

## Inverter Air Cooled Mini Chiller (Heat Pump)

Model: UAL030ER5 ~ UAL150ER5

Cooling Capacity: 9.4kW ~ 40.0kW

Heating Capacity: 9.8kW ~ 41.0kW



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**NOTE:** Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

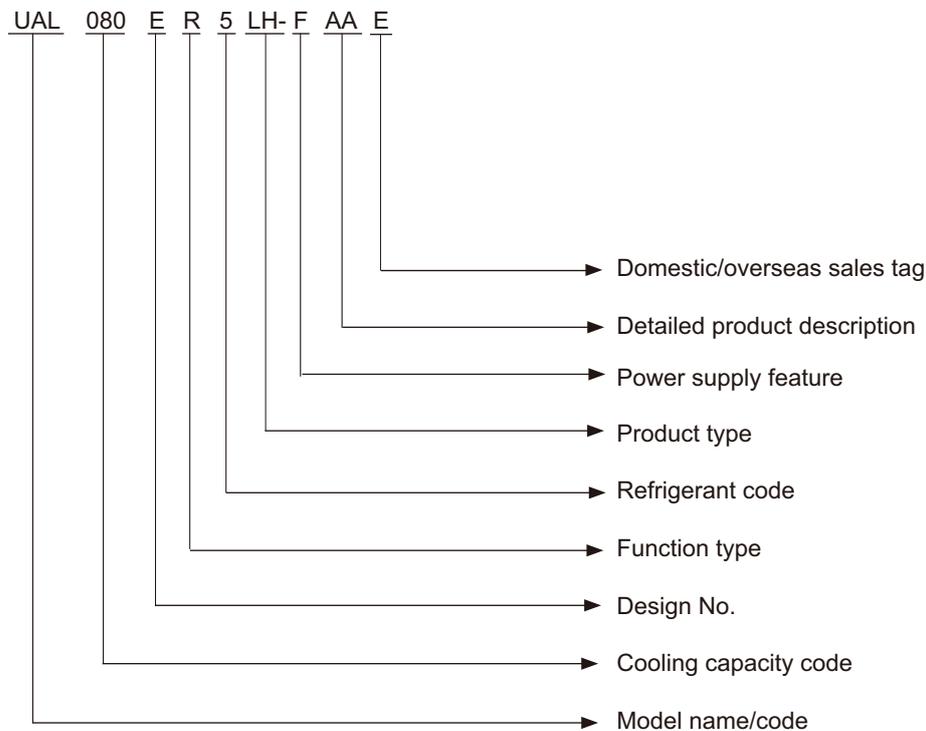
**Caution:** Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

**Warning:** Moving machinery and electrical power hazard may cause severe personal injury or death. Disconnect and lock off power before servicing equipment.

# Model series

| Model     | Cooling Capacity/ kW | Heating Capacity/ kW |
|-----------|----------------------|----------------------|
| UAL030ER5 | 9.4                  | 9.8                  |
| UAL040ER5 | 11.4                 | 12.0                 |
| UAL050ER5 | 14.6                 | 14.8                 |
| UAL060ER5 | 16.8                 | 17.0                 |
| UAL070ER5 | 19.8                 | 20.8                 |
| UAL080ER5 | 24.9                 | 26.0                 |
| UAL100ER5 | 28.8                 | 30.0                 |
| UAL120ER5 | 33.5                 | 34.0                 |
| UAL150ER5 | 40.0                 | 41.0                 |

# Nomenclature



Model name/code – UAL, UALS...

Cooling capacity code – 030, 040, 050...

Design No. - A, B, C...

Functional type - R: cooling & heating; omitted for cooling-only units

Refrigerant code - 3: R134a; 4: R407C; 5: R410A; R22: omitted

Product type – standard: omitted

LC: low temperature cooling; LH: low temperature heating; SR: total heat recovery

Power supply features: F: 380-415V/3N~/50Hz; A: 220-240V~/50Hz

Detailed description on product specification changes – AA, AB, AC ...ZZ

Domestic/overseas sales tag – relevant corporate standard for overseas sales; omitted for domestic sales

# Features

## Overview

DAIKIN UAL-E air cooled inverter mini chiller (heat pump) is designed to meet the highest user requirements for product reliability, security and flexibility.

The unit is characterized by elaborate design and beautiful appearance. It can be flexibly connected with different types of fan coils, air handling units or floor heating pipes with different specifications.

With advantages like high efficiency, low noise, ease-of-use, safety, and easy installation & maintenance, the unit widely applies to multiple scenarios such as factories, stations, hotels, villas, office buildings, high-grade residential buildings, and industrial cooling.

## Highly Efficient IPLV for Better Building Energy Saving

UAL-E air cooled inverter mini chiller (heat pump) has been inspected by national authorities. It adopts advanced DC inverter technology which improves part load operation efficiency. Excellent performance helps users reduce the operation costs, which obtains higher values within building period for proprietors.

## Advanced Energy-saving Inverter Technology

The excellent performance of the unit owes to the application of advanced DC inverter technology. Combining the DC inverter compressor and multi-speed fan motor, the unit also adopts advanced DC inverter technology to adjust the capacity output according to the load change.

## Efficient Components after Optimal Match

UAL-E series products adopt the world-leading technology and internationally famous accessories to ensure that they match with each other under strict tests. The fully hermetic volute compressor and low-noise fan produce little noise during operation. The efficient inverter compressor and precise throttle system of electronic expansion valve guarantee high EER and COP values especially in part load.

## High-precision Capacity Regulation

UAL-E air cooled inverter mini chiller (heat pump) can realize 15% to 100% stepless capacity regulation with low load, low output and low energy consumption.

## Modular Design and Diversified Composite Application Solutions (Option)

Modular design allows up to 16 units in each group to meet various load requirements in different buildings.

## Easy to Control

Electronic unit control realizes both centralized control and independent control. With high anti-interference capability, the controller can control units within the maximum range of 1,000 meters. When an error occurs, the controller displays the corresponding error code.

## Precise Water Temperature Control for Better Comfort

Outlet water temperature control can be set at the unit to accurately control the outlet water temperature of the unit. The insignificant fluctuation in water temperature avoids fluctuations in the air supply temperature of the indoor unit and ensures better comfort. The process cooling application features constant water temperature and high cooling stability.

## Multi-variable Intelligent Defrosting Control

The unit judges frosting status by detecting multiple variables and intelligently selects the optimal time for entering or exiting defrosting conditions, avoiding problems such as incomplete or frequent defrosting. The dual-system unit can implement alternate defrosting, resulting that there is not large fluctuation for the water temperature and users can still enjoy comfortable heating effect. Manual defrosting can be set as required in a harsh environment.

## **Safe Operation Control**

The cooling system provides high/low pressure protection to avoid over-high discharge pressure and over-low suction pressure. Discharge temperature protection avoids over-high discharge temperature. Cooling anti-freezing protection ensures that the plate heat exchanger is not frozen and burst at an over-low water temperature. The anti-freezing function prevents unit shutdown in winter and frost cracking of plate heat exchanger caused by over-low outdoor temperature (only effective when the main power supply is on).

## **Low Startup Current for Smaller Shock on Power Grid**

When combining inverter units, they start at low frequency to produce low startup current. When combining an inverter unit and a constant speed unit, they start in a stepped manner to decrease the startup current. Startup with low current can not only ease shock on the power grid, but also improve electricity security.

## **High Environment Adaptability**

The unit shell is made of zinc-plated steel plate. Phosphate treatment and polyester powder coating make it bearable for the sun, rain, flooding and wind. With compact structure design, the unit can be installed in the front of or at the back of the house, on the balcony or roof without needing a professional equipment room.

Excellent performance makes the unit operate properly even in harsh conditions of high temperature or low temperature.

## **Simple Installation**

The unit is designed to consider convenient installation to the maximum extent. The cooling system has been made hermetic in the factory, without needing any pipe connection or refrigerant filling. The water system is reserved with the inlet and outlet interfaces for connecting with end equipment. After installing the inlet and outlet pipes, users can inject water and power on the unit when ensuring water quality and clean pump pipeline.

## **Convenient Maintenance**

After removing the side panel or front panel of the unit, users can touch any part for convenient repair and maintenance. When unit shutdown occurs in exceptional conditions, the controller may display fault causes for rapid troubleshooting.

# Specifications

## General data

| Model                        |        | UAL030ER5      | UAL040ER5 | UAL050ER5 | UAL060ER5 | UAL070ER5         | UAL080ER5 | UAL100ER5 | UAL120ER5 | UAL150ER5 |     |
|------------------------------|--------|----------------|-----------|-----------|-----------|-------------------|-----------|-----------|-----------|-----------|-----|
| Accessory kit                | -      | UAL-A5E        |           |           |           | UAL-A6E           |           | UAL-A7E   |           |           |     |
| Nominal cooling capacity     | kW     | 9.4            | 11.4      | 14.6      | 16.8      | 19.8              | 24.9      | 28.8      | 33.5      | 40.0      |     |
| Nominal heating capacity     | kW     | 9.8            | 12.0      | 14.8      | 17.0      | 20.8              | 26.0      | 30.0      | 34.0      | 41.0      |     |
| Capacity control             | -      | 15%~100%       |           |           |           |                   |           |           |           |           |     |
| Rated cooling power input    | kW     | 3.0            | 3.9       | 4.6       | 5.7       | 6.7               | 8.6       | 9.5       | 10.4      | 13.9      |     |
| Rated cooling current        | A      | 13.8           | 18.0      | 21.0      | 26.4      | 10.3              | 13.2      | 15.2      | 16.6      | 22.3      |     |
| Rated heating power input    | kW     | 3.1            | 3.9       | 4.8       | 5.5       | 6.6               | 8.3       | 9.9       | 10.8      | 13.1      |     |
| Rated heating current        | A      | 14.4           | 18.0      | 21.9      | 25.5      | 10.1              | 12.7      | 15.8      | 17.3      | 21.3      |     |
| Cooling COP                  | -      | 3.13           | 2.92      | 3.17      | 2.95      | 2.96              | 2.90      | 3.03      | 3.22      | 2.88      |     |
| Heating COP                  | -      | 3.16           | 3.08      | 3.08      | 3.09      | 3.15              | 3.13      | 3.03      | 3.15      | 3.13      |     |
| IPLV (GB)                    | -      | 4.21           | 4.23      | 4.16      | 4.13      | 4.15              | 4.23      | 4.90      | 4.71      | 4.45      |     |
| Power supply                 | -      | 220-240V~/50Hz |           |           |           | 380-415V/3N~/50Hz |           |           |           |           |     |
| Refrigerant                  | Type   | R410A          |           |           |           |                   |           |           |           |           |     |
|                              | Charge | kg             | 2.9       | 3         | 4         | 4                 | 5.2       | 5.2       | 8         | 8.5       | 9.1 |
| Throttle device              | -      | EXV            |           |           |           |                   |           |           |           |           |     |
| Unit WPD                     | kPa    | 17             | 19        | 27        | 27        | 34                | 40        | 27        | 32        | 65        |     |
| External head                | m      | 15             | 14        | 18        | 14        | 23                | 21        | 22(31)    | 18(28)    | 18(26)    |     |
| Water pipe size              | mm     | RC1            |           |           |           | RC1 1/4           |           | G1 1/4    |           |           |     |
| Max chilled water difference | °C     | 7              |           |           |           |                   |           |           |           |           |     |
| Unit dimensions              | Length | mm             | 950       |           | 995       |                   |           | 990       | 1350      |           |     |
|                              | Width  | mm             | 397       |           | 395       |                   |           | 844       |           |           |     |
|                              | Height | mm             | 1010      |           | 1362      |                   |           | 1780      |           |           |     |
| Packing dimensions           | Length | mm             | 1010      |           | 1086      |                   |           | 1030      | 1440      |           |     |
|                              | Width  | mm             | 498       |           | 512       |                   |           | 890       |           |           |     |
|                              | Height | mm             | 1175      |           | 1530      |                   |           | 1970      |           |           |     |
| Noise (H/M/L)                | dB(A)  | 56/53/46       | 56/53/46  | 58/55/48  | 58/55/48  | 59/54/52          | 60/56/52  | 63        | 64        | 65        |     |
| Operating weight             | kg     | 111            | 112       | 149       | 151       | 161               | 168       | 232       | 254       | 285       |     |
| Net weight                   | kg     | 109            | 110       | 146       | 148       | 158               | 165       | 228       | 250       | 280       |     |
| Gross weight                 | kg     | 119            | 119       | 159       | 161       | 171               | 178       | 256       | 286       | 316       |     |

### Note:

- Nominal cooling condition: leaving water temperature is 7°C, water flow is 0.172[m<sup>3</sup>/(h·kW)], ambient temperature is 35°C.
- Nominal heating condition: leaving water temperature is 45°C, water flow is 0.172[m<sup>3</sup>/(h·kW)], ambient dry bulb temperature is 7°C, wet bulb temperature is 6°C.
- WPD includes water pressure drop of the unit and pressure drop of the supplied Y shape water filter.
- External head includes unit water pressure drop, but don't include water pressure drop of Y shape water filter.
- The external head in brackets is optional. Please contact the factory if needed.
- Built-in hydraulic kit with water pump, expansion tank. Water filter, safety valve, water filling valve and wired controller need to install on site.
- The specifications given in the table will be subject to the modifications on product design by the manufacturer, and without prior notice.

## Components Data

| Model               |                           |  | UAL030ER5                                    | UAL040ER5 | UAL050ER5      | UAL060ER5 | UAL070ER5 | UAL080ER5 | UAL100ER5       | UAL120ER5 | UAL150ER5 |
|---------------------|---------------------------|--|--|-----------|----------------|-----------|-----------|-----------|-----------------|-----------|-----------|
| Compressor          | Type                      | -  | Inverter rotor compressor                    |           |                |           |           |           |                 |           |           |
|                     | Qty                       | Unit   | 1  |           |                |           |           |           |                 |           | 2         |
| Fan motor           | Type                      | -  | Axial 3 speeds fan                           |           |                |           |           |           | DC inverter fan |           |           |
|                     | Qty                       | Unit   | 1  |           | 2              |           |           | 1         |                 |           |           |
|                     | Motor power input (H/M/L) | kW   | 0.22/0.16/0.12                               |           | 0.44/0.32/0.24 |           |           | 0.81      |                 |           |           |
| Pump                | Type                      | -  | Stainless steel multi stage centrifugal pump |           |                |           |           |           |                 |           |           |
|                     | Rated power               | kW   | 0.37   |           |                |           | 0.55      |           |                 |           | 0.75      |
|                     | Rated current             | A  | 2.26   |           | 2.7            | 3.65      |           | 1.45      |                 | 2.1       |           |
| Evaporator          | Type                      | -  | Braze Plate Heat Exchanger                   |           |                |           |           |           |                 |           |           |
|                     | Plate material            | -  | Stainless steel                              |           |                |           |           |           |                 |           |           |
|                     | Water flow                | m <sup>3</sup> /h  | 1.62   | 1.96      | 2.51           | 2.89      | 3.41      | 4.28      | 4.95            | 5.76      | 6.88      |
|                     | Water volume              | L  | 0.963  | 1.18      | 1.35           | 1.66      | 1.93      | 2.46      | 3.92            | 3.92      | 4.06      |
|                     | Water piping connecting   | Inch   | 1  |           |                | 1 1/4     |           |           |                 |           |           |
| Condenser coil tube | Material                  | -  | Copper                                       |           |                |           |           |           |                 |           |           |
|                     | Type                      | -  | Inner groove                                 |           |                |           |           |           |                 |           |           |
|                     | Outer diameter            | mm   | 7.94   |           |                |           |           |           |                 |           |           |
| Fin                 | Material                  | -  | Aluminum                                     |           |                |           |           |           |                 |           |           |
|                     | Type                      | -  | Blue fin                                     |           |                |           |           |           |                 |           |           |
|                     | Rows                      | -  | 2  |           |                | 3         |           |           | 2               |           |           |
|                     | Fin per inch              | -  | 13   |           |                |           |           |           |                 |           |           |
| Heat exchange area  | m <sup>2</sup>            | 34.7   |  | 51        |                | 67        |           | 71        | 112             |           |           |
| Condenser fan       | Blade material            | -  | Plastics                                     |           |                |           |           |           |                 |           |           |
| Casing              | Colour                    | -  | RAL 7032 Pebble Grey                         |           |                |           |           |           |                 |           |           |
|                     | Material                  | -  | Electro-galvanized Mild Steel                |           |                |           |           |           |                 |           |           |
| Protection devices  | -                         | High pressure switch /Thermal and current overload protector |  |           |                |           |           |           |                 |           |           |

Note: All specifications are subjected to change by the manufacturer without prior notice.

## Electrical Data

| Model                    |                          |      | UAL030ER5 | UAL040ER5 | UAL050ER5 | UAL060ER5 | UAL070ER5 | UAL080ER5 | UAL100ER5 | UAL120ER5 | UAL150ER5 |
|--------------------------|--------------------------|------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Fan motor                | Rated running current    | A    | 1.0       |           | 1.0+1.0   |           |           | 4.8       |           |           |           |
|                          | Motor rated power output | W    | 125       |           | 125+125   |           |           | 810       |           |           |           |
|                          | Poles                    | -    | 6         |           |           | 8         |           |           |           |           |           |
| Fan speed                | RPM                      | 850  |           |           | 1100      |           |           |           |           |           |           |
| Unit protection grade    | -                        | IPX4 |           |           |           |           |           |           |           |           |           |
| Unit max power input     | kW                       | 5.1  |           | 7.8       | 10.2      | 11.2      | 19.0      | 20.0      |           |           |           |
| Unit max running current | A                        | 23.7 |           | 36.0      | 16.1      | 19.0      | 31.0      | 32.0      |           |           |           |

Note:

1. Unit max running current is tested under cooling outdoor dry-bulb temperature 48°C and highest speed the compressor can reach at this temperature.
2. All specifications are subjected to change by the manufacturer without prior notice.

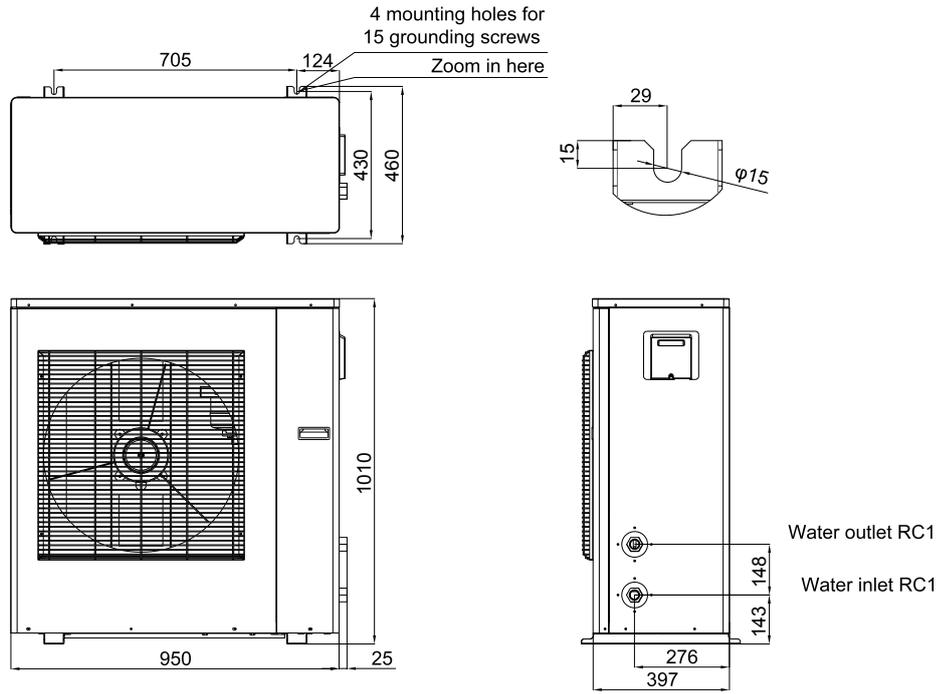
## Safety Devices

| Model                         |                      |       | UAL030ER5                         | UAL040ER5  | UAL050ER5 | UAL060ER5 | UAL070ER5 | UAL080ER5 | UAL100ER5 | UAL120ER5 | UAL150ER5 |  |
|-------------------------------|----------------------|-------|-----------------------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| Safety device                 | High pressure switch | Type  | PSW,H20PS B 4.15/3.11MPa1500mm,JL |            |           |           |           |           |           |           |           |  |
|                               |                      | Open  | MPa                               | 4.15 ± 0.1 |           |           |           |           |           |           |           |  |
|                               |                      | Close | MPa                               | 3.11 ± 0.1 |           |           |           |           |           |           |           |  |
|                               | Low pressure switch  | Type  | N/A                               |            |           |           |           |           |           |           |           |  |
|                               |                      | Open  | MPa                               | N/A        |           |           |           |           |           |           |           |  |
|                               |                      | Close | MPa                               | N/A        |           |           |           |           |           |           |           |  |
|                               | Phase sequencer      | -     | YES                               |            |           |           |           |           |           |           |           |  |
| Discharge temperature setting | °C                   | 130   |                                   |            |           |           |           |           |           |           |           |  |

Note: All specifications are subjected to change by the manufacturer without prior notice.

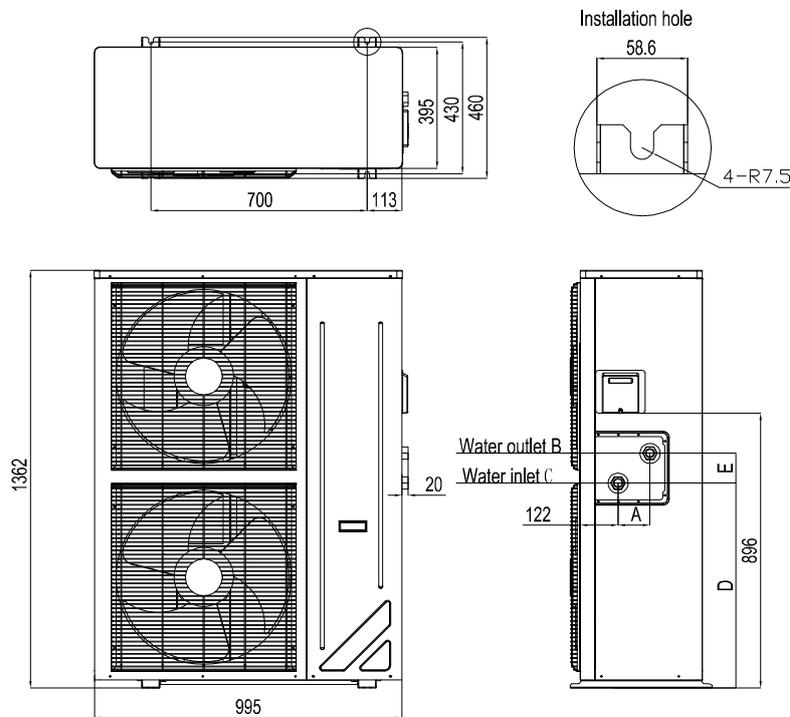
# Dimensions

## UAL030-040ER5



Unit: mm

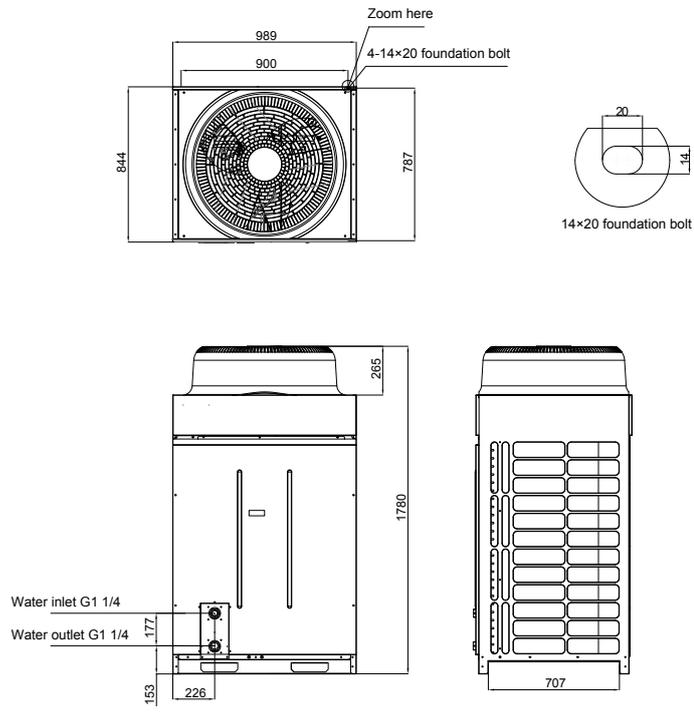
## UAL050-080ER5



| Model         | A   | B       | C       | D   | E   |
|---------------|-----|---------|---------|-----|-----|
| UAL050ER5     | 103 | Rc1     | Rc1     | 669 | 97  |
| UAL060ER5     | 103 | Rc1     | Rc1     | 649 | 117 |
| UAL070/080ER5 | 81  | Rc1 1/4 | Rc1 1/4 | 649 | 117 |

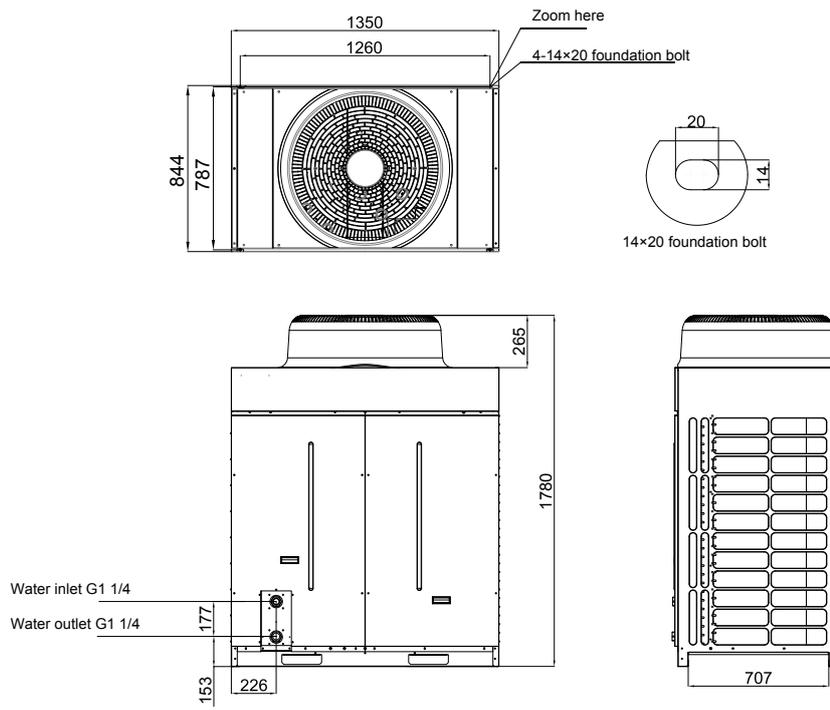
Unit: mm

**UAL100ER5**



Unit: mm

**UAL120/150ER5**

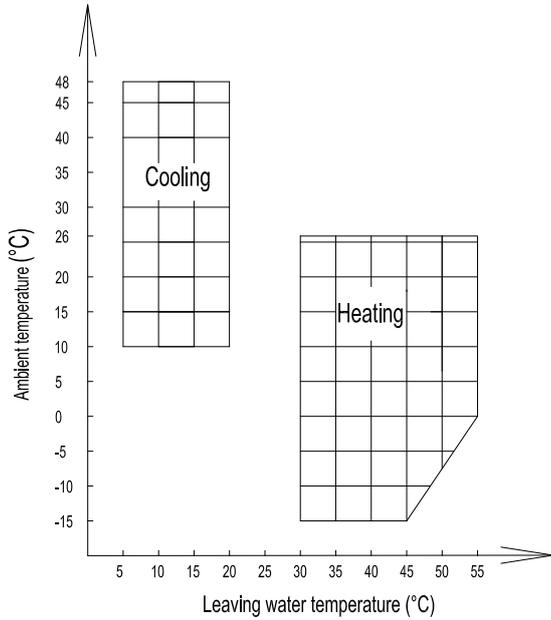


Unit: mm

# Performance data

## Operating range

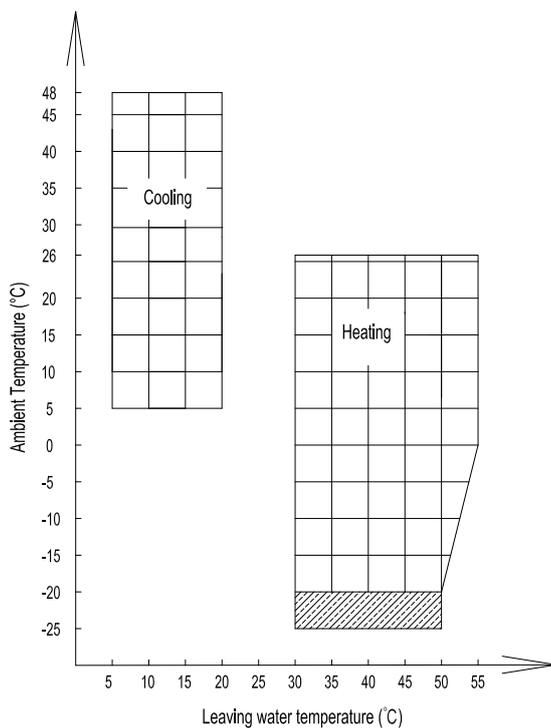
### UAL030-080ER5



**Note:**

Ensure that the water flow is in the application range. If the flow is too low, scale adsorption will occur so as to reduce unit performance, cause frost protection sensor action, or refrigerant leakage rust caused by corrosion. If the water flow is too high, impact corrosion will occur.

### UAL100-150ER5



**Note:**

1. Make sure water flow is in working range, if water flow is too small, it will generate scale which decrease performance, cause frozen protection tripped or cause corrosion and leakage; if water flow is too large, it will cause shock corrosion.
2. The shadow area of heating range: below -20°C ambient the unit can only start up for auxiliary heater interlock running.

# Cooling capacity performance table

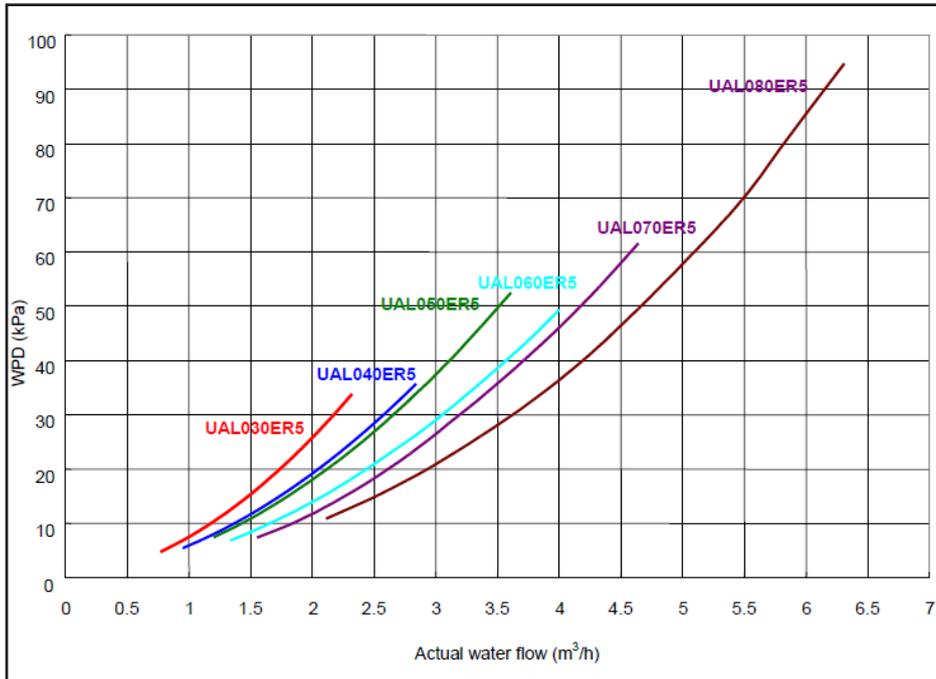
| Model     | Leaving water temperature (°C) | Ambient temperature (°C) |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |
|-----------|--------------------------------|--------------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|
|           |                                | 5                        |            | 10                    |            | 15                    |            | 20                    |            | 25                    |            | 30                    |            | 35                    |            | 40                    |            | 45                    |            | 48                    |            |
|           |                                | Cooling capacity (kW)    | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) |
| UAL030ER5 | 5                              | -                        | -          | 10.7                  | 1.5        | 10.4                  | 1.8        | 10.1                  | 2.0        | 9.7                   | 2.3        | 9.3                   | 2.7        | 8.7                   | 3.0        | 8.1                   | 3.3        | 7.5                   | 3.7        | 7.1                   | 3.9        |
|           | 7                              | -                        | -          | 11.5                  | 1.5        | 11.2                  | 1.8        | 10.9                  | 2.1        | 10.4                  | 2.4        | 10.0                  | 2.7        | 9.4                   | 3.0        | 8.8                   | 3.4        | 8.1                   | 3.7        | 7.7                   | 3.9        |
|           | 9                              | -                        | -          | 12.4                  | 1.5        | 12.0                  | 1.8        | 11.6                  | 2.1        | 11.2                  | 2.4        | 10.7                  | 2.7        | 10.1                  | 3.0        | 9.4                   | 3.4        | 8.7                   | 3.7        | 8.3                   | 4.0        |
|           | 12                             | -                        | -          | 13.7                  | 1.5        | 13.3                  | 1.8        | 12.8                  | 2.1        | 12.4                  | 2.4        | 11.8                  | 2.7        | 11.2                  | 3.0        | 10.5                  | 3.4        | 9.7                   | 3.7        | 9.2                   | 4.0        |
|           | 15                             | -                        | -          | 15.0                  | 1.6        | 14.6                  | 1.8        | 14.1                  | 2.1        | 13.6                  | 2.4        | 12.9                  | 2.7        | 12.3                  | 3.0        | 11.5                  | 3.4        | 10.7                  | 3.7        | 10.2                  | 4.0        |
|           | 20                             | -                        | -          | 15.7                  | 1.6        | 15.2                  | 1.8        | 14.6                  | 2.1        | 14.0                  | 2.4        | 13.3                  | 2.7        | 12.7                  | 3.0        | 11.9                  | 3.4        | 11.1                  | 3.7        | 10.6                  | 4.0        |
| UAL040ER5 | 5                              | -                        | -          | 13.3                  | 2.0        | 12.9                  | 2.3        | 12.5                  | 2.7        | 11.9                  | 3.1        | 11.3                  | 3.5        | 10.6                  | 3.9        | 9.8                   | 4.3        | 8.9                   | 4.8        | 8.4                   | 5.1        |
|           | 7                              | -                        | -          | 14.3                  | 2.0        | 13.9                  | 2.3        | 13.4                  | 2.7        | 12.8                  | 3.1        | 12.1                  | 3.5        | 11.4                  | 3.9        | 10.6                  | 4.3        | 9.7                   | 4.8        | 9.1                   | 5.1        |
|           | 9                              | -                        | -          | 15.3                  | 2.0        | 14.9                  | 2.3        | 14.3                  | 2.7        | 13.7                  | 3.1        | 13.0                  | 3.5        | 12.2                  | 3.9        | 11.4                  | 4.4        | 10.4                  | 4.8        | 9.8                   | 5.1        |
|           | 12                             | -                        | -          | 16.9                  | 2.0        | 16.4                  | 2.4        | 15.8                  | 2.7        | 15.2                  | 3.1        | 14.4                  | 3.5        | 13.6                  | 3.9        | 12.6                  | 4.4        | 11.6                  | 4.8        | 11.0                  | 5.1        |
|           | 15                             | -                        | -          | 18.6                  | 2.1        | 18.0                  | 2.4        | 17.4                  | 2.7        | 16.6                  | 3.1        | 15.8                  | 3.5        | 14.9                  | 3.9        | 13.9                  | 4.4        | 12.9                  | 4.8        | 12.2                  | 5.1        |
|           | 20                             | -                        | -          | 19.3                  | 2.1        | 18.5                  | 2.4        | 18.0                  | 2.8        | 17.2                  | 3.2        | 16.4                  | 3.6        | 15.3                  | 3.9        | 14.5                  | 4.4        | 13.6                  | 4.9        | 12.9                  | 5.2        |
| UAL050ER5 | 5                              | -                        | -          | 18.3                  | 2.6        | 17.3                  | 3.0        | 16.4                  | 3.3        | 15.4                  | 3.7        | 14.5                  | 4.1        | 13.5                  | 4.6        | 12.6                  | 5.1        | 11.6                  | 5.6        | 11.1                  | 5.9        |
|           | 7                              | -                        | -          | 19.6                  | 2.5        | 18.6                  | 2.9        | 17.6                  | 3.3        | 16.6                  | 3.7        | 15.6                  | 4.1        | 14.6                  | 4.6        | 13.6                  | 5.1        | 12.6                  | 5.6        | 12.0                  | 5.9        |
|           | 9                              | -                        | -          | 21.0                  | 2.4        | 20.0                  | 2.8        | 18.9                  | 3.2        | 17.8                  | 3.6        | 16.8                  | 4.1        | 15.7                  | 4.6        | 14.7                  | 5.1        | 13.6                  | 5.6        | 13.0                  | 6.0        |
|           | 12                             | -                        | -          | 23.2                  | 2.3        | 22.1                  | 2.7        | 20.9                  | 3.1        | 19.8                  | 3.6        | 18.6                  | 4.1        | 17.5                  | 4.6        | 16.3                  | 5.1        | 15.2                  | 5.7        | 14.5                  | 6.0        |
|           | 15                             | -                        | -          | 25.5                  | 2.1        | 24.3                  | 2.5        | 23.1                  | 3.0        | 21.8                  | 3.5        | 20.6                  | 4.0        | 19.4                  | 4.5        | 18.2                  | 5.1        | 16.9                  | 5.7        | 16.2                  | 6.0        |
|           | 20                             | -                        | -          | 26.2                  | 2.1        | 25.0                  | 2.4        | 23.9                  | 3.0        | 22.4                  | 3.4        | 21.1                  | 3.9        | 19.8                  | 4.5        | 18.7                  | 5.0        | 17.6                  | 5.7        | 17.0                  | 6.0        |
| UAL060ER5 | 5                              | -                        | -          | 21.1                  | 3.2        | 20.0                  | 3.6        | 18.9                  | 4.1        | 17.8                  | 4.6        | 16.7                  | 5.1        | 15.6                  | 5.7        | 14.5                  | 6.3        | 13.4                  | 6.9        | 12.7                  | 7.3        |
|           | 7                              | -                        | -          | 22.6                  | 3.1        | 21.5                  | 3.5        | 20.3                  | 4.0        | 19.1                  | 4.6        | 18.0                  | 5.1        | 16.8                  | 5.7        | 15.6                  | 6.3        | 14.5                  | 7.0        | 13.8                  | 7.4        |
|           | 9                              | -                        | -          | 24.3                  | 3.0        | 23.0                  | 3.5        | 21.8                  | 4.0        | 20.6                  | 4.5        | 19.3                  | 5.1        | 18.1                  | 5.7        | 16.8                  | 6.3        | 15.6                  | 7.0        | 14.9                  | 7.4        |
|           | 12                             | -                        | -          | 26.8                  | 2.8        | 25.5                  | 3.3        | 24.1                  | 3.8        | 22.8                  | 4.4        | 21.5                  | 5.0        | 20.1                  | 5.7        | 18.8                  | 6.3        | 17.5                  | 7.0        | 16.7                  | 7.5        |
|           | 15                             | -                        | -          | 29.5                  | 2.6        | 28.0                  | 3.1        | 26.6                  | 3.7        | 25.2                  | 4.3        | 23.7                  | 4.9        | 22.3                  | 5.6        | 20.9                  | 6.3        | 19.4                  | 7.1        | 18.6                  | 7.5        |
|           | 20                             | -                        | -          | 30.2                  | 2.6        | 28.8                  | 3.0        | 27.6                  | 3.7        | 25.8                  | 4.2        | 24.3                  | 4.8        | 22.8                  | 5.6        | 21.5                  | 6.2        | 20.3                  | 7.1        | 19.5                  | 7.5        |
| UAL070ER5 | 5                              | -                        | -          | 25.0                  | 3.8        | 23.7                  | 4.3        | 22.3                  | 4.8        | 21.0                  | 5.4        | 19.7                  | 6.0        | 18.3                  | 6.7        | 17.0                  | 7.4        | 15.7                  | 8.1        | 14.8                  | 8.5        |
|           | 7                              | -                        | -          | 26.9                  | 3.7        | 25.5                  | 4.2        | 24.1                  | 4.8        | 22.6                  | 5.4        | 21.2                  | 6.0        | 19.8                  | 6.7        | 18.4                  | 7.4        | 17.0                  | 8.2        | 16.1                  | 8.6        |
|           | 9                              | -                        | -          | 28.8                  | 3.6        | 27.4                  | 4.1        | 25.9                  | 4.7        | 24.4                  | 5.4        | 22.9                  | 6.0        | 21.3                  | 6.7        | 19.8                  | 7.4        | 18.3                  | 8.2        | 17.4                  | 8.7        |
|           | 12                             | -                        | -          | 31.9                  | 3.4        | 30.3                  | 4.0        | 28.7                  | 4.6        | 27.1                  | 5.3        | 25.4                  | 6.0        | 23.8                  | 6.7        | 22.2                  | 7.5        | 20.6                  | 8.3        | 19.6                  | 8.8        |
|           | 15                             | -                        | -          | 35.2                  | 3.2        | 33.5                  | 3.8        | 31.7                  | 4.4        | 30.0                  | 5.1        | 28.2                  | 5.9        | 26.5                  | 6.7        | 24.7                  | 7.5        | 23.0                  | 8.3        | 21.9                  | 8.8        |
|           | 20                             | -                        | -          | 36.1                  | 3.2        | 34.4                  | 3.6        | 32.8                  | 4.4        | 30.7                  | 5.0        | 28.9                  | 5.8        | 27.0                  | 6.6        | 25.4                  | 7.5        | 23.8                  | 8.3        | 23.0                  | 8.8        |
| UAL080ER5 | 5                              | -                        | -          | 31.7                  | 4.9        | 30.0                  | 5.5        | 28.3                  | 6.2        | 26.5                  | 6.9        | 24.8                  | 7.7        | 23.1                  | 8.6        | 21.3                  | 9.4        | 19.6                  | 10.4       | 18.5                  | 10.9       |
|           | 7                              | -                        | -          | 34.1                  | 4.7        | 32.3                  | 5.4        | 30.4                  | 6.2        | 28.6                  | 6.9        | 26.7                  | 7.7        | 24.9                  | 8.6        | 23.1                  | 9.5        | 21.2                  | 10.5       | 20.1                  | 11.0       |
|           | 9                              | -                        | -          | 36.6                  | 4.6        | 34.6                  | 5.3        | 32.7                  | 6.1        | 30.7                  | 6.9        | 28.8                  | 7.7        | 26.8                  | 8.6        | 24.9                  | 9.6        | 22.9                  | 10.5       | 21.8                  | 11.2       |
|           | 12                             | -                        | -          | 40.5                  | 4.4        | 38.4                  | 5.1        | 36.3                  | 5.9        | 34.2                  | 6.8        | 32.1                  | 7.7        | 30.0                  | 8.6        | 27.8                  | 9.6        | 25.7                  | 10.6       | 24.5                  | 11.3       |
|           | 15                             | -                        | -          | 44.6                  | 4.1        | 42.3                  | 4.9        | 40.1                  | 5.8        | 37.8                  | 6.7        | 35.5                  | 7.6        | 33.3                  | 8.6        | 31.0                  | 9.6        | 28.8                  | 10.7       | 27.4                  | 11.4       |
|           | 20                             | -                        | -          | 45.7                  | 4.1        | 44.0                  | 4.9        | 41.5                  | 5.8        | 38.9                  | 6.7        | 36.4                  | 7.6        | 35.0                  | 8.6        | 33.0                  | 9.6        | 30.0                  | 10.7       | 28.8                  | 11.3       |
| UAL100ER5 | 5                              | 37.7                     | 5.6        | 34.8                  | 6.5        | 33.6                  | 6.9        | 32.2                  | 7.4        | 40.9                  | 8.0        | 28.9                  | 8.6        | 27.0                  | 9.4        | 25.0                  | 10.3       | 22.7                  | 11.2       | 21.3                  | 11.8       |
|           | 7                              | 40.3                     | 5.7        | 37.1                  | 6.6        | 35.8                  | 7.0        | 34.3                  | 7.5        | 32.6                  | 8.0        | 41.0                  | 8.7        | 28.8                  | 9.5        | 26.4                  | 10.3       | 24.0                  | 11.3       | 22.5                  | 11.9       |
|           | 9                              | 43.6                     | 5.7        | 39.6                  | 6.7        | 38.6                  | 7.1        | 36.4                  | 7.6        | 34.6                  | 8.1        | 32.6                  | 8.8        | 30.4                  | 9.6        | 28.1                  | 10.4       | 25.6                  | 11.3       | 23.9                  | 11.9       |
|           | 12                             | 49.5                     | 5.7        | 43.6                  | 6.9        | 41.9                  | 7.3        | 40.1                  | 7.8        | 38.0                  | 8.3        | 33.4                  | 9.7        | 33.4                  | 9.7        | 31.0                  | 10.6       | 28.2                  | 11.5       | 26.4                  | 12.1       |
|           | 15                             | 53.1                     | 5.8        | 48.0                  | 7.2        | 46.1                  | 7.6        | 44.0                  | 8.0        | 41.8                  | 8.6        | 36.8                  | 10.0       | 36.9                  | 10.0       | 34.0                  | 10.8       | 31.0                  | 11.7       | 29.2                  | 12.3       |
|           | 20                             | 55.8                     | 5.8        | 50.1                  | 7.3        | 48.0                  | 7.6        | 45.7                  | 8.1        | 43.6                  | 8.7        | 38.0                  | 10.1       | 38.2                  | 10.0       | 35.3                  | 10.8       | 32.2                  | 11.7       | 30.4                  | 12.3       |
| UAL120ER5 | 5                              | 45.4                     | 6.6        | 41.9                  | 7.6        | 39.8                  | 7.8        | 37.6                  | 8.2        | 35.4                  | 8.8        | 33.1                  | 9.4        | 30.8                  | 10.3       | 28.4                  | 11.2       | 26.0                  | 12.3       | 24.4                  | 13.1       |
|           | 7                              | 48.4                     | 6.7        | 44.6                  | 7.8        | 42.4                  | 8.0        | 40.2                  | 8.4        | 38.0                  | 8.9        | 35.5                  | 9.6        | 33.5                  | 10.4       | 30.6                  | 11.3       | 28.1                  | 12.3       | 26.5                  | 13.1       |
|           | 9                              | 53.2                     | 6.9        | 47.4                  | 8.0        | 45.1                  | 8.2        | 42.8                  | 8.6        | 40.4                  | 9.1        | 38.0                  | 9.7        | 35.0                  | 10.6       | 32.9                  | 11.4       | 30.4                  | 12.6       | 28.7                  | 13.2       |
|           | 12                             | 58.7                     | 7.2        | 51.7                  | 8.4        | 49.3                  | 8.6        | 46.9                  | 8.9        | 44.5                  | 9.4        | 41.8                  | 10.0       | 39.2                  | 10.8       | 36.4                  | 11.7       | 33.7                  | 12.8       | 32.0                  | 13.5       |
|           | 15                             | 62.2                     | 7.4        | 56.2                  | 8.9        | 53.6                  | 9.1        | 51.0                  | 9.4        | 48.2                  | 9.9        | 45.7                  | 10.5       | 43.3                  | 11.2       | 40.1                  | 12.1       | 37.0                  | 13.1       | 35.4                  | 13.7       |
|           | 20                             | 65.4                     | 7.4        | 58.7                  | 9.0        | 55.8                  | 9.1        | 53.0                  | 9.5        | 50.3                  | 10.0       | 47.2                  | 10.6       | 44.9                  | 11.2       | 41.6                  | 12.1       | 38.4                  | 13.1       | 36.8                  | 13.7       |
| UAL150ER5 | 5                              | 54.5                     | 8.7        | 50.3                  | 10.1       | 47.8                  | 10.5       | 45.2                  | 11.0       | 42.6                  | 11.7       | 39.8                  | 12.6       | 37.0                  | 13.7       | 34.1                  | 15.0       | 31.2                  | 16.5       | 29.4                  | 17.5       |
|           | 7                              | 58.2                     | 8.9        | 53.6                  | 10.4       | 51.0                  | 10.7       | 48.3                  | 11.2       | 45.6                  | 11.9       | 42.7                  | 12.8       | 40.0                  | 13.9       | 36.8                  | 15.1       | 33.7                  | 16.5       | 31.9                  | 17.6       |
|           | 9                              | 62.8                     | 9.2        | 56.9                  | 10.7       | 54.2                  | 11.0       | 51.4                  | 11.5       | 48.6                  | 12.1       | 45.7                  | 13.0       | 42.0                  | 14.2       | 39.5                  | 15.3       | 36.5                  | 16.8       | 34.4                  | 17.7       |
|           | 12                             | 70.6                     | 10.3       | 62.1                  | 11.3       | 59.2                  | 11.5       | 56.3                  | 12.0       | 53.5                  | 12.6       | 50.2                  | 13.4       | 47.1                  | 14.4       | 43.8                  | 15.7       | 40.5                  | 17.1       | 38.0                  | 18.0       |
|           | 15                             | 74.7                     | 10.6       | 67.5                  | 12.0       | 64.4                  | 12.2       | 61.3                  | 12.6       | 57.9                  | 13.2       | 54.9                  | 14.0       | 52.0                  | 14.9       | 48.2                  | 16.1       | 44.4                  | 17.5       | 42.0                  | 18.3       |
|           | 20                             | 77.1                     | 10.6       | 69.2                  | 12.0       | 66.3                  | 12.3       | 63.5                  | 12.7       | 59.3                  | 13.2       | 56.2                  | 14.0       | 53.6                  | 15.0       | 49.6                  | 16.1       | 46.2                  | 17.6       | 44.1                  | 18.2       |

# Heating capacity performance table

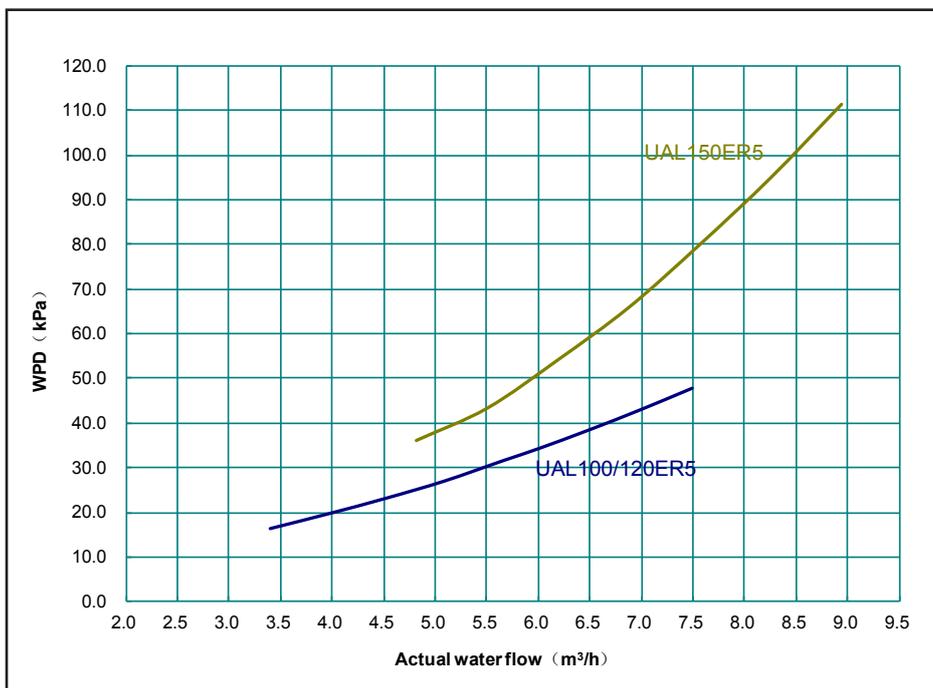
| Model     | Leaving water temperature (°C) | Ambient temperature (°C) |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |                       |            |
|-----------|--------------------------------|--------------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|-----------------------|------------|
|           |                                | -15                      |            | -10                   |            | -5                    |            | 0                     |            | 7                     |            | 15                    |            | 21                    |            | 26                    |            |
|           |                                | Cooling capacity (kW)    | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) | Cooling capacity (kW) | Power (kW) |
| UAL030ER5 | 30                             | 3.9                      | 2.0        | 5.2                   | 2.1        | 6.5                   | 2.1        | 8.0                   | 2.1        | 10.3                  | 2.2        | 13.1                  | 2.2        | 15.4                  | 2.2        | 17.4                  | 2.2        |
|           | 35                             | 4.1                      | 2.3        | 5.3                   | 2.4        | 6.6                   | 2.4        | 8.0                   | 2.4        | 10.2                  | 2.5        | 12.9                  | 2.5        | 15.1                  | 2.5        | 17.1                  | 2.5        |
|           | 40                             | 4.3                      | 2.6        | 5.4                   | 2.7        | 6.6                   | 2.7        | 8.0                   | 2.7        | 10.0                  | 2.8        | 12.6                  | 2.8        | 14.7                  | 2.8        | 16.6                  | 2.8        |
|           | 45                             | 4.4                      | 3.0        | 5.5                   | 3.0        | 6.6                   | 3.0        | 7.9                   | 3.1        | 9.8                   | 3.1        | 12.3                  | 3.1        | 14.3                  | 3.2        | 16.2                  | 3.2        |
|           | 50                             | 4.5                      | 3.3        | 5.5                   | 3.4        | 6.5                   | 3.4        | 7.7                   | 3.4        | 9.6                   | 3.4        | 11.9                  | 3.5        | 13.9                  | 3.5        | 15.6                  | 3.5        |
|           | 55                             | 4.5                      | 3.7        | 5.4                   | 3.7        | 6.4                   | 3.8        | 7.5                   | 3.8        | 9.3                   | 3.8        | 11.5                  | 3.8        | 13.4                  | 3.9        | 15.1                  | 3.9        |
| UAL040ER5 | 30                             | 4.6                      | 2.5        | 6.2                   | 2.6        | 7.9                   | 2.6        | 9.7                   | 2.6        | 12.5                  | 2.7        | 16.0                  | 2.7        | 18.9                  | 2.8        | 21.5                  | 2.8        |
|           | 35                             | 4.9                      | 2.9        | 6.4                   | 2.9        | 8.0                   | 3.0        | 9.7                   | 3.0        | 12.4                  | 3.1        | 15.8                  | 3.1        | 18.6                  | 3.1        | 21.0                  | 3.2        |
|           | 40                             | 5.2                      | 3.3        | 6.5                   | 3.4        | 8.0                   | 3.4        | 9.7                   | 3.4        | 12.2                  | 3.5        | 15.5                  | 3.5        | 18.1                  | 3.5        | 20.5                  | 3.6        |
|           | 45                             | 5.3                      | 3.8        | 6.6                   | 3.8        | 8.0                   | 3.8        | 9.6                   | 3.9        | 12.0                  | 3.9        | 15.1                  | 3.9        | 17.6                  | 4.0        | 19.9                  | 4.0        |
|           | 50                             | 5.4                      | 4.2        | 6.6                   | 4.2        | 8.0                   | 4.3        | 9.4                   | 4.3        | 11.7                  | 4.3        | 14.7                  | 4.4        | 17.1                  | 4.4        | 19.3                  | 4.4        |
|           | 55                             | 5.5                      | 4.7        | 6.6                   | 4.7        | 7.8                   | 4.8        | 9.2                   | 4.8        | 11.4                  | 4.8        | 14.2                  | 4.9        | 16.5                  | 4.9        | 18.6                  | 4.9        |
| UAL050ER5 | 30                             | 7.5                      | 3.2        | 9.0                   | 3.4        | 10.8                  | 3.5        | 12.8                  | 3.6        | 16.2                  | 3.6        | 20.7                  | 3.5        | 24.6                  | 3.3        | 28.1                  | 3.1        |
|           | 35                             | 7.5                      | 3.4        | 8.9                   | 3.6        | 10.5                  | 3.8        | 12.5                  | 3.9        | 15.7                  | 4.0        | 20.1                  | 3.9        | 23.8                  | 3.8        | 27.2                  | 3.6        |
|           | 40                             | 7.5                      | 3.6        | 8.8                   | 3.9        | 10.3                  | 4.1        | 12.2                  | 4.2        | 15.2                  | 4.4        | 19.4                  | 4.4        | 23.0                  | 4.3        | 26.4                  | 4.2        |
|           | 45                             | 7.5                      | 3.8        | 8.7                   | 4.1        | 10.1                  | 4.4        | 11.9                  | 4.6        | 14.8                  | 4.8        | 18.8                  | 4.9        | 22.3                  | 4.8        | 25.5                  | 4.7        |
|           | 50                             | 7.5                      | 4.1        | 8.6                   | 4.4        | 10.0                  | 4.8        | 11.6                  | 5.0        | 14.4                  | 5.2        | 18.2                  | 5.4        | 21.6                  | 5.4        | 24.7                  | 5.4        |
|           | 55                             | 7.6                      | 4.4        | 8.5                   | 4.8        | 9.8                   | 5.1        | 11.3                  | 5.4        | 14.0                  | 5.7        | 17.7                  | 5.9        | 20.9                  | 6.0        | 23.9                  | 6.0        |
| UAL060ER5 | 30                             | 8.6                      | 3.6        | 10.3                  | 3.9        | 12.4                  | 4.0        | 14.7                  | 4.1        | 18.6                  | 4.1        | 23.8                  | 4.0        | 28.3                  | 3.8        | 32.4                  | 3.5        |
|           | 35                             | 8.6                      | 3.8        | 10.2                  | 4.1        | 12.1                  | 4.3        | 14.3                  | 4.5        | 18.0                  | 4.6        | 23.1                  | 4.5        | 27.4                  | 4.3        | 31.4                  | 4.1        |
|           | 40                             | 8.6                      | 4.1        | 10.0                  | 4.4        | 11.8                  | 4.7        | 14.0                  | 4.9        | 17.5                  | 5.0        | 22.3                  | 5.0        | 26.5                  | 4.9        | 30.4                  | 4.8        |
|           | 45                             | 8.6                      | 4.3        | 9.9                   | 4.7        | 11.6                  | 5.0        | 13.6                  | 5.3        | 17.0                  | 5.5        | 21.6                  | 5.6        | 25.7                  | 5.6        | 29.4                  | 5.5        |
|           | 50                             | 8.6                      | 4.6        | 9.9                   | 5.1        | 11.4                  | 5.4        | 13.3                  | 5.7        | 16.5                  | 6.0        | 21.0                  | 6.2        | 24.9                  | 6.2        | 28.5                  | 6.2        |
|           | 55                             | 8.7                      | 5.0        | 9.8                   | 5.4        | 11.3                  | 5.8        | 13.0                  | 6.2        | 16.1                  | 6.6        | 20.3                  | 6.8        | 24.1                  | 6.9        | 27.6                  | 6.9        |
| UAL070ER5 | 30                             | 10.6                     | 4.4        | 12.7                  | 4.6        | 15.2                  | 4.8        | 18.1                  | 4.9        | 22.8                  | 4.9        | 29.1                  | 4.7        | 34.5                  | 4.4        | 39.4                  | 4.1        |
|           | 35                             | 10.5                     | 4.6        | 12.5                  | 4.9        | 14.8                  | 5.2        | 17.6                  | 5.3        | 22.1                  | 5.4        | 28.2                  | 5.3        | 33.4                  | 5.1        | 38.2                  | 4.9        |
|           | 40                             | 10.5                     | 4.9        | 12.3                  | 5.3        | 14.5                  | 5.6        | 17.1                  | 5.8        | 21.4                  | 6.0        | 27.3                  | 6.0        | 32.4                  | 5.9        | 37.0                  | 5.7        |
|           | 45                             | 10.5                     | 5.2        | 12.2                  | 5.7        | 14.2                  | 6.1        | 16.7                  | 6.3        | 20.8                  | 6.6        | 26.4                  | 6.7        | 31.3                  | 6.7        | 35.8                  | 6.5        |
|           | 50                             | 10.5                     | 5.6        | 12.1                  | 6.1        | 14.0                  | 6.5        | 16.3                  | 6.9        | 20.2                  | 7.2        | 25.6                  | 7.4        | 30.3                  | 7.5        | 34.7                  | 7.4        |
|           | 55                             | 10.6                     | 6.0        | 12.0                  | 6.6        | 13.8                  | 7.1        | 15.9                  | 7.5        | 19.6                  | 7.9        | 24.8                  | 8.2        | 29.4                  | 8.3        | 33.6                  | 8.3        |
| UAL080ER5 | 30                             | 13.2                     | 5.4        | 15.8                  | 5.8        | 18.9                  | 6.0        | 22.5                  | 6.1        | 28.4                  | 6.2        | 36.4                  | 5.9        | 43.3                  | 5.6        | 49.5                  | 5.2        |
|           | 35                             | 13.1                     | 5.7        | 15.5                  | 6.2        | 18.5                  | 6.5        | 21.9                  | 6.7        | 27.6                  | 6.8        | 35.3                  | 6.7        | 41.9                  | 6.5        | 48.0                  | 6.2        |
|           | 40                             | 13.1                     | 6.1        | 15.4                  | 6.6        | 18.1                  | 7.0        | 21.4                  | 7.3        | 26.8                  | 7.5        | 34.2                  | 7.6        | 40.6                  | 7.4        | 46.5                  | 7.2        |
|           | 45                             | 13.1                     | 6.5        | 15.2                  | 7.1        | 17.8                  | 7.6        | 20.8                  | 7.9        | 26.0                  | 8.3        | 33.1                  | 8.5        | 39.3                  | 8.4        | 45.0                  | 8.2        |
|           | 50                             | 13.2                     | 6.9        | 15.1                  | 7.6        | 17.5                  | 8.2        | 20.4                  | 8.6        | 25.3                  | 9.1        | 32.1                  | 9.4        | 38.0                  | 9.4        | 43.6                  | 9.3        |
|           | 55                             | 13.3                     | 7.4        | 15.0                  | 8.2        | 17.2                  | 8.8        | 19.9                  | 9.4        | 24.6                  | 10.0       | 31.1                  | 10.4       | 36.8                  | 10.5       | 42.2                  | 10.5       |
| UAL100ER5 | 30                             | 17.7                     | 7.4        | 19.2                  | 7.5        | 21.2                  | 7.5        | 24.6                  | 7.6        | 30.1                  | 7.7        | 35.2                  | 7.7        | 40.8                  | 7.7        | 46.4                  | 7.7        |
|           | 35                             | 17.6                     | 8.0        | 19.0                  | 8.1        | 20.8                  | 8.2        | 24.4                  | 8.3        | 29.9                  | 8.3        | 34.7                  | 8.4        | 40.3                  | 8.4        | 45.6                  | 8.4        |
|           | 40                             | 17.5                     | 8.8        | 18.8                  | 8.9        | 20.4                  | 9.0        | 24.1                  | 9.0        | 29.6                  | 9.1        | 34.1                  | 9.2        | 39.4                  | 9.2        | 44.5                  | 9.2        |
|           | 45                             | 17.3                     | 9.6        | 18.5                  | 9.7        | 20.0                  | 9.8        | 23.7                  | 9.9        | 30.0                  | 9.9        | 33.3                  | 10.1       | 38.1                  | 10.1       | 43.0                  | 10.1       |
|           | 50                             | 16.1                     | 10.6       | 17.2                  | 10.7       | 19.7                  | 10.8       | 23.0                  | 10.8       | 27.9                  | 10.9       | 32.1                  | 11.0       | 36.4                  | 11.0       | 41.1                  | 11.0       |
|           | 55                             | -                        | -          | -                     | -          | -                     | -          | 21.8                  | 11.9       | 26.4                  | 12.0       | 29.8                  | 12.1       | 34.3                  | 12.1       | 38.9                  | 12.1       |
| UAL120ER5 | 30                             | 19.2                     | 7.8        | 22.4                  | 7.9        | 24.9                  | 8.0        | 28.5                  | 8.2        | 36.8                  | 8.3        | 41.6                  | 9.0        | 46.6                  | 9.5        | 50.8                  | 10.0       |
|           | 35                             | 18.3                     | 8.2        | 21.6                  | 8.5        | 24.1                  | 8.7        | 27.7                  | 8.9        | 35.6                  | 9.0        | 40.1                  | 9.5        | 44.9                  | 9.9        | 48.8                  | 10.3       |
|           | 40                             | 17.4                     | 8.6        | 20.6                  | 9.1        | 23.0                  | 9.5        | 26.9                  | 9.7        | 34.5                  | 9.8        | 38.7                  | 10.1       | 43.2                  | 10.4       | 46.9                  | 10.7       |
|           | 45                             | 16.5                     | 9.0        | 20.0                  | 9.5        | 22.0                  | 9.8        | 26.2                  | 10.1       | 34.0                  | 10.8       | 37.3                  | 10.9       | 41.6                  | 11.1       | 45.0                  | 11.3       |
|           | 50                             | 15.8                     | 9.5        | 19.2                  | 10.1       | 21.4                  | 10.7       | 25.6                  | 11.1       | 32.6                  | 11.4       | 36.0                  | 11.6       | 40.0                  | 11.8       | 43.3                  | 11.9       |
|           | 55                             | -                        | -          | -                     | -          | -                     | -          | 25.2                  | 12.0       | 31.8                  | 12.3       | 34.8                  | 12.5       | 38.6                  | 12.6       | 41.6                  | 12.7       |
| UAL150ER5 | 30                             | 23.1                     | 9.5        | 27.0                  | 9.6        | 30.1                  | 9.7        | 34.4                  | 9.9        | 44.4                  | 10.1       | 50.2                  | 10.9       | 56.2                  | 11.5       | 61.2                  | 12.1       |
|           | 35                             | 22.1                     | 9.9        | 26.1                  | 10.3       | 29.1                  | 10.5       | 33.3                  | 10.8       | 42.9                  | 10.9       | 48.3                  | 11.5       | 54.1                  | 12.0       | 58.8                  | 12.4       |
|           | 40                             | 20.9                     | 10.4       | 24.9                  | 11.0       | 27.8                  | 11.5       | 32.4                  | 11.7       | 41.6                  | 11.9       | 46.6                  | 12.3       | 52.1                  | 12.6       | 56.5                  | 13.0       |
|           | 45                             | 19.8                     | 10.8       | 24.1                  | 11.5       | 26.6                  | 11.9       | 31.6                  | 12.2       | 41.0                  | 13.1       | 45.0                  | 13.2       | 50.1                  | 13.4       | 54.3                  | 13.6       |
|           | 50                             | 19.0                     | 11.4       | 23.1                  | 12.1       | 25.9                  | 13.0       | 30.9                  | 13.4       | 39.3                  | 13.8       | 43.4                  | 14.1       | 48.3                  | 14.3       | 52.2                  | 14.4       |
|           | 55                             | -                        | -          | -                     | -          | -                     | -          | 30.4                  | 14.6       | 38.3                  | 14.8       | 42.0                  | 15.1       | 46.5                  | 15.2       | 50.1                  | 15.4       |

## Water pressure drop curve

### UAL030-080ER5



### UAL100-150ER5



#### Notes:

1. Water pressure drop of the unit is tested by the plate heat exchanger and the supplied Y-type filter.
2. Water resistance of plate heat exchanger and Y-type filter is tested under condition of clean water; it may be inconsistent with that shown in the diagram due to the water quality on site.

## Sound data

### Acoustic noise

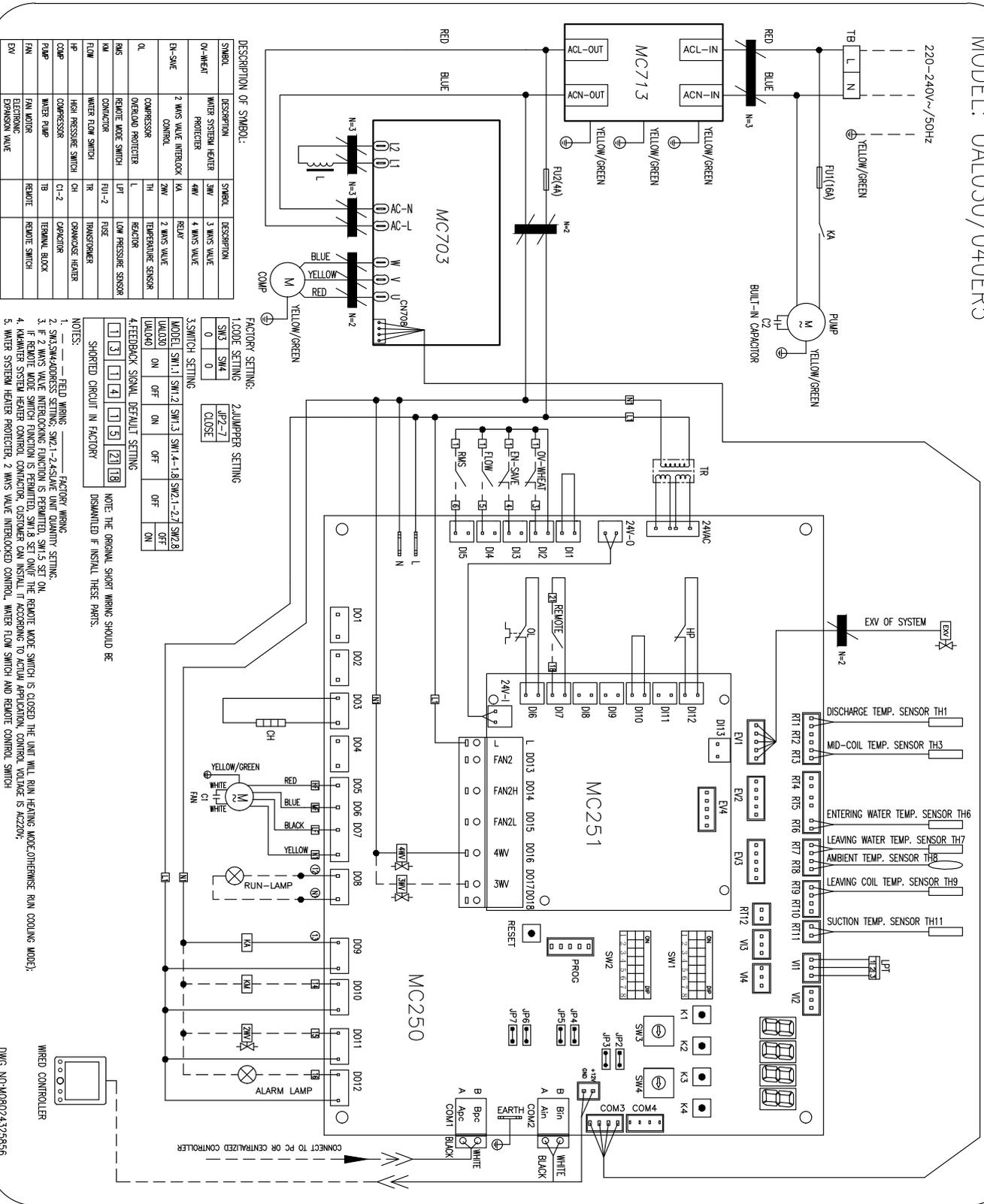
| Model     | Octave Band Sound Pressure Level (dB, ref20μPa) |       |       |       |      |      |      |      | dB(A)   |
|-----------|---|-------|-------|-------|------|------|------|------|---------|
|           | 63Hz  | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Overall |
| UAL030ER5 | 35.5  | 49.1  | 47.3  | 49.5  | 50.2 | 45.9 | 45.8 | 36.7 | 56      |
| UAL040ER5 | 32.3  | 42.6  | 49.5  | 51.0  | 48.8 | 46.1 | 46.1 | 39.3 | 56      |
| UAL050ER5 | 39.3  | 43.1  | 50.1  | 52.6  | 52.6 | 49.0 | 46.3 | 38.7 | 58      |
| UAL060ER5 | 38.5  | 43.1  | 49.0  | 51.8  | 52.6 | 49.2 | 46.6 | 50.0 | 58      |
| UAL070ER5 | 45.8  | 50.3  | 50.1  | 53.2  | 53.2 | 49.9 | 46.4 | 40.6 | 59      |
| UAL080ER5 | 39.9  | 45.2  | 51.5  | 53.6  | 55.8 | 51.8 | 47.7 | 39.4 | 60      |
| UAL100ER5 | 43.0  | 49.5  | 53.6  | 57.6  | 57.1 | 57.4 | 51.0 | 43.7 | 63      |
| UAL120ER5 | 38.1  | 47.0  | 52.3  | 58.6  | 59.1 | 57.5 | 51.1 | 44.1 | 64      |
| UAL150ER5 | 49.6  | 56.5  | 56.2  | 57.9  | 58.0 | 57.9 | 54.8 | 47.9 | 65      |

Test condition: Octave band sound pressure level noise is tested base on high speed and in 11.5dB(A) background noise semi-anechoic room.

# Wiring diagram

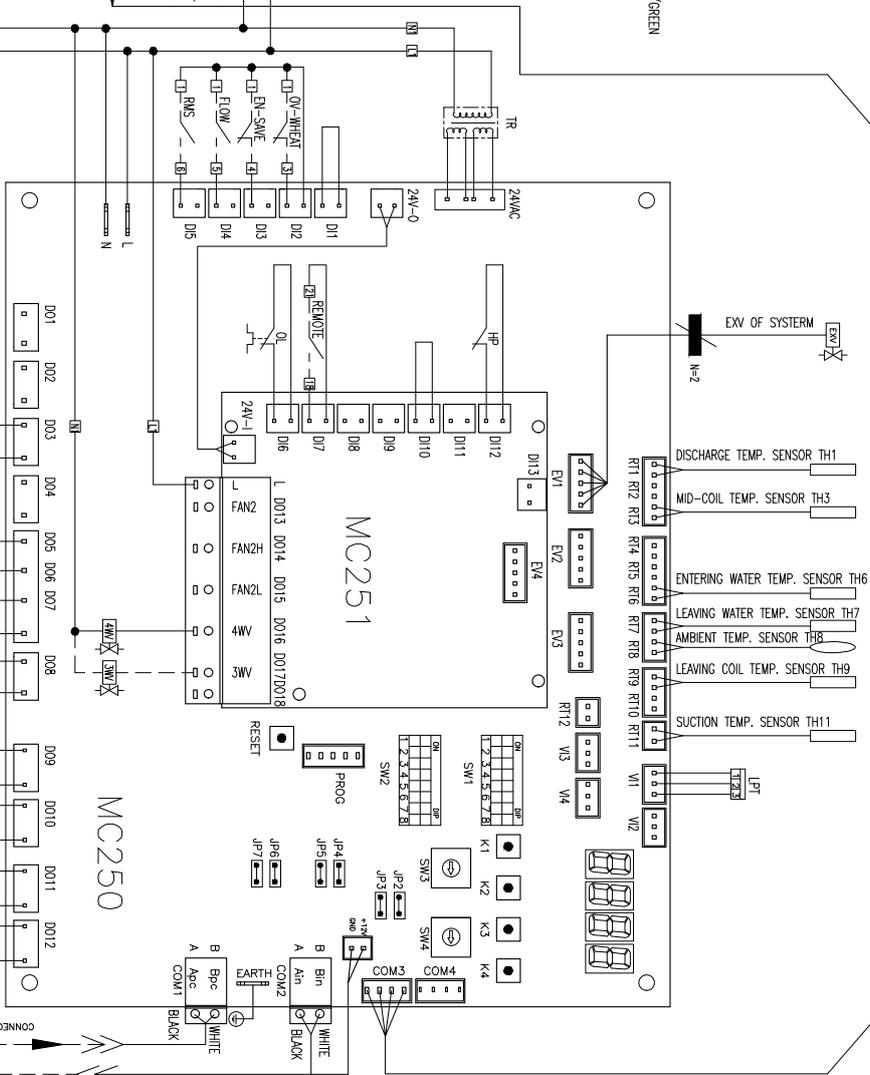
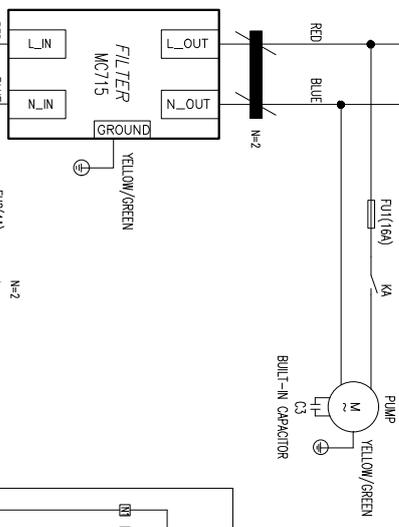
UAL030-040ER5

MODEL: UAL030/040ER5



MODEL: UAL050/060ER5

220-240V~/50Hz



DESCRIPTION OF SYMBOL:

| SYMBOL   | DESCRIPTION                    | SYMBOL | DESCRIPTION                |
|----------|--------------------------------|--------|----------------------------|
| OV-WHEAT | WATER SYSTEM HEATER PROTECTOR  | 3W     | 3 WAYS VALVE               |
| EN-SWVE  | 2 WAYS VALVE INTERLOCK CONTROL | 4W     | 4 WAYS VALVE               |
| OL       | OVERLOAD PROTECT               | KA     | RELAY                      |
| COMPR    | COMPRESSOR                     | TH     | 2 WAYS VALVE               |
| RMIS     | REMOTE MODE SWITCH             | L      | RELAY                      |
| RM       | REMOTE MODE SWITCH             | UP1    | LOW PRESSURE SENSOR        |
| RMV      | REMOTE MODE SWITCH             | UP2    | RISE TRANSDUCER            |
| HP       | HIGH PRESSOR SWITCH            | CH     | CHAMBER HEATER             |
| COMP     | COMPRESSOR                     | CI-1   | CAPACITOR                  |
| FAN      | FAN MOTOR                      | TR     | TRANSFORMER                |
| PIC      | PIC RESISTOR                   | EV     | ELECTRONIC EXPANSION VALVE |

FACTORY SETTINGS:

| 1.CODE SETTING | 2.JUMPER SETTING |
|----------------|------------------|
| SW3 SW4        | JP2-7            |
| 0 0            | CLOSE            |

3.SWITCH SETTING

| MODEL  | SW1.1 | SW1.2 | SW1.3 | SW1.4 | SW1.5 | SW1.6 | SW1.7 | SW1.8 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| UAL050 | ON    | OFF   | ON    | OFF   | OFF   | ON    | ON    | OFF   |
| UAL060 | ON    | OFF   | ON    | OFF   | OFF   | ON    | ON    | OFF   |

4.FEEDBACK AND SWITCH SIGNAL DEFAULT SETTING

| SHORTED CIRCUIT IN FACTORY | NOTE: THE ORIGINAL SHORT WIRING SHOULD BE DISMANTLED IF INSTALL THESE PARTS. |
|----------------------------|--|
| 1 2 3 4 5 6 7 8            |  |

NOTES:

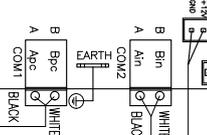
1. SW1.1: FIELD WIRING
2. SW1.2: SW1.2 ADDRESS SETTING
3. SW1.3: SW1.3 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED
4. SW1.4: SW1.4 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED
5. SW1.5: SW1.5 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED
6. SW1.6: SW1.6 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED
7. SW1.7: SW1.7 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED
8. SW1.8: SW1.8 SET ON: THE FUNCTION OF RESUMING AFTER POWER ON IS PERMITTED

5. WIRE SYSTEM HEATER PROTECTOR, 2 WAYS VALVE INTERLOCKED CONTROL, WATER FLOW SWITCH AND REMOTE CONTROL SWITCH CAN BE COMBINED BY CUSTOMER ACCORDING TO CUSTOMER'S ACTUAL REQUIREMENT.

WIRING CONTROLLER



CONNECT ONLY TO PC OR CENTRALIZED CONTROLLER



DWG NO:UM08024328857

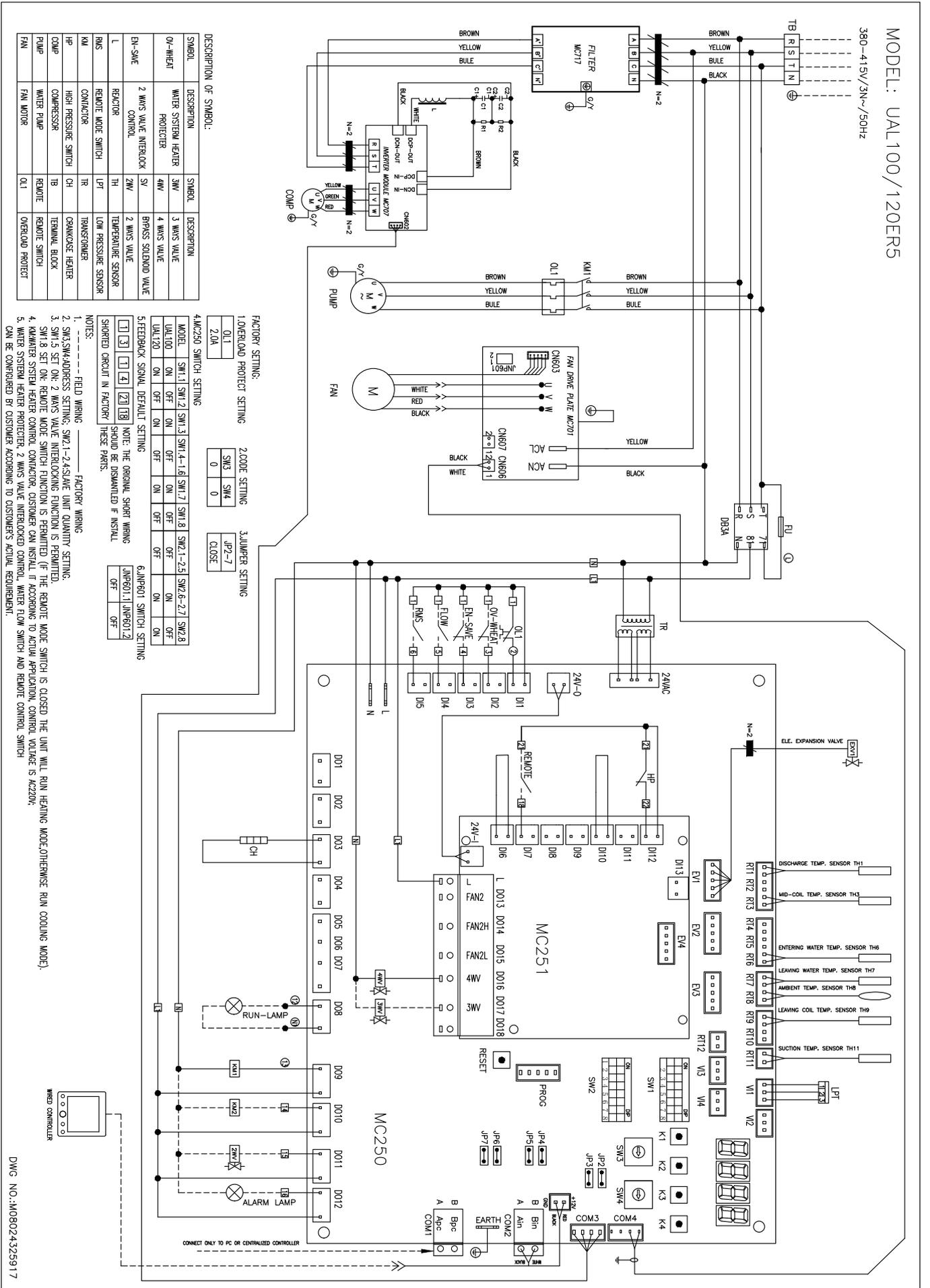




# UAL100-120ER5

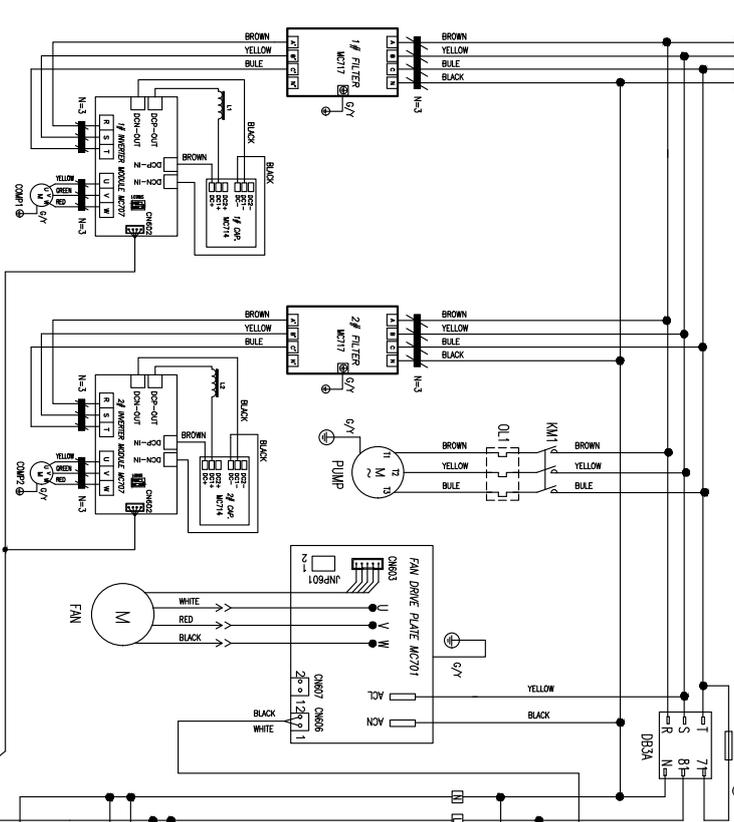
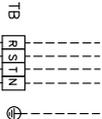
MODEL: UAL100/120ER5

380-415V/3N~/50Hz



MODEL: UAL150ER5

380-415V/3N~/50HZ

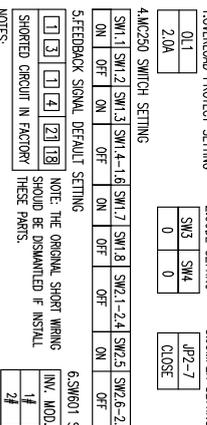


DESCRIPTION OF SYMBOL:

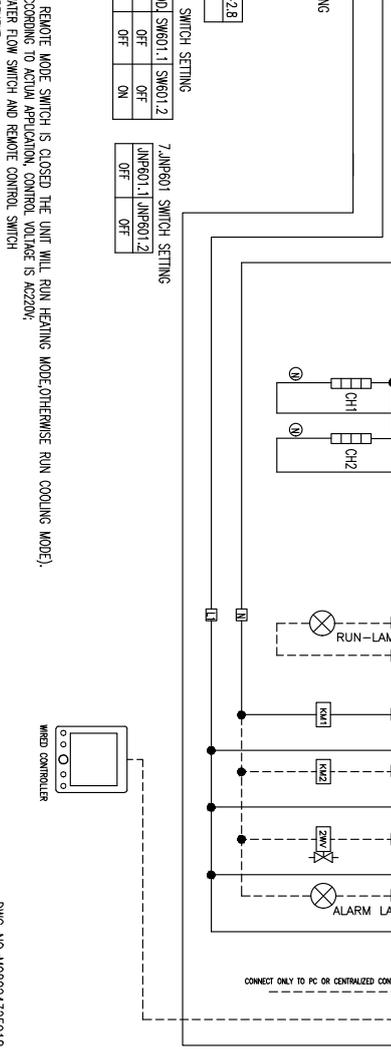
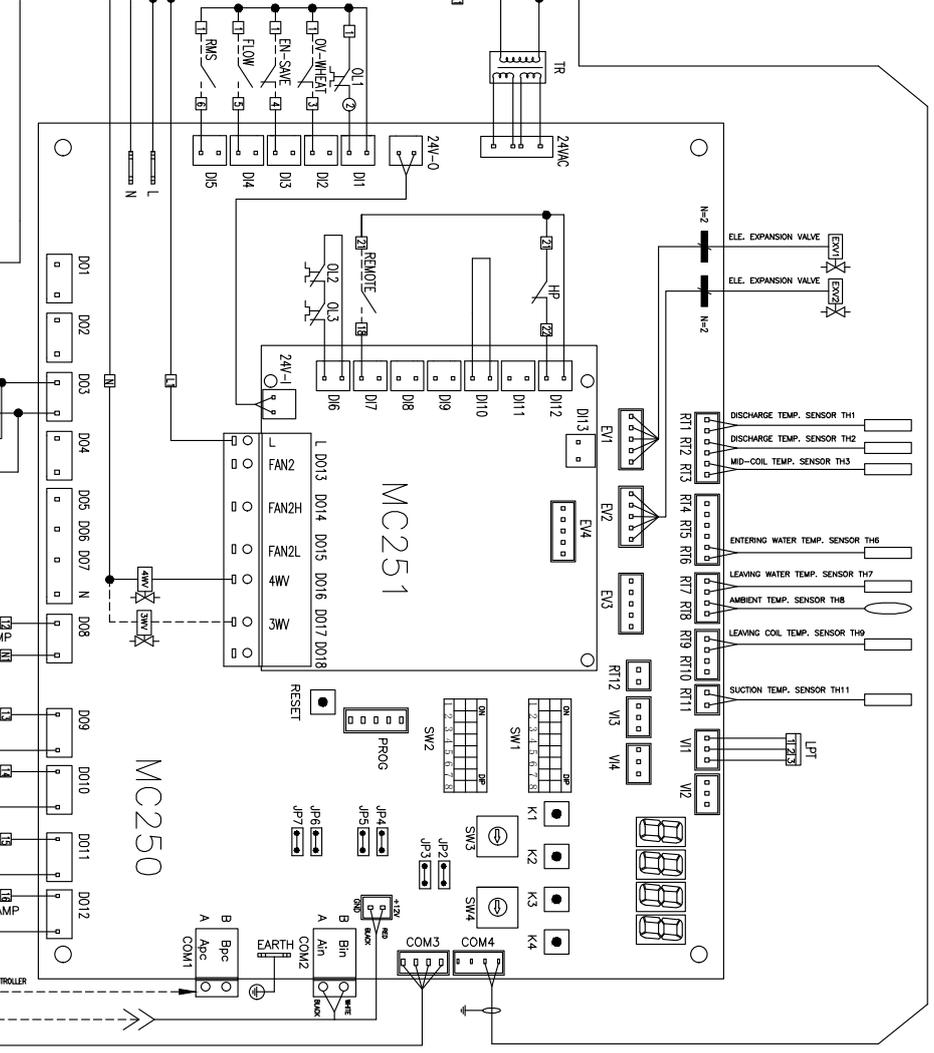
| SYMBOL    | DESCRIPTION                          | SYMBOL | DESCRIPTION         |
|-----------|--------------------------------------|--------|---------------------|
| OH-WH/EXT | WATER SYSTEM HEATER PROTECTOR        | 3WV    | 3 WAYS VALVE        |
| EH-SW/E   | 2 WAYS VALVE INTERLOCK CONTROL       | 4WV    | 4 WAYS VALVE        |
| 0.2-3     | COMPRESSOR TOP TEMPERATURE PROTECTOR | TH     | TEMPERATURE SENSOR  |
| RMS       | REMOTE MODE SWITCH                   | LPT    | LOW PRESSURE SENSOR |
| KM        | CONTACTOR                            | TR     | TRANSFORMER         |
| HP        | HIGH PRESSURE SWITCH                 | CH-1-2 | CRANKCASE HEATER    |
| COMP      | COMPRESSOR                           | TR     | TERMINAL BLOCK      |
| PUMP      | WATER PUMP                           | RE     | REMOTE SWITCH       |
| FAN       | FAN MOTOR                            | OL1    | OVERLOAD PROTECT    |

FACTORY SETTINGS:

- 1.OVERLOAD PROTECT SETTING
- 2.CODE SETTING
- 3.JUMPER SETTINGS



- NOTES:
1. --- FIELD WIRING --- FACTORY WIRING
  2. SW3,SW4 ADDRESS SETTING: SW2,1-2,4,5,6 UNIT QUANTITY SETTING.
  3. SW1,5 SET ON, 2 WAYS VALVE INTERLOCKING FUNCTION IS PERMITTED.
  4. SW1,8 SET ON, REMOTE MODE SWITCH FUNCTION IS PERMITTED. (IF THE REMOTE MODE SWITCH IS CLOSED THE UNIT WILL RUN HEATING MODE,OTHERWISE RUN COOLING MODE).
  5. WATER SYSTEM HEATER PROTECTOR, 2 WAYS VALVE INTERLOCK CONTROL, WATER FLOW SWITCH AND REMOTE CONTROL SWITCH CAN BE CONFIGURED BY CUSTOMER ACCORDING TO CUSTOMER'S ACTUAL REQUIREMENT.



DWG NO. UA09024325918

# Unit installation

## Working condition requirement

| Item                      | Description  |
|---------------------------|--|
| Power supply voltage      | Rated voltage $\pm 10\%$   |
| Power supply frequency    | Rated frequency $\pm 1\%$  |
| Variations between phases | Rated voltage $\pm 2\%$ (for 3 phases unit only)   |
| Air quality               | Must not contain solute that can corrode copper, aluminum or iron.   |
| Water flow                | Nominal water flow $\pm 50\%$  |
| Water flow velocity       | 0.5 ~ 2.0m/s   |
| Pressure of chilled water | < 1.0 Mpa  |
| Quality of chilled water  | Must not contain solute that can corrode copper, iron, or welding material.<br>For details on the water quality requirements, see ""Water Quality Requirements""." |
| Installation site         | Take anti-snow and ventilation measures as required.   |
| Ambient temp.             | Refer to the operating range.  |
| Relative humidity         | <90%   |

Note:

1. The unit is strictly tested before delivery and can work safely in the rated working conditions.
2. For the performance of the unit in different working conditions, please refer to performance table and water pressure drop curve. This is the normal operating temperature range for the unit. Beyond this temperature range, the unit can only operate for a short moment before a failure alarm is triggered.

## Installation of UAL030-080ER5

Each unit can be independently installed in a position, or multiple units can be installed in a wide position. Pay attention to their arrangement when multiple units are installed in a position. Different arrangement modes are detailed as follows:

With an Obstacle at the Air Inlet Side

- Without an obstacle at the upper side
  - a. Single unit installation
    - An obstacle exists at the air inlet side only (see Figure 1).
    - Obstacles exist at both sides and the air inlet side (see Figure 2).
  - b. Group installation (two or more units)
    - Obstacles exist at both sides and the air inlet side (see Figure 3). Obstacles exist at both sides and the air inlet side (see Figure 3).

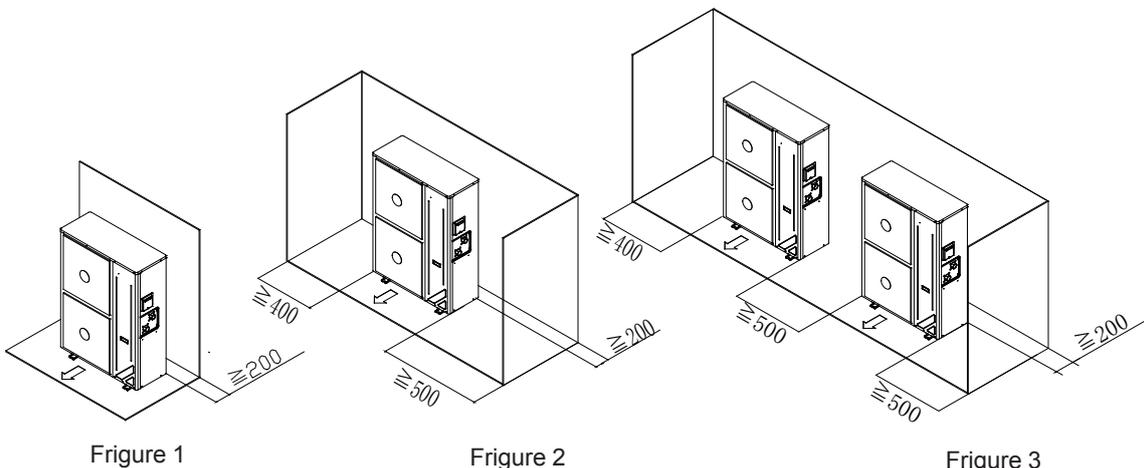


Figure 1

Figure 2

Figure 3

Unit: mm

- **With an obstacle at the upper side**

- a. Single unit installation

- An obstacle exists at the air inlet side (see Figure 4).
- Obstacles exist at both sides and the air inlet side (see Figure 5).

- b. Group installation (two or more units)

- Obstacles exist at both sides and the air inlet side (see Figure 6).

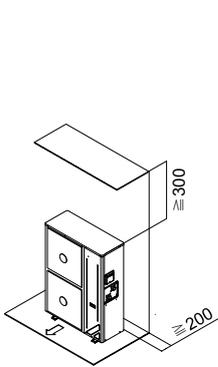


Figure 4

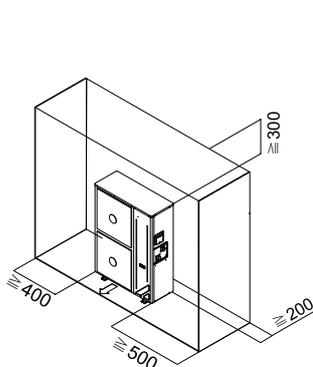


Figure 5

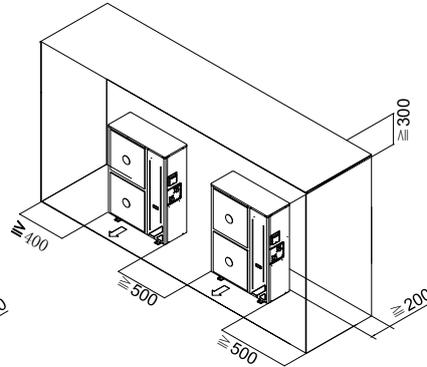


Figure 6

Unit: mm

### With an obstacle at the air discharge side

- **Without an obstacle at the upper side**

- a. Single unit installation (see Figure 7)
- b. Group installation (two or more units) (see Figure 8)

- **With an obstacle at the upper side**

- a. Single unit installation (see Figure 9)

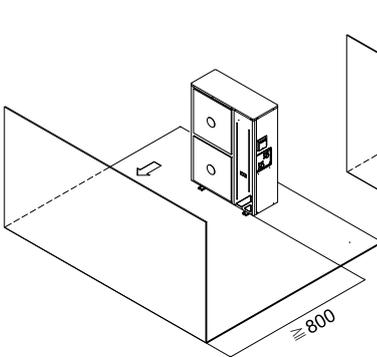


Figure 7

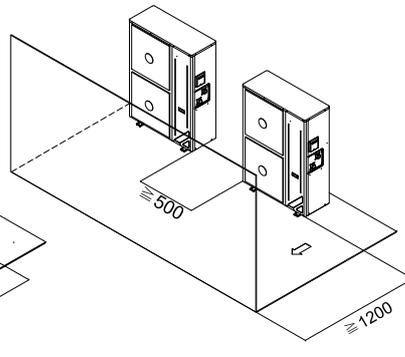


Figure 8

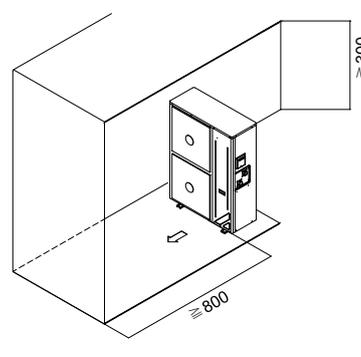


Figure 9

Unit: mm

- b. Group installation (two or more units) (see Figure 10)

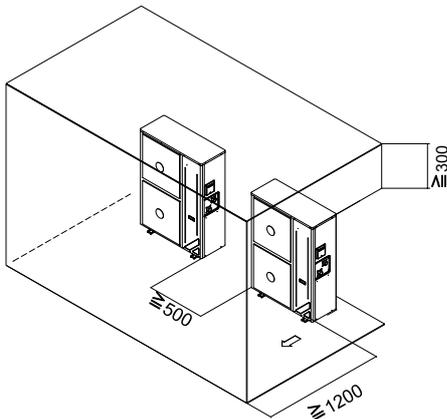


Figure 10

Unit: mm

## With obstacles at both the air Inlet and discharge sides

Mode 1: When the obstacle at the air discharge side is higher than the unit, the height of the obstacle at the air inlet side will not be limited.

- **Without an obstacle at the upper side**
  - a. Single unit installation (see Figure 11)
  - b. Group installation (two or more units) (see Figure 12)

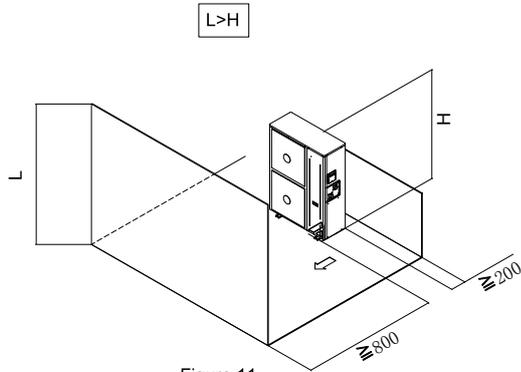


Figure 11

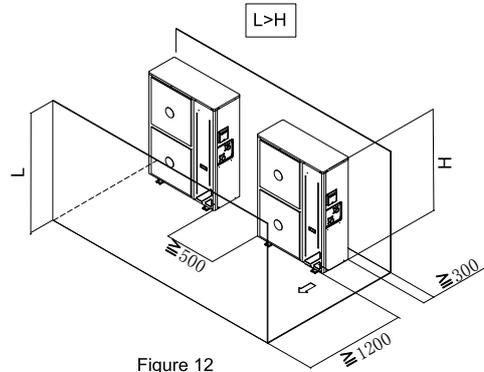


Figure 12

Unit: mm

- **With an obstacle at the upper side**
  - a. Single unit installation (see Figure 13)

The relationship between H, A, and L is as follows:

|            | L                               | A    |
|------------|---------------------------------|------|
| $L \leq H$ | $0 < L \leq 1/2H$               | 900  |
|            | $1/2H < L \leq H$               | 1200 |
| $H < L$    | $L \leq H$ for setting the base |      |

- b. Group installation (see Figure 14)

The relationship between H, A, and L is as follows:

|            | L                               | A    |
|------------|---------------------------------|------|
| $L \leq H$ | $0 < L \leq 1/2H$               | 1200 |
|            | $1/2H < L \leq H$               | 1450 |
| $H < L$    | $L \leq H$ for setting the base |      |

Only two units can be installed in this mode.

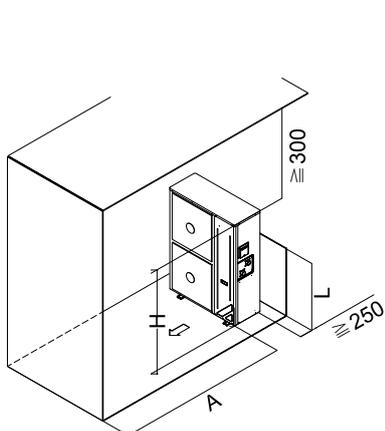


Figure 13

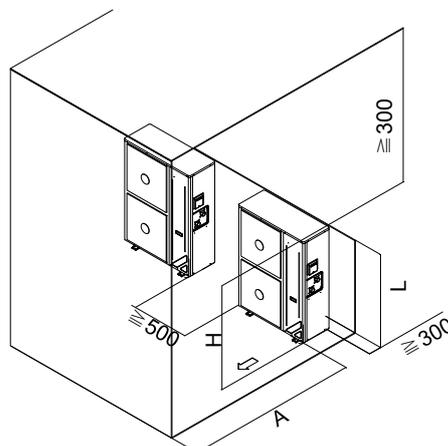


Figure 14

Unit: mm

Mode 2: When the obstacle at the air discharge side is lower than the unit, the height of the obstacle at the air inlet side will not be limited.

• **Without an obstacle at the upper side**

a. Single unit installation (see Figure 15)

$L \leq H$

b. Group installation (two or more units) (see Figure 16)

The relationship between H, A, and L is as follows:

| L                 | A   |
|-------------------|-----|
| $0 < L \leq 1/2H$ | 250 |
| $1/2H < L \leq H$ | 300 |

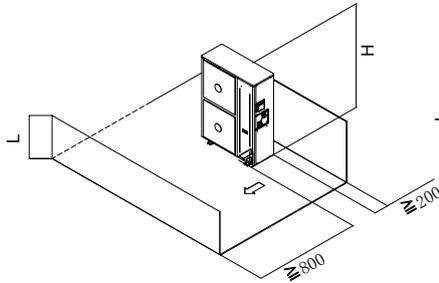


Figure 15

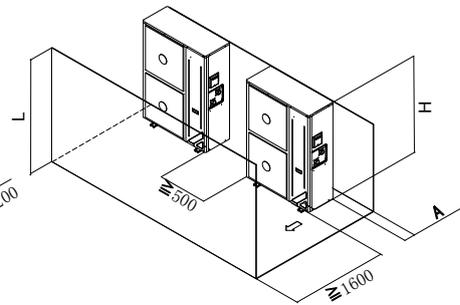


Figure 16

Unit: mm

• **With an obstacle at the upper side**

a. Single unit installation (see Figure 17)

The relationship between H, A, and L is as follows:

|            | L                          | A   |
|------------|----------------------------|-----|
| $L \leq H$ | $0 < L \leq 1/2H$          | 200 |
|            | $1/2H < L \leq H$          | 250 |
| $H < L$    | L > H for setting the base |     |

b. Group installation (see Figure 18)

The relationship between H, A, and L is as follows:

|            | L                          | A   |
|------------|----------------------------|-----|
| $L \leq H$ | $0 < L \leq 1/2H$          | 250 |
|            | $1/2H < L \leq H$          | 300 |
| $H < L$    | L > H for setting the base |     |

Only two units can be installed in this mode.

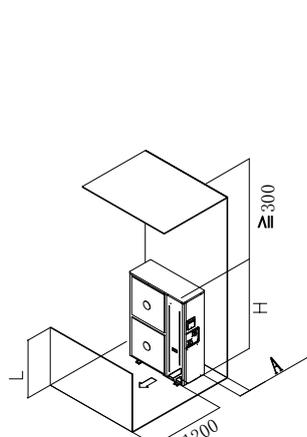


Figure 17

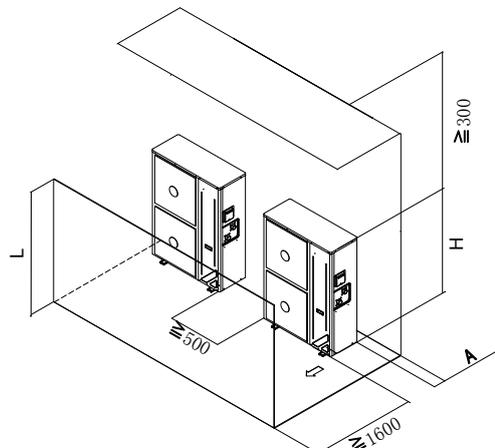


Figure 18

Unit: mm

Note:

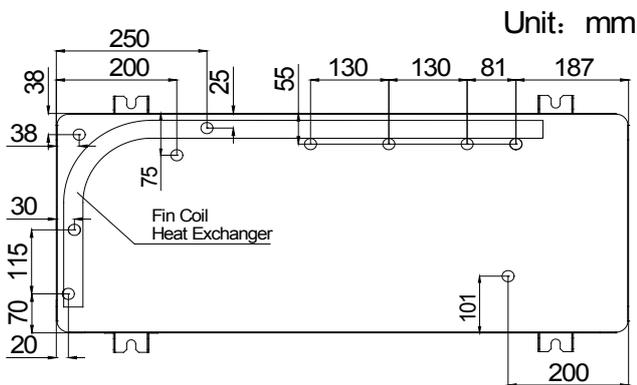
1. H is height from foundation base bottom to unit top.
2. L is height of obstacle.
3. A is distance from unit rear to obstacle at unit inlet side.

## Condensate water treatment

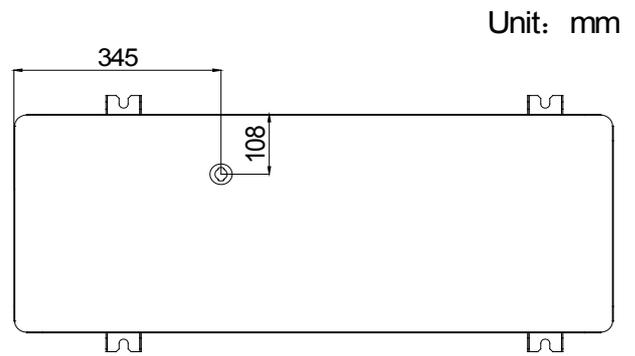
The unit may drain off condensate water when operating in heating or defrosting mode. A drainage connector and a suitable drainage hose can be installed at the bottom of the unit to conduct centralized drainage. Installation precautions are as follows:

- Reserve a space for convenience of installing/removing the drainage connector. Raise the unit for at least 80 mm and maintain a certain slope for the drainage hose to guarantee smooth drainage.
- Take the drainage connector and washer (standard accessories of the unit) out of the accessory case and install them at the drainage hole of the bottom chassis.
- Connect a drainage hose of  $\Phi 16\text{mm}$  (standard accessories in the market, purchased by users according to onsite situations).
- Do not use drainage connectors in cold places, but let condensate water drain off freely. Otherwise, condensate water may be frozen at the bottom chassis, affecting heating effects of the unit and causing drainage pipeline cracking.

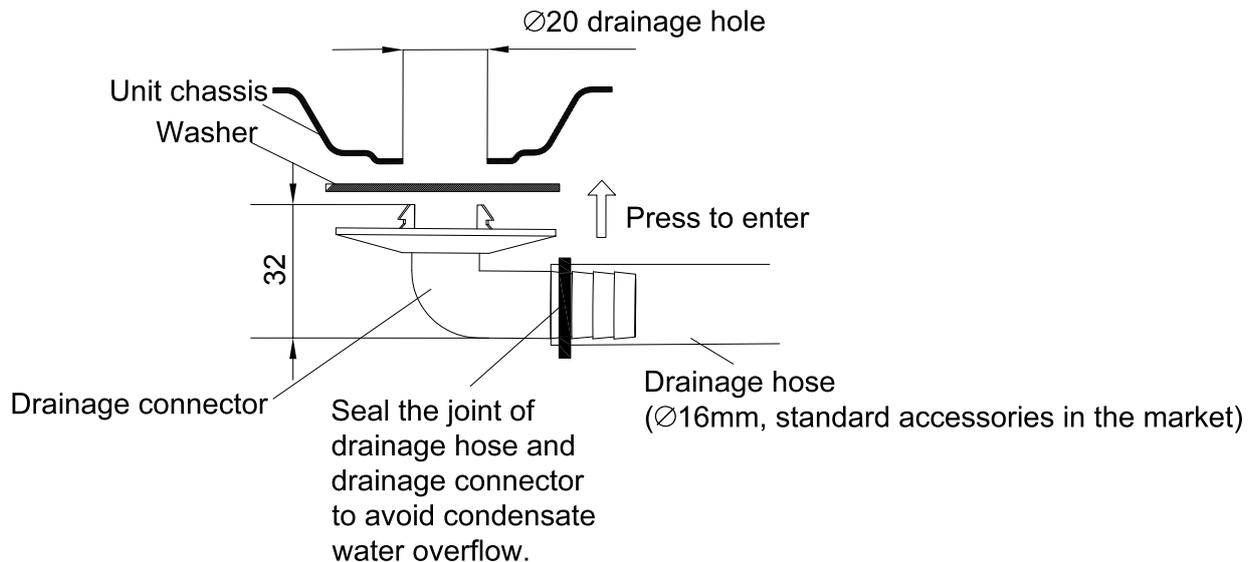
The following figures show the size of drainage hole and the installation method of drainage connector:



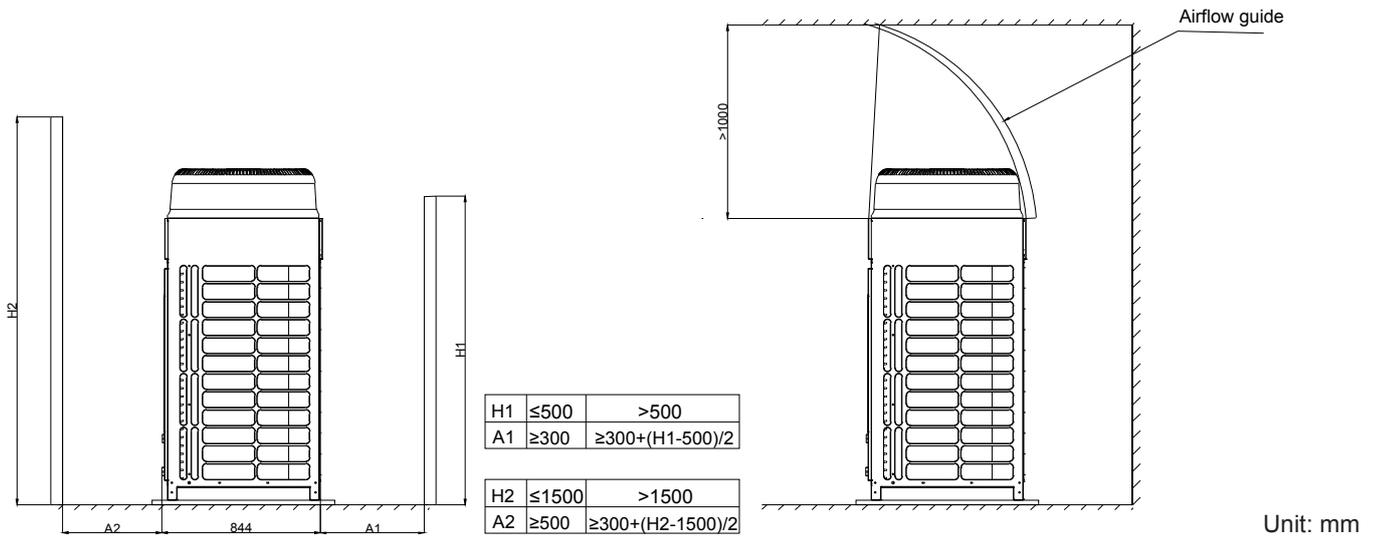
Size of drainage hole for UAL030/040ER5



Size of drainage hole for UAL050~080ER5



# Installation of UAL100-150ER5



The unit can be mounted in one place or multiple units are mounted in a large area. For the latter, attention should be paid to the arrangement, which is detailed as follows:

## Obstacles at two sides

- a. Mounting of single unit
  - Obstacles in the back only (see Figure 1)
  - Obstacles in the back and sides (see Figure 2)
- b. Package mounting (2 sets or more)
  - Obstacles in the front and back (see Figure 3)
  - Obstacles in the back and sides (see Figure 4)

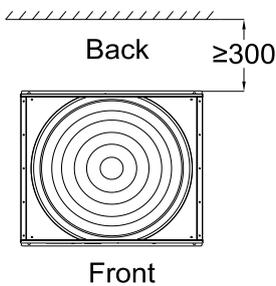


Figure 1

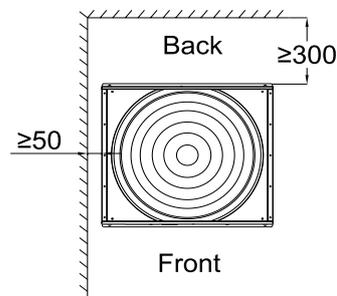


Figure 2

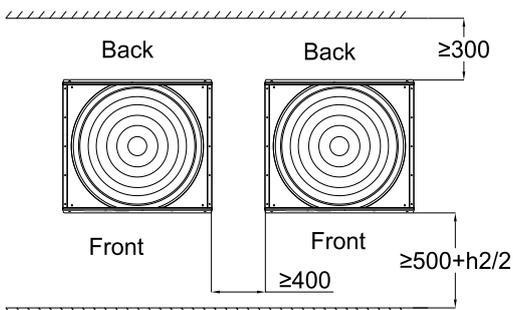


Figure 3

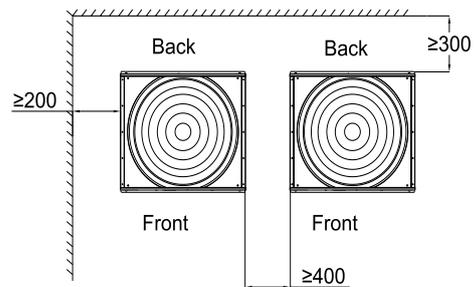


Figure 4

Unit: mm

**Obstacles in the three sides**

- a. Mounting of single unit
  - Obstacles in the front, back and one side (see Figure 5)
- b. Package mounting (more than two sets)
  - Obstacles in the front, back and one side, mounting in the same direction (see Figure 6)
  - Obstacles in the front, back and one side, back-to-back mounting 1 (see Figure 7)
  - Obstacles in the front, back and one side, back-to-back mounting 2 (see Figure 8)

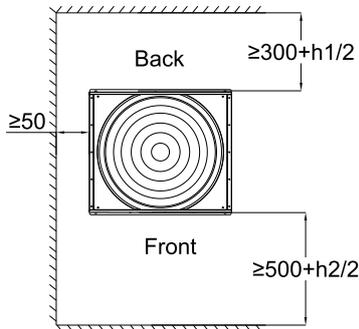


Figure 5

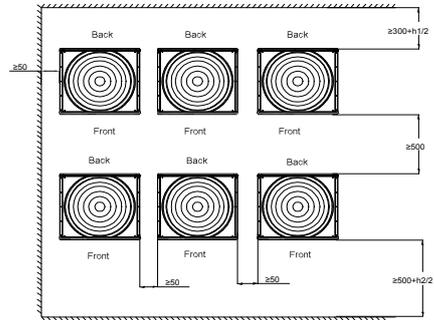


Figure 6

Mounting in the same direction

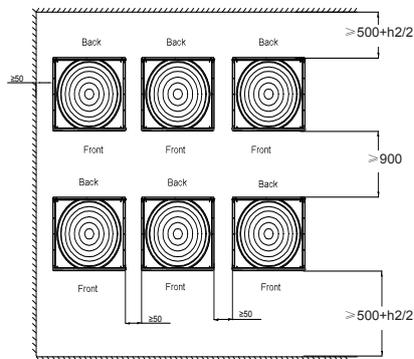


Figure 7

Back-to-back mounting 1

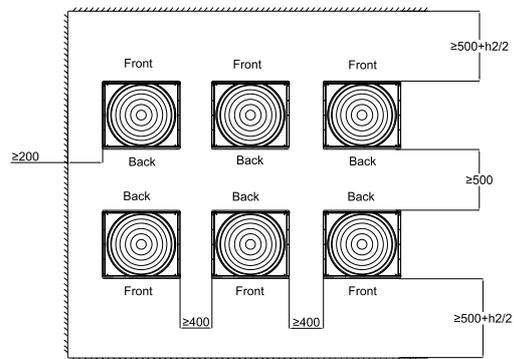


Figure 8

Back-to-back mounting 2

Unit: mm

**Obstacles in the four sides**

- a. Mounting of single unit
  - Obstacles in the front, back and sides (see Figure 9)
- b. Package mounting (more than two sets)
  - Obstacles in the front, back and sides, mounting in the same direction (see Figure 10)
  - Obstacles in the front, back and sides, back-to-back mounting 1 (see Figure 11)
  - Obstacles in the front, back and sides, back-to-back mounting 2 (see Figure 12)
  - Obstacles in the front, back and sides, face-to-face mounting (see Figure 13)

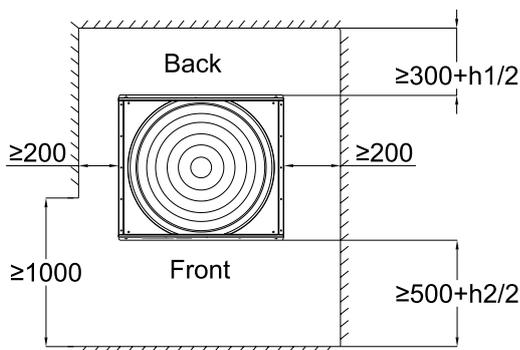


Figure 9

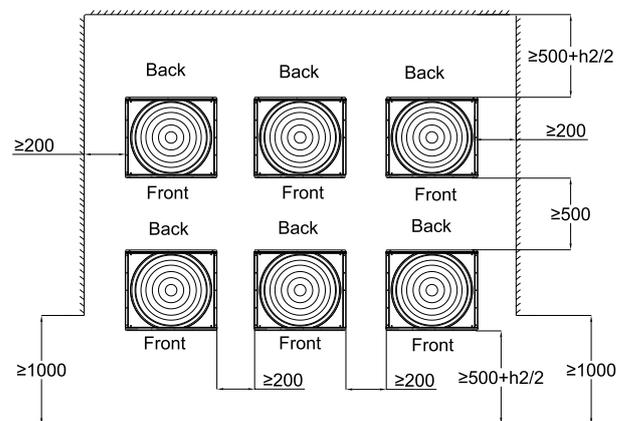


Figure 10

Mounting in the same direction

Unit: mm

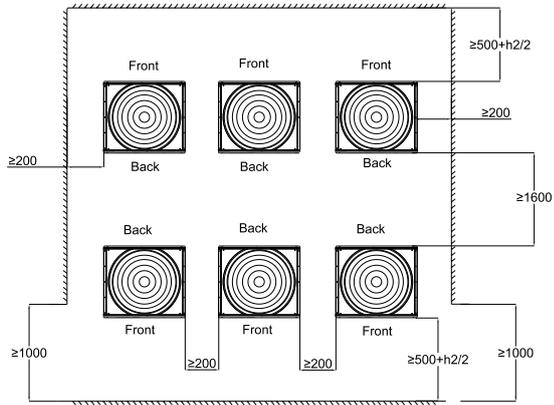


Figure 11  
Back-to-back mounting 1

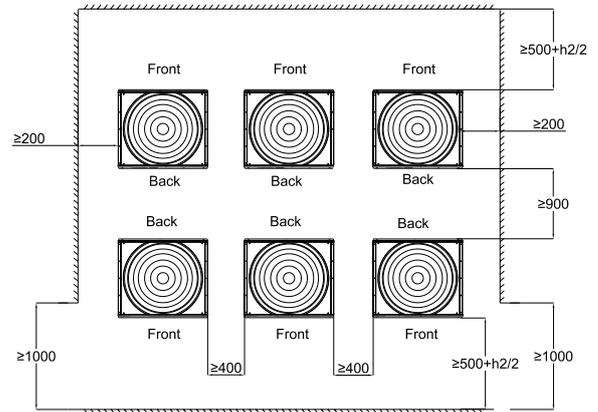


Figure 12  
Back-to-back mounting 2

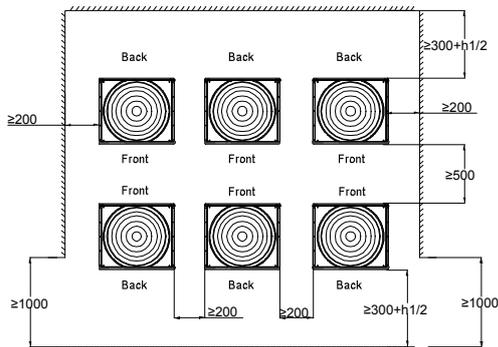
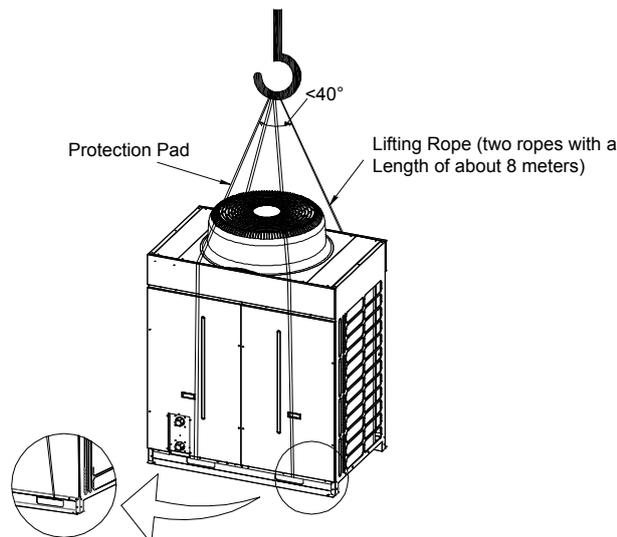


Figure 13  
Face-to-face mounting

Unit: mm

## Hoisting the unit

Perform Hoisting operation according to the following diagram. Support the units at four points when moving them. Do not move with three supporting points, which may cause instability and dropping of the units.



**CAUTION:** Be sure to carefully move the units.

Do not use the supplied packaging straps to rig or move the units; doing so may cause danger.

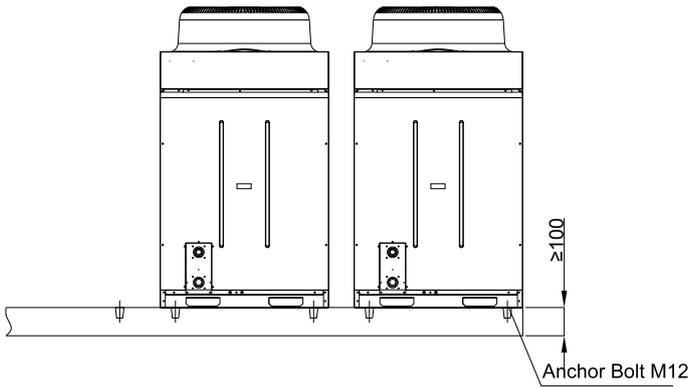
Do not touch heat exchanger fins with bare hands; doing so may hurt your fingers.

The center of gravity of units lies in the front right side. Try to find the center of gravity and then slowly rig the units.

Select appropriate rigging ropes according to the weight of units.

L: for UAL030-080ER5 is 6, for UAL100-150ER5 is 8.

## Installation for chillers



### Remarks:

1. Dimension B in the drawing should satisfy requirements of space limit for unit installation above;
2. Each unit should be fixed by four M12 bolts;

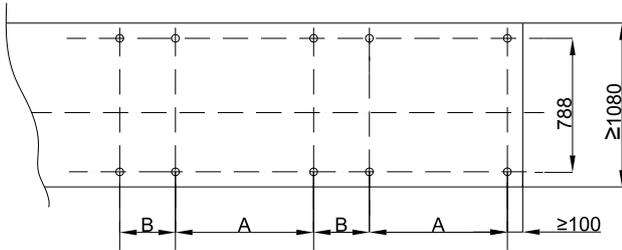
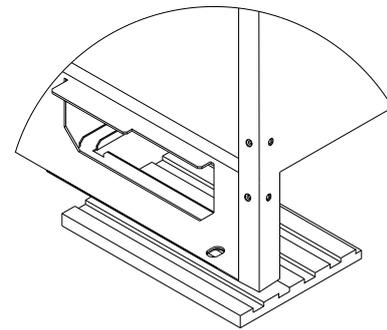


Diagram for Mounting of Damping Pad



Centralized mounting of multiple units

| Model         | A    | B    |
|---------------|------|------|
| UAL100ER5     | 900  | ≥200 |
| UAL120/150ER5 | 1260 | ≥200 |

Unit: mm

- Build the base with concrete or mounting bracket. When building the base, take into considerations about the floor's intensity, drainage (when the units operate, water drains away from the units), pipes and cable layout. Insufficient intensity may cause dropping of the unit, thus causing personal injuries.
- Fasten the chillers with anchor bolts to avoid falling down due to earthquake or strong wind. The unit must be properly installed to prevent damages arising from strong wind and earthquake.
- Vibration may transmit to installation parts and the floor and wall may cause vibration and noises, both of which depend on the installation conditions. Therefore, anti-vibration measures must be taken (such as the anti-vibration pad and bumper bracket).

| Unit model                                   | UAL030~080ER5 | UAL100~150ER5 |
|--|---------------|---------------|
| Specification of anti-vibration pads (L×W×H) | 100×80×15mm   | 150×125×15mm  |
| Qty  | 4             | 4             |

### WARNING:

- The unit must be installed in a place with sufficient strength for bearing the running weight of the unit.

## Part list of accessory kit:

| Item | Name                   | UAL-A5E  | UAL-A6E  | UAL-A7E  |
|------|------------------------|----------|----------|----------|
|      |                        | QUANTITY | QUANTITY | QUANTITY |
| 1    | Product Manual         | 1        | 1        | 1        |
| 2    | Water Filter DN25      | 1        | /        | /        |
|      | Water Filter DN32      | /        | 1        | 1        |
| 3    | Automatic Refill Valve | 1        | 1        | 1        |
| 4    | Safty Valve            | 1        | 1        | 1        |
| 5    | Remote Control Wire    | 1        | 1        | 1        |
| 6    | Wired Controller       | 1        | 1        | 1        |
| 7    | Drain Cock Joint       | 3        | 2        | /        |
| 8    | PE Gasket              | 3        | 2        | /        |

Note: Accessory kit should be purchased separately.

## Electrical installation

### Before connecting the circuit, strictly abide by the following safety rules and measures:

The units must be installed by DAIKIN service personnel or personnel who are specially trained. The installation must abide by the national and local laws and regulations in aspects of electricity, construction and environment protection as well as meet the requirement of product installation instructions. Users are not allowed to remove or add control components. For unit damages and personal injuries caused by operations which fail to follow the rules, DAIKIN assumes no responsibility.

The earth wires of the air conditioning unit must be grounded well. Earth wires cannot be connected to gas pipes, water pipes, and telephone lines, because poor earth may result in electric shock.

Circuit connecting must refer to wiring diagram and the instructions as below.

### Check whether the power supply is of standards before starting.

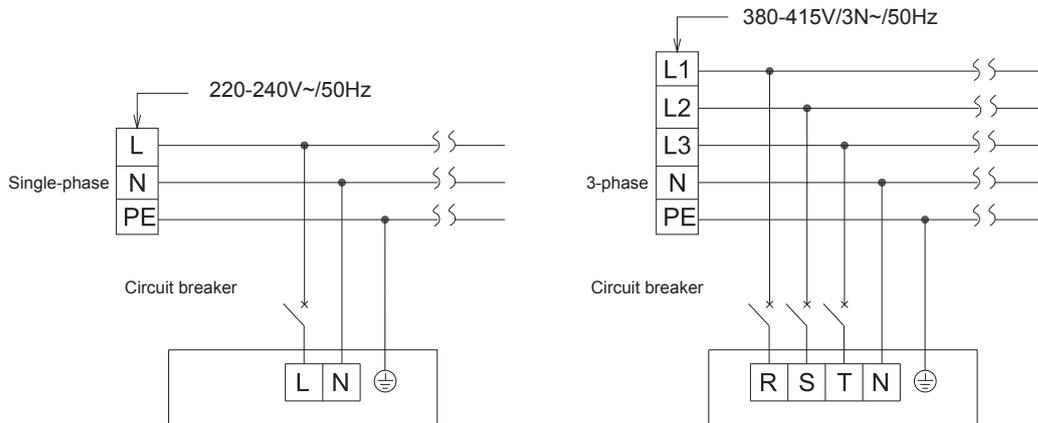
| Model         | Diameter of minimum power cable (mm <sup>2</sup> ) |           |                | Max working current (A) | Max power input (kW) |
|---------------|--|-----------|----------------|-------------------------|----------------------|
|               | Live line  | Null line | Grounding line |                         |                      |
| UAL030-040ER5 | 4  | 4         | 4              | 23.7                    | 5.1                  |
| UAL050-060ER5 | 6  | 6         | 6              | 36                      | 7.8                  |
| UAL070ER5     | 4  | 4         | 4              | 16.1                    | 10.2                 |
| UAL080ER5     | 4  | 4         | 4              | 19                      | 11.2                 |
| UAL100ER5     | 6  | 6         | 6              | 31                      | 19                   |
| UAL120ER5     | 6  | 6         | 6              | 31                      | 19                   |
| UAL150ER5     | 6  | 6         | 6              | 32                      | 20                   |

Note:

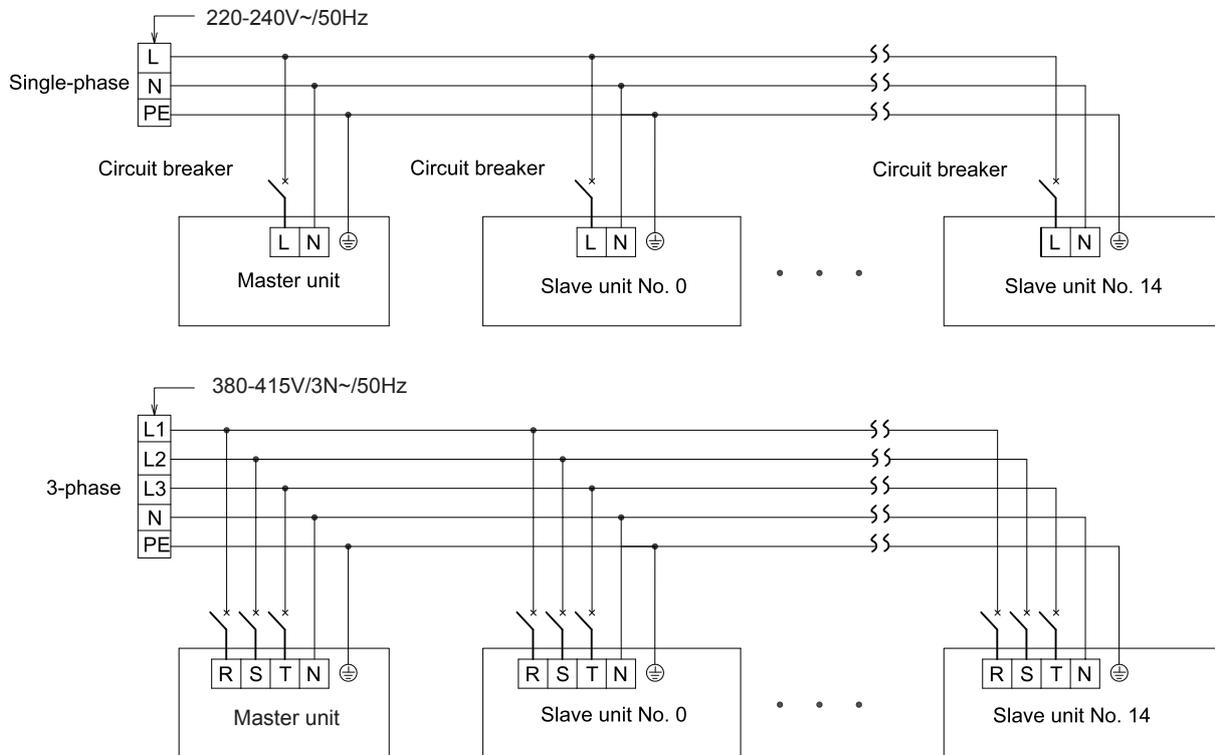
1. The above data are electric parameters for basic module units.
2. Connection for all the conductors must be secure.
3. Keep all the conductors away from refrigerant pipes and movable components like compressor and fan.

# Power cable connection diagram

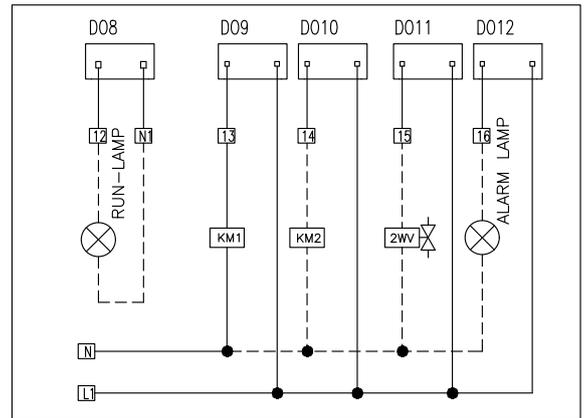
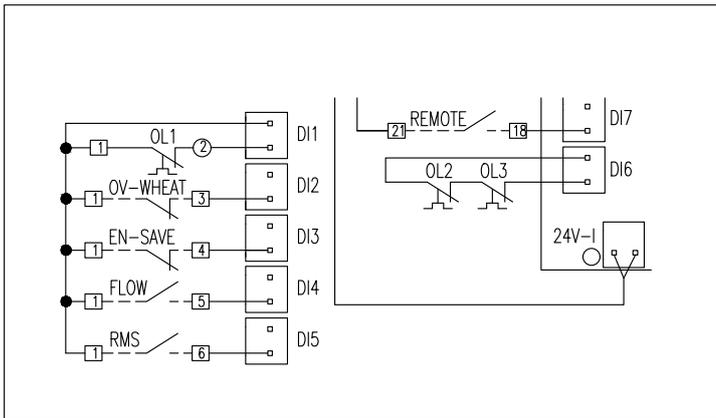
## Single unit



## With slave unit



## Connection illustration for control devices



### Note:

- “-----”Parts within the dashed box are to be connected onsite.
- “——”Parts within the real-line box are connected before ex-factory.

### Description of symbol:

- OV-WHEAT: Water system heater protector (heater is mainly for auxiliary heating in winter).
- EN-SAVE: 2-way valve interlock control (for interlock control between outdoor unit and fan coil unit).
- FLOW: Water flow switch
- RMS: Remote mode switch (for cooling mode and heating mode switching).
- REMOTE: Remote switch ( for remote control outdoor unit ON an OFF).
- NOTE: Feedback signal, module interface input voltage is 24V.

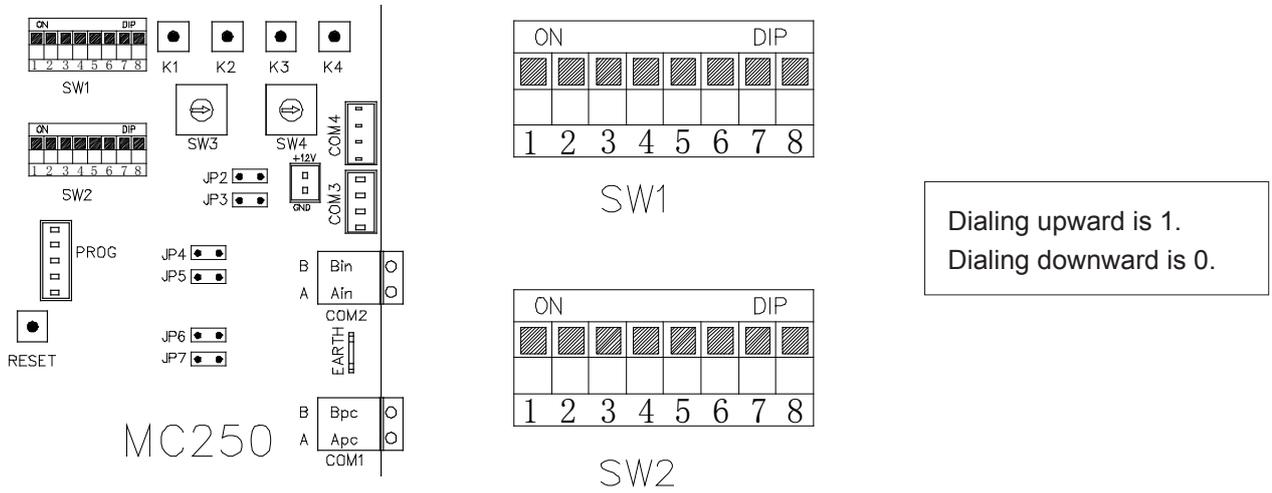
- RUN-LAMP: Lamp for indicating unit running status.
- KM2: Contactor for water system heater.
- 2WV: 2-way valve for water system (for variable flow control in modular combination).
- ALARM-LAMP: Lamp for indicating unit alarm.
- NOTE: The output voltage of the module interface is 220-240 V.

### NOTE:

1. ABOVE PARTS CAN BE CONFIGURED BY CUSTOMER ACCORDING TO ACTUAL REQUIREMENT OF CUSTOMER.
2. WATER FLOW SWITCH (FLOW) CAN BE INSTALLED FOR DOUBLE WATER FLOW PROTECTION, THE UNIT ALREADY HAS WATER FLOW PROTECTION CONTROL BY INTERNAL CONTROL LOGIC.

## DIP switch setting

The control board can be used to set the unit's capacity, address, master and slave unit number. The capacity DIP has been set at delivery time and cannot be changed. The address DIP and slave number DIP need to be set as needed after the unit is installed. Customers need to take down the address number and location of the unit and keep the record in good condition for maintenance reference.



- SW1.1 indicates setting master and slave unit. Set SW1.1 to ON for master unit, and set SW1.1 to OFF for slave unit.
  - SW1.2 indicates setting cooling only unit or heat pump unit. Set SW1.2 to ON for cooling only, and set SW1.2 to OFF for heat pump unit.
  - SW1.3 indicates setting temperature control. Set SW1.3 to ON for leaving water temperature control, and set SW1.3 to OFF for return water temperature control.
- NOTE: when units are modular combined, main pipe outlet water sensor TH5 and connecting wire should be configured by factory which are options.
- SW1.4 & SW1.7 are for setting unit type.
  - SW1.5 indicates setting 2-way valve interlock function. When using this function, set SW1.5 to ON.
  - SW1.6 indicates setting water flow control method. Set SW1.6 to ON for variable flow system, set SW1.6 to OFF for constant flow system.
  - SW1.8 indicates setting remote mode switch (Cooling/Heating). Set SW1.8 to ON to enable the function, set SW1.8 to OFF to disable the function.

The master unit must be set the quantity of slave units to be connected, while slave units do not need to set SW2.1~SW2.4.

| Quantity of slave units | SW2.1 | SW2.2 | SW2.3 | SW2.4 | Quantity of slave units | SW2.1 | SW2.2 | SW2.3 | SW2.4 |
|-------------------------|-------|-------|-------|-------|-------------------------|-------|-------|-------|-------|
| 0                       | 0     | 0     | 0     | 0     | 8                       | 1     | 0     | 0     | 0     |
| 1                       | 0     | 0     | 0     | 1     | 9                       | 1     | 0     | 0     | 1     |
| 2                       | 0     | 0     | 1     | 0     | 10                      | 1     | 0     | 1     | 0     |
| 3                       | 0     | 0     | 1     | 1     | 11                      | 1     | 0     | 1     | 1     |
| 4                       | 0     | 1     | 0     | 0     | 12                      | 1     | 1     | 0     | 0     |
| 5                       | 0     | 1     | 0     | 1     | 13                      | 1     | 1     | 0     | 1     |
| 6                       | 0     | 1     | 1     | 0     | 14                      | 1     | 1     | 1     | 0     |
| 7                       | 0     | 1     | 1     | 1     | 15                      | 1     | 1     | 1     | 1     |

Set SW2.5~SW2.8 for unit model.(Factory setting).

| Model     | SW2.5 | SW2.6 | SW2.7 | SW2.8 |
|-----------|-------|-------|-------|-------|
| UAL030ER5 | 0     | 0     | 0     | 0     |
| UAL040ER5 | 0     | 0     | 0     | 1     |
| UAL050ER5 | 0     | 0     | 1     | 0     |
| UAL060ER5 | 0     | 0     | 1     | 1     |
| UAL070ER5 | 0     | 1     | 0     | 0     |
| UAL080ER5 | 0     | 1     | 0     | 1     |
| UAL100ER5 | 0     | 1     | 1     | 0     |
| UAL120ER5 | 0     | 1     | 1     | 1     |
| UAL150ER5 | 1     | 0     | 0     | 0     |

**Address DIP setting of master units (in the range of 0 to 99):**

| SW3 | SW4 | Master unit address |
|-----|-----|---------------------|-----|-----|---------------------|-----|-----|---------------------|-----|-----|---------------------|
| 0   | 0   | 1#                  | 0   | 8   | 9#                  | 1   | 6   | 17#                 | 2   | 4   | 25#                 |
| 0   | 1   | 2#                  | 0   | 9   | 10#                 | 1   | 7   | 18#                 | 2   | 5   | 26#                 |
| 0   | 2   | 3#                  | 1   | 0   | 11#                 | 1   | 8   | 19#                 | 2   | 6   | 27#                 |
| 0   | 3   | 4#                  | 1   | 1   | 12#                 | 1   | 9   | 20#                 | 2   | 7   | 28#                 |
| 0   | 4   | 5#                  | 1   | 2   | 13#                 | 2   | 0   | 21#                 | 2   | 8   | 29#                 |
| 0   | 5   | 6#                  | 1   | 3   | 14#                 | 2   | 1   | 22#                 | 2   | 9   | 30#                 |
| 0   | 6   | 7#                  | 1   | 4   | 15#                 | 2   | 2   | 23#                 | 3   | 0   | 31#                 |
| 0   | 7   | 8#                  | 1   | 5   | 16#                 | 2   | 3   | 24#                 | 3   | 1   | 32#                 |

**Address DIP setting of slave units (in the range of 0 to 14)**

| SW3 | SW4 | Slave unit address | SW3 | SW4 | Slave unit address |
|-----|-----|--------------------|-----|-----|--------------------|
| 0   | 0   | 0#                 | 0   | 8   | 8#                 |
| 0   | 1   | 1#                 | 0   | 9   | 9#                 |
| 0   | 2   | 2#                 | 1   | 0   | 10#                |
| 0   | 3   | 3#                 | 1   | 1   | 11#                |
| 0   | 4   | 4#                 | 1   | 2   | 12#                |
| 0   | 5   | 5#                 | 1   | 3   | 13#                |
| 0   | 6   | 6#                 | 1   | 4   | 14#                |
| 0   | 7   | 7#                 |     |     |                    |

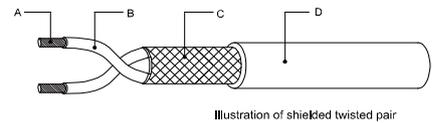
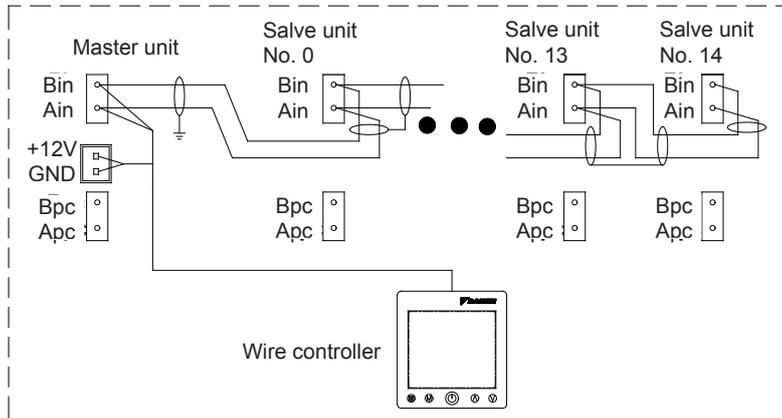
**Note:**

Address codes in the same system cannot be repeated.

Prepare for commissioning with power-on only after setting the address code.

The inner side of the control box of the unit is attached with electrical wiring diagram of the unit, which provides detailed descriptions for DIP setting. Please keep it properly.

**Wiring between master and slave unit and wiring of controller**



- A) Conductor (WTC pair with cross section area of at least 0.5mm<sup>2</sup> or 20AWG)
- B) Insulator
- C) Screen layer (twisted WTC with a screening factor no less than 95%)
- D) Outer jacket (PVC)

**Note:**

Better choose network cables with a tensor shielding layer and smaller twisting distance.

Please refer to the UL2547 or UL2791 wire specification.

The control cable must not be longer than 1000 meters.

The control cable must be at least 20cm away from major current wire.

# Water system installation

## Notes for connecting water pipes

The water pump is supplied with the unit. Ensure that the lift used is within the lift range of the water pump.

Fix the thermometers and pressure gauges on the water inlets and outlets. This helps you know operating condition of the chiller.

The water side heat exchanger is a stainless steel plate heat exchanger. There is a possibility that scales adhere to the plate heat exchanger, depending on water quality. To remove these scales, therefore, a periodical cleaning using cleaning agent is required.

Ensure that the water flow is in the application range. If the flow is too low, scale adsorption will occur so as to reduce unit performance, cause anti-freezing protection sensor action, or gas leakage caused by rust corrosion. If the water flow is too high, impact corrosion will occur.

An expansion tank has been equipped with the water system upon factory delivery to adapt to the water pressure fluctuation resulting from water temperature change in the water supply system.

For UAL100-150ER5, a insulated water tank of proper volume is recommended to avoid unit frequently start and stop during too low of the load.

Be sure to set an automatic exhaust valve at the highest point of the water system, and set a proper drain valve at the lowest point of the water system.

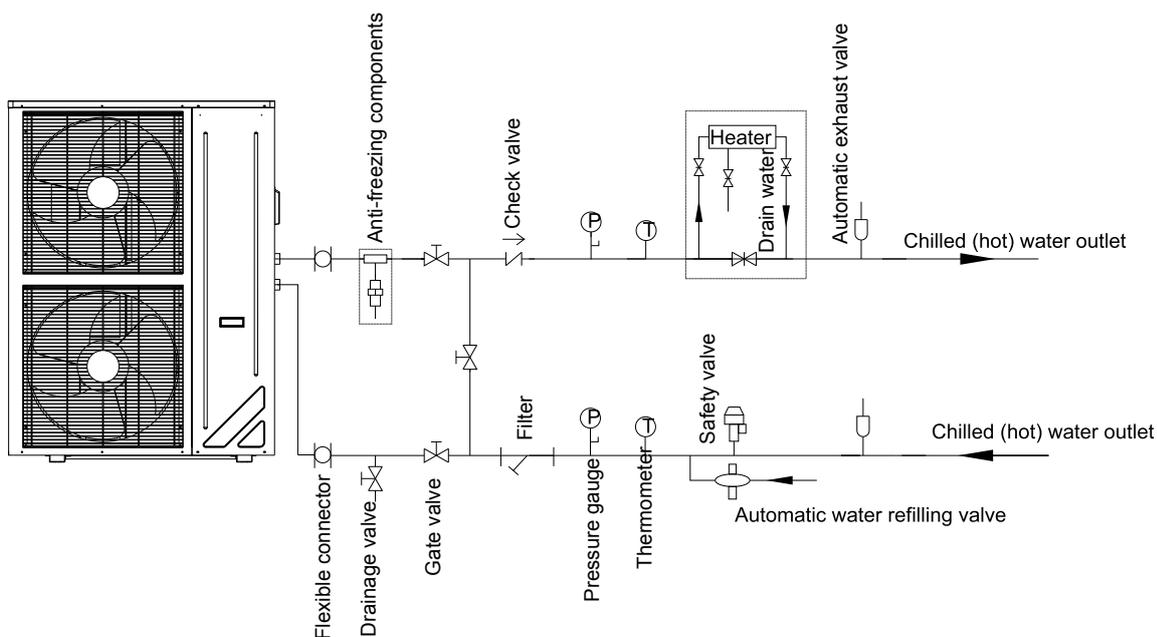
Take insulation measures for the water pipe to prevent heat loss and water condensation.

For water system installation, please see the water system installation diagram. Refer to the design drawings from the design institute for specific installation construction.

Install the Y-shaped water filter equipped with the unit (DN32 filter: 18 meshes, DN25 filter: 30 meshes) on the water return pipe. Clean the filter mesh after commissioning.

Before injecting water, ensure that there are not sand, pebbles, rusty iron, welding slag or other foreign materials in the pipes to prevent damaging the heat exchanger. When flushing the water supply system, bypass the master unit and the end-side heat exchanger with bypass valves.

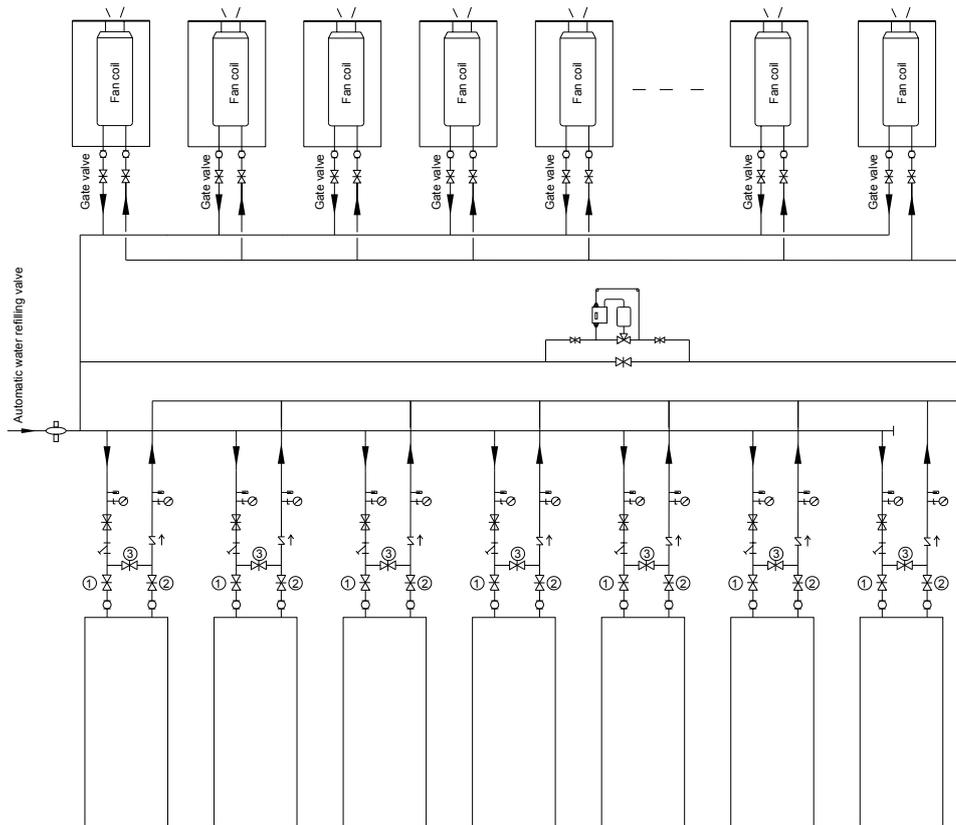
## Water system installation diagram for a single unit



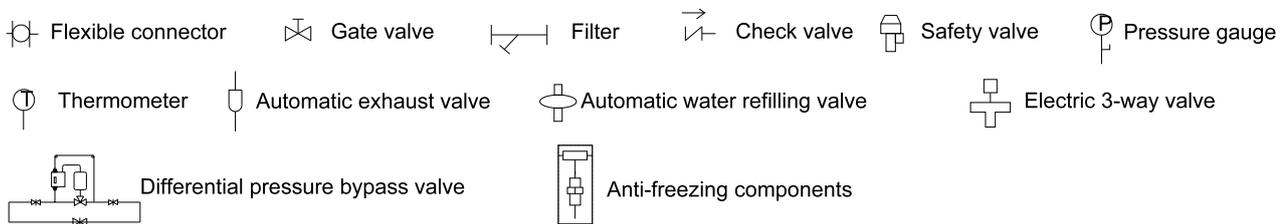
Note: When the ambient temperature is lower than 0°C, keep the unit in power-on status. If the unit is powered off for more than 3 hours, use drainage valves to directly drain off water from the system to avoid frost cracking of water-side heat exchanger and pipes.



**Multiple module unit combinations: reference diagram of variable flow rate water system adjusting indoor temperature by adjusting flow rate of chilled water.**



**Legends in systematic diagram:**



**Total dimension for the pipes of module combinations:**

| Quantity of units                    |                           | 1      | 2~3 | 4~5 | 6~10 | 11~16 |
|--------------------------------------|---------------------------|--------|-----|-----|------|-------|
| Total dimension for the pipes (inch) | UAL030/040/050/060ER5     | ≥1     | ≥2  | ≥3  | ≥4   | ≥5    |
|                                      | UAL070/080/100/120/150ER5 | ≥1 1/4 | ≥2  | ≥3  | ≥4   | ≥5    |

**CAUTION:**

- (1) When cleaning the water system, close all the gate valves as shown in position 1 and 2. Open the 3 valve to bypass the units to avoid foreign matters in water system entering the plate of units, which may influence the efficiency of heat exchange and life expectancy of the plate.
- (2) If two or more units are combined, it is recommended to install a reserved return system for the water system. If a direct return system is adopted, it may cause uneven water flow distribution of units, thus affecting operation of units. In addition, differential pressure bypass valves should be added to balance the pressure of the water system.
- (3) The areas with the ambient temperature lower than 0°C can be configured with anti-freezing components, which should be installed at the water outlet side. To facilitate drainage, customers need to install drainage hoses.

# Hydraulic calculation and pipe system

## Pipe design for the air-conditioning system

- The pipes of an air conditioning system must have sufficient transportation capacities. For example, the water system must ensure that the water flowing through the air conditioning unit or fan coil reaches the rated flow rate to ensure that the unit works properly.
- Deploy pipes properly. Use pipes with reverse return if possible. Although the initial investment is increased a little, the water flow in the system is more stable. If pipes have no reverse return design, pressure between branch pipes must be balanced in the design process.
- When determining the diameters of pipes, ensure that the transportation capacity is sufficient, the resistance and noise is minimal, and that the unit works economically. A larger pipe diameter requires more investment, but the flow resistance is smaller, the circulation pump consumes less energy, and the operation cost is smaller. Therefore, a balance needs to be achieved between the operation cost and investment by designing the pipe diameter properly. Avoid a large water flow with small temperature variation to ensure that the pipe system is economical.
- In the design process, calculate water resistance accurately to ensure that water pressures between circuits are well balanced and that the air conditioning system works with the best water and thermal conditions.
- The pipe system of an air conditioning system must meet the adjustment requirements for partial workload.
- The pipe system of an air conditioning system should use energy saving technologies whenever possible.
- Pipes and accessories of the pipe system must meet the related requirements.
- The design of the pipe system must facilitate maintenance, operation, and adjustment.

\* Determining the diameter of pipes in the air conditioning system

The pipe diameter is determined based on the following: 
$$d = \sqrt{\frac{4m_w}{3.14v}}$$

mw: water flow m<sup>3</sup>/s  
v: water speed m/s

The water speed should be determined by the recommendations in the first table and design the water pipe diameters accordingly, or you can determine the water pipe diameter based on water flow in the second table.

Table 1: Recommended water speed (m/s)

|                     |           |           |           |           |           |           |           |           |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Diameter (mm)       | 12        | 20        | 25        | 32        | 40        | 50        | 65        | 80        |
| Closed water system | 0.4 - 0.5 | 0.5 - 0.6 | 0.6 - 0.7 | 0.7 - 0.9 | 0.8 - 1.0 | 0.9 - 1.2 | 1.1 - 1.4 | 1.2 - 1.6 |
| Open water system   | 0.3 - 0.4 | 0.4 - 0.5 | 0.5 - 0.6 | 0.6 - 0.8 | 0.7 - 0.9 | 0.9 - 1.0 | 0.9 - 1.2 | 1.1 - 1.4 |
| Diameter (mm)       | 100       | 125       | 150       | 200       | 250       | 300       | 350       | 400       |
| Closed water system | 1.3 - 1.8 | 1.5 - 2.0 | 1.6 - 2.2 | 1.8 - 2.5 | 1.8 - 2.6 | 1.9 - 2.9 | 1.6 - 2.5 | 1.8 - 2.6 |
| Open water system   | 1.2 - 1.6 | 1.4 - 1.8 | 1.5 - 2.0 | 1.6 - 2.3 | 1.7 - 2.4 | 1.7 - 2.4 | 1.6 - 2.1 | 1.8 - 2.3 |

Table 2: Pipe diameter and resistance loss in unit length

| Diameter of the steel tube (mm) | Closed water system            |          | Open water system              |          |
|---------------------------------|--------------------------------|----------|--------------------------------|----------|
|                                 | Water flow (m <sup>3</sup> /h) | kPa/100m | Water flow (m <sup>3</sup> /h) | kPa/100m |
| 15                              | 0 - 0.5                        | 0 - 60   | --                             | --       |
| 20                              | 0.5 - 1.0                      | 10 - 60  | --                             | --       |
| 25                              | 1.0 - 2.0                      | 10 - 60  | 0 - 1.3                        | 0 - 43   |
| 32                              | 2.0 - 4.0                      | 10 - 60  | 1.3 - 2.0                      | 11 - 40  |
| 40                              | 4.0 - 6.0                      | 10 - 60  | 2.0 - 4.0                      | 10 - 40  |
| 50                              | 6.0 - 11.0                     | 10 - 60  | 4.0 - 8.0                      | --       |
| 65                              | 11.0 - 18.0                    | 10 - 60  | 8.0 - 14.0                     | --       |
| 80                              | 18 - 32                        | 10 - 60  | 14 - 22                        | --       |
| 100                             | 32 - 65                        | 10 - 60  | 22 - 45                        | --       |
| 125                             | 65 - 115                       | 10 - 60  | 45 - 82                        | 10 - 40  |
| 150                             | 115-185                        | 10 - 47  | 82 - 130                       | 10 - 43  |

Note: Parameters in the preceding table may vary based on the design manual. For details, see the «HVAC Design Manual».

## Water storage tank volume calculating

Unit water system minimum water volume must meet below value:

| Model     | Min water volume /L | Model     | Min water volume /L | Model     | Min water volume /L |
|-----------|---------------------|-----------|---------------------|-----------|---------------------|
| UAL030ER5 | 67                  | UAL060ER5 | 121                 | UAL100ER5 | 207                 |
| UAL040ER5 | 82                  | UAL070ER5 | 142                 | UAL120ER5 | 240                 |
| UAL050ER5 | 106                 | UAL080ER5 | 179                 | UAL150ER5 | 287                 |

# Wired controller instruction

## Display interface



The following table lists icons and their meanings:

| Icon             | Meaning                            | Icon       | Meaning                                   |
|------------------|------------------------------------|------------|---|
|                  | Cooling mode                       |            | Alarm                                     |
|                  | Heating mode                       |            | Water pump                                |
|                  | Hot water mode                     | <b>PWD</b> | Password                                  |
|                  | Floor heating mode                 | <b>AM</b>  | Morning                                   |
| <b>SET</b>       | Setting                            | <b>PM</b>  | Afternoon                                 |
| <b>A/C WATER</b> | Air conditioning water temperature | <b>ON</b>  | Timer power-on                            |
| <b>HOT WATER</b> | Hot water temperature              | <b>OFF</b> | Timer power-off                           |
|                  | Clock                              |            | Locking                                   |
|                  | Defrosting                         |            | Automatic startup after power restoration |
|                  | Silence                            |            | Low battery                               |

## Function overview

- Power-on/off control
- Mode setting
- Temperature setting
- Switching common temperature types
- Error code display
- Clock setting
- Timer setting
- Automatic startup after power restoration
- Low-noise mode setting
- Password input
- Manual defrosting
- Low battery reminder
- Locking
- Energy-saving mode setting
- Floor heating mode enabling
- Water pump mode setting

## Number of controller keys

Five keys: “Menu” key, “Mode” key, “ON/OFF” key, “Plus” key, and “Minus” key.

|      |      |        |      |       |
|------|------|--------|------|-------|
|      |      |        |      |       |
| Menu | Mode | ON/OFF | Plus | Minus |

## Description of controller functions

### ■ Power-on/off control

In power-on status, press “” to enter the power-off status. In power-off status, press “” to enter the power-on status.

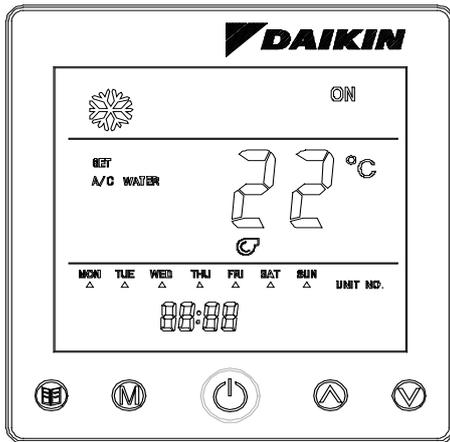


Figure: Power-on status

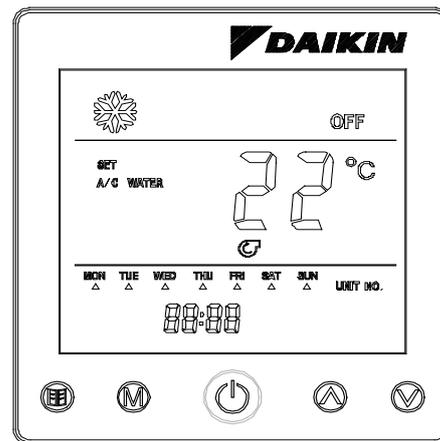


Figure: Power-off status

### ■ Mode setting

In power-off status, press “” to switch the mode as follows:

Cooling  → Heating  → Hot water  → Floor heating  → Automatic in summer (  +  ) → Automatic in winter (  +  ) →  (The specific modes are determined by logics of the unit.)

Note: To run the floor heating mode, set this mode for the master unit and enable this mode on the wired controller.

### ■ Temperature setting

Press “”, and then press “” or “” to make “**Setting**” and “**Air Conditioning Water Temperature**” or “**Hot Water Temperature**” blink. Press “” to enter temperature change.

Press “” or “” to adjust the temperature, and then press “” to save the change.

### ■ Switching between preset temperature and actual temperature

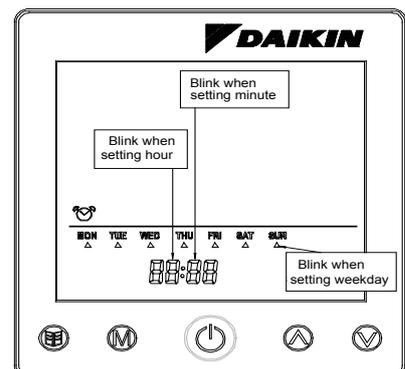
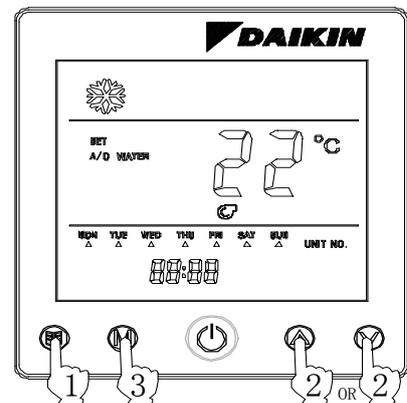
Press “” or “” to switch between preset temperature and actual temperature.

### ■ Error code display

When failure occurs, “” blinks and the corresponding error code is displayed.

### ■ Clock setting

Clock setting allows you to set the weekday, hour and minute.



■ **Weekday setting**

Press and hold “

■ **Hour setting**

When the hour part starts to blink, press “

■ **Minute setting**

When the minute part starts to blink, press “

■ **Timer setting**

Timer setting allows you to set timed power-on and timed power-off four times every day. To cancel timer setting, set timed power-on/off to 00:00.

■ **Timer power-on setting**

Press and hold “

■ **Timer power-off setting**

Press and hold “

■ **Canceling timer setting**

1. To cancel a timed action, set the time for this action to 00:00.
2. To cancel all timed actions, press and hold “

■ **Automatic startup after power restoration**

When the function of automatic startup after power restoration is set on the unit, the wire controller displays “

To set this function on the wire controller:

1. Press “

■ **Low-noise mode setting**

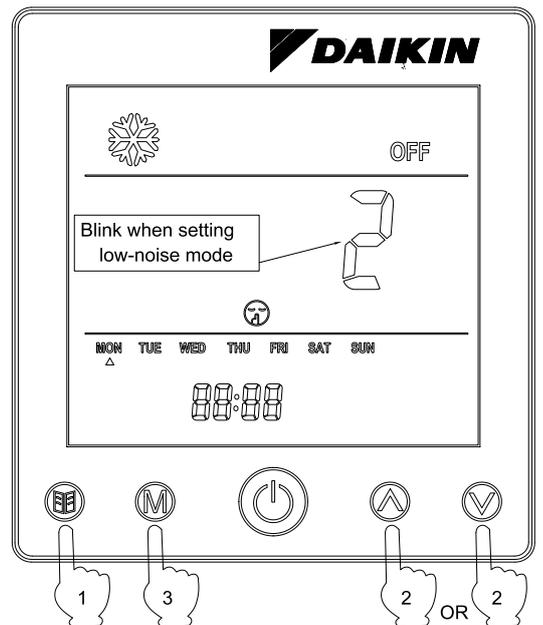
When the function of low-noise mode is set on the unit, the wire controller displays “

To set this function on the wire controller:

Press “

Note:

1. Only when the mode value is set to 1 or 2, “



### ■ Password input

Press and hold “”, and then press “” or “” to make “Password” blink. Press “” to enter password input status. Press “” or “” to change the password, and then press “” to save.

### ■ Manual defrosting

Press “” after inputting the password. Press “” or “” to make “” blink, and then press “”. Press “” or “” to select a parameter value. When the value is set to 1, the wire controller will send a manual defrosting direction to the unit.

Note:

1. When “” is displayed, it indicates that the air conditioning system is defrosting.
2. Manual defrosting can be set only when the unit is powered on in heating mode.

### ■ Low battery reminder

When the battery level of the wire controller is low, “” will be displayed.

### ■ Backlight display

1. When the wire controller incurs key actions, the backlight will go on.
2. If there are not any operations on the wire controller for 10 seconds, the backlight will go out.

### ■ Wire controller locking

Press and hold “” to enter or exit the locked status. In locking status, “” is displayed.

Note: When the wire controller is in locked status, power-on/off actions cannot be performed. When you press a key, the icon will blink and a long beeping sound will occur.

### ■ Unit No. setting

By default, “Unit No.” and the corresponding number are not displayed. To set the unit No.:

1. Press and hold “”.
2. Press “” or “” to make “Unit No.” blink.
3. Press “” to enter unit No. setting. Press “” or “” to select a unit No.

Note: If you exit the unit No. setting status when “--” is displayed, “Unit No.” and the corresponding number will not be displayed and the unit No. is set to FF (master unit), as shown in the following figure:

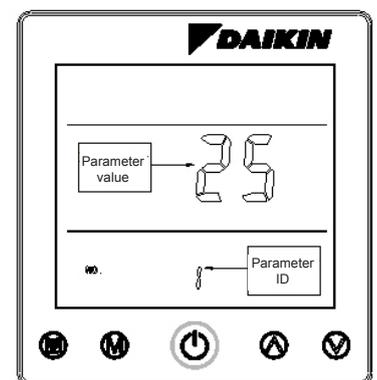


### ■ Parameter query and setting

Parameter query and setting can be used only after you input the service password.

1. Press “” to enter the parameter query and setting status. Only the parameter ID and parameter value are displayed.
2. Press “” or “” to adjust the parameter value.
3. Press “” to enter parameter value modification. Press “” or “” to modify the parameter value.
4. Press “” to save the modification.

Note: If there are not any operations on the wire controller after you input the service password, you need to input the service password again to enter the parameter query and setting status.



### ■ Energy-saving mode setting

When the unit operates in energy-saving mode, “” is displayed on the wire controller.

To set the energy-saving mode on the wire controller:

1. Press “”, and then press “” or “” to make “” blink.
2. Press “” to enter energy-saving mode setting.
3. Press “” or “” to switch parameter values. Press “” to save a value. When the parameter value is 1, it indicates the unit operates in energy-saving mode; to exit the energy-saving mode, set the parameter value to 0.

■ **Floor heating mode enabling**

When the unit requires operating in floor heating mode, enable the floor heating mode on the wire controller as follows:

1. Press “”, and then press “” or “” to make “” (to the right of “”) blink.
2. Press “”.
3. Press “” or “” to switch parameter values. Press “” to save a value. When the parameter value is 1, it indicates the floor heating mode is enabled and can be selected on the wire controller; to exit the floor heating mode, set the parameter value to 0.

■ **Water pump mode setting**

To set the water pump mode on the wire controller:

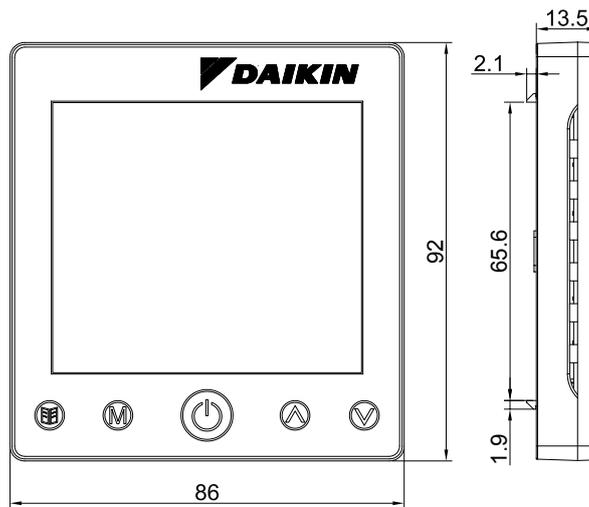
1. Press “”, and then press “” or “” to make “” blink.
2. Press “”.
3. Press “” or “” to switch parameter values. Press “” to save a value. When the parameter value is 1, it indicates the water pump mode is enabled and “” always blinks; to exit the water pump mode, set the parameter value to 0.

■ **Others**

1. When setting a function, press “” to immediately exit the current action.
2. If there are not any valid operations within 10 seconds during setting, the wire controller will exit the current action and return to the idle status.
3. When the air conditioning water pump is enabled, “” will be displayed.

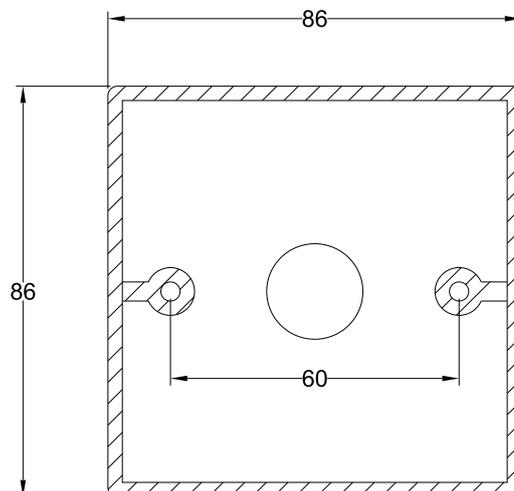
**Controller installation**

Dimensions:



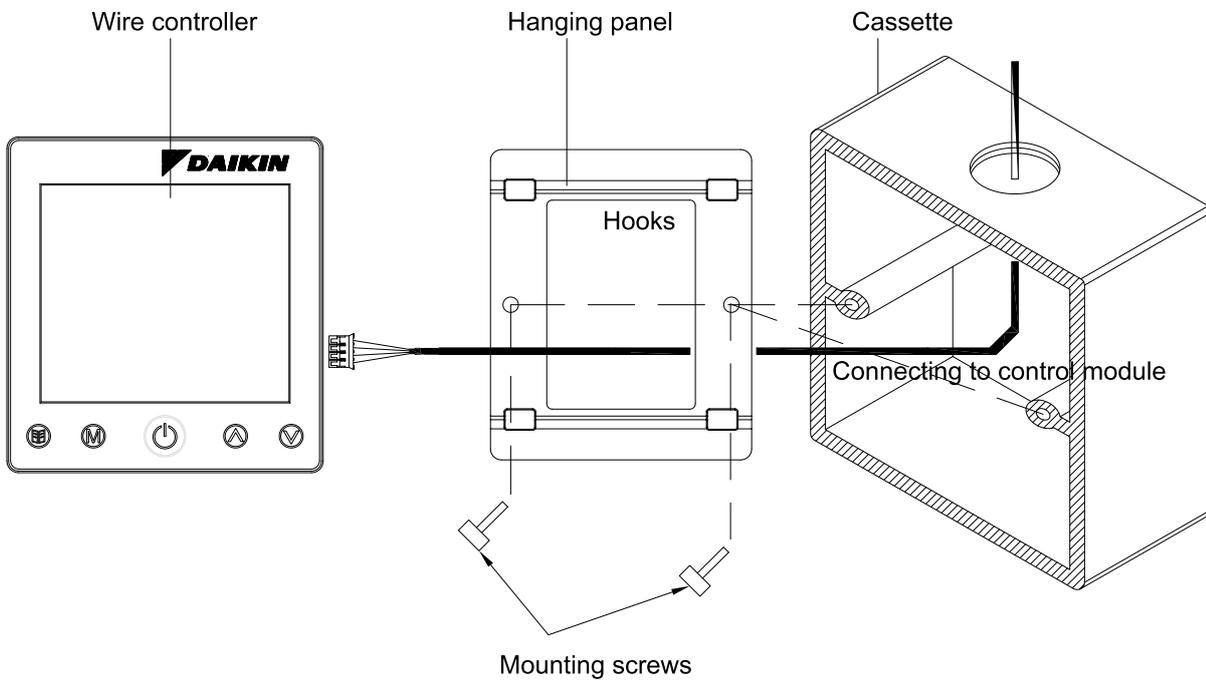
Unit: mm

The MC324 wire controller shall be installed with a standard 86 mm cassette:



Unit: mm

- (1) Remove the hanging panel from the wire controller and fix it to the cassette with mounting screws.
  - (2) Connect wires of the wire controller and buckle mounting holes at the back of the wire controller with hooks of the hanging panel.
- See the following installation diagram:



# Commissioning and operation

## Check items before test run



**CAUTION:** In order to protect the equipment, you should check the following before attempting test run. It would also be a good idea to read “Safety Precautions” once more before starting.

- Is the water pump interlock circuit connected?  
Control the starting/stopping of the pump through the pump output on PCB controller. Otherwise, the heat exchanger may crack due to frost!  
Ensure the interlock contacts of the pump are voltage-free contacts. If there is voltage loop, the control components of the units may be damaged.
- To start the unit for the first time or restart it after long-time shutdown, turn the power supply to “ON” at least 12 hours ahead for heating up the crankcase to ensure the compressor operates smoothly.
- Is the water pump filled with water?  
If not, open the water supply faucet and fill the water system with water, while purging air.
- Check electric connection of the unit. Check whether power lines are of correct diameter and correctly connected, and whether grounding lines are firmly connected.
- Before test run, clean the water system to ensure there are not any pollutants in the piping. For details about the cleaning method, see “Water quality control”.
- Ensure that the scope of application does not exceed the operating scope of the units.

## Check items after test run

After the unit runs in stable state, check the following items:

| S/N | Inspection item                               | Inspection method | Reference                |
|-----|---|-------------------|--------------------------|
| 1   | Power voltage                                 | Voltmeter         | Rated voltage $\pm 10\%$ |
| 2   | Operating current of a single compressor      | Galvanometer      | 13~30A                   |
| 3   | Operating current of a single fan             | Galvanometer      | 1.5~5A                   |
| 4   | Inlet water temperature in cooling operation  | Thermometer       | 15~20°C                  |
| 5   | Outlet water temperature in cooling operation | Thermometer       | 6~15°C                   |
| 6   | Inlet water temperature in heating operation  | Thermometer       | 30~45°C                  |
| 7   | Temperature difference of inlet/outlet water  | Thermometer       | 2~7°C                    |
| 8   | Discharge air temperature of the compressor   | Thermometer       | 65~115°C                 |
| 9   | Low pressure in cooling operation             | Pressure gauge    | 6.5~10.0bar              |
| 10  | High pressure in cooling operation            | Pressure gauge    | 22~41.5bar               |
| 11  | Low pressure in heating operation             | Pressure gauge    | 3.0~10.0bar              |
| 12  | High pressure in heating operation            | Pressure gauge    | 22~33bar                 |

Note: The above references are only bases to judge whether the units onsite are in good condition. The maximum and minimum reference values are for maximum and minimum conditions. If the units exceed the reference values in stable operating, please consult the local dealer and DAIKIN.

# Inspection and maintenance



CAUTION: Recheck the relevant safety precautions before inspection and maintenance.



CAUTION: The unit has been strictly tested and inspected before factory delivery. Customers shall perform periodical inspection and maintenance to ensure excellent performance.

- This unit shall be inspected and maintained by the personnel who have experienced professional cooling training. Check safety control components of the unit before the unit restarts.

## Periodical inspection

- Clean the fin heat exchanger.  
To ensure working efficiency of the condenser and maximize heat exchange, keep the heat exchanger clean and get rid of any pollutants that may block heat exchanger fins such as leaves, cotton wool and insects. Clean by washing with water or steam-cleaning.
- Check the chilled water.  
Drop some water from the air or water purge plug.  
If the water is dirty, replace all the water in the system. (For details about the water quality requirements, see Water Quality Control.)  
Dirty water reduces cooling capability and causes corrosion of water heat exchangers and piping.
- Check if there is air in the water piping system.  
Even after air is purged at the beginning, air can still get inside the system. You should continue to purge air in the system from time to time.
- Clean the Y-shaped water filter in the water system.
- Refill the refrigerant and lubricant.  
Each unit is supplied with sufficient refrigerant and lubricant before delivery.  
In case of a normal system, no refrigerant or lubricant needs to be refilled and it is not allowed to randomly refill or replace the refrigerant or lubricant.  
If there is any need for refilling due to a leakage, refer to the refilling amount specified on the unit nameplate.

## Maintenance

Routine check must be performed during operation of the unit to ensure the performance of the unit, which is the best method for avoiding unnecessary downtime and other wastes. Routine check is performed for the following items:

| Items  | Monthly | Quarterly | Semiannually | Annually | For consideration of needs |
|--|---------|-----------|--------------|----------|----------------------------|
| <b>1. Compressor</b>   |         |           |              |          |                            |
| Evaluate performance and check whether there are abnormal noises | •       |           |              |          |                            |
| Check whether connection lines are firm                          | •       |           |              |          |                            |
| Check whether the current is abnormal (within 10%)               |         | ▲         |              |          |                            |
| Check the discharge air temperature of the compressor            |         | ▲         |              |          |                            |
| Detect the level of oil  |         |           |              |          | ▲                          |
| Check the color of lubricant                                     |         |           |              |          | ▲                          |
| <b>2. Controller</b>   |         |           |              |          |                            |
| Check parameter settings   |         |           | ▲            |          |                            |
| Check the protector  |         |           | ▲            |          |                            |
| Check the time-delay protector                                   |         |           | ▲            |          |                            |
| Check the phase sequence protector                               |         |           | ▲            |          |                            |
| Check the high/Low pressure switch                               |         |           |              |          | ▲                          |
| Check the differential pressure switch and water switch          |         |           |              |          | ▲                          |
| Check the overload protector                                     |         |           | ▲            |          |                            |
| Check the discharge air temperature protector                    |         |           | ▲            |          |                            |
| <b>3. Plate heat exchanger</b>                                   |         |           |              |          |                            |
| Check water quality  | •       |           |              |          |                            |
| Clean plate heat exchanger                                       |         |           |              |          | ▲                          |
| Check seasonal protective measures (anti-freezing in winter)     |         |           |              |          | ▲                          |
| <b>4. Fin heat exchanger</b>                                     |         |           |              |          |                            |
| Clean fin heat exchanger   |         | ▲         |              |          |                            |
| <b>5. Others</b>   |         |           |              |          |                            |
| Check whether the Y-type filter needs to be replaced or cleaned  | •       |           |              |          |                            |
| Check whether bolts of the unit are loose                        |         | •         |              |          |                            |

Remarks: The forgoing maintenance plans are supervisory only (for reference) and specific maintenance plans may be implemented according to different operation performance and areas.

Note: • indicates items checked by users themselves, and ▲ indicates items checked by professional technicians.

# Water quality control

## Water quality requirements

Water in the water system must be softened to prevent scale in the heat exchanger and affecting the heat exchanger performance. Water not softened can also cause scale in the water pipes and cause the water resistance to increase. This affects the water flow and the performance of the water pump. Softened water must meet the following requirements.

| Item            |                                |                                       | Benchmark value    | Tendencies |         |
|-----------------|--------------------------------|---------------------------------------|--------------------|------------|---------|
|                 |                                |                                       |                    | Corrosion  | Scaling |
| Benchmark items | pH (25°C)                      |                                       | 7.5 - 9.0          | ○          | ○       |
|                 | Conductivity (25°C)            | μS/cm                                 | < 800              | ○          | ○       |
|                 | Cl <sup>-</sup>                | mg (Cl <sup>-</sup> )/L               | < 200              | ○          |         |
|                 | SO <sub>4</sub> <sup>2-</sup>  | mg (SO <sub>4</sub> <sup>2-</sup> )/L | < 200              | ○          |         |
|                 | Acid consumption<br>(pH = 4.8) | mg (CaCO <sub>3</sub> )/L             | < 100              |            | ○       |
|                 | Total hardness                 |                                       |                    |            | ○       |
| Reference items | Fe                             | mg (Fe)/L                             | < 1.0              | ○          | ○       |
|                 | S <sup>2-</sup>                | mg (S <sup>2-</sup> )/L               | Cannot be detected | ○          |         |
|                 | NH <sup>+</sup>                | mg (NH <sup>+</sup> )/L               | < 1.0              | ○          |         |
|                 | SiO <sub>2</sub>               | mg (SiO <sub>2</sub> )/L              | < 50               |            | ○       |

Note: ○ represents factors that may cause corrosion or scaling.

In addition, since water in the water system is directly used by users, water quality must meet the requirements of local domestic water health standards.

## Water processing method

To ensure effective operation and durability, cleaning, washing and chemical processing are very important for water systems. Different types of water circuits need to be cleaned in different ways.

### ■ Close re-Circulation system

Water systems of this type generally require no adjustment to subdue scale, and require no chemical to suppress mud and alga. This type of water system is recommended. Closed recycle systems may need anti-corrosion measures, including the following (for reference only):

NaNO<sub>2</sub>, borate and inhibitors for organic materials

- NaNO<sub>2</sub>, borate and silicate
- High density chromate solution and pH control
- pH and sulfite control
- Polyphosphate salt and silicate
- Alkali, phosphate and sulfite control

Because it is hard to control water quality, for closed recycle systems, we recommend that the total density of copper pipe inhibitors such as NaNO<sub>2</sub>, borax, silicate and benzothiazole should be no less than 1400 ppm. The inhibitor NaNO<sub>2</sub> is soluble in glycol, and can be used in northern areas or in the subsystem of solar power systems.

### ■ Open re-circulation system

This type of water system is generally not recommended. They are exposed to the atmosphere, and are susceptible to scale, corrosion, mud and alga. Therefore, they might degrade the performance and reduce the service life of the unit.

### ■ Once-through system

Generally, once-through systems are only used for cooling only air conditioners. Water systems of this type use water from taps, lakes, rivers, and wells. Although the once-through system exchanges heat with the closed water circuit, it is not considered as an integral part of the water source heat pump system. Once-through systems may be troubled by either scale or corrosion. This type of water system requires large amount of adjustment water. Therefore, you need to consider the scale coefficient, the equipment used for cleaning work, and necessary anti-corrosion materials.

# Caution

Water from lakes and rivers may cause problems such as mud and alga!

## Comparison among closed recycle systems, open recycle systems and once-through systems

|                      | Once-through System  | Open Recycle System   | Closed Recycle System   |
|----------------------|--|---|---|
| Scale control        | <ol style="list-style-type: none"> <li>1. Surface activator such as polyphosphate salt</li> <li>2. Increased acidity</li> <li>3. pH adjustment</li> <li>4. Other considerations include: surface temperature, water temperature and system cleaning</li> </ol> | <ol style="list-style-type: none"> <li>1. Discharge</li> <li>2. Surface activator such as polyphosphate salt</li> <li>3. Increased acidity</li> <li>4. pH adjustment</li> <li>5. Softening (other considerations include: surface temperature, water temperature and system cleaning).</li> </ol> | No control is necessary   |
| Corrosion control    | <ol style="list-style-type: none"> <li>1. Low density corrosion inhibitor</li> <li>2. Anti-CaCO<sub>2</sub> plate</li> <li>3. pH control</li> <li>4. Proper material</li> </ol>  | <ol style="list-style-type: none"> <li>1. High density (200 - 500 ppm) corrosion inhibitor</li> <li>2. Low density (20 - 30 ppm) corrosion inhibitor</li> <li>3. pH control</li> <li>4. Proper material</li> </ol>  | <ol style="list-style-type: none"> <li>1. High density corrosion inhibitor</li> <li>2. Proper material</li> </ol> |
| Mud and alga control | <ol style="list-style-type: none"> <li>1. Chloridized hydroxybenzene</li> <li>2. Other chemicals</li> <li>3. Chlorine formed by hypochlorite and liquid chlorine</li> </ol>  | <ol style="list-style-type: none"> <li>1. Chloridized hydroxybenzene</li> <li>2. Other chemicals</li> <li>3. Chlorine formed by hypochlorite and liquid chlorine</li> </ol>   | No control is necessary   |

## Warning



- Daikin Industries, Ltd.'s products are manufactured for export to numerous countries throughout the world. Daikin Industries., Ltd. does not have control over which products are exported to and used in a particular country. Prior to purchase, please therefore confirm with your local authorized importer, distributor and/or retailer whether this product conforms to the applicable standards, and is suitable for use, in the region where the product will be used. This statement does not purport to exclude, restrict or modify the application of any local legislation.
- Ask a qualified installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorized parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Read the User's Manual carefully before using this product. The User's Manual provides important safety instructions and warnings. Be sure to follow these instructions and warnings.

If you have any enquiries, please contact your local importer, distributor and/or retailer.



The air conditioners manufactured by Daikin Industries have received **ISO 9001 series** certification for quality assurance.

Certificate Number. FM 661837



The airconditioning factories of Daikin Industries have received environmental management system standard **ISO 14001** certification.

Certificate Number. EMS 80362

### Cautions on product corrosion

1. The units should not be installed in areas where corrosive gases, such as acid gas or alkaline gas, are produced.
2. If the unit is to be installed close to the sea shore, direct exposure to the sea breeze should be avoided. If you need to install the unit close to the sea shore, contact your local distributor.

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Printed with soy ink.

**Literature No.:** ED-UAL-MINI-201903  
**Supersedes:** ED-UAL-MINI-201902