DAIKIN

Catalogue/Engineering Data

ED-UAL-D-202001

Air Cooled Modular Chiller

Heat Pump	UAL-DR5
Cooling only	UAL-D5/D5LC
Heat recovery	UAL-DR5SR

R410A
ECOLOGIC AND HIGH EFFICIENCY

DAIKIN INDUSTRIES, LTD.

Literature No.: ED-UAL-D-202001
Supersedes: ED-UAL-D-201902

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

Chiller/Heat pump

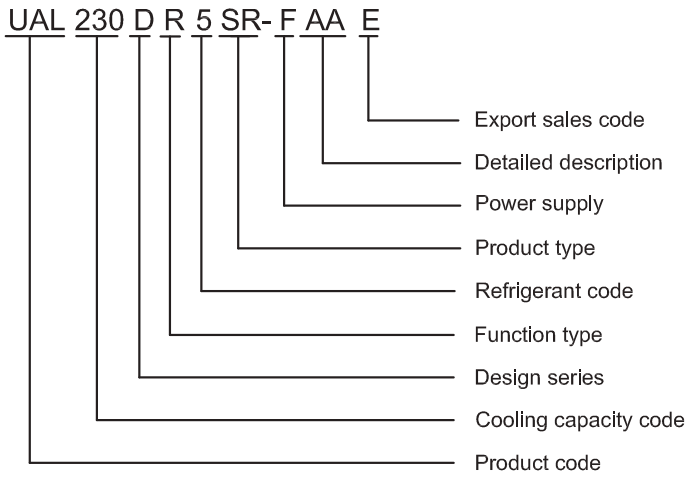
Series		Model	Max Combination Qty	Capacity range
50Hz	Cooling only	UAL230D5/D5LC	16	Cooling Capacity: 66kW-1056kW
		UAL340D5	16	Cooling Capacity: 100kW-1600kW
		UAL450D5	16	Cooling Capacity: 135kW-2160kW
	Heat pump	UAL230DR5	16	Cooling Capacity: 66kW-1056kW Heating Capacity: 67kW-1072kW
		UAL340DR5	16	Cooling Capacity: 100kW-1600kW Heating Capacity: 100kW-1600kW
		UAL450DR5	16	Cooling Capacity: 130kW-2080kW Heating Capacity: 130kW-2080kW
	Heat recovery	UAL230DR5SR	16	Cooling Capacity: 66kW-1056kW Heat Recovery Capacity: 81kW-1296kW
		UAL450DR5SR	16	Cooling Capacity: 130kW-2080kW Heat Recovery Capacity: 158kW-2528kW
60Hz	Cooling only	UAL230D5	16	Cooling capacity:68.5kW-1096kW
		UAL450D5	16	Cooling capacity:138kW-2208kW

Pump kit

Series	Model	Pump head	Recommended Capacity range
UAL-S	022D	20.8~24.7m	65~150kW
	040D	24.0~29.9m	195~300kW

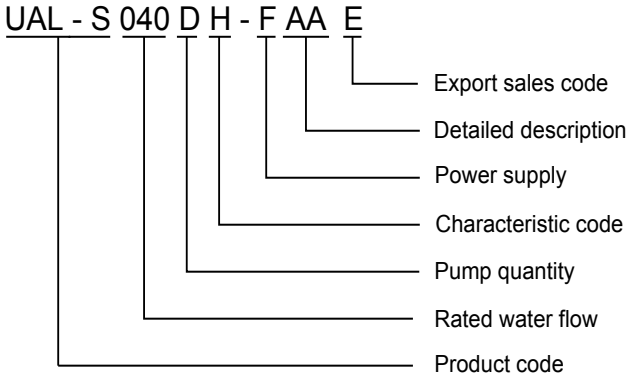
Nomenclature

Chiller/Heat pump



Product code - UAL: Daikin Air cooled scroll/ modular chiller/ heat pump
Cooling Capacity code - 230,340,450
Desin series - A,B,C,D,.....
Function type - R: Heat pump, Omitted: Cooling only
Refrigerant code - 3: R134a, 4: R407C, 5: R410A
Product type - Omitted: Standard, LC： Low ambient cooling, SR: Total heat recovery
Power supply - F: 380-415V/3N~/50Hz P: 208~230V/3Ph/60Hz R:380V/3Ph/60Hz Q:460V/3Ph/60Hz
Detailed description - Design change: AA, AB, AC ..... ZZ
Export sales code - E: Export, Omitted:Domestic

Pump kit



Product code - UAL-S: Pump kit
Rated water flow - 022/040
Pump quantity - S: single-pump system; D: double-pump system
Characteristic code - H: high-lift pump, E: inverter pump, Omitted: standard pump
Power supply - F: 380-415V/3N~/50Hz
Detailed description - Design change: AA, AB, AC …… ZZ
Export sales code - E: Export, Omitted:Domestic

Overview

DAIKIN UAL-D R410A series is a new generation of air-cooled chillers/heat pumps. They ideally combine the advanced and mature chiller technology. In addition, this series features outstanding performance, high capacity, low sound level, easy installation, and flexible system management, taking the lead in the global market.

Features

Refrigerant

DAIKIN is committed to protecting the global ecosystem and has developed air-cooled chiller/heat pump with R410A, a new type of refrigerant. Without chlorine, the R410A causes no harm to the ozonosphere (ODP=0).

Low Sound Level

Thanks to the newly designed spiral blades, the outdoor units feature smooth air flow, significantly reducing the turbulence and lowering the air flow sound level. Unique compressor sound-insulation design and fully hermetic volute compressor minimizes the operation noise.

Easy Installation

UAL-D series is designed to best facilitate user installation. The refrigerant system is made hermetic in the factory. Customers do not need to connect any copper pipe or refill refrigerant or invest more money for complex water systems.

Multi-grade Modulation

UAL-D series features multi-grade modulation which can be transformed to multi-grade modulations in modular combinations. With operation grades controlled electronically, the unit exerts less shock to the power grid and saves more energy.

Flexible module combination

1~16 sets with different capacity can be combined at will to satisfy the load selection requirements of various applications. When combined with different models,every model can be used as the master unit; the modular design of the unit allows the owner not to have to invest in the equipment at one time. The owner can increase the investment at any time with the development. The number of modular and the corresponding equipment greatly save the initial investment.

Compact Size

Moreover, UAL-D series features compact size. Its dimensions and weight are significantly reduced. UAL R410 can be lifted without large lifting tools and located on the roof, balcony or any possible outdoor space.

Reliable Operation

UAL-D series adapts modular design and one by one start, reducing the impact upon the grid when starting. All units have undergone strict and long-term test, ensuring reliable operation even under extreme hot/cold conditions. Units themselves, moreover, have multiple protections. The security of units is maximally guaranteed.

Outstanding Performance

UAL-D series features leading-edge scroll technology and name-brand accessories which are strictly tested for high compatibility and reliability. Equipped with efficient scroll compressors and precise electronic expansion valves, these units feature high EER and COP, especially at partial load.

Intelligent Control System

UAL-D features user-friendly intelligent control system. Micro chip and large-scaled LCD display are employed to make the control easy.

- Group control: One single controller can control a group made up by one master unit and maximum 15 slave units.

Wired controller kit purchasing name is UAL-A1E

- Centralized control:1~8 groups unit of 1 master and 15 slaves can be combined in one control system.

Centralized controller kit purchasing name is UC-HMI325AE

- BMS: UAL-D is standard with Modbus protocol and ports for BMS, can support maximum 100 groups modular units, one group can support one master unit and maximum 15 slave units.

Basic Operating Mode

- Cooling
- Heating

Parameter Setting

- Real time setting
- Weekly timing on/off (two on/off per day)
- Chilled water inlet temperature
- Hot water inlet temperature
- Anti-freezing/defrost temperature setting
- Whole day/night silent mode setting

Parameter Display

- Running status display
- Setted inlet temperature
- Actual inlet temperature
- Timing point
- Anti-freezing/defrost temperature

Fault Alarm And Protection

- Multy protections and fault alarm functions

Defrost Mode

- Auto defrost
- Mannual defrost

Memory Function

- Backup battery for realtime clock
- Memory function after power failure (jobsite setting)

Interlock control

- Air side unit interlock function
- Remote on/off function
- Water pump on/off interlock function
- Water system two-way valve control (variable flow system)
- Auxiliary electric heating
- Unit on/off status signal

Pump Kit

UAL-S pump kit includes water pump, expansion tank, water strainer, stop valve, safety valve, automatic refill valve, thermometer, pressure gauge and other parts which are necessary for air conditioning hydraulic system. It helps user on saving much time and money on hydraulic system design installation and trial run.

The pump kit can run interlocking with chiller and fan coil units, by using thermostat AC2982 to control the fan coil units, it can achieve remote turn on/off the chiller, cooling/heating mode switching which will simplify user operation. Two water pumps are built in and one runs one standby, provides higher reliability for the hydraulic system.

According to the air conditioning system capacity, maximum 4 pump kits can be modular combined to adapt bigger capacity.

Abundant options

	Water filter	LWT control	-5°C LWT	Gold fin	Sealed packing	50Pa ESP
UAL230D(R)5/D5LC	●	○	○	○	○	×
UAL340D(R)5	●	○	○	○	○	○
UAL450D(R)5	●	○	○	○	○	○

● Means standard configuration ○ means optional × means not applicable

Note:

1. Water filter of UAL230D(R)5/D5LC is brass type and stainless steel type for UAL340/450D(R)5.
2. Compressor quantity in water system must be no less than 8 when adopt LWT control.

Please contact with factory if above option is needed.

Specifications

General Data

50Hz chiller/Heat pump general data

MODEL			C/O	H/P	C/O	H/P	C/O	H/P
			UAL230D5/D5LC	UAL230DR5	UAL340D5	UAL340DR5	UAL450D5	UAL450DR5
COOLING MODE	NOMINAL COOLING CAPACITY	Ton	18.8	18.8	28.3	28.3	38.4	36.8
		kW	66	66	100	100	135	130
	RATED POWER INPUT	kW	20.3	20.6	30.5	29.6	40.3	39
	RATED RUNNING CURRENT	A	38.1	38.5	54.4	54.4	76.1	73.6
	EER	Btu/h/W	11.1	-	11.2	-	11.4	-
	COP	W/W	3.25	3.20	3.28	3.38	3.35	3.33
HEATING MODE	NOMINAL HEATING CAPACITY	kW	-	67	-	100	-	130
	RATED POWER INPUT	kW	-	20.6	-	29.9	-	40
	RATED RUNNING CURRENT	A	-	37.8	-	55.8	-	73.2
WATER FLOW	COOLING	m^3/h	11.3	11.3	17.2	17.2	23.2	22.4
	HEATING	m^3/h	-	11.5	-	17.2	-	22.4
WPD		kPa	55	55	28	28	48	48
POWER SUPPLY		V/Ph/Hz	380-415V/3N~/50Hz					
REFRIGERANT	TYPE	-	R410a					
	CHARGE	kg/lb	17.0/37.5	17.5/38.6	26.3/58.0	28.2/62.2	30.6/67.5	32.4/71.4
UNIT DIMENSION	L×W×H	mm/in.	1990×840×1840/78×33×72		2100×1100×2300/83×43×90			
PACKING DIMENSION	L×W×H	mm/in.	2010×890×2010/79×35×79		2175×1150×2430/86×45×96			
NET WEIGHT		kg/lb	471/1038	515/1135	860/1896	870/1918	940/2072	990/2183
GROSS WEIGHT		kg/lb	511/1127	555/1224	880/1940	890/1962	960/2116	1010/2227
OPERATING WEIGHT		kg/lb	480/1058	525/1157	870/1918	880/1940	950/2094	1000/2205
STANDARD ACCESSORY IN CONTROLLER KIT			IOMM/WIRED CONTROLLER/40M COMUNICATION CABLE BETWEEN MASTER UNIT AND WIRED CONTROLLER					

NOTES:

1. *THE SPECIFICATIONS GIVEN IN THE TABLE WILL BE SUBJECT TO CHANGE BY MANUFACTURER WITHOUT PRIOR NOTICE.*
2. *NOMINAL COOLING CAPACITY CONDITION: LWT 7°C, WATER FLOW 0.172 [M^3/(H•KW)], OUTDOOR TEMPERATURE 35°C.*
3. *NOMINAL HEATING CAPACITY CONDITION: LWT 45°C, WATER FLOW 0.172 [M^3/(H•KW)], OUTDOOR DRY-BULB TEMPERATURE 7°C, WET-BULB TEMPERATURE 6°C.*
4. *ABOVE PARAMETERS ARE TESTED UNDER POWER SUPPLY: 380V/3N~/50HZ.*
5. *WPD IN THE TABLE CONTAINS WATER PRESSURE DROP OF THE UNIT AND THE SUPPLIED WATER FILTER.*
6. *COMINICATION CABLE ATTACHED TO THE SLAVE UNIT IS 5M.*

MODEL			HR	
			UAL230DR5SR	UAL450DR5SR
COOLING MODE	NOMINAL COOLING CAPACITY	kW	66	130
	RATED POWER INPUT	kW	20	40.7
	RATED RUNNING CURRENT	A	36.5	75.6
	EER	Btu/h/W	11.3	10.9
	COP	W/W	3.30	3.19
HEATING MODE	NOMINAL HEATING CAPACITY	kW	68.5	135
	RATED POWER INPUT	kW	20.1	42.2
	RATED RUNNING CURRENT	A	36.8	76.3
HOT WATER MODE	NOMINAL HEATING CAPACITY	kW	82	160
	RATED POWER INPUT	kW	20.4	40.5
	RATED RUNNING CURRENT	A	37	74.4
HEAT RECOVERY MODE	NOMINAL COOLING CAPACITY	kW	63	120
	NOMINAL HEAT RECOVERY CAPACITY	kW	81	158
	RATED POWER INPUT	kW	18.8	37.1
	RATED RUNNING CURRENT	A	34.9	68.1
WATER FLOW	A/C WATER SIDE	m^3/h	11.4	22.4
	HOT WATER SIDE	m^3/h	14.1	27.5
WPD	A/C WATER SIDE	kPa	52	40
	HOT WATER SIDE	kPa	62	68
POWER SUPPLY		V/Ph/Hz	380-415V/3N~/50Hz	
REFRIGERANT	TYPE	-	R410a	
	CHARGE	kg/lb	18.3/40.3	30/66.1
UNIT DIMENSION	L×W×H	mm/in.	1990×840×1840/78×33×72	2100×1100×2300/83×43×90
PACKING DIMENSION	L×W×H	mm/in.	2010×890×2010/79×35×79	2175×1150×2430/86×45×96
NET WEIGHT		kg/lb	550/1213	1000/2205
GROSS WEIGHT		kg/lb	590/1301	1020/2249
OPERATING WEIGHT		kg/lb	565/1246	1025/2260

NOTES:

1. *THE SPECIFICATIONS GIVEN IN THE TABLE WILL BE SUBJECT TO CHANGE BY MANUFACTURER WITHOUT PRIOR NOTICE.*
2. *NOMINAL COOLING CAPACITY CONDITION: LWT 7°C, WATER FLOW 0.172 [M^3/(H•KW)], OUTDOOR TEMPERATURE 35°C.*
3. *NOMINAL HEATING CAPACITY CONDITION: LWT 45°C, WATER FLOW 0.172 [M^3/(H•KW)], OUTDOOR DRY-BULB TEMPERATURE 7°C,WET-BULB TEMPERATURE 6°C.*
4. *NOMINAL HOT WATER CAPACITY CONDITION: OUTDOOR TEMERATURE 20/15°C, HOT WATER LWT 45°C, WATER FLOW 0.172 [M^3/(H•KW)].*
5. *NOMINAL HEAT RECOVERY CAPACITY CONDITION: CHILLED WATER LWT 7°C, WATER FLOW 0.172 [M^3/(H•KW)], HOT WATER LWT 45°C, WATER FLOW 0.172 [M^3/(H•KW)].*
6. *ABOVE PARAMETERS ARE TESTED UNDER POWER SUPPLY: 380V/3N~/50HZ.*
7. *CHILLED WATER SIDE WPD IS MEASURED AT RATED WATER FLOW WITH WATER FILTER, HOT WATER SIDE WPD IS MEASURED AT RATED WATER WITHOUT WATER FILTER.*
8. *FOR MORE INFORMATION ABOUT HEAT RECOVERY UNITS, PLEASE CONTACT WITH FACTORY.*

60Hz chiller general data

Model			C/O	C/O
			UAL230D5-P/Q/R	UAL450D5-P/Q/R
MINAL COOLING CAPACITY		kW	68.5	138
RATED POWER INPUT		kW	20.6	41.8
RATED RUNNING CURRENT	208V~230V/3Ph/60Hz	A	64.8	133.5
	460V/3Ph/60Hz	A	34.2	70.5
	380V/3Ph/60Hz	A	38.5	76.8
COP		W/W	3.33	3.30
WATER FLOW		m^3/h	11.78	23.74
WPD		kPa	57	46
POWER SUPPLY		V/Ph/Hz	208~230V/380V/460V/3Ph/60Hz	
REFRIGERANT	TYPE	-	R410A	
	CHARGE	kg/lb	15.5/34.2	27.2/59.9
UNIT DIMENSION	L*W*H	mm/in.	1990*840*1840/78x33x72	2100*1100*2300/83x43x90
PACKING DIMENSION	L*W*H	mm/in.	2010*890*2010/79x35x79	2175×1150×2430/86x45x96
NET WEIGHT		kg/lb	464/1023	918/2024
GROSS WEIGHT		kg/lb	504/1111	938/2068
OPERATING WEIGHT		kg/lb	474/1045	928/2046
SRANDARD ACCESSORY IN CONTROLLER KIT			IOMM/WIRED CONTROLLER/40M COMUNICATION CABLE BETWEEN MASTER UNIT AND WIRED CONTROLLER	

NOTES:

1. *ALL SPECIFICATIONS ARE SUBKECT TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.*
2. *NOMINAL COOLING CAPACITY TEST CONDITION:LWT 7ºC, WATER FLOW 0.172M3/(H.KW),AMBIENT TEMPERATURE 35ºC.*
3. *ABOVE PARAMETERS ARE TESTED UNDER POWER SUPPLY: 220V/3PH/60HZ, 380V/3PH/60HZ, 460V/3PH/60HZ.*
4. *WPD IN THE TABLE CONTAINS THE PRESSURE DROP OF THE UNIT AND THE SUPPLIED Y-TYPE STRAINER.*
5. *COMINICATION CABLE ATTACHED TO THE SLAVE UNIT IS 5M.*

Pump kit general data

MODEL		UAL-S022D	UAL-S040D
COOLING CAPACITY RANGE	kW	65~150	195~300
NOMINAL WATER FLOW OF SINGLE PUMP	m^3/h	22.4	44.7
STANDARD EXTERNAL LIFT OF SINGLE PUMP	m	22	27
WATER FLOW RANGE	m^3/h	11.5~25.8	33.5~51.6
POWER SUPPLY	V/Ph/Hz	380-415V/3N~/50Hz	
VALID EXTERNAL LIFT RANGE	m	20.8~24.7	24.0~29.9
RATED POWER OF SINGLE PUMP	kW	3.0	5.5
RATED CURRENT OF SINGLE PUMP	A	6.0	10.6
MAX OPERATING CURRENT OF SINGLE PUMP	A	7.2	12.7
AUXILIARY HEATER POWER	kW	0.32	0.42
DIAMETER OF WATER PIPE	inch	2-1/2	3
WATER PIPE CONNECTION TYPE	-	Flange	
QUANTITY OF WATER PUMP	-	2	
VOLUME OF EXPANSION TANK	L	18	
MAX WATER SIDE PRESSURE	MPa	1.0	
UNIT DIMENSION (L×W×H)	mm/in.	1304×675×1126/51×27×44	
PACKING DIMENSION (L×W×H)	mm/in.	1410×735×1276/56×29×50	
NET WEIGHT	kg/lb	336/741	385/849
GROSS WEIGHT	kg/lb	352/776	401/884
OPERATING WEIGHT	kg/lb	341/752	390/860

NOTES:

1. *THE LIFT IN THE TABLE INDICATES THE EXTERNAL LIFT OF THE PUMP KIT, EXCLUDING WATER PRESSURE DROP OF THE CHILLER.*

Components Data

50Hz series

MODEL			UAL230D5/D5LC	UAL230DR5	UAL340D5	UAL340DR5	UAL450D5	UAL450DR5
EVAPORATOR	TYPE		BRAZED PLATE HEAT EXCHANGER					
	PLATE MATERIAL		STAINLESS STEEL					
	NOMINAL COOLING WATER FLOW	m^3/h	11.3	11.3	17.2	17.2	23.2	22.4
	NOMINAL HEATING WATER FLOW	m^3/h	-	11.5	-	17.2	-	22.4
	WATER VOLUME	L	5		9.6		11.4	
	PIPING CONNECTION SIZE	inch	Rc 2		Rc 2-1/2			
CONDENSER	TUBE MATERIAL		COPPER					
	TUBE TYPE		INNER GROOVE					
	TUBE OUTER DIAMETER	mm	7.94					
	FIN MATERIAL		ALUMINIUM					
	FIN TYPE		WHITE FIN	HYDROPHILIC FIN				
	FIN PER INCH		14					
	ROWS		3					
	FACE AREA	m^2/ft^2	3.49/37.6		7.13/76.7			
CONDENSER FAN	TYPE		FIX SPEED / **DC INVERTER	FIX SPEED				
	QUANTITY		2					
	BLADE MATERIAL		PLASTIC		ALUMINIUM			
	AIR VOLUME	m^3	12525x2 / **12000x2	12525x2	19500+19000		19500x2	
COMPRESSOR	TYPE		HERMETIC SCROLL COMPRESSOR					
	QUANTITY		2		3		4	
FLOW CONTROL	TYPE		EXV					
NUMBER OF CIRCUITS			1		2			
OIL	MODEL		RL-32H					
	CHARGE	L	1.9				3.8	
CASING	COLOUR		RAL 7032 PEBBLE GREY					
	MATERIAL		EG					
PROTECTION DEVICES			HIGH PRESSURE SWITH/ THERMAL AND CURRENT OVERLOAD PROTECTOR					

NOTE:

1. *THE SPECIFICATIONS GIVEN IN THE TABLE WILL BE SUBJECT TO THE MODIFICATIONS ON PRODUCT DESIGN BY THE MANUFACTURER.*
2. *DATA WITH " ** " ARE FOR UAL230D5LC.*

60Hz series

MODEL			UAL230D5	UAL450D5
EVAPORATOR	TYPE		BRAZED PLATE HEAT EXCHANGER	
	PLATE MATERIAL		STAINLESS STEEL	
	NOMINAL WATER FLOW	m^3/h	11.78	23.74
	WATER VOLUME	L	5	11.4
	PIPING CONNECTION SIZE	Inch	Rc 2	Rc2-1/2
CONDENSRER	TUBE MATERIAL		COPPER	
	TUBE TYPE		INNER GROOVE	
	TUBE OUTER DIAMETER		7.94	7.94
	ROWS		3	3
	FIN MATERIAL		ALUMINUM	
	FIN TYPE		HYDROPHILIC FIN	
	FIN PER INCH		14	14
	FACE AREA	m^2	0.92*2+0.82*2	1.62*4
CONDENSRER FAN	TYPE		FIXED SPEED	
	QUANTITY		2	2
	BLADE MATERIAL		ALUMINUM	
	AIR VOLUME	m^3/h	12500*2	22000*2
COMPRESSOR	TYPE		SCROLL COMPRESSOR	
	QUANTITY		2	4
FLOW CONTROL TYPE			EXV	
NUMBER OF CIRCUITS			1	2
OIL	MODEL		RL-32H	
	CHARGE	L	1.9	1.9*2
CASING	COLOR		RAL7032 PEBBLE GREY	
	MATERIAL		EG	
PROTECTIVE DEVICE			HIGH PRESSURE SWITCH/THERMAL AND CURRENT OVERLOAD PROTECTOR	

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

Electrical Data

50Hz series

MODEL			UAL230D5/D5LC	UAL230DR5	UAL340D5	UAL340DR5	UAL450D5	UAL450DR5
FAN MOTOR	RATED RUNNING CURRENT	A	2.5×2/2.5 / **NA	2.5×2/2.5	3.96×2/2.64×2			
	INPUT POWER (H/L)	kW	2.20/1.10 / **0.8×2	2.20/1.10	1.4+1.25/1.16+1.0		1.40x2/1.16x2	
	POLES	-	6 / **8	6				
	RATED SPEED	RPM	780 / **850	780	920/750			
COMPRESSOR	RATED RUNNING CURRENT	A	19.7		18.7			
	LOCKED ROTOR AMP (LRA)	A	135		124			
IP/ INSULATION GRADE		-	IPX4 / F					
UNIT MAX RUNNING CURRENT		A	47.2	47.7	76.2		103.1	99.8

60Hz series

MODEL			UAL230D5-P	UAL230D5-R	UAL230D5-Q	UAL450D5-P	UAL450D5-R	UAL450D5-Q
POWER SUPPLY			208-220V/3PH/ 60HZ	380V/3PH/ 60HZ	460V/3PH/ 60HZ	208-230V/3PH/ 60HZ	380V/3PH/ 60HZ	460V/3PH/ 60HZ
MOTOR	RATED RUNNIG CURRENT	A	3.45*2	2.14*2	1.76*2	6.4*2	3.6*2	3.5*2
	INPUT POWER	kW	0.9*2			2.1*2		2.25*2
	POLES	-	4					
	LOCKED TOTOR AMP(LRA)	A	5.6	2.5		7.8	4.6	
	RATED SPEED	RPM	780			880		
COMPRESSOR	RATED RUNNING CURRENT	A	31	19	16	31	19	16
	LOCKED TOTOR AMP(LRA)	A	43	26	23	43	26	23
IP/INSULATION GRADE		-	IPX4/F					
UNIT MAX. RUNNING CURRENT		A	84.3	50.2	41.2	185.2	98.9	81.2

NOTES:

1) *ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.*
2) *UNIT MAX RUNNING CURRENT IS TESTED UNDER BELOW CONDITION: COOLING OUTDOOR DRY-BULB TEMPERATURE 43°C; HEATING DRY-BULB TEMPERATURE 21°C, WET-BULB TEMPERATURE 15.5°C. 90% OF RATED VOLTAGE.*
3) *FAN RATED RUNING CURRENT AND INPUT POWER ARE TESTED UNDER BELOW CONDITIONS: UAL230D5/DR5 RUNS DOUBLE FANS AND SINGLE FAN, UAL340/450D(R)5 RUNS AT HIGH FAN SPEED AND LOW FAN SPEED.*
4) *DATA WITH " ** " ARE FOR UAL230D5LC.*

Safety Devices

MODEL				50Hz series						60Hz series	
				UAL230D5/D5LC	UAL230DR5	UAL340D5	UAL340DR5	UAL450D5	UAL450DR5	UAL230D5	UAL450D5
SAFETY DEVICE	HIGH PRESSURE SWITCH	TYPE	-	PSW.H20PS							
		OPEN	MPa	4.15±0.15							
		CLOSE	MPa	3.11±0.15							
	LOW PRESSURE SWITCH	TYPE	-	N/A							
		OPEN	MPa	N/A							
		CLOSE	MPa	N/A							
	PHASE SEQUENCER			DB3A01A						DPA51CM44	
	DISCHARGE TEMPERATURE SETTING		°C/°F	130/266						125/257	

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

Glycol concentration and correction factors

Minimum glycol concentration for low ambient cooling

MINIMUM AMBIENT TEMPERATURE(°C)	-1	-5	-10	-15
MINIMUM GLYCOL %	9	18	26	33

Minimum glycol concentration for low LWT

LWT (°C)	4	2	0	-2	-4	-5
MINIMUM GLYCOL %	10	10	15	18	20	22

Correction factor for low LWT corresponding to 7C LWT

LWT (°C)	4	2	0	-2	-4	-5
COOLING CAPACITY	0.903	0.842	0.785	0.725	0.670	0.642
COOLING POWER INPUT	0.970	0.950	0.940	0.920	0.890	0.880

Correction factors with glycol use

GLYCOL %	0	10	20	30	40	50
COOLING CAPACITY	1	0.991	0.982	0.972	0.961	0.946
COOLING POWER INPUT	1	0.996	0.992	0.986	0.976	0.966
HEATING CAPACITY	1	0.996	0.991	0.985	0.980	0.974
HEATING POWER INPUT	1	1.005	1.010	1.016	1.023	1.030

TIPS FOR LOW LWT PERFORMANCE CALCULATION:

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

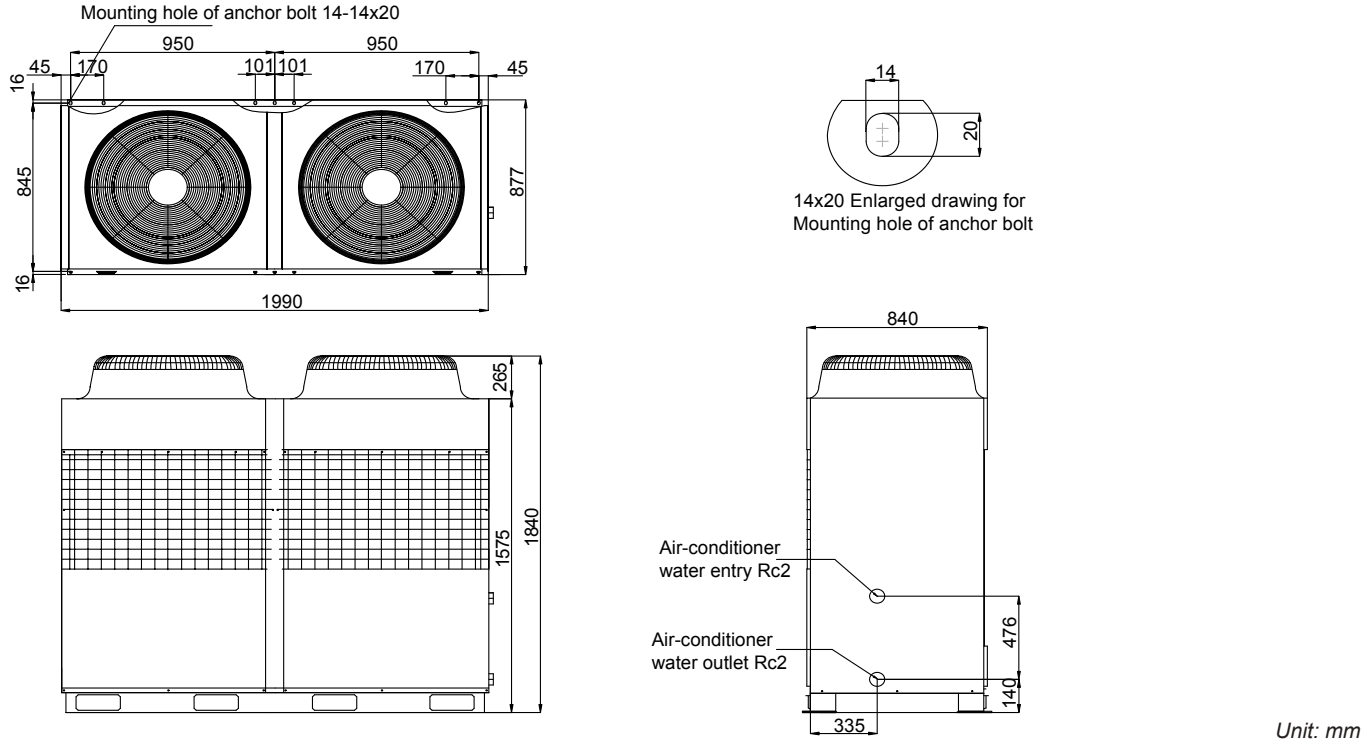
STEP 2: CALCULATE LOW LWT COOLING CAPACITY/ POWER BY MULTIPLY CORRECTION FACTOR WITH COOLING CAPACITY/ POWER OF 7C LWT.

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

NOTE: PLEASE CONSULT FACTORY FOR LOW AMBIENT COOLING OR LOW LWT REQUIREMENT.

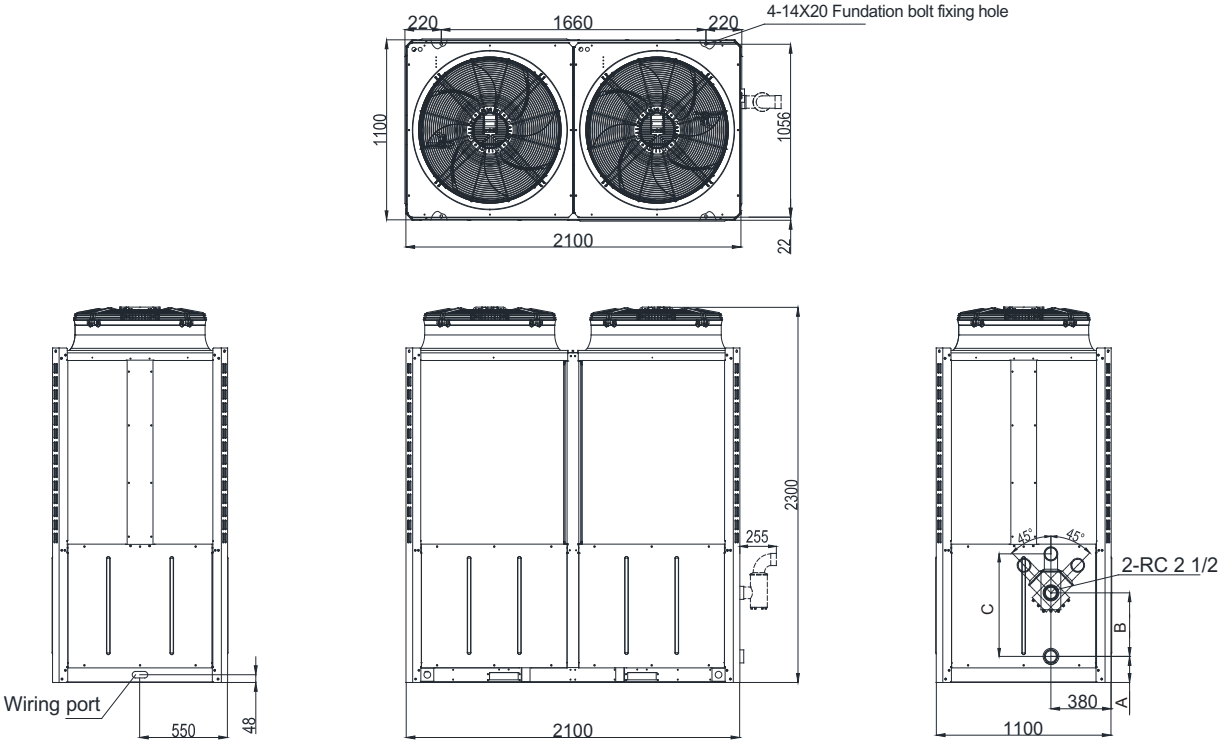
Dimensions

UAL230D5/D5LC/DR5



Unit: mm

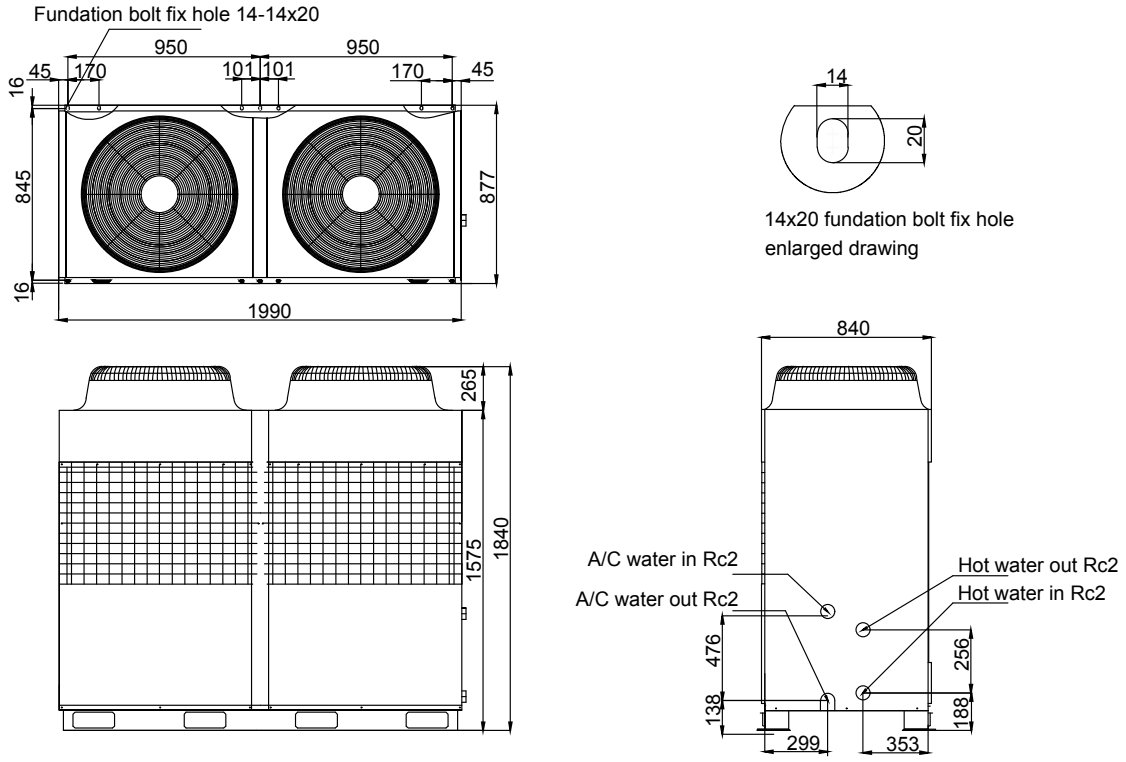
UAL340/450D(R)5



Unit: mm

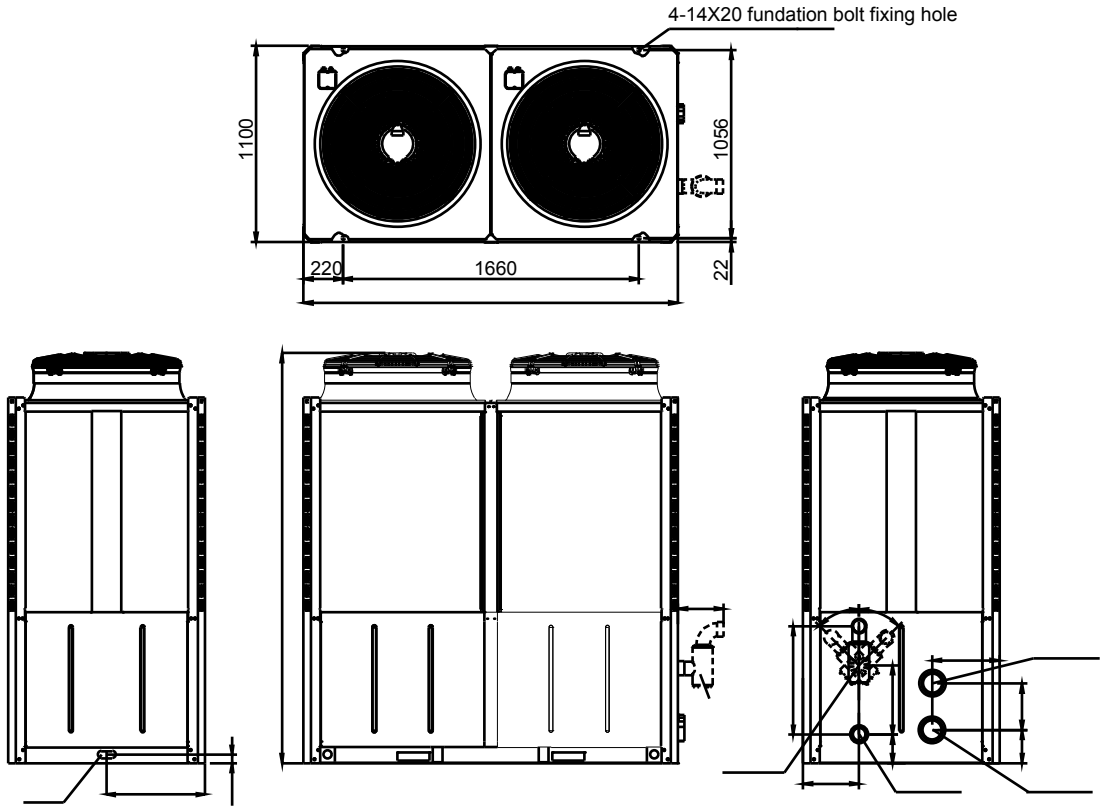
Model	A(mm)	B(mm)	C(mm)
UAL340D5/340DR5	164	369	587
UAL450D5/450DR5	160	390	608

UAL230DR5SR



Unit: mm

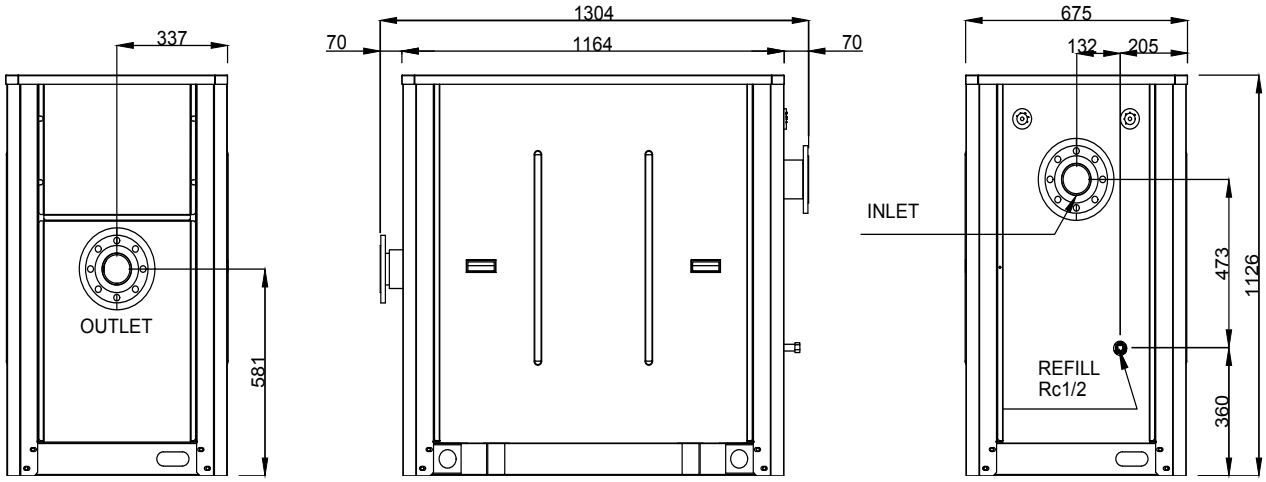
UAL450DR5SR



Unit: mm

Note: water filter is standard comes along with unit and should be installed on jobsite.

Pump kit

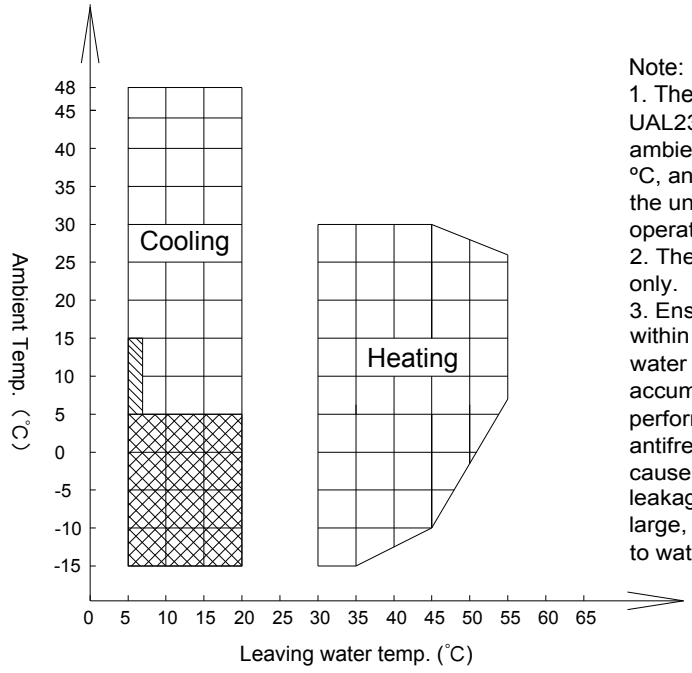


Performance Data

Operating Range

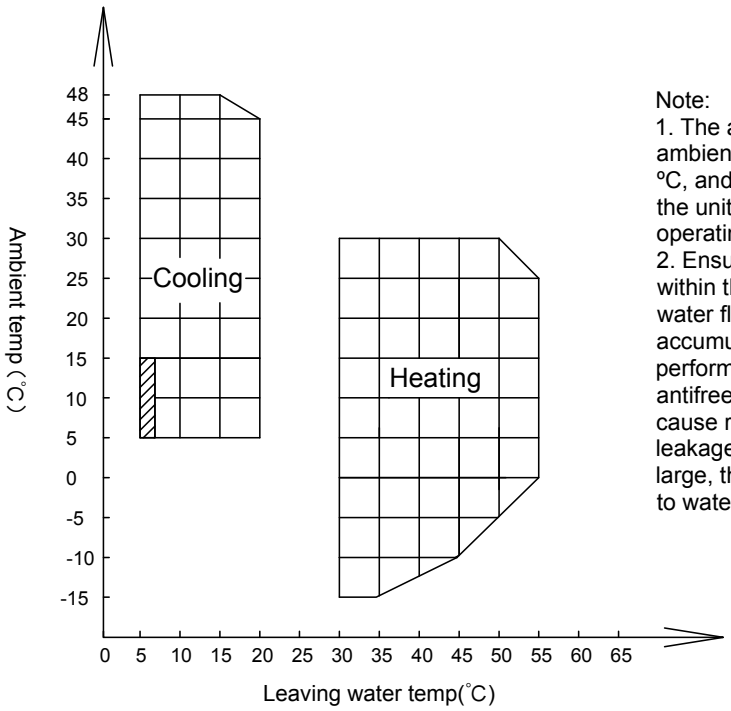
50Hz series

UAL230D5/D5LC/DR5



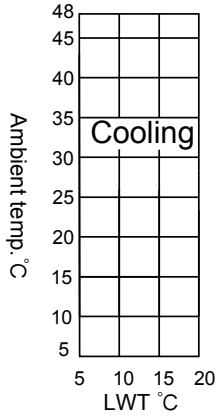
Note:
1. The area ▧ is for UAL230D5/DR5 in which the ambient temperature is less than 15 ºC, and LWT is less than 7 ºC, and the unit will be under deloading operating status.
2. The area ▩ is for UAL230D5LC only.
3. Ensure that the water flow is within the specified range. If the water flow is too small, 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.

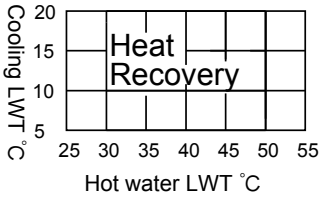
UAL340/450D(R)5

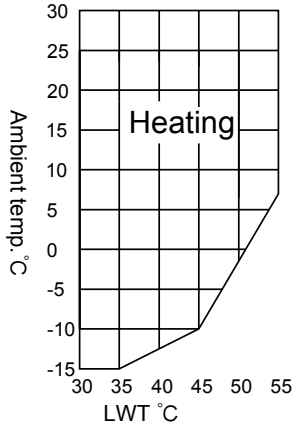


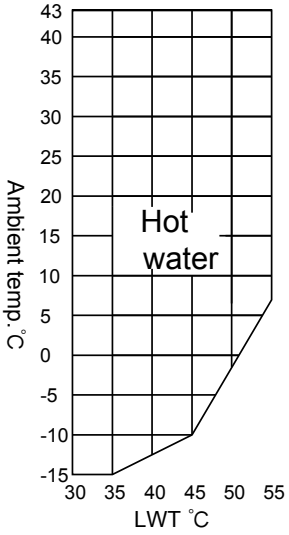
Note:
1. The area in shade which the ambient temperature is less than 15 ºC, and LWT is less than 7 ºC, and the unit will be under deloading operating status.
2. Ensure that the water flow is within the specified range. If the water flow is too small, scale may accumulate and degrade the performance 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.

UAL230DR5SR

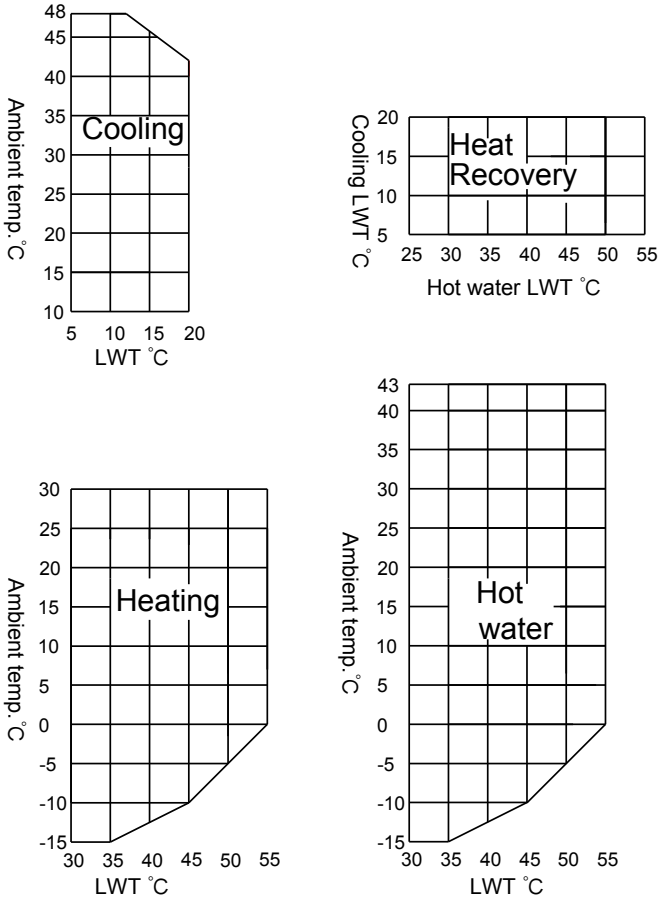






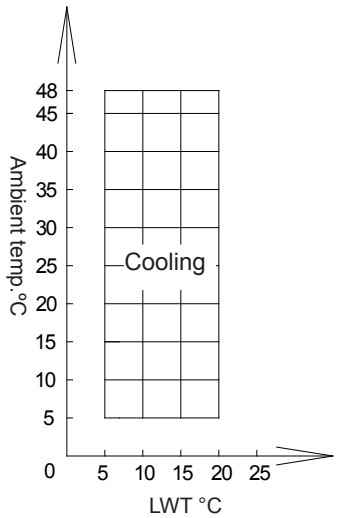


UAL450DR5SR



60Hz series

UAL230D5/450D5



Cooling Capacity Performance Table (50Hz)

Model	Leaving Water Temp. (°C)	Ambient Temp. (°C)																	
		5		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
UAL230D5/ D5LC	5	79.2**	16.6**	73.4	15.2	69.4	16.2	65.7	17.1	63.0	18.6	60.4	19.9	55.5	21.9	27.8	12.5	26.2	13.1
	7	88.8	15.0	77.8	15.7	74.3	16.6	70.7	17.5	68.4	19.0	66.0	20.3	60.2	22.2	30.0	12.7	28.0	13.3
	9	92.4	15.4	82.5	16.1	78.9	17.0	75.5	18.0	72.8	19.4	70.1	20.8	64.4	22.8	32.2	12.9	30.3	13.5
	12	98.0	16.3	89.2	16.8	85.8	17.7	82.4	18.7	79.4	20.1	76.4	21.5	70.6	23.5	35.6	13.2	33.8	13.9
	15	102.8	16.8	95.6	17.4	92.3	18.4	89.1	19.3	86.1	20.8	82.9	22.2	77.1	24.1	39.2	13.6	37.3	14.3
	20	109.7	17.6	103.5	18.0	101.0	19.0	98.3	20.0	95.7	21.5	93.2	23.2	86.7	24.8	44.1	13.9	41.9	14.5
UAL230DR5	5	-	-	74.5	14.8	70.5	15.8	66.7	16.7	64.0	18.1	61.3	19.4	56.3	21.4	28.2	12.2	26.6	12.8
	7	90.1	14.6	79.0	15.3	75.4	16.2	71.8	17.1	69.4	18.5	66.0	20.6	61.1	21.7	30.4	12.4	28.4	13.0
	9	93.8	15.0	83.7	15.7	80.1	16.6	76.6	17.6	73.9	18.9	71.2	20.3	65.4	22.2	32.7	12.6	30.8	13.2
	12	99.5	15.9	90.6	16.4	87.1	17.3	83.6	18.2	80.6	19.6	77.6	21.0	71.7	22.9	36.2	12.9	34.3	13.5
	15	104.3	16.3	97.0	17.0	93.7	17.9	90.5	18.8	87.4	20.3	84.2	21.7	78.3	23.5	39.8	13.3	37.8	13.9
	20	111.3	17.1	105.1	17.6	102.5	18.5	99.8	19.5	97.2	21.0	94.6	22.6	88.0	24.2	44.8	13.6	42.6	14.2
UAL340D5	5	-	-	113.6	22.8	109.6	24.5	105.5	26.3	99.4	28.4	94.1	29.9	86.2	33.7	56.0	25.5	52.5	27.0
	7	126.4	22.1	121.5	23.7	116.7	25.2	111.8	26.8	106.5	29.1	100.0	30.5	93.6	34.1	61.3	25.8	57.9	27.2
	9	132.7	23.0	127.1	24.6	122.9	26.1	118.7	27.6	113.4	29.6	107.5	31.9	100.8	34.5	66.5	26.0	63.1	27.4
	12	141.5	24.3	136.2	25.9	132.5	27.2	128.7	28.4	123.2	30.4	116.5	32.7	111.0	35.1	73.9	26.4	70.6	27.7
	15	150.0	25.7	145.0	27.0	141.2	28.3	137.3	29.6	132.5	31.3	126.9	33.4	120.6	35.8	80.7	26.5	78.0	28.0
	20	163.4	27.8	158.1	29.0	154.2	29.7	150.2	30.5	146.5	32.7	142.0	35.2	135.2	36.8	91.5	27.3	-	-
UAL340DR5	5	-	-	113.6	22.1	109.6	23.8	105.5	25.5	99.4	27.6	94.1	29	86.2	32.7	56.0	24.8	52.5	26.2
	7	126.4	21.4	121.5	23	116.7	24.5	111.8	26	106.5	28.2	100	29.6	93.6	33.1	61.3	25.1	57.9	26.4
	9	132.7	22.3	127.1	23.9	122.9	25.4	118.7	26.8	113.4	28.7	107.5	31	100.8	33.5	66.5	25.3	63.1	26.6
	12	141.5	23.6	136.2	25.1	132.5	26.4	128.7	27.6	123.2	29.5	116.5	31.7	111	34.1	73.9	25.6	70.6	26.9
	15	150	24.9	145	26.2	141.2	27.5	137.3	28.7	132.5	30.4	126.9	32.4	120.6	34.7	80.7	25.8	78.0	27.1
	20	163.4	27	158.1	28.1	154.2	28.9	150.2	29.6	146.5	31.7	142	34.2	135.2	35.7	91.5	26.5	-	-
UAL450D5	5	-	-	151.9	30.4	146.9	32.3	141.9	34.1	135.0	36.6	126.9	39.6	117.7	43.1	59.0	24.7	55.2	26.0
	7	168.1	29.4	161.9	31.2	156.4	33.0	150.8	34.8	143.5	37.3	135.0	40.3	125.2	43.7	62.9	25.0	59.0	26.4
	9	179.3	30.4	172.1	32.0	166.1	33.8	160.1	35.6	152.3	38.1	143.3	41.0	133.1	44.4	67.0	25.4	62.9	26.7
	12	196.6	31.8	188.0	33.5	181.3	35.2	174.6	36.9	166.1	39.4	156.4	42.3	145.5	45.6	73.4	25.9	69.1	27.3
	15	214.5	33.4	204.4	34.9	197.0	36.6	189.6	38.3	180.4	40.7	170.0	43.6	158.5	46.9	80.1	26.6	75.3	27.9
	20	245.6	36.3	233.2	37.7	224.7	39.3	216.1	40.9	205.8	43.3	194.2	46.1	181.4	49.3	92.1	27.8	-	-
UAL450DR5	5	-	-	146.3	29.4	141.5	31.2	136.6	33.0	130.0	35.4	122.2	38.3	113.3	41.7	56.8	23.9	53.2	25.2
	7	161.9	28.5	155.9	30.2	150.6	32.0	145.2	33.7	138.2	36.1	130.0	39.0	120.6	42.3	60.6	24.2	56.8	25.5
	9	172.7	29.4	165.7	31.0	160.0	32.8	154.2	34.5	146.7	36.9	138.0	39.7	128.2	43.0	64.5	24.6	60.6	25.8
	12	189.3	30.8	181.0	32.4	174.6	34.1	168.1	35.7	159.9	38.1	150.6	40.9	140.1	44.1	70.7	25.1	66.5	26.4
	15	206.5	32.3	196.8	33.8	189.7	35.5	182.6	37.1	173.7	39.4	163.7	42.2	152.6	45.4	77.2	25.7	72.4	27.0
	20	236.5	35.1	224.6	36.5	216.4	38.1	208.1	39.6	198.2	41.9	187.0	44.6	174.7	47.7	88.7	26.9	-	-

*NOTE:DATA WITH "**" AT 5°C AMBIENT AND 5°C LWT ARE FOR UAL230D5LC ONLY.*

Model	Leaving Water Temp. (°C)	Ambient Temp. (°C)							
		-15		-10		-5		0	
		Cooling Capacity (kW)	Power (kW)	Cooling Capacity (kW)	Power (kW)	Cooling Capacity (kW)	Power (kW)	Cooling Capacity (kW)	Power (kW)
UAL230D5LC	5	83.8	10.5	85.0	11.9	86.1	13.3	82.2	15.5
	7	85.5	10.6	87.6	12.3	89.8	13.9	86.3	16.0
	9	87.2	10.8	90.3	12.6	93.4	14.4	90.5	16.6
	12	89.7	11.0	94.3	13.1	98.9	15.2	96.7	17.4
	15	92.2	11.2	98.3	13.6	104.4	16.0	102.9	18.2
	20	96.4	11.6	105.0	14.5	113.5	17.3	113.3	19.6

NOTE: DATA ABOVE ARE FOR UAL230D5LC ONLY IN LOW AMBIENT COOLING OPERATING RANGE.

Heating Capacity Performance Table

Model	Leaving Water Temp. (°C)	Ambient Temp. (°C)																	
		-15°C		-10°C		-5°C		0°C		7°C		10°C		15°C		21°C		30°C	
		Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)	Heating capacity (kW)	Power Input (kW)
UAL230DR5	30	38.4	14.4	43.4	14.5	49.0	14.6	56.8	14.9	72.1	14.9	73.2	15.0	74.8	15.1	83.2	15.2	91.0	15.4
	35	37.5	15.6	42.3	15.8	47.7	16.0	55.5	16.1	70.7	16.4	71.8	16.5	73.7	16.5	82.3	16.8	90.6	17.0
	40	-	-	41.1	17.3	46.3	17.4	54.0	17.7	69.4	17.9	70.5	18.1	72.3	18.2	81.1	18.4	89.4	18.6
	45	-	-	39.7	19.2	44.7	19.4	52.6	19.6	67.0	20.6	69.1	20.7	70.9	20.8	79.6	20.9	88.3	21.0
	50	-	-	-	-	-	-	50.9	21.5	65.8	21.7	67.0	21.8	69.0	22.0	77.8	22.3	-	-
	55	-	-	-	-	-	-	-	-	63.6	23.8	64.9	24.0	67.2	24.2	76.0	24.5	-	-
UAL340DR5	30	51.4	21.5	62.8	22.7	74.2	23.2	88.6	23.8	106.1	24.1	111.4	24.5	121.8	24.8	130.9	25.0	141.7	25.1
	35	50.6	23.9	61.8	24.6	72.8	25.2	86.4	25.7	102.9	26.3	109.0	26.5	118.0	26.7	126.7	26.9	135.6	26.9
	40	-	-	61.0	27.5	71.9	27.6	85.4	28.1	100.8	28.7	106.4	28.8	114.6	29.1	122.4	29.2	129.8	29.2
	45	-	-	60.2	29.1	71.0	29.3	84.2	29.8	100.0	29.9	104.7	31.6	113.5	31.9	120.0	31.9	123.9	31.8
	50	-	-	-	-	69.3	33.9	83.3	34.0	94.8	34.8	102.8	34.7	111.8	34.7	117.7	35.0	119.7	34.9
	55	-	-	-	-	-	-	81.6	37.6	92.3	38.2	98.7	38.2	107.1	38.0	112.6	38.5	-	-
UAL450DR5	30	91.5	28.6	97.8	29.3	106.7	29.6	117.8	29.9	137.1	30.2	146.4	30.5	163.6	31.0	186.7	31.7	226.4	33.1
	35	90.9	31.0	96.9	32.0	106.4	32.3	117.4	32.8	135.7	33.1	144.7	33.3	161.1	33.7	183.4	34.4	221.9	35.8
	40	-	-	96.6	35.6	106.0	35.8	116.1	36.0	133.3	36.3	141.9	36.5	157.7	36.9	179.1	37.5	216.4	38.7
	45	-	-	96.3	39.1	104.3	39.4	113.7	39.6	130.0	39.8	138.1	40.0	153.2	40.3	173.9	40.9	210.0	42.1
	50	-	-	-	-	101.6	43.6	110.3	43.5	125.7	43.7	133.4	43.8	147.8	44.1	167.6	44.6	202.5	45.7
	55	-	-	-	-	-	-	105.9	47.8	120.3	47.9	127.6	48.0	141.4	48.2	160.4	48.7	-	-

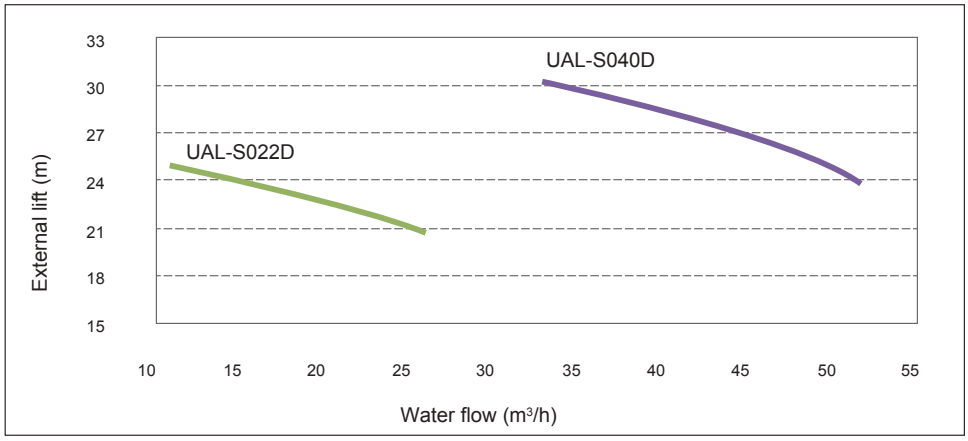
NOTE: PARAMETERS IN THE ABOVE TABLES ARE MEASURED WHEN THE UNIT OPERATES AT THE RATED WATER FLOW.

Cooling Capacity Performance Table (60Hz)

Model	Leaving Water temp. (ºC)	Ambient temperature																			
		5		10		15		20		25		30		35		40		45		48	
		Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)	Cooling Capacity (kW)	Power input (kW)
UAL230D5	5	74.2	15.7	72.3	16.8	73.6	16.4	73.6	16.7	70.2	18.1	67.2	19.4	62.7	21.2	58.6	23.0	53.0	25.3	49.3	27.0
	7	79.0	16.2	77.1	17.4	79.4	16.8	78.7	17.1	75.7	19.0	71.7	19.8	68.5	20.6	59.6	21.6	28.4	12.3	27.0	12.8
	9	84.0	16.6	81.1	17.8	83.4	17.2	83.4	17.4	79.6	18.8	76.0	20.2	71.0	22.0	65.4	24.0	32.1	12.4	30.5	13.0
	12	91.0	17.6	87.7	18.7	88.4	17.8	87.8	17.7	84.7	19.2	82.1	20.6	78.8	22.6	75.3	24.8	36.3	12.6	34.5	13.2
	15	96.9	18.4	93.4	19.6	92.1	18.2	90.7	17.9	88.5	19.5	87.0	21.0	85.5	23.1	84.5	25.6	39.2	12.8	37.3	13.3
	20	102.4	19.1	99.5	20.6	96.3	18.8	93.8	18.2	92.3	19.9	91.0	21.4	90.4	23.7	85.0	25.4	40.0	12.9	38.0	13.4
UAL450D5	5	162.1	27.2	166.9	29.5	161.9	32.7	150.9	34.1	139.7	36.5	128.9	39.8	122.9	42.4	115.8	46.3	108.3	50.5	78.6	39.0
	7	172.2	27.9	180.8	30.4	175.0	33.8	162.6	35.1	150.1	37.0	139.5	40.4	138	41.8	125.0	47.0	116.3	50.9	81.3	38.6
	9	185.7	29.4	194.8	31.5	186.5	34.7	170.1	35.7	158.6	37.4	148.5	41.2	142.3	43.3	132.2	47.6	121.6	51.8	61.7	26.9
	12	200.0	30.8	208.2	33.2	200.7	35.8	186.5	37.0	172.1	38.7	161.2	42.0	154.7	44.3	146.3	48.9	134.5	52.6	66.8	26.4
	15	207.7	31.3	219.2	33.5	211.2	36.9	195.5	38.2	180.5	39.5	170.3	43.1	164.3	45.8	158.0	50.0	111.5	39.4	71.8	25.8
	20	211.9	31.4	228.2	34.2	220.4	37.3	204.5	39.1	189.6	41.1	180.7	45.0	175.6	49.0	166.9	50.9	80.1	24.7	75.8	25.8

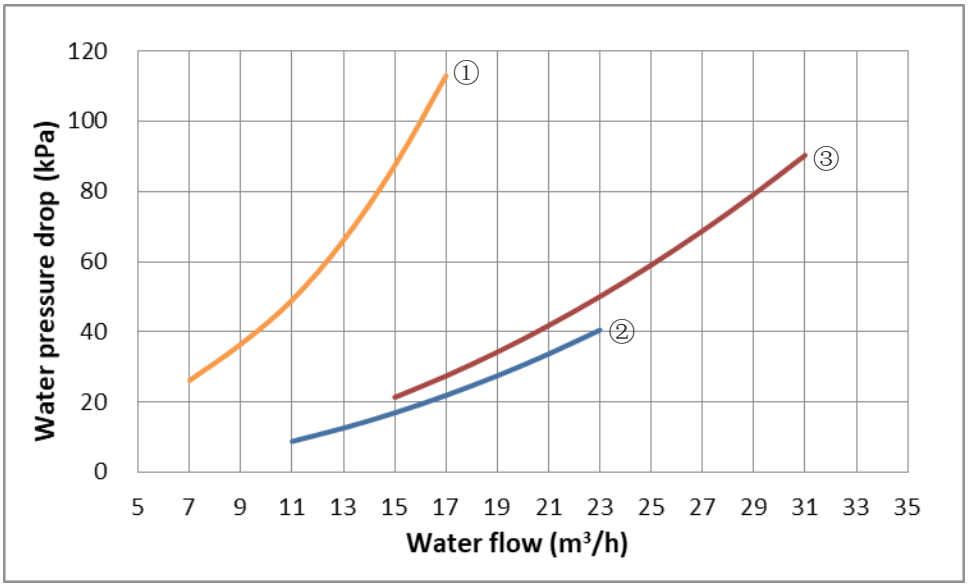
NOTE:PARAMETERS IN THE ABOVE TABLES ARE MEASURED WHEN THE UNIT OPERATES AT THE RATED WATER FLOW.

Pump kit water flow - lift curve and recommended capacity table



Model	Recommended chiller capacity	Water flow	External head
	kW	m³/h	m
UAL-S022D	65	11.5	24.7
	100	17.2	23.4
	130	22.4	22
	150	25.8	20.8
UAL-S040D	195	33.5	29.9
	200	34.4	29.7
	260	44.7	27
	300	51.6	24

Water Pressure Drop Curve



① UAL230D5/ UAL230D5LC/ UAL230DR5

② UAL340D5/ UAL340DR5

③ UAL450D5/ UAL450DR5

Notes:

1. Water pressure drop of the unit is tested with the supplied water filter.
2. Water resistance of BPHE and water 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.

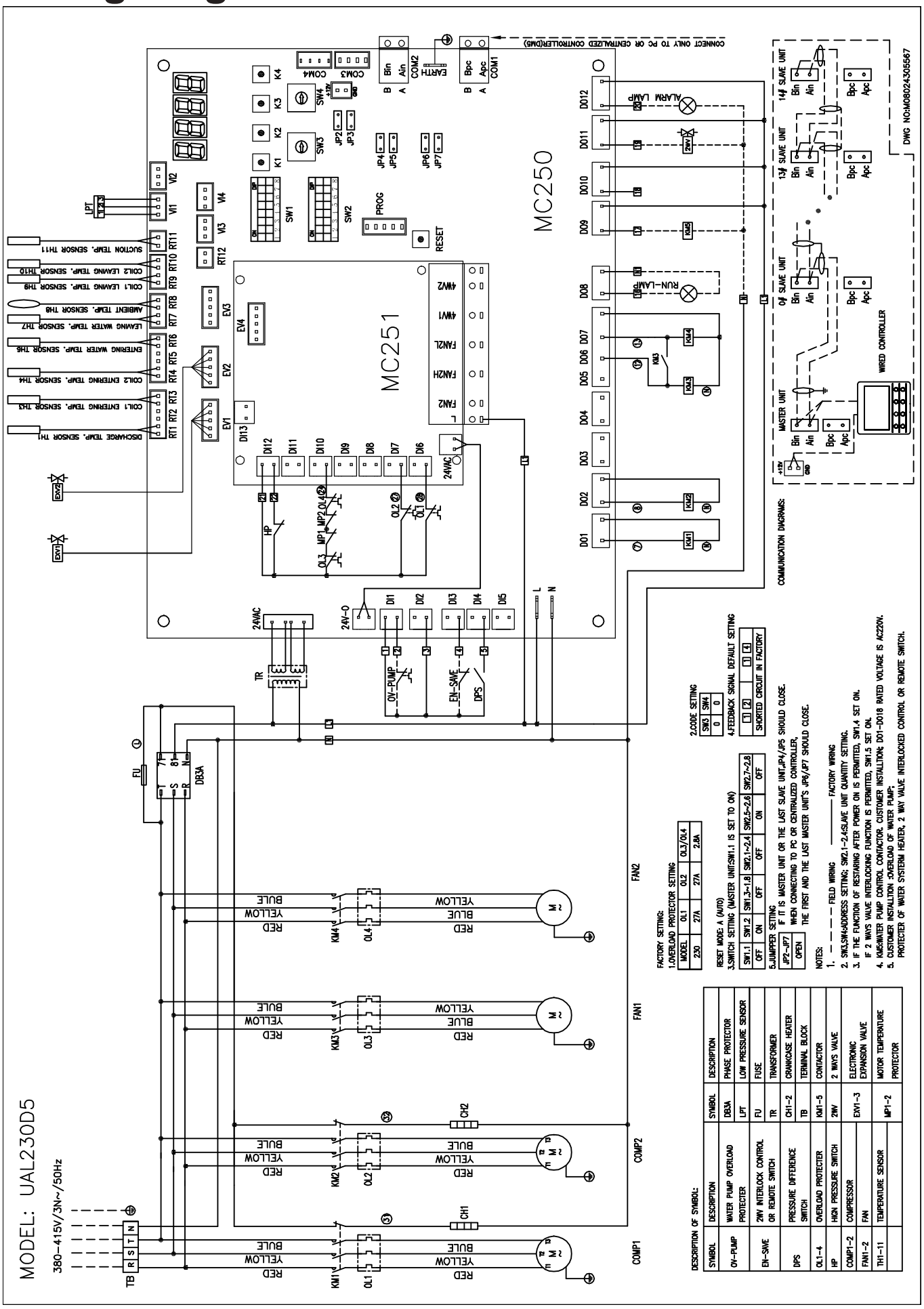
Sound Data

Acoustic Noise

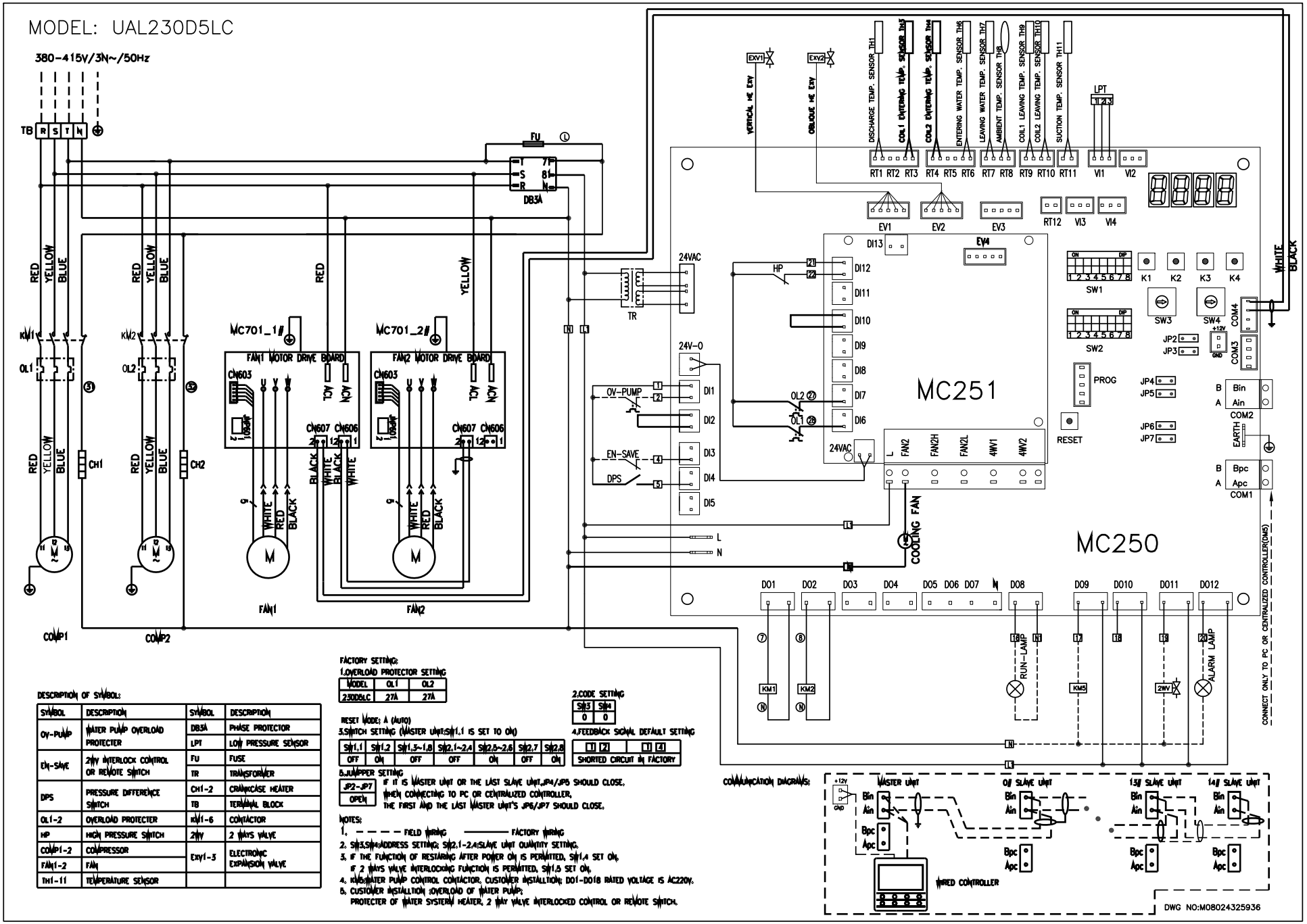
Units		Octave Band Sound Pressure Level (dB, ref20μPa)								dB(A)
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Overall
UAL230D5/D5LC/DR5	50Hz	45.3	52.6	56.5	60.6	61.0	59.0	50.2	41.2	66.0
UAL340D5/DR5		53.4	53.5	59.1	60.0	62.8	58.1	52.6	45.2	67.0
UAL450D5/DR5		54.3	55.0	60.4	61.2	65.4	60.8	54.0	46.7	69.0
UAL230D5-P/Q/R	60Hz	50.2	55.3	59.2	63.6	62.5	60.2	58.4	47.7	68.0
UAL450D5-P/Q/R		51.2	58.9	60.3	61.6	64.2	59.4	54.2	47.6	69.0

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

Wiring Diagrams



MODEL: UAL230D5LC



DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTER	DB3A	PHASE PROTECTOR
		LPT	LOW PRESSURE SENSOR
EN-SAVE	2WV INTERLOCK CONTROL OR REMOTE SWITCH	FU	FUSE
		TR	TRANSFORMER
DPS	PRESSURE DIFFERENCE SWITCH	CH1-2	CRANKCASE HEATER
		TB	TERMINAL BLOCK
OL1-2	OVERLOAD PROTECTER	KM1-6	CONTACTOR
HP	HIGH PRESSURE SWITCH	2WV	2 WAYS VALVE
COMP1-2	COMPRESSOR	EXV1-3	ELECTRONIC EXPANSION VALVE
FAN1-2	FAN		
TH1-11	TEMPERATURE SENSOR		

FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

MODEL	OL1	OL2
230D5LC	27A	27A

2.CODE SETTING

SW3	SW4
0	0

RESET MODE: A (AUTO)

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.4	SW2.5~2.6	SW2.7	SW2.8
OFF	ON	OFF	OFF	ON	OFF	ON

4.FEEDBACK SIGNAL DEFAULT SETTING

1 2	1 4
SHORTED CIRCUIT IN FACTORY	

5.JUMPER SETTING

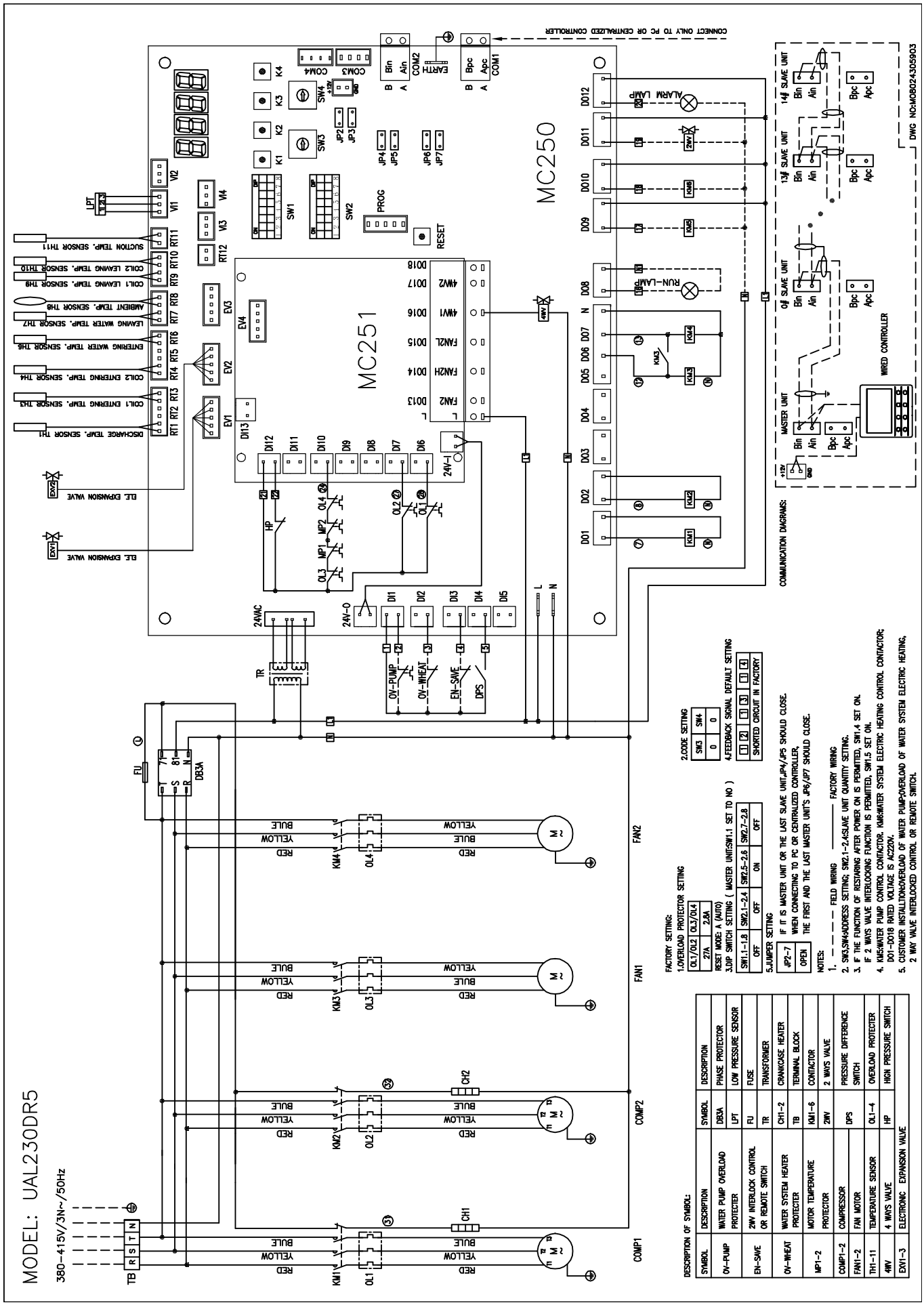
JP2-JP7
OPEN

IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

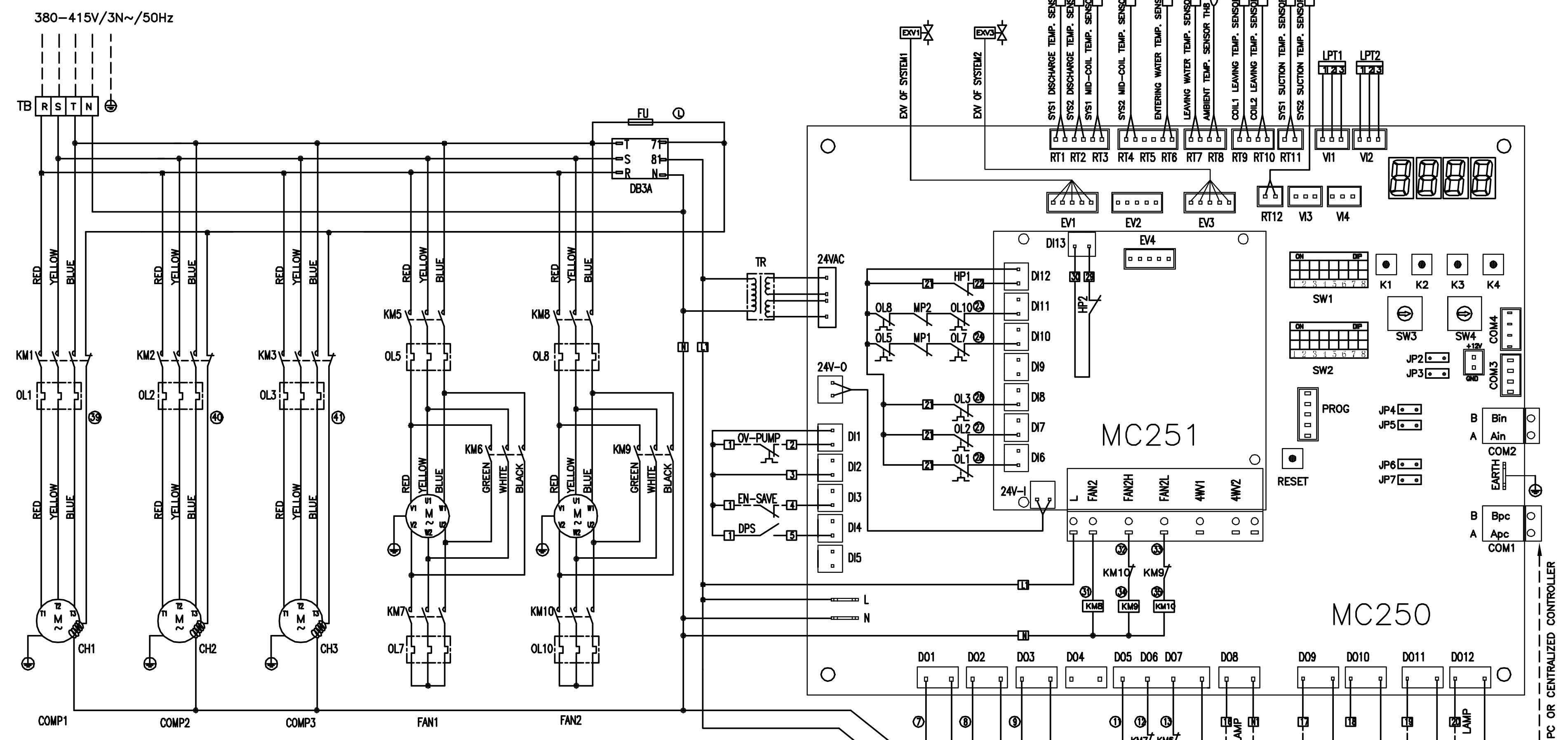
NOTES:

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. KM6:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLTION; DO1-DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTION :OVERLOAD OF WATER PUMP;
   PROTECTER OF WATER SYSTERM HEATER, 2 WAY VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

COMMUNICATION DIAGRAMS:


MODEL: UAL230DR5
380~415V/3N~/50Hz
MC250
MC251
DESCRIPTION OF SYMBOL:
SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION
OV-PUMP | WATER PUMP OVERLOAD PROTECTER | DB3A | PHASE PROTECTOR
EN-SAVE | 2WV INTERLOCK CONTROL OR REMOTE SWITCH | LPT | LOW PRESSURE SENSOR
OV-WHEAT | WATER SYSTEM HEATER PROTECTER | FU | FUSE
MP1-2 | MOTOR TEMPERATURE PROTECTOR | TR | TRANSFORMER
COMP1-2 | COMPRESSOR | CH1-2 | CRANKCASE HEATER
FAN1-2 | FAN MOTOR | 2WV | 2 WAYS VALVE
TH1-11 | TEMPERATURE SENSOR | DPS | PRESSURE DIFFERENCE SWITCH
4WV | 4 WAYS VALVE | OL1-4 | OVERLOAD PROTECTER
EXV1-3 | ELECTRONIC EXPANSION VALVE | HP | HIGH PRESSURE SWITCH
FACTORY SETTING:
1.OVERLOAD PROTECTOR SETTING
OL1/OL2 | OL3/OL4
27A | 2.6A
RESET MODE: A (AUTO)
3.DIP SWITCH SETTING (MASTER UNIT:SW1.1 SET TO NO)
SW1.1-1.8 | SW2.1-2.4 | SW2.5-2.6 | SW2.7-2.8
OFF | OFF | ON | OFF
5.JUMPER SETTING
JP2-7 | IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
OPEN | WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.
2.CODE SETTING
SW3 | SW4
0 | 0
4.FEEDBACK SIGNAL DEFAULT SETTING
1 2 3 4
SHORTED CIRCUIT IN FACTORY
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. KM6:WATER PUMP CONTROL CONTACTOR. KM5:WATER SYSTEM ELECTRIC HEATING CONTROL CONTACTOR;
DO1-DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTIONOVERLOAD OF WATER PUMP-OVERLOAD OF WATER SYSTEM ELECTRIC HEATING,
2 WAY VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.
COMMUNICATION DIAGRAMS:
MASTER UNIT
1# SLAVE UNIT
13# SLAVE UNIT
14# SLAVE UNIT
WIRED CONTROLLER
CONNECT ONLY TO PC OR CENTRALIZED CONTROLLER
DWG NO:M08024305903

MODEL: UAL340D5



FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

OL1~OL3	OL5	OL7	OL8	OL10
27A	6.0A	2.9A	5.2A	2.2A

RESET MODE: A (AUTO)

2.CODE SETTING

SW3	SW4
0	0

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.5	SW2.6	SW2.7~2.8
OFF	ON	OFF	OFF	ON	OFF

4.FEEDBACK SIGNAL DEFAULT SETTING

1 2	1 4
SHORTED CIRCUIT IN FACTORY	

5.JUMPPER SETTING

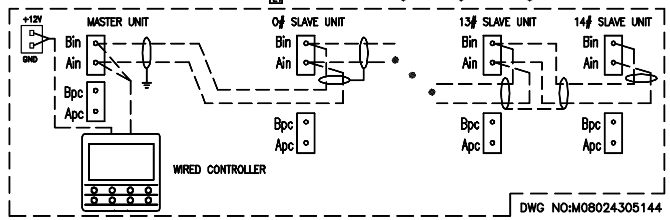
JP2~JP7
OPEN

IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

NOTES:

1. ---------- FIELD WIRING ———— FACTORY WIRING
2. SW3,SW4:ADDRESS SETTING; SW2.1~2.4:SLAVE UNIT QUANTITY SETTING;
3. IF THE FUNCTION OF RESTARTING AFTER POWER ON IS PERMITTED, SW1.4 SET ON.
   IF 2 WAYS VALVE INTERLOCKED FUNCTIONIS IS PERMITTED,SW1.5 SET ON.
4. KM11:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLTION;DO1~DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTION :OVERLOAD OF WATER PUMP,
   2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

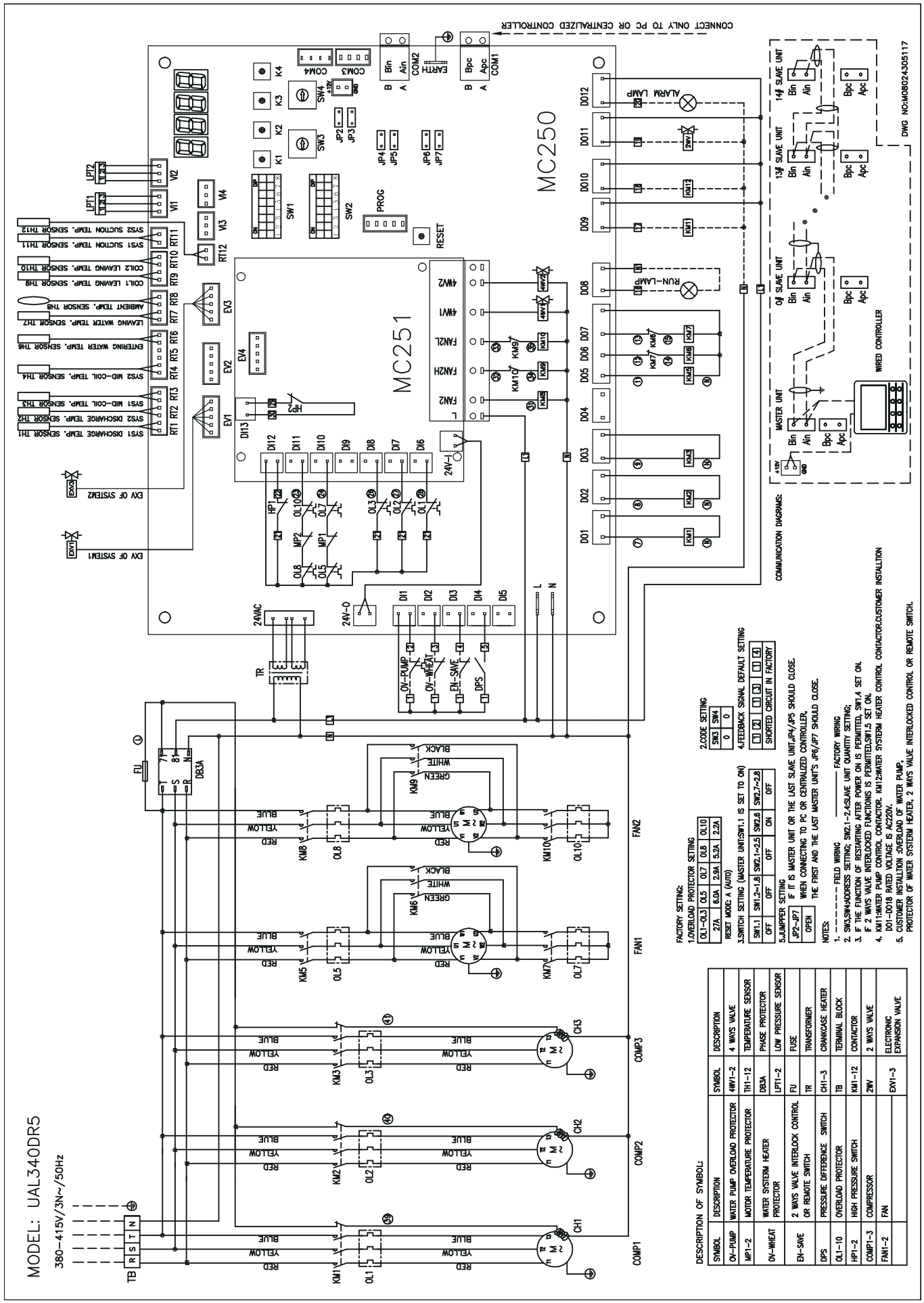
COMMUNICATION DIAGRAMS:

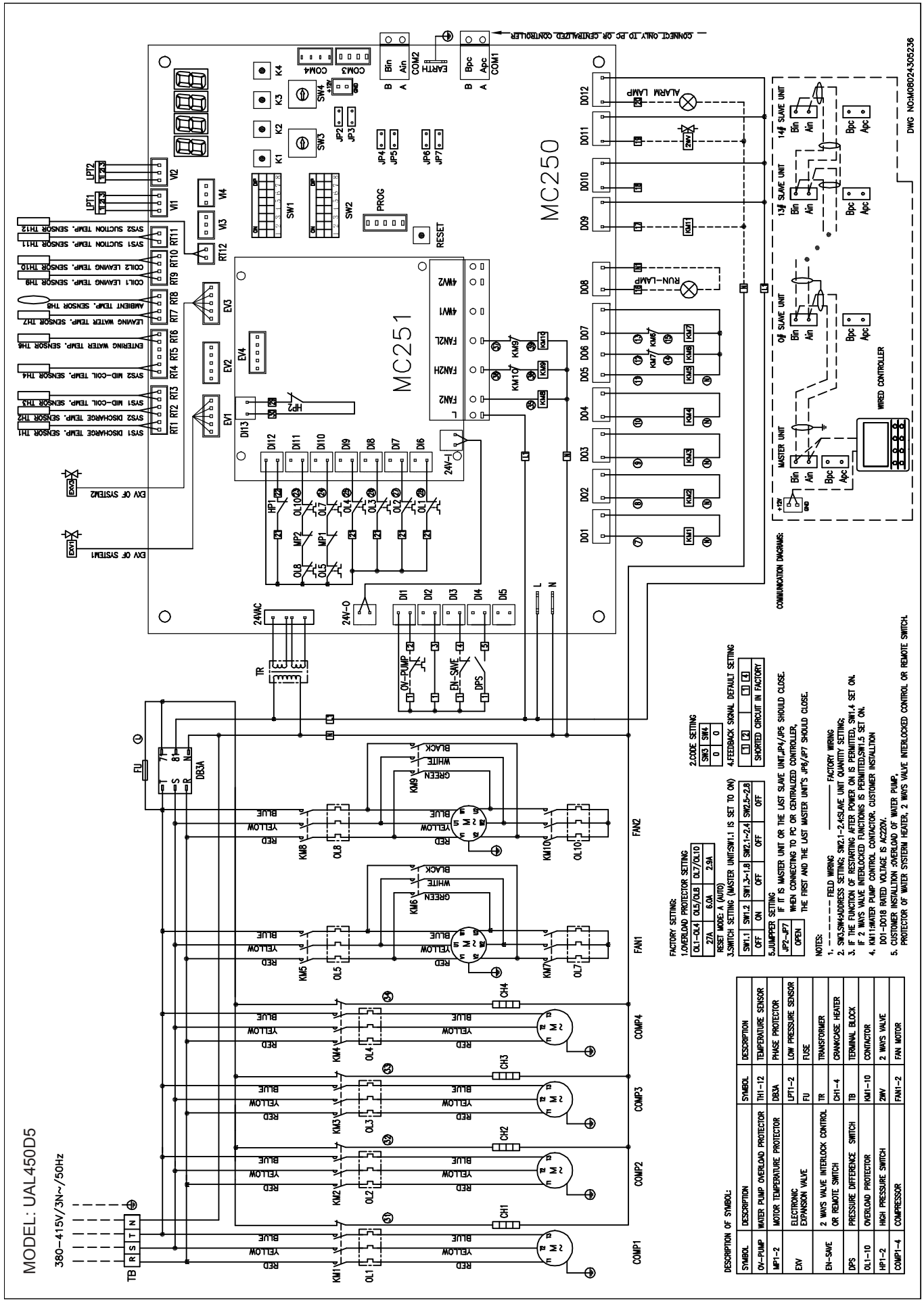


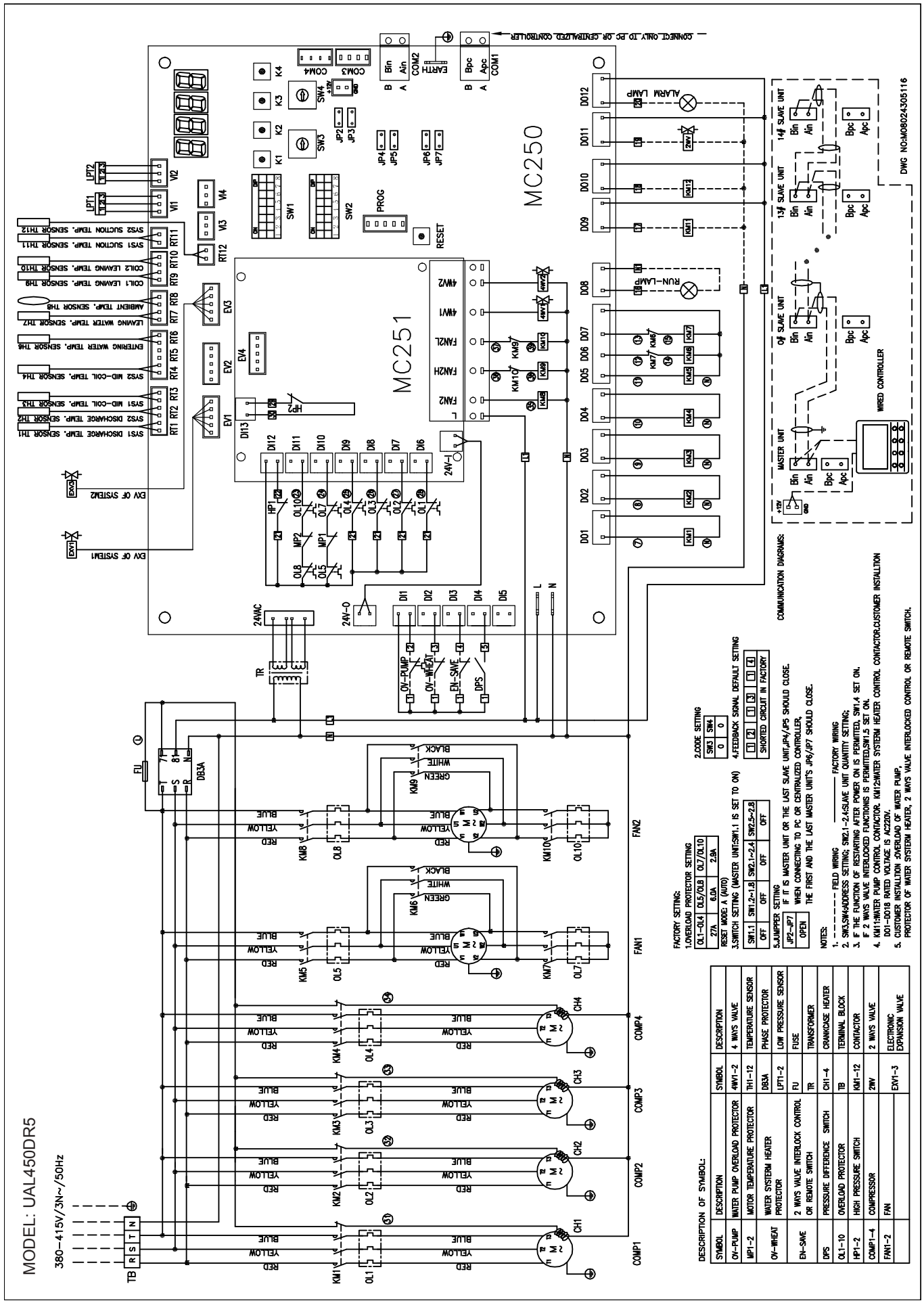
DWG NO:M08024305144

DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTOR	FAN1~2	FAN
MP1~2	MOTOR TEMPERATURE PROTECTOR	TH1~12	TEMPERATURE SENSOR
EXV1~3	ELECTRONIC EXPANSION VALVE	DB3A	PHASE PROTECTOR
		LPT1~2	LOW PRESSURE SENSOR
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	FU	FUSE
		TR	TRANSFORMER
DPS	PRESSURE DIFFERENCE SWITCH	CH1~3	CRANKCASE HEATER
OL1~10	OVERLOAD PROTECTOR	TB	TERMINAL BLOCK
HP1~2	HIGH PRESSURE SWITCH	KM1~11	CONTACTOR
COMP1~3	COMPRESSOR	2WV	2 WAYS VALVE

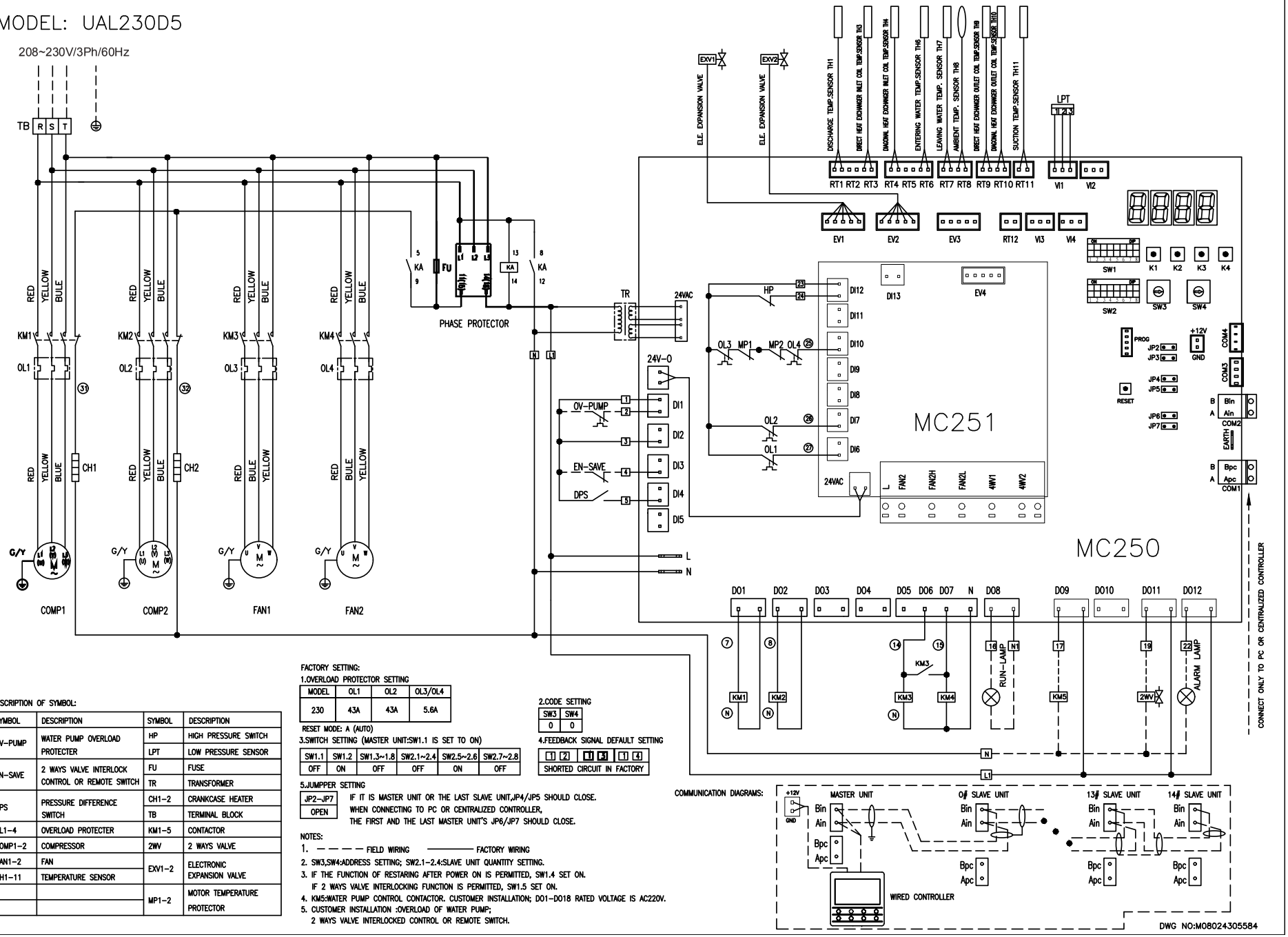

MODEL: UAL340DR5
380~415V/3N~/50Hz
MC250
MC251
CONNECT ONLY TO PC OR CENTRALIZED CONTROLLER
WIRED CONTROLLER
MASTER UNIT
1# SLAVE UNIT
2# SLAVE UNIT
3# SLAVE UNIT
4# SLAVE UNIT
ALARM LAMP
RUN-LAMP
COMMUNICATION DIAGRAMS:
DWG NO:M08024305117
DESCRIPTION OF SYMBOL:
SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION
OV-PUMP | WATER PUMP OVERLOAD PROTECTOR | 4WV1-2 | 4 WAYS VALVE
MP1-2 | MOTOR TEMPERATURE PROTECTOR | TH1-12 | TEMPERATURE SENSOR
OV-WHEAT | WATER SYSTERM HEATER PROTECTOR | DB3A | PHASE PROTECTOR
| | LPT1-2 | LOW PRESSURE SENSOR
EN-SAVE | 2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH | FU | FUSE
| | TR | TRANSFORMER
DPS | PRESSURE DIFFERENCE SWITCH | CH1-3 | CRANKCASE HEATER
OL1-10 | OVERLOAD PROTECTOR | TB | TERMINAL BLOCK
HP1-2 | HIGH PRESSURE SWITCH | KM1-12 | CONTACTOR
COMP1-3 | COMPRESSOR | 2WV | 2 WAYS VALVE
FAN1-2 | FAN | EXV1-3 | ELECTRONIC EXPANSION VALVE
FACTORY SETTING:
1.OVERLOAD PROTECTOR SETTING
OL1-OL3 | OL5 | OL7 | OL8 | OL10
27A | 6.0A | 2.9A | 5.2A | 2.2A
RESET MODE A (AUTO)
2.CODE SETTING
SW3 | SW4
0 | 0
3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)
SW1.1 | SW1.2~1.8 | SW2.1~2.5 | SW2.6 | SW2.7~2.8
OFF | OFF | OFF | ON | OFF
4.FEEDBACK SIGNAL DEFAULT SETTING
1 2 | 1 3 | 1 4
SHORTED CIRCUIT IN FACTORY
5.JUMPPER SETTING
JP2~JP7 | IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
OPEN | WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER, THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.
NOTES:
1. ------ FIELD WIRING ---------- FACTORY WIRING
2. SW3,SW4=ADDRESS SETTING; SW2.1~2.4:SLAVE UNIT QUANTITY SETTING;
3. IF THE FUNCTION OF RESTARTING AFTER POWER ON IS PERMITTED, SW1.4 SET ON.
IF 2 WAYS VALVE INTERLOCKED FUNCTIONS IS PERMITTED,SW1.5 SET ON.
4. KM11=WATER PUMP CONTROL CONTACTOR, KM12=WATER SYSTERM HEATER CONTROL CONTACTOR.CUSTOMER INSTALLTION DO1~DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTION :OVERLOAD OF WATER PUMP, PROTECTOR OF WATER SYSTERM HEATER, 2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.


MODEL: UAL450D5
380~415V/3N~/50Hz
MC250
MC251
DESCRIPTION OF SYMBOL:
NOTES:
FACTORY SETTING:
1.OVERLOAD PROTECTOR SETTING
2.CODE SETTING
3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)
4.FEEDBACK SIGNAL DEFAULT SETTING
5.JUMPER SETTING
COMMUNICATION DIAGRAMS:
WIRED CONTROLLER
MASTER UNIT
SLAVE UNIT
ALARM LAMP
RUN-LAMP
DWG NO:M08024305236


MODEL: UAL450DR5
380~415V/3N~/50Hz
MC250
MC251
DESCRIPTION OF SYMBOL:
FACTORY SETTING:
1.OVERLOAD PROTECTOR SETTING
2.CODE SETTING
3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)
4.FEEDBACK SIGNAL DEFAULT SETTING
5.JUMPER SETTING
NOTES:
COMMUNICATION DIAGRAMS:
WIRED CONTROLLER
MASTER UNIT
SLAVE UNIT
RUN-LAMP
ALARM LAMP
DWG NO:M08024305116

MODEL: UAL230D5

208~230V/3Ph/60Hz



DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTER	HP	HIGH PRESSURE SWITCH
		LPT	LOW PRESSURE SENSOR
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	FU	FUSE
		TR	TRANSFORMER
DPS	PRESSURE DIFFERENCE SWITCH	CH1-2	CRANKCASE HEATER
		TB	TERMINAL BLOCK
OL1-4	OVERLOAD PROTECTER	KM1-5	CONTACTOR
COMP1-2	COMPRESSOR	2WV	2 WAYS VALVE
FAN1-2	FAN	EXV1-2	ELECTRONIC EXPANSION VALVE
TH1-11	TEMPERATURE SENSOR		
		MP1-2	MOTOR TEMPERATURE PROTECTOR

FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

MODEL	OL1	OL2	OL3/OL4
230	43A	43A	5.6A

RESET MODE: A (AUTO)

2.CODE SETTING

SW3	SW4
0	0

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.4	SW2.5~2.6	SW2.7~2.8
OFF	ON	OFF	OFF	ON	OFF

4.FEEDBACK SIGNAL DEFAULT SETTING

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

5.JUMPPER SETTING

JP2-JP7
OPEN

IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

NOTES:

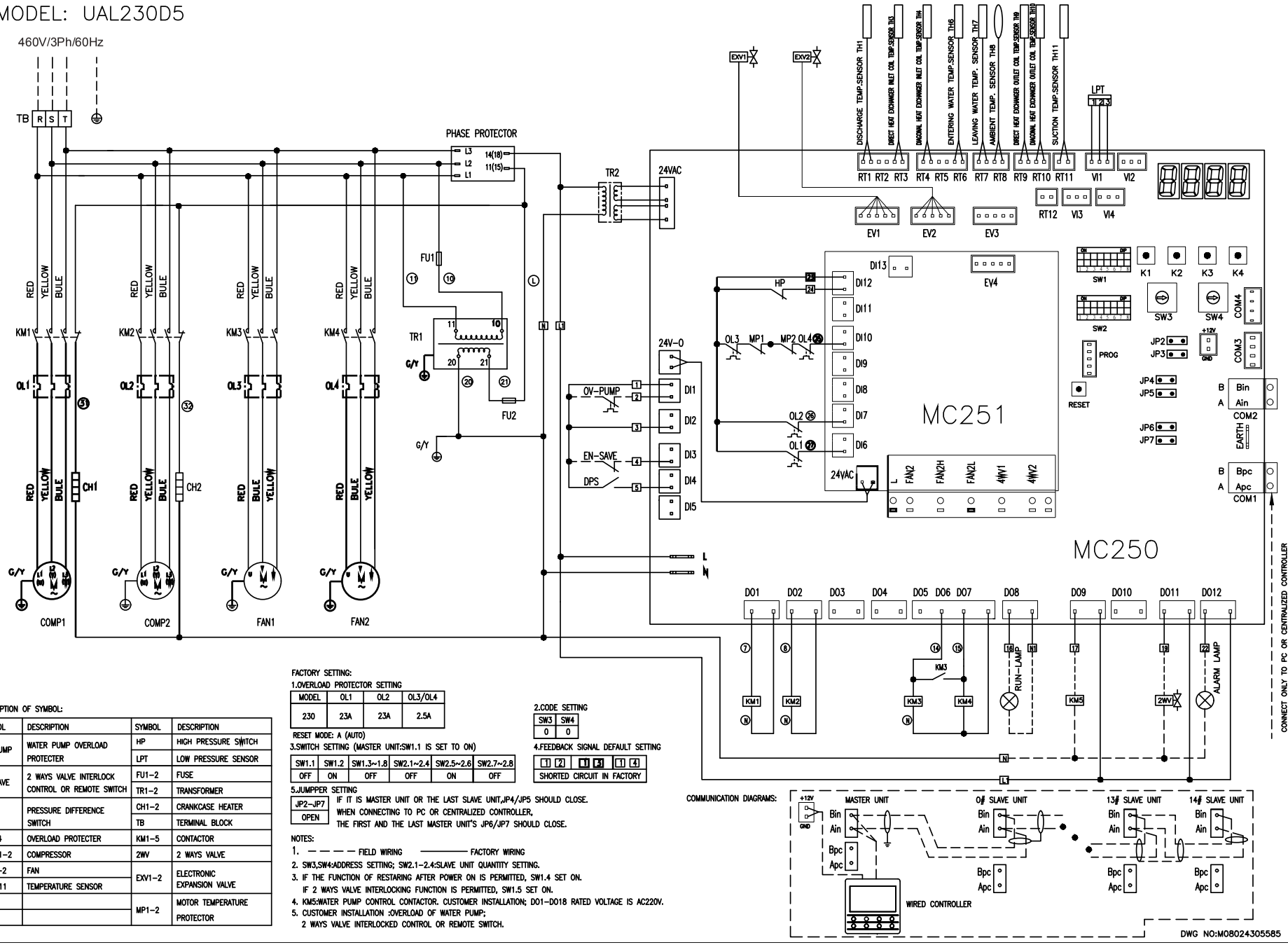
1. ---- FIELD WIRING ———— FACTORY WIRING
2. SW3,SW4:ADDRESS SETTING; SW2.1-2.4:SLAVE UNIT QUANTITY SETTING.
3. IF THE FUNCTION OF RESTARING AFTER POWER ON IS PERMITTED, SW1.4 SET ON.
   IF 2 WAYS VALVE INTERLOCKING FUNCTION IS PERMITTED, SW1.5 SET ON.
4. KM5:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLATION; DO1-DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLATION :OVERLOAD OF WATER PUMP;
   2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

COMMUNICATION DIAGRAMS:

DWG NO:M08024305584

MODEL: UAL230D5

460V/3Ph/60Hz



DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTER	HP	HIGH PRESSURE SWITCH
		LPT	LOW PRESSURE SENSOR
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	FU1-2	FUSE
		TR1-2	TRANSFORMER
DPS	PRESSURE DIFFERENCE SWITCH	CH1-2	CRANKCASE HEATER
		TB	TERMINAL BLOCK
OL1-4	OVERLOAD PROTECTER	KM1-5	CONTACTOR
COMP1-2	COMPRESSOR	2WV	2 WAYS VALVE
FAN1-2	FAN	EXV1-2	ELECTRONIC EXPANSION VALVE
TH1-11	TEMPERATURE SENSOR		
		MP1-2	MOTOR TEMPERATURE PROTECTOR

FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

MODEL	OL1	OL2	OL3/OL4
230	23A	23A	2.5A

RESET MODE: A (AUTO)

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.4	SW2.5~2.6	SW2.7~2.8
OFF	ON	OFF	OFF	ON	OFF

5.JUMPPER SETTING

JP2-JP7	IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
OPEN	WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER, THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

2.CODE SETTING

SW3	SW4
0	0

4.FEEDBACK SIGNAL DEFAULT SETTING

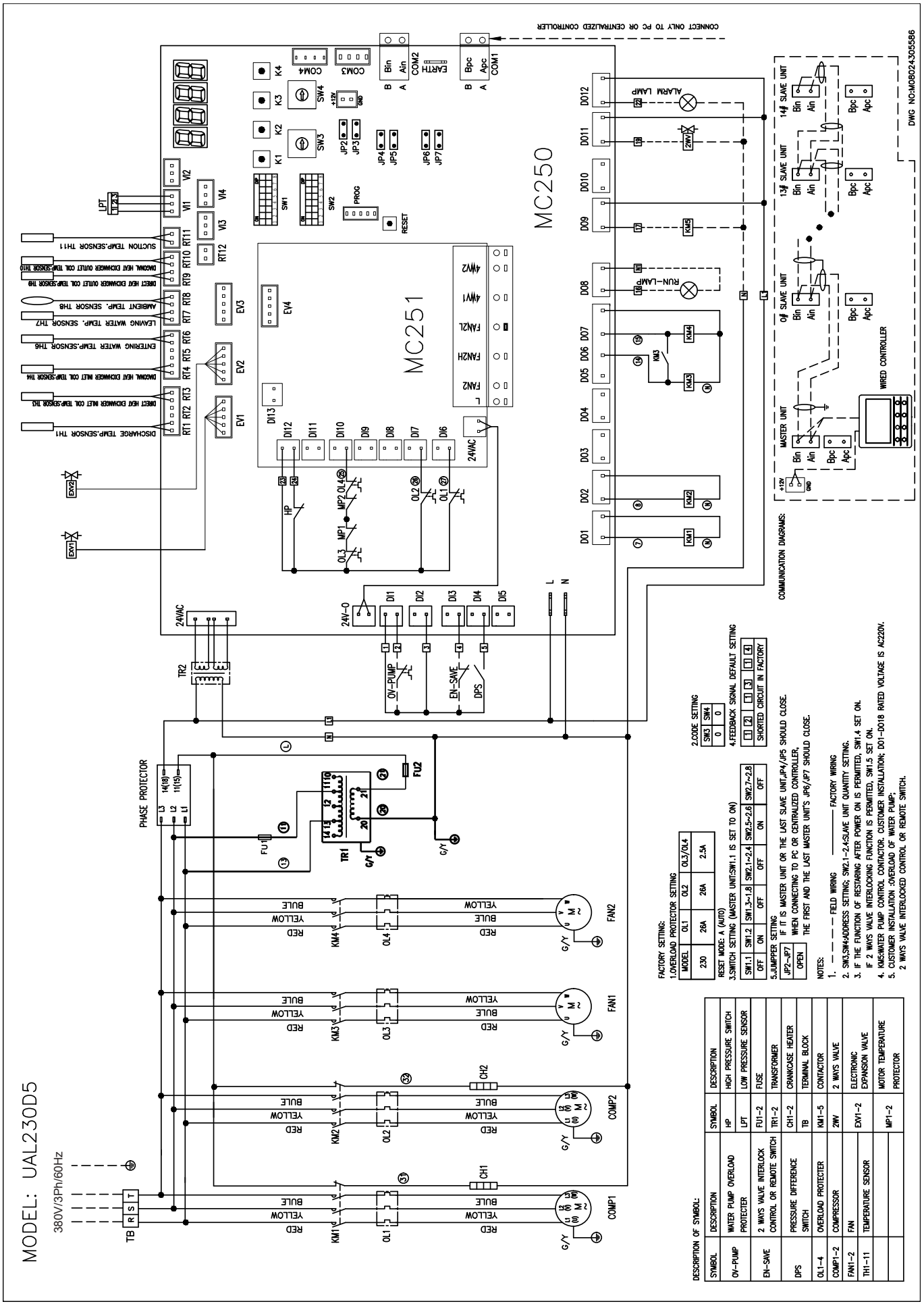
1 2 / 1 3 / 1 4	SHORTED CIRCUIT IN FACTORY

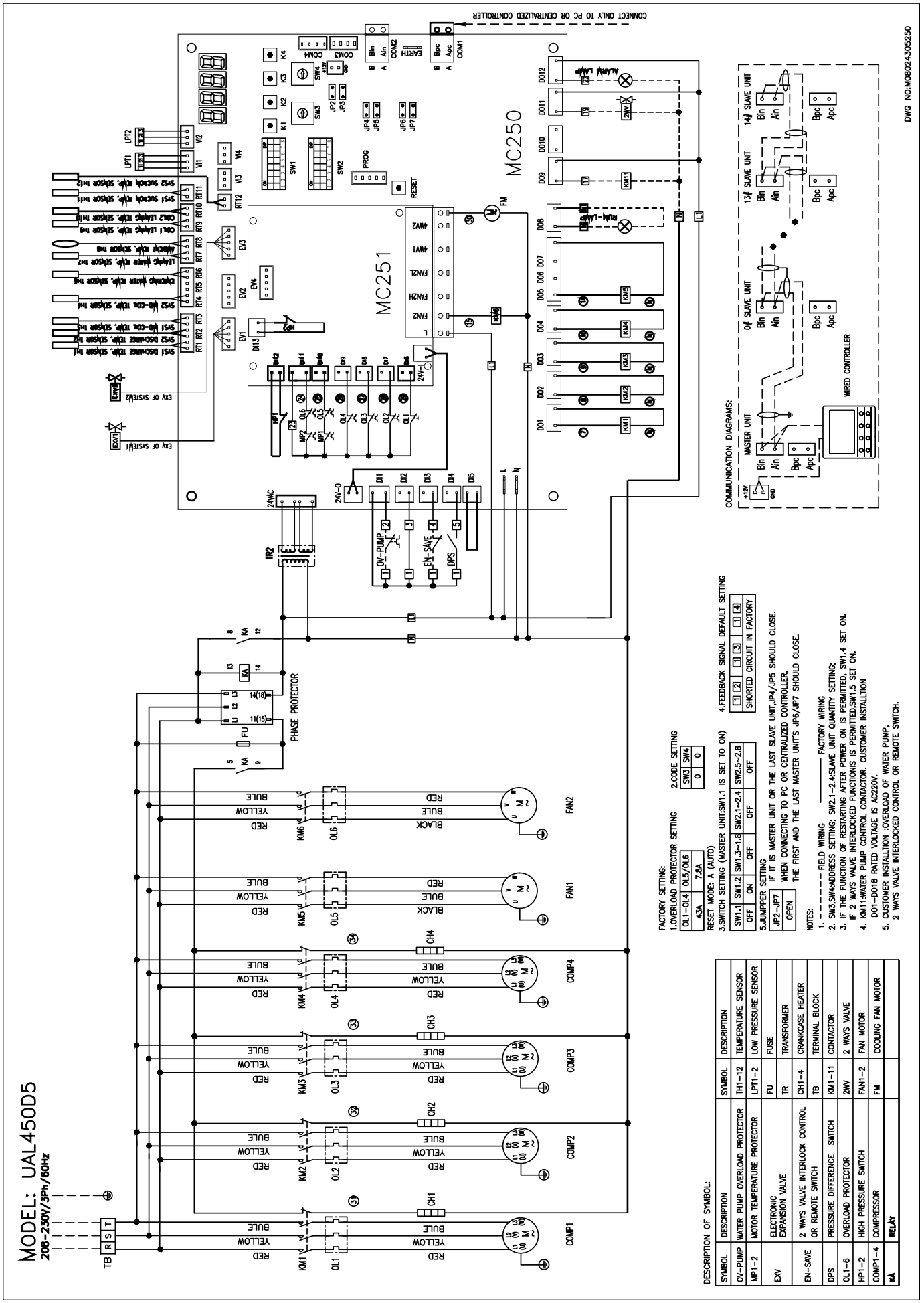
NOTES:

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. KM5:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLATION; DO1-D018 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLATION :OVERLOAD OF WATER PUMP;
   2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

COMMUNICATION DIAGRAMS:

DWG NO:M08024305585


MODEL: UAL230D5
380V/3Ph/60Hz
MC250
MC251
CONNECT ONLY TO PC OR CENTRALIZED CONTROLLER
DWG NO:M08024305586
COMMUNICATION DIAGRAMS:
WIRED CONTROLLER
MASTER UNIT
SLAVE UNIT
PHASE PROTECTOR
FACTORY SETTING:
1.OVERLOAD PROTECTOR SETTING
2.CODE SETTING
3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)
4.FEEDBACK SIGNAL DEFAULT SETTING
5.JUMPER SETTING
RESET MODE: A (AUTO)
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. KM5:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLATION; D01~D018 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLATION :OVERLOAD OF WATER PUMP;
2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.
DESCRIPTION OF SYMBOL:

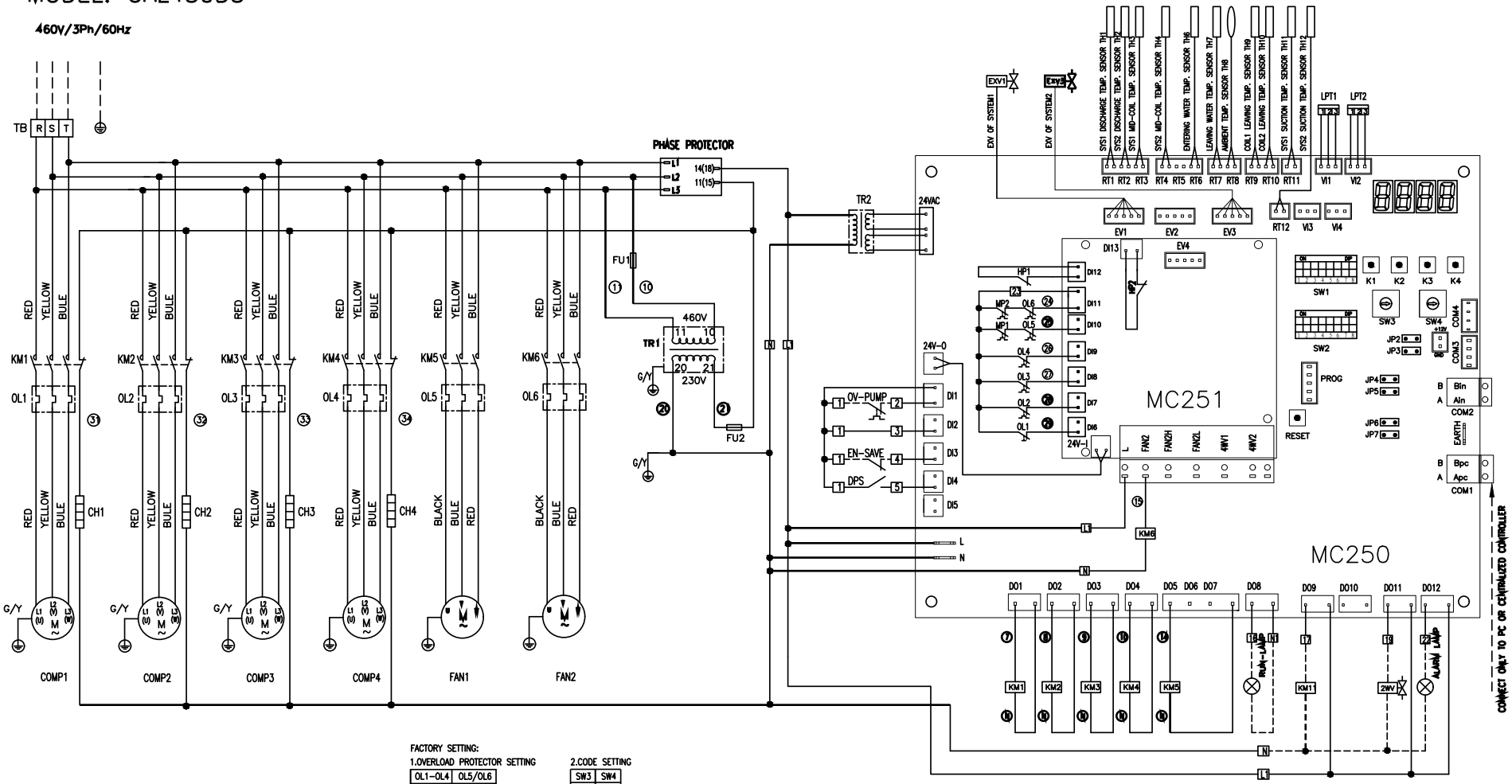


DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTOR	TH1~12	TEMPERATURE SENSOR
MP1~2	MOTOR TEMPERATURE PROTECTOR	LPT1~2	LOW PRESSURE SENSOR
EXV	ELECTRONIC EXPANSION VALVE	FU	FUSE
		TR	TRANSFORMER
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	CH1~4	CRANKCASE HEATER
		TB	TERMINAL BLOCK
DPS	PRESSURE DIFFERENCE SWITCH	KM1~11	CONTACTOR
OL1~6	OVERLOAD PROTECTOR	2WV	2 WAYS VALVE
HP1~2	HIGH PRESSURE SWITCH	FAN1~2	FAN MOTOR
COMP1~4	COMPRESSOR	FM	COOLING FAN MOTOR
KA	RELAY		

MODEL: UAL450D5

460V/3Ph/60Hz



DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTOR	TH1-12	TEMPERATURE SENSOR
MP1-2	MOTOR TEMPERATURE PROTECTOR	LPT1-2	LOW PRESSURE SENSOR
EXV	ELECTRONIC EXPANSION VALVE	FU	FUSE
		TR1-2	TRANSFORMER
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	CH1-4	CRANKCASE HEATER
		TB	TERMINAL BLOCK
DPS	PRESSURE DIFFERENCE SWITCH	KM1-11	CONTACTOR
OL1-6	OVERLOAD PROTECTOR	2WV	2 WAYS VALVE
HP1-2	HIGH PRESSURE SWITCH	FAN1-2	FAN MOTOR
COMP1-4	COMPRESSOR		

FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

OL1-OL4	OL5/OL6
23A	4.6A

RESET MODE: A (AUTO)

2.CODE SETTING

SW3	SW4
0	0

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.4	SW2.5~2.8
OFF	ON	OFF	OFF	OFF

4.FEEDBACK SIGNAL DEFAULT SETTING

1 2	1 3	1 4
SHORTED CIRCUIT IN FACTORY		

5.JUMPPER SETTING

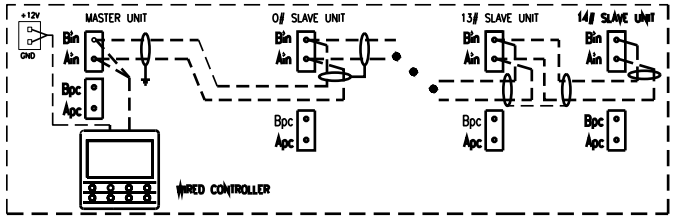
JP2-JP7
OPEN

IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

NOTES:

1. ------- FIELD WIRING ——— FACTORY WIRING
2. SW3,SW4:ADDRESS SETTING; SW2.1-2.4:SLAVE UNIT QUANTITY SETTING;
3. IF THE FUNCTION OF RESTARTING AFTER POWER ON IS PERMITTED, SW1.4 SET ON.
   IF 2 WAYS VALVE INTERLOCKED FUNCTIONIS IS PERMITTED,SW1.5 SET ON.
4. KM11:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLTION
   DO1-DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTION :OVERLOAD OF WATER PUMP,
   2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

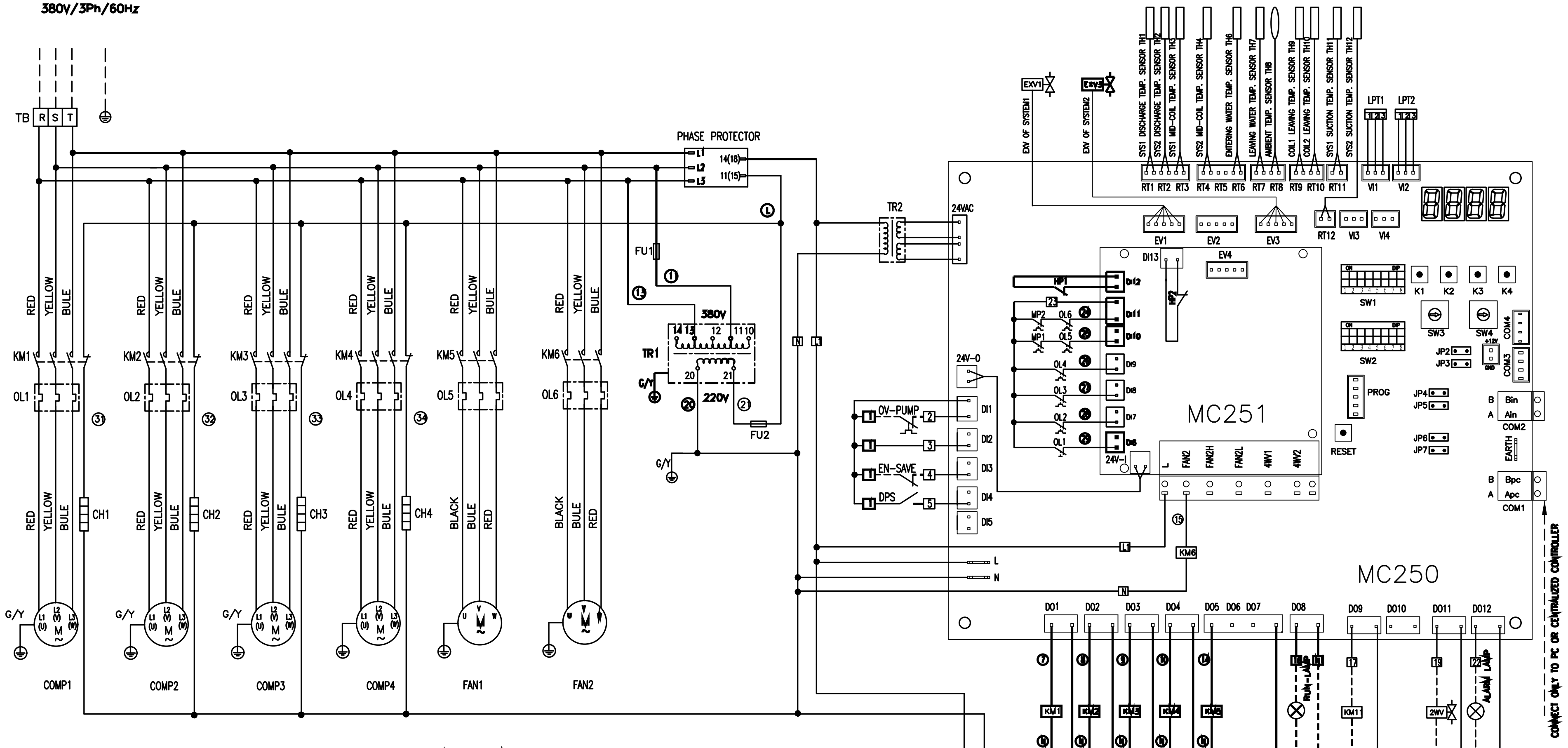
COMMUNICATION DIAGRAMS:



DWG NO:W0802430525S

MODEL: UAL450D5

380V/3Ph/60Hz



FACTORY SETTING:

1.OVERLOAD PROTECTOR SETTING

OL1-OL4	OL5/OL6
26A	4.6A

2.CODE SETTING

SW3	SW4
0	0

RESET MODE: A (AUTO)

3.SWITCH SETTING (MASTER UNIT:SW1.1 IS SET TO ON)

SW1.1	SW1.2	SW1.3~1.8	SW2.1~2.4	SW2.5~2.8
OFF	ON	OFF	OFF	OFF

4.FEEDBACK SIGNAL DEFAULT SETTING

1 2	1 3	1 4
SHORTED CIRCUIT IN FACTORY		

5.JUMPPER SETTING

JP2-JP7
OPEN

IF IT IS MASTER UNIT OR THE LAST SLAVE UNIT,JP4/JP5 SHOULD CLOSE.
WHEN CONNECTING TO PC OR CENTRALIZED CONTROLLER,
THE FIRST AND THE LAST MASTER UNIT'S JP6/JP7 SHOULD CLOSE.

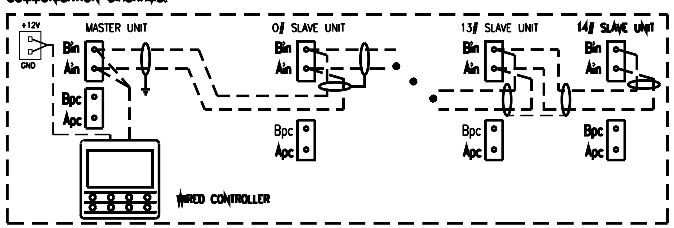
NOTES:

1. — — — — FIELD WIRING ———— FACTORY WIRING
2. SW3,SW4:ADDRESS SETTING; SW2.1-2.4:SLAVE UNIT QUANTITY SETTING;
3. IF THE FUNCTION OF RESTARTING AFTER POWER ON IS PERMITTED, SW1.4 SET ON. IF 2 WAYS VALVE INTERLOCKED FUNCTIONS IS PERMITTED,SW1.5 SET ON.
4. KM11:WATER PUMP CONTROL CONTACTOR. CUSTOMER INSTALLTION DO1-DO18 RATED VOLTAGE IS AC220V.
5. CUSTOMER INSTALLTION :OVERLOAD OF WATER PUMP, 2 WAYS VALVE INTERLOCKED CONTROL OR REMOTE SWITCH.

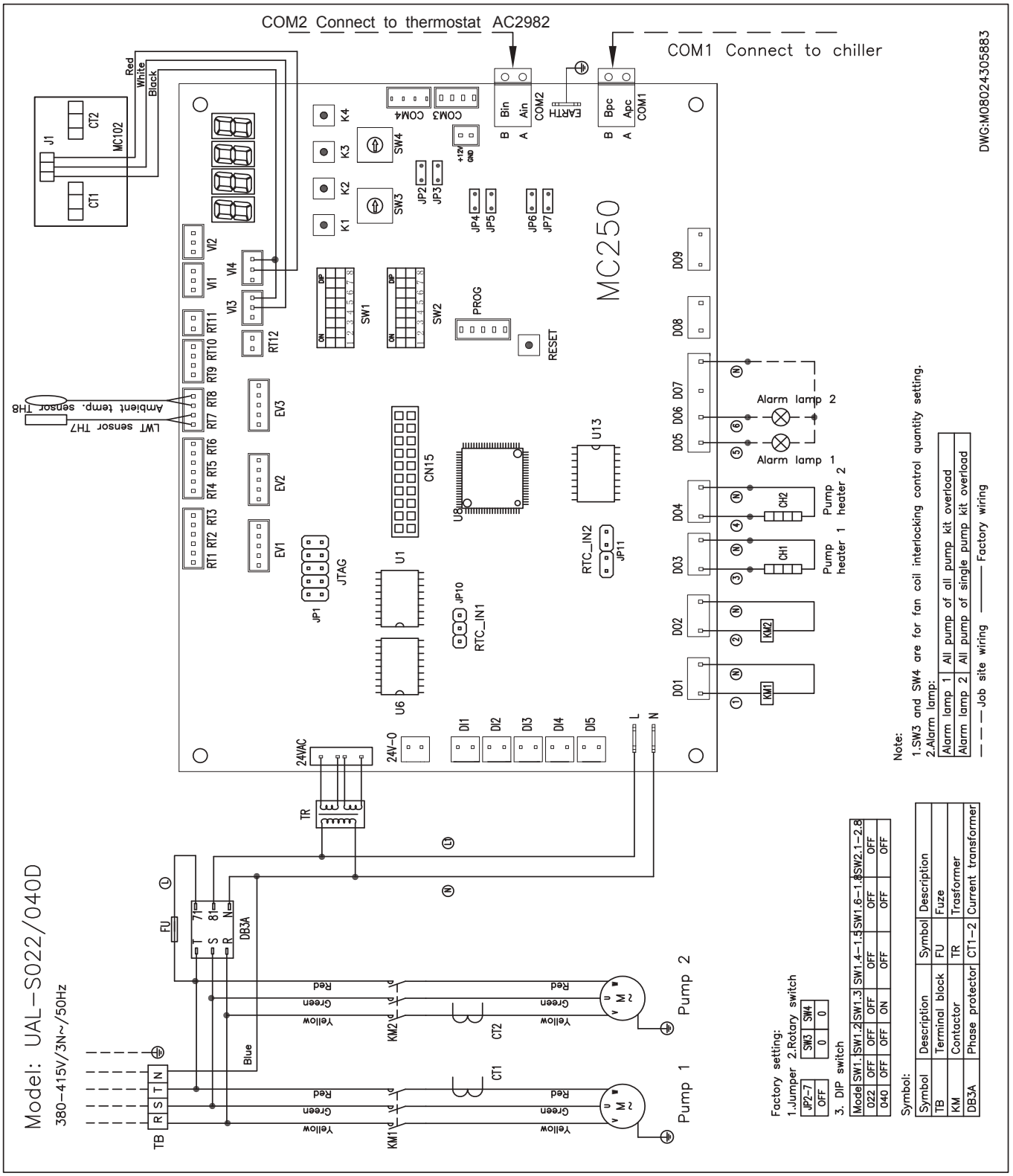
DESCRIPTION OF SYMBOL:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
OV-PUMP	WATER PUMP OVERLOAD PROTECTOR	TH1-12	TEMPERATURE SENSOR
MP1-2	MOTOR TEMPERATURE PROTECTOR	LPT1-2	LOW PRESSURE SENSOR
EXV	ELECTRONIC EXPANSION VALVE	FU	FUSE
		TR1-2	TRANSFORMER
EN-SAVE	2 WAYS VALVE INTERLOCK CONTROL OR REMOTE SWITCH	CH1-4	CRANKCASE HEATER
		TB	TERMINAL BLOCK
DPS	PRESSURE DIFFERENCE SWITCH	KM1-11	CONTACTOR
OL1-6	OVERLOAD PROTECTOR	2WV	2 WAYS VALVE
HP1-2	HIGH PRESSURE SWITCH	FAN1-2	FAN MOTOR
COMP1-4	COMPRESSOR		

COMMUNICATION DIAGRAMS:



DWG NO:M08024305252


COM2 Connect to thermostat AC2982
COM1 Connect to chiller
DWG:M08024305883
MC250
Model: UAL-S022/040D
380-415V/3N~/50Hz
Ambient temp. sensor TH8
LWT sensor TH7
Alarm lamp 2
Alarm lamp 1
Pump heater 2
Pump heater 1
Pump 1
Pump 2
TB
Blue
Red
White
Black
Yellow
Green
Note:
1.SW3 and SW4 are for fan coil interlocking control quantity setting.
2.Alarm lamp:
Alarm lamp 1 | All pump of all pump kit overload
Alarm lamp 2 | All pump of single pump kit overload
— — — Job site wiring ——— Factory wiring
Factory setting:
1.Jumper 2.Rotary switch
JP2-7 OFF
SW3 0 SW4 0
3. DIP switch
Model | SW1.1 | SW1.2 | SW1.3 | SW1.4-1.5 | SW1.6-1.8 | SW2.1-2.8
022 | OFF | OFF | OFF | OFF | OFF | OFF
040 | OFF | OFF | ON | OFF | OFF | OFF
Symbol:
Symbol | Description | Symbol | Description
TB | Terminal block | FU | Fuze
KM | Contactor | TR | Trasformer
DB3A | Phase protector | CT1-2 | Current transformer

Installation

Working Condition

Item	UAL230D(R)5 UAL230D5LC UAL340D(R)5 UAL450D(R)5	UAL230D5-P UAL450D5-P	UAL230D5-Q UAL450D5-Q	UAL230D5-R UAL450D5-R
Power supply voltage	380V±10% 50Hz	220V±10% 60Hz	460V±10% 60Hz	380V±10% 60Hz
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 rate 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, see "Water Quality Requirement."			
Installation site	Take anti-snow and ventilation measures as required.			
Ambient temp.	Refer to the Performance Data Operating Range.			
Relative humidity	< 90%			

NOTES:

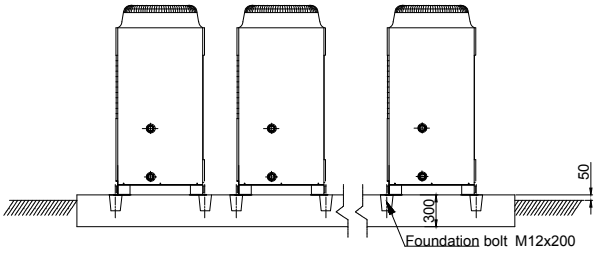
1. *THE UNIT IS STRICTLY TESTED BEFORE DELIVERY AND CAN WORK SAFELY IN THE RATED WORKING CONDITIONS.*
2. *FOR THE PERFORMANCE PARAMETERS OF THE UNIT IN DIFFERENT WORKING CONDITIONS, REFERENCE TABLE FOR PERFORMANCE PARAMETERS.*
3. *THIS IS THE NORMAL OPERATING TEMPERATURE RANGE FOR THE UNIT. BEYOND THIS TEMPERATURE RANGE, THE UNIT CAN ONLY OPERATE FOR A SHORT MOMENT BEFORE A FAILURE ALARM IS TRIGGERED.*

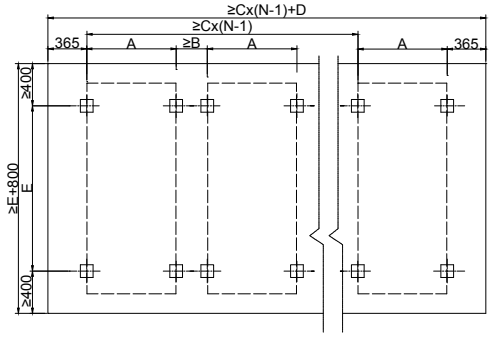
Installation Dimensions and Environment Limits

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.

The instructions, warranty, accessories and packing list of the units are placed on the shadow area on the right side of the units before delivery, as shown in the figure on the left side. Reserve maintenance space as large as possible permitted by the onsite conditions. If the units are installed in snowy area, take measures against the snow for the normal operation of units.

Assembling Unit Modules





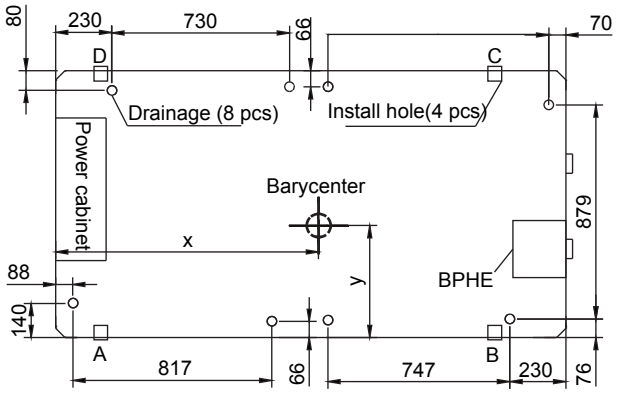
Installation size map Unit: mm

	A	B	C	D	E
UAL230D5/D5LC/DR5	845	400	1245	1575	1560
UAL340/450D(R)5	1056	544	1600	1786	1660

NOTE:

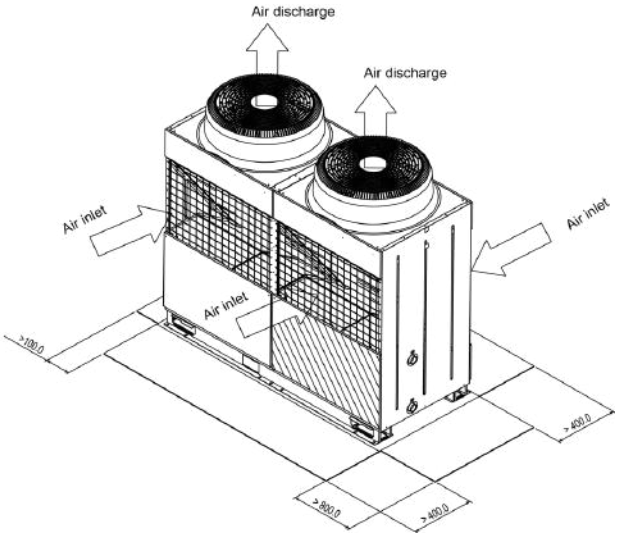
THE GROUNDWORK MUST BE A CONCRETE FLOOR OR A V-IRON STRUCTURE THAT IS STRONG ENOUGH TO BEAR THE OPERATION PRESSURE OF THE UNIT.
N REPRESENTS THE NUMBER OF MODULES INSTALLED.
EACH UNIT MUST BE FIXED BY 4 M12 BOLTS;
6 RUBBER CUSHIONS OF 20MM THICK MUST BE INSTALLED BETWEEN THE UNIT AND THE GROUNDWORK.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

Unit barycenter and drainage (Top view)

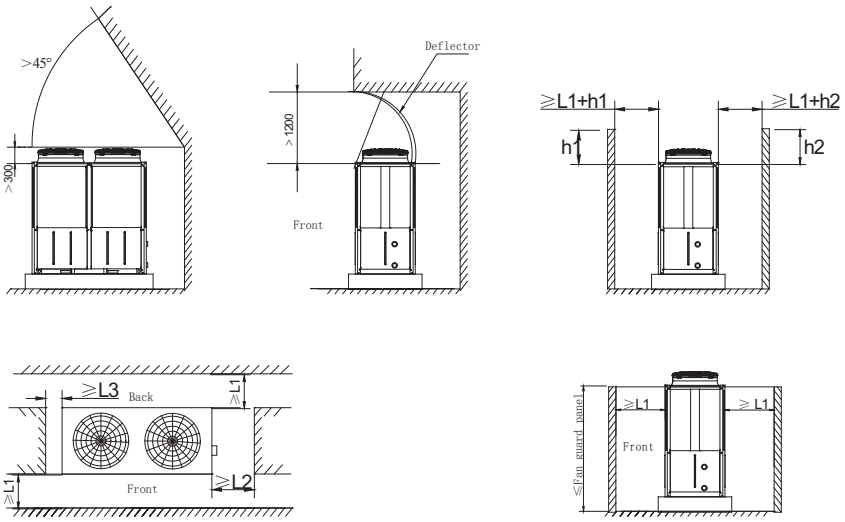


Model	X(mm)	Y(mm)	A(Kg)	B(Kg)	C(Kg)	D(Kg)
UAL340D5	1058	465	251	256	189	185
UAL340DR5	1045	500	240	235	195	200
UAL450D5	1072	458	280	269	201	192
UAL450DR5	1080	460	280	300	210	200

UAL230D5LC/D(R)5



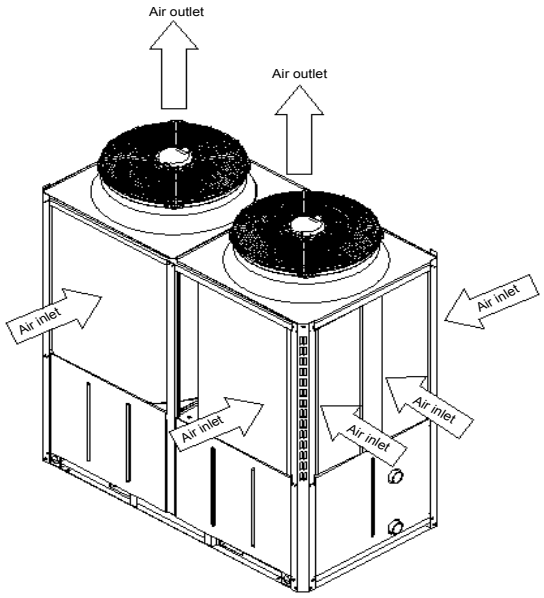
Installation space for single water chillers



L1	L2	L3
400	800	100

Unit: mm

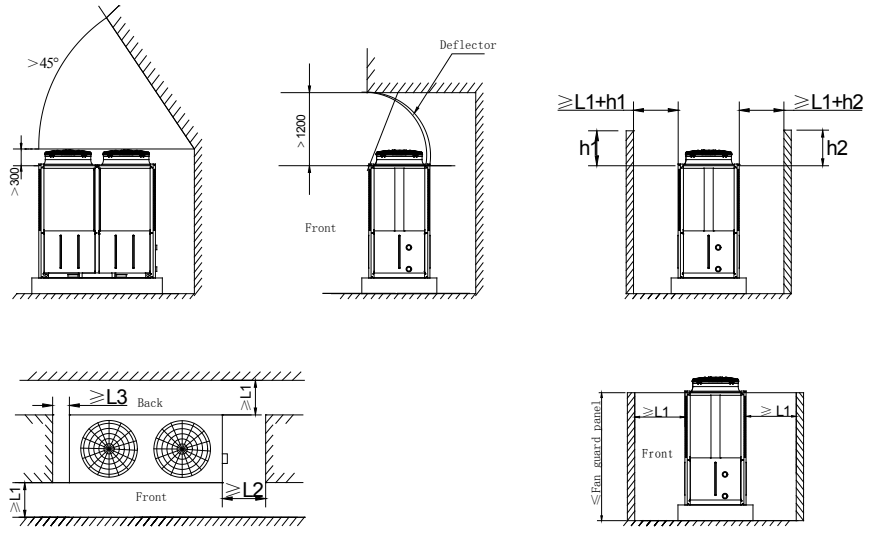
UAL340/450D(R)5



Installation space for single chiller

Unit: mm

L1	L2	L3
500	800	600



Installation space for multiple water chillers

UAL230D5LC/D(R)5

- Installation spacing A has to be more than 800mm;
- Assembly installation spacing L has to be not less than the corresponding value in Table 1;
- Distance L1, L2 from the wall: When the wall height H> 2300mm, L1, L2> 2000mm; when the wall height H≤2300mm, L1, L2> (H-300) mm.

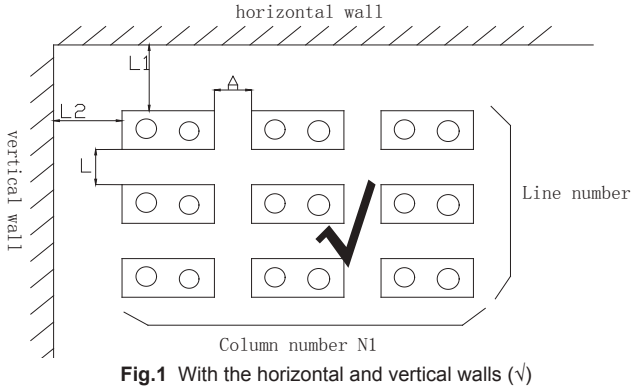


Fig.1 With the horizontal and vertical walls (√)

Note:
Installation Diagrams with "√" indicate the recommended, such as Figure 1 to 6; Installation Diagrams with "×" (including three sides or four-sides wall) indicate the prohibited, the unit installed in such a state is prone to cause the unpredictable failures of exhaust temperature, exhaust pressure and so on.

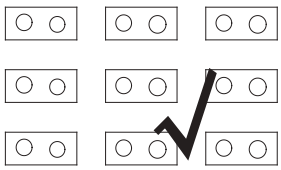


Fig.2 Without wall (√)

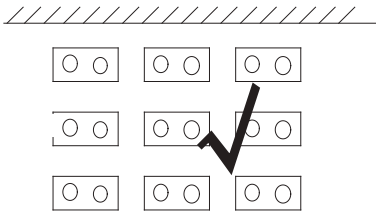


Fig.3 With one-side horizontal wall (√)

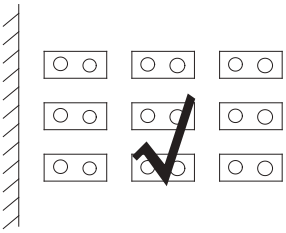


Fig.4 With one-side vertical wall (√)

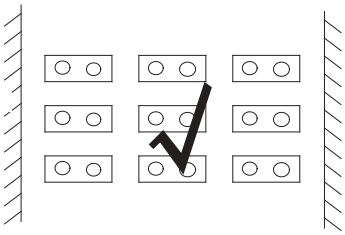


Fig.5 With two-side vertical walls (√)

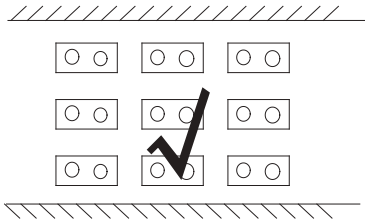


Fig.6 With two-side horizontal walls (√)

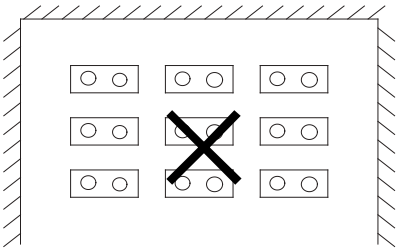


Fig.7 With three-side walls or more (×)

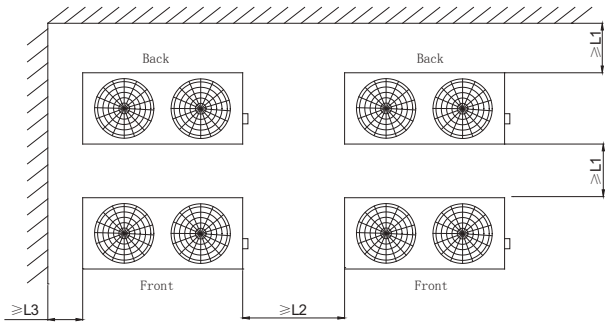
Table 1 Minimum spacing of assemble installation **unit: mm**

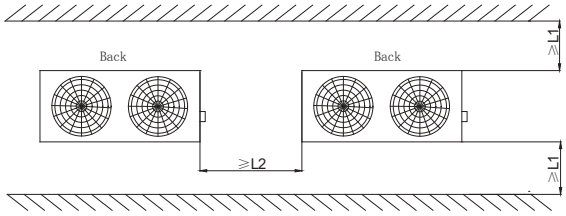
		Number of column										
		1	2	3	4	5	6	7	8	9	10	….
Number of rows	1	/										
	2	400										
	3	400										
	4	400										
	5	400		600		800						
	6	400		600	800	1200						
	7	400		600	800	1600						
	8	400		600	800	1600		2000				
	9	400		600	800	1600		2000		Please contact manufacturer		
	10	400		600	800	1600		2000				
	…	400		600	800	1600		2000				

Note: For the installation as shown in Fig.1 (both the horizontal and vertical walls exist, therefore, in the calculation, the column number shall be plus by 1, and the line number shall be plus by 2;
For example: In Fig.1, the number of columns is 3 + 1 = 4, the number of lines is 3 + 2 = 5, L value is 800mm; In Fig.2, the number of columns is 3 and the number of lines is 3, L value is 400.

UAL340/450D(R)5

Unit: mm

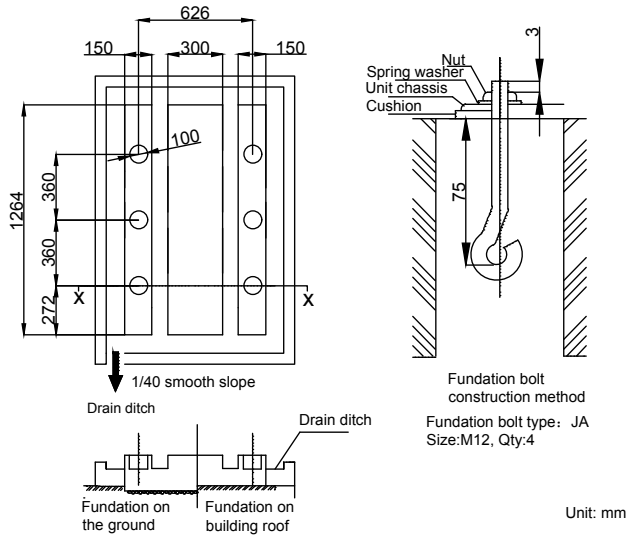


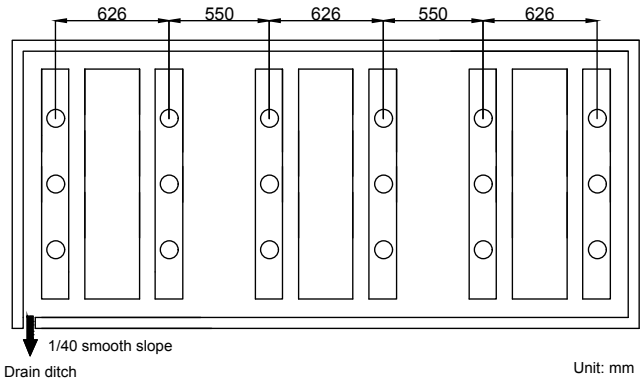


L1	L2	L3
500	800	600

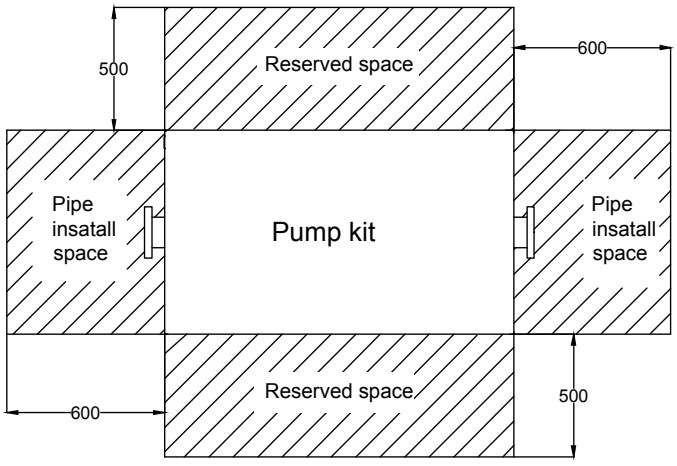
The installation base must be concrete ground or V-iron structure capable of bearing the operating weight of the units. N indicates the sum of installed modular. Each unit is fastened with four M12 bolts. Six rubber cushions with specifications of 280 x 180 x 20 mm must be installed between the units and installation base. The installation base must be equipped with drainage facility to drain away the condensate water and defrosting water.

Space Allotted for Pump Kit



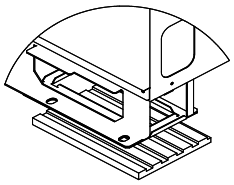


Multiple units installaion



Installing Chiller

- 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.

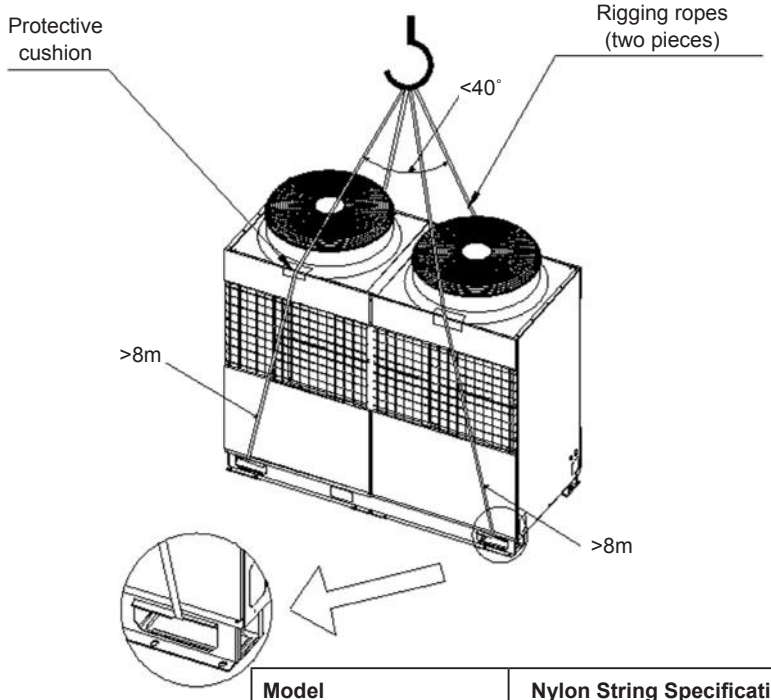


- Screw down the chilled water unit using anchor bolts so that it will not fall off in case of strong wind or earthquakes. To avoid damages caused by strong wind or earthquakes, The unit must be securely installed at a proper place to avoid direct hit of strong winds.
- Depending on mounting conditions, 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.

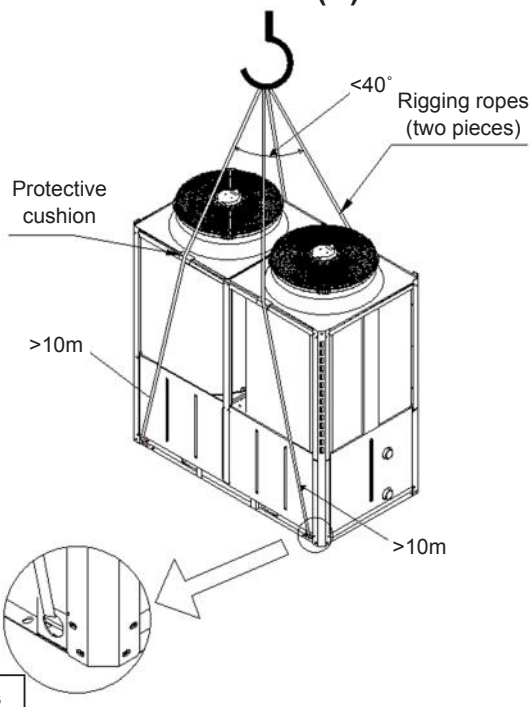
Hoisting Chillers

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.

UAL230D5/DLC/DR5



UAL340/450D(R)5



Model	Nylon String Specifications
UAL230D5/DLC/DR5	8m min (2 pcs.)
UAL340/450D(R)5	10m min (2 pcs)

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 which will affect the heat exchanger performance. Unsoftened water may also cause scale in the water pipes so as to increase water resistance and affect water flow and water pump working performance. Softened water must meet the following requirements.

Item			Benchmark value	Tendencies	
				Corrosion	Scaling
Benchmark items	pH (25°C)		7.0 - 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.					

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 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.

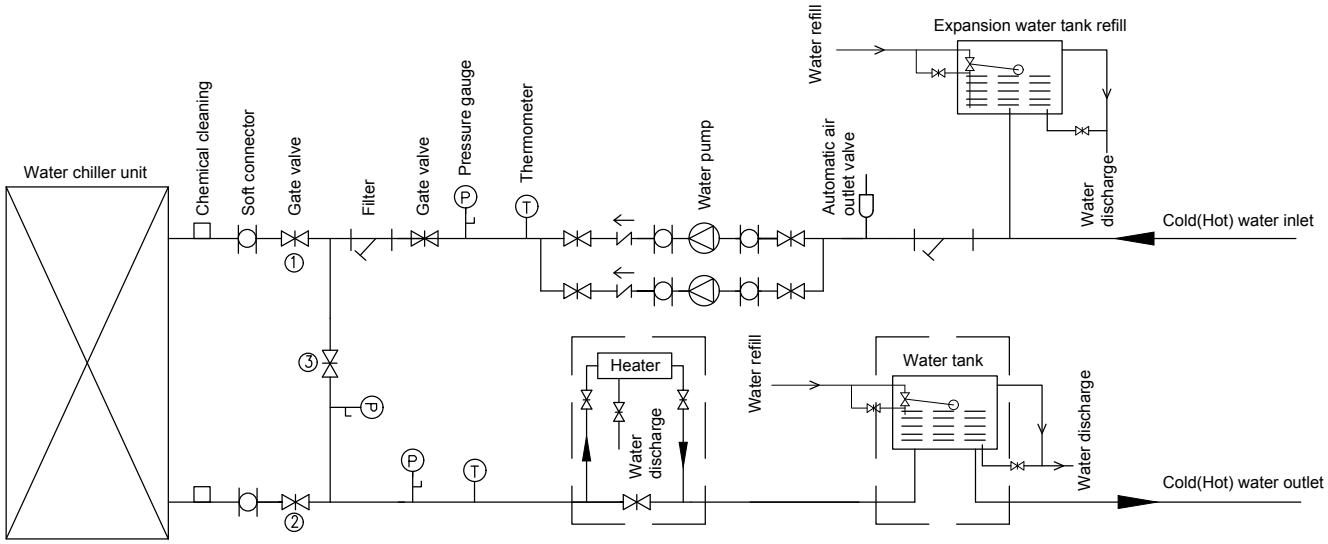
- Water pressure gauges and thermometers must be installed at the water inlets and outlets to facilitate the reading of unit operation status.
- The heat exchanger at the water side is made of stainless steel. Water scale may accumulate depending on the water quality and must be cleared using chemicals 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.

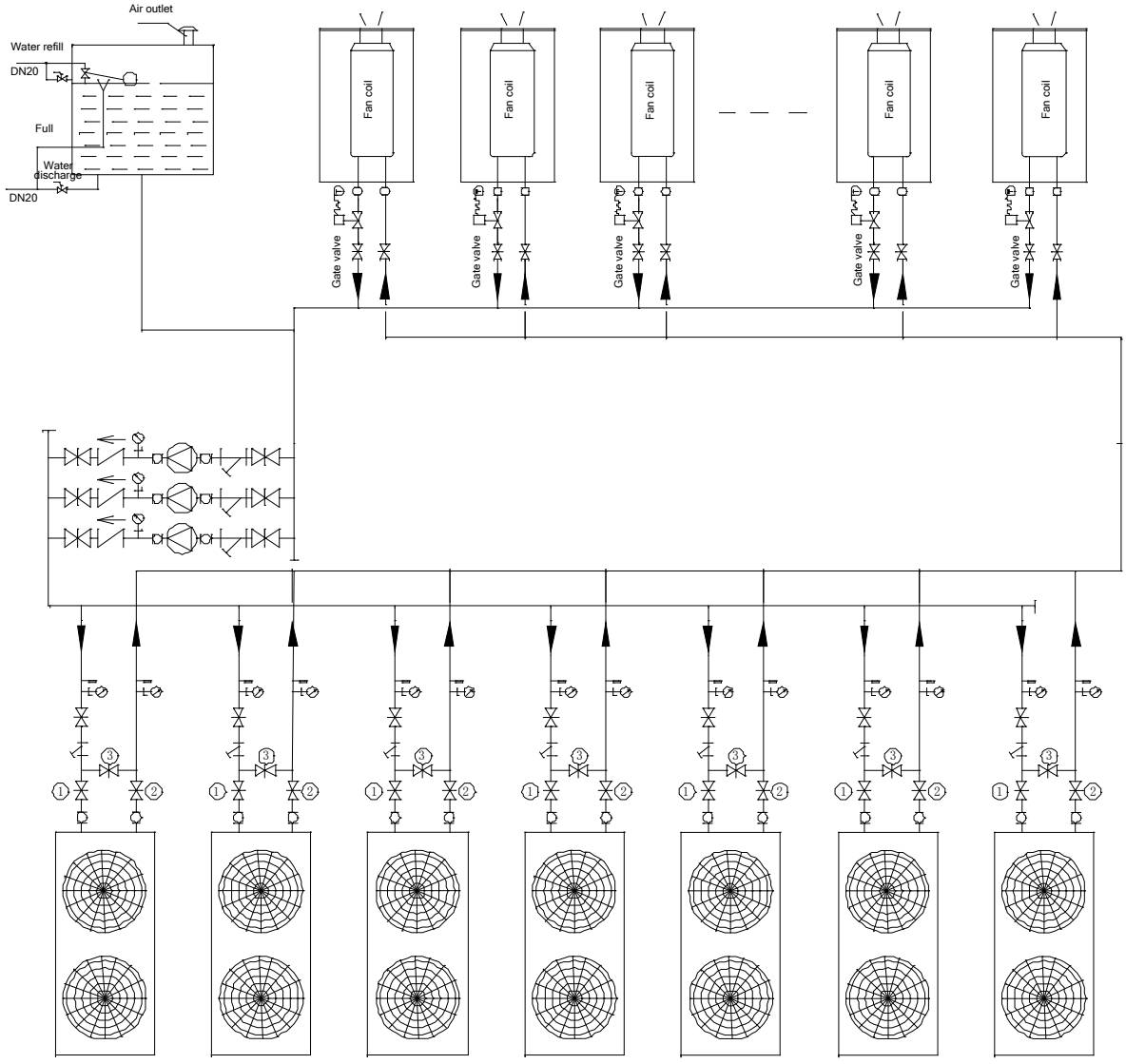
- Thermal insulated water tank with a proper volume is suggested to install. If the capacity is too small, the unit might frequently restart, which causes wear and tear on the compressor.
- An expansion water tank must be installed at the return water side of the water system to adapt to water pressure 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 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.

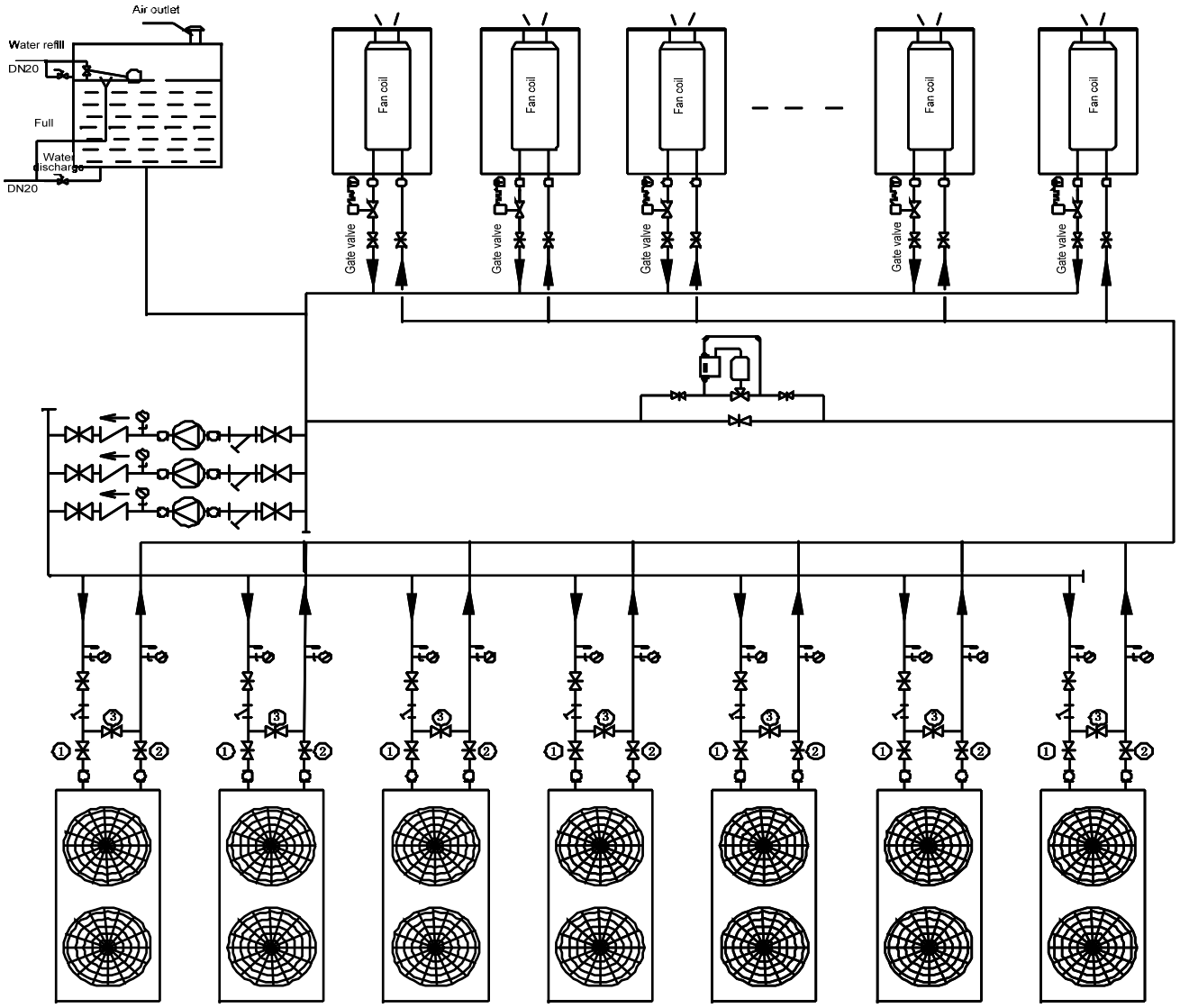
■ Installation illustration for the water system of a single unit:



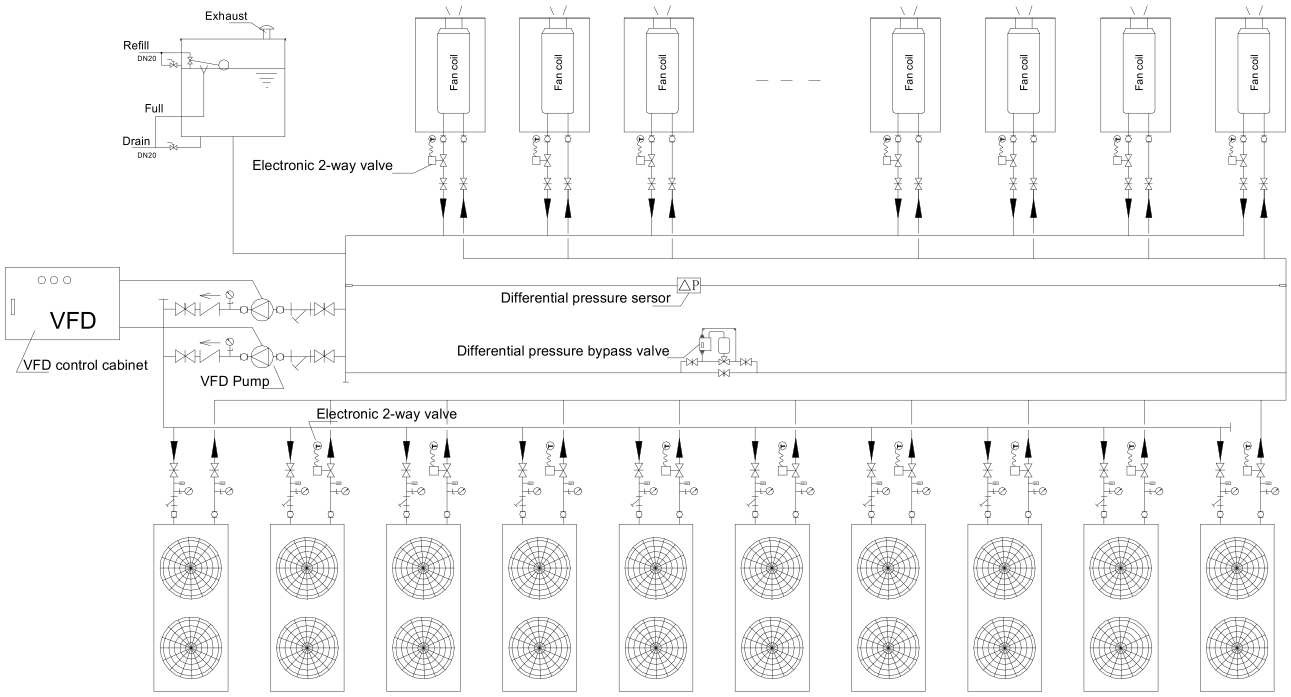
■ Multi-unit combination, illustration for water system with fixed chilled water flow which adjusts indoor temperature by modulating the terminal air rate



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



■ Installation illustration for water system of multi-unit combination (variable flow): (option)



1. By default, the unit is set as constant water flow system. Please consult factory in advance for variable flow system.
2. Install one electric two-way valve at the outlet of each slave unit to implement the interworking with the unit.
3. Install one electric two-way valve in each piece of terminal equipment to implement the interworking between the valve and the terminal. (Generally, relevant interface is preserved on the terminal fan coil unit. For details about wiring, please refer to the instruction to fan coil unit.)
4. It is recommended to use variable-frequency water pumps only to simplify the control and increase the control precision. Select the pump head based on the system water flow and water pressure. Adopt variable-speed water pump and install transducer to implement variable frequency.
5. Install the differential pressure sensor ΔP between the main pipes for chilled water supply and return. The location is shown in the schematic diagram of the water system. Check the difference between the chilled water supply pressure and return pressure, and transmit the signal of pressure difference change to the variable-frequency water pump, so as to change the speed of the variable frequency water pump and change the water flow on the chilled water side.

5.1 Requirement for minimum water flow adjustment: the variable frequency adjustment range of water pump is 50 Hz ~ 35 Hz, the selected minimum water flow for adjustment shall not be lower than 70% of the total designed water flow (ensure that the water flow of a single unit is no less than 70% of the rated water flow); the more the units configured, the smaller the ratio of selectable minimum water flow for adjustment to the designed water flow; therefore, configure and debug based on actual conditions.

5.2 Requirement for flow change rate: the flow adjustment speed of water pump cannot be too fast; otherwise, the stability of outlet temperature of the cold water unit and the terminal regulating valve can be affected; it is recommended to set the change rate of cold water flow to 2% ~ 30% per minute, the specific value varies with the model of the cooling unit, control, and the cycling time of water in the system; the optimum flow adjustment rate shall be determined on site after debugging, and the adjustment rate of 10% per minute can be used as a initial value for system debugging.

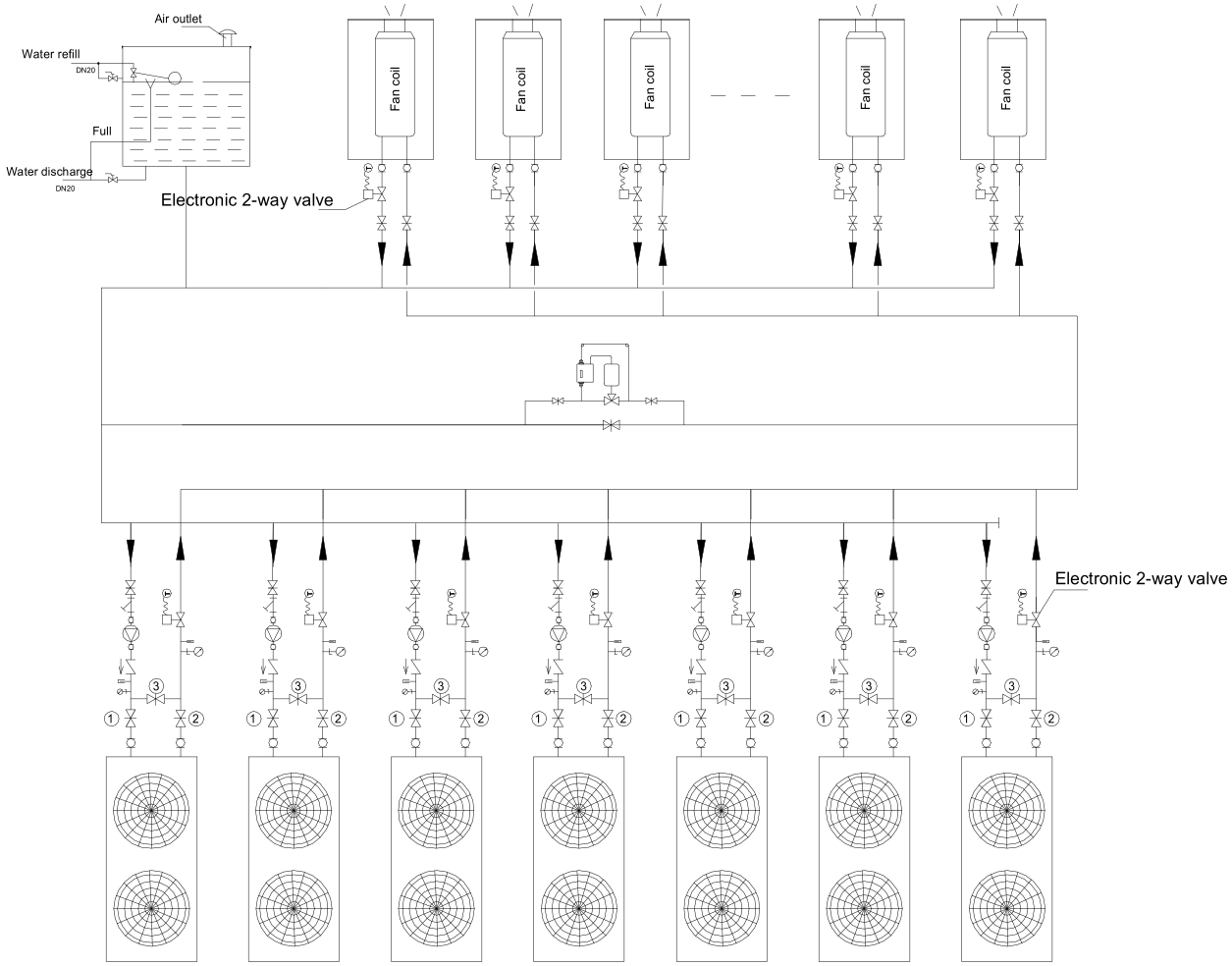
6. In the schematic diagram of the water system except for the components such as contactors and terminal blocks that are also included in fixed-frequency systems, variable-frequency systems also require frequency converters, DDC, differential pressure sensors and other components used for the variable-frequency startup and control of the water pump. Major components that make a variable flow rate system different from a fixed flow rate system are:

Component	Function
Electric two-way valve	Interworking with the unit
Frequency converter	Implementing water pump variable frequency
Differential pressure sensor	Checking pressure difference between water supply and water return, and controlling water pump adjustment
DDC	Direct digital controller

Interfaces implementing the preceding functions are preserved on the unit. For details about wiring, please refer to "Control System Instruction - PCB Instruction".

NOTE: THE PRECEDING INFORMATION SERVES ONLY AS A REFERENCE FOR THE DESIGN OF PRIMARY PUMP VARIABLE FLOW SYSTEM. IN PRACTICE, THE DESIGN PROVIDED BY A QUALIFIED HVAC INSTALLATION ENGINEERING COMPANY OR AN ARCHITECTURE DESIGN INSTITUTE SHALL PREVAIL.

■ Installation illustration for water system of multi-unit combination (one pump for one unit):



The water system with separate pumps for each unit is applicable only to the occasion where a few units are used (that is, one or two units). When the quantity of units is large, it is not recommended to use this type of water system. Because:

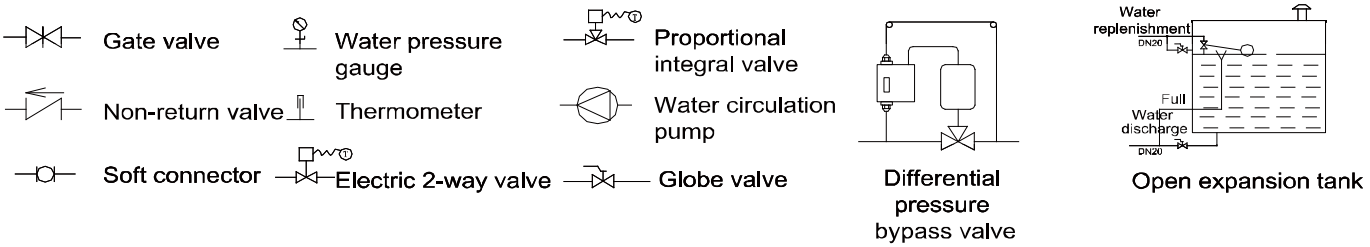
1. Single pump for each unit are not cost-effective when there are many units;
2. The water flow in the system might be over low, which can affect the unit performance. For example, for a group of 10 units with 200 terminals connected, in the case of low load, if only one unit and all terminals are running, the water flow in the system can be over low and will affect the unit performance.

Application instruction:

1. Set master unit water system to variable flow system.
2. Install electric two-way valve on the terminal side to implement the interworking between the electric two-way valve and the fan coil unit.
3. Install an independent water pump for each unit, and configure interworking between the water pump and the unit; install electric two-way valve on each slave unit to implement the interworking between the electronic two-way valve and the unit.

Interfaces implementing the preceding functions are preserved on the master unit. For details about wiring, please refer to "Control System Instruction - PCB Instruction".

■ 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)	UAL230D5/D5LC/DR5	≥2	≥3	≥4	≥5	≥6
	UAL340D(R)5	≥2.5	≥4	≥5	≥7	≥9
	UAL450D(R)5	≥2.5	≥5	≥6	≥9	≥11

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. Adopt the reversed return system in hydraulic system when two more units are combined. Although the initial investment is increased a little, the water flow in the system is more stable. if the direct return system is used, 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:

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

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

Vmin is referred to below table

Setting EWT (°C)	UAL230D(R)5 UAL230D5LC	UAL340D(R)5	UAL450D(R)5
14	357	281	336
13	421	325	398
12	515	386	486
11	662	476	625
10	927	618	875
9	1545	883	1458

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 OUTPUT 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 UAL230DR5 modular units with temperature of return water set to 12°C, a main inlet/out water pipe of DN80 and 50m long and 10 fans with coils 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. = 515

To avoid frequent unit startup/shutdown and alarms, the volume of the water tank should be no less than Vmin. - V = 515-251-15=249

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 difference °C
Vs----water volume in the system (total water volume in the system and pipes) m^3

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).

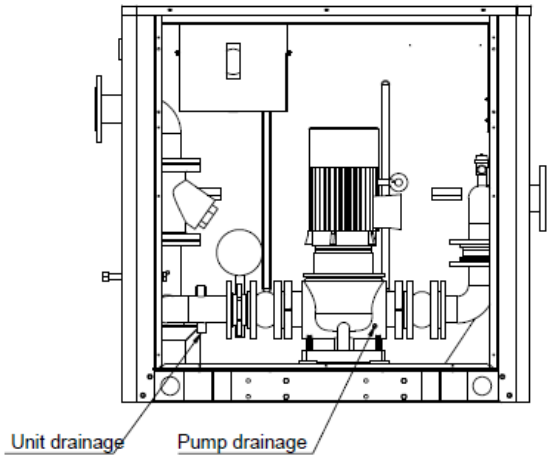
NOTE: THE WATER FLOW OF THE UNIT SHOULD CALCULATE ACCORDING THE WATER FLOW RANGE.

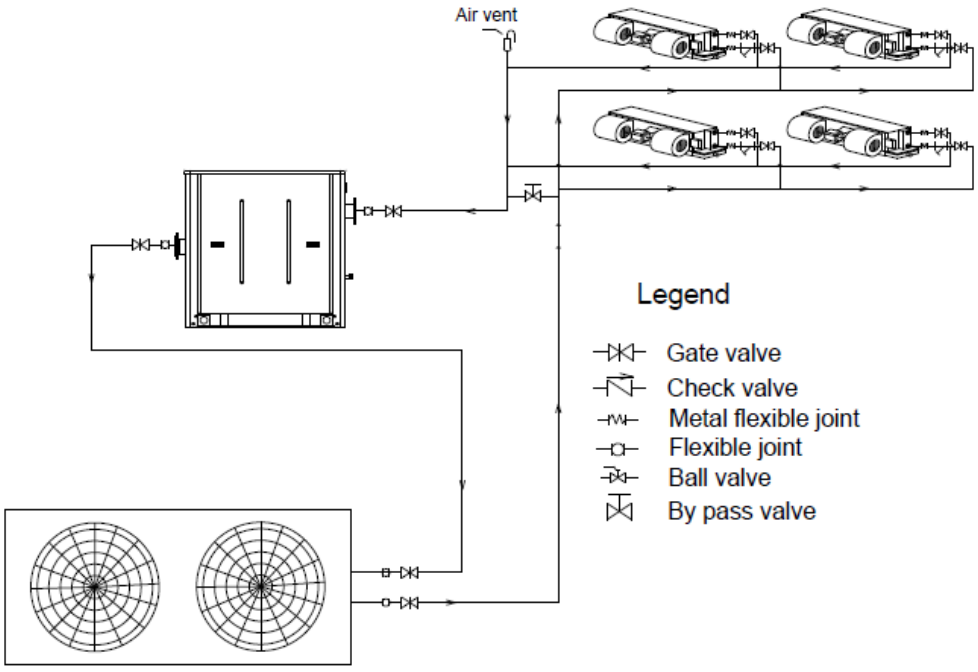
- Water flow range

Model		50Hz series						60Hz series	
		UAL230D5/D5LC	UAL230DR5	UAL340D5	UAL340DR5	UAL450D5	UAL450DR5	UAL230D5	UAL450D5
Flow range	Max. value (m^3/h)	14.7	15.0	22.4	22.4	30.2	29.1	15.3	30.86
	Rated value (m^3/h)	11.3	11.5	17.2	17.2	23.2	22.4	11.78	23.74
	Min. value (m^3/h)	7.9	8.0	12.1	12.1	16.2	15.7	8.2	16.62

Water System Installation with Pump Kit

Install a gate valve at the water inlet of the pump kit.
If the pump kit is installed at the highest point of the water system, use the air vent of the unit to exhaust gas. Otherwise, install an air vent at the highest point of the water system.
After the water system is connected, inject water into the system, and open the air vent to empty air in the water pipes and then close the valve.
Install a water drainage valve at the lowest point of the water pipe.
In an open system, the suction pressure must be more than 20kPa, and the suction level is not allowed to lower than the water pump inlet. Otherwise, it will cause pump cavitation, which affects the water supply and pump life.
If the unit is not used in winter, drain the water in the unit and cut off the power supply of the unit to prevent the unit from freezing or the electric heater damage. The following figure shows the drainage outlets of the unit and water pump:





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 "Water Quality Requirements")
  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 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-freeze in winter)					
4. Fin heat exchanger					
Clean the fin heat exchanger		▲			
5. Others					
Whether the 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 more 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

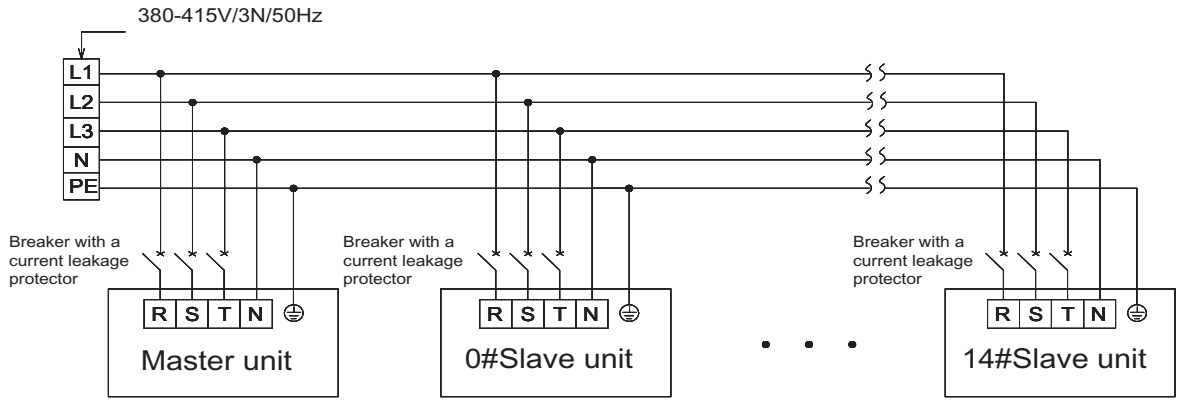
Before connecting the circuit, strictly abide by the following safety rules and measures:

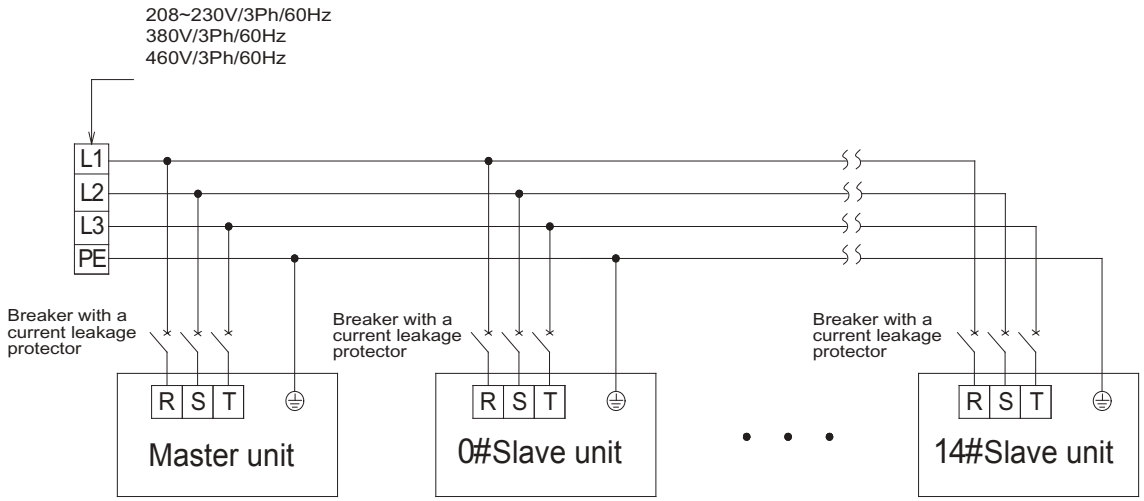
- The units must be installed by Daikin service personnel or personnel who are specially trained. The installation must abide by local laws and regulations in aspects of electricity, construction and environment protection as well as meet the requirement of product installation instructions. Users are 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	Power supply	Cross-sectional area of power cord (mm^2)			Max working current (A)	Max input power (kW)
		Main line (R/S/T)	Neutral line	Earth wire		
UAL230D5	380-415V/3N~/50Hz	10	10	10	47.2	27.6
UAL230D5	208-230V/3Ph/60Hz	25	-	25	84.3	26.5
UAL230D5	380V/3Ph/60Hz	10	-	10	50.2	26.5
UAL230D5	460V/3Ph/60Hz	10	-	10	41.2	26.5
UAL230DR5	380-415V/3N~/50Hz	10	10	10	47.7	28.6
UAL230D5LC	380-415V/3N~/50Hz	10	10	10	47.2	27.6
UAL340DR5	380-415V/3N~/50Hz	25	16	16	76.2	41.4
UAL340D5	380-415V/3N~/50Hz	25	16	16	76.2	41.4
UAL450DR5	380-415V/3N~/50Hz	35	25	16	99.8	54
UAL450D5	380-415V/3N~/50Hz	35	25	16	103.1	55.8
UAL450D5	208-230V/3Ph/60Hz	95	70	50	185.2	55.8
UAL450D5	380V/3Ph/60Hz	35	25	16	98.9	55.8
UAL450D5	460V/3Ph/60Hz	25	16	16	81.2	55.8

✧ 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

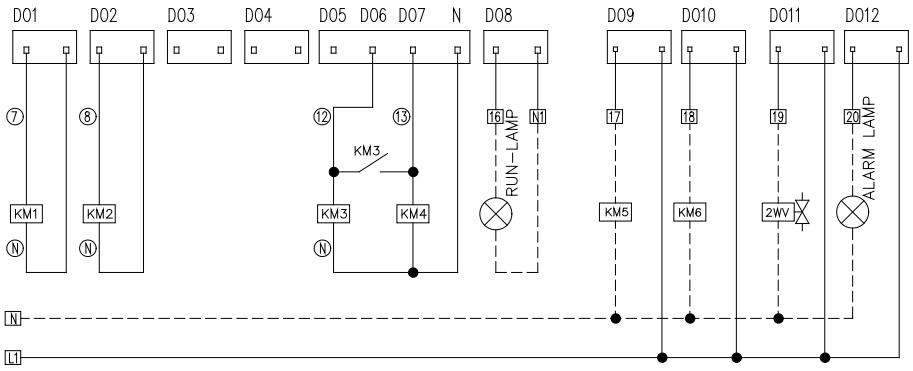


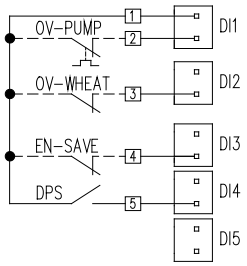


PCB Instruction

■ Connection illustration for pumps and other parts

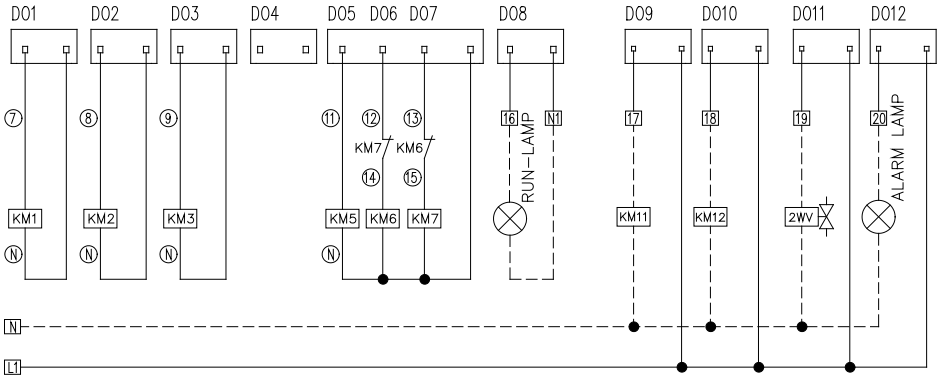
UAL230D5/D5LC/DR5

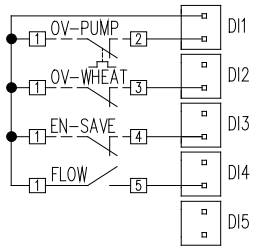




KM5: Water pump control contactor.
KM6: Water system heater control contactor.

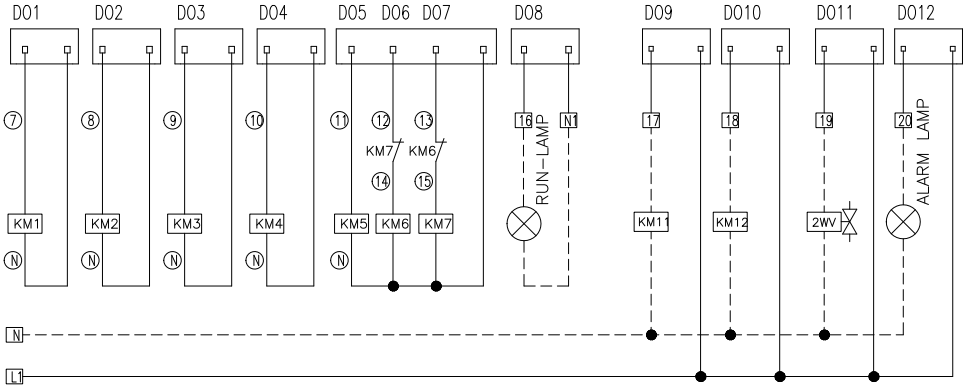
UAL340D5/DR5

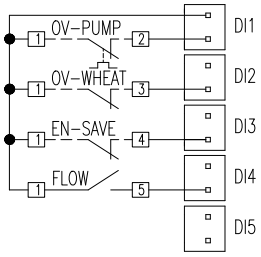




K11: Water pump control contactor.
K12: Water system heater control contactor

UAL450D5/DR5





KM11: Water pump control contactor
KM12: Water system heater control contactor

NOTE:

1. COOLING ONLY DOES NOT HAVE TO INSTALL WATER SYSTEM HEATER CONTROL CONTECTOR.

2. FLOW SWITCH HAS BEEN REPLACED BY WATER DIFFENRETIAL PRESSURE SWITCH.

NOTE:

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

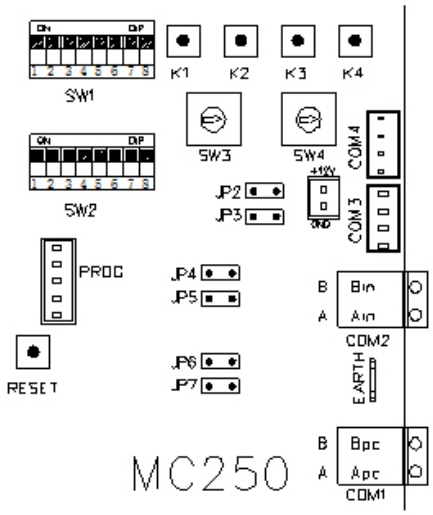
CONTROL MODULE VOLTAGE OUTPUT 220-240V FOR CONNECTIONS FOLLOWS: 2WV (WATER SYSTEM 2-WAY VALVE), KM11, KM12, RUN-LAMP, ALARM-LAMP.

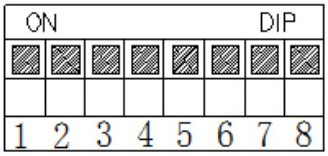
FOLLOWS ARE PASSIVE DRY CONTACTS (FEEDBACK SIGNAL 24V INPUT): OV-PUMP (PUMP OVERLAOD PROTECTION), OV-WHEAT (WATER SYSTEM HEATER OVERLOAD PROTECTION), EN-SAVE (2-WAY VALVE INTERLOCKING OR REMOTE CONTROL SWITCH)

IF THE AIR CONDITIONING SYSTEM RUNS WITH WATER SYSTEM OF "ONE PUMP FOR ONE UNIT", FOR THE CONTROLLING OF WATER PUMP OF SLAVE UNITS, YOU NEED TO CONNECT THE PUMP TO "2WV" POINT OF SLAVE UNITS.

■ **Address DIP setting**

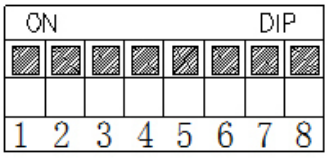
The controller of the units has DIP functions for FCU/AHU interlock control, automatic startup after power restoration, master/slave units setting, address and the quantity of slave units. The address DIP and the quantity of slave units must be set based on actual conditions after the air conditioner is installed. In addition, users must record the address number and installation position, and save them as an important file for reference during maintenance.





SW1

Upward represents 1
Downward represents 0



SW2

- The first digit of SW1 indicates the DIP of master/slave unit. It is set to ON for the master unit, and set to OFF for the slave unit.
- The digit code of second to third, sixth to eighth on SW1 indicates unit type identification.
- The fourth digit of SW1 indicates automatic startup after power restoration. It is set to ON when this function is used.
- The fifth digit of SW1 indicates AHU/FCU 2-way valve interlock function. It is set to ON when this function is used.

- The master machine must set the number of slave machines connected. The slave machine doesn't have to be set (bits 1~4 of SW2):

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 digit and the sixth digit of SW2 indicate the unit type. When is UAL230, set SW2.5 to ON and set SW2.6 to ON. When is UAL340, set SW2.5 to OFF and set SW2.6 to ON. When is UAL450, set SW2.5 to OFF and set SW2.6 to OFF.
- The seventh digit of SW2 indicates the control mode.
  ON: Leaving water temperature control (optional configuration).
  OFF: The entering water temperature control (standard configuration of factory).

Note: the unit with leaving water temperature control needs to be customized. The leaving water temperature sensor of main pipe (Th5) and connecting wire should be equipped by factory. In order to avoid frequent start-stop of units, the number of compressors should be ≥8 when module combination uses the leaving water temperature control.

- The eighth digit of SW2 indicates unit type identification.
- Address setting (SW3 and SW4: When SW1.1 is set as master unit, the setting is for master address, which range is 0~99.

SW3	SW4	Master unit address	SW3	SW4	Master unit address	SW3	SW4	Master unit address	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 (when SW1.1 is set as slave unit, the set is for slave address,which range from 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 NUMBERS MUST BE UNIQUE IN THE SAME SYSTEM.

THE UNIT CAN ONLY BE POWERED ON AND COMMISSIONED AFTER THE ADDRESS NUMBERS ARE CONFIGURED.

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.

- **Pump Kit Dip Switch Setting**

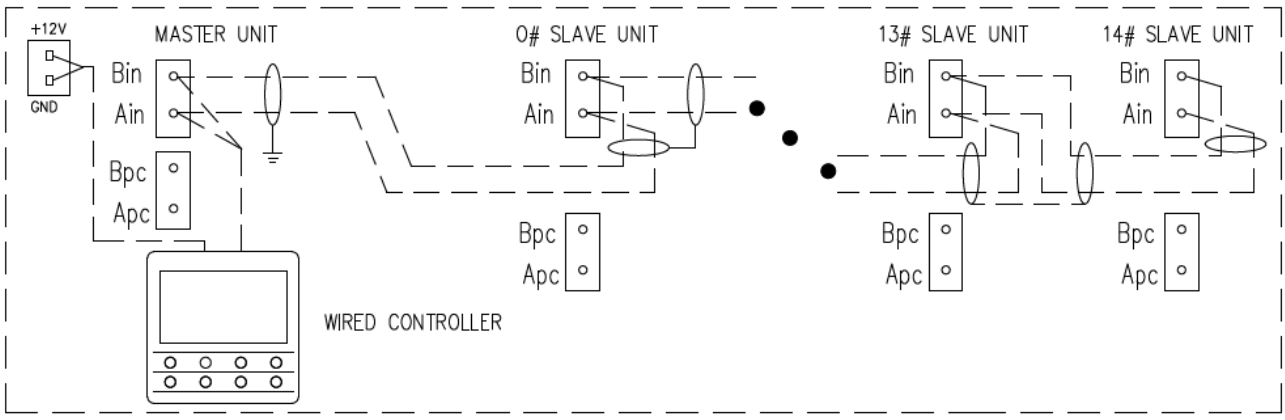
SW1.1~1.2: unit address setting
00: 0# pump kit, 01: 1# pump kit, 10: 2# pump kit, 11: 3# pump kit
SW1.3: unit model
0: 022D; 1: 040D
SW1.4: number of water pumps
0: double pumps, 1: single pump
SW1.5: pump working mode setting
0: single open, 1: double open (started at the same time)
SW1.6~1.8: reserved, SW2.1~2.8: reserved

SW3 and SW4 are used to set the quantity of interlocking fan coil units.

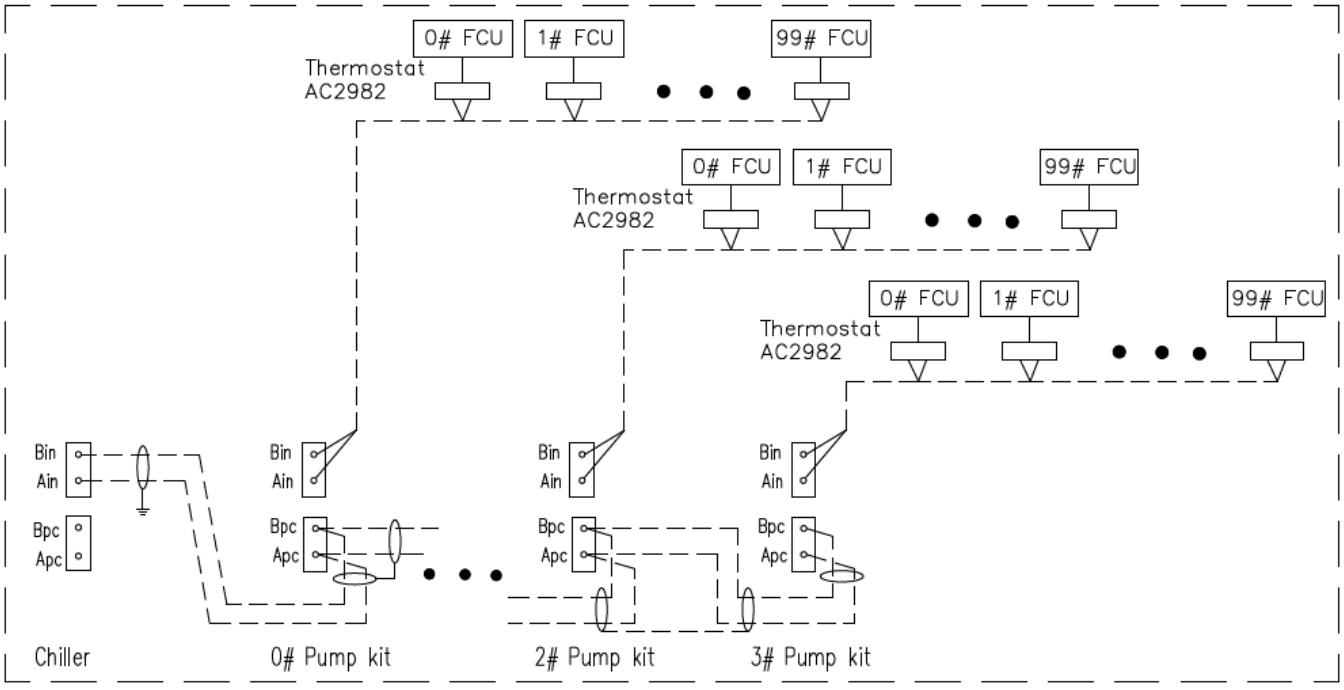
SW3	SW4	Qty of Fan Coil Units
0	0	0
0	1	1
0	2	2
0	3	3
…		…
9	7	97
9	8	98
9	9	99

■ Communication between master and slave unit

Control (Communication) Wire Connection

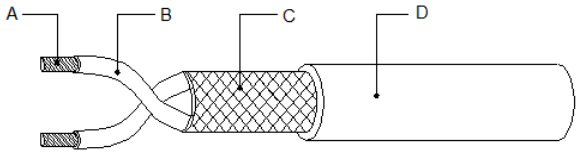


■ Communication Connection of Pump Kit



■ Communication Cable

A) conductor (WTC pair with cross section area of at least 0.5mm2 or 20AWG), B) insulator, C) Screen layer (twisted WTC with a screening factor no less than 95%) ,D) Outer jacket (PVC)



Legend of shielded twisted pair

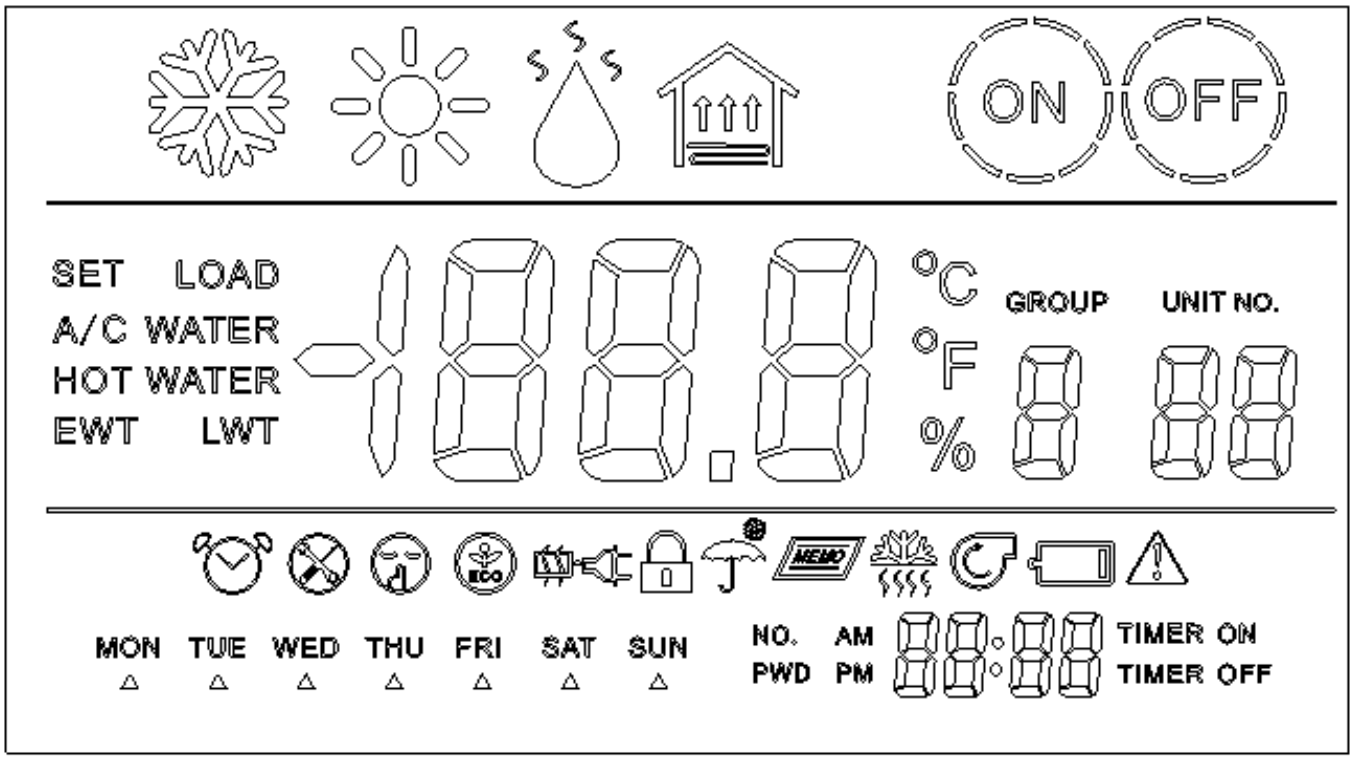
Note:
Better choose network cables with a tenser shielding layer and smaller twisting distance.
Please refer to the UL2547 or UL2791 wire specification.
The control wire must not be longer than 1000 meters.
The control wire must be at least 20cm away from major current wire.

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, timed 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.	No.
SET	Set	PWD	Password
A/C WATER	Air conditioning chilled water temperature	AM	a.m.
HOT WATER	Hot water temperature	PM	p.m.

Icon	Description	Icon	Description
	Timer	TIMER ON	Timer ON
	Defrost	TIMER OFF	Timer OFF
	Locked	UNIT NO.	Unit No.
	Silent 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

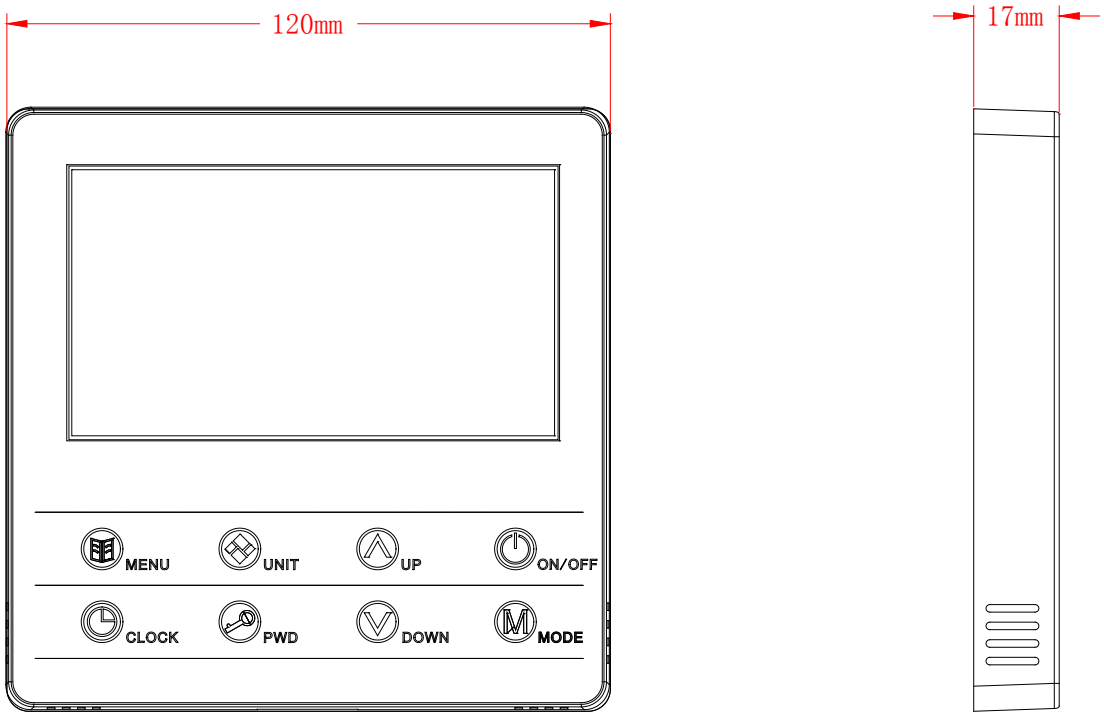
Keys of the Wired Controller

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

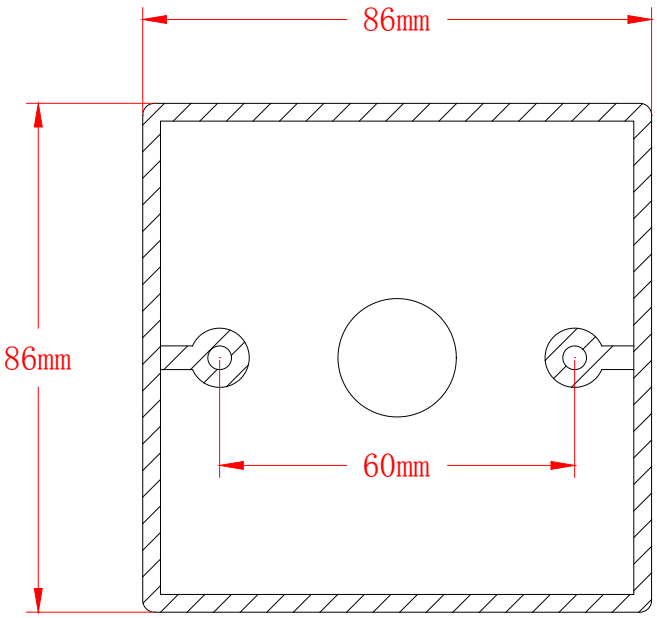
Icon	Description	Icon	Description
	Menu		Unit
	Clock		Password
	Up		ON/OFF
	Down		Mode

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, ask factory for 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

DAIKIN INDUSTRIES, LTD.

Head Office:
Umeda Center Bldg., 2-4-12, Nakazaki-Nishi,
Kita-ku, Osaka, 530-8323 Japan

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

Literature No.: ED-UAL-D-202001
Supersedes: ED-UAL-D-201902