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**LG HVAC SOLUTION**

# WATER COOLED SCREW CHILLER

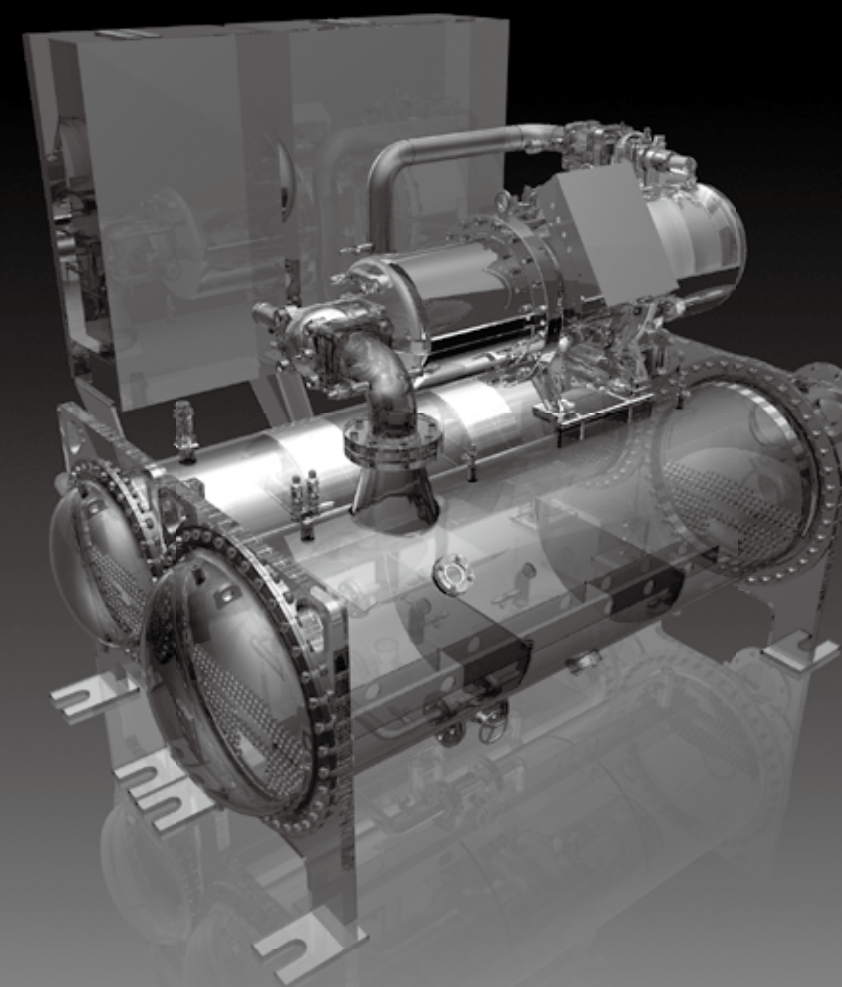


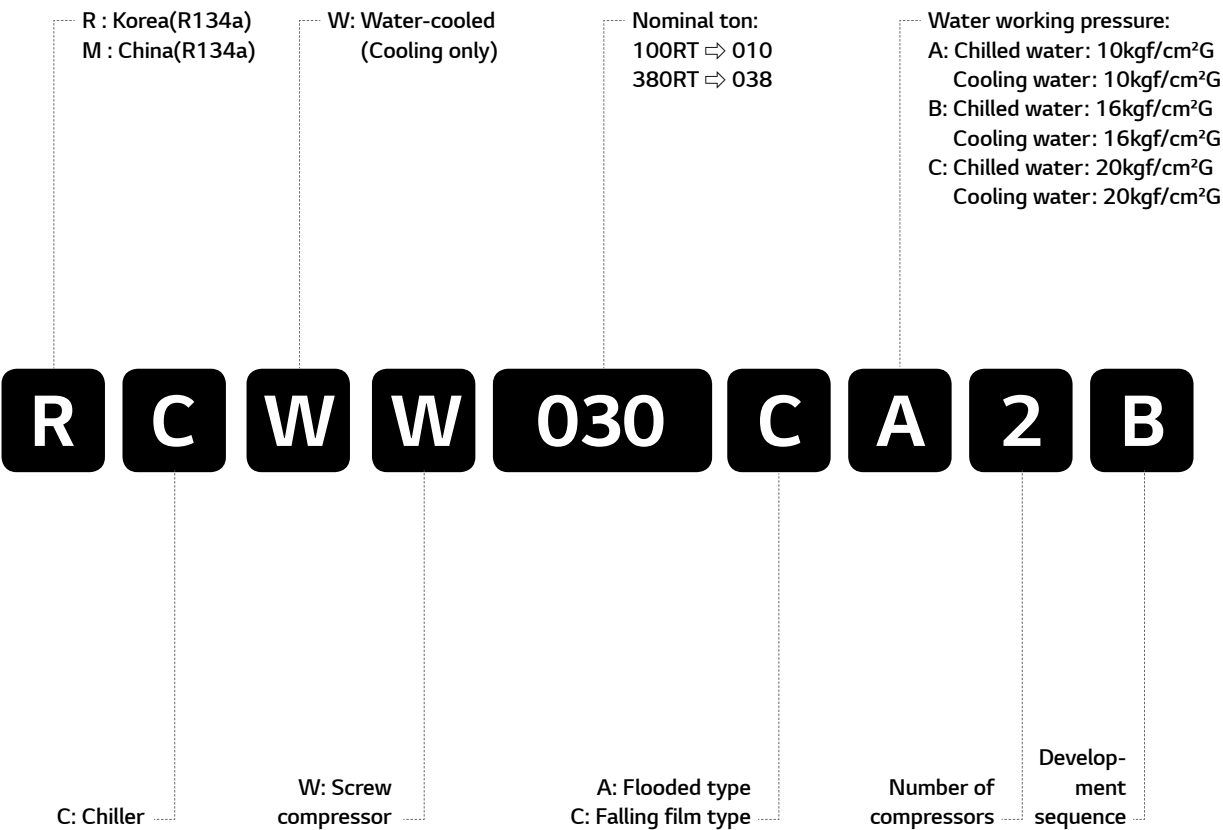
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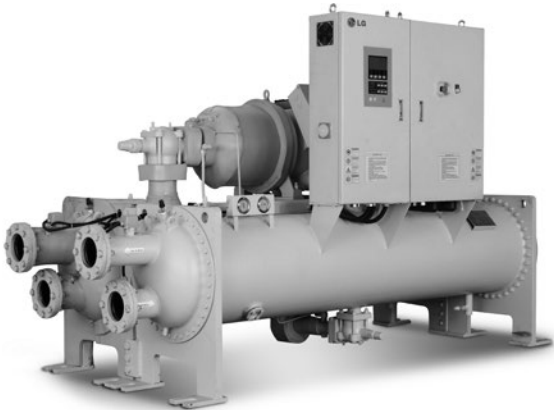
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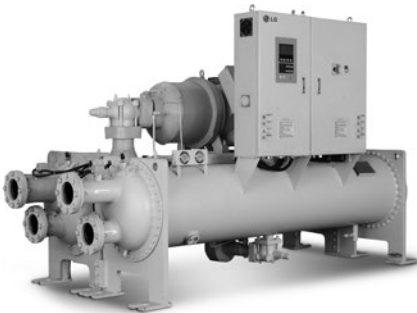


Line up

| Model   |        | 50   | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 |
|---|--------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|  | R-134a | 50Hz |     |     |     |     |     |     |     |     |     |
|   |        | 60Hz |     |     |     |     |     |     |     |     |     |

\* The above range is based on the nominal tonnage.

LG’s latest Water cooled screw chiller offers excellent operational efficiency thanks to the company’s advanced technologies and unrivalled air conditioning expertise. The new model’s advanced capacity control system valve help to improve performance and efficiency. LG’s proprietary PID(Proportional, Integral, Differential control), which controls hydraulic-head loss rate, helps to minimize energy loss even further.



- High-performance compressor manufactured by specialized manufacturer is adopted to ensure that the chiller is economical and durable with low vibration and low noise.
- Highly integrated motherboard is adopted and hence the function is strong and reliable.
- Advanced control algorithm is adopted to control chiller in advance and hence avoid frequent stoppage protection of chiller.
- We have set complete safety protection function in order to make chiller safely and reliably run.
- The linkage control and remote monitoring function of peripheral equipment ensure that the chiller can run safely and the operation and monitoring are convenient.
- The selection of excellent raw materials and fittings is the key to guaranteeing chiller quality.

High efficiency, High reliability

The RCWW & MCWW series is a kind of water-cooled spray screw chiller produced by LGE Corporation. Because of the special structure design, the chiller has high efficiency and high reliability.

Optimized dedicated motor R134a with high efficiency

Made of premium grade, low-loss core steel with the special slot design, the motors of R134a dedicated compressors

can gain the highest efficiency with low power consumption. Besides, different winding for specific voltage and frequency requirement contributes to the best power factor and excellent performance.

Constructional design of dedicated screw compressor

The screw compressor is characterized by a very compact design. Most of inner dimensions have been totally modified considering displacement volume, size of compression chamber, length & profile of rotors, oil separator specification and oil piping rearrangement, etc. to ensure consistency and cost effectiveness of the compressor.

Compressor

- Semi-hermetical twin-rotor screw compressor.
- Direct-drive, low speed/RPM for high efficiency and high reliability.
- Only three moving parts, resulting in high reliability with simple solution.
- Field serviceable compressor and easy maintenance.
- Precise rotor tip clearance.
- The world’s advanced patent screw tooth with low noise, smooth operation long life advantages.
- A refrigerant dispersing cooling device is set internally for compressor cooling, which uses return-refrigerant cooling.
- Years of research and testing. The LG screw chiller has amassed thousands of hours of testing, and conditions

beyond normal air conditioning applications.

Unit performance testing

LG began promoting factory performance tests for air-cooled chillers and water-cooled chillers, to show we stand behind the products we design and build.

The benefits of a performance test include verification of performance, prevention of operational problems, and assurance of a smooth start-up.

Only a performance test conducted in a laboratory or laboratory grade facility will confirm both performance and operation of a specific chiller.

Mostly factory performance tests go smoothly. If a problem occurs, LG personnel easily correct them and chiller is shipped to job site.

When a factory performance test is requested, the test can be conducted at the specified, design conditions. The test facility has the capability to control ambient test conditions to assure our customers that our chillers will perform as predicted.

AHRI certification program and standards and codes

Chillers conform to the following Standards and Codes:

- AHRI 550/590 - water chilling packages using the vapor compression cycle.
- ANSI/ASHRAE 34 - number designation and safety classification of refrigerants.
- ASME Section VIII(Option) - boiler and pressure vessel.
- GB/T 18430.1 - water chilling(heat pump) packages using the vapor compression cycle - part 1: water chilling(heat pump) packages for industrial & commercial and similar applications. (This code is only applied to product manufactured in China)



Equipment Overview

Semi-hermetic twin compressor

The semi-hermetic screw compressor is developed especially for applications in air-conditioning and refrigeration. With high operating load design, each compressor is of high efficiency and reliability in all operating conditions. Each compressor has the latest and advanced 5-to-6 Patented Screw Rotor Profile designed to ensure high capacity and efficiency in all operating conditions.

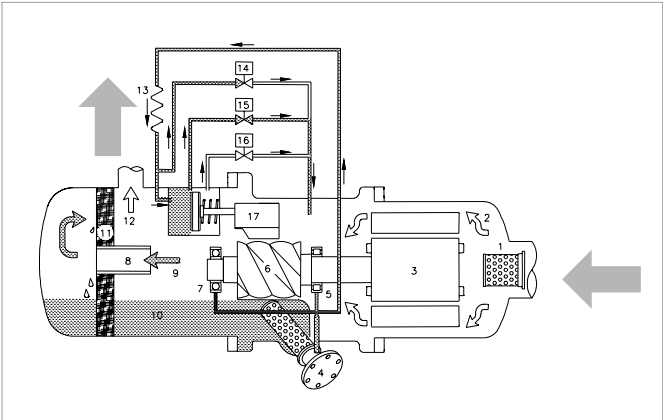
The compressor is equipped with separated radial and axial bearings, liquid injection and economizer connection, PTC motor temperature thermistors and discharge temperature thermistors, a motor protector, and oil level switch and

oil pressure differential switch and other accessories. The complete accessories and their new designs guarantee the compressor has the best reliability, longest bearing life during heavy duty running and strict operating conditions.

The slide valve for capacity control is located in the compressor chamber. The slide valve is actuated by injection of pressurized oil into the cylinder from the oil sump as well as bypass of oil through solenoid valves in each oil lines with pressure differential.

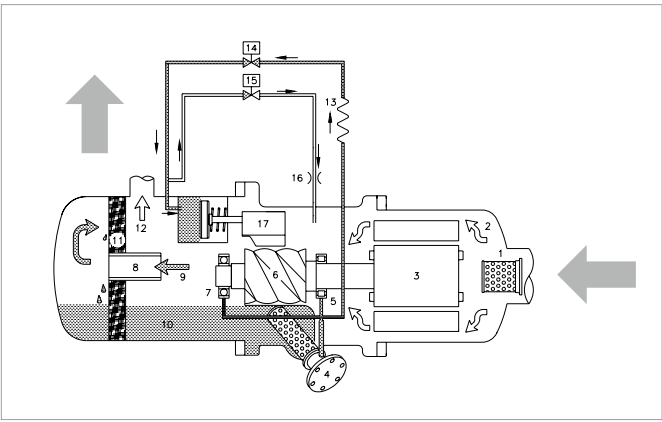
The screw compressors are equipped with either 3-step/4-step capacity control system or continuous(stepless) capacity control system. Both of the capacity control systems consist of a modulation slide valve, piston rod, cylinder, piston and piston rings. The slide valve and the piston are connected by a piston rod. The principle of operation is using the oil pressure to drive the piston in the cylinder. The lubrication oil flows from the oil sump through the oil filter cartridge and capillary then fills into the cylinder due to the positive oil pressure bigger than the right side of spring force plus the high pressure gas. The positive pressure differential causes the piston to move toward the right side in the cylinder. When the slide valve moves toward the right side, the effective compression volume in the compression chamber increases. This means the displacement of refrigerant gas also increases, as a result the refrigeration capacity also increases.

However, when any of the step solenoid valve(for 4-step capacity control system) is opened, the high pressure oil in the cylinder bypasses to the suction port, which causes the piston and the slide valve to move toward the left side, and then some of the refrigerant gas bypasses from the compression chamber back to the suction end. As a result, the refrigeration capacity decreases because of the reduction of displacement of refrigerant gas flowing in the system. The piston spring is used to push the piston back to its original position, i.e. minimum load position in order to reduce the starting current for the next starting.



4-steps capacity control

| No | Component                       | No | Component                           |
|----|---------------------------------|----|-------------------------------------|
| 1  | Suction filter                  | 10 | Lubricant                           |
| 2  | Gas in(low pressure)            | 11 | Oil separator cartridge             |
| 3  | Motor                           | 12 | Gas out (high pressure without oil) |
| 4  | Oil filter cartridge            | 13 | Capillary                           |
| 5  | Suction bearings                | 14 | Solenoid valve, SV2                 |
| 6  | Male rotor                      | 15 | Solenoid valve, SV1                 |
| 7  | Discharge bearings              | 16 | Orifice                             |
| 8  | Oil separator baffle            | 17 | Slide valve                         |
| 9  | Gas out(high pressure with oil) |    |                                     |



Step-less capacity control

| No | Component                       | No | Component  |
|----|---------------------------------|----|--|
| 1  | Suction filter                  | 10 | Lubricant  |
| 2  | Gas in(low pressure)            | 11 | Oil separator demister                               |
| 3  | Motor                           | 12 | Gas out(high pressure without oil)                   |
| 4  | Oil filter cartridge            | 13 | Capillary  |
| 5  | Suction bearings                | 14 | Solenoid valve(min. %), SV 25% / 33%                 |
| 6  | Male rotor                      | 15 | Solenoid valve (50% of full load), SV 50%            |
| 7  | Discharge bearings              | 16 | Solenoid valve(75% / 66% of full load), SV 75% / 66% |
| 8  | Oil separator baffle            | 17 | Slide valve  |
| 9  | Gas out(high pressure with oil) | *  | For RC2-100, 140 & 180 the SV50% omitted             |

Heat exchanger

Evaporator

Falling film type

“Falling film” shell and tube type evaporator having refrigerant in the shell and chilled water inside the tubes. Advantage of this type evaporator is higher heat transfer performance and reduced refrigerant charge. Distributer located on the top side of inside shell makes uniform flow of refrigerant, this refrigerant flows downward by gravity as a continuous film. The shell is of welded carbon steel construction with steel

tube sheets and copper heat exchange tubes. Removable steel water boxes at both ends of the cooler allow tube cleaning without disturbing the refrigerant circuit. Tubes are mechanically expanded into tube sheets with double grooves to ensure leak tight and trouble free operation. Multiple compressor/ circuit chillers have coolers with separate refrigeration circuits for each compressor.

Each refrigeration circuit is provided with its own pressure relief valve. All chillers are fitted with drain valves on the removable heads and shell. All coolers are factory insulated with 19mm of closed cell expanded synthetic rubber with all joints vapor sealed.

Expansion device

Expansion unit consists of butterfly valve and orifice. At 100% load situation, the pressure loss at the orifice is smaller than the refrigerant pressure loss in the condenser, thus the super-cooled refrigerant passes through the orifice.

At this stage the maximum amount of refrigerant is flowing into the evaporator. As the load reduces gradually, the circulating amount of refrigerant also reduces and accordingly the refrigerant level in the condenser is getting low.

When the amount of liquid refrigerant reduces, the gas amount in the orifice is getting larger, raising the resistance thus controlling the flow rate.

Control

Controller system information

Generally controller consist of Display, Master, Slave and Relay board. Each board connect with RS485 communication and include analog input/output, digital input/output channel.

- 7 and 10.2-inch color LCD touch screen with high resolution (1,024 x 600)
- Operation scheduling function
- Real time trend display
- Web Access(Additional accessory)
- Running data acquisition
- Easy-to-read display of operational data
- Certified EMI/EMS
- Communication supported: Modbus, RS485(standard)
- Language: English / Chinese / Korean





R134a(60Hz)

| Model             |                              | Units | RCWW008CA1B              | RCWW010CA1B | RCWW011CA1B | RCWW012CA1B | RCWW014CA1B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 276.0                    | 332.2       | 376.4       | 407.0       | 472.2       |
|                   |                              | usRT  | 78.5                     | 94.5        | 107.0       | 115.7       | 134.3       |
|                   | Input Power                  | kW    | 51.6                     | 62.3        | 70.5        | 76.1        | 84.7        |
|                   |                              | COP   | 5.35                     | 5.33        | 5.34        | 5.35        | 5.58        |
| General Unit Data | Number of Circuits           |       | 1                        | 1           | 1           | 1           | 1           |
|                   | Refrigerant, R-134a          | kg    | 110                      | 110         | 110         | 110         | 140         |
|                   | Oil Charge                   | l     | 16                       | 16          | 18          | 20          | 20          |
| Weight            | Shipping Weight              | kg    | 2,670                    | 2,860       | 2,950       | 2,940       | 3,230       |
|                   | Operating Weight             | kg    | 2,810                    | 3,020       | 3,120       | 3,120       | 3,460       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |             |             |
|                   | Quantity                     | EA    | 1                        | 1           | 1           | 1           | 1           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 6.6                      | 7.5         | 8.5         | 8.5         | 10.8        |
|                   | Max. Cooling Water Flow Rate | l/s   | 26.5                     | 30.0        | 34.2        | 34.2        | 43.2        |
|                   | Water Connections            | DN    | 100                      | 100         | 100         | 100         | 125         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 5.6                      | 7.7         | 7.7         | 8.4         | 10.1        |
|                   | Max. Chilled Water Flow Rate | l/s   | 22.3                     | 30.7        | 30.7        | 33.5        | 40.5        |
|                   | Water Connections            | DN    | 100                      | 100         | 100         | 100         | 125         |
| Dimension         | Length                       | mm    | 3,040                    | 3,040       | 3,040       | 3,040       | 3,145       |
|                   | Width                        | mm    | 1,435                    | 1,435       | 1,435       | 1,435       | 1,480       |
|                   | Height                       | mm    | 1,860                    | 1,865       | 1,865       | 1,865       | 2,080       |

Note:

1. 1usRT = 3,024kcal/hr = 3.517kW, 1mH<sub>2</sub>O = 9.8kPa

2. AHRI conditions :

Leaving chilled water temperature is 6.7 °C(44 °F). Water flow is 0.043 L/s per kW(2.4 gpm/ton)

Entering cooling water temperature is 29.4 °C(85 °F). Water flow is 0.054 L/s per kW(3.0 gpm/ton)

Fouling factor of water in evaporator is 0.018 m²·°C/kW(0.00001 h·ft²·°F/Btu)

Fouling factor of water in condenser is 0.044 m²·°C/kW(0.00025 h·ft²·°F/Btu)

3. Due to our policy of innovation some specification may be changed without prior notification.

R134a(60Hz)

| Model             |                              | Units | RCWW016CA1B              | RCWW018CA1B | RCWW020CA1B | RCWW022CA1B | RCWW020CA2B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 571.6                    | 632.8       | 681.1       | 795.9       | 667.6       |
|                   |                              | usRT  | 162.6                    | 180.0       | 193.7       | 226.4       | 189.8       |
|                   | Input Power                  | kW    | 105.0                    | 114.7       | 124.6       | 142.0       | 124.7       |
|                   |                              | COP   | 5.44                     | 5.52        | 5.47        | 5.61        | 5.35        |
| General Unit Data | Number of Circuits           |       | 1                        | 1           | 1           | 1           | 2           |
|                   | Refrigerant, R-134a          | kg    | 140                      | 165         | 165         | 200         | 120 x 2     |
|                   | Oil Charge                   | l     | 28                       | 28          | 28          | 1           | 16 / 16     |
| Weight            | Shipping Weight              | kg    | 3,560                    | 3,680       | 3,780       | 3,880       | 5,140       |
|                   | Operating Weight             | kg    | 3,810                    | 3,960       | 4,060       | 4,160       | 5,410       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |             |             |
|                   | Quantity                     | EA    | 1                        | 1           | 1           | 1           | 2           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 12.0                     | 13.6        | 13.6        | 13.6        | 12.0        |
|                   | Max. Cooling Water Flow Rate | l/s   | 48.1                     | 54.4        | 54.4        | 54.4        | 48.1        |
|                   | Water Connections            | DN    | 125                      | 125         | 125         | 125         | 150         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 11.2                     | 12.6        | 12.6        | 12.6        | 11.2        |
|                   | Max. Chilled Water Flow Rate | l/s   | 44.6                     | 50.2        | 50.2        | 50.2        | 44.6        |
|                   | Water Connections            | DN    | 125                      | 125         | 125         | 125         | 150         |
| Dimension         | Length                       | mm    | 3,145                    | 3,145       | 3,145       | 3,365       | 3,855       |
|                   | Width                        | mm    | 1,480                    | 1,605       | 1,605       | 1,750       | 1,565       |
|                   | Height                       | mm    | 2,080                    | 2,105       | 2,105       | 2,150       | 2,175       |

Note:

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2. AHRI conditions :

Leaving chilled water temperature is 6.7 °C(44 °F). Water flow is 0.043 L/s per kW(2.4 gpm/ton)

Entering cooling water temperature is 29.4 °C(85 °F). Water flow is 0.054 L/s per kW(3.0 gpm/ton)

Fouling factor of water in evaporator is 0.018 m²·°C/kW(0.00001 h·ft²·°F/Btu)

Fouling factor of water in condenser is 0.044 m²·°C/kW(0.00025 h·ft²·°F/Btu)

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R134a(60Hz)

| Model             |                              | Units | RCWW022CA2B              | RCWW024CA2B | RCWW026CA2B | RCWW028CA2B | RCWW032CA2B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 754.6                    | 814.0       | 886.8       | 945.3       | 1,141.1     |
|                   |                              | usRT  | 214.6                    | 231.5       | 252.2       | 268.8       | 324.5       |
|                   | Input Power                  | kW    | 140.9                    | 152.4       | 164.7       | 169.9       | 210.5       |
|                   |                              | COP   | 5.35                     | 5.34        | 5.38        | 5.56        | 5.42        |
| General Unit Data | Number of Circuits           |       | 2                        | 2           | 2           | 2           | 2           |
|                   | Refrigerant, R-134a          | kg    | 120 x 2                  | 120 x 2     | 120 x 2     | 145 x 2     | 145 x 2     |
|                   | Oil Charge                   | l     | 18 / 18                  | 20 / 20     | 23 / 23     | 20 / 20     | 28 / 28     |
| Weight            | Shipping Weight              | kg    | 5,460                    | 5,600       | 5,720       | 5,770       | 6,580       |
|                   | Operating Weight             | kg    | 5,780                    | 5,940       | 6,080       | 6,150       | 7,040       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |             |             |
|                   | Quantity                     | EA    | 2                        | 2           | 2           | 2           | 2           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 13.6                     | 14.6        | 14.6        | 16.9        | 19.0        |
|                   | Max. Cooling Water Flow Rate | l/s   | 54.4                     | 58.6        | 58.6        | 67.7        | 76.0        |
|                   | Water Connections            | DN    | 150                      | 150         | 150         | 150         | 200         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 12.6                     | 13.8        | 13.8        | 15.7        | 18.0        |
|                   | Max. Chilled Water Flow Rate | l/s   | 50.2                     | 55.1        | 55.1        | 62.8        | 71.8        |
|                   | Water Connections            | DN    | 150                      | 150         | 150         | 150         | 200         |
| Dimension         | Length                       | mm    | 3,855                    | 3,855       | 3,855       | 3,855       | 3,855       |
|                   | Width                        | mm    | 1,565                    | 1,565       | 1,565       | 1,685       | 1,685       |
|                   | Height                       | mm    | 2,175                    | 2,175       | 2,175       | 2,225       | 2,225       |

Note:

1. 1usRT = 3,024kcal/hr = 3.517kW, 1mH<sub>2</sub>O = 9.8kPa

2. AHRI conditions :

Leaving chilled water temperature is 6.7 °C(44 °F). Water flow is 0.043 L/s per kW(2.4 gpm/ton)

Entering cooling water temperature is 29.4 °C(85 °F). Water flow is 0.054 L/s per kW(3.0 gpm/ton)

Fouling factor of water in evaporator is 0.018 m²·°C/kW(0.00001 h·ft²·°F/Btu)

Fouling factor of water in condenser is 0.044 m²·°C/kW(0.00025 h·ft²·°F/Btu)

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R134a(60Hz)

| Model             |                              | Units | RCWW036CA2B              | RCWW040CA2B | RCWW044CA2B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 1,267.5                  | 1,357.7     | 1,589.0     |
|                   |                              | usRT  | 360.5                    | 386.1       | 451.9       |
|                   | Input Power                  | kW    | 230.0                    | 249.8       | 284.7       |
|                   |                              | COP   | 5.51                     | 5.44        | 5.58        |
| General Unit Data | Number of Circuits           |       | 2                        | 2           | 2           |
|                   | Refrigerant, R-134a          | kg    | 165 x 2                  | 165 x 2     | 190 x 2     |
|                   | Oil Charge                   | l     | 28 / 28                  | 28 / 28     | 28 / 28     |
| Weight            | Shipping Weight              | kg    | 6,910                    | 6,930       | 7,430       |
|                   | Operating Weight             | kg    | 7,430                    | 7,480       | 7,980       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |
|                   | Quantity                     | EA    | 2                        | 2           | 2           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 21.6                     | 21.6        | 21.6        |
|                   | Max. Cooling Water Flow Rate | l/s   | 86.5                     | 86.5        | 86.5        |
|                   | Water Connections            | DN    | 200                      | 200         | 200         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 20.2                     | 20.2        | 20.2        |
|                   | Max. Chilled Water Flow Rate | l/s   | 80.9                     | 80.9        | 80.9        |
|                   | Water Connections            | DN    | 200                      | 200         | 200         |
| Dimension         | Length                       | mm    | 4,550                    | 4,550       | 4,550       |
|                   | Width                        | mm    | 1,795                    | 1,795       | 1,910       |
|                   | Height                       | mm    | 2,275                    | 2,275       | 2,300       |

Note:

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2. AHRI conditions :

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R134a(50Hz)

| Model             |                              | Units | RCWW008CA1B              | RCWW010CA1B | RCWW011CA1B | RCWW012CA1B | RCWW014CA1B | RCWW016CA1B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|-------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 277.4                    | 337.9       | 370.1       | 414.9       | 473.9       | 567.2       |
|                   |                              | usRT  | 78.9                     | 96.1        | 105.2       | 118.0       | 134.8       | 161.3       |
|                   | Input Power                  | kW    | 51.8                     | 63.2        | 68.3        | 76.2        | 87.3        | 103.6       |
|                   |                              | COP   | 5.36                     | 5.35        | 5.42        | 5.45        | 5.43        | 5.48        |
| General Unit Data | Number of Circuits           |       | 1                        | 1           | 1           | 1           | 1           | 1           |
|                   | Refrigerant, R-134a          | kg    | 110                      | 110         | 110         | 110         | 140         | 140         |
|                   | Oil Charge                   | l     | 16                       | 16          | 18          | 20          | 20          | 28          |
| Weight            | Shipping Weight              | kg    | 2,800                    | 2,890       | 2,970       | 3,030       | 3,430       | 3,610       |
|                   | Operating Weight             | kg    | 2,940                    | 3,050       | 3,140       | 3,210       | 3,660       | 3,860       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |             |             |             |
|                   | Quantity                     | EA    | 1                        | 1           | 1           | 1           | 1           | 1           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 6.6                      | 7.5         | 8.5         | 8.5         | 10.8        | 12.0        |
|                   | Max. Cooling Water Flow Rate | l/s   | 26.5                     | 30.0        | 34.2        | 34.2        | 43.2        | 48.1        |
|                   | Water Connections            | DN    | 100                      | 100         | 100         | 100         | 125         | 125         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         | 0.9         | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 5.6                      | 7.7         | 7.7         | 8.4         | 10.1        | 11.2        |
|                   | Max. Chilled Water Flow Rate | l/s   | 22.3                     | 30.7        | 30.7        | 33.5        | 40.5        | 44.6        |
|                   | Water Connections            | DN    | 100                      | 100         | 100         | 100         | 125         | 125         |
| Dimension         | Length                       | mm    | 3,040                    | 3,040       | 3,040       | 3,040       | 3,145       | 3,145       |
|                   | Width                        | mm    | 1,435                    | 1,435       | 1,435       | 1,435       | 1,480       | 1,480       |
|                   | Height                       | mm    | 1,860                    | 1,865       | 1,865       | 1,865       | 2,080       | 2,080       |

Note:

1. 1usRT = 3,024kcal/hr = 3.517kW, 1mH<sub>2</sub>O = 9.8kPa

2. AHRI conditions :

Leaving chilled water temperature is 6.7 °C(44 °F). Water flow is 0.043 L/s per kW(2.4 gpm/ton)

Entering cooling water temperature is 29.4 °C(85 °F). Water flow is 0.054 L/s per kW(3.0 gpm/ton)

Fouling factor of water in evaporator is 0.018 m²·°C/kW(0.00001 h·ft²·°F/Btu)

Fouling factor of water in condenser is 0.044 m²·°C/kW(0.00025 h·ft²·°F/Btu)

3. Due to our policy of innovation some specification may be changed without prior notification.

R134a(50Hz)

| Model             |                              | Units | RCWW019CA1B              | RCWW020CA2B | RCWW022CA2B | RCWW024CA2B | RCWW028CA2B | RCWW032CA2B | RCWW038CA2B |
|-------------------|------------------------------|-------|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| AHRI Condition    | Cooling capacity             | kW    | 657.9                    | 679.3       | 741.2       | 829.9       | 948.9       | 1,132.3     | 1,317.9     |
|                   |                              | usRT  | 187.1                    | 193.2       | 210.8       | 236.0       | 269.9       | 322.0       | 374.8       |
|                   | Input Power                  | kW    | 118.2                    | 126.5       | 136.6       | 152.5       | 175.1       | 207.6       | 237.0       |
|                   | COP                          |       | 5.57                     | 5.37        | 5.43        | 5.44        | 5.42        | 5.45        | 5.56        |
| General Unit Data | Number of Circuits           |       | 1                        | 2           | 2           | 2           | 2           | 2           | 2           |
|                   | Refrigerant, R-134a          | kg    | 165                      | 120 x 2     | 120 x 2     | 120 x 2     | 145 x 2     | 145 x 2     | 165 x 2     |
|                   | Oil Charge                   | l     | 28                       | 16 / 16     | 18 / 18     | 20 / 20     | 20 / 20     | 28 / 28     | 28 / 28     |
| Weight            | Shipping Weight              | kg    | 3,720                    | 5,220       | 5,500       | 5,780       | 6,180       | 6,680       | 6,990       |
|                   | Operating Weight             | kg    | 4,000                    | 5,490       | 5,860       | 6,120       | 6,560       | 7,140       | 7,510       |
| Compressors       | Compressor type              |       | Semi-hermetic twin screw |             |             |             |             |             |             |
|                   | Quantity                     | EA    | 1                        | 2           | 2           | 2           | 2           | 2           | 2           |
| Condenser         | Condenser type               |       | Shell and Tube           |             |             |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Min. Cooling Water Flow Rate | l/s   | 13.6                     | 12.0        | 13.6        | 14.6        | 16.9        | 19.0        | 21.6        |
|                   | Max. Cooling Water Flow Rate | l/s   | 54.4                     | 48.1        | 54.4        | 58.6        | 67.7        | 76.0        | 86.5        |
|                   | Water Connections            | DN    | 125                      | 150         | 150         | 150         | 150         | 200         | 200         |
| Evaporator        | Evaporator type              |       | Shell and Tube           |             |             |             |             |             |             |
|                   | Max. Water Pressure          | MPa   | 1.0                      | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         | 1.0         |
|                   | Max. Refrigerant Pressure    | MPa   | 0.9                      | 0.9         | 0.9         | 0.9         | 0.9         | 0.9         | 0.9         |
|                   | Min. Chilled Water Flow Rate | l/s   | 12.6                     | 11.2        | 12.6        | 13.8        | 15.7        | 18.0        | 20.2        |
|                   | Max. Chilled Water Flow Rate | l/s   | 50.2                     | 44.6        | 50.2        | 55.1        | 62.8        | 71.8        | 80.9        |
|                   | Water Connections            | DN    | 125                      | 150         | 150         | 150         | 150         | 200         | 200         |
| Dimension         | Length                       | mm    | 3,145                    | 3,855       | 3,855       | 3,855       | 3,855       | 3,855       | 4,550       |
|                   | Width                        | mm    | 1,605                    | 1,565       | 1,565       | 1,565       | 1,685       | 1,685       | 1,795       |
|                   | Height                       | mm    | 2,105                    | 2,175       | 2,175       | 2,175       | 2,225       | 2,225       | 2,275       |

Note:

1. 1usRT = 3,024kcal/hr = 3.517kW, 1mH<sub>2</sub>O = 9.8kPa

2. AHRI conditions :

Leaving chilled water temperature is 6.7 °C(44 °F). Water flow is 0.043 L/s per kW(2.4 gpm/ton)

Entering cooling water temperature is 29.4 °C(85 °F). Water flow is 0.054 L/s per kW(3.0 gpm/ton)

Fouling factor of water in evaporator is 0.018 m²·°C/kW(0.00001 h·ft²·°F/Btu)

Fouling factor of water in condenser is 0.044 m²·°C/kW(0.00025 h·ft²·°F/Btu)

3. Due to our policy of innovation some specification may be changed without prior notification.

380V / 60Hz

| Model       |           | Voltage | Compressor |     |               | Total RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|-----------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |           |             |     |       |
| RCWW008CA1B | Circuit 1 | 380     | 810        | 88  | 270           | 96        | 270         | 129 | 232   |
| RCWW010CA1B | Circuit 1 |         | 820        | 112 | 273           | 122       | 273         | 165 | 296   |
| RCWW011CA1B | Circuit 1 |         | 985        | 125 | 328           | 135       | 328         | 181 | 325   |
| RCWW012CA1B | Circuit 1 |         | 985        | 134 | 328           | 145       | 328         | 195 | 350   |
| RCWW014CA1B | Circuit 1 |         | 1,115      | 150 | 372           | 162       | 372         | 217 | 390   |
| RCWW016CA1B | Circuit 1 |         | 1,750      | 188 | 583           | 203       | 583         | 270 | 486   |
| RCWW018CA1B | Circuit 1 |         | 1,930      | 200 | 643           | 218       | 643         | 294 | 529   |
| RCWW020CA1B | Circuit 1 |         | 2,185      | 217 | 728           | 236       | 728         | 316 | 569   |
| RCWW022CA1B | Circuit 1 |         | 2,470      | 248 | 823           | 269       | 823         | 360 | 647   |
| RCWW020CA2B | Circuit 1 |         | 820        | 112 | 273           | 224       | 385         | 329 | 592   |
|             | Circuit 2 |         | 820        | 112 | 273           |           |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 985        | 125 | 328           | 249       | 453         | 362 | 651   |
|             | Circuit 2 |         | 985        | 125 | 328           |           |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 985        | 134 | 328           | 267       | 462         | 389 | 700   |
|             | Circuit 2 |         | 985        | 134 | 328           |           |             |     |       |
| RCWW026CA2B | Circuit 1 |         | 1,115      | 146 | 372           | 293       | 518         | 422 | 759   |
|             | Circuit 2 |         | 1,115      | 146 | 372           |           |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 1,115      | 150 | 372           | 300       | 522         | 434 | 781   |
|             | Circuit 2 |         | 1,115      | 150 | 372           |           |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,750      | 188 | 583           | 376       | 771         | 541 | 973   |
|             | Circuit 2 |         | 1,750      | 188 | 583           |           |             |     |       |
| RCWW036CA2B | Circuit 1 |         | 1,930      | 200 | 643           | 400       | 843         | 588 | 1,058 |
|             | Circuit 2 |         | 1,930      | 200 | 643           |           |             |     |       |
| RCWW040CA2B | Circuit 1 |         | 2,185      | 217 | 728           | 434       | 945         | 632 | 1,138 |
|             | Circuit 2 |         | 2,185      | 217 | 728           |           |             |     |       |
| RCWW044CA2B | Circuit 1 |         | 2,470      | 248 | 823           | 496       | 1,071       | 719 | 1,294 |
|             | Circuit 2 |         | 2,470      | 248 | 823           |           |             |     |       |

Note:

1. AHRI conditions :  
Leaving chilled water temperature is 6.7°F(44°C)  
Entering cooling water temperature is 29.4°F(85°C)

2. Symbols :  
LRA : Locked Rotor Ampere  
RLA : Rated Load Ampere  
MCA : Minimum Circuit Ampere  
MOCP : Maximum OverCurrent Protection  
Total RLA : Current when all compressor running  
Start Current : Starting current of one compressor  
Max current : Start current(Circuit 1) + RLA(Circuit 2)

440V / 60Hz

| Model       |           | Voltage | Compressor |     |               | Total RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|-----------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |           |             |     |       |
| RCWW008CA1B | Circuit 1 | 440     | 690        | 77  | 230           | 77        | 230         | 111 | 200   |
| RCWW010CA1B | Circuit 1 |         | 700        | 97  | 233           | 97        | 233         | 142 | 256   |
| RCWW011CA1B | Circuit 1 |         | 810        | 108 | 270           | 108       | 270         | 156 | 281   |
| RCWW012CA1B | Circuit 1 |         | 810        | 115 | 270           | 115       | 270         | 168 | 302   |
| RCWW014CA1B | Circuit 1 |         | 875        | 130 | 292           | 130       | 292         | 187 | 337   |
| RCWW016CA1B | Circuit 1 |         | 1,340      | 162 | 447           | 162       | 447         | 233 | 420   |
| RCWW018CA1B | Circuit 1 |         | 1,430      | 173 | 477           | 173       | 477         | 254 | 457   |
| RCWW020CA1B | Circuit 1 |         | 1,565      | 188 | 522           | 188       | 522         | 273 | 491   |
| RCWW022CA1B | Circuit 1 |         | 1,990      | 214 | 663           | 214       | 663         | 310 | 559   |
| RCWW020CA2B | Circuit 1 |         | 700        | 97  | 233           | 194       | 331         | 284 | 511   |
|             | Circuit 2 |         | 700        | 97  | 233           |           |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 810        | 108 | 270           | 215       | 378         | 312 | 562   |
|             | Circuit 2 |         | 810        | 108 | 270           |           |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 810        | 115 | 270           | 231       | 385         | 336 | 605   |
|             | Circuit 2 |         | 810        | 115 | 270           |           |             |     |       |
| RCWW026CA2B | Circuit 1 |         | 875        | 126 | 292           | 252       | 418         | 364 | 656   |
|             | Circuit 2 |         | 875        | 126 | 292           |           |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 875        | 130 | 292           | 259       | 421         | 375 | 675   |
|             | Circuit 2 |         | 875        | 130 | 292           |           |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,340      | 162 | 447           | 325       | 609         | 467 | 840   |
|             | Circuit 2 |         | 1,340      | 162 | 447           |           |             |     |       |
| RCWW036CA2B | Circuit 1 |         | 1,430      | 173 | 477           | 346       | 650         | 508 | 914   |
|             | Circuit 2 |         | 1,430      | 173 | 477           |           |             |     |       |
| RCWW040CA2B | Circuit 1 |         | 1,565      | 188 | 522           | 375       | 709         | 546 | 982   |
|             | Circuit 2 |         | 1,565      | 188 | 522           |           |             |     |       |
| RCWW044CA2B | Circuit 1 |         | 1,990      | 214 | 663           | 429       | 878         | 621 | 1,117 |
|             | Circuit 2 |         | 1,990      | 214 | 663           |           |             |     |       |

Note:

1. AHRI conditions :  
Leaving chilled water temperature is 6.7°F(44°C)  
Entering cooling water temperature is 29.4°F(85°C)

2. Symbols :  
LRA : Locked Rotor Ampere  
RLA : Rated Load Ampere  
MCA : Minimum Circuit Ampere  
MOCP : Maximum OverCurrent Protection  
Total RLA : Current when all compressor running  
Start Current : Starting current of one compressor  
Max current : Start current(Circuit 1) + RLA(Circuit 2)



460V / 60Hz

| Model       |           | Voltage | Compressor |     |               | Total<br>RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|--------------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |              |             |     |       |
| RCWW008CA1B | Circuit 1 | 460     | 720        | 73  | 240           | 73           | 240         | 107 | 192   |
| RCWW010CA1B | Circuit 1 |         | 730        | 93  | 243           | 93           | 243         | 136 | 245   |
| RCWW011CA1B | Circuit 1 |         | 845        | 103 | 282           | 103          | 282         | 149 | 269   |
| RCWW012CA1B | Circuit 1 |         | 845        | 110 | 282           | 110          | 282         | 161 | 289   |
| RCWW014CA1B | Circuit 1 |         | 915        | 124 | 305           | 124          | 305         | 179 | 322   |
| RCWW016CA1B | Circuit 1 |         | 1,400      | 155 | 467           | 155          | 467         | 223 | 402   |
| RCWW018CA1B | Circuit 1 |         | 1,495      | 166 | 498           | 166          | 498         | 243 | 437   |
| RCWW020CA1B | Circuit 1 |         | 1,635      | 179 | 545           | 179          | 545         | 261 | 470   |
| RCWW022CA1B | Circuit 1 |         | 2,080      | 205 | 693           | 205          | 693         | 297 | 534   |
| RCWW020CA2B | Circuit 1 |         | 730        | 93  | 243           | 186          | 336         | 272 | 489   |
|             | Circuit 2 |         | 730        | 93  | 243           |              |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 845        | 103 | 282           | 206          | 384         | 299 | 537   |
|             | Circuit 2 |         | 845        | 103 | 282           |              |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 845        | 110 | 282           | 221          | 392         | 321 | 578   |
|             | Circuit 2 |         | 845        | 110 | 282           |              |             |     |       |
| RCWW026CA2B | Circuit 1 |         | 915        | 121 | 305           | 241          | 426         | 349 | 627   |
|             | Circuit 2 |         | 915        | 121 | 305           |              |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 915        | 124 | 305           | 248          | 429         | 358 | 645   |
|             | Circuit 2 |         | 915        | 124 | 305           |              |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,400      | 155 | 467           | 311          | 622         | 447 | 804   |
|             | Circuit 2 |         | 1,400      | 155 | 467           |              |             |     |       |
| RCWW036CA2B | Circuit 1 |         | 1,495      | 166 | 498           | 331          | 664         | 485 | 873   |
|             | Circuit 2 |         | 1,495      | 166 | 498           |              |             |     |       |
| RCWW040CA2B | Circuit 1 |         | 1,635      | 179 | 545           | 359          | 724         | 522 | 940   |
|             | Circuit 2 |         | 1,635      | 179 | 545           |              |             |     |       |
| RCWW044CA2B | Circuit 1 |         | 2,080      | 205 | 693           | 410          | 898         | 594 | 1,069 |
|             | Circuit 2 |         | 2,080      | 205 | 693           |              |             |     |       |

Note:  
1. AHRI conditions :  
  Leaving chilled water temperature is 6.7°F(44°C)  
  Entering cooling water temperature is 29.4°F(85°C)  
2. Symbols :  
  LRA : Locked Rotor Ampere  
  RLA : Rated Load Ampere  
  MCA : Minimum Circuit Ampere  
  MOCP : Maximum OverCurrent Protection  
  Total RLA : Current when all compressor running  
  Start Current : Starting current of one compressor  
  Max current : Start current(Circuit 1) + RLA(Circuit 2)

480V / 60Hz

| Model       |           | Voltage | Compressor |     |               | Total<br>RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|--------------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |              |             |     |       |
| RCWW008CA1B | Circuit 1 | 480     | 655        | 70  | 218           | 70           | 218         | 102 | 184   |
| RCWW010CA1B | Circuit 1 |         | 690        | 89  | 230           | 89           | 230         | 130 | 234   |
| RCWW011CA1B | Circuit 1 |         | 795        | 99  | 265           | 99           | 265         | 143 | 257   |
| RCWW012CA1B | Circuit 1 |         | 795        | 106 | 265           | 106          | 265         | 154 | 277   |
| RCWW014CA1B | Circuit 1 |         | 850        | 119 | 283           | 119          | 283         | 172 | 309   |
| RCWW016CA1B | Circuit 1 |         | 1,295      | 149 | 432           | 149          | 432         | 214 | 385   |
| RCWW018CA1B | Circuit 1 |         | 1,370      | 159 | 457           | 159          | 457         | 233 | 419   |
| RCWW020CA1B | Circuit 1 |         | 1,485      | 172 | 495           | 172          | 495         | 250 | 450   |
| RCWW022CA1B | Circuit 1 |         | 1,850      | 197 | 617           | 197          | 617         | 285 | 512   |
| RCWW020CA2B | Circuit 1 |         | 690        | 89  | 230           | 178          | 319         | 261 | 469   |
|             | Circuit 2 |         | 690        | 89  | 230           |              |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 795        | 99  | 265           | 197          | 364         | 286 | 515   |
|             | Circuit 2 |         | 795        | 99  | 265           |              |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 795        | 106 | 265           | 212          | 371         | 308 | 554   |
|             | Circuit 2 |         | 795        | 106 | 265           |              |             |     |       |
| RCWW026CA2B | Circuit 1 |         | 850        | 116 | 283           | 231          | 399         | 334 | 601   |
|             | Circuit 2 |         | 850        | 116 | 283           |              |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 850        | 119 | 283           | 238          | 402         | 344 | 618   |
|             | Circuit 2 |         | 850        | 119 | 283           |              |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,295      | 149 | 432           | 298          | 580         | 428 | 770   |
|             | Circuit 2 |         | 1,295      | 149 | 432           |              |             |     |       |
| RCWW036CA2B | Circuit 1 |         | 1,370      | 159 | 457           | 317          | 615         | 465 | 837   |
|             | Circuit 2 |         | 1,370      | 159 | 457           |              |             |     |       |
| RCWW040CA2B | Circuit 1 |         | 1,485      | 172 | 495           | 344          | 667         | 500 | 900   |
|             | Circuit 2 |         | 1,485      | 172 | 495           |              |             |     |       |
| RCWW044CA2B | Circuit 1 |         | 1,850      | 197 | 617           | 393          | 813         | 569 | 1,024 |
|             | Circuit 2 |         | 1,850      | 197 | 617           |              |             |     |       |

Note:  
1. AHRI conditions :  
  Leaving chilled water temperature is 6.7°F(44°C)  
  Entering cooling water temperature is 29.4°F(85°C)  
2. Symbols :  
  LRA : Locked Rotor Ampere  
  RLA : Rated Load Ampere  
  MCA : Minimum Circuit Ampere  
  MOCP : Maximum OverCurrent Protection  
  Total RLA : Current when all compressor running  
  Start Current : Starting current of one compressor  
  Max current : Start current(Circuit 1) + RLA(Circuit 2)

380V / 50Hz

| Model       |           | Voltage | Compressor |     |               | Total RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|-----------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |           |             |     |       |
| RCWW008CA1B | Circuit 1 | 380     | 700        | 95  | 233           | 95        | 233         | 138 | 248   |
| RCWW010CA1B | Circuit 1 |         | 810        | 113 | 270           | 113       | 270         | 164 | 295   |
| RCWW011CA1B | Circuit 1 |         | 875        | 125 | 292           | 125       | 292         | 179 | 322   |
| RCWW012CA1B | Circuit 1 |         | 1,220      | 134 | 407           | 134       | 407         | 194 | 350   |
| RCWW014CA1B | Circuit 1 |         | 1,340      | 160 | 447           | 160       | 447         | 230 | 415   |
| RCWW016CA1B | Circuit 1 |         | 1,565      | 182 | 522           | 182       | 522         | 266 | 478   |
| RCWW019CA1B | Circuit 1 |         | 1,990      | 209 | 663           | 209       | 663         | 304 | 547   |
| RCWW020CA2B | Circuit 1 |         | 810        | 113 | 270           | 240       | 383         | 327 | 589   |
|             | Circuit 2 |         | 810        | 113 | 270           |           |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 875        | 125 | 292           | 270       | 416         | 358 | 644   |
|             | Circuit 2 |         | 875        | 125 | 292           |           |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 1,220      | 134 | 407           | 290       | 540         | 389 | 699   |
|             | Circuit 2 |         | 1,220      | 134 | 407           |           |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 1,340      | 160 | 447           | 312       | 607         | 461 | 829   |
|             | Circuit 2 |         | 1,340      | 160 | 447           |           |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,565      | 182 | 522           | 390       | 704         | 531 | 956   |
|             | Circuit 2 |         | 1,565      | 182 | 522           |           |             |     |       |
| RCWW038CA2B | Circuit 1 |         | 1,990      | 209 | 663           | 418       | 872         | 608 | 1,094 |
|             | Circuit 2 |         | 1,990      | 209 | 663           |           |             |     |       |

Note:  
1. AHRI conditions :  
Leaving chilled water temperature is 6.7°F(44°C)  
Entering cooling water temperature is 29.4°F(85°C)  
2. Symbols :  
LRA : Locked Rotor Ampere  
RLA : Rated Load Ampere  
MCA : Minimum Circuit Ampere  
MOCP : Maximum OverCurrent Protection  
Total RLA : Current when all compressor running  
Start Current : Starting current of one compressor  
Max current : Start current(Circuit 1) + RLA(Circuit 2)

400V / 50Hz

| Model       |           | Voltage | Compressor |     |               | Total RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|-----------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |           |             |     |       |
| RCWW008CA1B | Circuit 1 | 400     | 730        | 92  | 243           | 92        | 243         | 134 | 241   |
| RCWW010CA1B | Circuit 1 |         | 845        | 110 | 282           | 110       | 282         | 159 | 286   |
| RCWW011CA1B | Circuit 1 |         | 915        | 121 | 305           | 121       | 305         | 174 | 313   |
| RCWW012CA1B | Circuit 1 |         | 1,285      | 130 | 428           | 130       | 428         | 189 | 340   |
| RCWW014CA1B | Circuit 1 |         | 1,400      | 156 | 467           | 156       | 467         | 224 | 404   |
| RCWW016CA1B | Circuit 1 |         | 1,635      | 177 | 545           | 177       | 545         | 258 | 465   |
| RCWW019CA1B | Circuit 1 |         | 2,080      | 203 | 693           | 203       | 693         | 295 | 532   |
| RCWW020CA2B | Circuit 1 |         | 845        | 110 | 282           | 220       | 392         | 318 | 573   |
|             | Circuit 2 |         | 845        | 110 | 282           |           |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 915        | 121 | 305           | 242       | 426         | 348 | 627   |
|             | Circuit 2 |         | 915        | 121 | 305           |           |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 1,285      | 130 | 428           | 260       | 558         | 378 | 680   |
|             | Circuit 2 |         | 1,285      | 130 | 428           |           |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 1,400      | 157 | 467           | 313       | 623         | 449 | 807   |
|             | Circuit 2 |         | 1,400      | 157 | 467           |           |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,635      | 178 | 545           | 355       | 723         | 516 | 929   |
|             | Circuit 2 |         | 1,635      | 178 | 545           |           |             |     |       |
| RCWW038CA2B | Circuit 1 |         | 2,080      | 203 | 693           | 407       | 897         | 591 | 1,063 |
|             | Circuit 2 |         | 2,080      | 203 | 693           |           |             |     |       |

Note:  
1. AHRI conditions :  
Leaving chilled water temperature is 6.7°F(44°C)  
Entering cooling water temperature is 29.4°F(85°C)  
2. Symbols :  
LRA : Locked Rotor Ampere  
RLA : Rated Load Ampere  
MCA : Minimum Circuit Ampere  
MOCP : Maximum OverCurrent Protection  
Total RLA : Current when all compressor running  
Start Current : Starting current of one compressor  
Max current : Start current(Circuit 1) + RLA(Circuit 2)

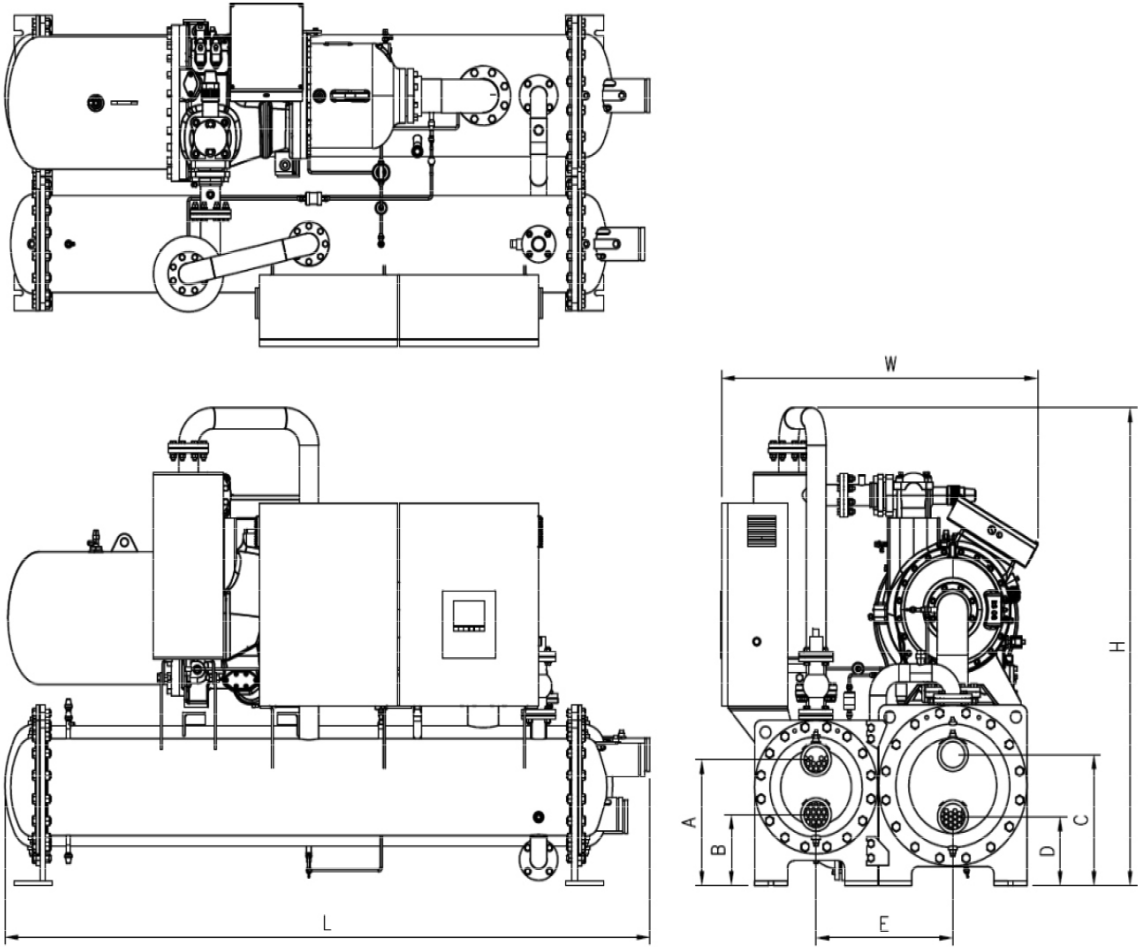
415V / 50Hz

| Model       |           | Voltage | Compressor |     |               | Total RLA | Max Current | MCA | MOCP  |
|-------------|-----------|---------|------------|-----|---------------|-----------|-------------|-----|-------|
|             |           |         | LRA        | RLA | Start Current |           |             |     |       |
| RCWW008CA1B | Circuit 1 | 415     | 690        | 87  | 230           | 87        | 230         | 126 | 227   |
| RCWW010CA1B | Circuit 1 |         | 795        | 104 | 265           | 104       | 265         | 150 | 270   |
| RCWW011CA1B | Circuit 1 |         | 850        | 114 | 283           | 114       | 283         | 164 | 295   |
| RCWW012CA1B | Circuit 1 |         | 1,160      | 122 | 387           | 122       | 387         | 178 | 320   |
| RCWW014CA1B | Circuit 1 |         | 1,295      | 147 | 432           | 147       | 432         | 211 | 380   |
| RCWW016CA1B | Circuit 1 |         | 1,485      | 167 | 495           | 167       | 495         | 243 | 438   |
| RCWW019CA1B | Circuit 1 |         | 1,850      | 191 | 617           | 191       | 617         | 278 | 501   |
| RCWW020CA2B | Circuit 1 |         | 795        | 104 | 265           | 207       | 369         | 300 | 539   |
|             | Circuit 2 |         | 795        | 104 | 265           |           |             |     |       |
| RCWW022CA2B | Circuit 1 |         | 850        | 114 | 283           | 228       | 397         | 328 | 590   |
|             | Circuit 2 |         | 850        | 114 | 283           |           |             |     |       |
| RCWW024CA2B | Circuit 1 |         | 1,160      | 123 | 387           | 245       | 509         | 356 | 640   |
|             | Circuit 2 |         | 1,160      | 123 | 387           |           |             |     |       |
| RCWW028CA2B | Circuit 1 |         | 1,295      | 147 | 432           | 294       | 579         | 422 | 760   |
|             | Circuit 2 |         | 1,295      | 147 | 432           |           |             |     |       |
| RCWW032CA2B | Circuit 1 |         | 1,485      | 167 | 495           | 334       | 662         | 486 | 875   |
|             | Circuit 2 |         | 1,485      | 167 | 495           |           |             |     |       |
| RCWW038CA2B | Circuit 1 |         | 1,850      | 192 | 617           | 383       | 808         | 556 | 1,001 |
|             | Circuit 2 |         | 1,850      | 192 | 617           |           |             |     |       |

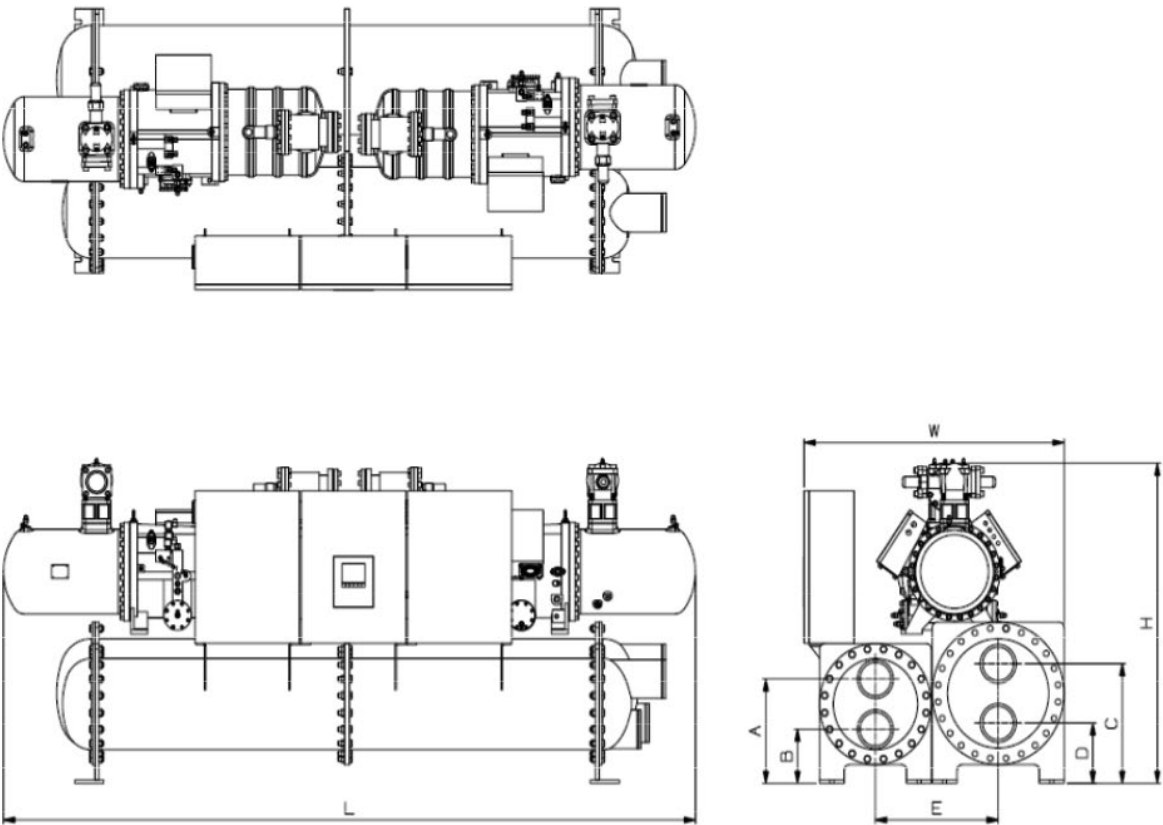
Note:

1. AHRI conditions :  
Leaving chilled water temperature is 6.7°F(44°C)  
Entering cooling water temperature is 29.4°F(85°C)

2. Symbols :  
LRA : Locked Rotor Ampere  
RLA : Rated Load Ampere  
MCA : Minimum Circuit Ampere  
MOCP : Maximum OverCurrent Protection  
Total RLA : Current when all compressor running  
Start Current : Starting current of one compressor  
Max current : Start current(Circuit 1) + RLA(Circuit 2)

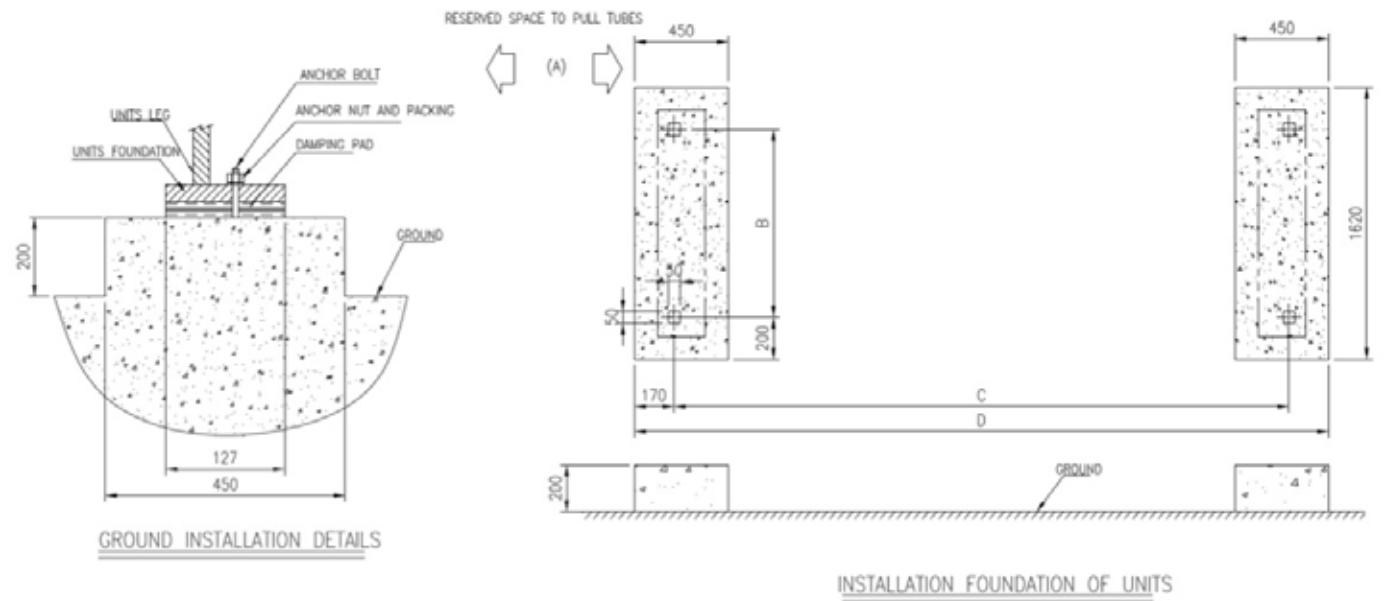


| Frequency | Model       | L     | W     | H     | A   | B   | C   | D   | E   |
|-----------|-------------|-------|-------|-------|-----|-----|-----|-----|-----|
| 60Hz      | RCWW008CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW010CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW011CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW012CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW014CA1B | 3,145 | 1,480 | 2,080 | 632 | 392 | 667 | 407 | 655 |
|           | RCWW016CA1B | 3,145 | 1,480 | 2,080 | 632 | 392 | 667 | 407 | 655 |
|           | RCWW018CA1B | 3,145 | 1,605 | 2,105 | 657 | 357 | 642 | 342 | 715 |
|           | RCWW020CA1B | 3,145 | 1,605 | 2,105 | 657 | 357 | 642 | 342 | 715 |
| 50Hz      | RCWW022CA1B | 3,365 | 1,750 | 2,150 | 692 | 432 | 717 | 458 | 775 |
|           | RCWW008CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW010CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW011CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW012CA1B | 3,040 | 1,435 | 1,860 | 543 | 283 | 559 | 299 | 595 |
|           | RCWW014CA1B | 3,145 | 1,480 | 2,080 | 632 | 392 | 667 | 407 | 655 |
|           | RCWW016CA1B | 3,145 | 1,480 | 2,080 | 632 | 392 | 667 | 407 | 655 |
|           | RCWW019CA1B | 3,145 | 1,605 | 2,105 | 657 | 357 | 642 | 342 | 715 |



| Frequency | Model       | L     | W     | H     | A   | B   | C   | D   | E   |
|-----------|-------------|-------|-------|-------|-----|-----|-----|-----|-----|
| 60Hz      | RCWW020CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW022CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW024CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW026CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW028CA2B | 3,855 | 1,685 | 2,225 | 667 | 407 | 763 | 463 | 800 |
|           | RCWW032CA2B | 3,855 | 1,685 | 2,225 | 667 | 407 | 763 | 463 | 800 |
|           | RCWW036CA2B | 4,550 | 1,795 | 2,275 | 747 | 427 | 789 | 489 | 855 |
|           | RCWW040CA2B | 4,550 | 1,795 | 2,275 | 747 | 427 | 789 | 489 | 855 |
|           | RCWW044CA2B | 4,550 | 1,910 | 2,300 | 763 | 463 | 834 | 474 | 915 |
| 50Hz      | RCWW020CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW022CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW024CA2B | 3,855 | 1,565 | 2,175 | 645 | 335 | 665 | 365 | 740 |
|           | RCWW028CA2B | 3,855 | 1,685 | 2,225 | 667 | 407 | 763 | 463 | 800 |
|           | RCWW032CA2B | 3,855 | 1,685 | 2,225 | 667 | 407 | 763 | 463 | 800 |
|           | RCWW038CA1B | 4,550 | 1,795 | 2,275 | 747 | 427 | 789 | 489 | 855 |

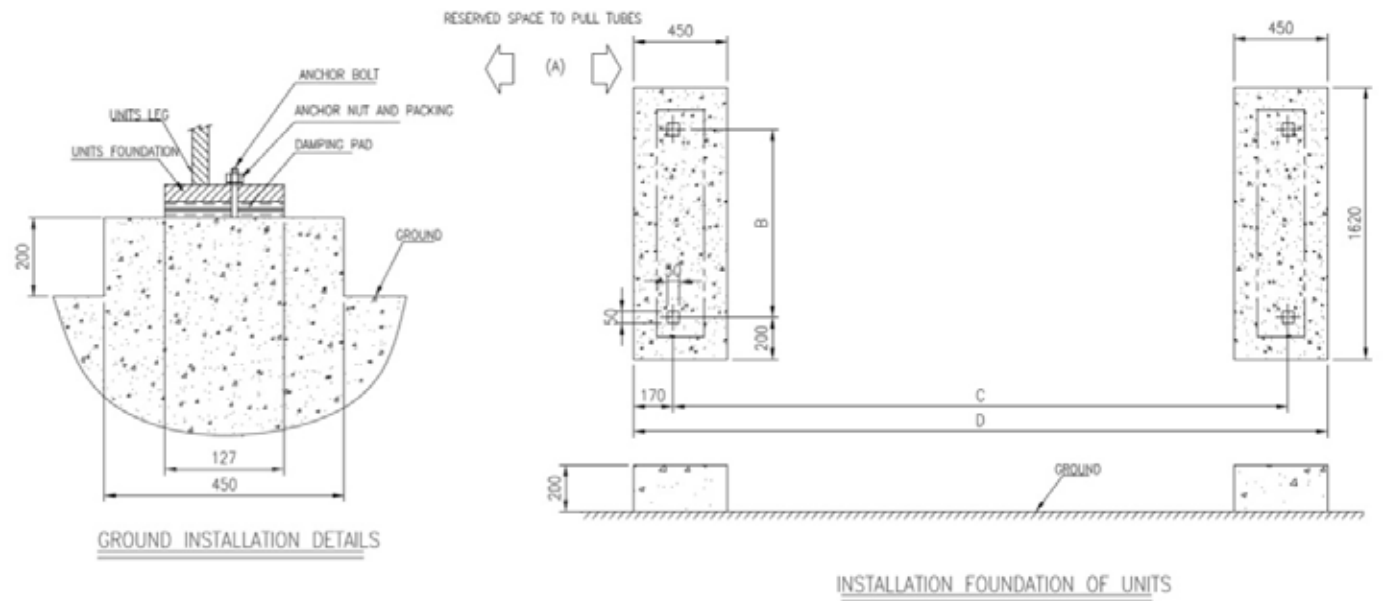
1 Compressor model



| Frequency | Model       | A     | B     | C     | D     |
|-----------|-------------|-------|-------|-------|-------|
| 60Hz      | RCWW008CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW010CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW011CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW012CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW014CA1B | 2,500 | 1,150 | 2,530 | 2,870 |
|           | RCWW016CA1B | 2,500 | 1,150 | 2,530 | 2,870 |
|           | RCWW018CA1B | 2,500 | 1,275 | 2,530 | 2,870 |
|           | RCWW020CA1B | 2,500 | 1,275 | 2,530 | 2,870 |
|           | RCWW022CA1B | 2,500 | 1,395 | 2,530 | 2,870 |
| 50Hz      | RCWW008CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW010CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW011CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW012CA1B | 2,500 | 1,035 | 2,530 | 2,870 |
|           | RCWW014CA1B | 2,500 | 1,150 | 2,530 | 2,870 |
|           | RCWW016CA1B | 2,500 | 1,150 | 2,530 | 2,870 |
|           | RCWW018CA1B | 2,500 | 1,275 | 2,530 | 2,870 |
|           | RCWW019CA1B | 2,500 | 1,275 | 2,530 | 2,870 |

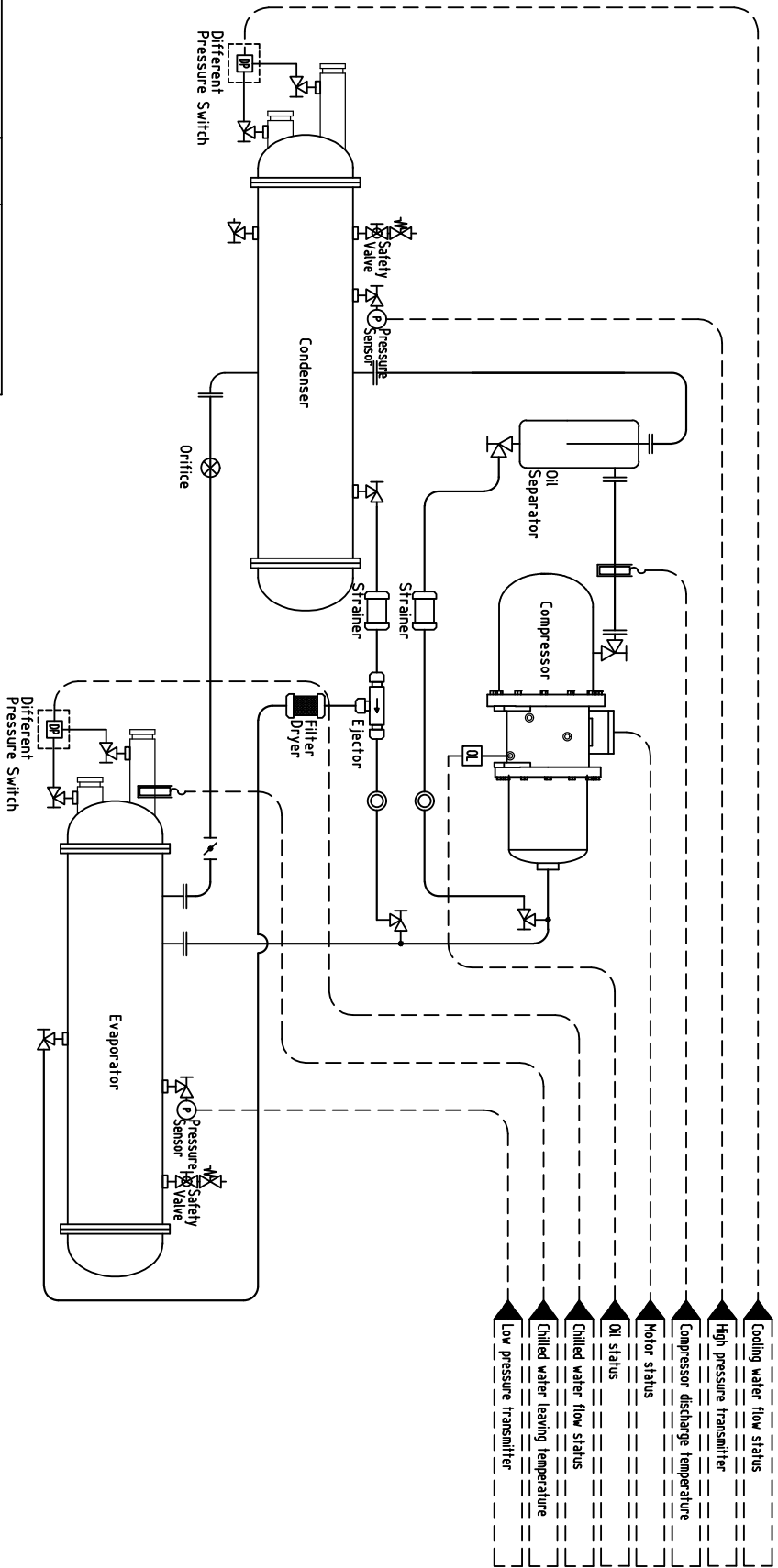


2 Compressor model

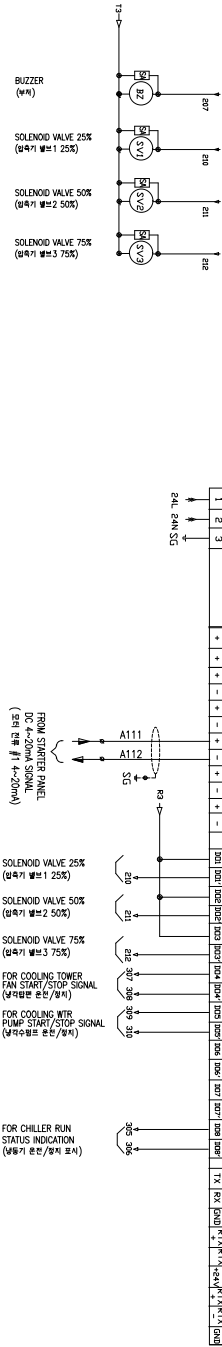
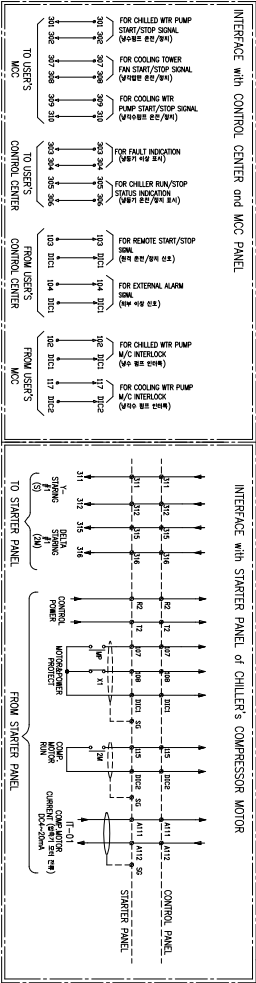
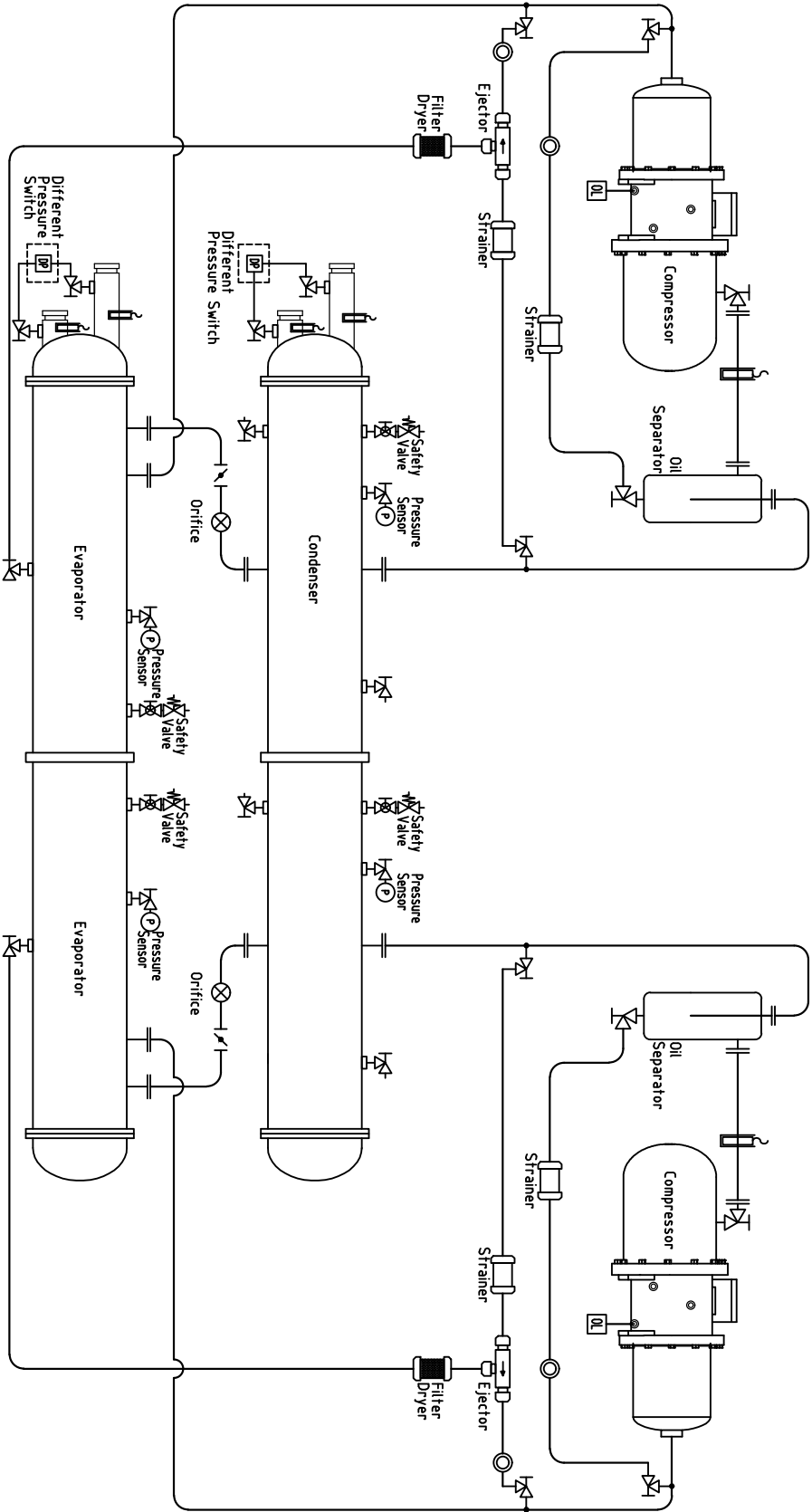


| Frequency | Model       | A     | B     | C     | D     |
|-----------|-------------|-------|-------|-------|-------|
| 60Hz      | RCWW020CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW022CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW024CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW026CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW028CA2B | 3,100 | 1,445 | 3,128 | 3,468 |
|           | RCWW032CA2B | 3,100 | 1,445 | 3,128 | 3,468 |
|           | RCWW036CA2B | 3,100 | 1,555 | 3,128 | 3,468 |
|           | RCWW040CA2B | 3,100 | 1,555 | 3,128 | 3,468 |
| 50Hz      | RCWW044CA2B | 3,100 | 1,670 | 3,128 | 3,468 |
|           | RCWW020CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW022CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW024CA2B | 3,100 | 1,325 | 3,128 | 3,468 |
|           | RCWW028CA2B | 3,100 | 1,445 | 3,128 | 3,468 |
|           | RCWW032CA2B | 3,100 | 1,445 | 3,128 | 3,468 |
|           | RCWW038CA1B | 3,100 | 1,555 | 3,128 | 3,468 |

| SYMBOL | DESCRIPTION              | SYMBOL | DESCRIPTION                  |
|--------|--------------------------|--------|------------------------------|
|        | Solenoid valve           |        | High pressure switch         |
|        | Electric expansion valve |        | Low pressure switch          |
|        | Expansion device         |        | Differential pressure switch |
|        | Angle valve              |        | Oil level switch             |
|        | Ball valve               |        | Flow switch                  |
|        | Safety valve             |        | Pressure sensor              |
|        | Check valve              |        | Strainer                     |
|        | Tee                      |        | Filter dryer                 |
|        | Flange connection        |        | Sight glass                  |
|        | Reducer                  |        | Ejector                      |

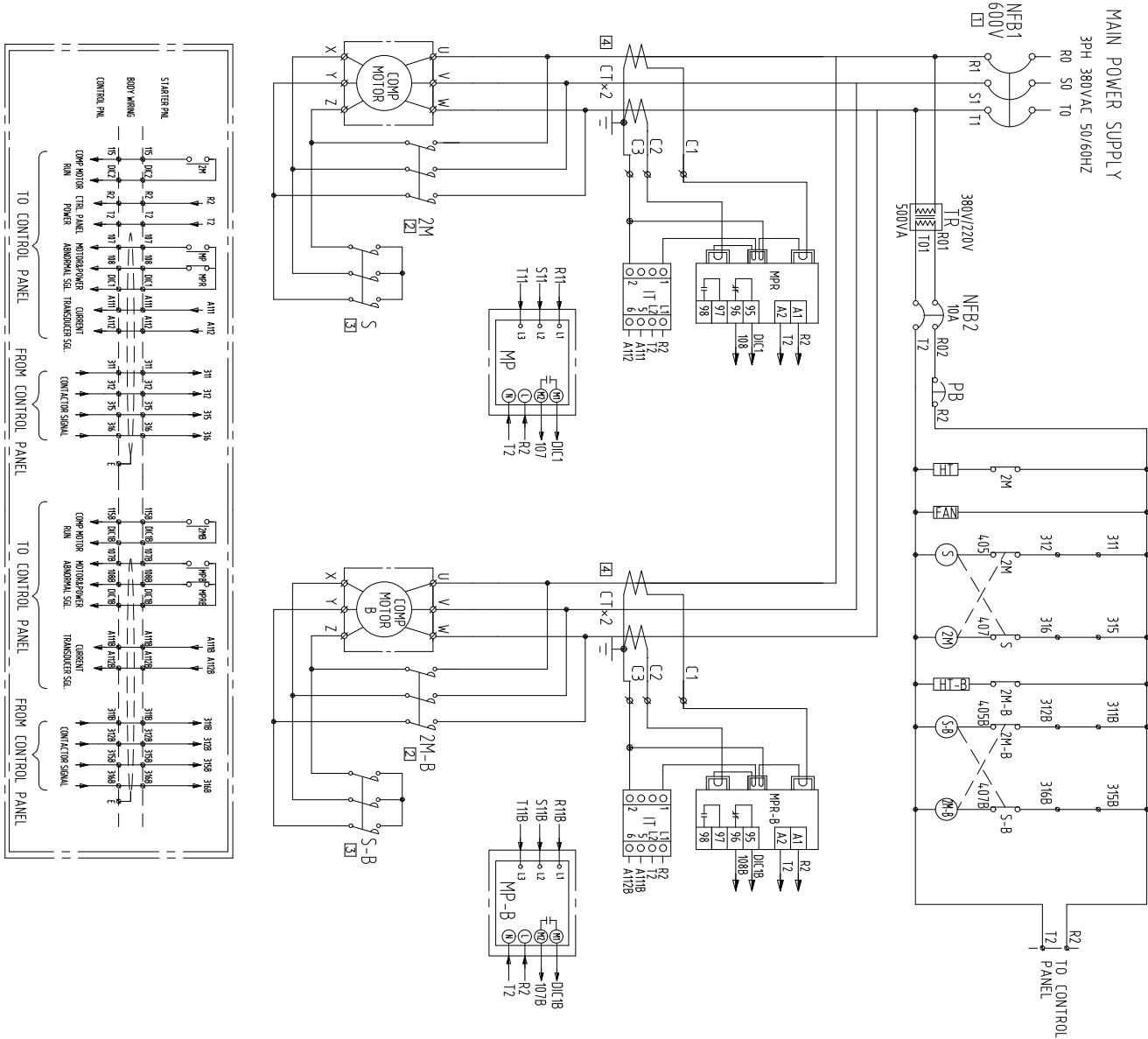


| SYMBOL | DESCRIPTION              | SYMBOL | DESCRIPTION                  |
|--------|--------------------------|--------|------------------------------|
|        | Solenoid valve           |        | High pressure switch         |
|        | Electric expansion valve |        | Low pressure switch          |
|        | Expansion device         |        | Differential pressure switch |
|        | Angle valve              |        | Oil level switch             |
|        | Ball valve               |        | Flow switch                  |
|        | Safety valve             |        | Pressure sensor              |
|        | Butterfly valve          |        | Temperature sensor           |
|        | Check valve              |        | Strainer                     |
|        | Tee                      |        | Filter dryer                 |
|        | Flange connection        |        | Sight glass                  |
|        | Reducer                  |        | Ejector                      |



| SYMBOL | DESCRIPTION   | REMARKS                            |
|--------|---------------|------------------------------------|
| SC01   | ALARM CONTACT | STARTED BY REVERSELY WITH BUMP     |
| SC02   | ALARM CONTACT | STARTED BY REVERSELY WITH BUMP     |
| SC03   | FLOW S/W      | CONTROL ROOM MONITORING WITH       |
| SC04   | FLOW S/W      | CONTROL ROOM MONITORING WITH       |
| SC05   | FLOW S/W      | STARTED BY DESK                    |
| SC06   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC07   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC08   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC09   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC10   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC11   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC12   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC13   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC14   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC15   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC16   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC17   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC18   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC19   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC20   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC21   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC22   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC23   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC24   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC25   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC26   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC27   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC28   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC29   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC30   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC31   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC32   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC33   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC34   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC35   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC36   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC37   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC38   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC39   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC40   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC41   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC42   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC43   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC44   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC45   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC46   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC47   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC48   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC49   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC50   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC51   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC52   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC53   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC54   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
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| SC56   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC57   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC58   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC59   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC60   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC61   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC62   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC63   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC64   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC65   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC66   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC67   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC68   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC69   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC70   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC71   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC72   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC73   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC74   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC75   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC76   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC77   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC78   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC79   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC80   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC81   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC82   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC83   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC84   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC85   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC86   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC87   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC88   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC89   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC90   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC91   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC92   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC93   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC94   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC95   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC96   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC97   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC98   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC99   | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |
| SC100  | ALARM CONTACT | FROM STARTER/COMP MOTOR RUN SIGNAL |





| ELECTRICAL PART LIST |            |                                  |                  |  |  |
|----------------------|------------|----------------------------------|------------------|--|--|
| 1                    | 114.2A.S   | MAGNETIC CONTACTOR               |                  |  |  |
| 2                    | 114-B-2M-B | MAGNETIC CONTACTOR               |                  |  |  |
| 3                    | S-B        | NO FUSE BREAKER                  |                  |  |  |
| 4                    | NFB2       | NO FUSE BREAKER                  |                  |  |  |
| 5                    | TR         | TRANSFORMER                      | 500VA            |  |  |
| 6                    | PR         | EMERGENCY STOP SWITCH            |                  |  |  |
| 7                    | MP         | MOTOR PROTECT RELAY              |                  |  |  |
| 8                    | MP-B       | MOTOR PROTECT RELAY              |                  |  |  |
| 9                    | MPR        | ELECTRONIC MOTOR PROTECTOR RELAY | ECOR-SS          |  |  |
| 10                   | MPR-B      | ELECTRONIC MOTOR PROTECTOR RELAY | ECOR-SS          |  |  |
| 11                   | IT         | APPERE TRANSISTOR                |                  |  |  |
| 12                   | IT-B       | APPERE TRANSISTOR                |                  |  |  |
| 13                   | CT         | CURRENT TRANSFORMER              |                  |  |  |
| 14                   | CT-B       | CURRENT TRANSFORMER              |                  |  |  |
| 15                   | FAN        | COOLING FAN                      |                  |  |  |
| 16                   | KMI-3      | AUX-RELAY CONTACT                | FROM CONTROL PNL |  |  |
| 17                   | KMI-B-3B   | AUX-RELAY CONTACT                | FROM CONTROL PNL |  |  |
| 18                   | HT         | OIL HEATER                       |                  |  |  |
| 19                   | HT-B       | OIL HEATER                       |                  |  |  |
| 20                   | HTX2       | AUX-RELAY                        |                  |  |  |

|         |      |      |       |        |             |
|---------|------|------|-------|--------|-------------|
| 500 /5A | 225A | 225A | 1000A | 520RT  | R22         |
| 400 /5A | 225A | 225A | 800A  | 440RT  |             |
| 300 /5A | 185A | 185A | 700A  | 400RT  |             |
| 250 /5A | 130A | 130A | 500A  | 280RT  |             |
| 200 /5A | 100A | 100A | 400A  | 220RT  | R134o       |
| 150 /5A | 185A | 185A | 700A  | 390RT  |             |
| 100 /5A | 130A | 130A | 500A  | 280RT  |             |
| 50 /5A  | 130A | 130A | 400A  | 240RT  |             |
| CT      | S    | 2M   | 350A  | 220RT  | REFRIGERANT |
| HT      | 3    | 2M   | NFB1  | ITEM   |             |
| HTX2    | 3    | 2M   | NFB1  | NUMBER |             |

Checking of the site information

Before installing the chiller unit, check the site in advance, review the necessary details and coordinate the followings with the site personnel so that the installation can be performed safely and accurately.

- 1) Work scope and unit data: Check the site installation work scope and approved document
- 2) Installation location: Check the environmental condition to install according to the article 3-2.
- 3) Check the entrance size(width, length and height) to the installing site in advance not to have any trouble in moving. Then check and review the detail method and order for moving the unit.

The environmental condition of installation site

The site space to install or store the product along with the following environmental condition should be considered.

- 1) Be careful not to damage the piping, insulation materials and wires of the chiller unit when storing and installing.  
The site should have ventilation measures for the refrigerant leakage.
- 2) Select site where the temperature is below 40 °C all the time with good ventilation. When the unit is to be stored for long term, pay a close attention to the temperature of the site to be maintained below 40 °C all the time. If the chiller unit is charged with refrigerant and the pressure of the unit exceeds the limit, the pressure relief valve will be operated and discharge the refrigerant gas resulting in the loss of refrigerant gas along with potential loss of lives. If the machine room temperature is over 40 °C, the pressure vessel should be reconfigured. Check the set pressure for the relief valve of the chiller unit and maintain the room below the relief valve operating temperature consulting the authorized service engineer of LG Electronics.
- 3) Store the chiller unit in dry and safe location without any vibration.
- 4) The floor surface to install the chiller unit should be flat and of sufficient strength and mass to support the chiller operating weight.
- 5) Avoid place of any fire or flammable materials near. When installed in parallel to the heating object such as a boiler, sufficient care to the radiation heat is required.
- 6) Be careful with high humidity as it causes the electric error and the corrosion of the chiller unit.
- 7) Select the site where less dust are as the dust cause electric error.
- 8) Provide enough space around the unit to allow the installation and maintenance personnel access to all service points such as replacing heat exchanger tubes and waterbox to open.
- 9) Secure maximum or safe height to fit to the crane for easy lifting and lowering of the chiller unit.
- 10) Secure good drainage from the machine room.
- 11) Secure sufficient lighting considering the repair and maintenance.
- 12) This chiller unit is manufactured for indoor use. Therefore avoid installing outdoors or a place under direct sunlight.
- 13) Protect the unit by vinyl cover form dust and rains.
- 14) When installing the chiller unit, plan appropriately in accordance with the installation of High Pressure Gas Safety Control Act. (Local standard)



Securing service space

- 1) Before installation, provide enough space for the service and maintenance as indicated on the foundation drawing.  
This is the minimum required space for the maintenance.
- 2) The foundation to install the chiller unit should be of sufficient strength and mass to support the chiller operating weight.
- 3) Prepare a good drainage path to drain out the chilled water and cooling water when cleaning the heat exchanger tubes or before shutting down.
- 4) To ensure stable operation of the chiller, level the chiller by adjusting the level plate within 1/16"
- 5) Floor foundation construction is out of scope of LG Electronics. Please work according to the approved foundation drawings.  
LG Electronics is not responsible for any unit failure caused by the inappropriate design and construction of the foundation.

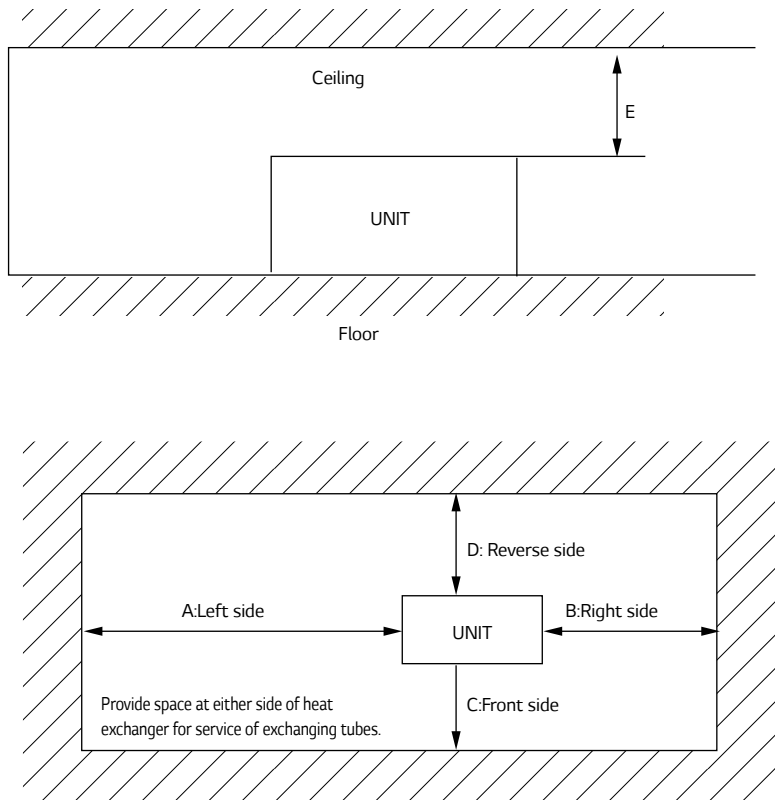


Figure 4. Minimum space requirement for installation

| Model                     | A     | B     | C     | D     | E     |
|---------------------------|-------|-------|-------|-------|-------|
| RCWW008CA11 ~ RCWW018CA11 | 2,500 | 1,500 | 1,500 | 1,500 | 1,000 |
| RCWW020CA21 ~ RCWW040CA21 | 3,100 | 1,500 | 1,500 | 1,500 | 1,000 |

Contents

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Part 1 – General

1.01 Scope

The requirements of the General Conditions, Supplementary Conditions and Drawings apply to all work herein.

1.02 System descriptions

Microprocessor controlled water-cooled liquid chiller utilizing screw compressor(s) and electronic expansion valves.

1.03 Quality assurance

- AHRI 550/590 - water chilling packages using the vapor compression cycle.
- ANSI/ASHRAE 34 - number designation and safety classification of refrigerants.
- ASME Section VIII - boiler and pressure vessel.
- GB/T 18430.1 - water chilling(heat pump) packages using the vapor compression cycle - part 1: water chilling(heat pump) packages for industrial & commercial and similar applications.
- GB25131 - Safety requirements for water chillers(heat pump) using the vapor compression cycle.
- GB150/151 - steel pressure vessels / Tubular heat exchangers.
- ANSI/ASHRAE Standard 15 safety code.
- Manufactured in an EN ISO 9001 accredited organization.

- The packaged chiller shall be pressure and leak test.
- Chiller manufacturer shall have factory trained and supported service organization local to the chiller installation to provide commissioning and service support throughout the manufacturer’s warranty period.
- Manufacturer shall warrant all equipment and material of its supply against defects in workmanship and material for a period of eighteen(18) months from date of shipment or twelve(12) months from initial start-up, whichever occurs first.

1.04 Delivery and handling

Depending on the condition of the installation site, chiller is shipped as a single unit or as separated unit, and as charged with refrigerant or with nitrogen. If shipped as separated units, contact the authorized LG Electronics dealers or LG Electronics directly. For single unit type, the unit will be delivered to the site as preassembled. Separated unit type will be delivered as 2 or 3 separated main pieces. Confirm and record that it is the correct unit and that it is properly equipped as the submitted packing list. When refrigerant is charged, refrigerant and oil are charged together according to the specification of the chiller unit. It needs special attention to high pressure inside since the saturated refrigerant pressure is decided by the external air temperature. When nitrogen is charged, the unit

is charged with 0.5kg/cm2 before shipment from the factory. If the pressure is “0”, please record the condition and check for any leakage, since there is leak possibility. Unit shall be handled, transported and stored in accordance with manufacturer’s instructions.

Shipping: Unit shall ship in one piece and shall require installer to provide the evaporator and condenser inlet and outlet pipe connections. If providing chiller model that ships in multiple pieces, bid shall include all the material and field labor costs for factory authorized personnel to connect the pieces as well as all interconnecting piping and wiring.

Part 2 – Products

2.01 General

The equipment shown on the drawings is based on the model RCWW and MCWW series water cooled liquid chiller as manufactured by the LG Electronics.

2.02 Equipment description

Supply and install and commission as shown on the drawings and schedules complete factory assembled, charged and operationally tested air cooled screw compressor chiller(s) as specified herein. Chiller shall include one or more independent refrigeration circuits, semi hermetic twin screw compressors(s), shell and tube liquid cooler & condenser, Refrigerant R-134a, lubrication system and oil, interconnecting piping and wiring and lockable control center housing safety, operating and capacity controls necessary for the safe automatic operation of the liquid chiller.

2.03 Operating characteristics

- Chiller will be installed in an indoor location and shall be capable of operating in room temperatures between 4.4°C and 15.6°C(40F-60F)
- Provide capacity control system capable of reducing unit capacity to min. 25% of full load.

2.04 Compressor

The semi-hermetic twin screw compressor with precision machined cast iron housing and discharge shutoff valve. Compressor motor is cooled down by refrigerants. The differential pressure type oil lubrication and a filter-integrated type should be used. A compressor integrated type oil separator is used, a check valve should be installed at the discharge side to prevent the backward flowing of the refrigerants. Design working pressure of entire compressor, suction to discharge shall be 30 bar(435 psig) 4-step or stepless control that can control the capacity from 25 % to 100 % using a capacity control slide valve. A discharge/suction shut-off valve is installed.

To separate the oil from the refrigerant in which oil is mixed together, the internal oil separator is designed to allow the oil flow into the system to the minimum.

2.05 Heat exchanger

| Falling Film Type |  
Evaporator shall be of the falling film shell and tube type with removable heads and mechanically cleanable tubes of seamless copper with internally and externally enhanced surface. Distributer located on the top side of inside shell, this makes uniform flow of refrigerant. Through distributor refrigerant flows downward by gravity as a continuous film. Tubes shall be mechanically expanded into multiple grooves in tube sheets. Cooler will incorporate one, two independent refrigerant circuits with a common chilled liquid multi-pass circuit arrangement. Coolers will be factory insulated with 19mm(optional 38) closed cell insulation with all joints vapor sealed and water drain and vent taps in cooler heads.

| Condenser |  
The shall is manufactured Shell & Tube and shell be constructed and tested in accordance with pressure vessel code for a refrigerant and 10bar(150 psig) water-side pressure. To increase efficiency, sub-cooler is installed for over-cooling of condenser liquid refrigerant.

2.06 Expansion unit

Expansion unit consists of butterfly valve and orifice. At 100% load situation, the pressure loss at the orifice is smaller than the refrigerant pressure loss in the condenser, thus the super-cooled refrigerant passes through the orifice. At this stage the maximum amount of refrigerant is flowing into the evaporator. As the load reduces gradually, the circulating amount of refrigerant also reduces and accordingly the refrigerant level in the condenser is getting low. When the amount of liquid refrigerant reduces, the gas amount in the orifice is getting larger, raising the resistance thus controlling the flow rate.

| Refrigerant isolation v/v: Option |  
Refrigerant isolation valves shall be provided to isolate the referent into the condenser for standard water chilling application.

2.07 Controller

| Composition of the control panel |  
The control panel is composed of a Micom module(a main module, an I/O module, a display and an operation key module), a power supply unit that provides stable power, and a breaker that performs other control jobs or ensures safety, magnetic contact, and a relay for control. The major functions of these modules are as follows.

| Main module |  
A high-performance microprocessor is installed in the main module and performs the control function optimized to equipment. A high-precision analog/digital converter measures sensor values in real time and displays them on the screen or applies them for the equipment control. In addition, the RS-485/232C communication port is integrated to support customers’ remote monitoring. Customers can select RS-485 or RS-232C with simple operation. Therefore, It can be responded to the building automation easily.

| Display and operation key module |  
The display and operation key module is composed of setting values needed for various operation data and equipment operation, a display unit that displays the malfunction information in texts, a key input unit that enables operators to input data or select menus, and a LED lamp display unit. In particular, the convenience for operators is enhanced by allowing them to use keys directly, if keys are used frequently, or select menus. Operation keys are composed of four menu handling keys, three manual control value handling keys, three manual extraction pump handling keys and two run/stop keys to run or stop the equipment operation. If the operation keys are out of order, operators can handle the control valve and the refrigerant value using the text display unit and the menu selection key. In addition, the operation status(temperature, running/stopping of the neighboring device, storage) can be displayed in English, Chinese or Korean for users’ convenience.

| I/O module |  
The I/O module is composed of a digital input unit which checks the operational state of various switches, and a digital output unit that controls the equipment operation. In addition, a photo coupler is installed at the I/O unit to block noises. All the I/O module data can be sent and received from the main module. Therefore, the malfunction by the EMI, which can occur when the data are transmitted using a regular cable, can be prevented and high availability can be secured.

2.08 Characteristics of the controller

| Convenient management of the operation data |  
The 7.1inch color LCD shows much operation information on a screen. The analog data(e.g., temperature data) can be saved for 300 times by intervals defined by customers. The data can be used to keep operation logs or to perform maintenance work. In addition, the temperature of the chilled water outlet is displayed on a graph so that customers can understand the trend of temperature changes conveniently.

| Safety controller algorithm |  
The safety parts such as high and low pressure sensor,

discharge temperature, current sensor can help product operation without shutdown. This algorithm can be minimized malfunction operations without manual reset.

| Self-diagnosis and malfunction history saving |  
The microcomputer monitors the equipment state when the equipment is stopped or running, and informs the state to operators using text messages, alarm lamps and buzzers. The advice function shows cause of malfunction and checking point and troubleshooting. It can be saved in USB memory with operation and malfunction history.

| Optimized artificial intelligent control algorithm |  
• Flexible Startup  
To prevent excessive shocks to the equipment due to any abrupt load at the time of startup, the input power will be supplied gradually.

| Advanced digital PID control |  
A digital PID control together with its smooth start-up minimizes unnecessary chiller shut-downs by recognizing the optimal PID control point automatically when the chiller is started or the chiller operation mode is changed from manual to automatic, and applying the point to the control formula. Compared with existing analog controls, more stable and accurate temperature control is possible.  
※A digital transmitter to show and monitor the evaporator pressure/condenser pressure/ differential oil pressure.  
※A digital transmitter to show and monitor the current/ voltage.  
※PT 100 sensor a chilled water/Cooling water/Oil temperature PT 100 Sensor installation.

| Scheduled operation function |  
Customers can conveniently run the equipment using the schedule operation function that allows customers to select Run/Stop and control temperature setting values by weekday or holiday for 11 times per day.

| Customer support function |  
• Communication function for building automation, remote surveillance and control The communication function (RS232C/RS485, users can select) is integrated so that the equipment can be connected to customers' monitoring system with ease. Also, no voltage I/O is provided so that customers can run/stop the equipment or remotely monitor the important operation state using a simple electric wiring. MODBUS is basic specification , BACnet and Modem is optional.  
• Help function  
If a malfunction occurs, the details thereabout will be logged and operators can take measures using the help function.  
• Three language support

Users can select Korean, Chinese or English languages from the operation menu.  
• Pump down function  
If the operation stops, the pump-down operation will be started automatically and the refrigerants will be gathered at the condenser. Therefore, the equipment can be operated cost-effectively by its improved operation stability and by preventing the liquid suction during the operation.

**2.09 Automatic safety device**  
A double protection device that prevents reverse phase, phase loss and overcurrents is installed. Therefore, the compressor can be completely protected against external electric shocks. Chilled water and cooling water safety device  
• A chilled water pump interlock contact  
• A cooling water pump interlock contact  
• A chilled /cooling water flow switch: chilled /cooling water level – under 50 %.  
• Chilled water temperature(low): Chilled water out temperature – under 2.5°C.  
• Evaporator refrigerant temperature(low) – Refrigerant temperature – under 2.5°C.  
※A run/stop signal and interlock contact of the chilled water and cooling water pump is a very important safety device that can prevent freezing and bursting and safety incidents. Therefore, make sure to connect the line in such a way that the chiller, the chilled water pump and the cooling water pump can be linked at the time of operation.  
※In addition, the automatic blocking valve should be installed to prevent the water flow on the cooling water pipe of the chiller if several cooling water pipes are connected in parallel. Then, the automatic blocking valve should be operated in line with the LG control device. To link the automatic blocking valve, the valve should be opened/closed in synchronization with the cooling water pump run/stop signal provided by the control panel.  
• For more details, please contact LG service center in advance.

| Chiller protection device |  
• Evaporator low pressure  
• Condenser high pressure  
• Differential oil pressure  
• Low chilled water flow  
• Evaporator low temperature  
• Condenser high temperature  
• Overcurrent protection  
• Compressor overheat protection  
| Motor/Compressor protector |  
• A reverse phase/phase loss protection relay  
• A three-phase wire-wound temperature monitoring S/W  
• A compressor discharge temperature monitoring sensor

**2.10 Accessories and options**  
Some accessories and options supersede standard product features. All options are factory-mounted unless otherwise noted.

| Gateway |  
Provides communication for Building Automation Systems, including BACnet(MS/ TP), Modbus,(Field Commissioned by BAS Manufacturer)

| General Options |  
1. Flow Switch: The water flow switch comes with SPDT output function, 1.6MPa(232 psi) working pressure, -10°C to 120°C(-14°F to 248°F) with 1" NPT connection for upright mounting in horizontal pipe(This flow switch or equivalent must be furnished with each unit). Field mounted.  
2. Differential Pressure Switch: 0.2-3 bar(3-45 psig) range with 1/4" NPTE pressure connections.(Field Mounted by Contractor)

| Vibration Isolation(All Options Field Mounted by Contractor |  
1" Deflection Spring Isolators: Level adjustable, spring and cage type isolators for mounting under the unit base rails.

| Compressor acoustic enclosure |  
The compressor acoustic enclosure can be provided as a option to reduce compressor sound levels.

| Single power point connection |  
For models installed with 2, 3 and 4 compressors, to minimize job site installation cost and time, single point power connection can be provided as an option about the following models. If optional single point power connection is required, terminal block connections will be supplied at the point of incoming single point connection.

| Power factor correction |  
Provide equipment with power factor correction capacitors as required to maintain a displacement power factor of 95% at all load conditions.

| Double thickness insulation |  
As a standard, the evaporator shell is insulated with 19mm (3/4"). As a option, it can be insulated with 38mm(1-1/2").

| NFB(Non-Fused Breaker) power disconnect switch |  
A non-fused disconnect is available as a factory-installed option for all units with single point power connection units. This option is that power supply is disconnected during service & repair work as well as door interlock.

| Suction service isolation valve |  
Service suction isolation valve is installed with unit for each

refrigerant circuit as a standard.  
  
| Pressure vessel(options) |  
The evaporator and condenser can be provided with either ASME or PED pressure vessel codes certification.

**Part 3 – Execution**  
**3.01 Installation**  
A. General: rig and install in full accordance with manufacturer's requirements, project drawings, and contract documents.  
B. Location: locate chiller as indicated on drawings, including cleaning and service maintenance clearance per manufacturer instructions. Adjust and level chiller on support structure.  
C. Components: installing contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.  
D. Electrical: coordinate electrical requirements and connections for all power feeds with electrical contractor.  
E. Controls: coordinate all control requirements and connections with controls contractor.  
F. Finish: installing contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.

# Memo

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# Memo

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