMENSIONS

ECVA280C

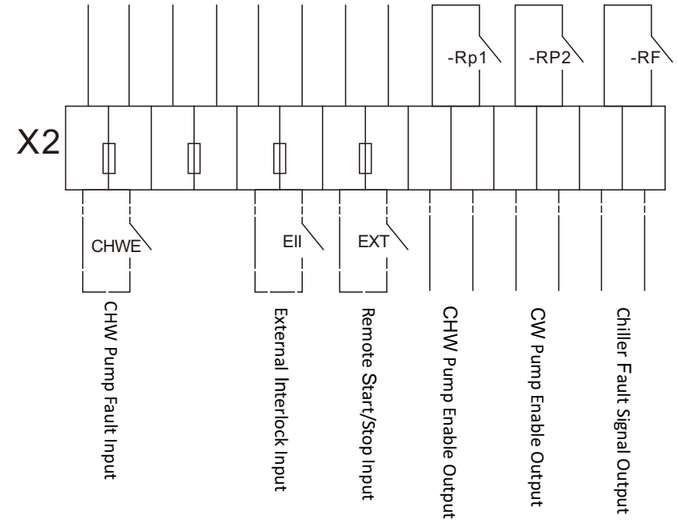


PHYSICAL DIMENSIONS

ECVA350C



FIELD WIRING DIAGRAM



Technical Notes:

1. Minimum cross section of control wires should be 1mm^2;
2. All input terminals have been factory-bridged, which require removal of jumper blocks before use;
3. All input terminals are volt-free contacts;
4. Maximum current allowable for volt-free output contact is 5A (Resistive);
5. "—" for factory wiring and "--" for field wiring.

WIDE RANGE OF APPLICATIONS

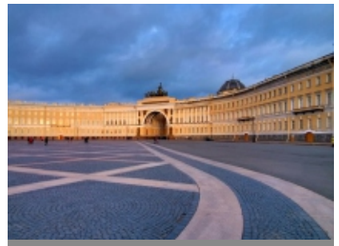
ECOLITE products are used in a wide range of applications in large high-rise commercial buildings, multi-story building complex, and various industrial refrigeration fields shown as below:


Office Buildings


Villas

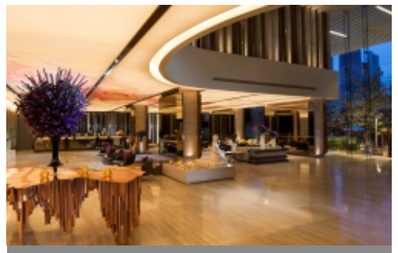

Commercial Pedestrian Streets

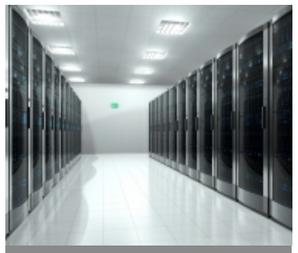

Metros


Plazas


Factories


Schools/Libraries


Hotels


Data Centers


Movie Theaters


Banks


Hospitals