Air Cooled Water Chillers

Eshtar air-cooled water chillers with semi-hermetic reciprocating & scroll saving energy compressors are available in a wide range of sizes to meet customer requirements for different applications.

It state of the art low sound, reliability, high energy efficiency and small physical footprint chillers.

Chillers consist of high efficiency low-pressure drop Shell & Tube evaporators (coolers), condenser coils to maximize airflow and are equipped with low noise fans with patented design fan and motor mounting.

Chillers are equipped with unsurpassed features including cutting edge microprocessor controller to manage the unit's performance for optimum efficiency and Energy saving at both full load and part load values.

OUTSTANDING FEATURES

1. Superior Efficiency
2. Low Noise Chillers
3. Quality Assurance
4. Easy Installation
5. Design Flexibility

FEATURES AND BENEFITS

A. Compressors

1. Semi-Hermetic Reciprocating Compressor:

To match the reliability and efficiency Copeland Semi-Hermetic Reciprocating Compressors provide the following features:

- High performance and efficiency with minimal energy requirements,
- Low noise and vibration levels,
- Suction gas cooled compressor motor windings,
- Highly efficient internal pressure relief valve efficient large volume motors,
- Insertion type crankcase heater with sleeve,
- Rain-tight terminal box,
- Generously sized reversible oil pump,
- Core Sense for unique embedded electronics Diagnostics.

2. Scroll compressors

- Very quiet operation,
- Very low vibration,
- Proven reliability,
- Continuous compression process with almost no pulsation or vibration,
- Excellent individual full-load and part-load efficiency,
- Energy saving up to 30% of full load,
- Unique embedded electronics for accurate Diagnostics.
- Advance Scroll Temperature Protection (ASTP).

B. Air-Cooled Condenser

Air-cooled condenser coils are designed to deliver their duties with optimum performance for all design conditions. Coils are manufactured from seamless copper tubes mechanically expanded into aluminum fins. All coils are air pressure tested at 450 Psi, under water to avoid leakage. They also undergo dry chemical cleaning after manufacturing for optimum system cleanness.

C. Direct Drive Condenser Propeller Fans

All condenser fans are of the propeller axial type, which are external rotor motor. All fans run at approximately 900/1100 RPM (50/60Hz), for optimum fan efficiency and maximum sound power reduction. Fan blades are made from coated steel or aluminum for maximum corrosion resistance, and are statically and dynamically balanced before installation.

D. Condenser Fan Motor

All fan motors are of the premium efficiency, six pole, and squirrel-cage induction type motors. They are totally enclosed, air-cooled, permanently lubricated. They have internal thermal current protection & all motors are IEC certified.

E. Refrigerant standard features

- High and low Pressure Protection,
- Solenoid valve
- Replaceable core type filter drier
- Expansion valve
- Moisture sight glass indicator

F. Electrical

- Power ON switch/indication light.
- Thermal Magnetic Motor circuit breaker for each Compressor,
- Thermal Magnetic Motor circuit breaker for each Fan,
- Starting Contactor for each Compressor and condenser fan motors,
- One capacity control step for each compressor
- Inherent motor protection for each compressor
- Inherent motor protection for each condenser fan motor
- Control voltage is 24-30V for all components
- Power supply monitor (phase failure relay)
- Single point power connection for each electrical panel (refer to electrical data tables)
- ON/OFF switch for each compressor
- Control circuit breaker for short circuit protection
- Microprocessor control for full management of the chiller operation and safety circuits Control terminal strip for easy connection with electrical board and easy field installation which includes but not limited to:
  - Smart lead-lag operation for compressors
  - Free terminal for remote ON/OFF connection
  - Free terminal for general alarm output
  - Short cycling protection for compressors (time delay)

G. Performance Data

Scroll Compressor Configuration										
Model (ESC)	6.1	8.1	12.1	15.1	20.1	25.1	30.1	40.2	50.2	60.2
Nominal cooling capacity (MBH)	60	74	115	150	190	240	290	360	480	580
Compressor power input (KW)	3.9	5	7.4	10.2	13.3	16.3	20.1	26.6	32.6	40.2
Total power input (KW)	4.3	6	8.4	11.2	14.8	17.8	21.6	28.6	34.6	42.2
Compressor	Scroll Compressor									
Nominal HP	6	8	12	15	20	25	30	20+20	25+25	32+32
Refrigerant Circuit (No.)	1	1	1	1	1	1	1	2	2	2
Oil charge (Lt)	1.8	2.5	3.25	3.25	4.7	6.8	6.8	2*4.7	2*6.6	2*6.8
Casing	Heavy Gauge Galvanized Steel									
Finishing	Powder Coating									
Condenser	Copper Tube Aluminum Fins									
Fins per inch	12									
Rows	3	4	4	4	3	3	3	4	4	4
Fan	Axial Fan									
Fan speed (RPM)	1400	1400	1400	1400	1400	1400	1400	900	900	900
Quantity	2	2	2	2	2	2	2	2	2	2
Total air flow (CFM)	3600	7000	7000	7000	12000	12000	12000	20000	20000	20000
Evaporator	Shell & Tube									
Control	Expansion Valve									
Water content (LT)	7.5	7.5	11	11	14.7	16	16	21	29.5	29.5
Nominal water flow (GPM)	12	15	23	30	38	48	58	72	96	116
Water pressure drop (KPa)	7	7	29	29	26	36	36	32	31	31
Water connection size (INCH)	1 1/2	1 1/2	1 1/2	1.5	2 1/2	2.5	2 1/2	2.5	3	3
Electrical data										
Nominal power supply	400V-3PH-50HZ									
Nominal unit current (A)	10	16.4	19.6	25.6	33.6	41.4	54.3	67.2	82.8	108.6
Unit length (MM)	1150	1752	1752	1752	1752	1752	1752	2250	2250	2250
Unit width (MM)	550	975	975	975	975	975	975	1275	1275	1275
Uni height (MM)	1150	1673	1673	1673	1673	1673	1673	2020	2020	2170
Operating weight (KG)	500	750	800	850	1100	1100	1150	1350	1400	1500

H. Performance Data

Semi -Hermetic Configuration									
Model [ESH]	25.1	30.1	35.1	40.1	50.1	60.2	80.2	90.2	100.2
Nominal cooling capacity (MBH)	220	255	326	385	450	510	770	835	900
Compressor power input (KW)	15.5	19.2	23.4	29	32.9	38.4	58	61.9	65.8
Total power input (KW)	17.5	21.2	25.4	31	34.9	40.4	61	64.9	68.8
Compressor	Semi-Hermetic Compressors								
Nominal HP	25	30	35	40	50	30+30	40+40	40+50	50+50
Refrigerant Circuit (no.)	1	1	1	1	1	2	2	2	2
Oil charge (Lt)	3.3	3.3	3.3	3.3	3.3	2*3.3	2*3.3	2*3.3	2*3.3
Casing	Heavy Gauge Galvanized								
Finishing	Powder Coating								
Condenser	Copper Tube Aluminum Fins								
Fins per inch	12								
Rows	3	3	4	4	4	4	4	4	4
Fan	Axial Fan								
Fan speed (RPM)	1400	1400	900	900	900	900	900	900	900
Quantity	2	2	2	2	2	2	2	2	2
Total air flow (CFM)	1200	1200	20000	20000	20000	20000	20000	20000	20000
Evaporator	Shell & Tube								
Control	Ex. Valve								
Water content (LT)	16	16	21	21	30	30	55	55	55
Nominal water flow (GPM)	44	51	65	77	90	102	154	167	180
Water pressure drop (KPa)	36	36	32	32	31	31	35	35	35
Water connection size (INCH)	2 1/2	2 1/2	2 1/2	2 1/2	3	3	DN100	DN100	DN 100
Electrical data									
Nominal power supply	400V - 3 PH-50 HZ								
Nominal unit current (A)	40.6	45	50	70	91	90	140	161	182
Unit length (MM)	1752	1752	2250	2250	2250	2250	4200	4200	4200
Unit width (MM)	975	975	1275	1275	1275	1275	2300	2300	2300
Unit height (MM)	1673	1673	2022	2022	2170	2172	2550	2550	2550
Operating weight (KG)	1100	1100	1350	1400	1600	1750	2300	2350	2400

MICROPROCESSOR CONTROLLER

Esther's microprocessor controller is characterized by great flexibility, this allow its use in several type of chiller units, from single circuit chiller up to several circuits chiller. Engineered to meet the most demanding requirements of all control and data monitoring applications. It could be activated to perform different functions for cooling applications.

In standard execution, while using the microprocessor for chiller control, it communicates with the standard conventional control such as, high pressure, flow switches, etc. thus allowing service technicians to inspect and maintain such devices in the conventional manner.
Eshtaradvanced controller provides the following features:

Main functions

- Temperature control on water inlet/outlet,
- Condenser Fan motor control related to Pressure and temperature.
- Complete alarm management with data Logger contains the data of the last 100 alarms.
- Compressors time management,
- Pump time management,
- Automatic lead/lag function,
- Anti-recycling timer, to limit the number of compressor starts per hour,
- Daily and weekly time zone management,
- Management of compressor type,
- External set point reset, due to external analogue signal for remote modification of set point (4-20 mA or 0-10 Vdc),
- Unloading function (Optional),
- LCD graphic Keyboard available for panel or wall mounting,
- Auto restart after power failure
- Password-Protected alarm menu.
- Standard protocol for communication Modbus-RTU.

Supervising

By using gate way the microprocessor controller will connected to the Ethernet which can be remotely monitoring and functioning the controlled machine. There are many available functions, for example the possibility of reading temperature and pressure status, controlled load status, the diagnostic through SMS or Email, and much more.

Devices controlled

- Compressors
- Condenser fans
- Water pumps
- Anti-freeze heaters
- Alarm signaling device

Displayed Data

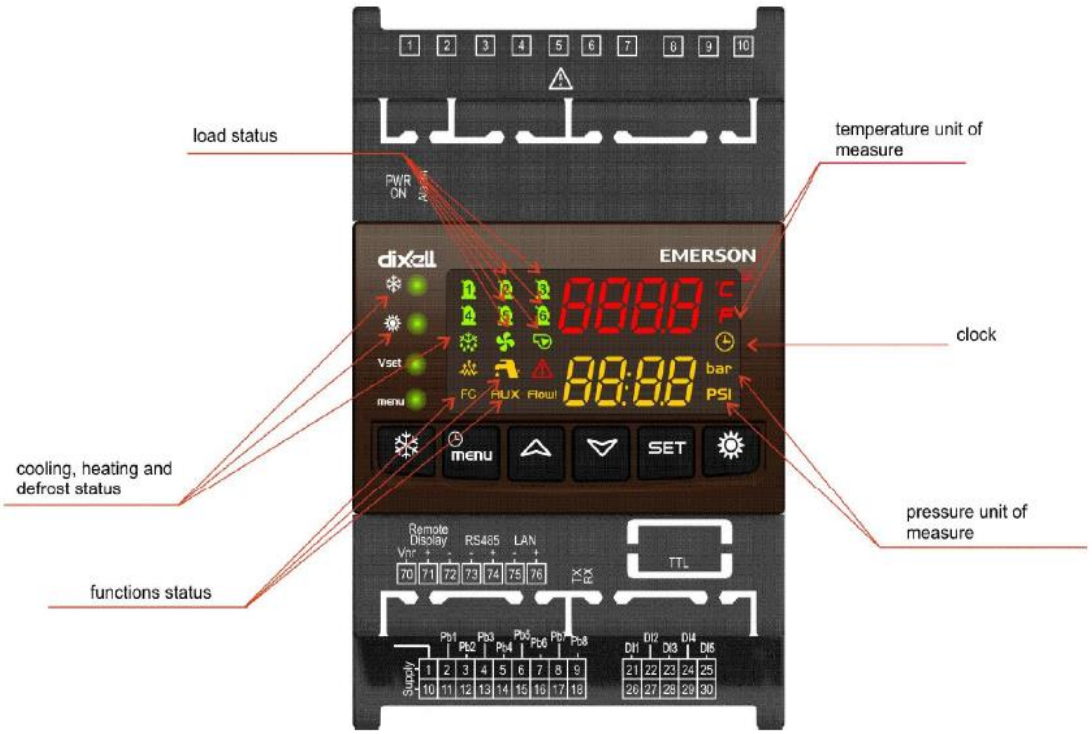
- Unit operation status,
- Unit cooling capacity,
- Compressor and fan motor status,
- Compressor Running hours,
- Compressor starts-up number,
- Compressor running ampere reading (Optional),
- Compressor suction/discharge pressure readings and control,
- Water Pump Running hours,
- Chilled water temperature leaving and entering,
- Ambient temperature ,
- analog output (fan inverter) (Optional)
- Status of unloaders
- Status of high and low pressure switches(Optional),
- Status of water flow switch
- Status of all inputs and outputs.

V2I820: LCD graphic keyboard (Visograph 2.0) available for panel or wall mounting, in white or black color and, upon request, with temperature probe on board

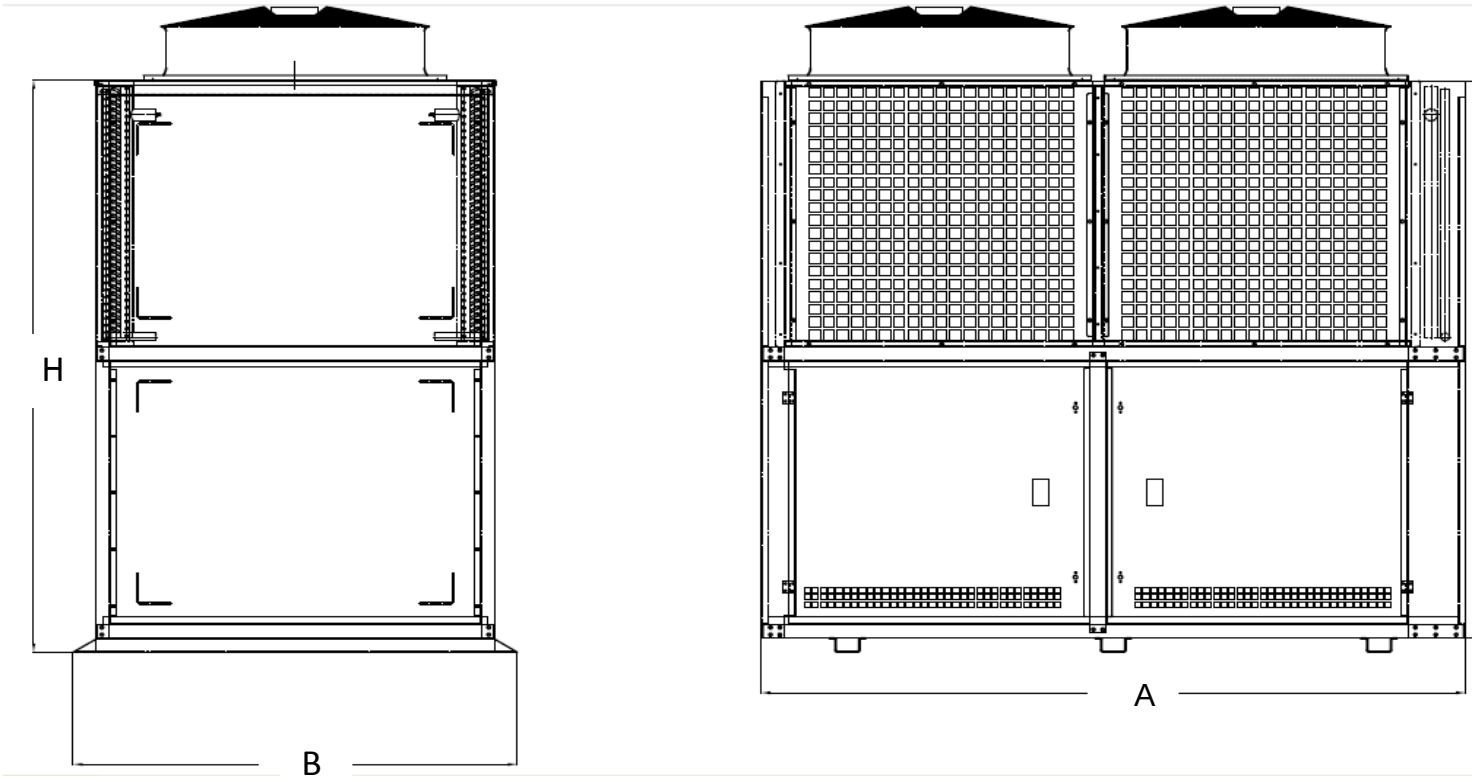
I. SEQUENCE OF OPERATION

Operation of the chiller is best understood by referring to the relevant power and control diagrams that are supplied with the unit.
The control panel layout (part of the wiring diagram) shows the location of each electrical component that is installed inside the electrical panel, such as contactors, circuit breakers, controllers, etc.
The power diagram shows the power connection/starting method for each motor.

- If the unit should work at full capacity, the 1st compressor will start after a time delay (programmed in the controller), then the 2nd Compressor will start keeping the safety time delay between the starts of two different compressors.

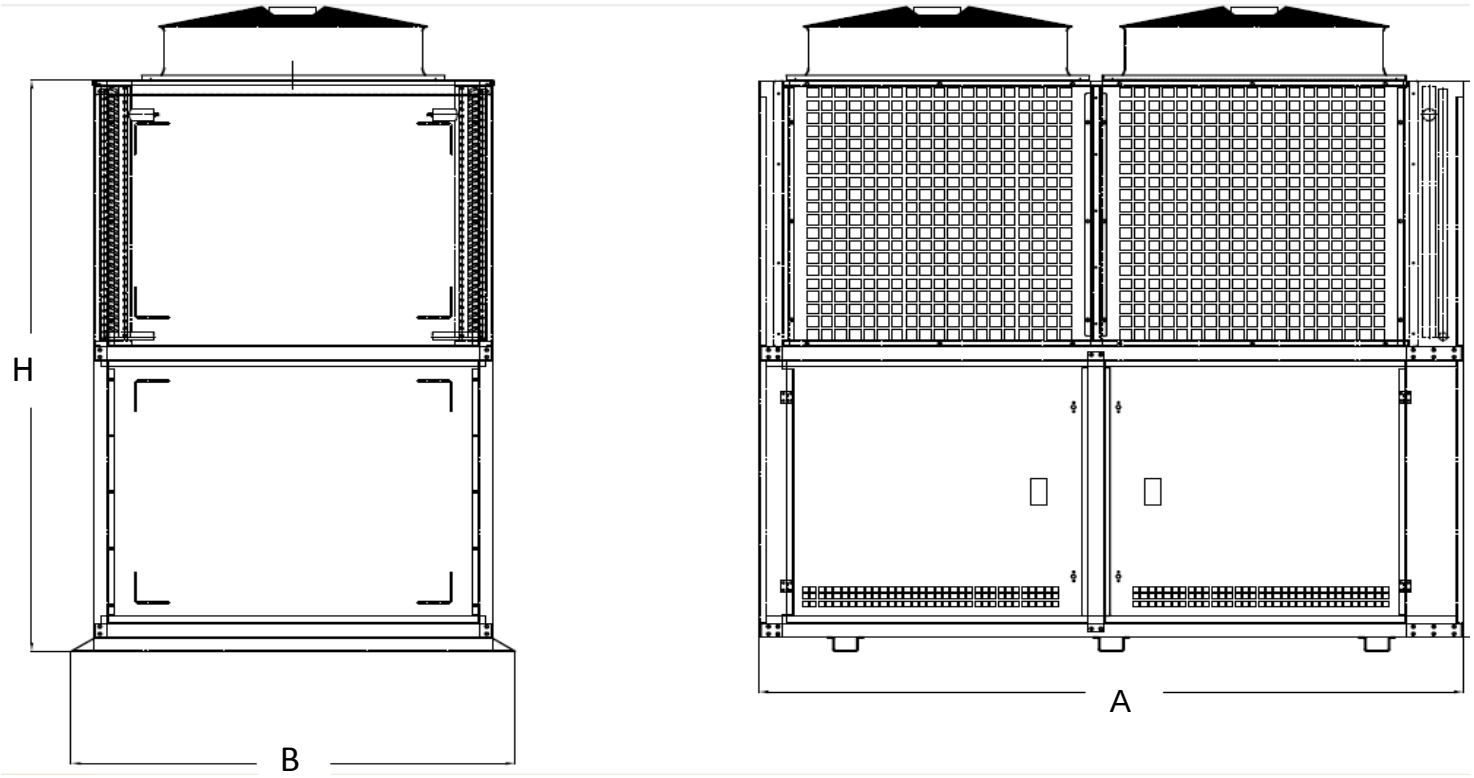


J. Dimensions –Scroll Compressor

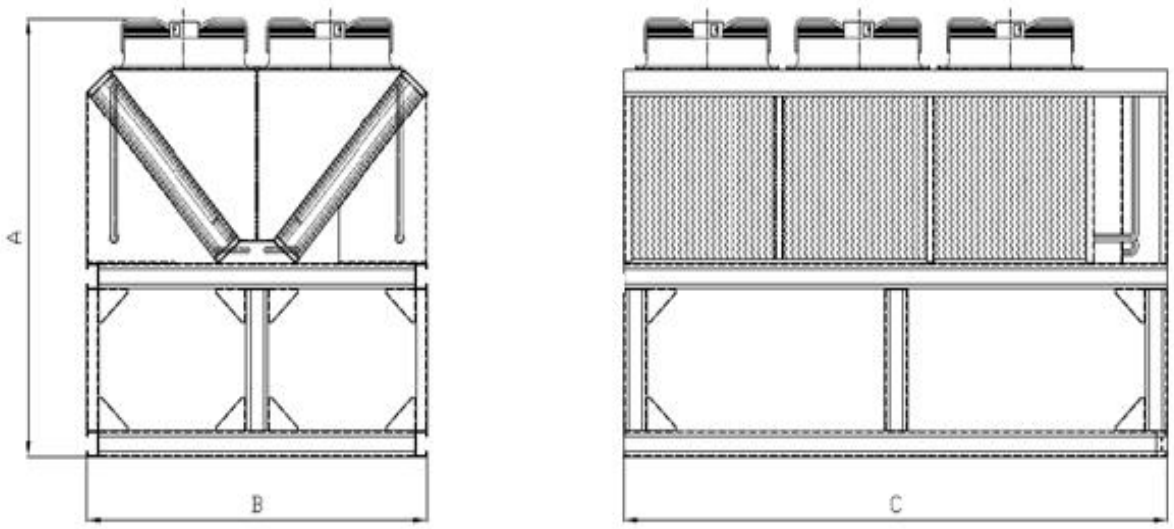


Unit Model	A	B	H
ESC 8.1	1752	975	1673
ESC 12.1	1752	975	1673
ESC 15.1	1752	975	1673
ESC 20.1	1752	975	1673
ESC 25.1	1752	975	1673
ESC 30.1	1752	975	1673
ESC 40.2	2252	1275	2020
ESC 50.2	2252	1275	2220
ESC 60.2	2252	1275	2220

Dimensions –Semi Hermetic

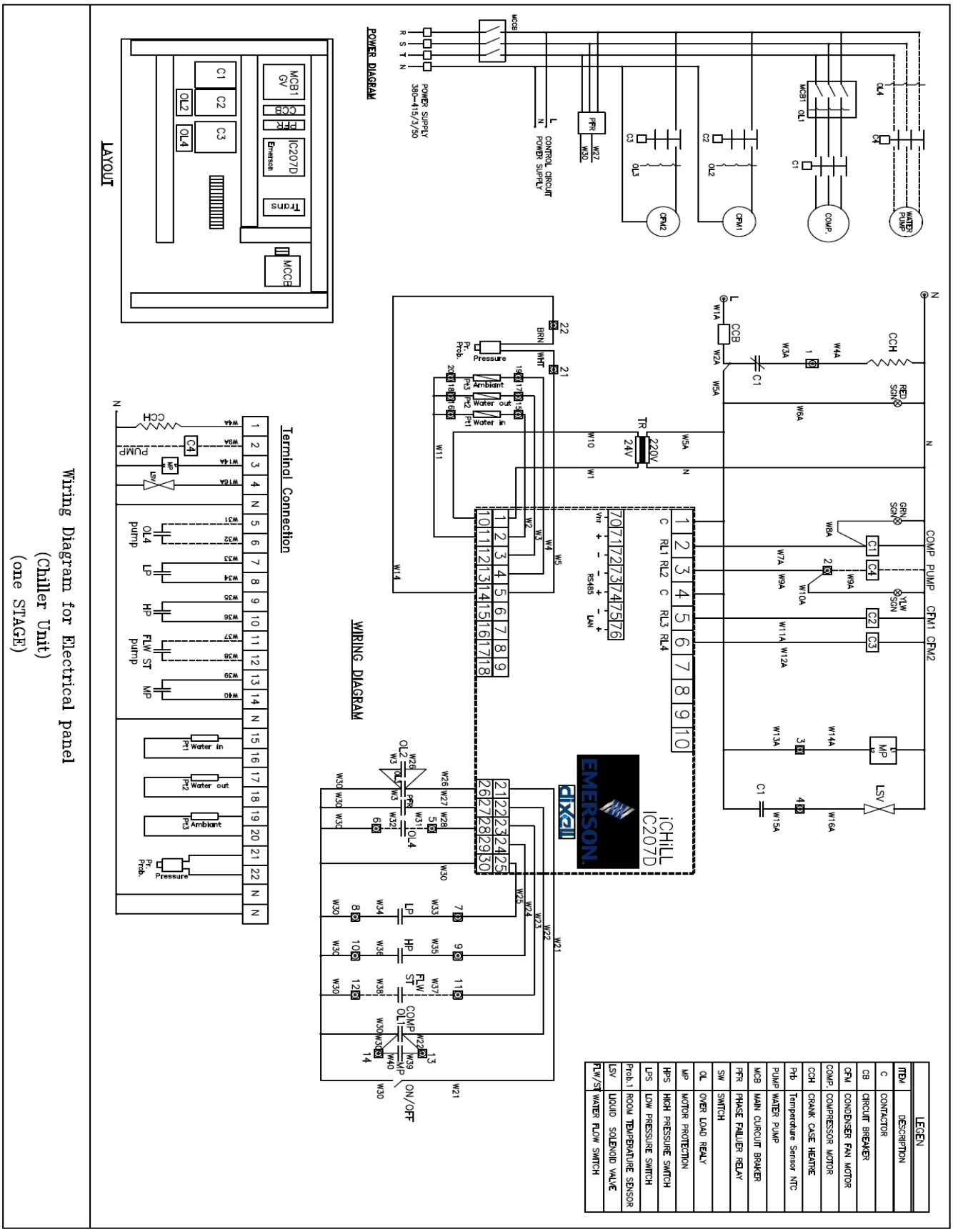


Unit Model	A	B	H
ESH 25.1	1752	975	1673
ESH 30.1	1752	975	1673
ESH 35.1	2252	1275	2020
ESH 40.1	2252	1275	2020
ESH 50.1	2252	1275	2220
ESH 60.2	2252	1275	2220



Unit Model	A	B	C
ESH80.2	2550	2300	4200
ESH90.2	2550	2300	4200
ESH 100.2	2550	2300	4200

K. Electrical Drawing



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