DAIKIN

Catalogue/Engineering Data

ED-UAL-E-201902

Air Cooled Inverter Modular Chiller/ Heat Pump

Heat Pump	UAL230ER5
Cooling only	UAL230E5

R410A
ECOLOGIC AND HIGH EFFICIENCY

DAIKIN INDUSTRIES, LTD.

Literature No.: ED-UAL-E-201902
Supersedes: ED-UAL-E-201901

Contents

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.

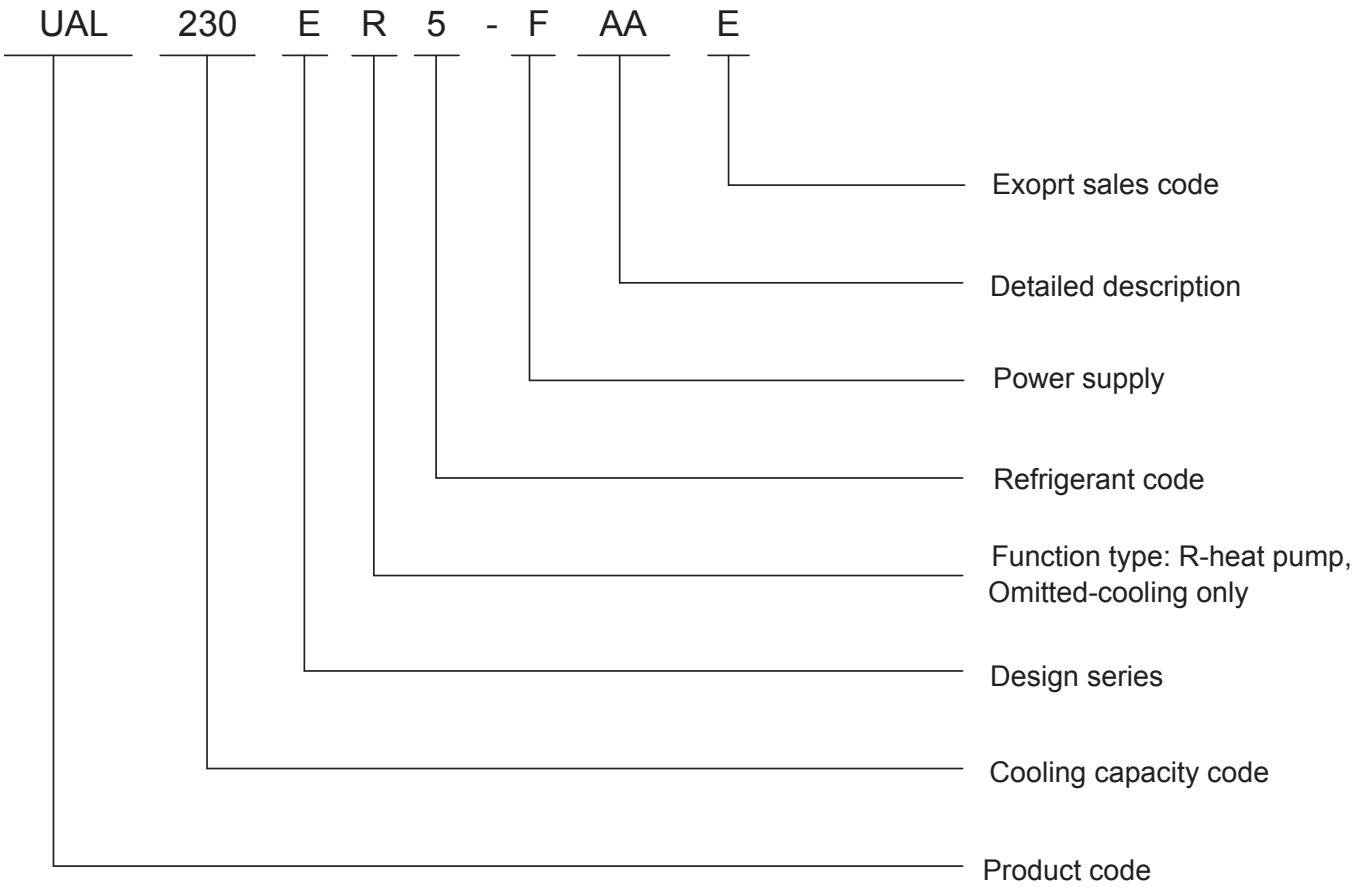
Caution: Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

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

Model Series

Series	Model	Cooling capacity	Heating capacity	Max Combination qty
Cooling only	UAL230E5	65kW	-	16
Heat pump	UAL230ER5	65kW	68kW	16

Nomenclature



Features

Energy-saving & Environmental friendly

1.1 Super-high IPLV, Impetus for building energy saving

UAL-E series modular air cooled inverter unit adopts advanced full DC inverter technology which improves part load operation efficiency and features a high IPLV (GB) of 4.51, 25% higher than that common modular air cooled units.

1.2 Leading energy-saving inverter technology

The excellent energy efficient of the unit owes to the application of cutting-edge DC inverter technology.
The mainstream inverter motor adopted in the unit compressor and fan motor drive can keep the unit operating under the optimal condition by adjusting the capacity output according to the load change in real time. Combining the DC variable-frequency compressor and DC variable-frequency fan motor, the unit also adopts advanced DC inverter technology.

1.3 Efficient components after optimal match

Besides for the high-end DC inverter technology, the unit also has quality and efficient components configured in other parts. All the efficient components of the unit integrated with the optimized control system and form a perfect energy-saving product.

1.3.1 High-efficiency plate heat exchanger

The water side heat exchanger in operation mode adopts efficient stainless steel brazed plate heat exchanger, which is small in size and efficient in heat exchange.

1.3.2 Electronic expansion valve

The unit adopts 480-steps electronic expansion valve based on the precision throttling technology. By dynamically adjustment of the Refrigeration system, the unit operates at optimal condition.

1.3.3 Half-M heat exchanger

The air side heat exchanger in operation mode adopts half-M fin-tube heat exchanger, which makes the air flow more smooth, reduces frosting and improves heat exchange capacity. The heat exchanger with threaded copper tube enlarges the heat exchange area and improves the perturbation of the refrigerant.

1.4 Stepless Capacity Control with High Precision

Common constant-speed modular unit can adjust energy in 2~4 stpes. In contrast, UAL-E series modular inverter unit implements 15%~100% stepless capacity control with precise low-load, low-output and low energy consumption.

1.5 Energy-saving, emission-reducing, harmless to the ozone layer

As a leader of HVAC industry, Daikin plays an important role in promoting energy saving globally and assumes a high sense of responsibility and commitment, which has made significant contribution to the cause of environment protection.

1.5.1 Reduce the emission of greenhouse gases

The unit saves energy for the user and reduces the emission of CO_2 for the society, thus alleviating the greenhouse effect. Compared with constant-speed modular air cooled unit the unit can reduce the emission of CO_2 by approximately 19%. Assume that there are ten thousand units in operation each year, we can reduce the emission of CO_2 by over 60,000 tons for the environment.

1.5.2 Harmless to the ozone layer

Daikin UAL-E series modular air cooled inverter unit adopts environmental refrigerant R410A. Compared with traditional refrigerant R22, refrigerant R410A does not contain chlorine element, which will do no harm to the ozone layer and is an alternative to refrigerant R22 in the medium and long term. The use of refrigerant R22 was restricted and reduced gradually from 2013.

Reliable & High quality

2.1 Quality prevails, trusted by users

Daikin modular air cooled unit boasts continuous technology development for over 40 years and successful domestic marketing experience for nearly 15 years. Thousands of users have chosen Daikin and our products are also exported overseas. The product wins a good reputation on the market for its excellent quality, which provides infinite motivation for our constant improvement and pursuit of perfection. All the components of the unit are of world well-known brands and undergo strict inspection and recognition. Quality review and recording cover the entire production process, with all units being tested online before they leave the factory, to guarantee the quality products delivered to our customers.

2.2 Multiple safety protection, stability and reliability

A dozen of safety protection functions of the unit can provide comprehensive protection for the unit and system.

2.2.1 Anti-freezing protection

Intelligent anti-freezing protection of the unit can automatically run the pump or heating mode in low temperature so as to greatly decrease the risk of being frozen when the unit is not used in winter.
By using advanced antifreeze technologies and according to the system pressure and temperature, the system can precisely determine whether freezing occurs in the evaporator and stop the unit to implement timely protection. In addition, the unit is provided with standard 18-mesh water filter that supports the filtering of particles with the minimum diameter of 1.0 mm (smaller than the plate range) so as to efficiently prevent dirty, blocked or frozen plates.

2.3 Serve as standbys mutually, reduce impacts of unit faults on applications

When multiple modular units are combined, the need of maintenance or repair for a certain unit in the group does not influence normal operations of other units.The property of serving as standbys mutually for the systems and units can effectively reduce the impacts of unit faults on air conditioning systems to the minimum. If a failure occurs in an integral air cooled heat pump, the entire system will fail or affected by a relatively large shortage of cooling/ heating capacity. Consequently, for places requiring high operation reliability, the modular air cooled unit is a prevailing choice.

2.4 Low startup current to ease the shock on the power grid

The low-current startup can ease the shock on the power grid due to unit startups and also improve safety of unit power consumption.

When variable-frequency units are applied in combination, the units are started up with low frequency and small startup current.

2.5 Wide operating range for much more assured use

The unit is functional in severe conditions, no matter a 52°C high ambient temperature or a -15°C low ambient temperature. The unit undergoes many long-term testings of CNAS which are tougher than those of national standards and all the testing results surpass national standards.

Intelligent Control

3.1 User-friendly control function, convenient operation

The unit uses a user-friendly micro-computer controller with a large LCD screen to facilitate operation. The controller provides parameter display, parameter setting and mode switching functions.

One controller can control up to 16 units and dynamically monitor the units' running statuses. Centralized controller can be provided as option if total quantity is more than 16 units.

3.1.1 Agenda management

Set the time of timed on/off every day in a period of week to make the unit operate automatically and implement the unsupervised function.

3.1.2 The compressor operates with balance

The controller monitors in real time the operating time of each modular unit in the group. The compressor is configured to operate intelligently and in balance as to prolong the service life of the unit.

3.1.3 Auto detection function

When a unit failure occurs, the controller can promptly and precisely displays where the failure locates and assists the fast troubleshooting, thus making the management and maintenance more convenient.

3.2 Full-automatic joint control function for more convenient use

3.2.1 Terminal interlocking control:

The operating state of the unit is controlled according to the starting/stopping of terminal equipment such as FCU or AHU so as to implement full-automatic operation.

3.2.2 Remote ON/OFF control:

Control the starting/stopping of the unit by connecting the remote switch.

3.2.3 Interlocking control of chilled water pump:

Control the starting/stopping of the pump to avoid damages due to the out-of-step of the pump and unit.

3.2.4 Interlocking controlling of auxiliary heat source of the system:

Intelligently control the starting/stopping of auxiliary heat source by using multivariate to determine the starting condition of auxiliary heat source.

Note: The foregoing functions have reserved control interfaces in advance and onsite connection of lines is required.

3.3 Multivariate intelligent defrosting control (For Heat pump unit)

By detecting multivariate to precisely determine frosting conditions, the unit can intelligently enter or exit the defrosting working condition at the best time so as to avoid uncompleted or frequent frosting.

Units in combination system can implement defrosting at intervals so that water temperature of the systems does not show large fluctuations and users can still enjoy comfortable heating.In harsh conditions, users can also configure Manual Defrosting at their demands.

3.4 Precise control of water temperature to improve comfort of air conditioners

By default, the unit implements entering water temperature control. And leaving water temperature control can be provided as option. Slight changes in water temperature ensure stable and comfortable indoor air supply.

3.5 Low-noise design to make a tranquil night

In the case of low-load running, the fan rotate speed will reduce automatically and the speed of unit operation can be as low as 49 dB(A).The noise of the unit is substantially reduced.

Stepless variable-speed fan adopted by the innovative unit can dynamically adjust the rotate speed according to unit operation.The noise level of the unit is significantly reduced using professional noise reduction practices, such as strictly choosing and improving fans, motors, structures and pipelines based on national precision noise rooms and noise spectrum analysis results.

3.6 Standard Modbus port to access BAS

The unit provides standard Modbus port to easily connect the unit to Building Automation System (BAS) to implement centralized control and intelligent management. Unnecessary energy waste is avoided and the cost for operating air conditioners is reduced.

Flexible Application

4.1 Modular Design and Diversified Composite Application Solutions

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

1. All inverter: 1 Inverter unit as master unit + maximum 15 inverter units as slave units
2. Inverter + fix speed: Inverter units can be combined with fix speed units, one of the inverter units must be set as master (50Hz only).

4.2 Convenience for Capacity Expansion and Able to Handle Phased Investment Projects.

Modular design of units composes the air-conditioner master unit system with different cooling (heating) ability through modular groups with different number of units.For the projects planned to construct in phases, reserve the pipeline in advance and purchase modular units by installment.In the case of function changing or expansion of the project which lead to the increase of air-conditioner load, appropriately increase the number of modular units to meet the load requirement.

4.3 Dispersal Transport of Modules, Safety and Convenience

In terms of transport, modular units is much simpler compared to integral air cooled heat pump. The forklift is applied to load and unload modular air cooled units, and small lifting equipment is applied to transport light modular units, even freight elevator is available.For an integral air cooled heat pump, large lifting equipment is required for the loading and unloading work of motor transport and lifting work on the construction site.

4.4 Simple System and High Space Utilization Rate

Modular designed units can be installed independently, so as to achieve installation in batches or simultaneously operating by several people.The unit is adaptable to irregular installation space, improving the space utilization. The units are installed in outdoor positions with good ventilation without need of specified indoor engine room, or installation of cooling tower or cooling water system, or heating source such as the boiler.

Specifications

General Data

Model		Unit	UAL230E5	UAL230ER5
Nominal cooling capacity		kW	65	65
Nominal heating capacity		kW	-	68
Capacity control		-	15%~100%	
Rated cooling power input		kW	21.8	21.8
Rated cooling current		A	35.9	35.9
Rated heating power input		kW	-	21.6
Rated heating current		A	-	36.5
Cooling COP		-	2.98	2.98
IPLV		-	4.51	4.51
Power supply		-	380-415V/3N~/50Hz 380V/3N~/60Hz	380-415V/3N~/50Hz
Rated cooling water flow		m^3/h	11.2	11.2
Rated heating water flow		m^3/h	-	11.7
WPD (water pressure drop)		kPa	55	55
Size of water pipe		inch	RC 2	RC 2
Design max ∆T (EWT-LWT)		ºC	7	7
Unit dimensions	L × W × H	mm	1990 x 840 x 1840	1990 x 840 x 1840
Packing dimensions	L × W × H	mm	2010 x 890 x 2010	2010 x 890 x 2010
Net weight		kg	491	491
Gross weight		kg	531	531
Operating weight		kg	500	500

NOTE:

1. *NOMINAL COOLING CODITION: LEAVING WATER TEMPERATURE IS 7ºC, WATER FLOW IS 0.172[M^3/(H•KW)], AMBIENT TEMPERATURE IS 35ºC.*
2. *NOMINAL HEATING CONDITION: LEAVING WATER TEMPERATURE IS 45ºC, WATER FLOW IS 0.172[M^3/(H•KW)], AMBIENT DRY BULB TEMPERATURE IS 7ºC，WET BULB TEMPERATURE IS 6ºC.*
3. *IPLV= COP IN 100% LOAD @35.0ºC AMBIENT X 2.3% + COP IN 75% LOAD @31.5ºC AMBIENT X 41.5% + COP IN 50% LOAD @28.0ºC AMBIENT X 46.1% + COP IN 25% LOAD @24.5ºC AMBIENT X 10.1%.*
4. *ABOVE PERFORMANCE DATA IS TESTED UNDER RATED VOLTAGE 380V.*
5. *WPD INCLUDES WATER PRESSURE DROP OF THE UNIT AND PRESSURE DROP OF THE SUPPLIED Y-TYPE FILTER.*
6. *ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.*

Components Data

Model		Unit	UAL230E5	UAL230ER5
Evaporator	Type	-	Brazed plate heat exchanger	Brazed plate heat exchanger
	Plate material	-	Stainless steel	Stainless steel
	Water volume	L	5	5
Condenser coil tube	Material	-	Copper	Copper
	Type	-	Inner groove	Inner groove
	Outer dimeter	mm	7.94	7.94
	Rows	-	3	3
Fin	Material	-	Aluminum	Aluminum
	Type	-	Blue	Blue
	Fin per inch	-	14	14
Face area		m^2	3.49m^2	3.49m^2
Condenser fan	Type/Drive	-	Axial big van low niose fan/DC inverter	Axial big van low niose fan/DC inverter
	Qty	-	2	2
	Blade material	-	Plastic	Plastic
	Air volume	m^3	12000 x 2	12000 x 2
Compressor	Type	-	Hermetic inverter scroll compressor	Hermetic inverter scroll compressor
	Qty	-	2	2
Refrigerant	Type	-	R410A	R410A
	Charge	kg	19.4	19.4
Flow control		-	EXV	EXV
Numbers of circuits		-	1	1
Oil	Model	-	PVE	PVE
	Charge	L	2.1	2.1
Casing	Colour	-	RAL 7032 pebble grey	RAL 7032 pebble grey
	Material	-	Hot-dip galvanized steel sheet	Hot-dip galvanized steel sheet
	Coating	-	Highlight powder	Highlight powder
Protection devices		-	High pressure switch/thermal and current overload protector	High pressure switch/thermal and current overload protector

NOTE: ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.

Electrical Data

Model		Unit	UAL230E5	UAL230ER5
Fan motor	Type	-	BLDC	BLDC
	Rated output	kW	0.81	0.81
	Poles	-	8	8
	Rated speed	RPM	850	850
	IP/Insulation grade	-	IP44/E	IP44/E
Compressor	Rated running current	A	19.7	19.7
	Box IP	-	IP21	IP21
Unit IP/Insulation grade		-	IPX4/F	IPX4/F
Unit max power input		kW	30.1	30.1
Unit max running current		A	50.3	50.3

NOTES:

1. *ALL SPECIFICTIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.*
2. *MAX RUNNING CURRENT IS TESTED UNDER BELOW CONDITION: COOLING OUTDOOR DRY-BULB TEMPERATURE 43ºC, HEATING DRY-BULB TEMPERATURE 21ºC, WET-BULB TEMPERATURE 15.5ºC.*

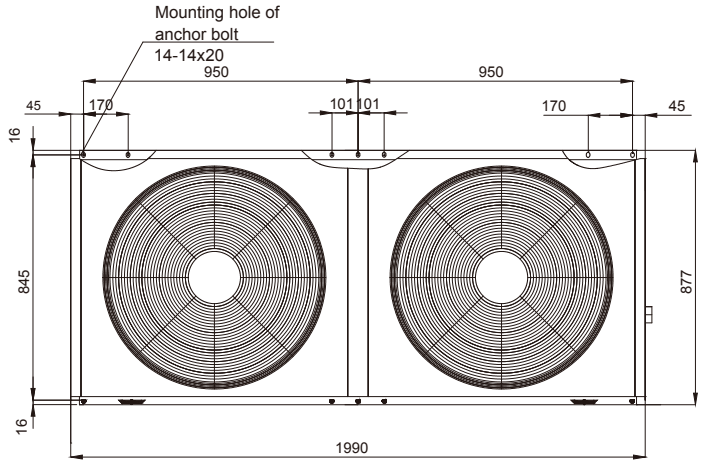
Safety Devices

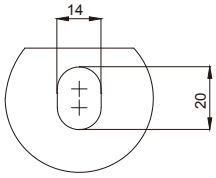
Model			Unit	UAL230E5	UAL230ER5
Safety device	High pressure switch	Model	-	PWS. YK-4.0/3.0	PWS. YK-4.0/3.0
		Open	MPa	4.0 - 0.15MPa	4.0 - 0.15MPa
		Close	MPa	3.0 ± 0.15MPa	3.0 ± 0.15MPa
	Low pressure switch	Type	-	N/A	N/A
		Open	MPa	N/A	N/A
		Close	MPa	N/A	N/A
	Phase sequencer		-	YES	YES
	Discharge temperature setting		ºC	120	120

NOTES:

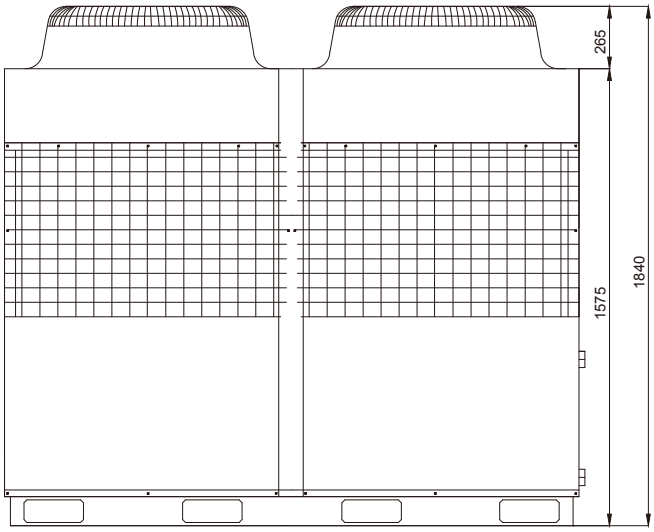
1. *ALL SPECIFICTIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.*

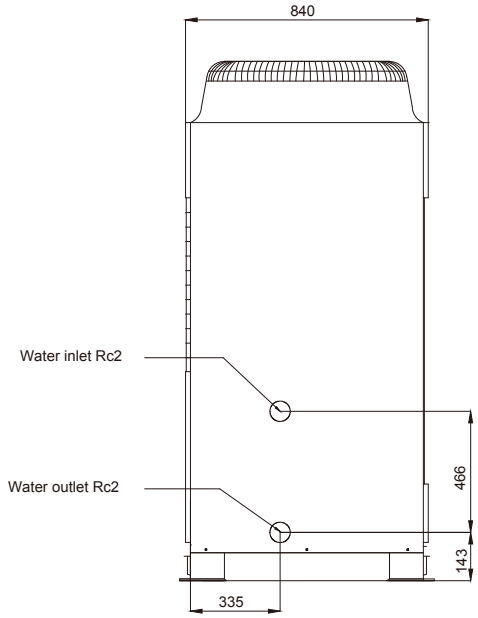
Dimensions





14x20 Enlarged drawing of
mounting hole of anchor bolt

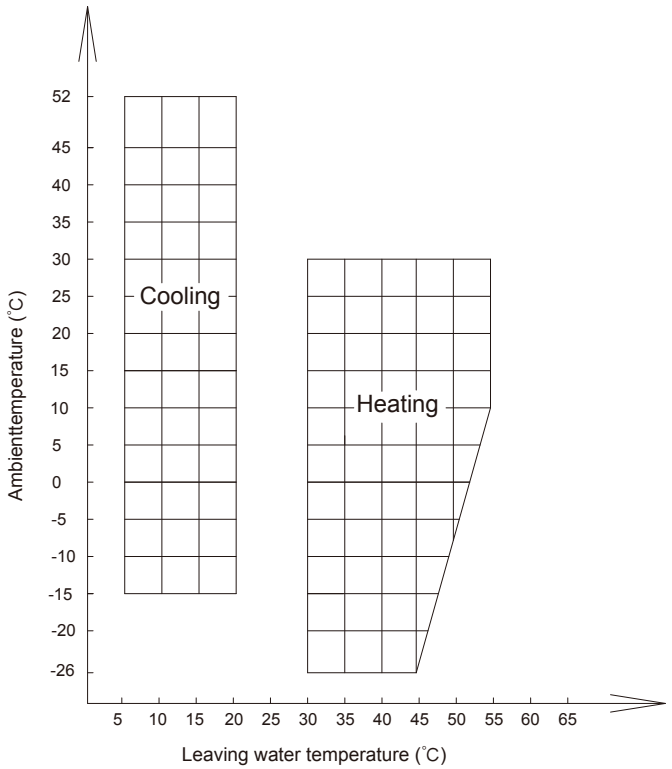




Unit: mm

Performance Data

Operating Range



Note: Heating operating range is for UAL230ER5 heat pump unit only.

Working Condition

Item	Description
Power supply voltage	Rated voltage ±10%
Power supply frequency	Rated frequency ±1%
Variations between phases	Rated voltage ±2%
Air quality	Must not contain solute that can corrode copper, aluminum or iron.
Flow range of chilled water	Rated water flow ±30%
Flow velocity of chilled water	0.5~2.0m/s
Pressure of chilled water	<1.0Mpa
Quality of chilled water	Must not contain solute that can corrode copper, iron, or welding material. For details on the water quality requirements, Refer to “Water Quality Management.”
Installation site	Take anti-snow and ventilation measures as required.
Ambient temperature.	Refer to operating range
Relative humidity	<90%

NOTE:

1. THE UNIT IS STRICTLY TESTED BEFORE DELIVERY AND CAN WORK SAFELY IN THE OPERATING RANGE.

2. THE OPERATING RANGE IS ACHIEVED UNDER TEST AT RATED WATER FLOW, UNIT CAN ONLY RUN IN A SHORT TIME WHEN EXCEEDING THE RANGE, OTHERWISE IT WILL OCCUR ALARM.

3. WHEN THE UNIT RUNS FOR LOW AMBIENT TEMPERATURE COOLING OR LOW LEAVING WATER TEMPERATURE, CERTAIN CONCENTRATION OF GLYCOL MUST BE ADDED INTO WATER SYSTEM, AND IT MUST BE TEST RUN BY DAIKIN CERTIFICATED PROFESSIONAL, OTHERWISE THERE MAY BE RISK OF HEAT EXCHANGER FREEZING.

Glycol concentration and correctiong factors

Mininum glycol concentration for low ambient cooling

Minimum ambient temperature (ºC)	-1	-5	-10	-15
Glycol volume concentration %	9	18	26	33

Mininum glycol concentration for low LWT

LWT (ºC)	4	2	0	-2	-4	-5
Glycol volume concentration %	10	10	15	18	20	22

NOTE: MINIMUM LWT CAN REACH -5ºC.

Correction factor for low LWT corresponding to 7C LWT

LWT (ºC)	4	2	0	-2	-4	-5
Cooling capacity	0.842	0.842	0.785	0.725	0.670	0.642
Cooling power input	0.950	0.950	0.940	0.920	0.890	0.880

Correction Factors With Glycol Use

Glycol volume concentration %	10	20	30	40	50
Cooling capacity	0.991	0.982	0.972	0.961	0.94
Cooling power input	0.996	0.992	0.986	0.976	0.966
Heating capacity	0.996	0.991	0.985	0.980	0.97
Heating power input	1.005	1.010	1.016	1.023	1.030

TIPS FOR LOW LWT CAPACITY CALCULATION:

STEP 1: CHOOSE GLYCOL PERCENTAGE WHICH CAN BE LARGER THAN MINIMUM REQUIREMENT.

STEP 2: CALCULATE LOW LWT COOLING CAPACITY/ POWER BY MULTIPLY CORRECTION FACTOR WITH COOLING CAPACITY/ POWER OF 7C LWT.

STEP 3: CALCULATE LOW LWT COOLING CAPACITY/ POWER AFTER USING GLYCOL BY GLYCOL USING CORRECTION FACTOR

NOTE: PLEASE CONSULT FACTORY FOR LOW LWT REQUIREMENT.

Cooling capacity performance table

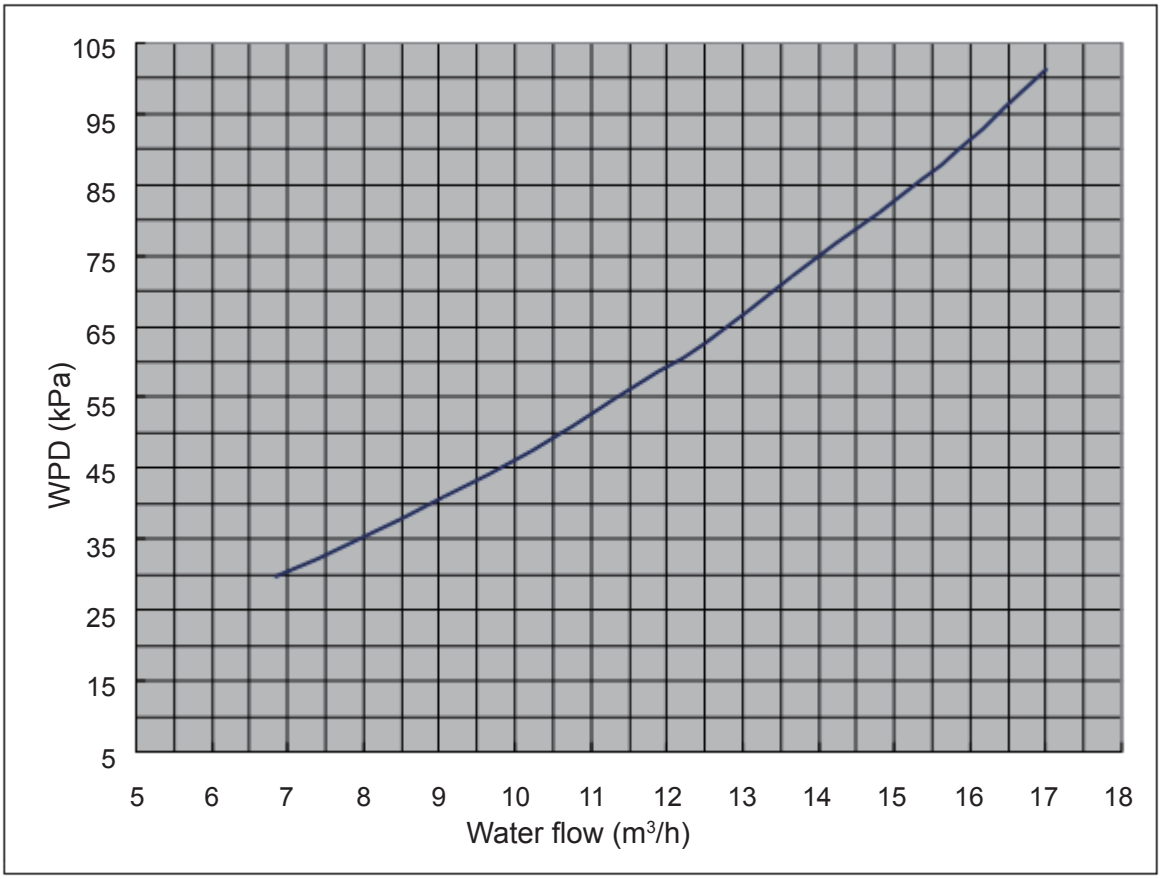
LWT °C	Ambient temperature °C																			
	-15		0		5		15		25		30		35		40		45		48	
	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW
5	41.9	8.0	55.6	13.7	56.5	14.1	58.3	14.7	77.5	21.5	69.1	21.6	60.7	21.7	52.3	22.0	34.0	16.8	23.0	14.2
7	46.5	8.4	61.7	14.3	62.7	14.8	64.7	15.4	83.0	21.0	74.0	21.4	65.0	21.8	56.0	22.2	38.0	17.7	26.0	15.0
9	51.1	8.7	67.7	14.7	68.8	15.1	71.0	16.0	88.5	20.5	78.9	21.2	69.3	21.9	59.6	22.3	43.2	18.7	30.0	15.8
12	58.0	9.2	76.8	15.2	78.1	15.5	80.6	16.3	96.8	19.7	86.3	20.9	75.8	22.1	65.1	22.6	48.0	20.0	34.4	16.9
15	64.8	9.8	85.9	15.4	87.3	15.7	90.1	16.2	105.0	19.0	93.6	20.6	82.2	22.2	70.6	22.8	54.0	21.4	38.9	18.0
20	76.3	10.7	101.1	15.8	102.7	16.1	106.0	16.7	110.0	17.7	105.9	20.1	93.0	22.5	79.7	23.2	65.0	23.7	47.0	19.9

Heating capacity performance table

LWT °C	Ambient temperature °C																			
	-20		-15		-10		-5		0		7		10		15		21		25		30	
	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW	Cap. kW	PI kW
30	39.7	17.3	45.4	17.7	51.1	18.1	59.5	18.4	67.7	18.7	77.6	18.9	81.8	19.0	85.0	18.4	88.8	17.5	91.3	17.0	94.5	16.3
35	38.0	18.1	43.5	18.5	49.0	18.9	57.0	19.2	64.9	19.6	74.4	19.8	77.0	19.7	81.5	19.5	86.3	19.5	89.6	19.4	93.6	19.4
40	36.5	19.0	41.7	19.2	46.8	19.8	54.6	20.1	62.1	20.5	71.2	20.7	73.7	20.7	78.0	20.6	83.9	21.3	87.8	21.8	92.6	22.4
45	35.0	19.9	39.8	20.0	44.7	20.7	52.2	21.0	59.3	21.4	68.0	21.6	70.4	21.7	74.5	21.8	81.4	23.2	85.9	24.2	91.7	25.5
50	-	-	-	-	-	-	49.7	21.9	56.4	22.2	64.8	22.5	67.1	22.7	71.0	22.9	78.9	25.1	84.1	26.6	90.7	28.6
55	-	-	-	-	-	-	-	-	-	-	-	-	60.1	21.5	67.5	24.1	76.5	27.0	82.3	29.0	89.8	31.6

NOTE: HEATING CAPACITY IS FOR UAL230ER5 HEAT PUMP UNIT ONLY.

Water Pressure Drop Curve



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.

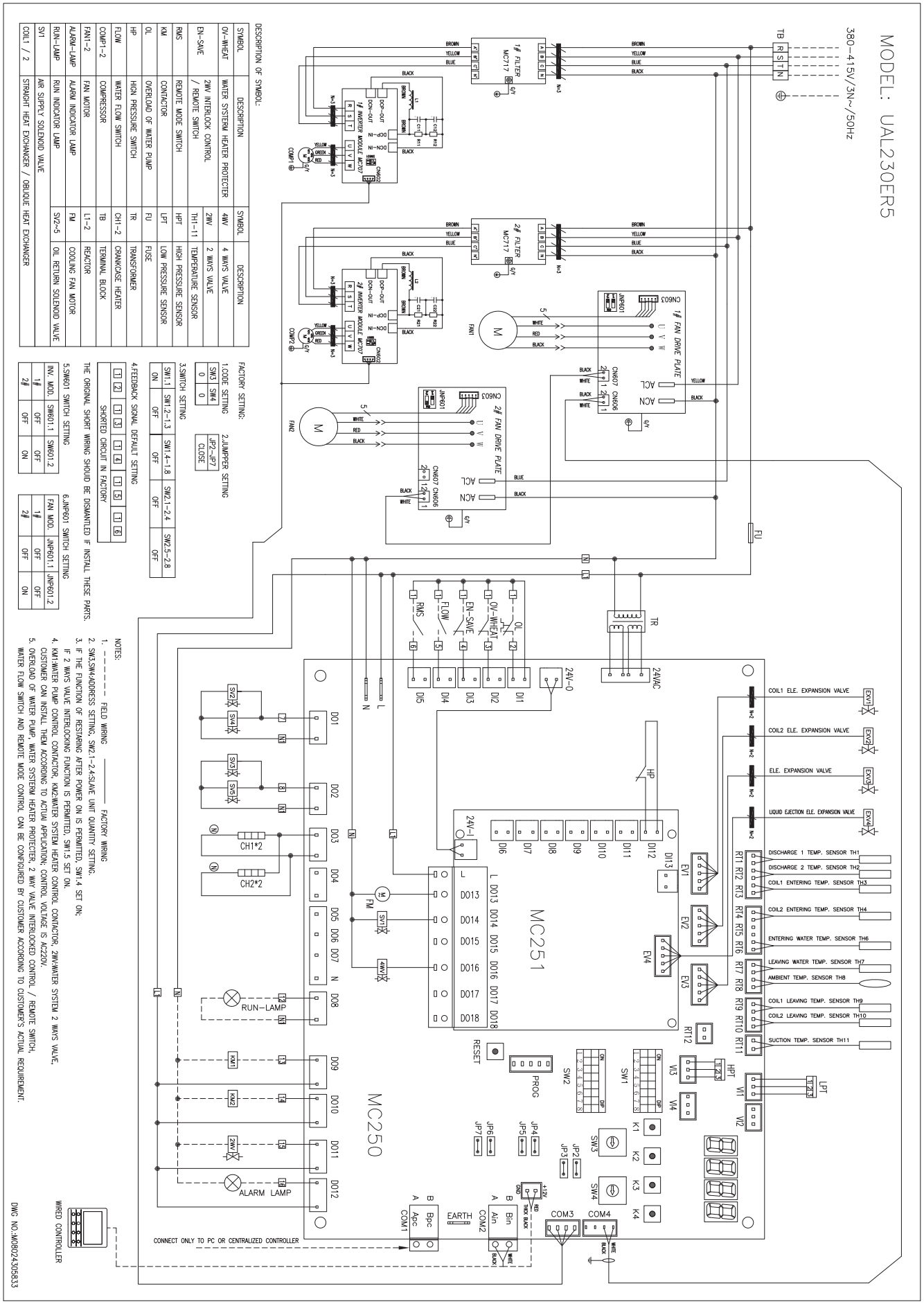
Sound Data

Acoustic Noise

	Octave band sound pressure level (dB,ref20μPa)								dB(A)
Model	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Overall
UAL230E5	52.6	57.3	59.6	63.4	60.2	58.3	48.9	42.6	67.5
UAL230ER5	52.6	57.3	59.6	63.4	60.2	58.3	48.9	42.6	67.5

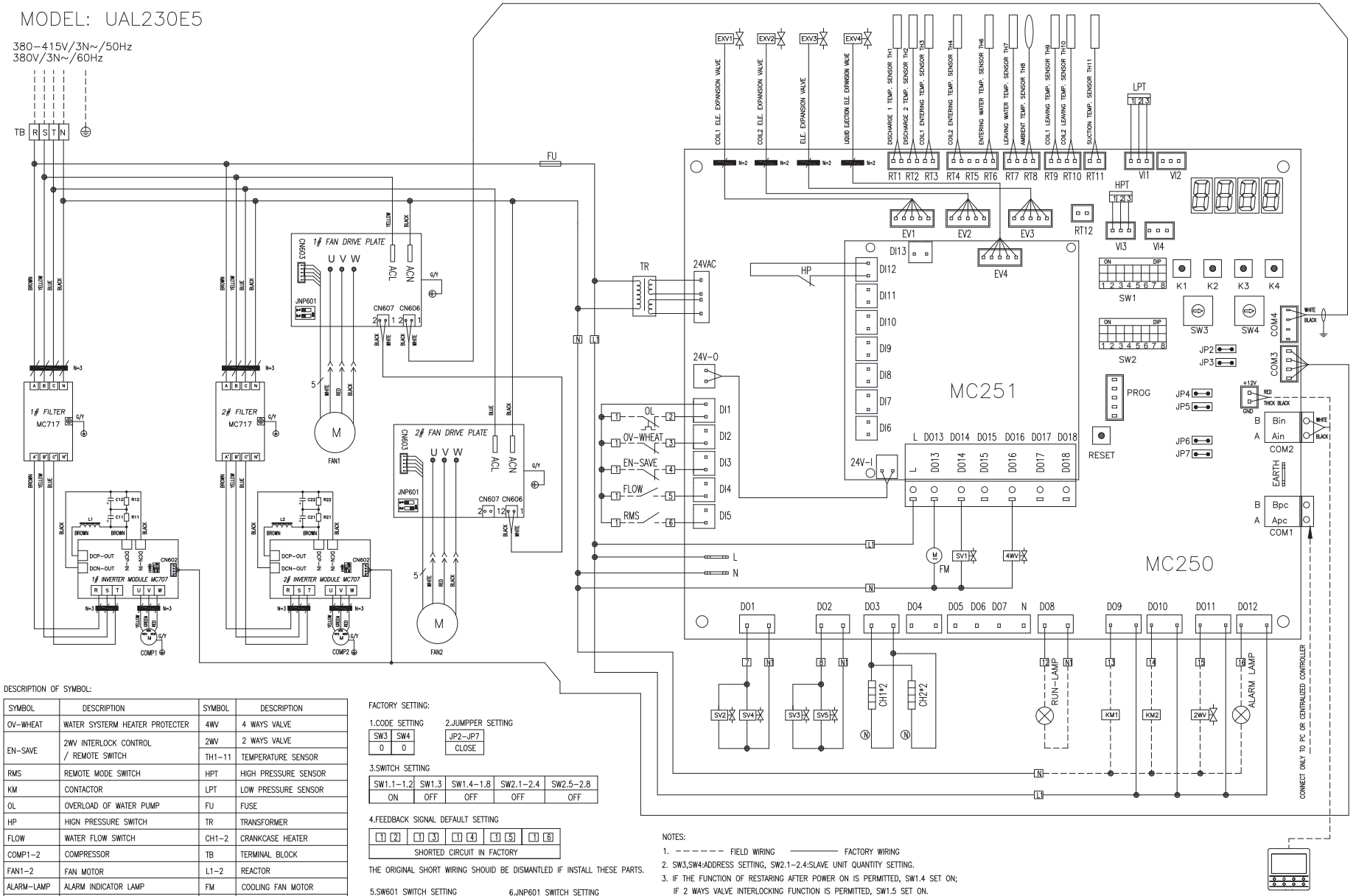
Test condition: Octave band sound pressure level noise is tested base on 11.5dB(A) background noise semi-anechoic room.

Wiring Diagram



MODEL: UAL230E5

380–415V/3N~/50Hz
380V/3N~/60Hz



DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV–WHEAT	WATER SYSTERM HEATER PROTECTER	4WV	4 WAYS VALVE
EN–SAVE	2WV INTERLOCK CONTROL / REMOTE SWITCH	2WV	2 WAYS VALVE
		TH1–11	TEMPERATURE SENSOR
RMS	REMOTE MODE SWITCH	HPT	HIGH PRESSURE SENSOR
KM	CONTACTOR	LPT	LOW PRESSURE SENSOR
OL	OVERLOAD OF WATER PUMP	FU	FUSE
HP	HIGN PRESSURE SWITCH	TR	TRANSFORMER
FLOW	WATER FLOW SWITCH	CH1–2	CRANKCASE HEATER
COMP1–2	COMPRESSOR	TB	TERMINAL BLOCK
FAN1–2	FAN MOTOR	L1–2	REACTOR
ALARM–LAMP	ALARM INDICATOR LAMP	FM	COOLING FAN MOTOR
RUN–LAMP	RUN INDICATOR LAMP	SV2~5	OIL RETURN SOLENOID VALVE
SV1	AIR SUPPLY SOLENOID VALVE		
COIL1 / 2	STRAIGHT HEAT EXCHANGER / OBLIQUE HEAT EXCHANGER		

FACTORY SETTING:

1.CODE SETTING

SW3	SW4
0	0

2.JUMPPER SETTING

JP2–JP7
CLOSE

3.SWITCH SETTING

SW1.1–1.2	SW1.3	SW1.4–1.8	SW2.1–2.4	SW2.5–2.8
ON	OFF	OFF	OFF	OFF

4.FEEDBACK SIGNAL DEFAULT SETTING

[1] [2]	[1] [3]	[1] [4]	[1] [5]	[1] [6]
SHORTED CIRCUIT IN FACTORY				

THE ORIGINAL SHORT WIRING SHOUID BE DISMANTLED IF INSTALL THESE PARTS.

5.SW601 SWITCH SETTING

INV. MOD.	SW601.1	SW601.2
1#	OFF	OFF
2#	OFF	ON

6.JNP601 SWITCH SETTING

FAN MOD.	JNP601.1	JNP601.2
1#	OFF	OFF
2#	OFF	ON

NOTES:

1. – – – – – – FIELD WIRING ———— FACTORY WIRING
2. SW3,SW4:ADDRESS SETTING, SW2.1–2.4:SLAVE UNIT QUANTITY SETTING.
3. IF THE FUNCTION OF RESTARING AFTER POWER ON IS PERMITTED, SW1.4 SET ON;
   IF 2 WAYS VALVE INTERLOCKING FUNCTION IS PERMITTED, SW1.5 SET ON.
4. KM1:WATER PUMP CONTROL CONTACTOR, KM2:WATER SYSTEM HEATER CONTROL CONTACTOR, 2WV:WATER SYSTEM 2 WAYS VALVE, CUSTOMER CAN INSTALL THEM ACCORDING TO ACTUAI APPLICATION; CONTROL VOLTAGE IS AC220V.
5. OVERLOAD OF WATER PUMP, WATER SYSTERM HEATER PROTECTER, 2 WAY VALVE INTERLOCKED CONTROL / REMOTE SWITCH, WATER FLOW SWITCH AND REMOTE MODE CONTROL CAN BE CONFIGURED BY CUSTOMER ACCORDING TO CUSTOMER'S ACTUAL REQUIREMENT.

DWG NO.:M08024305834

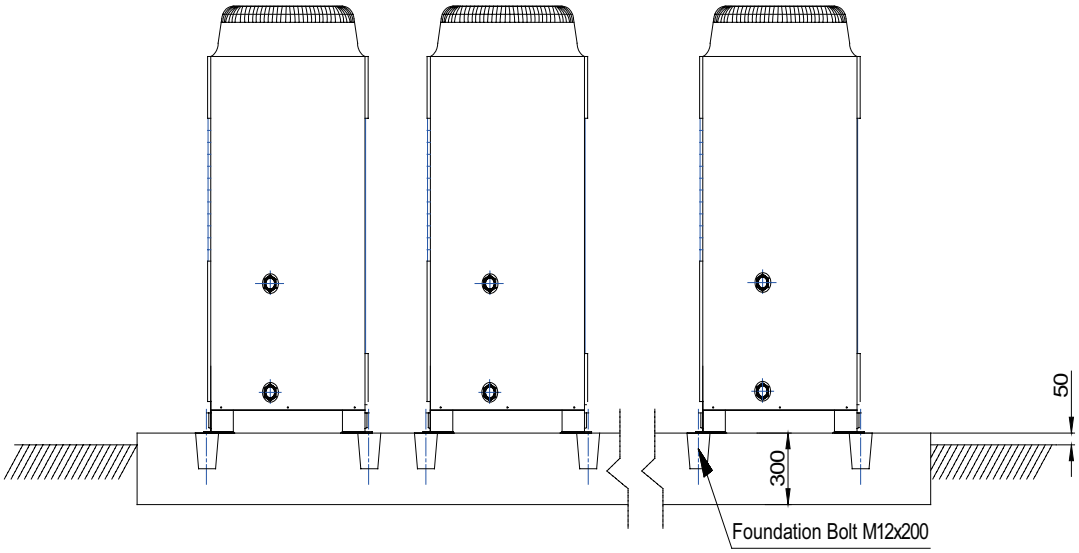
Installation

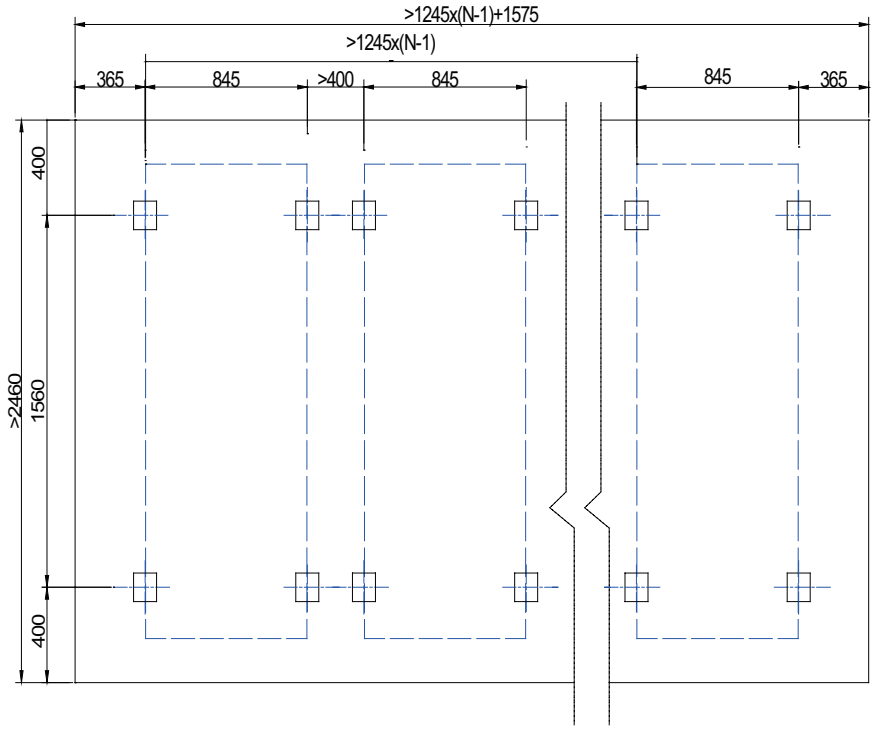
Installation Dimensions and Environment Limits

Machine Installation Space

Units must be installed by DAIKIN service staff or by specially trained personnel. Units must installed by following relevant national and local electric, building and environment protection standards as well as the installation manual.

Assembling Unit Modules

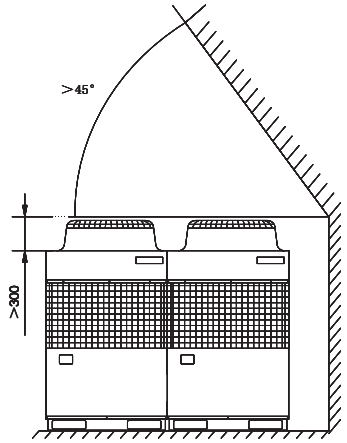


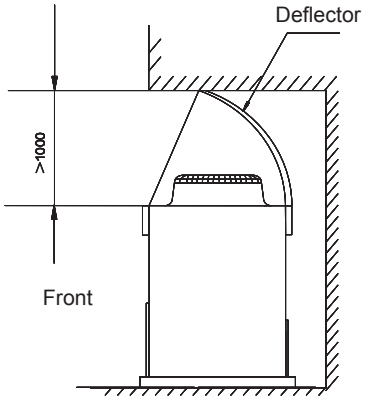


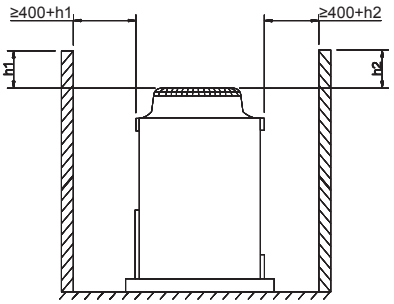
NOTE:

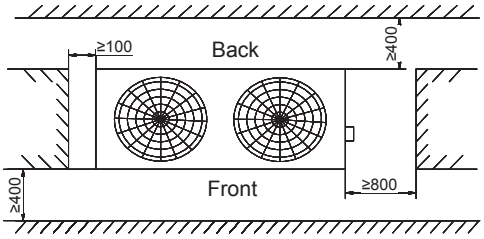
THE GROUNDWORK MUST BE A CONCRETE FLOOR OR A V-IRON STRUCTURE THAT IS STRONG ENOUGH TO BEAR THE OPERATION PRESSURE OF THE UNIT.
N REPRESENTS THE NUMBER OF MODULES INSTALLED.
EACH UNIT MUST BE FIXED BY 4 M12 BOLTS;
6 RUBBER CUSHIONS OF 20MM THICK MUST BE INSTALLED BETWEEN THE UNIT AND THE GROUNDWORK.
THE GROUNDWORK MUST HAVE DRAINING FACILITIES TO DISCHARGE CONDENSATE WATER AND DEFROSTING WATER.

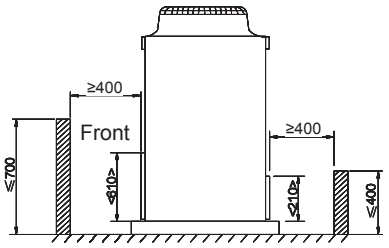
Space Allocated for A Single Chilled Water Unit





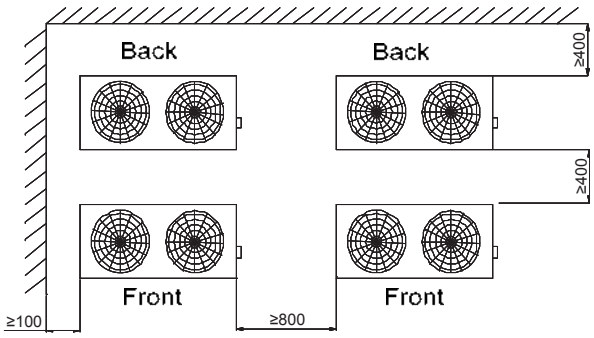


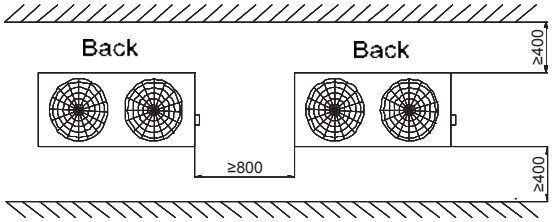




Unit: mm

Space Allotted for An Array of Chilled Water Units

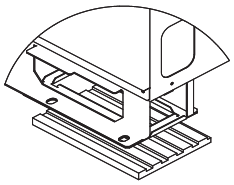




Unit: mm

Installing Chiller

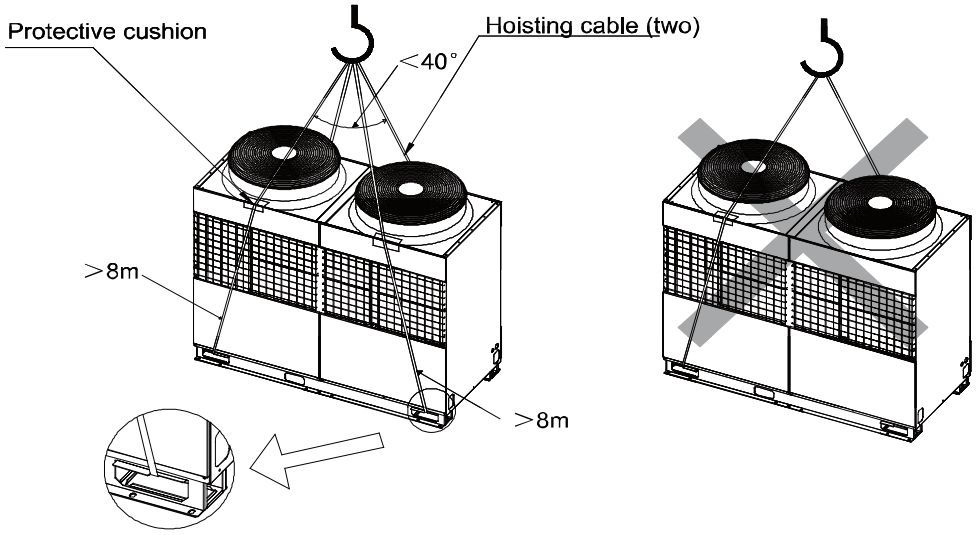
- The user manual, accessories, and packing list are place at the right side of the unit, as illustrated by the shaded part of the figure on the left.
- Reserve sufficient maintenance space if possible.
- If the unit is installed in a place where it snows in winter, proper measures must be taken to protect the unit against snow and ensure that the unit works properly.
- The groundwork should be made of concrete or supporting structures. While designing the groundwork, you must fully consider the strength of the floor, water discharge (the unit discharges water while working), pipelining and wiring. If the floor is not strong enough, the unit might fall off and breakdown, even incur bodily injuries.



- Screw down the chilled water unit using anchor bolts so that it will not fall off in case of strong wind or earthquakes. To avoid damages caused by strong wind or earthquakes, The unit must be securely installed at a proper place to avoid direct hit of strong winds.
- Depending on mounting conditions, operation vibration might pass through the groundwork and generate noises in the floor and walls. Therefore, proper vibration dampening mechanisms (such as bumper cushion, bumper frame etc.) should be in place.
- Corners and edges should be properly installed. Otherwise, the unit might get unbalanced and cause the grounding pins to bend. The unit might fall off and cause bodily injuries if it is not properly installed.

Hoisting Chillers

Please hoist the unit according to the following illustrations. Tie the cables to the four corners of the unit while moving it. If you tie the cables to only two corners of the unit, the unit might get unbalanced and fall off.



NOTES:

- *CHILLED WATER UNITS MUST BE MOVED WITH GREAT CARE.*
- *ACCESSORY STRIPS CANNOT BE USED TO HOIST OR MOVE THE UNIT AS THEY MIGHT BREAK AND CAUSE UNEXPECTED ACCIDENTS.*
- *DO NOT TOUCH THE HEAT SINKS OF THE HEAT EXCHANGER BARE-HANDEDLY AS THEY MIGHT CUT YOUR FINGERS.*
- *DISPOSE ALL PLASTIC BAGS PROPERLY AND KEEP THEM AWAY FROM CHILDREN.*
- *DUE TO THE DIFFERENT APPEARANCE OF THE UNIT, THE ABOVE HOISTING PICTURE IS ONLY FOR REFERENCE.*

Water System Installation

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^-	mg (Cl^-)/L	< 200	○	
	SO_4^{2-}	mg (SO_4^{2-})/L	< 200	○	
	Acid consumption (pH=4.8)	mg ($CaCO_3$)/L	< 100		○
	Total hardness	mg ($CaCO_3$)/L	< 200		○
Reference items	Fe	mg (Fe)/L	< 1.0	○	○
	S^{2-}	mg (S^{2-})/L	0	○	
	NH_4^+	mg (NH_4^+)/L	< 1.0	○	
	SiO_2	mg (SiO_2)/L	< 50		○
NOTE: ○ REPRESENTS FACTORS THAT MAY CAUSE CORROSION OR SCALING.					

Water System Installation Schematic Diagram

Connecting Water Pipes

No water pump is provided as an accessory. A proper water pump must be installed to overcome resistance of the water pipes.

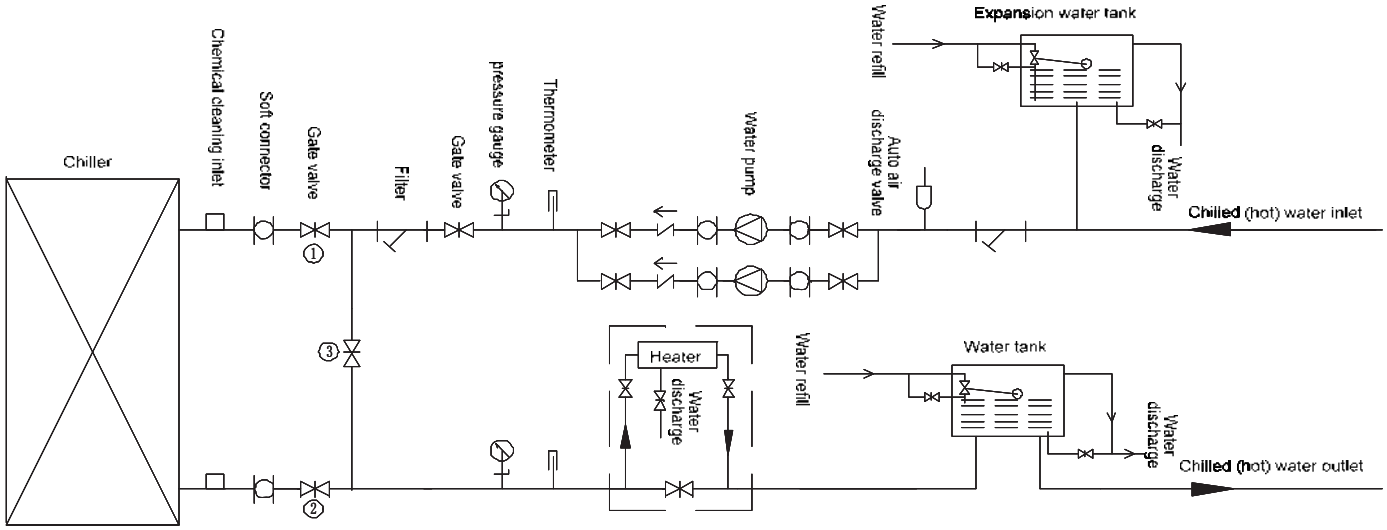
- Water pressure gauges and thermometers must be installed at the water inlets and outlets to facilitate the reading of unit operation status.
- The heat exchanger at the water side is made of stainless steel. Water scale may accumulate depending on the water quality and must be cleared using chemicals from time to time. Therefore, a chemical cleaning pipe connector needs to be installed at the water pipes (see the following figure).

The water flow must be in the rated range. If the water flow is too small, scale may accumulate and degrade the performance of the unit, cause the antifreeze device to activate, or cause rust points and refrigerant leakage. If the water flow is too large, the unit may be corroded due to water impact.

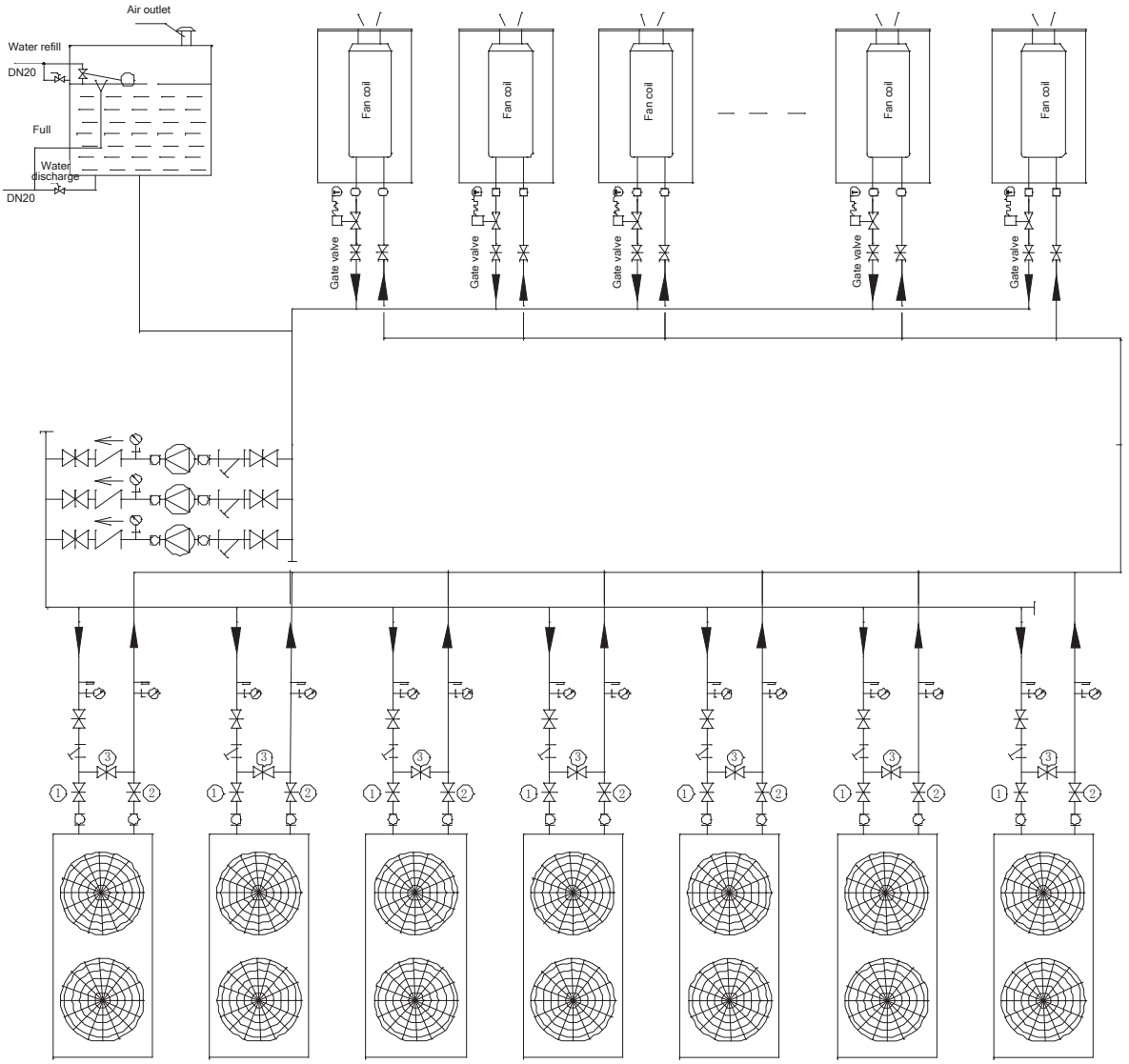
- Thermal insulated water tank with a proper volume is suggested to install. If the capacity is too small, the unit might frequently restart, which causes wear and tear on the compressor.
- An expansion water tank must be installed at the return water side of the water system to adapt to water pressure variations in the water supply system caused by ambient temperature changes.
- An auto relief valve must be installed at the highest point in the water system. A suitable water discharge valve must be installed at the lowest point in the water system.
- The water pipes must be thermal insulated to avoid heat loss and condensate water.
- Please follow the "Illustration for water system installation" and drawings from the design institute while installing the water system.
- Install the Y-shaped water filter inside the water inlet pipe and rinse the filter screen after commissioning.
- Before injecting water, make sure that no sand, rubble, rust, soldering tin residue or other impurities exist in the pipe, as these things might damage the heat exchanger.

While rinsing the water system, please bypass the unit and the terminal heat exchanger using by-pass valves.

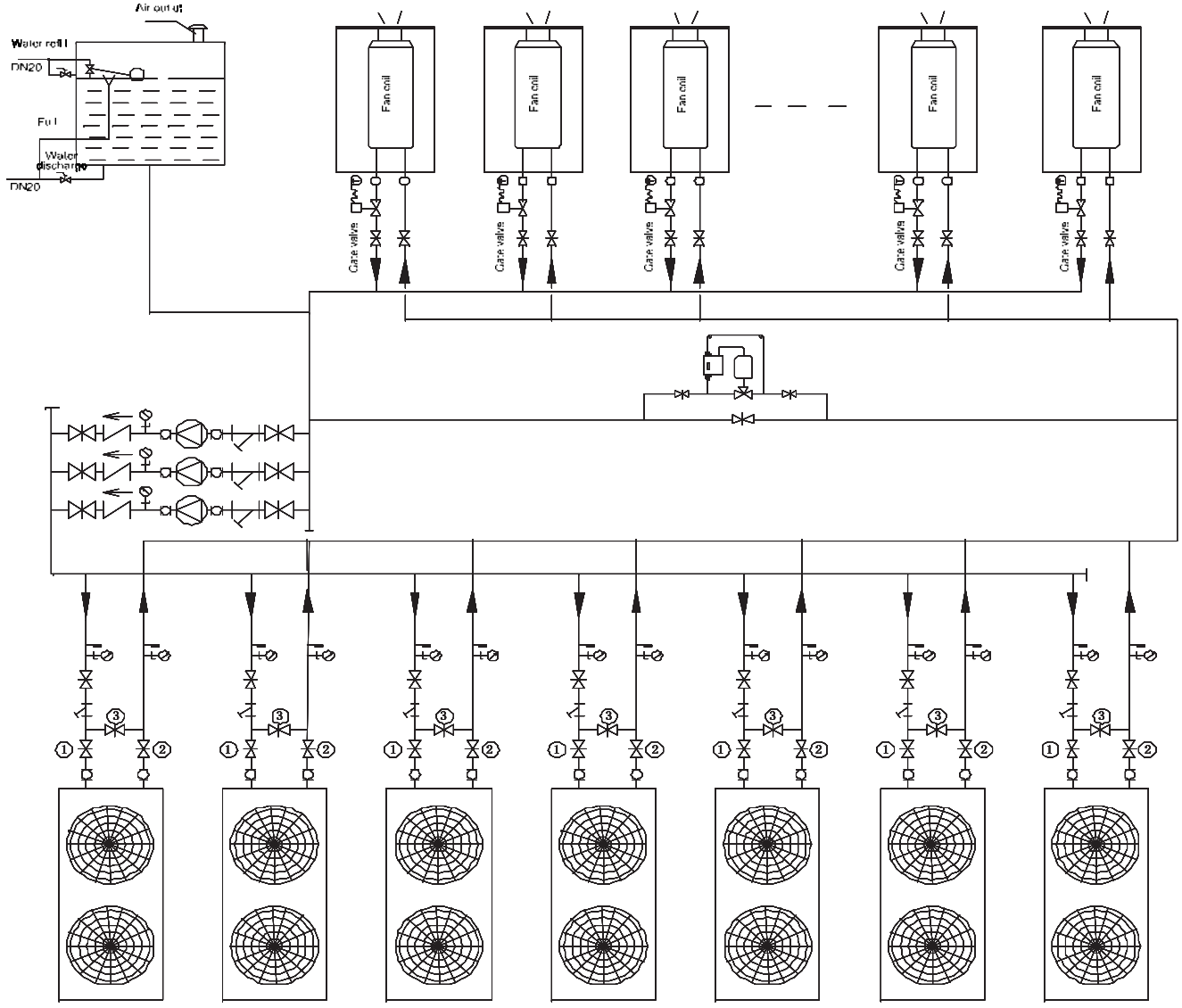
- Installation illustration for the water system of a single unit:



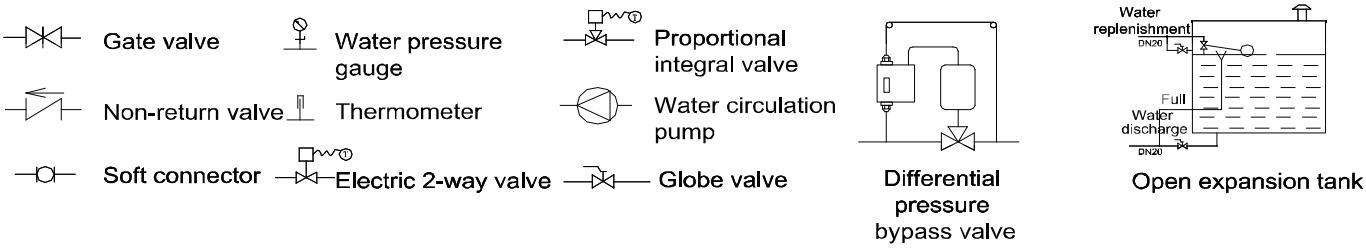
■ Multi-unit combination, illustration for water system with fixed chilled water flow which conditions indoor air by modulating the terminal air rate



■ Illustration for variable flow rate water system which adjusts indoor temperature by adjusting flow rate of chilled water (modular combination of multiple units)



Legends for the water system illustration:



Size of the main connecting pipe for modular combinations:

Unit Qty.	1	2-3	4-5	6-10	11-16
Size of main connecting pipe (inch)	≥2	≥3	≥4	≥5	≥6

NOTE: WHEN CLEANING THE WATER SYSTEM, PLEASE SHUT ① ② GATE VALVE AND OPEN ③ GATE VALVE MARKED IN THE DIAGRAM OF ALL THE UNITS, IN ORDER TO BYPASS THE UNITS, SO THE IMPURITIES CAN BE PREVENTED FROM ENTERING THE PLATE HEAT EXCHANGER AND THE EFFICIENCY AND SERVICE LIFE OF PLATE HEAT EXCHANGER CAN NOT BE AFFECTED.

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:

$$d = \sqrt{\frac{4m_w}{3.14\ v}}$$

In the formula: m_w-------water flow m^3/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^3/h)	kPa/100m	Water flow (m^3/h)	kPa/100m
15	0 - 0.5	0 - 60	--	--
20	0.5 - 1.0	10 - 60	--	--
25	1 - 2	10 - 60	0 - 1.3	0 - 43
32	2 - 4	10 - 60	1.3 - 2.0	11 - 40
40	4 - 6	10 - 60	2 - 4	10 - 40
50	6 - 11	10 - 60	4 - 8	--
65	11 - 18	10 - 60	8 - 14	--
80	18 - 32	10 - 60	14 - 22	--
100	32 - 65	10 - 60	22 - 45	--
125	65 - 115	10 - 60	45 - 82	10 - 40

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

Model	Vmin. (L)
UAL230E5	240
UAL230ER5	240

NOTES:

- *THE MINIMUM WORKING VOLUME REFERS TO THE ADDED-UP VOLUME OF THE MAIN WATER PIPE, WATER TANK AND CONSTANTLY-OPEN TERMINALS OF 2-WAY VALVES IN THE WATER CIRCULATION SYSTEM.*
- *THE ACTUAL WORKING VOLUME OF THE WATER SYSTEM MUST BE LARGER THAN VMIN; OTHERWISE THE UNIT WILL SEND OUT ALARMS AND SHUT DOWN FREQUENTLY.*
- *IF THE ACTUAL RESULTFUL VOLUME OF THE WATER SYSTEM V IS LESS THAN VMIN, PLEASE INSTALL A TANK THE VOLUME OF WHICH IS L (L=VMIN-V).*

Example for water system volume calculation:
There are 2 UAL230ER5, a main inlet/out water pipe of DN80 and 50m long and 10 fan coil units constantly open (each has a volume of 1.5 L)
Calculation: Volume of main inlet/outlet water pipe = 3.14 * [(80/2)/100] 2 * 500 = 251 L

Volume of terminal fan coils = 10 * 1.5 = 15
According to the table above, Vmin. = 240 L

Vmin - V = 240 - 251 - 15 = -26

The water system volume is larger than Vmin, so it doesn't need a water storage tank.

Calculating Volume of Expansion Water Tank

An expansion water tank with a proper volume must be installed to adapt to water volume changes as the temperature changes and avoid freezing burst and pressure instability at the water pump inlet.
The expansion water tank can also be used to supplement water and discharge air.
Calculating volume of expansion water tank.

$Vp=\alpha*\Delta t*Vs$

Vp----effective volume of the expansion water tank (volume of water between the signal pipe and the overflow pipe). m^3
α----volume expansion coefficient of water (α =0.0006/°C)
Δt----max. water temperature variation °C
Vs----water volume in the system (total water volume in the system and pipes) m^3

Model Selection Principles for the Water Circulation Pump

- Water flow in the water circulation pump ≥ rated water flow × 1.1
  Closed water circulation system: Water circulation pump lift ≥ (Pipe resistance of the water system + Partial resistance of the water system + Water pressure drop of the unit) × 1.1
- Open water circulation system: Water circulation pump lift ≥ (Static resistance of the water system + Pipe resistance of the water system + Partial resistance of the water system + Water pressure drop of the unit) × 1.1
- In the case that multiple units share the same pump, the pump lift is calculated according to the circuit that has the maximum resistance (usually the unit that is farthest away from the pump).

NOTE: THE WATER FLOW OF THE UNIT SHOULD CALCULATE ACCORDING THE WATER FLOW RANGE.

Commissioning and Operation

Items to be Confirmed before Turning on Unit

Note: Before the pilot run, check that the following conditions are met and read the "Safety Precautions" again.

- Ensure that the water pump and the unit are connected.
  Use the PCB controller to Control the on and off the water pump using the water pump output on the PCB controller; otherwise the BPHE may burst due to freezing.
  The water pump connection point must have no voltage. If a voltage circuit is connected, basic components may be damaged.
- Power on the unit to preheat the crankcase for at least 12 hours before starting up the unit for the first time or after a long-term stoppage. This ensures that the compressor works properly.
- Before turning on the unit, check that the water pump is filled with water.
  Before turning on the water pump, open the water supply valve, fill the pump with water, and discharge free air in the system
- Wiring of the unit: Check that the diameter of the wires meets requirements; the wires are correctly connected; the grounding line is securely connected;
- Before turning on the unit, clean the water system and ensure that pipes are clean without contaminants. For the cleaning method, see "Connecting Water Pipes"
- Make sure that the working conditions do not exceed the rated working range.

Items to be Checked during the Pilot Run

Check the following items after the unit has worked properly for a period of time:

S/N	Inspection Item	Inspection Method	Reference
1	Voltage	Voltmeter	Rated voltage±10%
2	Operating current of single compressor	Galvanometer	13~25A
3	Operating current of single fan	Galvanometer	2~5A
4	Inlet water temperature in cooling operation	Thermometer	10~25°C
5	Outlet water temperature in cooling operation	Thermometer	5~20°C
6	Inlet water temperature in heating operation	Thermometer	25~50°C
7	Outlet water temperature in heating operation	Thermometer	30~55°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	Baresthesiometer	6.5~10.0bar
10	High-pressure in cooling operation	Baresthesiometer	22~41.5bar
11	Low-pressure in heating operation	Baresthesiometer	1.4~10.0bar
12	High-pressure in heating operation	Baresthesiometer	22~37.0bar
13	Vibration and operating sound	Listening or touching	No abnormal vibration or operating sounds

NOTE: THE REFERENCE STANDARDS ARE USED TO CHECK WHETHER A UNIT WORKS PROPERLY ONSITE. REFERENCE STANDARDS ARE DETERMINED BASED ON THE MAXIMUM AND MINIMUM WORKING CONDITIONS. IF REFERENCE STANDARDS ARE EXCEEDS AFTER THE UNIT HAS PROPERLY WORKED FOR A PERIOD OF TIME, CONTACT THE LOCAL DEALER OR DAIKIN FOR HELP.

Maintenance

Repair

Note: Before checking and maintaining the unit, confirm the safety precautions again.

Note: Before delivery, strict factory test is conducted to ensure the unit works at optimal performance. The unit must be maintained from time to time.

- The unit can only be repaired and serviced by specially-trained technicians. After a unit is serviced, safety controls must be checked and analyzed before the unit is turned on.

Items to be Checked Periodically

- Clean the fins of heat exchanger periodically.
  To optimize heat exchange efficiency of the condenser, check that the external part of the condenser is clean without leaves, cotton fibers, insects or other impurities which might clog up fins of the condenser. Use water or water vapor while cleaning to clean it.
- Check the status of the chilled water from time to time.
  Discharge water by loosening the air or water discharge plug.
  If the water quality degrades, replace water in the system timely. (for the reference standards, see page 16)
  Contaminated water can degrade the cooling capacity and corrode the heat exchanger and water pipes.
- Check whether free air exists in the water pipe system.
  Free air may get into the system even during the air discharging process. Discharge air from time to time.
- Clean the Y-shaped water filter in the water system periodically.
- Replenishing refrigerant and lubricant.
  Each unit is filled with enough refrigerant and lubricant before delivery.
  If the system operates smoothly, customers neither need nor are allowed to replenish or change the refrigerant or lubricant.
  If replenishment is necessary due to leakage, please refill the quantity specified in the nameplate of the unit.

Maintenance

The unit must be checked on a routine basis to ensure performance. Routine check is the best way to reduce downtime and waste. The following needs to be checked on a routine basis:

Items	Monthly	Quarterly	Once half a year	Once a year	If necessary
1. Compressor					
Performance appraisal; whether there is abnormal sound	●				
Whether wires are securely connected	●				
Whether the working current is abnormal (fluctuation: 10%)		▲			
Discharge air temperature of the compressor		▲			
Check the oil level					▲
Check the color of the lubricant					▲
2. Controller					
Check parameter settings			▲		
Check protective device			▲		
Delay protector			▲		
Phase order protector			▲		
High/low pressure switch					▲
Differential water pressure switch/water flow switch					▲
Overload protector			▲		
Protector against extreme temperature of discharged air			▲		
3. Plate heat exchanger					
Check the water quality	●				
Clean the plate heat exchanger					▲
Seasonal protection measures (Anti-freezing)					▲
4. Fin heat exchanger					
Clean the fin heat exchanger		▲			
5. Others					
Whether the Y-shaped filter needs to be cleaned or replaced	●				
Whether bolts have loosened		●			

NOTE: THE PRECEDING MAINTENANCE PLAN IS FOR REFERENCE ONLY. THE MAINTENANCE PLAN MAY VARY BASED ON REGION.

● INDICATES ITEMS TO BE CHECKED BY CUSTOMERS; ▲ INDICATES ITEMS TO BE CHECKED BY SERVICE PERSONNEL.

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):
  $NaNO_2$, borate and inhibitors for organic materials
  a. $NaNO_2$, borate and silicate
  b. High density chromate solution and pH control
  c. pH and sulfite control
  d. Polyphosphate salt and silicate
  e. 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 $NaNO_2$, borax, silicate and benzothiazole should be no less than 1400 ppm. The inhibitor $NaNO_2$ 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	1. Surface activator such as polyphosphate salt 2. Increased acidity 3. pH adjustment 4. Other considerations include: surface temperature, water temperature and system cleaning	1. Discharge 2. Surface activator such as polyphosphate salt 3. Increased acidity 4. pH adjustment 5. Softening (other considerations include: surface temperature, water temperature and system cleaning).	No control is necessary
Corrosion control	1. Low density corrosion inhibitor 2. Anti-$CaCO_2$ plate 3. pH control 4. Proper material	1. High density (200 - 500 ppm) corrosion inhibitor 2. Low density (20 - 30 ppm) corrosion inhibitor 3. pH control 4. Proper material	1. High density corrosion inhibitor 2. Proper material
Mud and alga control	1. Chloridized hydroxybenzene 2. Other chemicals 3. Chlorine formed by hypochlorite and liquid chlorine	1. Chloridized hydroxybenzene 2. Other chemicals 3. Chlorine formed by hypochlorite and liquid chlorine	No control is necessary

Control System Instruction

Electric connection for water chiller unit

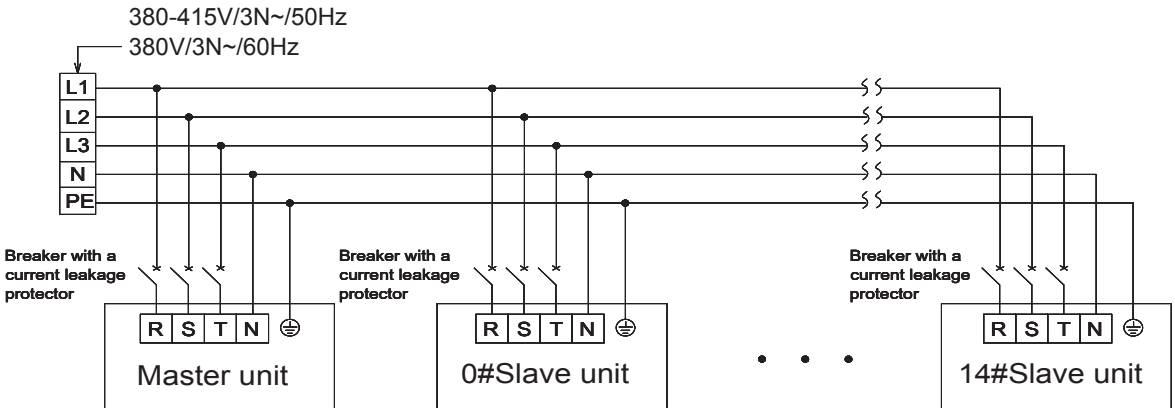
Before connecting the circuit, strictly abide by the following safety rules and measures:

- The units must be installed by Daikin service personnel or personnel who are specially trained. The installation must abide by 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 units damages and personal injuries caused by operations which fail to follow the rules, Daikin air-conditioner company assumes no responsibility.
- Circuit connecting must refer to Electric connection and parameters. Each machine is provided with connection figure which is put inside the switch box.
- The earthing wires of the air conditioning unit must be grounded well. Earthing wires cannot be connected to gas pipes, water pipes, and telephone lines, because poor earthing may result in electric shock.
- Check whether the power supply is of standards before starting.

Model	Cross-sectional area of power cord (mm²)			Max working current (A)	Max input power (kW)
	Main line (R/S/T)	Neutral line	Earth wire		
UAL230E5	10	10	10	50.3	30.1
UAL230ER5	10	10	10	50.3	30.1

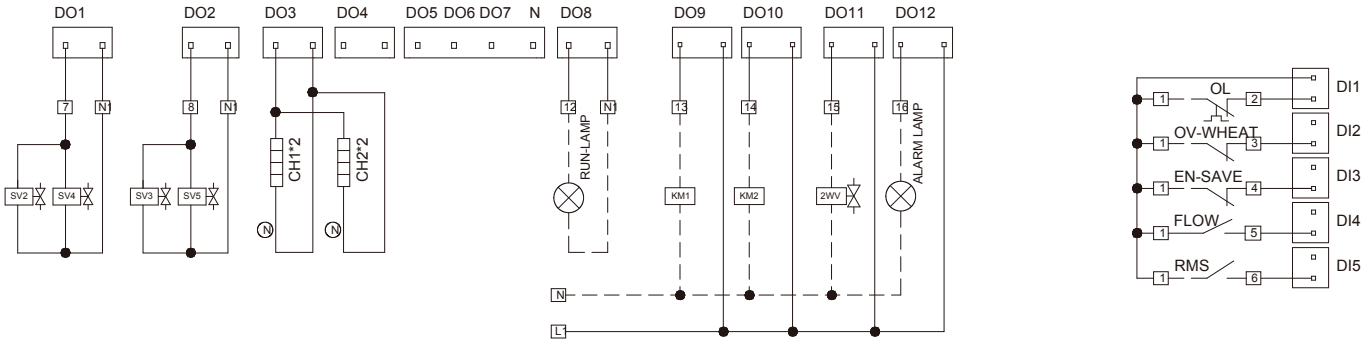
✧ The above data are electric parameters for basic module units.
✧ Connection for all the conductors must be secure.
✧ Keep all the conductors away from refrigerant pipes and movable components like compressor and fan.

Power Cable Connection Diagram



PCB Instruction

■ Connection illustration for parts at job site



NOTE:

PARTS WITHIN THE DASHED BOX ARE TO BE CONNECTED ONSITE, PARTS WITHIN THE REAL-LINE BOX ARE CONNECTED BEFORE DELIVERY.

CONTROL MODULE VOLTAGE OUTPUT 220-240V FOR CONNECTIONS FOLLOWS:

2WV: WATER SYSTEM 2-WAY VALVE

KM1: CONTACTOR OF CHILLED WATER PUMP

KM2: CONTACTOR OF WATER SYSTEM HEATER (FOR HEAT PUMP UNIT ONLY)

RUN-LAMP

ALARM-LAMP

FOLLOWS ARE PASSIVE DRY CONTACTS (FEEDBACK SIGNAL 24V INPUT):

OL: PUMP OVERLAOD PROTECTION

OV-WHEAT: WATER SYSTEM HEATER OVERLOAD PROTECTION (FOR HEAT PUMP UNIT ONLY)

EN-SAVE: 2-WAY VALVE INTERLOCKING OR REMOTE ON/OFF CONTROL SWITCH

FLOW: WATER FLOW SWITCH

RMS: REMOTE MODE SWITCH (FOR HEAT PUMP UNIT ONLY)

NOTE:

1. ABOVE PARTS CAN BE CONFIGURED BY CUSTOMER ACCORDING TO ACTUAL REQUIREMENT OF CUSTOMER.

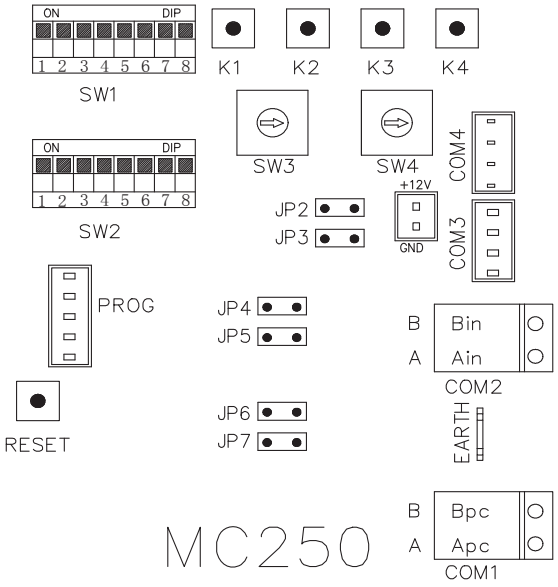
2. PUMP CONTACTOR (KM1) AND PUMP OVERLOAD PROTECTION (OL) ARE STRONGLY RECOMMENDED TO BE INSTALLED FOR UNIT SAFE OPERATING.

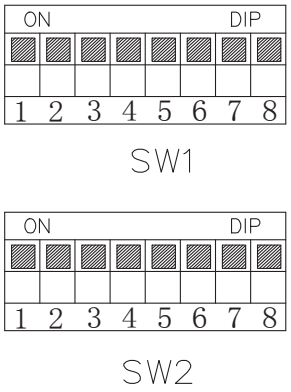
3. WATER FLOW SWITCH (FLOW) CAN BE INSTALLED FOR DOUBLE WATER FLOW PROTECTION, THE UNIT ALREADY HAS WATER FLOW PROTECTION CONTROL BY INTERNAL CONTROL LOGIC.

■ DIP switchs setting

The controller can be used to set the unit's capacity, address 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.

The control panel of the chiller is provided with multidisplay functions, thus making the controller multifunctional.





Digit upward represents 1 (ON)
Digit downward represents 0 (OFF)

- The first digit of SW1 indicates the DIP of master/slave unit, ON: master unit, OFF: slave unit (default setting).
- The second digit of SW1 indicates the DIP of unit function, ON: cooling only, OFF: heat pump.
- The third digit of SW1 is reserved, default set to OFF.
- The fourth digit of SW1 indicates automatic startup after power restoration, set it to ON at master unit when use this function.
- The fifth digit of SW1 indicates terminal 2-way valve interlock or remote ON/OFF control function, set it to ON when use this function.
- The sixth & seventh digit of SW1 indicates refrigerant type, 00: R410A, 01: R22 or other, 10: R32, factory default setting.
- The eighth digit of SW1 indicates unit type, ON: low ambient heating unit, OFF: common unit, UAL230E is set to OFF, factory default setting.
- The first to fourth digit of SW2 are for slave unit quantity setting, they must be set on master unit, the slave units don't have to be set.

Slave unit qty	1	2	3	4	Slave unit qty	1	2	3	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

- The fifth and sixth digit of SW2 are for unit capacity setting, factory default setting.
- The seventh digit of SW2 is for water temperature control method setting, ON: LWT contorl, OFF: EWT control, factory default setting.
- The eighth digit of SW2 is for fan motor type setting, factory default setting.
- Address setting: SW3 & SW4

  1. Set SW3 and SW4 on master unit, it's for master unit address setting, range is 0~99.
  2. Set SW3 and SW4 on slave unit, it's for slave unit address setting, range is 0~14.

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

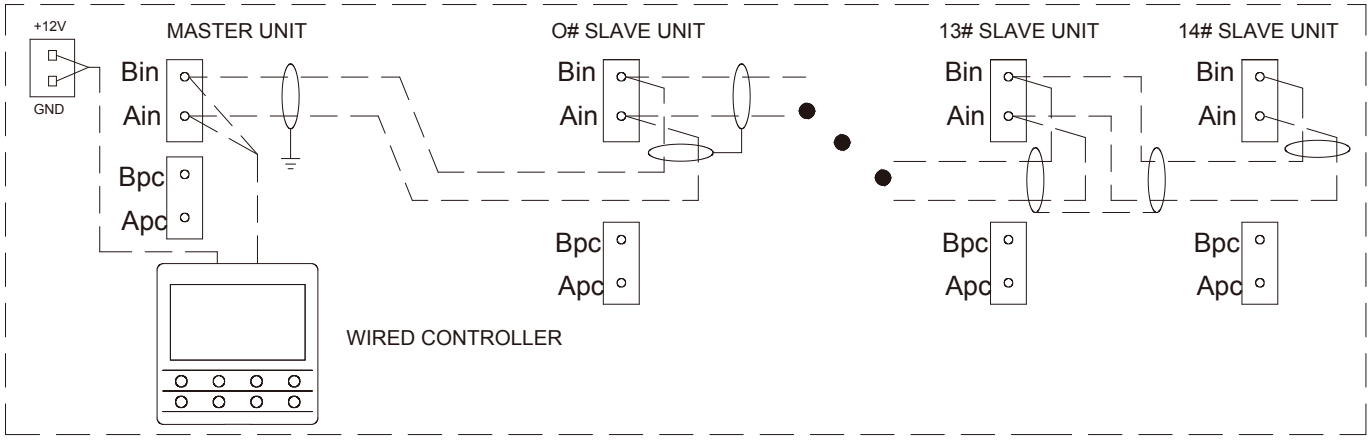
NOTE:

ADDRESS NUMBERS MUST BE UNIQUE IN THE SAME SYSTEM.

THE UNIT CAN ONLY BE POWERED ON AND COMMISSIONED AFTER THE ADDRESS IS SET.

THE INNER SIDE OF THE CONTROL BOX COVER OF THE UNIT IS ATTACHED WITH AN ELECTRICAL WIRING DIAGRAM OF THE UNIT, WHICH PROVIDES DETAILED DESCRIPTION FOR DIP SETTINGS. PLEASE KEEP IT PROPERLY.

■ Communication between master and slave unit



A) conductor (WTC pair with cross section area of at least 0.5mm^2 or 20AWG);
B) insulator; C) Screen layer (twisted WTC with a screening factor no less than 95%);
D) Outer jacket (PVC).

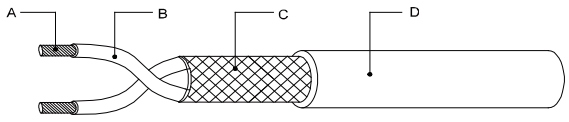


Illustration of shielded twisted pair

NOTE:

BETTER CHOOSE NETWORK CABLES WITH A TENSER SHIELDING LAYER AND SMALLER TWISTING DISTANCE.

PLEASE REFER TO THE UL2547 OR UL2791 WIRE SPECIFICATION.

THE CONTROL WIRE MUST NOT BE LONGER THAN 1000 METERS.

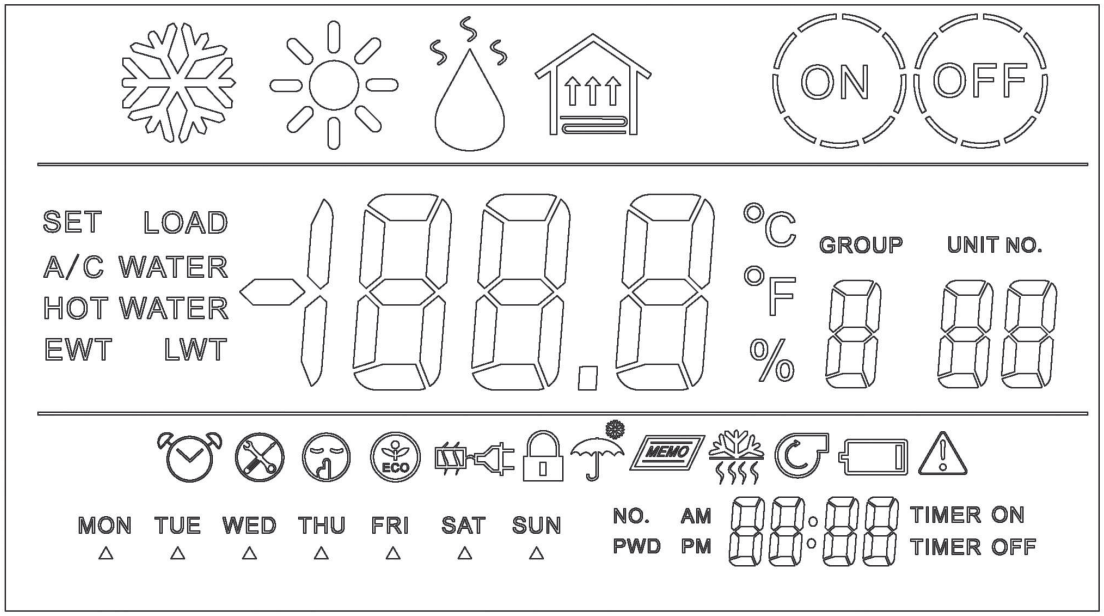
THE CONTROL WIRE MUST BE AT LEAST 20CM AWAY FROM MAJOR CURRENT WIRE.

Wired Controller Instruction

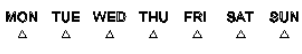
Overview

The MC325 is a wired controller with touch keys. It supports power-on/off control, mode switching, parameter setting, real-time clock, timer setting, status display, and malfunction-indication.

Display Screen of the Wired Controller



Icon and description

Icon	Description	Icon	Description
	Cooling mode		Alarm
	Heating mode		Weekday
	Hot water mode		No.
	Set		Password
	Air conditioning chilled water temperature		a.m.
	Hot water temperature		p.m.
	Timer		Timer ON

Icon	Description	Icon	Description
	Defrost	TIMER OFF	Timer OFF
	Locked	UNIT NO.	Unit No.
	Quiet mode		Auto startup upon power restoration
	Water pump		Low battery
LOAD	Compressor load		Floor heating mode
EWT	Entering water temperature		Anti-freezing
LWT	Leaving Water temperature		Electric heater
GROUP	Group		Load rate
	Maintenance		ON
	Energy-saving mode		OFF

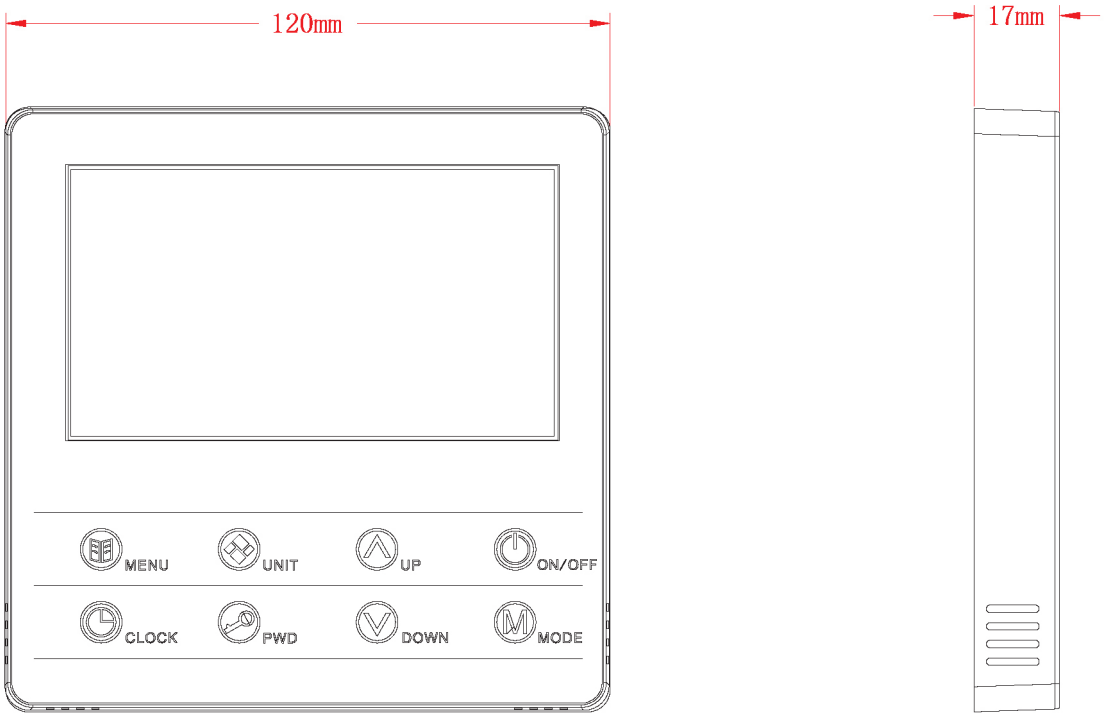
Keys of the Wired Controller

The wired controller has eight keys. The following table lists the key icons and meanings.

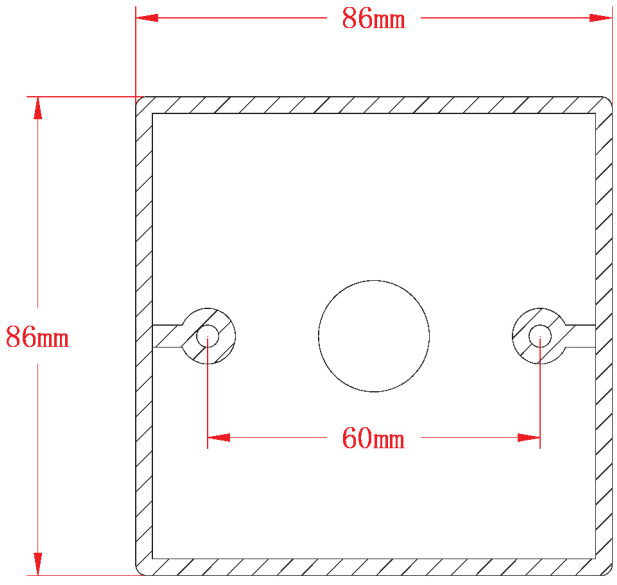
Icon	Description	Icon	Description
	Menu		Unit
	Clock		Password
	Up		ON/OFF
	Down		Mode

Installation of the Wired Controller

Dimensions:



The wired controller is installed using the standard 86 mm box.



For detailed installation steps, see the installation manual inside the package box of the wired controller.

For detailed operation steps, refer to operation manual.

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.

Dealer

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http://www.daikin.com/global_ac/

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