



Service Manual

Exposed fan coil unit



Contents

PRODUCT	2
1 Introduction	2
1.1 lineup	2
1.2 Nomenclature	2
1.3 Feature	3
1.4 Working principle	3
1.5 Specifications.....	4
1.5.1 General data (nominal conditions)	4
1.5.2 Electrical data	5
1.5.3 Capacity correction	6
2 Exploded views and parts list.....	8
3 Scope of supply	17
DESIGN AND SELECTION.....	19
1 Selection principle.....	19
1.1 Selection steps	19
1.2 Example for selection.....	19
2 Power supply specification.....	20
UNIT CONTROL	22
UNIT INSTALLATION.....	24
1 Flow chart	24
2 Precautions for engineering work.....	24
3 Tools	26
4 Installation.....	27
4.1 Installation conditions	27
4.2 Dismensional data	27
4.3 Installation and maintenance space.....	28
4.4 Installation process	28
4.4.1 Supports fixing	28


4.4.2 Precautions for installation	29
4.4.3 Installation of water pipes	31
4.4.4 Installation of drain hose	32
4.4.5 Installation of water valve.....	32
5 Electric wiring.....	34
5.1 Precautions for electric wiring	34
5.2 Wiring steps	34
5.3 External wiring diagram	35
TEST OPERATION, TROUBLESHOOTING AND MAINTENANCE.....	37
1 Commissioning	37
2 Troubleshooting	37
3 Maintenance	38
3.1 Replacement of motor.....	38
3.2 Replacement of cooling coil	40

Product

PRODUCT

1 Introduction

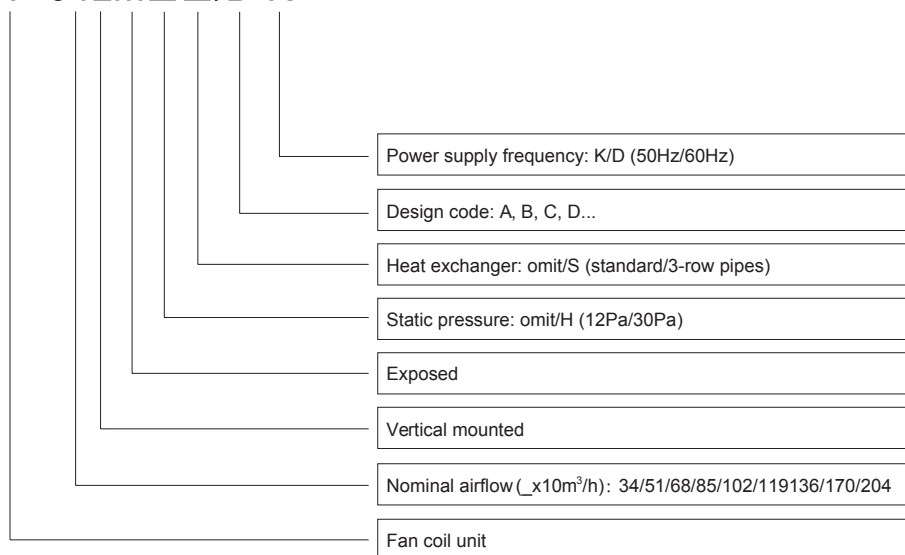
1.1 lineup

Name	Model	Product code	Cooling capacity (kW/ton)	Heating capacity (kW/ton)	Power supply	Appearance
Vertical mounted type	FP-22LM/D-K	EM51600300	1.4/0.40	2/0.57	220-240V AC 50Hz	
	FP-34LM/D-K	EM51600280	1.9/0.54	2.3/0.65		
	FP-51LM/D-K	EM51600290	2.8/0.80	3.4/0.97		
	FP-68LM/D-K	EM51600250	3.2/0.91	3.8/1.08		
	FP-85LM/D-K	EM51600270	4.25/1.21	4.9/1.39		
	FP-102LM/D-K	EM51600310	5.0/1.42	5.9/1.68		
	FP-119LM/D-K	EM51600260	5.3/1.51	6.45/1.83		
	FP-136LM/D-K	EM51600330	5.8/1.65	6.7/1.91		
	FP-170LM/D-K	EM51600320	9.2/2.62	10.7/3.04		
	FP-204LM/D-K	EM51600340	10.1/2.87	11.5/3.27		

Note: 1ton = 12000Btu/h = 3.517kW

1.2 Nomenclature

FP-34LM□□/D-K



1.3 Feature

(1) Extensive application

With the airflow ranging from 300 to 1900 m³/h and cooling capacity of 1.4 to 10.1kW, the FCU provides three air speed settings to satisfy users.

(2) High quality and reliability

Good materials and strict technical processing ensure high quality and normal service life of units.

(3) Low noise

In terms of dynamics, the optimized proportion of fan blade angle to impeller inner and outer diameters improves airflow and reduces noises.



(4) Lightweight and compactness

With aesthetic appeal, the unit is only 230mm thick, thus saving installation space.

The decoration panels have a curved surface presenting much thinness visually, which makes the unit harmonize with any interior.

A track-like design of the top and the margin between castings and sheet metals increase its uniqueness in appearance.

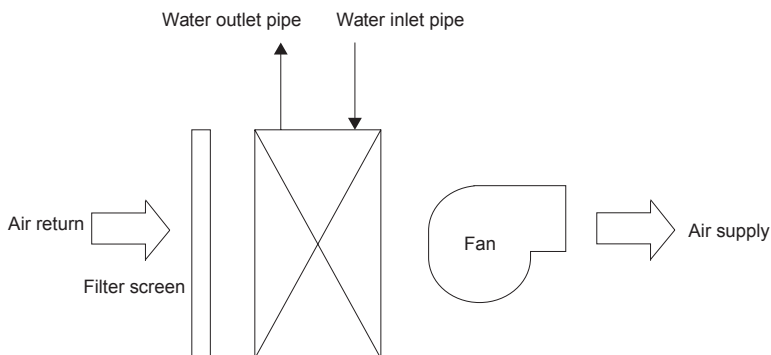
The color of castings on the top and bottom could be changed in accordance with clients' needs.

(5) Intelligent control

The control system through micro-computer programs is connected with its thermostat that has a LCD touch screen displaying many functions such as the cooling mode, heating mode, fan mode, timer and child lock.

1.4 Working principle

The chilled (or hot) water go in the fan coil and make heat exchange with the indoor circulated air (outdoor air), to realize cooling(heating), dehumidifying, filtrating or purifying. The processed air will be supplied to indoor directly or by air duct.



1.5 Specifications

1.5.1 General data (nominal conditions)

Model				FP-22LM/D-K	FP-34LM/D-K	FP-51LM/D-K	FP-68LM/D-K
Performance	Airflow	Hi	m ³ /h	300	400	580	680
		Mid		250	350	500	530
		Low		200	300	420	380
	Cooling capacity		kW	1.4	1.9	2.8	3.2
	Heating capacity		kW	2	2.3	3.4	3.8
	Water resistance		kPa	10	15	18	21
	Sound level		dB(A)	36	38	39	42
Coil	Type		Copper, high-efficiency louvered fins				
	Pressure	MPa	≤1.6				
Power supply			220-240VAC 50Hz				
Input power		W	35	46	56	66	
Electric shock resistance class			I				
Fan			Low-noise centrifugal fan				
Connection pipe	Inlet		Rc3/4(inner thread)				
	Outlet		Rc3/4(inner thread)				
	Condensate		Outer diameter of 22mm				
Net weight		kg	23	23	27	27	
Dimensions		mm	895×680×230		1050×680×230		
Thermostat model			Z5L5010AJ				

Model				FP-85LM/D-K	FP-102LM/D-K	FP-119LM/D-K
Performance	Airflow	Hi	m ³ /h	760	1000	1100
		Mid		600	740	860
		Low		400	510	610
	Cooling capacity		kW	4.25	5	5.3
	Heating capacity		kW	4.9	5.9	6.45
	Water resistance		kPa	27	18	20
	Sound level		dB(A)	45	48	50
Coil	Type		Copper, high-efficiency louvered fins			
	Pressure	MPa	≤1.6			
Power supply			220-240VAC 50Hz			
Input power		W	68	110	124	
Electric shock resistance class			I			
Fan			Low-noise centrifugal fan			
Connection pipe	Inlet		Rc3/4(inner thread)			
	Outlet		Rc3/4(inner thread)			
	Condensate		Outer diameter of 22mm			
Net weight		kg	28	33	33	
Dimensions		mm	1050×680×230	1350×680×230	1350×680×230	
Thermostat model			Z5L5010AJ			

Product

Model			FP-136LM/D-K	FP-170LM/D-K	FP-204LM/D-K	
Performance	Airflow	Hi	1100	1700	1900	
		Mid	870	1275	1425	
		Low	620	850	950	
	Cooling capacity		kW	5.8	9.2	10.1
	Heating capacity		kW	6.7	10.7	11.5
	Water resistance		kPa	25	45	55
	Sound level		dB(A)	50	49	52
Coil	Type		Copper, high-efficiency louvered fins			
	Pressure	MPa	≤1.6			
Power supply			220-240VAC 50Hz			
Input power		W	128	155	195	
Electric shock resistance class			I			
Fan			Low-noise centrifugal fan			
Connection pipe	Inlet		Rc3/4(inner thread)			
	Outlet		Rc3/4(inner thread)			
	Condensate		Outer diameter of 22mm			
Net weight		kg	34.5	47	47.5	
Dimensions		mm	1350×680×230	1773×680×230	1773×680×230	
Thermostat model			Z5L5010AJ			

Notes:

- (a) Nominal cooling conditions: indoor dry/wet bulb temperature of 27/19°C, entering and leaving water temperature of 7/12°C. Nominal heating conditions: indoor dry bulb temperature of 20°C, indoor wet bulb temperature of no more than 15°C, entering water temperature of 45°C and leaving water temperature of 40°C .
- (b) The sound level is tested under the semi-anechoic chamber and the actual value will change under different conditions.
- (c) When conditions are out of the range, please contact GREE.

1.5.2 Electrical data

Model	Power supply	Fan quantity
FP-22LM/D-K	220-240V AC 50Hz	1
FP-34LM/D-K	220-240V AC 50Hz	1
FP-51LM/D-K	220-240V AC 50Hz	2
FP-68LM/D-K	220-240V AC 50Hz	2
FP-85LM/D-K	220-240V AC 50Hz	2
FP-102LM/D-K	220-240V AC 50Hz	2
FP-119LM/D-K	220-240V AC 50Hz	2
FP-136LM/D-K	220-240V AC 50Hz	2
FP-170LM/D-K	220-240V AC 50Hz	4
FP-204LM/D-K	220-240V AC 50Hz	4

1.5.3 Capacity correction

(1) Cooling and heating capacity correction factor

Model		FP-22	FP-34	FP-51	FP-68	FP-85	FP-102	FP-119	FP-136	FP-170	FP-204
Middle speed	Cooling	0.81	0.82	0.75	0.71	0.72	0.73	0.74	0.79	0.76	0.77
	Heating	0.80	0.80	0.73	0.68	0.69	0.70	0.72	0.78	0.74	0.72
Low speed	Cooling	0.67	0.65	0.59	0.55	0.63	0.52	0.66	0.63	0.62	0.59
	Heating	0.63	0.62	0.56	0.52	0.60	0.50	0.63	0.60	0.60	0.57

(2) Cooling capacity correction factor

Entering water temp. (°C)	Water flow (multiple)	Inlet air									
		DB24°C		DB25°C		DB26°C		DB27°C		DB28°C	
		WB17°C		WB18°C		WB19°C		WB19.5°C		WB21°C	
		SH	TH	SH	TH	SH	TH	SH	TH	SH	TH
5	0.8	0.70	0.80	0.73	0.88	0.75	0.97	0.79	1.02	0.80	1.16
	1.0	0.74	0.89	0.78	0.98	0.79	1.07	0.84	1.13	0.84	1.29
	1.2	0.77	0.96	0.80	1.05	0.82	1.15	0.87	1.21	0.87	1.38
6	0.8	0.67	0.76	0.71	0.84	0.72	0.91	0.76	0.96	0.77	1.10
	1.0	0.72	0.85	0.75	0.93	0.76	1.02	0.80	1.07	0.81	1.22
	1.2	0.74	0.90	0.77	1.00	0.79	1.09	0.83	1.14	0.84	1.31
7	0.8	0.66	0.71	0.68	0.78	0.70	0.86	0.74	0.90	0.74	1.03
	1.0	0.70	0.79	0.73	0.87	0.74	0.95	0.78	1.00	0.79	1.14
	1.2	0.72	0.85	0.75	0.93	0.77	1.02	0.81	1.07	0.82	1.22
8	0.8	0.61	0.69	0.64	0.76	0.65	0.83	0.68	0.87	0.69	1.05
	1.0	0.65	0.77	0.68	0.84	0.69	0.92	0.73	0.97	0.73	1.11
	1.2	0.67	0.82	0.70	0.90	0.71	0.99	0.75	1.04	0.76	1.18
9	0.8	0.61	0.62	0.64	0.68	0.65	0.74	0.68	0.78	0.69	0.89
	1.0	0.65	0.69	0.68	0.76	0.69	0.83	0.73	0.87	0.73	0.99
	1.2	0.67	0.74	0.70	0.81	0.71	0.88	0.75	0.93	0.76	1.06

Notes:

- (a) TH: total heat (W)
- (b) SH: sensible heat (W)
- (c) DB: dry bulb temperature (°C)
- (d) WB: wet bulb temperature (°C)

(3) Heating capacity correction factor

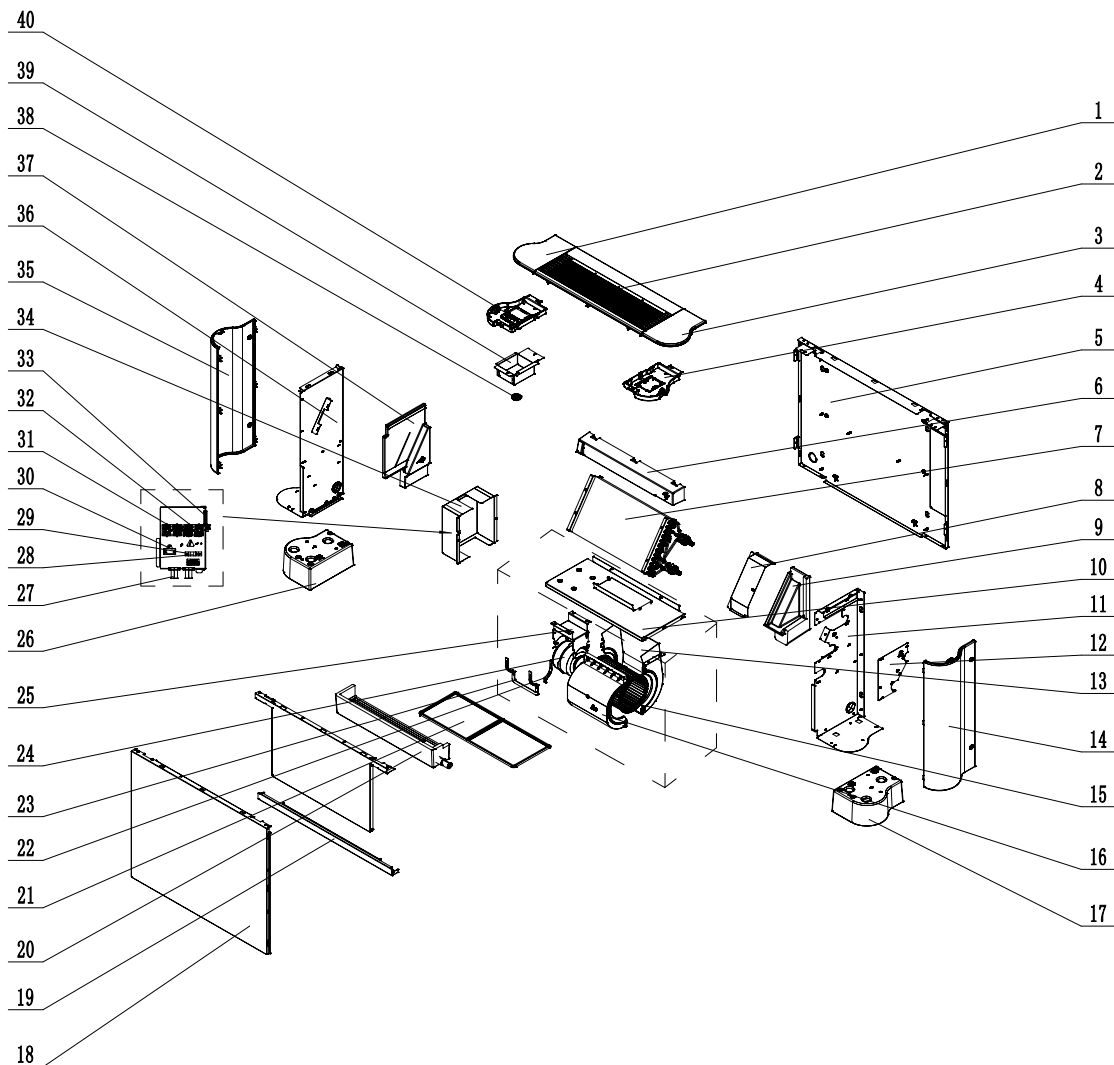
Entering water temp. (°C)	Water flow (multiple)	Inlet air					
		DB16°C	DB18°C	DB20°C	DB21°C	DB22°C	DB24°C
40	0.8	0.56	0.52	0.48	0.46	0.44	0.41
	1.0	0.58	0.54	0.50	0.48	0.46	0.42
	1.2	0.60	0.55	0.51	0.49	0.47	0.44
45	0.8	0.71	0.66	0.61	0.59	0.56	0.52
	1.0	0.74	0.68	0.63	0.61	0.59	0.54
	1.2	0.76	0.70	0.65	0.63	0.60	0.55
50	0.8	0.86	0.80	0.74	0.71	0.68	0.63
	1.0	0.90	0.83	0.77	0.74	0.71	0.65
	1.2	0.92	0.85	0.79	0.76	0.73	0.67
55	0.8	1.01	0.94	0.87	0.84	0.80	0.73
	1.0	1.05	0.97	0.90	0.87	0.84	0.77
	1.2	1.08	1.00	0.93	0.90	0.86	0.79
60	0.8	1.16	1.08	1.00	0.96	0.92	0.84
	1.0	1.21	1.12	1.04	1.00	0.96	0.88
	1.2	1.25	1.15	1.07	1.03	0.99	0.91
65	0.8	1.20	1.16	1.11	1.08	1.06	1.01
	1.0	1.25	1.21	1.15	1.13	1.11	1.05
	1.2	1.29	1.25	1.19	1.16	1.14	1.08
70	0.8	1.34	1.29	1.23	1.21	1.19	1.13
	1.0	1.40	1.35	1.29	1.26	1.23	1.17
	1.2	1.44	1.39	1.32	1.30	1.27	1.21
75	0.8	1.49	1.43	1.37	1.34	1.31	1.25
	1.0	1.55	1.50	1.43	1.40	1.37	1.30
	1.2	1.60	1.54	1.47	1.44	1.41	1.34

Notes:

- (a) TH: total heat (W)
- (b) SH: sensible heat (W)
- (c) DB: dry bulb temperature (°C)
- (d) WB: wet bulb temperature (°C)

2 Exploded views and parts list

(1) FP-22LM/D-K, FP-34LM/D-K (list code: EM51600280)



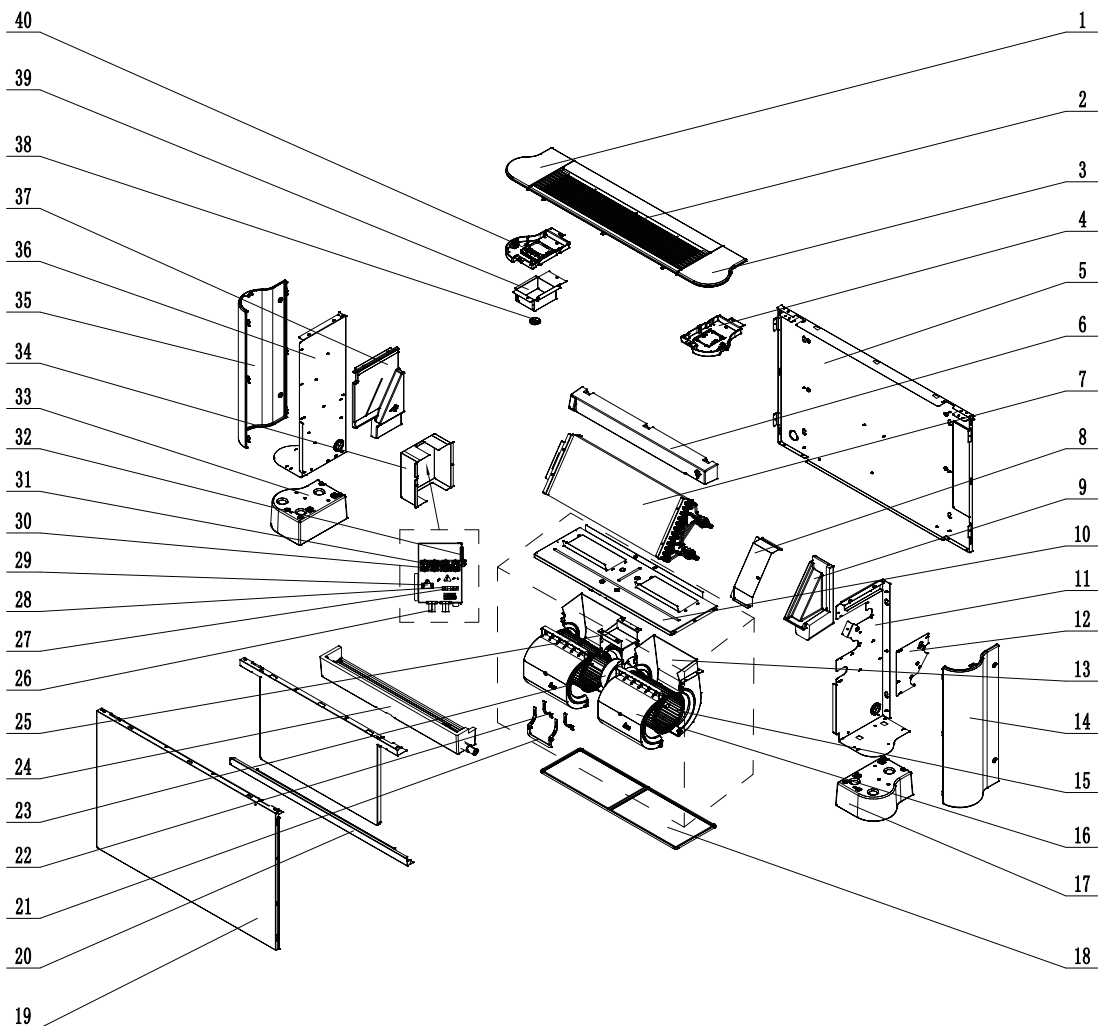
No.	Name	Quantity
1	Display panel Cover	1
2	Grille	1
3	Display panel Cover	1
4	Displayer Box	1
5	Base Deck Assy	1
6	Cellular	1
7	Surface-Cooler Assy	1
8	Connection Panel	1
9	Cellular	1
10	Centrifugal Fan Assy	1
11	Right Side Plate Assy	1

Product

No.	Name	Quantity
12	Closed Panel	1
13	Propeller Housing	1
14	Right Side Plate	1
15	Centrifugal fan blade	1
16	Propeller Housing	1
17	Base	1
18	Panel	1
19	Connection Panel	1
20	Cellular Assy	1
21	Filter Assy	1
22	Bar Clasp	2
23	Support sub-assy	1
24	Motor	1
25	Motor Support Assy	1
26	Base	1
27	Cable cross loop	2
28	Wire Clamp	1
29	Insulated Gasket	1
30	Capacitance	1
31	Terminal Board	1
32	Terminal Board	1
33	Cable cross loop	6
34	Electric Box Cover	1
35	Left Side Plate	1
36	Left Side Plate Assy	1
37	Cellular	1
38	Cable cross loop	1
39	Connection Panel	1
40	Display Panel	1

Product

(2) FP-51LM/D-K, FP-68LM/D-K, FP-85LM/D-K (list code: EM51600250)

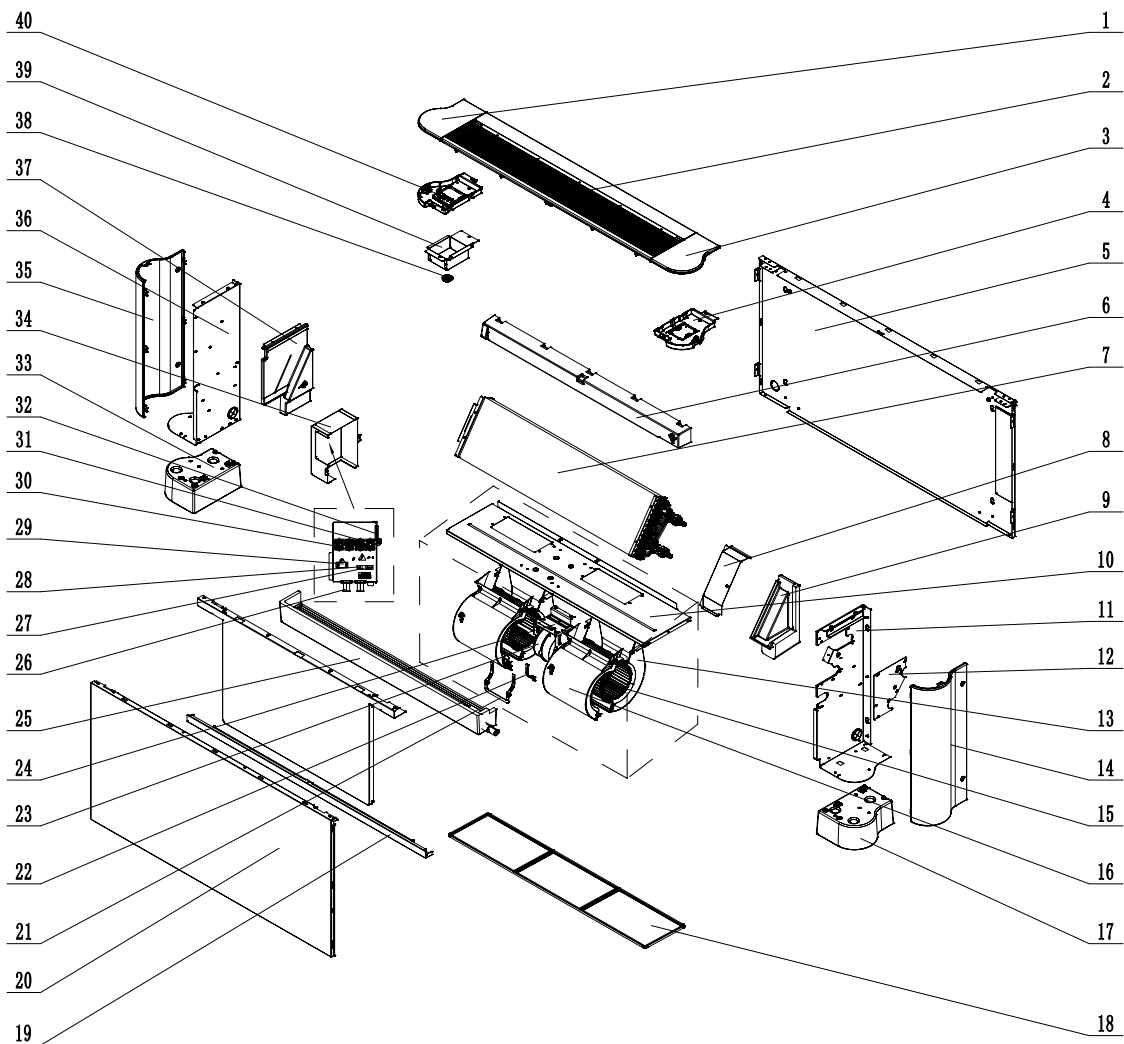


No.	Name	Quantity
1	Display panel Cover	1
2	Grille	1
3	Display panel Cover	1
4	Displayer Box	1
5	Base Deck Assy	1
6	Cellular	1
7	Surface-Cooler Assy	1
8	Connection Panel	1
9	Cellular	1
10	Centrifugal Fan Assy	1
11	Right Side Plate Assy	1
12	Closed Panel	1
13	Propeller Housing	2
14	Right Side Plate	1
15	Centrifugal fan blade	2

Product

No.	Name	Quantity
16	Propeller Housing	2
17	Base	1
18	Filter Assy	1
19	Panel	1
20	Connection Panel	1
21	Support sub-assy	1
22	Bar Clasp	2
23	Motor	1
24	Cellular Assy	1
25	Motor Support Assy	1
26	Cable cross loop	2
27	Wire Clamp	1
28	Insulated Gasket	1
29	Capacitance	1
30	Terminal Board	1
31	Terminal Board	1
32	Cable cross loop	6
33	Base	1
34	Electric Box Cover	1
35	Left Side Plate	1
36	Left Side Plate Assy	1
37	Cellular	1
38	Cable cross loop	1
39	Connection Panel	1
40	Display Panel	1

(3) FP-102LM/D-K, FP-119LM/D-K, FP-136LM/D-K (list code: EM51600310)

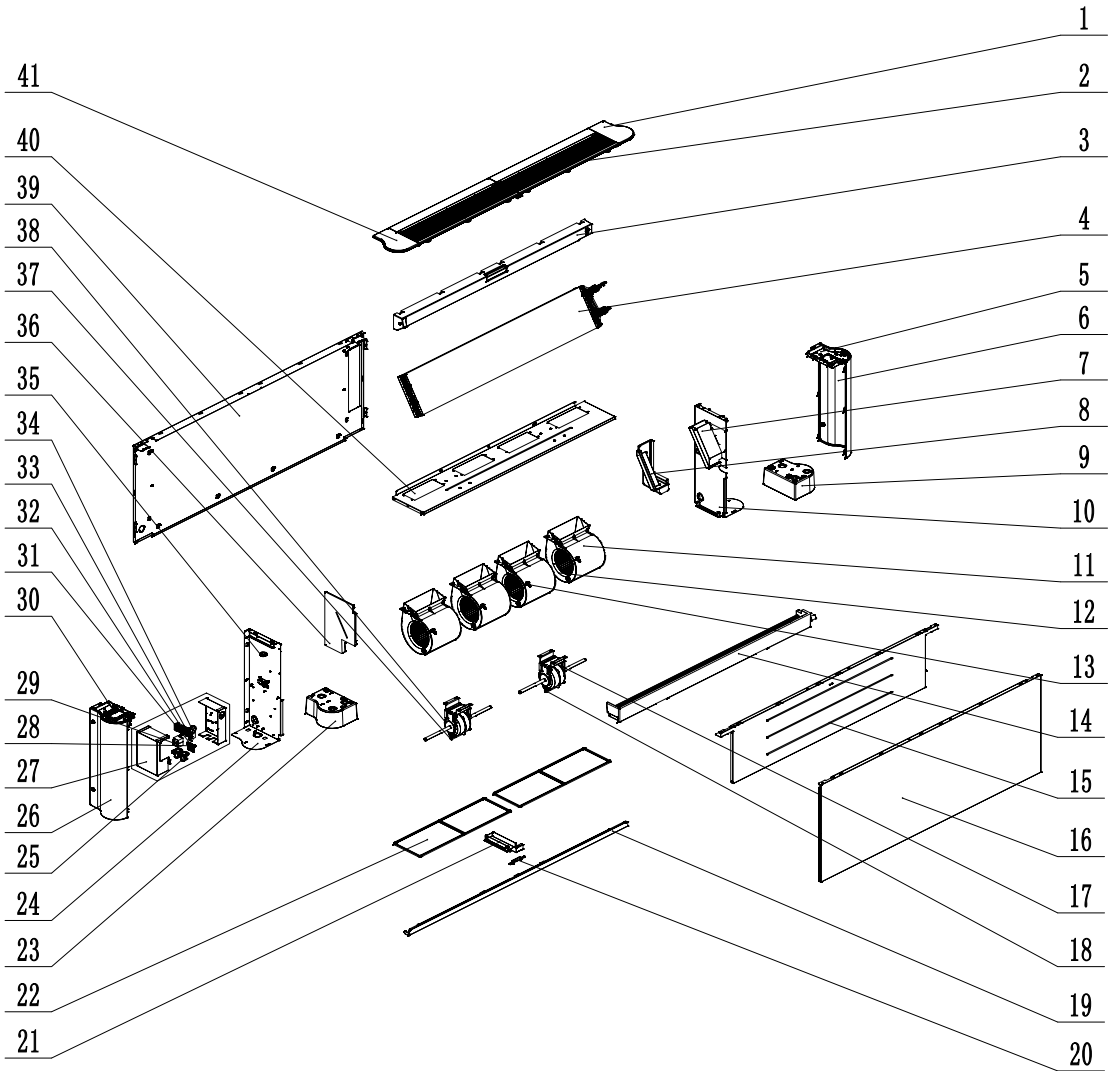


No.	Name	Quantity
1	Display panel Cover	1
2	Grille	1
3	Display panel Cover	1
4	Displayer Box	1
5	Base Deck Assy	1
6	Cellular	1
7	Surface-Cooler Assy	1
8	Connection Panel	1
9	Cellular	1
10	Barrier Assy	1
11	Right Side Plate Assy	1
12	Closed Panel	1
13	Propeller Housing	2
14	Right Side Plate	1

Product

No.	Name	Quantity
15	Centrifugal fan blade	2
16	Propeller Housing	2
17	Base	1
18	Filter Assy	1
19	Connection Panel	1
20	Panel	1
21	Support sub-assy	1
22	Bar Clasp	2
23	Motor	1
24	Motor Support	1
25	Cellular Assy	1
26	Cable cross loop	2
27	Wire Clamp	1
28	Insulated Gasket	1
29	Capacitance	1
30	Terminal Board	1
31	Terminal Board	1
32	Cable cross loop	6
33	Base	1
34	Electric Box Cover	1
35	Left Side Plate	1
36	Left Side Plate Assy	1
37	Cellular	1
38	Cable cross loop	1
39	Connection Panel	1
40	Display Panel	1

(4) FP-170LM/D-K (list code: EM51600320)

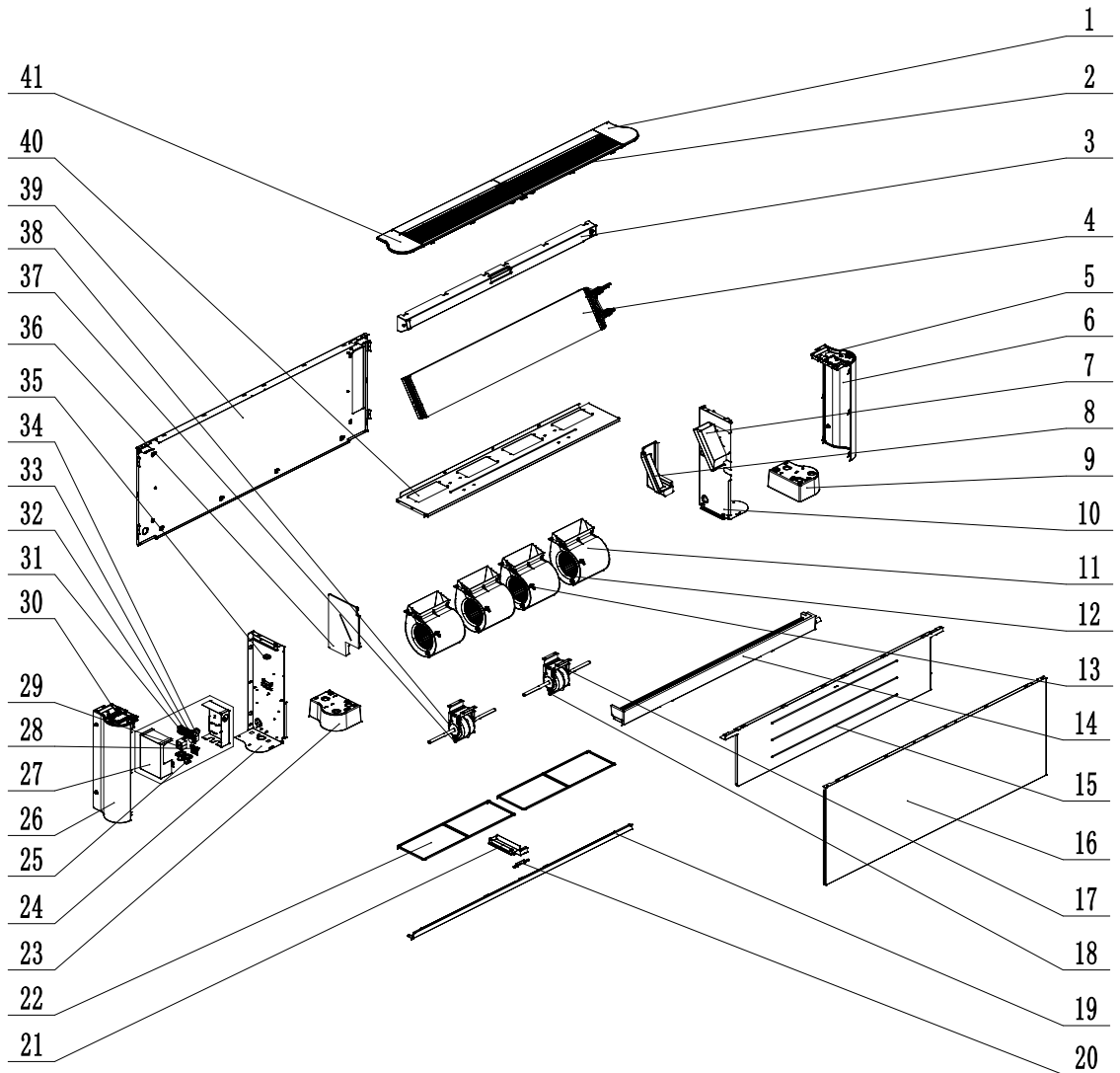


No.	Name	Quantity
1	Display Board Cover	1
2	Front Grill	2
3	Foam	1
4	Surface-Cooler Assy	1
5	Display Box	1
6	Right Side Plate	1
7	Connection Board	1
8	Foam	1
9	Rear Case	1
10	Right Side Plate Sub-Assy	1
11	Propeller Housing(Lower)	4
12	Propeller Housing(Upper)	4

Product

No.	Name	Quantity
13	Centrifugal Fan	4
14	Foam Sub- Assy	1
15	Air Outlet Assy	1
16	Front Panel	1
17	Motor Support	2
18	Fan Motor	2
19	Connection Sheet Sub-Assy	1
20	Connection Board	1
21	Connection Sheet Sub-Assy	1
22	Filter Sub-Assy	2
23	Rear Case	1
24	Left Side Plate Sub-Assy	1
25	Cable Cross Loop	2
26	Left Side Plate	1
27	Electric Box Cover	1
28	Wire Clamp	1
29	Capacitor CBB61	2
30	Display Board Cover	1
31	Insulation Gasket	1
32	Terminal Board	1
33	Terminal Board	1
34	Cable Cross Loop	4
35	Cable Cross Loop	1
36	Foam	1
37	Support Sub-assy	2
38	Bar Clasp	4
39	Seat Board Sub-Assy	1
40	Clapboard Sub-Assy	1
41	Display Board Cover	1

(5) FP-204LM/D-K (list code: EM51600340)



No.	Name	Quantity
1	Display Board Cover	1
2	Front Grill	2
3	Foam	1
4	Surface-Cooler Assy	1
5	Display Box	1
6	Right Side Plate	1
7	Connection Board	1
8	Foam	1
9	Rear Case	1
10	Right Side Plate Sub-Assy	1
11	Propeller Housing(Lower)	4
12	Propeller Housing(Upper)	4
13	Centrifugal Fan	4
14	Foam Sub-Assy	1
15	Air Outlet Assy	1

Product

No.	Name	Quantity
16	Front Panel	1
17	Motor Support	2
18	Fan Motor	2
19	Connection Sheet Sub-Assy	1
20	Connection Board	1
21	Connection Sheet Sub-Assy	1
22	Filter Sub-Assy	2
23	Rear Case	1
24	Left Side Plate Sub-Assy	1
25	Cable Cross Loop	2
26	Left Side Plate	1
27	Electric Box Cover	1
28	Wire Clamp	1
29	Capacitor CBB61	2
30	Display Board Cover	1
31	Insulation Gasket	1
32	Terminal Board	1
33	Terminal Board	1
34	Cable Cross Loop	4
35	Cable Cross Loop	1
36	Foam	1
37	Support Sub-assy	2
38	Bar Clasp	4
39	Seat Board Sub-Assy	1
40	Clapboard Sub-Assy	1
41	Display Board Cover	1

3 Scope of supply

S: standard; O: sfield-supply; P: optional

Scope of supply	Quantity	Type
Vertical mounted FCU	1	S
Thermostat	1	S
Delivery attached documentation	1	S
Electric water valve	1	P/O

Design and Selection

DESIGN AND SELECTION

1 Selection principle

1.1 Selection steps

- (1) If the external static pressure is 0Pa, the unit cannot be connected with ducts.
- (2) Select the unit type based on the air flow, cooling capacity and heating capacity.
- (3) Select the unit model based on the indoor cooling/heating load, inlet air DB/WB temperature, entering water temperature and related data sheets. The cooling/heating capacity of the selected unit should be or larger than the indoor cold/heat load.
- (4) Take consideration of sound level.

According to the allowable sound level of the corresponding building (as shown in the table below for reference), check if the selected unit can meet the sound requirement.

Allowed sound level

Type of buildings	A-weighted sound level dB(A)
Recording studio, broadcast studio, dubbing room	20~25
Concert hall, theatre, television studio	25~30
Cinema, lecture theatre, meeting room	30~35
Office room, design office, reading room	35~40
Restaurant, banquet hall, gym, hotel	40~50
Waiting room, shopping center	45~55
Cleaning room, office room with mechanical appliance	55~65

It is cited from *Practical Design Manual of Heating Air Conditioning*. If undesirable; reselect the unit with lower sound level.

1.2 Example for selection

For a room of a hotel, the cooling load is 3090W, the inlet air dry bulb temperature is 27°C, the inlet air wet bulb temperature is 19°C, the air flow is 600m³/h, the entering water temperature is 7°C and the leaving water temperature is 12°C; the heating load is 3800W, the inlet air dry bulb temperature is 20°C, the inlet air wet bulb temperature is no more than 15°C, the entering water temperature is 45°C and the leaving water temperature is 40°C. Based on these conditions, select a proper FCU.

Step 1: Select the unit type based on the air flow, cooling capacity and heating capacity.

- (1) Select the unit model based on the maximum cooling load.
- (2) Select the cooling capacity at the high air flow to meet the average cooling load.
- (3) In light of working conditions, the cooling capacity selected from the data sheet is equal to or larger than the cooling load.
- (4) When the cooling capacity is selected based on the medium or low speed air flow, then at specific or load peak, use the high-speed for meeting the load demand.
- (5) For the selected FP-68 in light of loads, its data sheet shows that the cooling capacity is 3200W, heating capacity is 3800W and the air flow is 680m³/h.
- (6) When the entering water temperature is 60°C, the heating capacity is 7000W, which meets the load demand.

Note: When selecting units, the practice is to match the design sensible heat load with the required sensible load. In most cases, there is enough latent heat for the coils to meet the design requirement.

Step 2: Check the sound level of the building

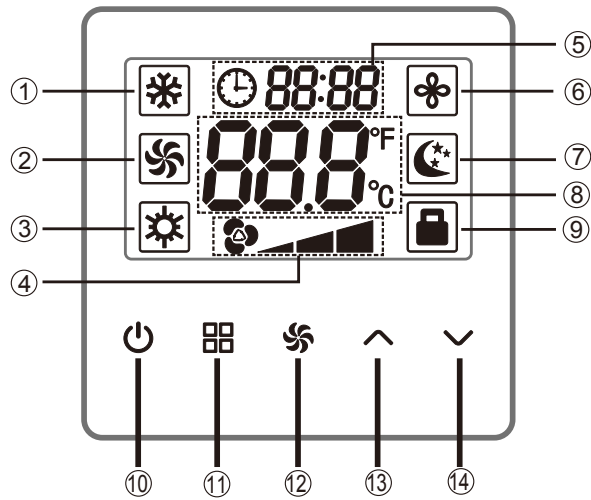
According to the table **Allowed sound level**, the allowable sound range for the hotel is 40~50dB (A). The designed sound level of the FP-68 is 42 dB(A) which can meet the requirements.

2 Power supply specification

Model	Power supply	Sectional area of power cords (mm ²)
FP-22LM/D-K FP-34LM/D-K FP-51LM/D-K FP-68LM/D-K FP-85LM/D-K FP-102LM/D-K FP-119LM/D-K FP-136LM/D-K FP-170LM/D-K FP-204LM/D-K	220-240VAC 1Ph 50Hz	3x1.0

Unit Control

UNIT CONTROL



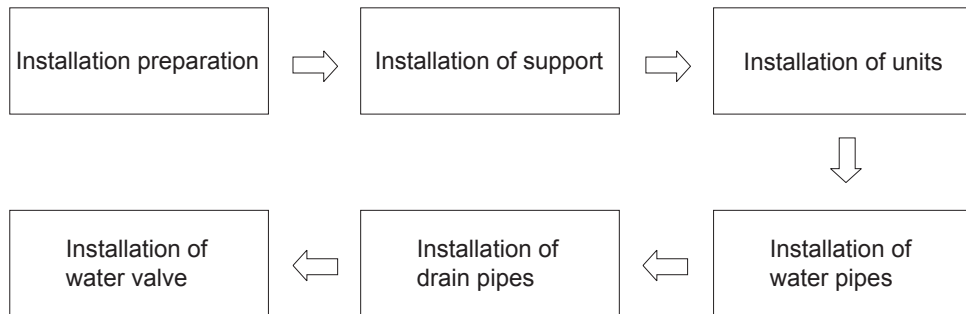
①	Cooling mode	⑧	Temperature or error codes
②	Air supplying mode	⑨	Child lock
③	Heating mode	⑩	ON/OFF
④	Fan speed	⑪	MODE
⑤	Timer	⑫	SPEED
⑥	Drying function	⑬	UP
⑦	Sleep function	⑭	DOWN

Through the thermostat that controls electric water valves and three-speed fans, you can enable many function of the unit, such as the cooling mode, heating mode, timer and drying. The controller also provide services including temperature unit setting, power failure memory and cooling/heating temperature set in the energy saving mode.

Unit Installation

UNIT INSTALLATION

1 Flow chart



2 Precautions for engineering work

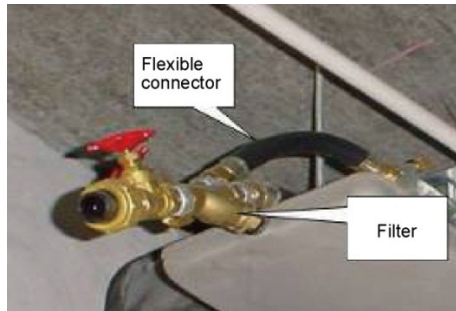
- (1) The unit should be installed in accordance with instructions covered in the user's manual and make sure enough maintenance space is reserved around the unit. The air inlet and outlet should be far away from obstacles, so that air flow can go through everywhere of the room. When the heat exchanging room is too small, it would lead to decreased capacity.



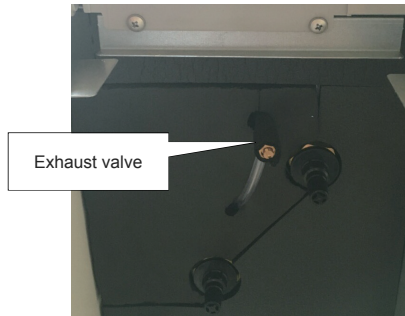
- (2) The unit should be installed where no smog, corrosive and inflammable gases are present, otherwise the unit would fail to run normally or its service life would be shortened.
- (3) Fit valves to entering and leaving water pipes and wrap units with a dust-proof cover.



- (4) The flexible connectors or the movable joints should be used for connection of the water inlet and outlet pipes. Moreover, the water filters should be installed at the water inlet pipe.



- (5) The condensate pipe should not be blocked with a grade of slope no less than 5%.
- (6) A filter should be installed at the return air inlet and cleaned periodically so as to not affect the heat exchanging efficiency.
- (7) For initial operation, open the exhaust valve at the return water pipe to expel air inside coils. Then, close it until water flows out.










- (8) Temperature of the cold water should not be lower than 5°C and not higher than 70°C (for concealed ceiling types) or 65°C (for vertical mounted types) for hot water. Water should be clean. The unit should be entirely maintained every 2~3 years. Water scale inside coils should be removed by chemical method so as to guarantee the heat exchanging performance.
- (9) The air outlet and the duct should be connected with the flexible connector and shall not bear the weight of valves, pipes and other devices.
- (10) Wiring arrangement should be performed in accordance with the safety standards for electric devices and local relative regulations. Special electric circuits should be used. When capacity of the electric circuits is poor or electric operation is improper, it would lead to electric shocks or fire hazards etc.
- (11) The earth leakage circuit breaker should be installed for each installation location. The unit should be grounded; otherwise it would lead to electric shocks.

Warning

Installation and commissioning work must be performed by professional personnel. Improper installation would cause water leaks, electric shock and fire accidents.

3 Tools

No.	Name	Usage	Image
1	Hand-held electric drill	It is used for drilling holes at metals, wood or plastics.	
2	Cutter	The fiber-reinforced sheet wheel can cut the round or special shaped steel pipes, cast iron pipes, channel steel and flat steel.	
3	Grinding machine	The fiber-reinforced line-shaped wheel can grind metal pieces and cut sectional materials. Before welding, a groove should be made, and fins and burrs of the work piece should be removed. Equipped with the diamond cut sheet, it can cut the non-metallic materials, like ceramic tiles, stones etc. Equipped with the special wheel, it can be used for cutting glass. Equipped with the wire brush, it can be used for de-rusting. Equipped with the rubber pad and sand paper, it can be used for polishing.	
4	Electric Hammer	Equipped with the rigid alloy drilling bit, it is used for holes and grooves drilling and dabbing at the concrete, the stone, bricks etc.	
5	Percussion drill	There are two operating statuses for the percussion drill. Under the slow mode, with the auger bit, it can be used as the electric drill. Under the slew and percussion state, with the rigid alloy impact bit, it can be used to drill holes at the bricks, concrete and ceramic tiles.	
6	Hand-held electric shears	It is used to cut the metal sheets, especially for edge and angle trimming.	
7	Rivet gun	It is used for self-plugging rivets at different structures, especially for single-side riveting of the leak-proof structure.	

Moreover, it is necessary to prepare commonly accessible tools including pipe pliers, screw drivers, rubber pads, rubber hammers, scissors, spanners, level bars, measuring tape, angle square, glue guns, brushes, ladders, pulleys.

4 Installation

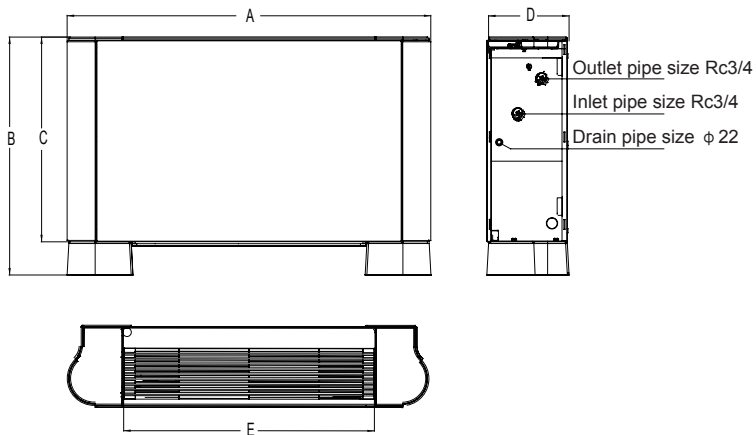
4.1 Installation conditions

- (1) There should be no direct sunlight.
- (2) The hanger, ceiling and the building structure should be capable of supporting the weight of the unit.
- (3) The drain pipe can be easily led out.
- (4) The inlet and outlet air flow will not be blocked.
- (5) There should be no inflammable and explosive substances.
- (6) There should be no corrosive gas, heavy dust, salt fog, smog or moisture.

Notice

- Use materials, equipment, finished products and semi-finished products in accordance with applicable state or local codes. Firefighting products are verified by approval documents that are granted by firefighting administrations. Do acceptance checks on these credentials with project supervision authorities and keep essential records.
- Make sure that all equipment, tools, safety devices for electricals and fire fighting are all set.
- Install air conditioning units after the completion of upholding frameworks for buildings. Clean up barriers in the field.
- Negotiate with engineering participants in charge of water systems, electricity and decoration on the installation space specified in design drawings. Get an approval for installation work and complete disclosure of technical tasks, quality and safety.

4.2 Dimensional data

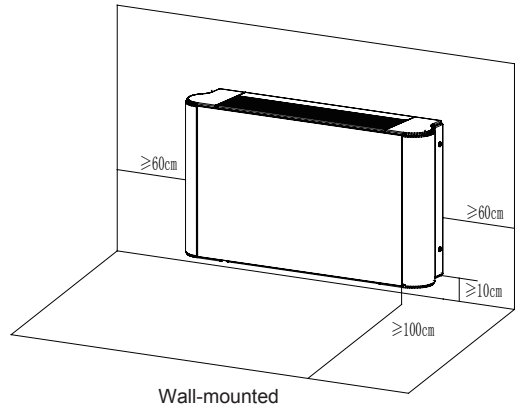
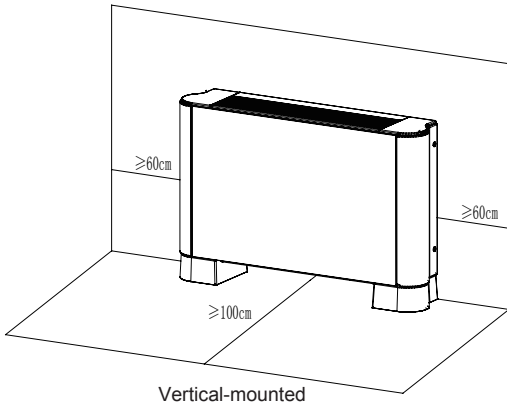


Unit: mm

Model	A	B	C	D	E
FP-22LM/D-K	895	680	585	230	568
FP-34LM/D-K	895	680	585	230	568
FP-51LM/D-K	1050	680	585	230	723
FP-68LM/D-K	1050	680	585	230	723
FP-85LM/D-K	1050	680	585	230	723
FP-102LM/D-K	1350	680	585	230	1023
FP-119LM/D-K	1350	680	585	230	1023
FP-136LM/D-K	1350	680	585	230	1023

Model	A	B	C	D	E
FP-170LM/D-K	1773	680	585	230	1446
FP-204LM/D-K	1773	680	585	230	1446

4.3 Installation and maintenance space

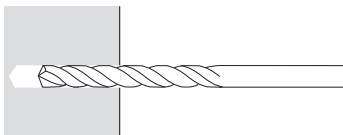


4.4 Installation process

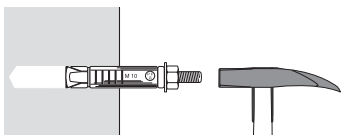
4.4.1 Supports fixing

It is quite common to use expansion bolt to fix supports, while recessed fitments and welding could be alternatives.

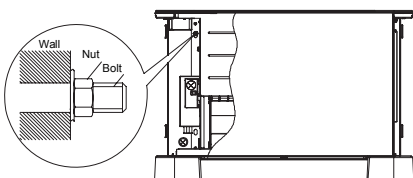
You need to make sure that the concrete rigidity and strength are satisfactory. Concrete elements are proved C15 above in strength. The edge spacing, a distance between an expansion bolt and the edge of concrete elements is no less than eightfold as much as the diameter of drill holes. If a couple of screws are used, the spacing among them should be no less than tenfold. Check the diameters and depths of drill holes.



Drill a hole with correct diameter and depth.



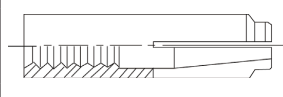
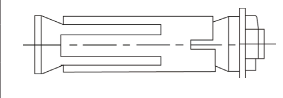
Insert an expansion bolt.



Fix the support.

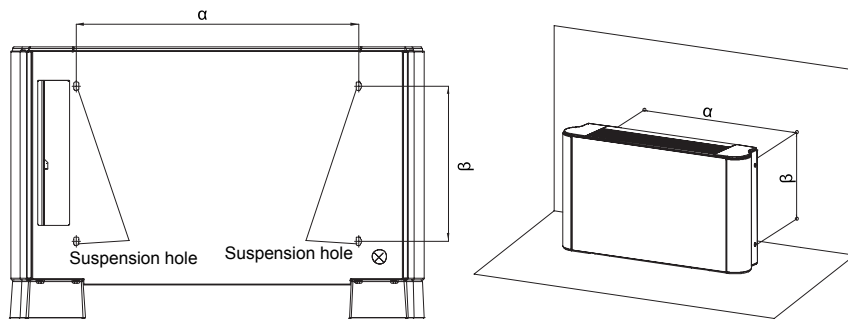
Unit Installation

Unit: mm

Name	Image	Size	Bolt length	Diameter of drill hole	Depth of drill hole
Inner screw type expansion bolt		M6	25	8	32~42
		M8	30	10	42~45
		M10	40	12	43~53
		M12	50	15	54~64
Single-sleeve expansion bolt		M8	95	10	65~75
		M10	110	12	75~85
		M12	125	18.5	80~90

4.4.2 Precautions for installation

Drill four holes on the wall accordance with the picture and the table below.

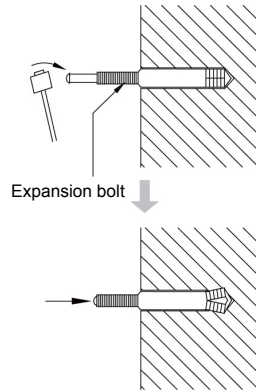


Unit: mm

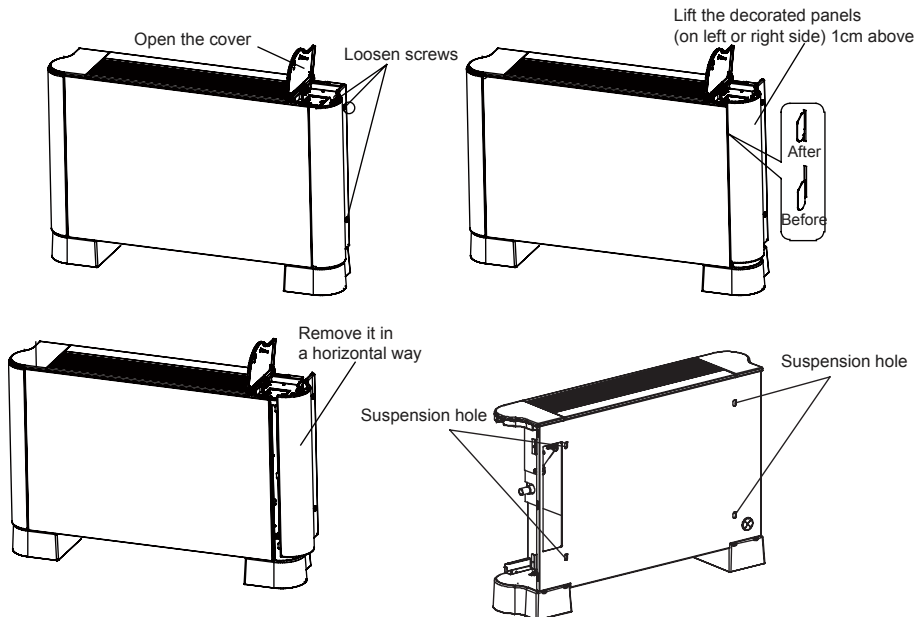
Model	α	β
FP-22LM/D-K	555	390
FP-34LM/D-K		
FP-51LM/D-K	710	
FP-68LM/D-K		
FP-85LM/D-K		
FP-102LM/D-K	1010	
FP-119LM/D-K		
FP-136LM/D-K		
FP-170LM/D-K		
FP-204LM/D-K	1433	

Unit Installation

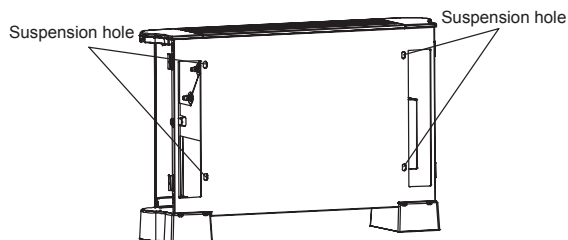
Insert user-provided M10 expansion bolts into the holes on the wall and fix them as shown in the picture below.

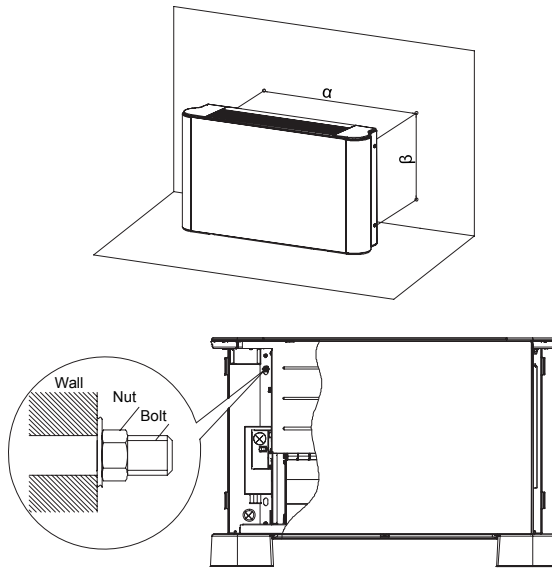


Open the cover. Loosen three screws and lift the decorated panels (on left or right side) 1cm above and remove them in a horizontal way.



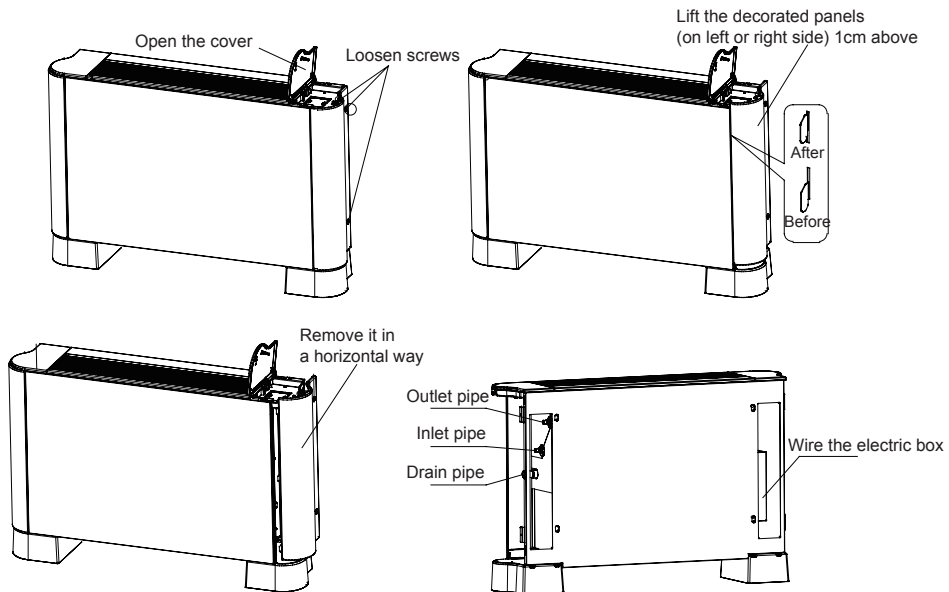
Let the suspension holes fit the expansion bolts so that the unit can be hung. Regulate the unit position to slightly tilt the drain pipe and tighten bolts with nuts. Use a level to indicate that the unit is flush with the ground.





4.4.3 Installation of water pipes

- (1) Open the panel. Loosen three screws and lift the decorated panels (on left or right side) 1cm above and remove them in a horizontal way.
- (2) Install water valves and pipes and get wires in.
- (3) Metallic hoses similar to the picture below are recommended for inlet and outlet pipes.
- (4) Pipe connectors and electric valve threads should be bounded with teflon tapes
- (5) Fixing all water pipes tightly, start the water pump and check if there is leakage. Use the exhaust valve to release all the gases inside pipes.
- (6) Wrap with sponge the insulating sleeves that connect inlet and outlet pipes.

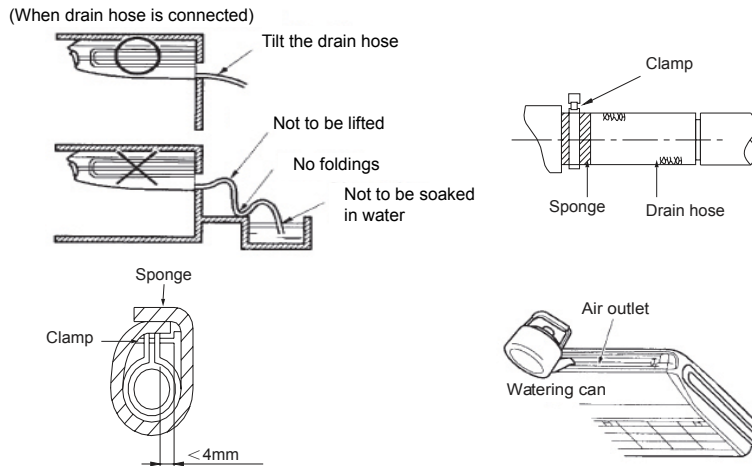


4.4.4 Installation of drain hose

Precautions:

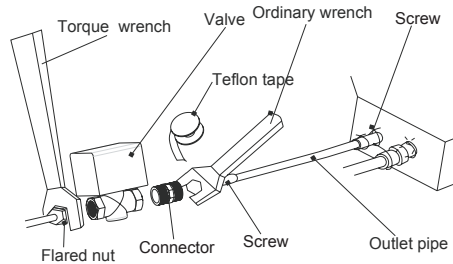
- (1) The drain hose outlet is mounted at the right rear side of the unit.
- (2) The diameter of the drain hose should be equal to or greater than the diameter of the connecting pipe
- (3) Keep at least 1/100 inclination for the drain hose.
- (4) Connect drain hoses and wrap the pipes and connectors with sponge and tighten them with clamps.
- (5) Wrap clamps and drain pipes with sponge.
- (6) Do not bend drain pipes.
- (7) Charge 600cc water from the air outlet to the drain pan to check the drainage effect.
- (8) Do not connect condensate pipes to those with corrosives and unpleasant smells to prevent these unwanted substance from entering the unit and indoor areas.
- (9) Do not connect condensate pipes to rainwater pipes to prevent the back flow of rain.
- (10) Connect condensate pipes to the specialized drainage system of the unit.

Installation steps and drawings



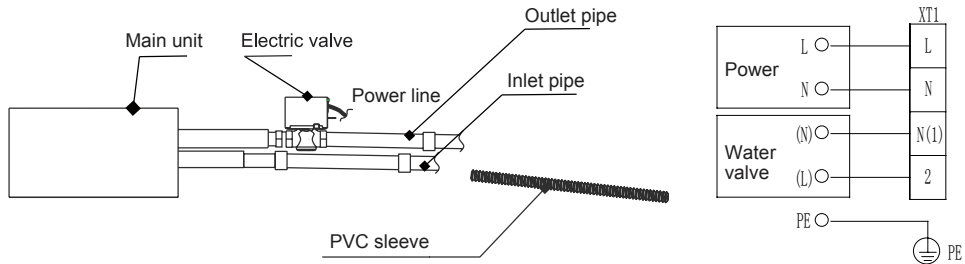
4.4.5 Installation of water valve

Precautions:



- (1) See the figure above for installation of the water valve. Firstly, connect one end of the water pipe to the water inlet of the unit, and then connect the other end to water valve. During installation, both the torque wrench and ordinary wrench should be used. For the former, the torque should be less than 90N.m. Tighten connectors.

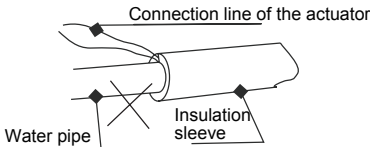
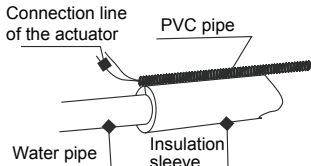
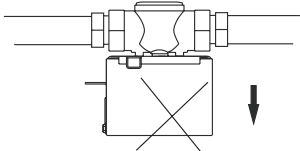
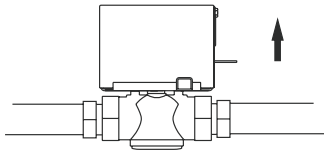
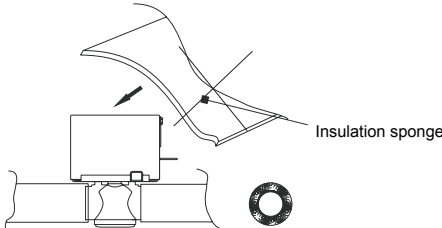
- (2) In order for better sealing effect, before connection they should be wrapped with Teflon tape.
- (3) After the connector, the water valve and the water pipes have been finished, you may start the water pump and see if they leak or not.
- (4) Insulate the water valve and the pipe with sponge.



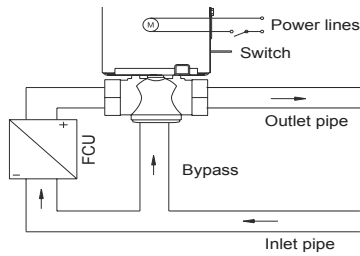
- (5) When the water pipe and water valve have been installed, connect the connection line of the valve to the wiring board of the unit.
- (6) Check the wiring carefully and then start the water pump and unit to see if they work normally.

Notices:

- (1) The water valve should be installed as the following statement; otherwise it would affect the normal operation.

<p>⊘ It is not allowed to directly insulate the connection line of the actuator and the water pipe together, otherwise it would lead to shortcutting of the water valve which would affect its service life.</p> 	<p>⚠ Put the connection line through the PVC pipe and then bind them with the insulation sleeve.</p> 
<p>⊘ Never install the valve downwards, otherwise the condensate would flow into the valve and damage the valve or then would lead to shortcutting or fire hazards.</p> 	<p>⚠ The main body of the valve should be installed upwards and the power lines should be arranged above the water pipe.</p> 
 <p>Do not cover fully the valve with the insulation sponge; otherwise it would lead to poor heat radiation and even fire hazards.</p>	

- (2) There are direct pass and bypass for the water valve and they can be selected based on actual conditions. See the figure below for the working principle for the water valve.



5 Electric wiring

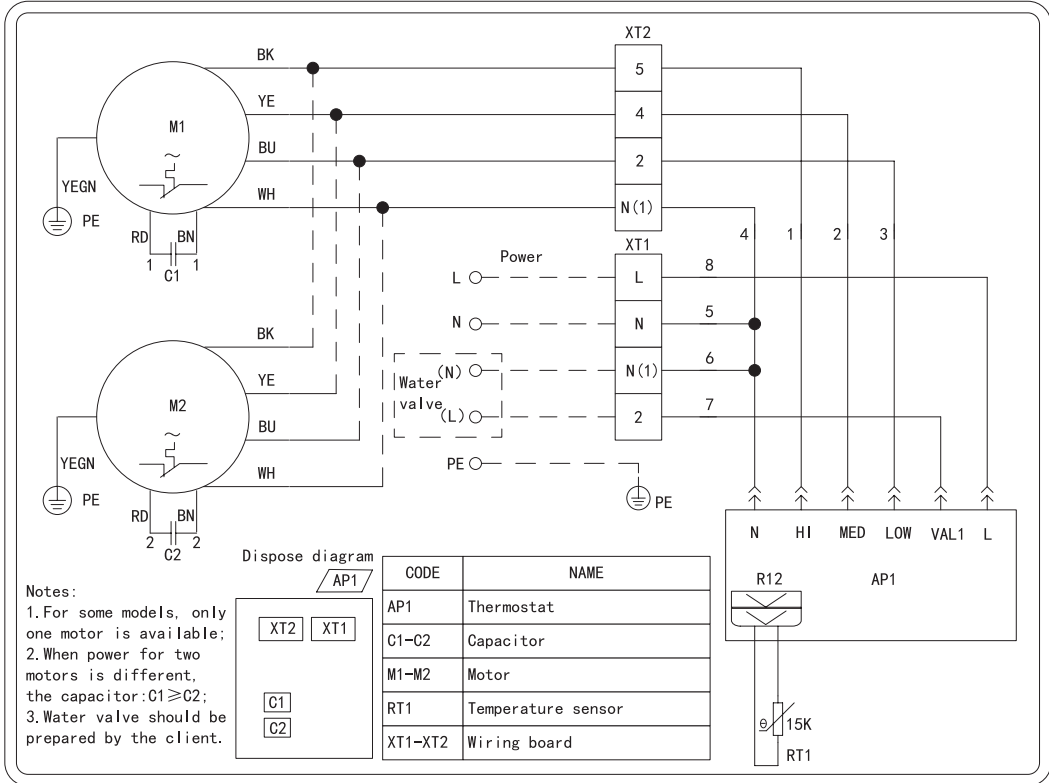
5.1 Precautions for electric wiring

- (1) All electric wiring should be performed by the qualified technical in accordance with local standards, regulations and this manual.
- (2) The specialized electric circuit with rated voltage should be used for the power supply.
- (3) Do not pull the power lines by force.
- (4) The power lines should be sized sufficiently. The damaged power lines and connection lines should be replaced by specialized lines.
- (5) The unit should be connected to the specialized grounding device by the qualified servicemen. For the fixed lines, there should be the breaker and air switch with sufficient capacity. The air switch should be of the magnetic or electric trip-off functions so as for shortcutting and overloading protection.
- (6) The unit should be earthed reliably. The yellow-green line is the grounding line. Do not put it into other use, or cut it. The grounding line cannot be fixed with self-tapping screws; otherwise it would lead to electric shock. The grounding line cannot be connected to the running water line, the gas line, the drain line and where it is not approved.
- (7) User power should be soundly earthed rather than be connected to these positions including water pipes, gas lines, drain pipes and others proved unsecure by professionals.

5.2 Wiring steps

- (1) Open the electric box and pull the power lines and connection lines of the electric water valve through the rubber rings. Then, fix them with the wire clamps.
- (2) Perform wiring in accordance with the electric wiring diagram.
- (3) Fix the lines with the wire clamps. Mount its cover to the electric box.

5.3 External wiring diagram



Note: The wiring diagram as shown above is just for reference. Those struck to the main body of the unit always prevail for repair and maintenance.

Test Operation, Troubleshooting and Maintenance

TEST OPERATION, TROUBLESHOOTING AND MAINTENANCE

1 Commissioning

◆ Preparation

Disconnect all power electricity before servicing.

Install control lines and electric lines properly.

Turn on all stop valves.

Remove distributed stuff including scrap metal, line ends and forceps clips.

◆ Steps

Connect power electricity and press the ON/OFF key of the thermostat to turn on the unit.

Press MODE to switch operating modes between Cooling, Heating and Fan and ensure the unit works well.

2 Troubleshooting

No.	Symptoms	Possible causes	Corrective measures
1	The unit does not run.	There is no power supply.	Repower the unit when power supply is available.
		The power plug is loosened.	Tighten the power plug.
		The motor is burnt out.	Replace the motor and check for the wiring.
2	There is abnormal noise.	The volute or blade is deformed, or the volute contacts the blade.	Replace the volute or the blade.
		The air filter is clogged.	Clean the filter.
		There are foreign matters at the inlet/outlet or inside the duct.	Remove foreign matters.
		There is abnormal noise from the motor.	Replace the motor.
		The fastening screws are loosened.	Tighten them.
3	The airflow rate is too low.	The air filter is clogged.	Clean the air filter.
		There are foreign matters at the return inlet and air outlet.	Clear foreign matters.
		The duct resistance exceeds the design value.	Lower the duct resistance or reselect the unit.
4	The cooling or heating effect is poor.	The air filter is clogged.	Clean the air filter.
		The dampers are not opened.	Open the dampers.
		The fins are clogged or damaged.	Clean or repair fins.
		The entering water temperature cooling is too high and too low for cooling.	Adjust the entering water temperature.

No.	Symptoms	Possible causes	Corrective measures
5	Water leaks.	The condensate pipe is clogged.	Clean the drain pipe.
		The unit is not installed as required.	Adjust the unit and let the unit keep a certain inclination degree.
		The environmental air humidity is too high.	Do humidification and do not let the high-temperature and high-humidity air coming into the room.
		The fan stops but cold water is supplied continuously.	Close the water dampers or run the unit.
		The discharge valve is not tightened.	Tighten the discharge valve.

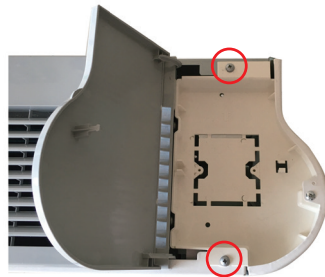
3 Maintenance

3.1 Replacement of motor

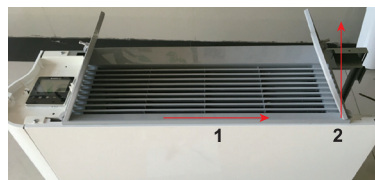
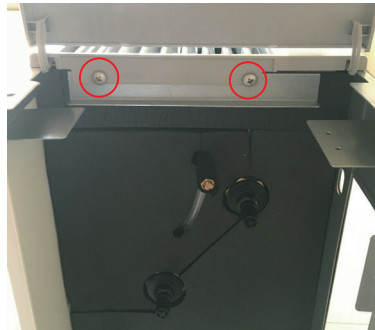
- (1) Open up the two display top covers. Loosen screws on the left, right and top of the unit. Lift up its decorated panels (on left or right side) and remove them in a horizon direction.



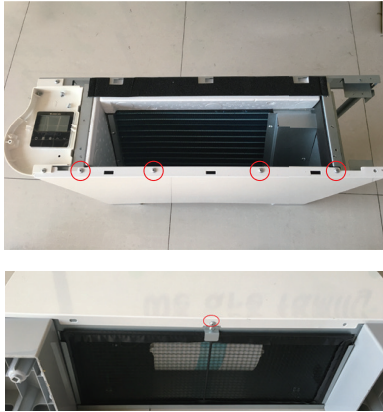
- (2) Loosen screws to take away display bottom covers.



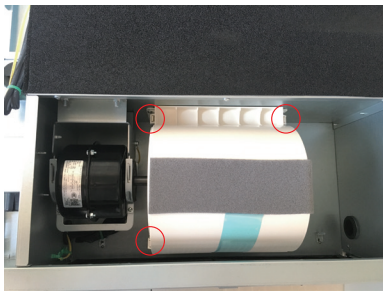
- (3) Loosen screws of the grille move it towards right and then up.



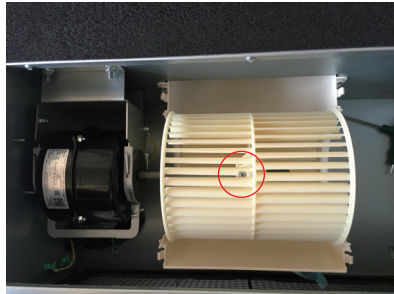
(4) Loosen screws to take away the panels.



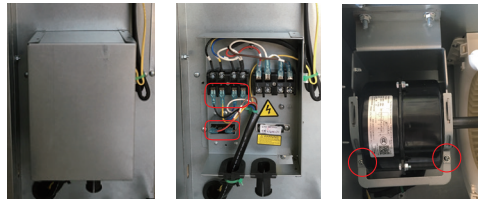
(5) Press clasps hard to take away volute casings.



(6) Use an inner hexagonal spanner to loosen screw to take out fan blades from the motor.

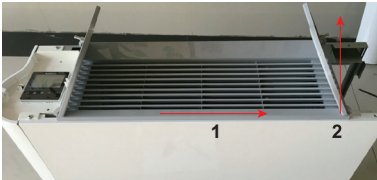
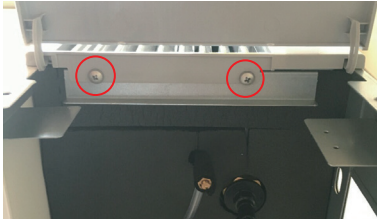


(7) Loosen two screws of the electric box to remove it. Take out connecting tabs between terminal blocks and capacitors. Cut off fixing clamps to take away motor wires. Loosen set screws of the motor to remove bar clasps and loops. Loosen its screws of earth lines to take away the motor.

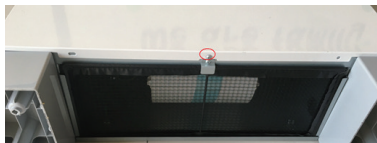
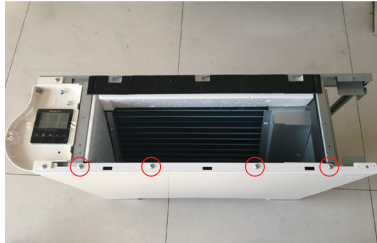


3.2 Replacement of cooling coil

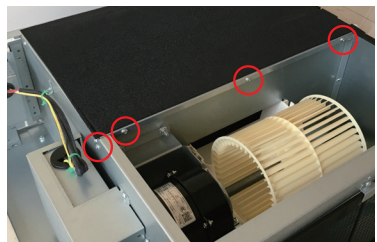
(1) Loosen screws of the grille move it towards right and then up.



(2) Loosen screws to take away the panels.



(3) Loosen screws to take away components at air vents.



(4) Loosen screws between the right seal panel and heat exchangers to take away the seal panel.



(5) Remove the defrosting pan and then the cooling coil.





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For continuous improvement in the products, Gree reserves the right to modify the product specification and appearance in this manual without notice and without incurring any obligation.

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