



Philippines Market

DC INVERTER SERIES

Service Manual 2012

LISAS-A-1211



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Part 1

General Information

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1. Model Lists

1.1 Indoor Units

R410A (capacity multiplied by 1000Btu/h)

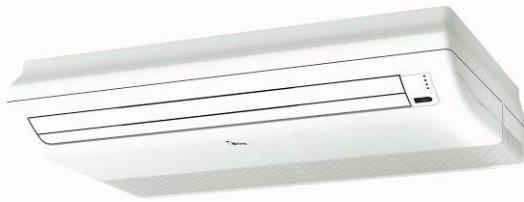
Type	Function	24	36	48
Four-way cassette	Cooling Only	✓	✓	✓
Super-slim Four-way cassette	Cooling Only		✓	
Ceiling & floor	Cooling Only	✓	✓	✓
3 rd generation ceiling & floor	Cooling Only		✓	
Floor-standing	Cooling Only		✓	

1.2 Outdoor Units

Universal Outdoor unit Model	Compressor type	Compressor Brand	Matched indoor units
MOU-24CDN1-N	Rotary DC Inverter	GMCC	MCC-24CRDN1-N MUB-24CRDN1-N
MOU-36CDN1-N	Rotary DC Inverter	MITSUBISHI	MCC-36CRDN1-N MUB-36CRDN1-N MCD-36CRDN1-N MUE-36CRDN1-N MFGA-36CRDN1-N
MOU-48CDN1-N	Rotary DC Inverter	MITSUBISHI	MCC-48CRDN1-N MUB-48CRDN1-N

2. External Appearance

2.1 Indoor Units

Four-way Cassette	Ceiling & Floor
	
Super-slime Four-way Cassette	3 rd Generation Ceiling-floor Type
	
GA Floor-standing	
	

2.2 Outdoor Units

MOU-24CDN1-N MOU-36CDN1-N	MOU-48CDN1-N
	

3. Nomenclature

3.1 Indoor Unit

M U B - 18 H R D N1

Refrigerant Type
N1 R410A

DC Inverter

Control Mode
R Remote Control

Function Code
C cooling Only
H cooling & Heating

Capacity (x 1000Btu/h)

Product Series

A First Time Design **B Second Time Design**
C Third Time Design

Product Category

C Cassette Type **F Console Type**
T Duct Type
U Ceiling & Floor Type
H High Static Pressure Duct Type

Midea

3.2 Outdoor Unit

M O U T- 36 H D N1- R

Power Supply
Q 220~240V,1N, 50HZ
R 380~420V, 3N, 50Hz
N 220~230V, 1N, 60Hz
D 220V~, 3N, 60Hz
C 380~420v,3N,60HZ

Refrigerant
N1 R410A -- R22

D DC Inverter -- On-off
F Full DC

Function Code
C Cooling Only **H Cooling & Heating**
A Cooling & Heating+PTC

Capacity (x 1000Btu/h)

T Tropical Condition
-- **T1 Condition**

O Outdoor unit

U Side Discharge Outdoor Unit
V Top Discharge Outdoor Unit
C Centrifugal Fan Outdoor Unit

Midea

4. Features

4.1 Universal outdoor unit design

Indoor unit with the same capacity can match with the same outdoor unit.

4.2 High efficiency and energy saving.

Thanks to the DC inverter technology and optimized piping system, the EER and COP of whole series can easily reach A-class.

4.3 Low noise and low starting current.

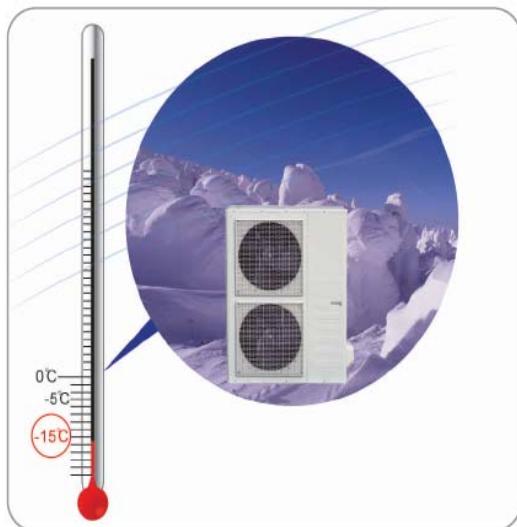
Thanks to the DC inverter technology, the system can work with low noise, and very small starting current.

4.4 Intelligent refrigerant adjustment technology.

Throttle part is made up of capillary and electronic expansion valve (EXV). The outdoor unit can output the most accurate capacity in any condition.

4.5 Working in cooling mode under -15°C.

Outdoor unit built-in with low ambient kit, it can control the outdoor unit's fan and cooling can be performed throughout the year for computer rooms, banquet halls, etc. Wide operation range covers outdoor temperatures as low as -15°C for cooling.



4.6 Indoor & outdoor unit's power supply is separate.

4.7 All indoor units have network control function.

4.8 All indoor units have Auto-restart function.

Part 2

Indoor Units

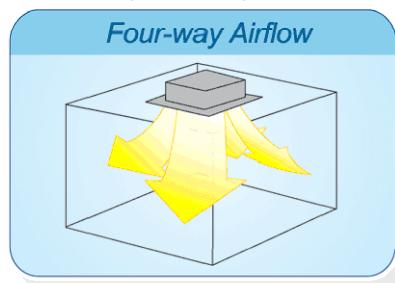
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Four-way Cassette Type

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1. Features

- (1) Low operation noise
 - Streamline plate ensures quietness
 - Creates natural and comfortable environment
- (2) Efficient cooling——Equal, fast and wide range cooling



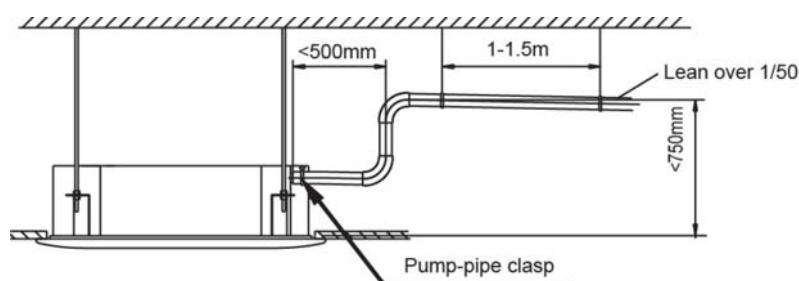
- (3) Excellent performance. The optimal evaporator & sufficient airflow volume guarantees the excellent capacity
- (4) The adoption of the most advanced 3- Dimensional Screw fan
 - Reduces the air resistance passing through
 - Smoothes the air flow
 - Makes air speed distribution to the heat exchange uniform



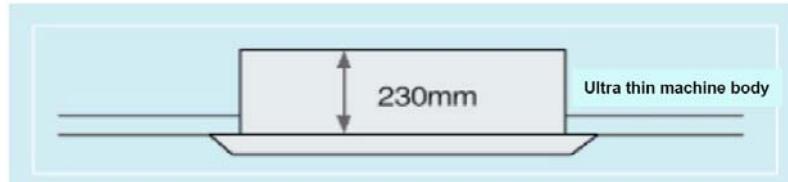
- (5) Fresh air makes life healthier and more comfortable.



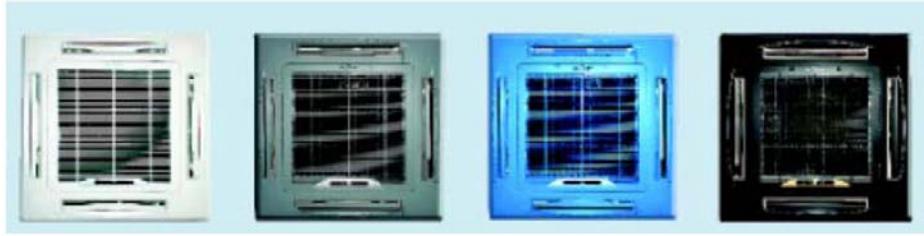
- (6) Drainage pump can take up the condenser water to 750mm.



- (7) Ultra thin machine body to easy installation and maintenance. 18K~24K:230mm, 36~48K:300mm.



(8) Different color panels for choose: White、Gray、Blue、Black



White

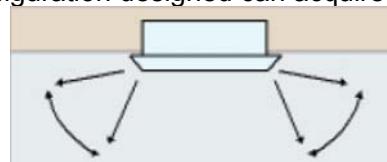
Gray (optional)

Blue (optional)

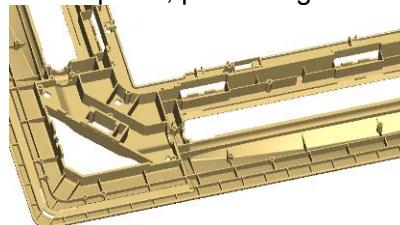
Black (optional)

(9) Swing angle of louver

- 1) Add one more swing motor, one motor driving two louvers. Controlling the interspace of each part, minimizing the angle loss.
- 2) The swing angle of the first louver are 40~42 degrees and the second louver are 37~38 degrees. New evaporator and inner configuration designed can acquire high heat-exchanger effect.

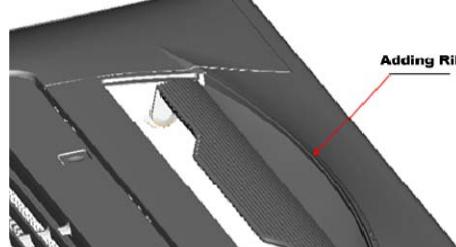


(10) More strengthening rib design around the panel, preventing the distortion for the panel.

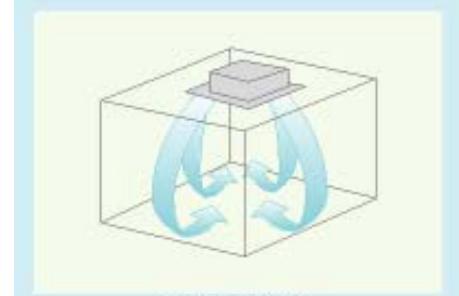


(11) New outlet frame design to make the phenomena of coagulation great improvement: prevent the condensing water from damaging the air guide strip.

(12) Adding rib on the panel of fan outlet, which can avoid the air outlet direct flow to people.



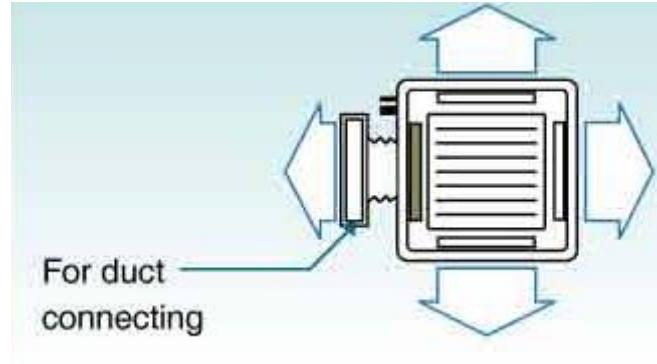
(13) 4 speeds available, optional super high fan speed design suitable for the large building over 3m high.



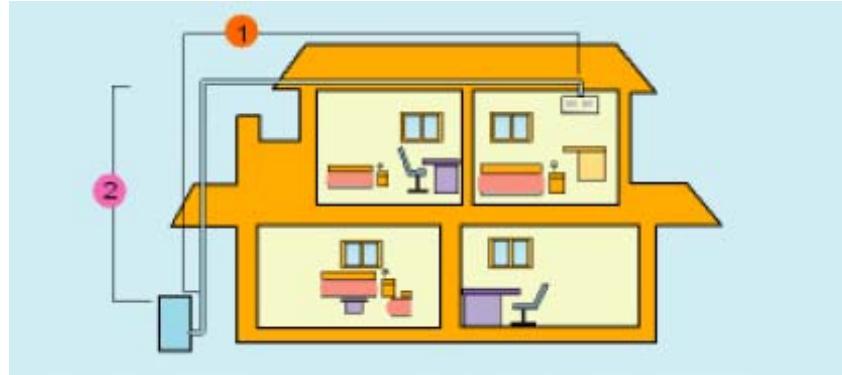
(14) Adding digital tube displaying on the display board. LED can display the Error Code to make the malfunction checking easier.



(15) Reserve spaces for air side-outlet, it is available to connect duct pipe hence air supplying from the four sides to nearby small room..

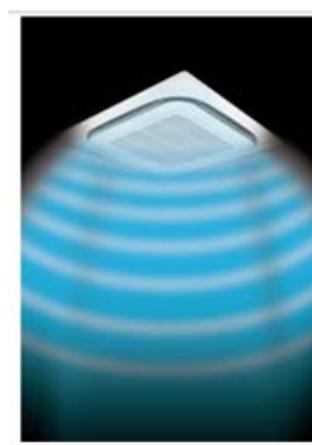


(16) The connecting pipe and drop height is higher. Max. pipe length up to 50m (refer to ①) , and Max. drop height up to 30m (refer to ②) .

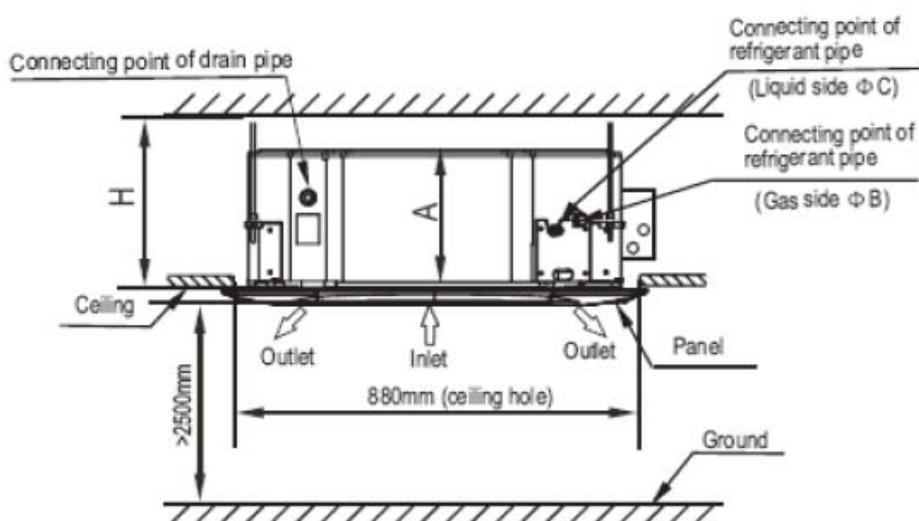
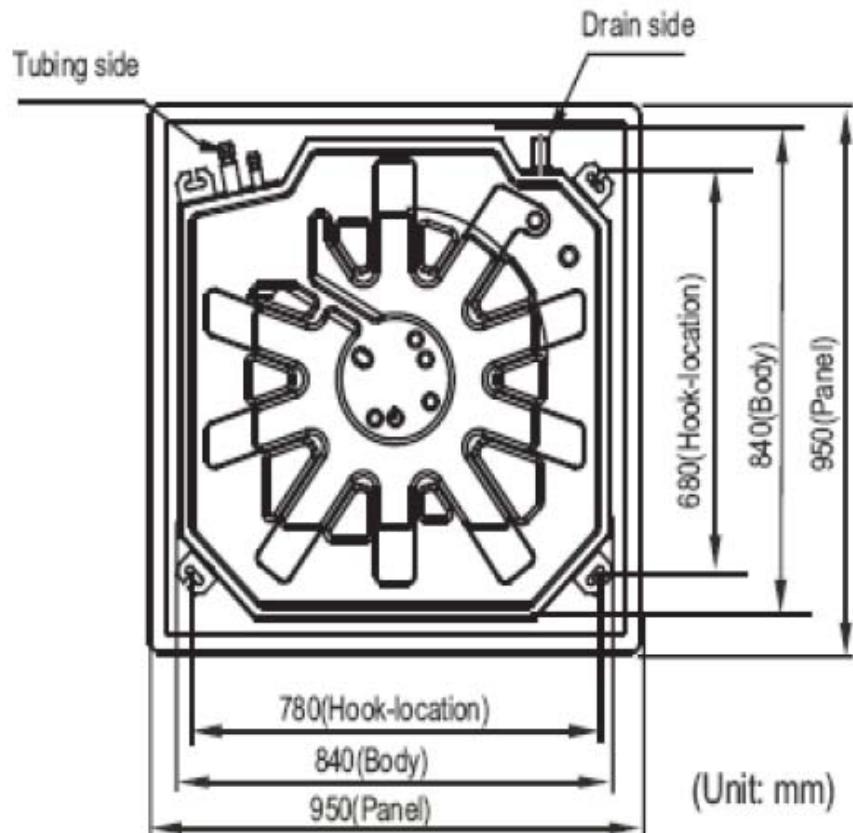


(17) Optimal design, smaller Control Box, Space saving and convenient for wiring, Using fire resistance galvanized steel for E-box material. Metal box make the control part more stable and prevent damaging.

(18) New Panel for optional: 360 degree air-outlet.



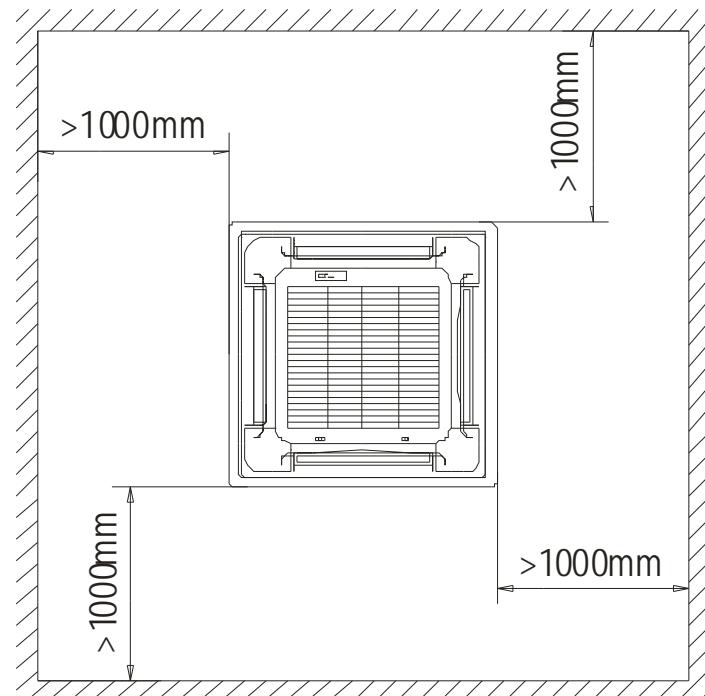
2. Dimensions



Unit: mm

MODEL	A	B	C	H
MCC-24CRDN1-N	230	Φ15.9	Φ9.52	>260
MCC-36CRDN1-N	300	Φ15.9	Φ9.52	>330
MCC-48CRDN1-N				

3. Service Space



4. Wiring Diagrams

MCC-24CRDN1-N MCC-36CRDN1-N

WIRING DIAGRAMMING

202042890195

FUNCTION OF SWITCH

S1	SWITCH	(FOR CCM UNIT ADDRESS)
'0~F' of the S2 and 'ON/OFF' of the S1 mean the addresses of the different units, Respectively.		

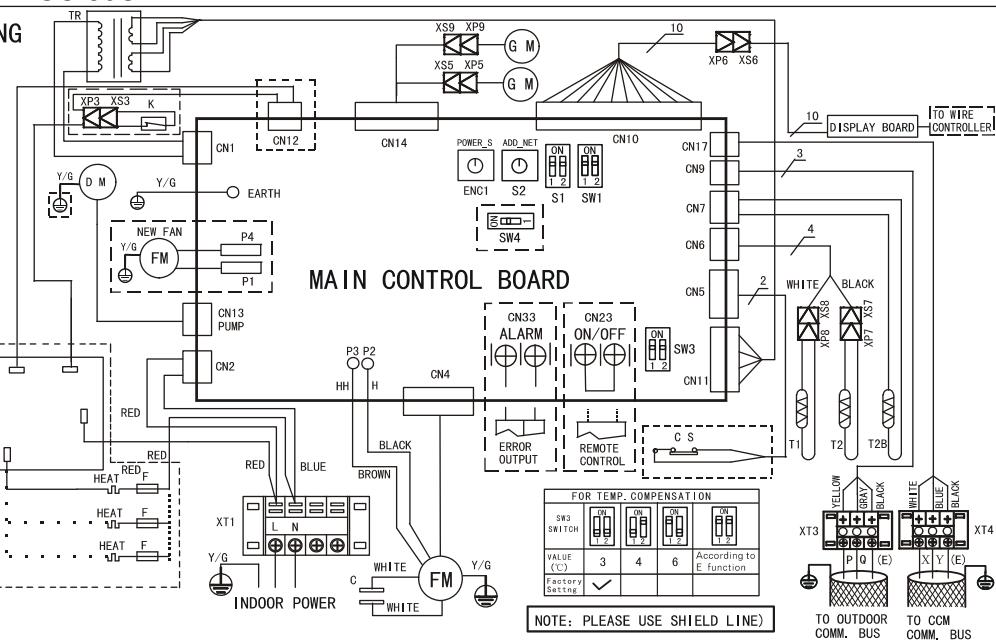
S2	S1+S2	ADDRESS	S1+S2
	ON 	0 32 2 32 15 47	ON 
0~F	ON 	16 48 2 63 31 63	ON 

SW4 SWITCH	ON	OFF
Memory	NO	YES

ENC1	SWITCH	(FOR POWER)
	NUMBER	POWER

NUMBER	POWER
4	5300W
5	7100W
6	8000W
7	9000W
8	10500W
9	14000W

A		16000W		
SW1	SWITCH (SELECT TEMP.)	ON 1 2	ON 1 2	ON 1 2
TE1	28	30	Fan	
TE2	32	35	motor	
TE3	30	32	do not	
TE4	15	24	stop.	
Factory				E func



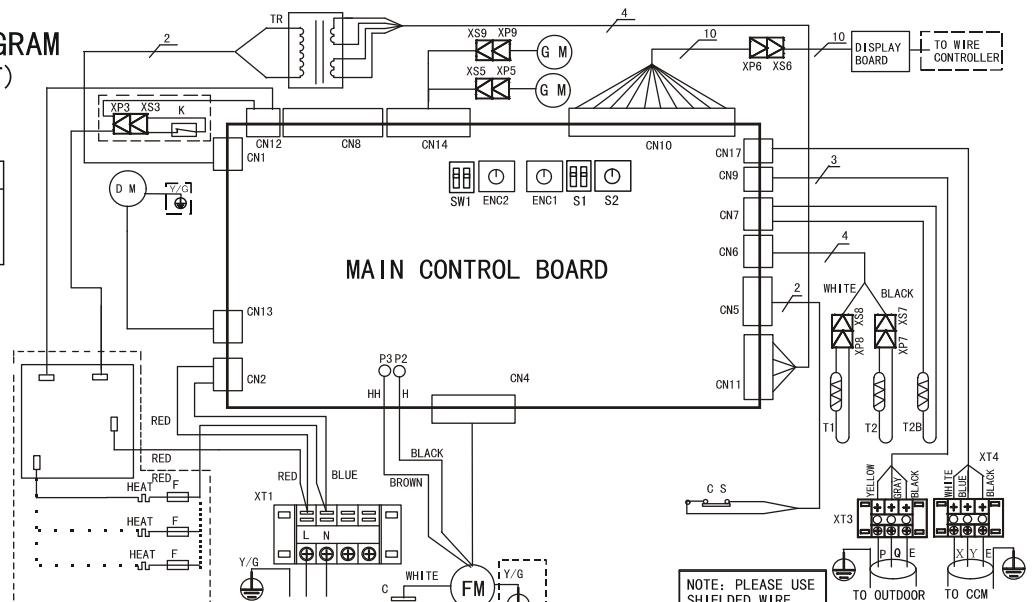
MCC-48CRDN1-N

202042790060

WIRING DIAGRAM (INDOOR UNIT)

FUNCTION OF SWITCH		
S1	SWITCH	(FOR CCM UNIT ADDRESS)
S2		'0-F' of the S2 and 'ON/OFF' of the S1 mean the addresses of the different units, respectively.

ENC	SWITCH	(FOR POWER)
NUMBER		POWER
0		220W (0, 8HP)
1		280W (1, 0HP)
2		360W (1, 2HP)
3		450W (1, 5HP)
4		560W (2, 0HP)
5		710W (2, 5HP)
6		800W (3, 0HP)
7		900W (3, 2HP)
8		1050W (4, 0HP)
9		1400W (5, 0HP) OR



5. Capacity Tables

5.1 Cooling Capacity

MCC-24CRDN1-N

Cooling		Outdoor conditions (DB)			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	7.52	7.15	6.79	6.50
	SC	5.56	5.51	5.43	5.46
	Input	2.10	2.28	2.38	2.46
24/17°C DB/WB	TC	7.74	7.37	7.01	6.57
	SC	5.80	5.75	5.68	5.52
	Input	2.23	2.38	2.49	2.61
27/19°C DB/WB	TC	7.88	7.52	7.30	6.79
	SC	5.83	5.79	5.69	5.57
	Input	2.28	2.41	2.54	2.66
32/23°C DB/WB	TC	8.03	7.74	7.59	7.01
	SC	6.83	6.73	6.68	6.52
	Input	2.38	2.49	2.66	2.76

MCC-36CRDN1-N

Cooling		Outdoor conditions (DB)			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	11.33	10.78	10.23	9.79
	SC	8.38	8.30	8.18	8.22
	Input	3.42	3.71	3.88	4.00
24/17°C DB/WB	TC	11.66	11.11	10.56	9.90
	SC	8.75	8.67	8.55	8.32
	Input	3.63	3.88	4.04	4.25
27/19°C DB/WB	TC	11.88	11.33	11.00	10.23
	SC	8.79	8.72	8.58	8.39
	Input	3.71	3.92	4.13	4.33
32/23°C DB/WB	TC	12.10	11.66	11.44	10.56
	SC	10.29	10.14	10.07	9.82
	Input	3.88	4.04	4.33	4.50

MCC-48CRDN1-N

Cooling		Outdoor conditions (DB)			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	14.42	13.72	13.02	12.46
	SC	10.67	10.56	10.42	10.47
	Input	3.89	4.22	4.41	4.55
24/17°C DB/WB	TC	14.84	14.14	13.44	12.60
	SC	11.13	11.03	10.89	10.58
	Input	4.13	4.41	4.60	4.83
27/19°C DB/WB	TC	15.12	14.42	14.00	13.02
	SC	11.19	11.10	10.92	10.68
	Input	4.22	4.45	4.69	4.92
32/23°C DB/WB	TC	15.40	14.84	14.56	13.44
	SC	13.09	12.91	12.81	12.50
	Input	4.41	4.60	4.92	5.11

Notes:

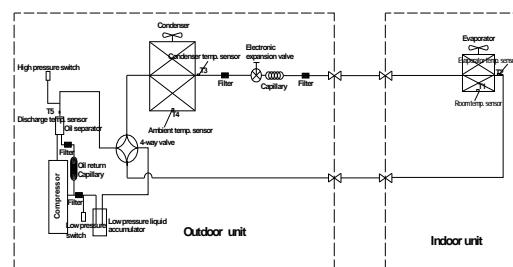
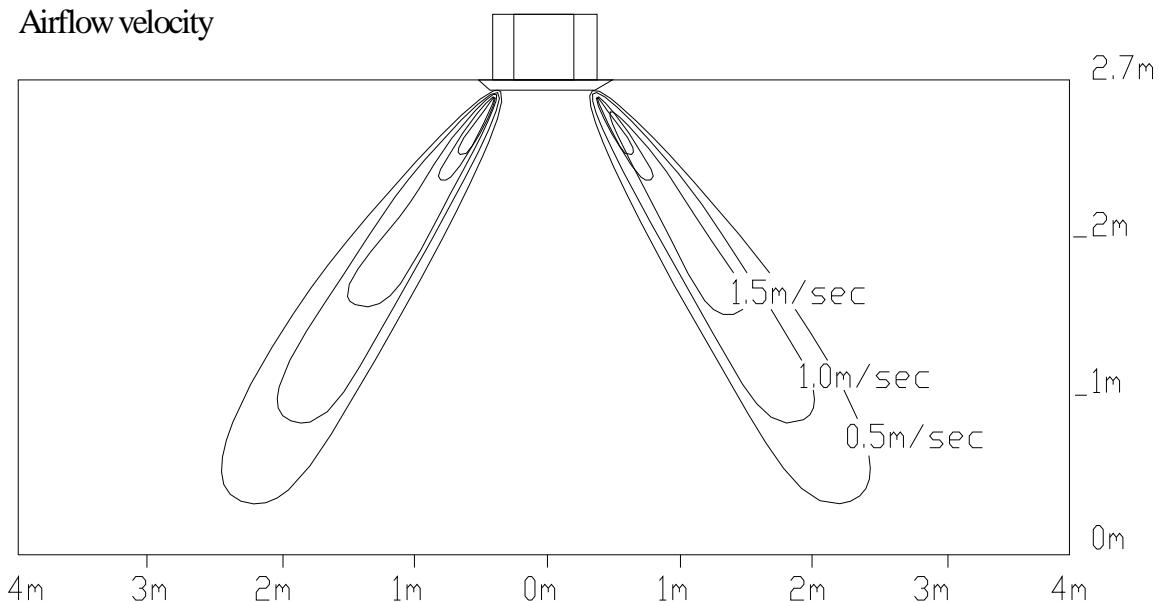
TC : Total capacity ; kW

SC: Sensible heat capacity ; kW

Input: Input power; kW

6. Air Velocity and Temperature Distributions (Reference Data)

Airflow velocity



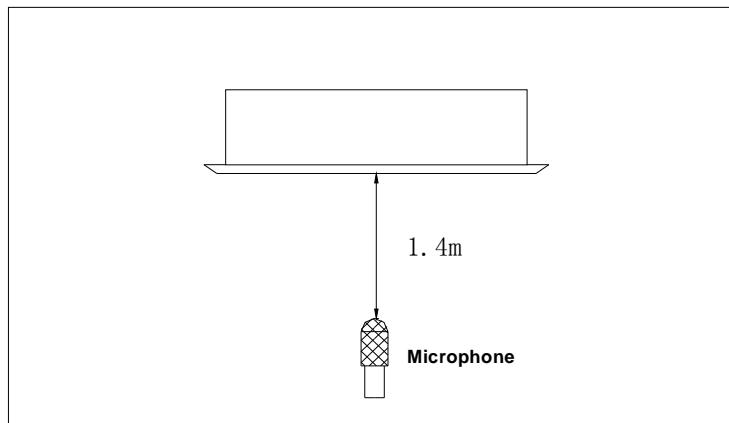
7. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min	Max	
MCC-24CRDN1-N	60	220-240	198	254	15
MCC-36CRDN1-N	60	220-240	198	254	15
MCC-48CRDN1-N	60	220-240	198	254	15

Notes:

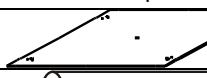
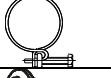
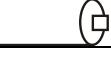
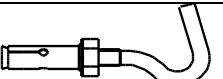
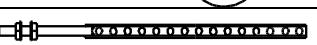
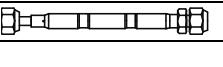
MFA: Max. Fuse Amps. (A)

8. Sound Levels



Model	Noise level dB(A)		
	H	M	L
MCC-24CRDN1-N	42	40.5	39
MCC-36CRDN1-N	44	42.5	41
MCC-48CRDN1-N	44	42	41

9. Accessories

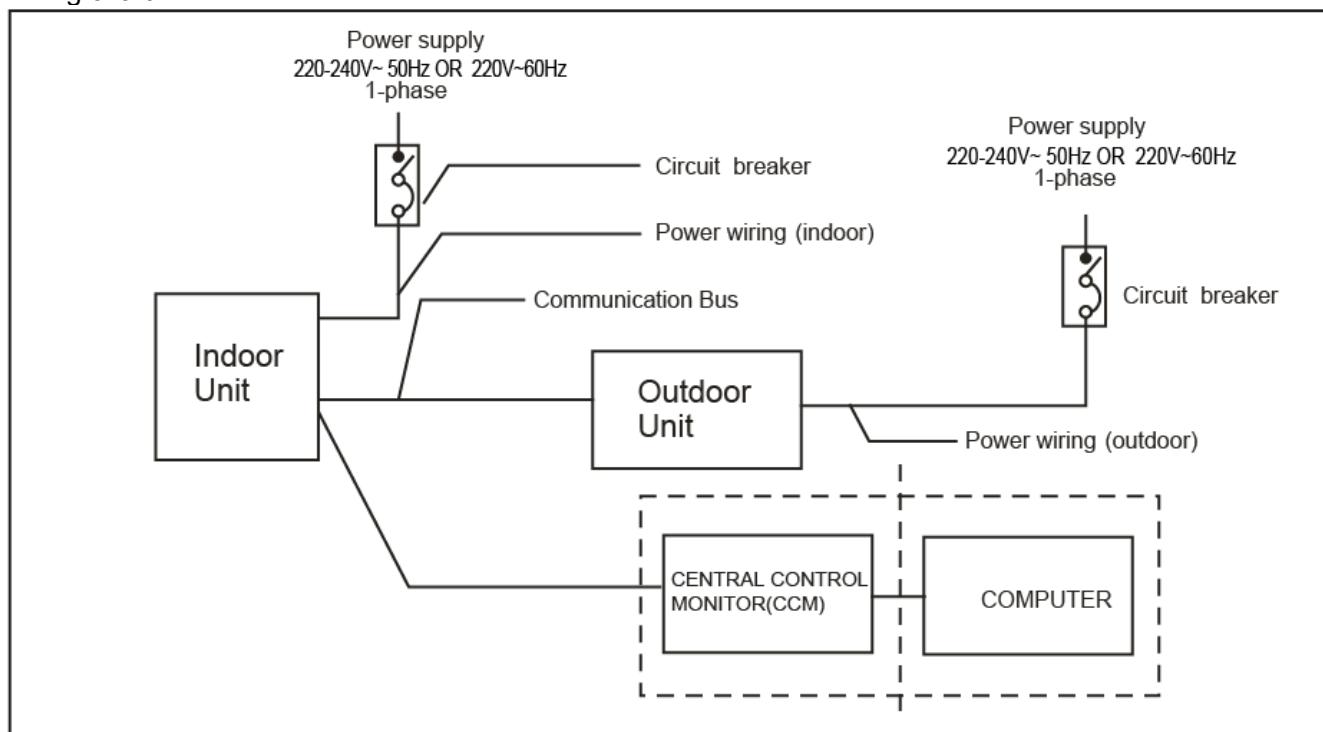
	Name	Shape	Quantity
INSTALLATION FITTINGS	Installation paper board		1
Tubing & Fittings	Soundproof / insulation sheath		2
	Connecting pipe group		1
Drainpipe Fittings	Out-let pipe sheath		1
	Out-let pipe clasp		1
	Drain joint		1
	Seal ring		1
Remote controller & Its Frame	Remote controller & Its Frame		1
	Remote controller holder		1
	Mounting screw(ST2.9×10-C-H)		2
	Alkaline dry batteries (AM4)		2
Others	Owner's manual		1
	Installation manual		1
Installation accessory (The product you have might not be provided the following accessories)	Expansible hook		4
	Installation hook		4
	Orifice		1

10. The Specification of Power

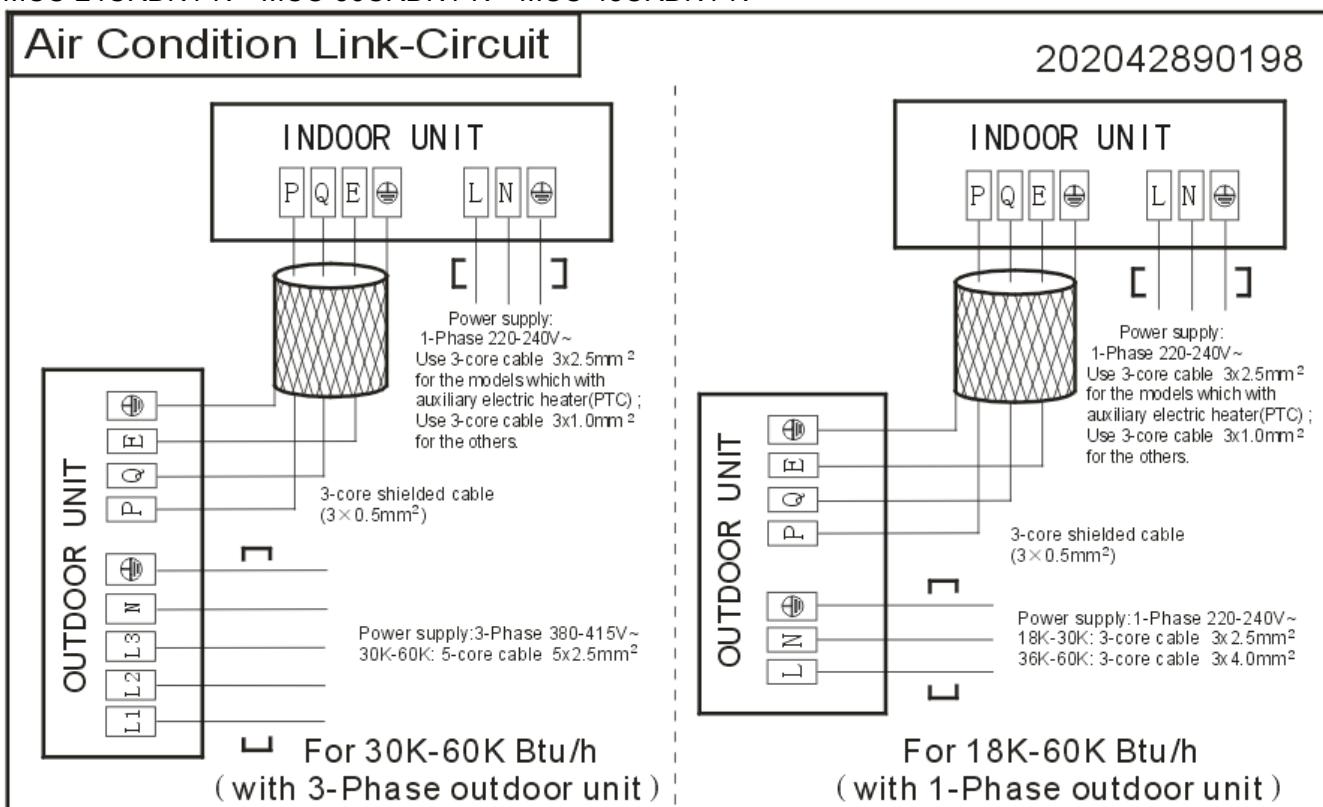
Type		MCC-24CRDN1-N	MCC-36CRDN1-N MCC-48CRDN1-N
Indoor unit Power	Phase	1- Phase	1- Phase
	Frequency and Voltage	220-240V~, 60Hz	220-240V~, 60Hz
	Power Wiring(mm ²)	3X1.0	3X1.0
	Circuit Breaker(A)	15	15
Outdoor unit Power	Phase	1- Phase	1- Phase
	Frequency and Voltage	220-240V~, 60Hz	220-240V~, 60Hz
	Power Wiring(mm ²)	3X2.5	3X3.3
	Circuit Breaker(A)	30	40
Indoor/outdoor connection wiring(Weak Electric Signal) (mm ²)		3X0.5	3X0.5
Indoor/outdoor connection wiring(Strong Electric Signal) (mm ²)		—	—

11. Field Wiring

Wiring chart



MCC-24CRDN1-N MCC-36CRDN1-N MCC-48CRDN1-N



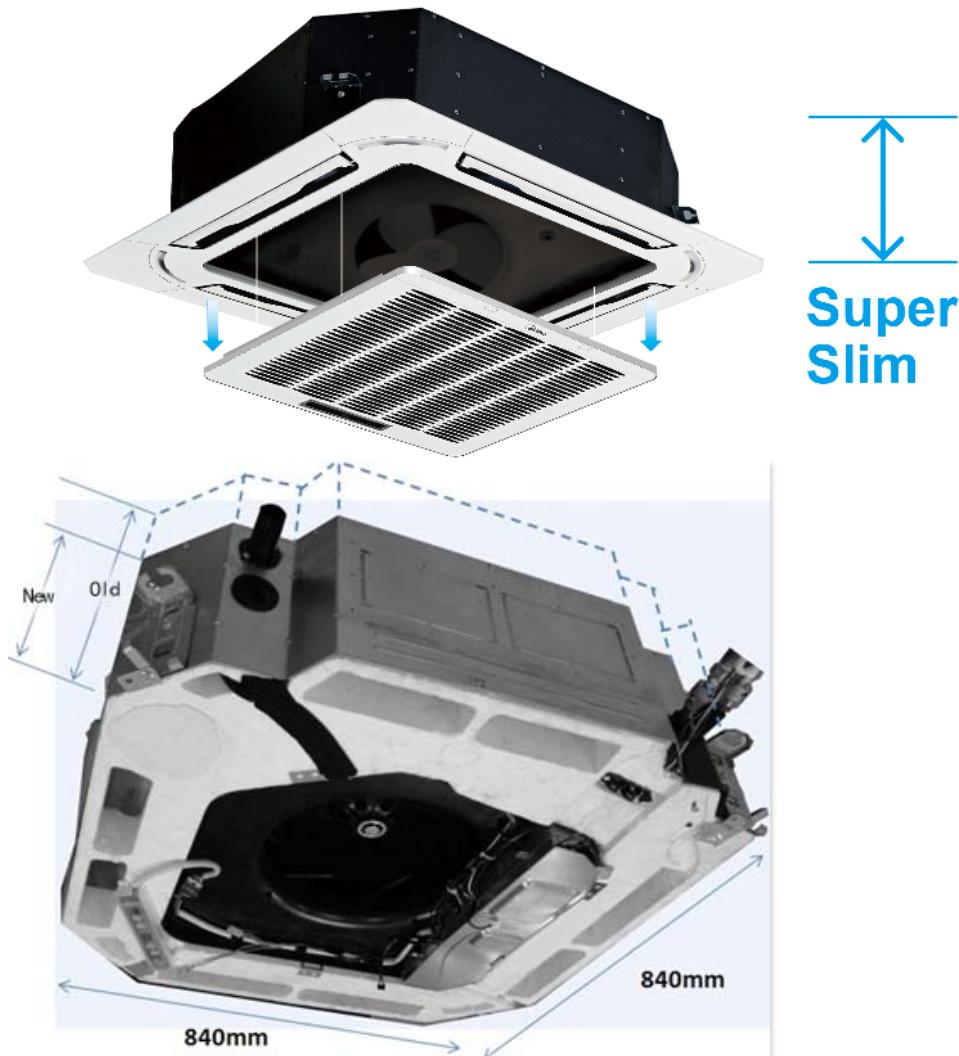
Super Slim Cassette Type

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1. Features

1.1 Overview

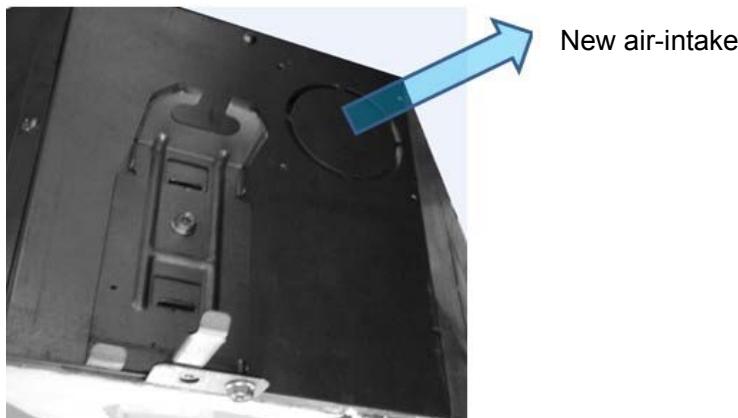
- Compact design, super slim body size, less space requiring in installation
- Each louver can be separately controlled, more comfort air blowing is possible.
- Auto-lifting panel design, more convenient to clean and maintain the filter. (optional)



	Old Cassette	New slim cassette	Volume change
Dimension	18K-24K: 840*230*840	18K-24K: 840*203*840	13.3%↓
	30K: 840*300*840	30K: 840*203*840	47.7%↓
	36K-48K: 840*300*840	36K-48K: 840*245*840	22.4%↓

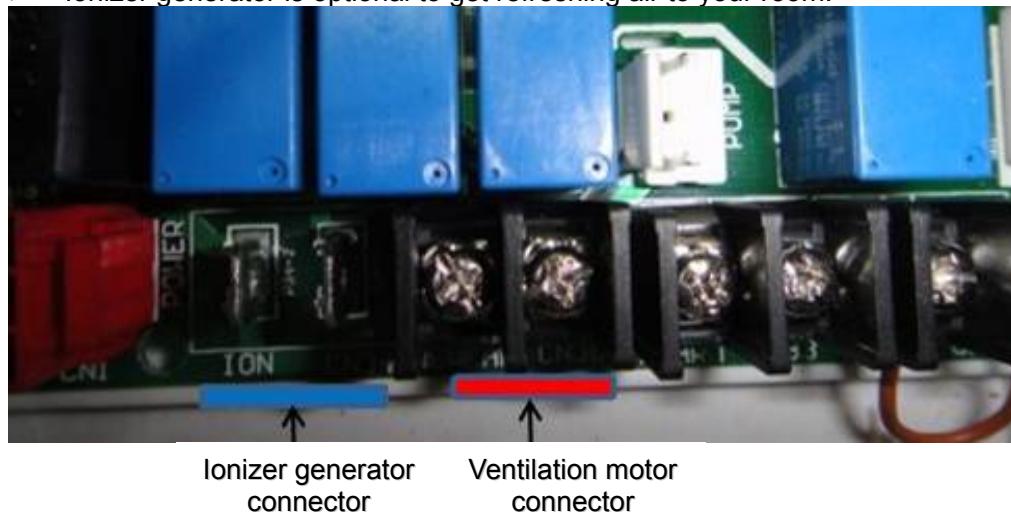
1.2 Fresh air intake function

- Fresh air fulfills air quality more healthy and comfortable.
- Ventilation motor is optional to increase the effect of fresh air.



1.3 Optional ionizer generator

- Ionizer generator is optional to get refreshing air to your room.

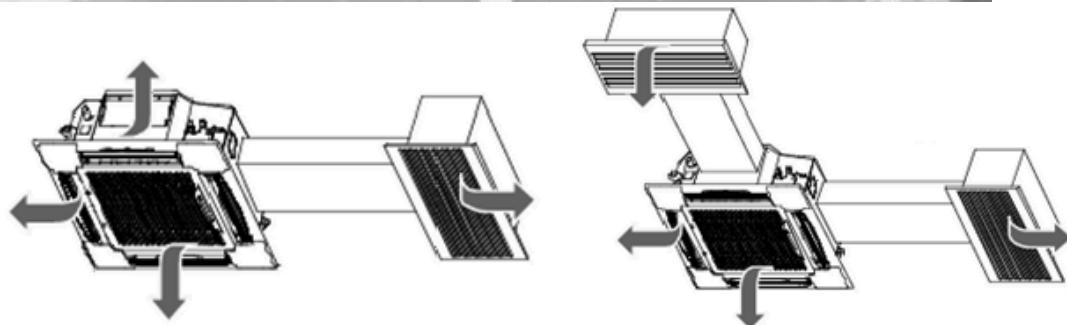


- Ionizer can be switched on or off by remote controller. When pressing the Clean Air button on the remote controller, Ionizer will work and the indicator light on display board will shine.



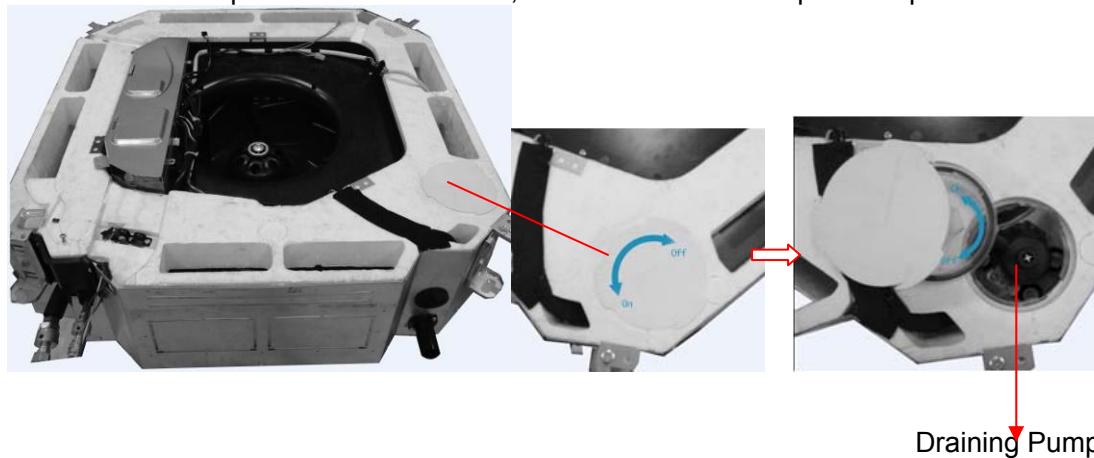
1.4 External air duct design

- Reserve external air duct, more flexible for the air supply.

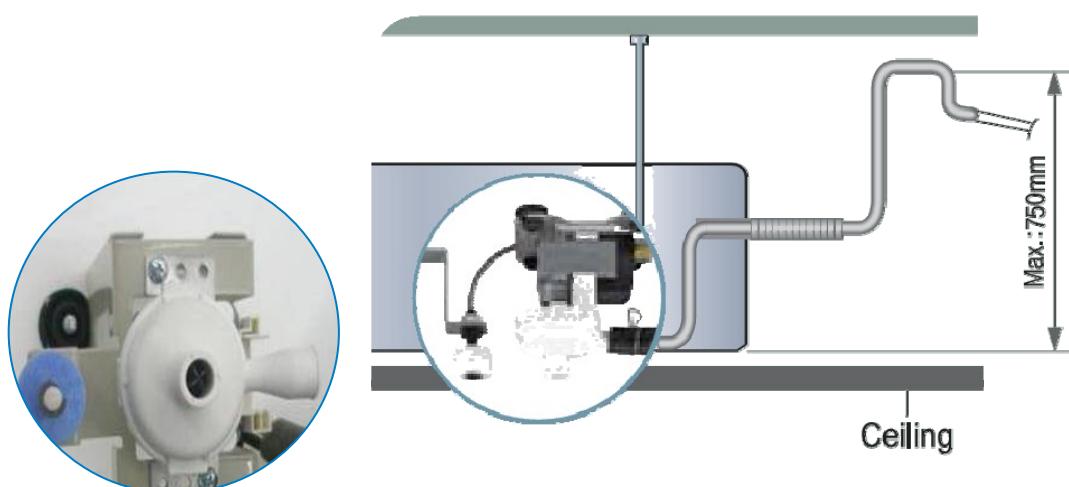


1.5 Built-in draining pump

- Due to the improvement of structure, more convenient to repair or replace the draining pump.



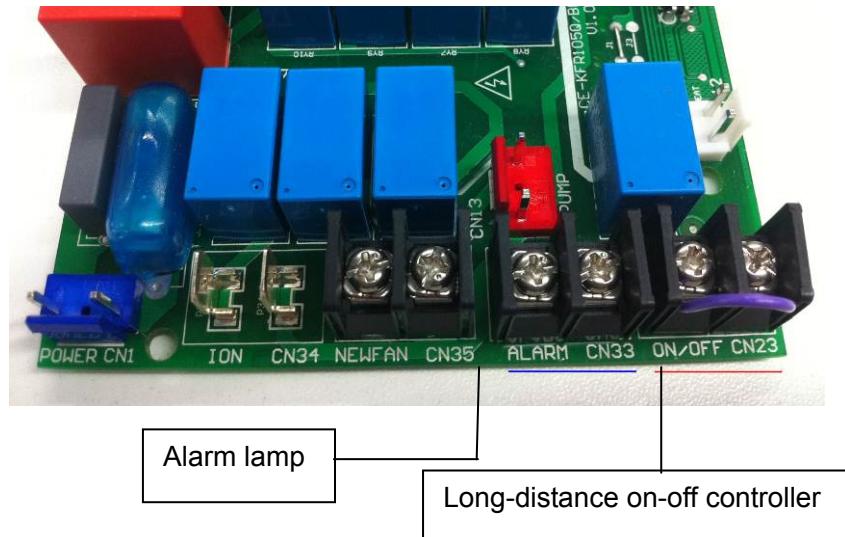
- Built-in draining pump to make sure condensed water drain out reliably.



1.6 Terminals for alarm lamp and long-distance on-off controller connection are standard

Features

- Reserve terminals for the connection of alarm lamp and long-distance on-off controller, more human control.



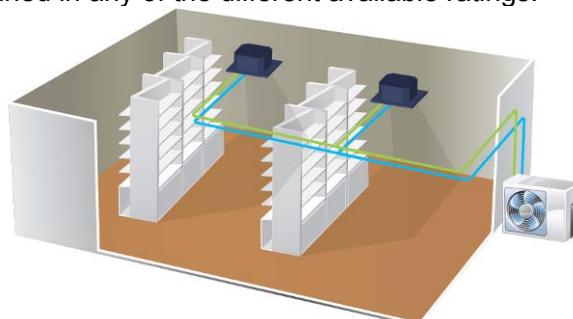
1.7 Standard touch screen wired controller

- Touch screen wired controller is standard, with error code indication function. Better man-machine conversation interface.
- Undated structure design, 4-way wire layout design, no raised part at backside, more convenient to place the wires and install the device.
- Remote controller is optional (without auto-lifting panel function).

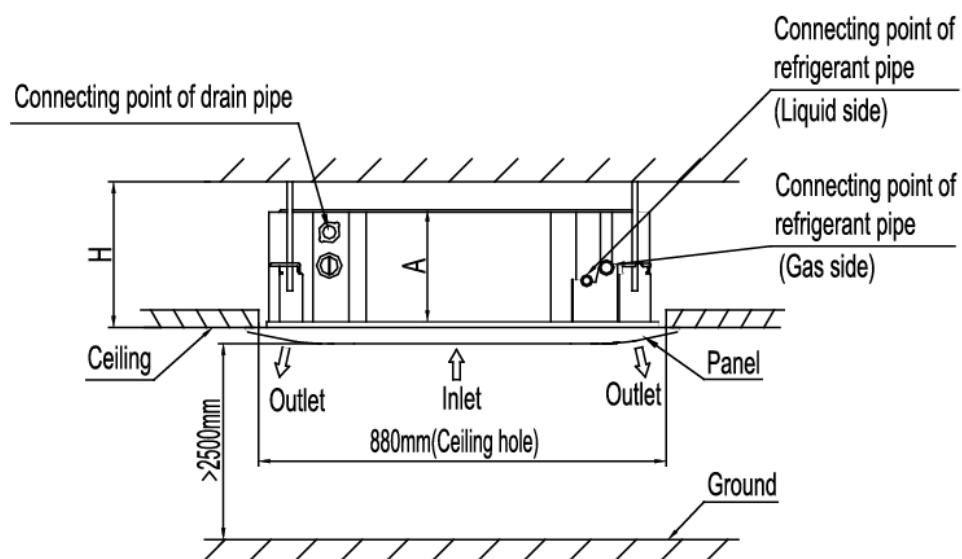
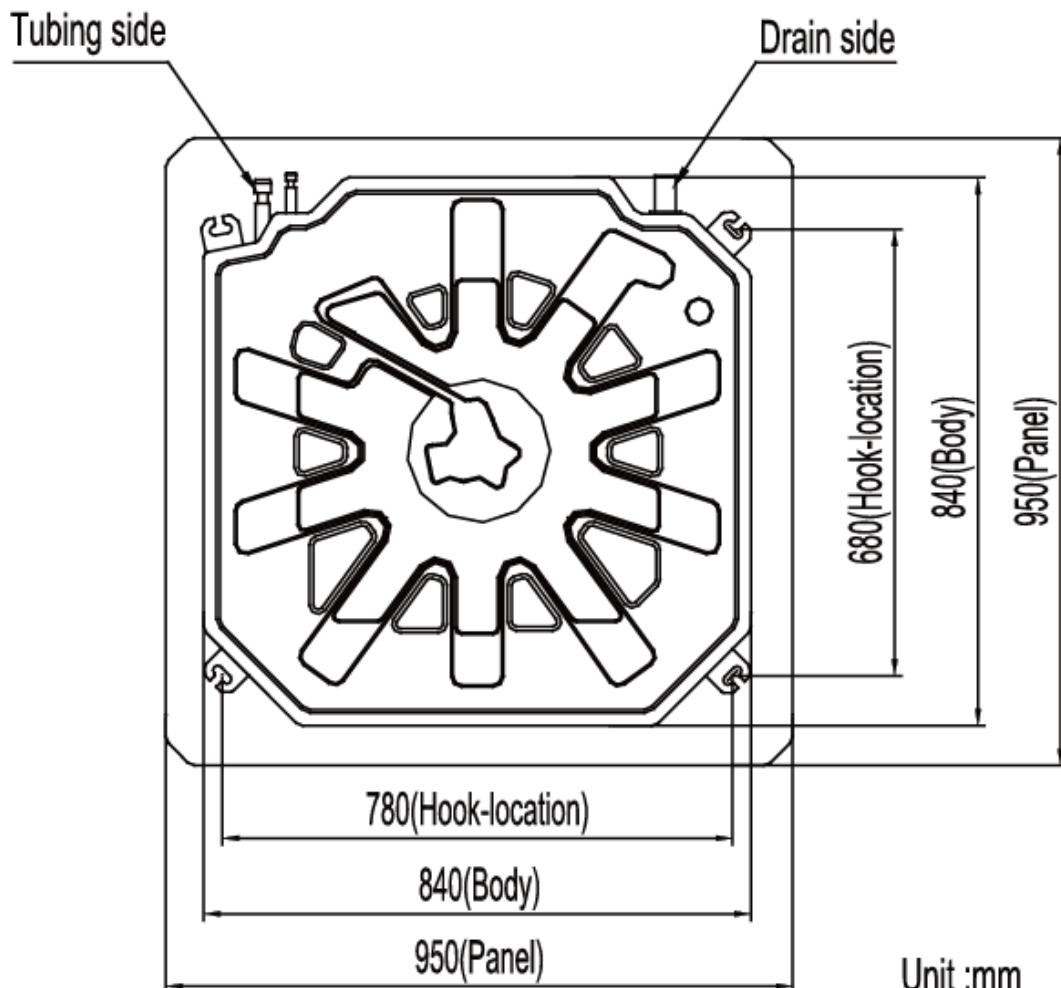


1.8 Twins Combination(18k-30k)

- The units can be installed as Twin systems: one outdoor unit can connect with two indoor units. The indoor units can be combined in any of the different available ratings.

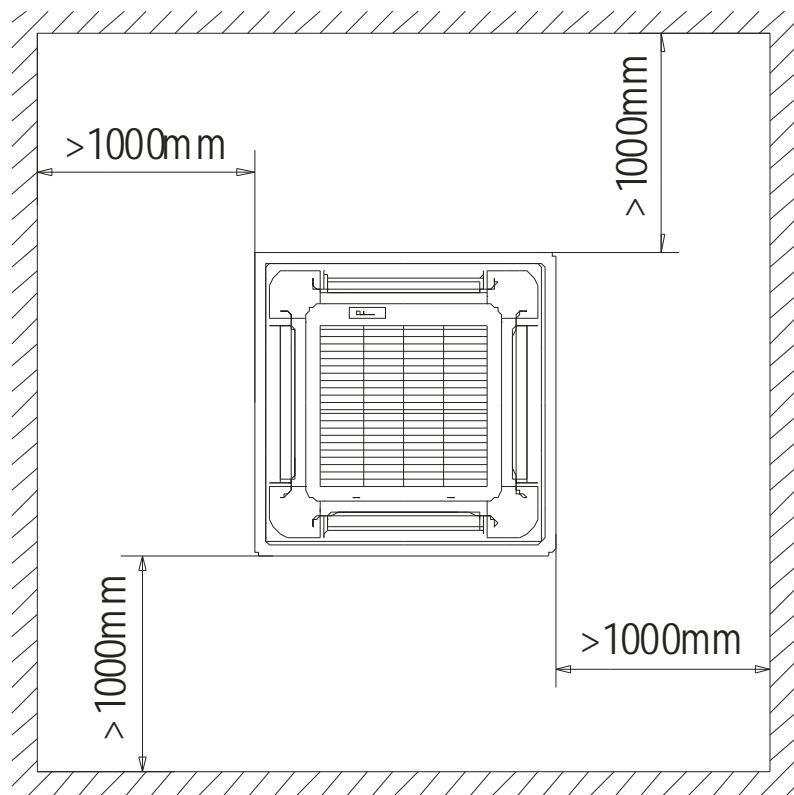


2. Dimensions



Model	A	H
18	205	>235
24	205	>235
30	205	>235
36	245	>275
48	245	>275

3. Service Space



4. Wiring Diagrams

MCD-36CRDN1-D

WIRING DIAGRAM

INDOOR UNIT

FUNCTION OF SWITCH

ENC1 SWITCH (FOR POWER)

NUMBER	POWER
0	2200W (0.8HP)
1	2800W (1.0HP)
2	3600W (1.2HP)
3	4500W (1.7HP)
4	5600W (2.0HP)
5	7100W (2.5HP)
6	8000W (3.0HP)
7	9000W (3.2HP)
8	10500W (4.0HP)
9	14000W (5.0HP)
A	16000W (6.0HP)

'0~F' of the ENC2 and 'ON/OFF' of the Sw1 mean the addresses of the different net units, respectively.

SW2 SWITCH (SELECT TEMP.)	ON 1 2	ON 1 2	ON 1 2	ON 1 2
TE1	28	30		
TE2	30	32	Fan motor	
TE3	24	28	do not stop.	
TE4	15	24		According to E function
TE5	32	35		
TE6	30	32		

Factory Setting

SW3 SWITCH FOR TEMP COMPENSATION	ON STATE	4	6	E function

SW5 SWITCH FOR MAIN-SLAVE SETTING	ON STATE	MAIN NO SLAVE	SLAVE MAIN	SLAVE

202042790257



XS9

XS10

XP9

XP10

G M

G M



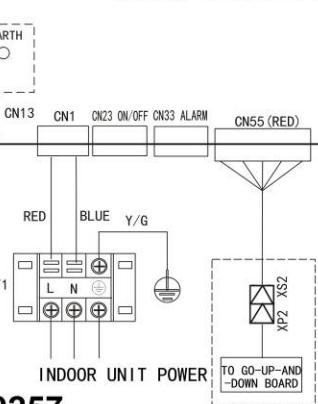
SW4 SWITCH FOR AUTO-RESTART

ON STATE

MODE ACTIVE

INACTIVE

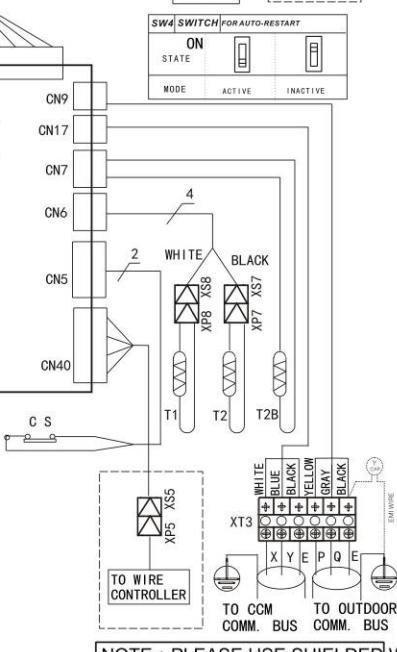
MAIN CONTROL BOARD



INDOOR UNIT POWER

TO GO-UP-AND-DOWN BOARD

TO SWING BOARD



NOTE : PLEASE USE SHIELDED WIRE

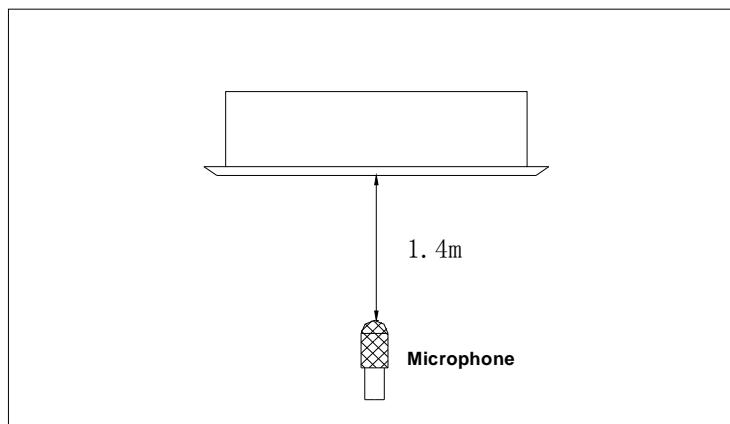
5. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min	Max	
MCD-36CRDN1-N	60	220-240	198	254	15

Notes:

MFA: Max. Fuse Amps. (A)

6. Sound Levels



Model	Noise level dB(A)		
	H	M	L
MCD-36CRDN1-N	59	47	43

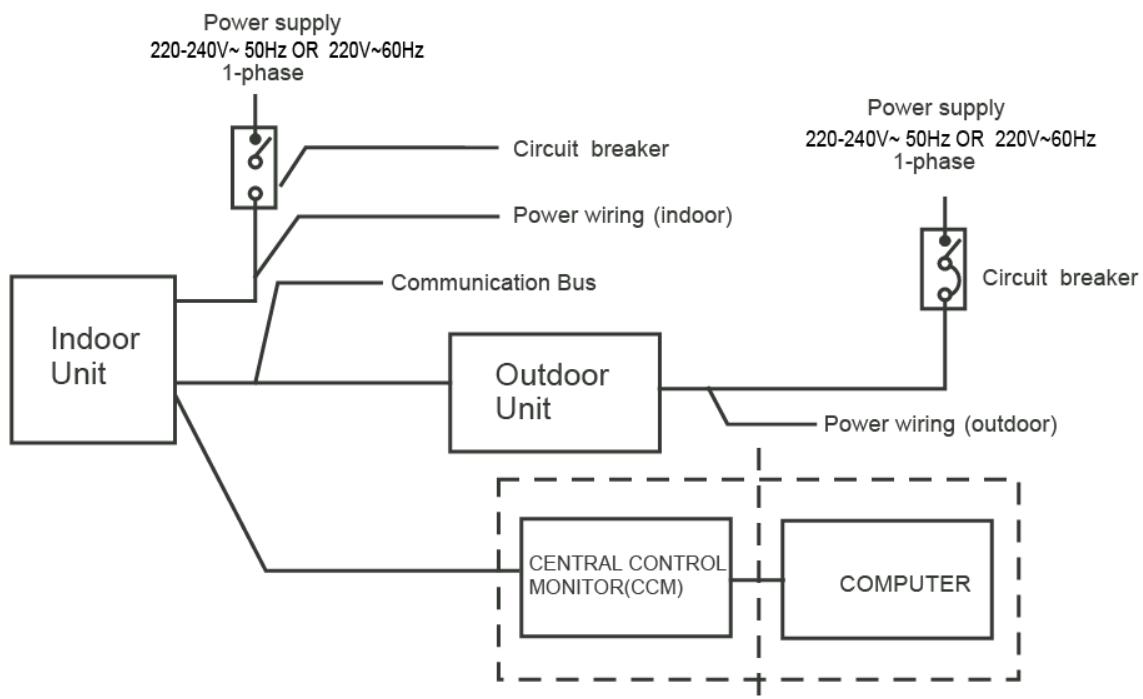
7. Accessories

	Name	Shape	Quantity
N FITTINGS INSTALLATION FITTINGS	Installation paper board		1
	Bolt M5		4
Tubing & Fittings	Soundproof / insulation sheath		2
Fittings Drainpipe	Out-let pipe		1
	Out-let pipe sheath		1
	Out-let pipe clasp		1
Remote controller & Its Frame	Remote controller & Its Frame		1
	Remote controller holder		1
	Mounting screw(ST2.9×10-C-H)		2
	Remote controller manual		1
	Alkaline dry batteries (AM4)		2
Others	Owner's manual		1
	Installation manual		1
	Network wires		1
Installation accessory (The product you have might not be provided the following accessories)	Expansible hook		4
	Installation hook		4
	Orifice		1

8. The Specification of Power

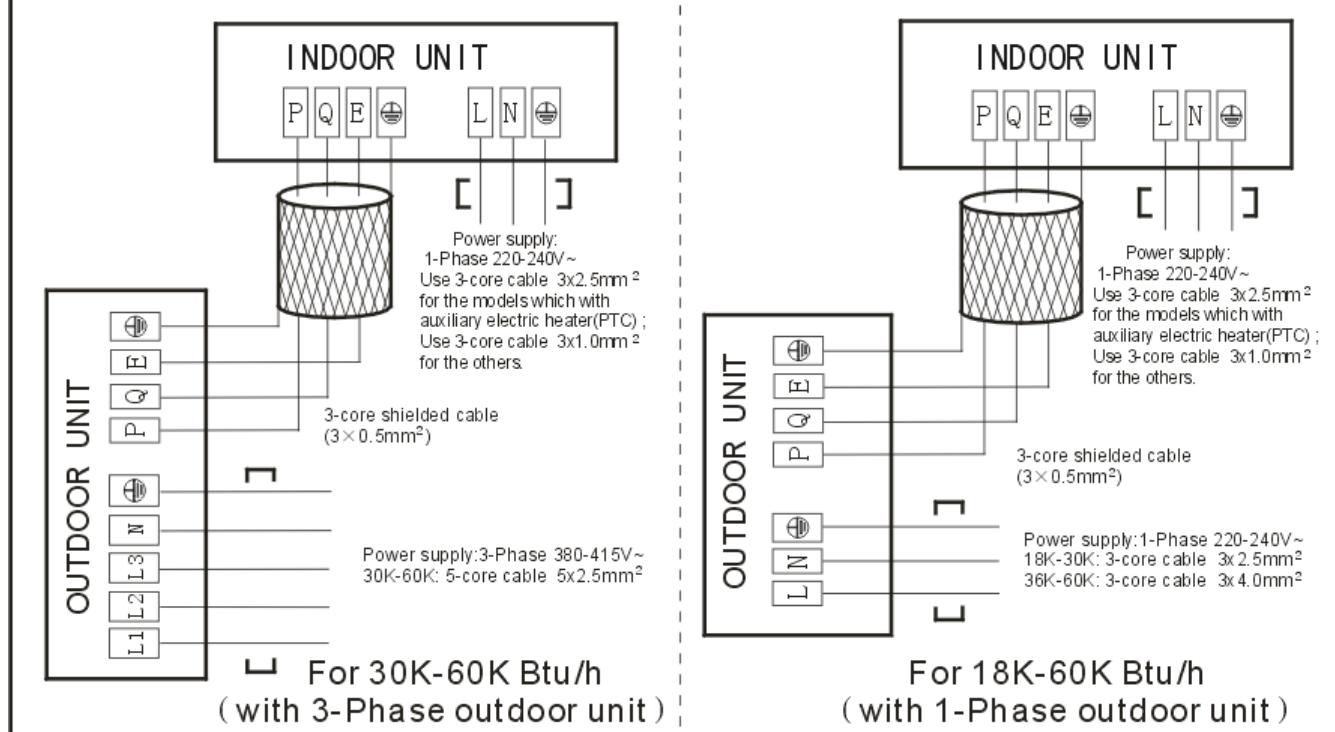
Model		18000-24000Btu/h	30000-60000 Btu/h
INDOOR UNIT POWER	Phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 60Hz	220-240V, 60Hz
	POWER WIRING (mm ²)	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	15	15
OUTDOOR UNIT POWER	Phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 60H	220-240V, 60H
	POWER WIRING (mm ²)	3×2.5	3×4.0
	CIRCUIT BREAKER (A)	30	40
Indoor/Outdoor Connecting Wiring (Weak Electric Signal) (mm ²)		3×0.5	3×0.5
Indoor/Outdoor Connecting Wiring (Strong Electric Signal) (mm ²)		—	—

9. Field Wiring



Air Condition Link-Circuit

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Ceiling & Floor Type

1. Features.....	34
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11. Field Wiring	44

1. Features

1.1. New design, more modern and elegant appearance.



1.2. Convenient installation

- The ceiling type can be easily installed into a corner of the ceiling even if the ceiling is very narrow
- It is especially useful when installation of an air conditioner in the center of the ceiling is impossible due to a structure such as one lighting.

1.3. Two direction auto swing (vertical & horizontal) and wide angle air flow,

- Air flow directional control minimizes the air resistance and produces wider air flow to vertical direction.
- The range of horizontal air discharge is widened which secures wider air flow distribution to provide more comfortable air circulation no matter where the unit is set up



1.4. Three level fan speed, more humanism design, meets different air-supply requirement.

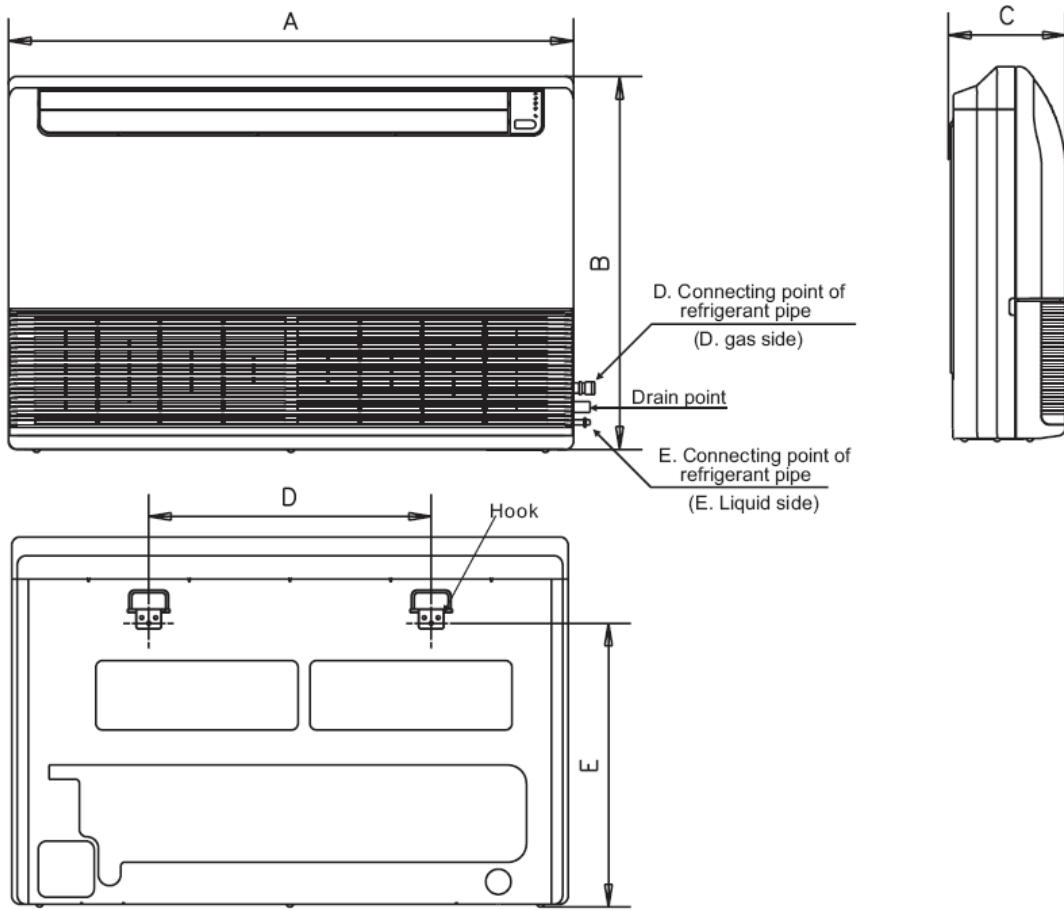
1.5. Water proof by utilizing the absorbing plastic film on water collector

1.6. Easy operation.

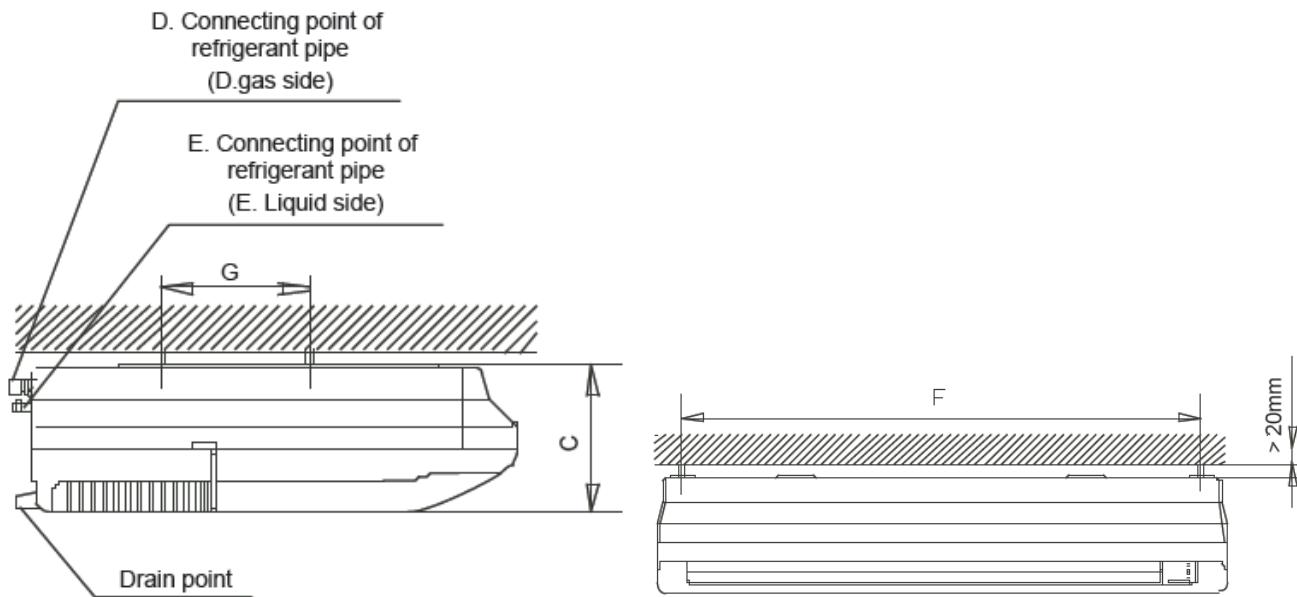
1.7. Remote control and optional wired control method.

2. Dimensions

a. Wall mounting installation

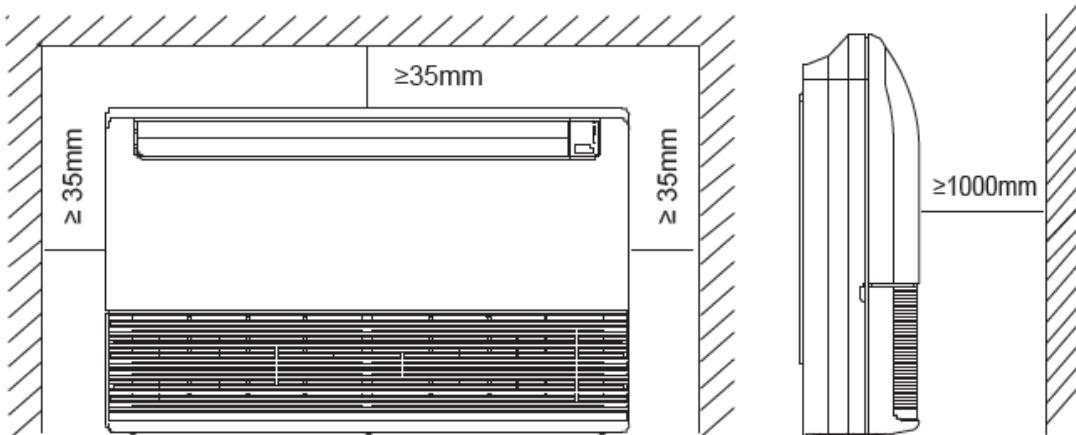


b. Ceiling installation



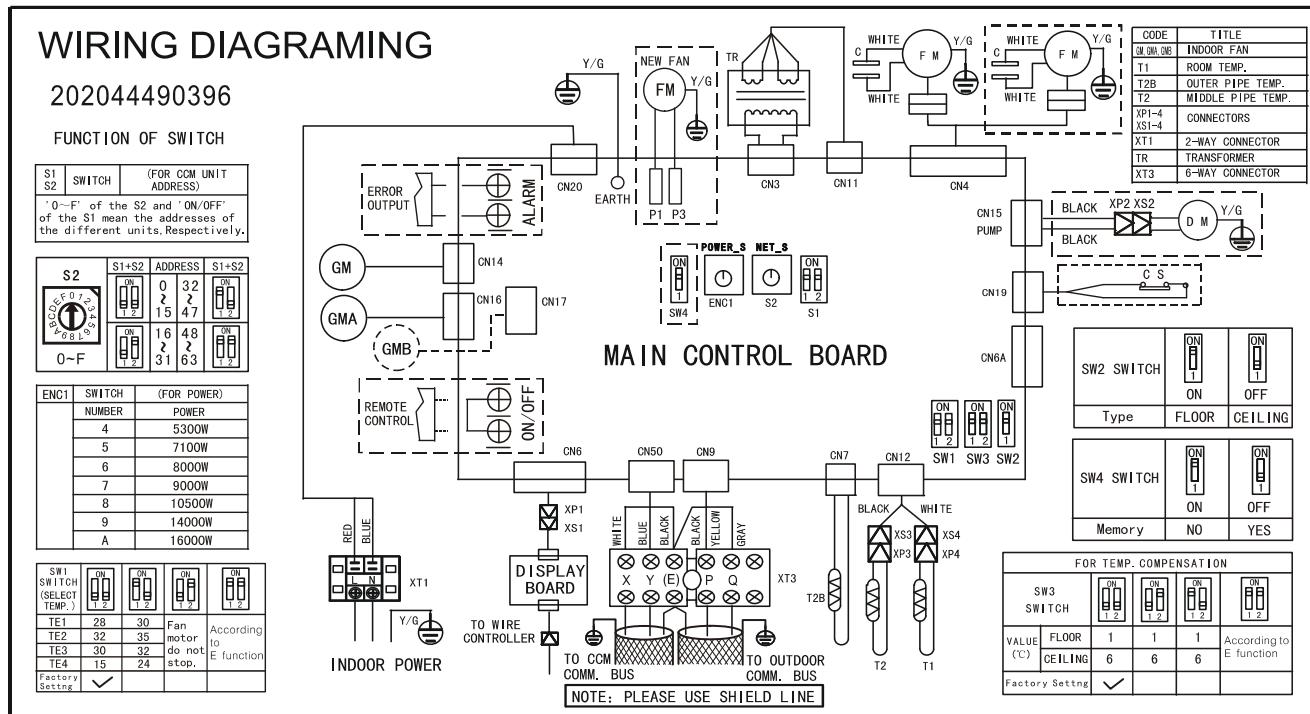
Capacity (Btu/h)	A	B	C	D	E	F	G
MUB-24CRDN1-N	990	660	203	505	506	907	200
MUB-36CRDN1-N	1280	660	203	795	506	1195	200
MUB-48CRDN1-N	1670	680	240	1070	450	1542	200

3. Service Space

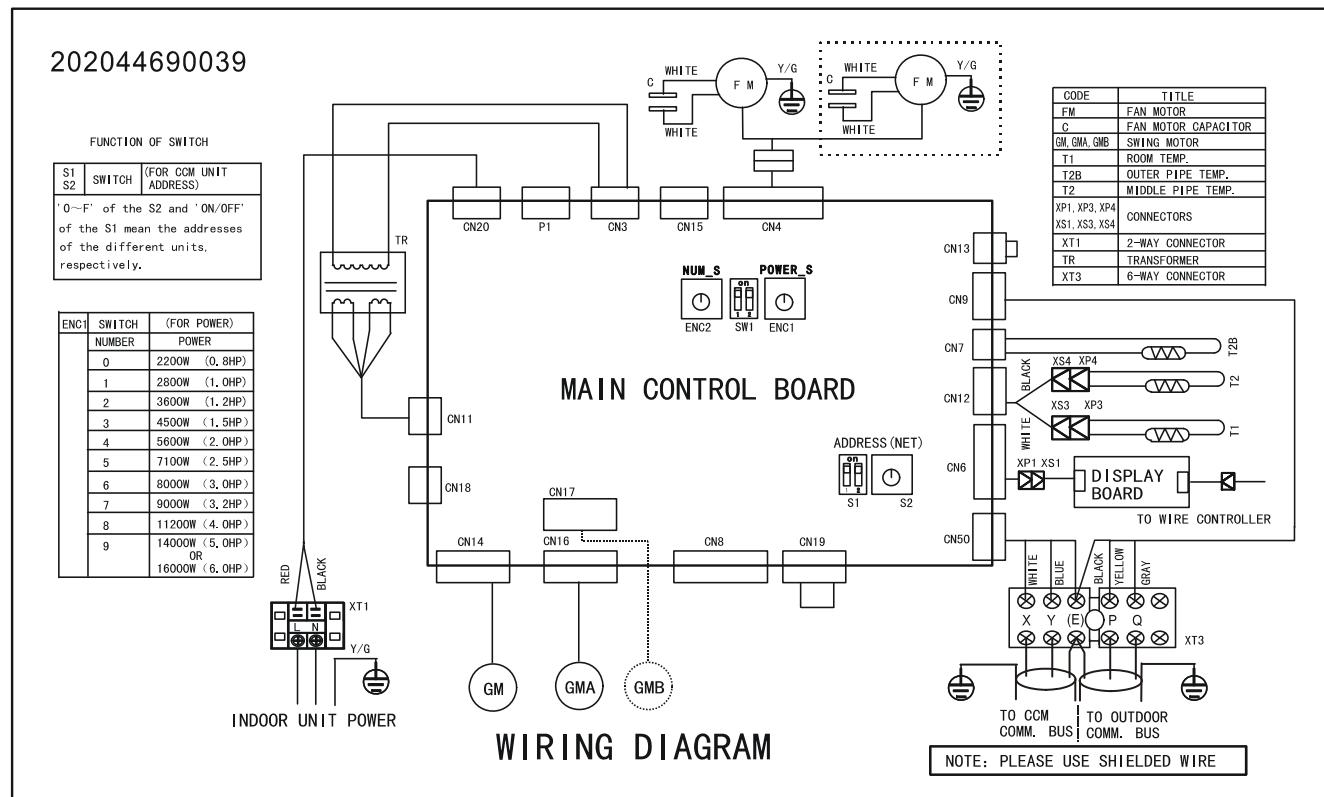


4. Wiring Diagrams

MUB-24CRDN1-N MUB-36CRDN1-N



MUB-48CRDN1-N



5. Capacity Tables

6.1 Cooling Capacity

MUB-24CRDN1-N

Cooling		Outdoor conditions (DB)			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	7.52	7.15	6.79	6.50
	SC	5.56	5.51	5.43	5.46
	Input	2.10	2.28	2.38	2.46
24/17°C DB/WB	TC	7.74	7.37	7.01	6.57
	SC	5.80	5.75	5.68	5.52
	Input	2.23	2.38	2.49	2.61
27/19°C DB/WB	TC	7.88	7.52	7.30	6.79
	SC	5.83	5.79	5.69	5.57
	Input	2.28	2.41	2.54	2.66
32/23°C DB/WB	TC	8.03	7.74	7.59	7.01
	SC	6.83	6.73	6.68	6.52
	Input	2.38	2.49	2.66	2.76

MUB-36CRDN1-N

High speed		Indoor conditions (DB) at 0Pa			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	10.82	10.29	9.77	9.35
	SC	8.00	7.92	7.81	7.85
	Input	3.44	3.73	3.89	4.02
24/17°C DB/WB	TC	11.13	10.61	10.08	9.45
	SC	8.35	8.27	8.16	7.94
	Input	3.64	3.89	4.06	4.26
27/19°C DB/WB	TC	11.34	10.82	10.50	9.77
	SC	8.39	8.33	8.19	8.01
	Input	3.73	3.93	4.14	4.35
32/23°C DB/WB	TC	11.55	11.13	10.92	10.08
	SC	9.82	9.68	9.61	9.37
	Input	3.89	4.06	4.35	4.51

MUB-48CRDN1-N

Cooling		Outdoor conditions (DB)			
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C
21/15°C DB/WB	TC	14.42	13.72	13.02	12.46
	SC	10.67	10.56	10.42	10.47
	Input	3.89	4.22	4.41	4.55
24/17°C DB/WB	TC	14.84	14.14	13.44	12.60
	SC	11.13	11.03	10.89	10.58
	Input	4.13	4.41	4.60	4.83
27/19°C DB/WB	TC	15.12	14.42	14.00	13.02
	SC	11.19	11.10	10.92	10.68
	Input	4.22	4.45	4.69	4.92
32/23°C DB/WB	TC	15.40	14.84	14.56	13.44
	SC	13.09	12.91	12.81	12.50
	Input	4.41	4.60	4.92	5.11

Notes:

TC : Total capacity ; kW

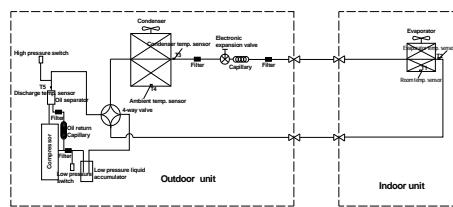
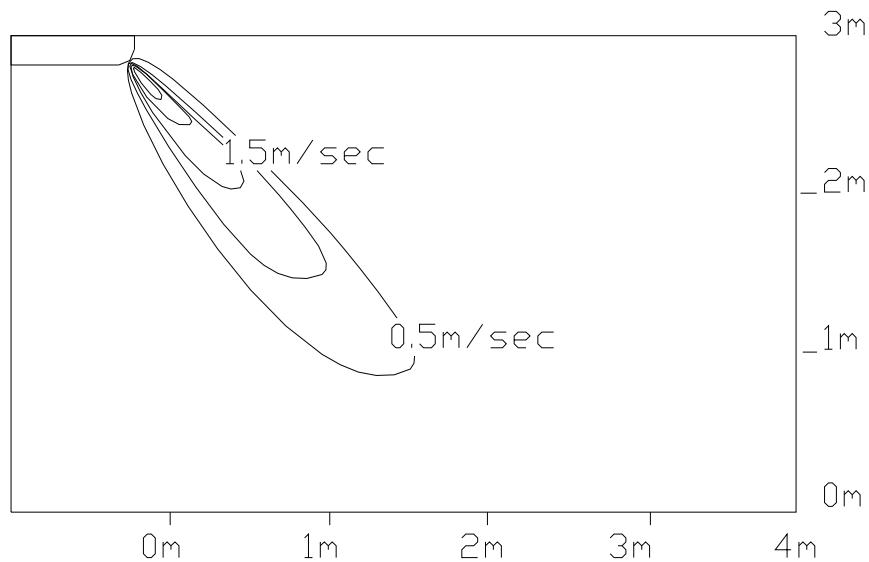
SC: Sensible heat capacity ; kW

Input: Input power; kW

6. Air Velocity and Temperature Distributions(Reference Data)

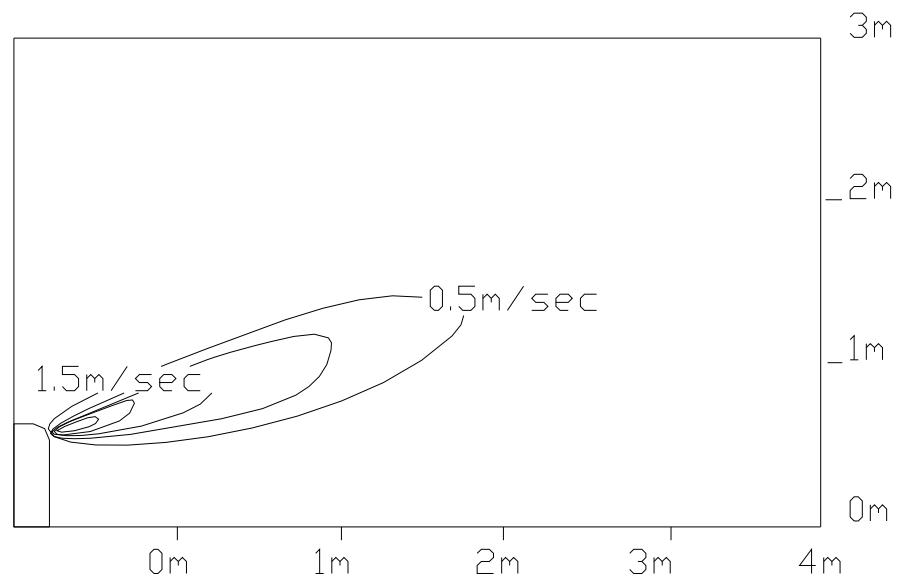
Discharge angle 60° (CEILING)

Airflow velocity

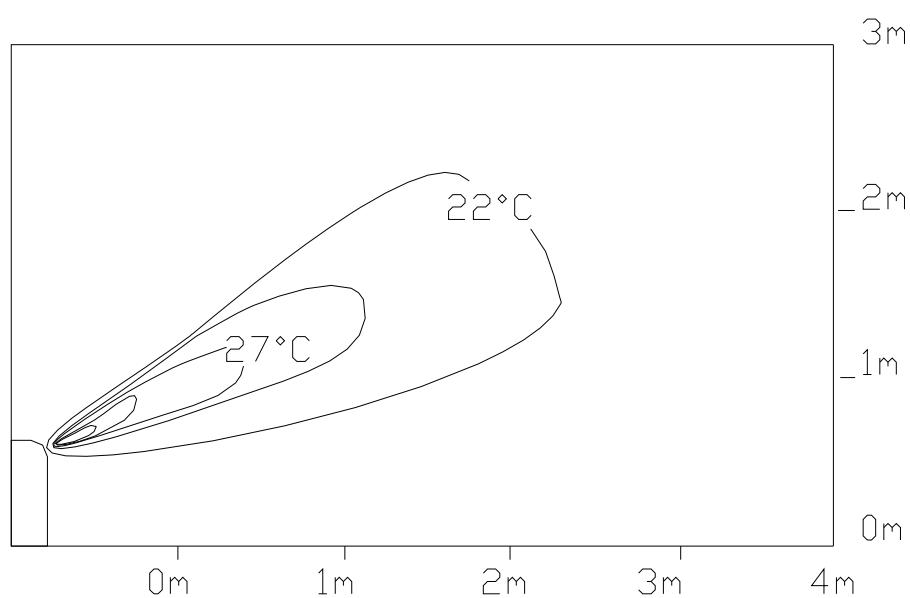


Discharge angle 60° (FLOOR)

Airflow velocity



Temperature



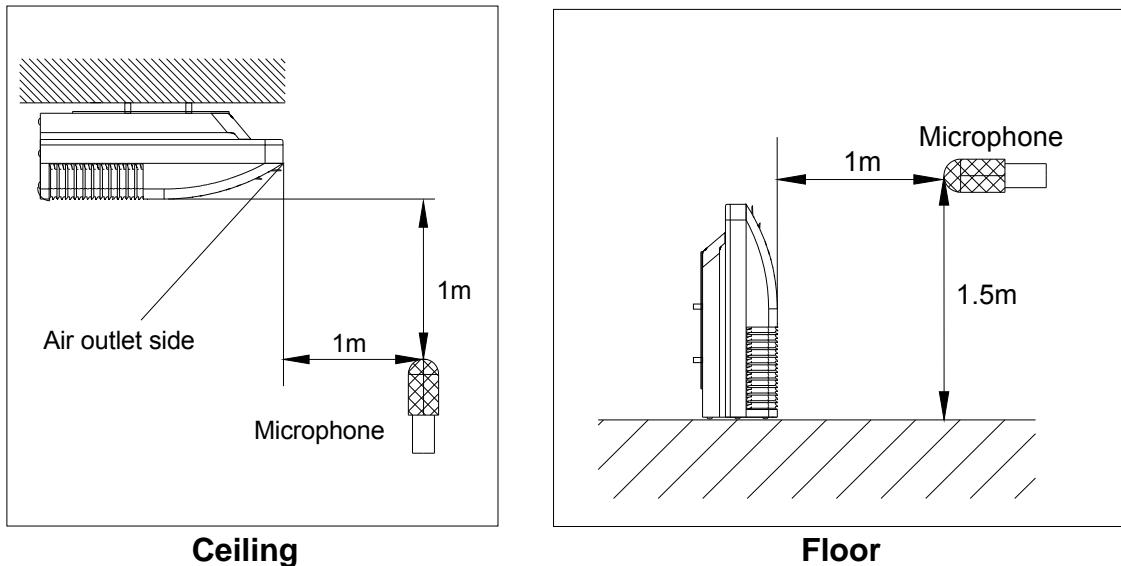
7. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min	Max	
MUB-24CRDN1-N	60	220-240	198	254	15
MUB-36CRDN1-N	60	220-240	198	254	15
MUB-48CRDN1-N	60	220-240	198	254	15

Notes:

MFA: Max. Fuse Amps. (A)

8. Sound Levels



Model	Noise level dB(A)		
	H	M	L
MUB-24CRDN1-N	45	43	40
MUB-36CRDN1-N	45	43	40
MUB-48CRDN1-N	47	46	44

9. Accessories

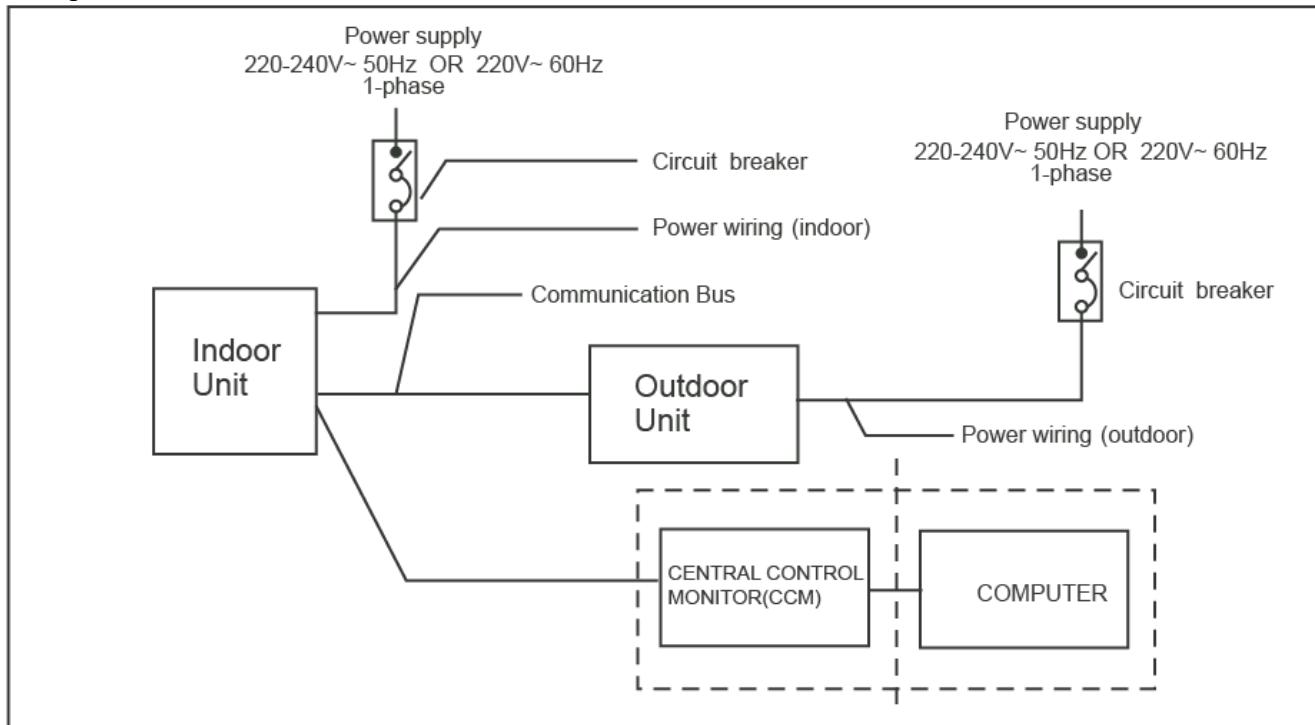
	Name	Shape	Quantity
Installation fittings	1. Hook		2
	2. Hanging arm		2
Remote controller & Its holder	3. Remote controller		1
	4. Remote controller holder		1
	5. Mounting screw (ST2.9×10-C-H)		2
	6. Alkaline dry batteries (AM4)		2
Others	7. Owner's manual	—	1
	8. Installation manual	—	1
	9. Remote controller manual	—	1

10. The Specification of Power

Type	MUB-24CRDN1-N MUB-36CRDN1-N MUB-48CRDN1-N	
Indoor unit Power	Phase	1- Phase
	Frequency and Voltage	220V~,60Hz
	Power Wiring(mm ²)	3X1.0
	Circuit Breaker(A)	15
Outdoor unit Power	Phase	1- Phase
	Frequency and Voltage	220V~,60Hz
	Power Wiring(mm ²)	3X3.3
	Circuit Breaker(A)	40
Indoor/outdoor connection wiring(Weak Electric Signal) (mm ²)	3X0.5	
Indoor/outdoor connection wiring(Strong Electric Signal) (mm ²)	—	

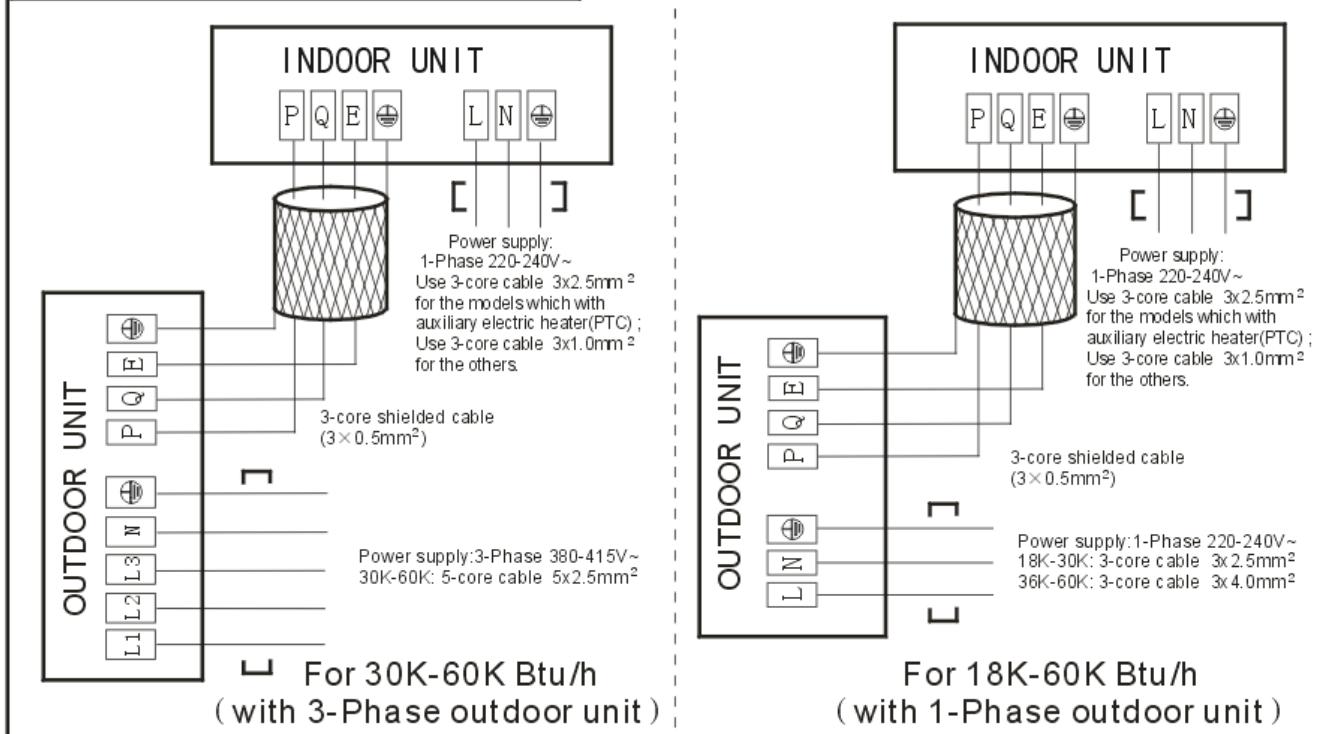
11. Field Wiring

Wiring chart



Air Condition Link-Circuit

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3rd Generation Ceiling & Floor Type

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6. Sound Levels.....	50
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8. The Specification of Power	51
9. Field Wiring	52

1. Features

1.1. New design, more modern and elegant appearance.

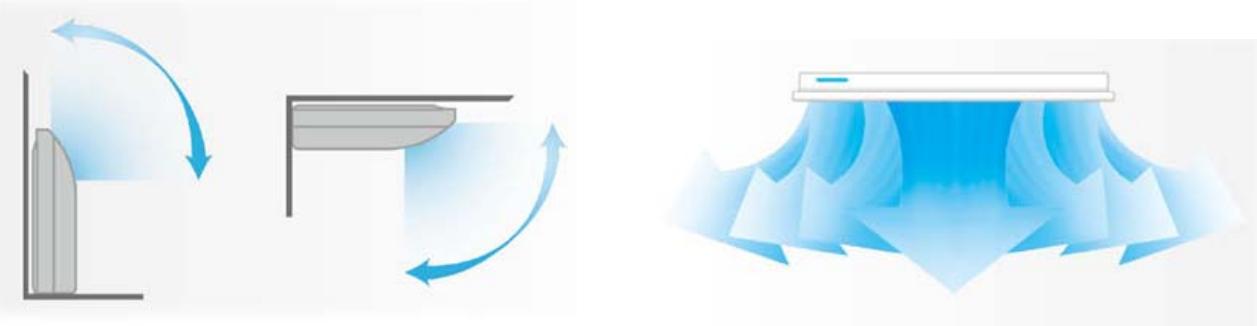


1.2. Convenient installation

- The ceiling type can be easily installed into a corner of the ceiling even if the ceiling is very narrow
- It is especially useful when installation of an air conditioner in the center of the ceiling is impossible due to a structure such as one lighting.

1.3. Two direction auto swing (vertical & horizontal) and wide angle air flow,

- Air flow directional control minimizes the air resistance and produces wider air flow to vertical direction.
- The range of horizontal air discharge is widened which secures wider air flow distribution to provide more comfortable air circulation no matter where the unit is set up



1.4. Three level fan speed, more humanism design, meets different air-supply requirement.

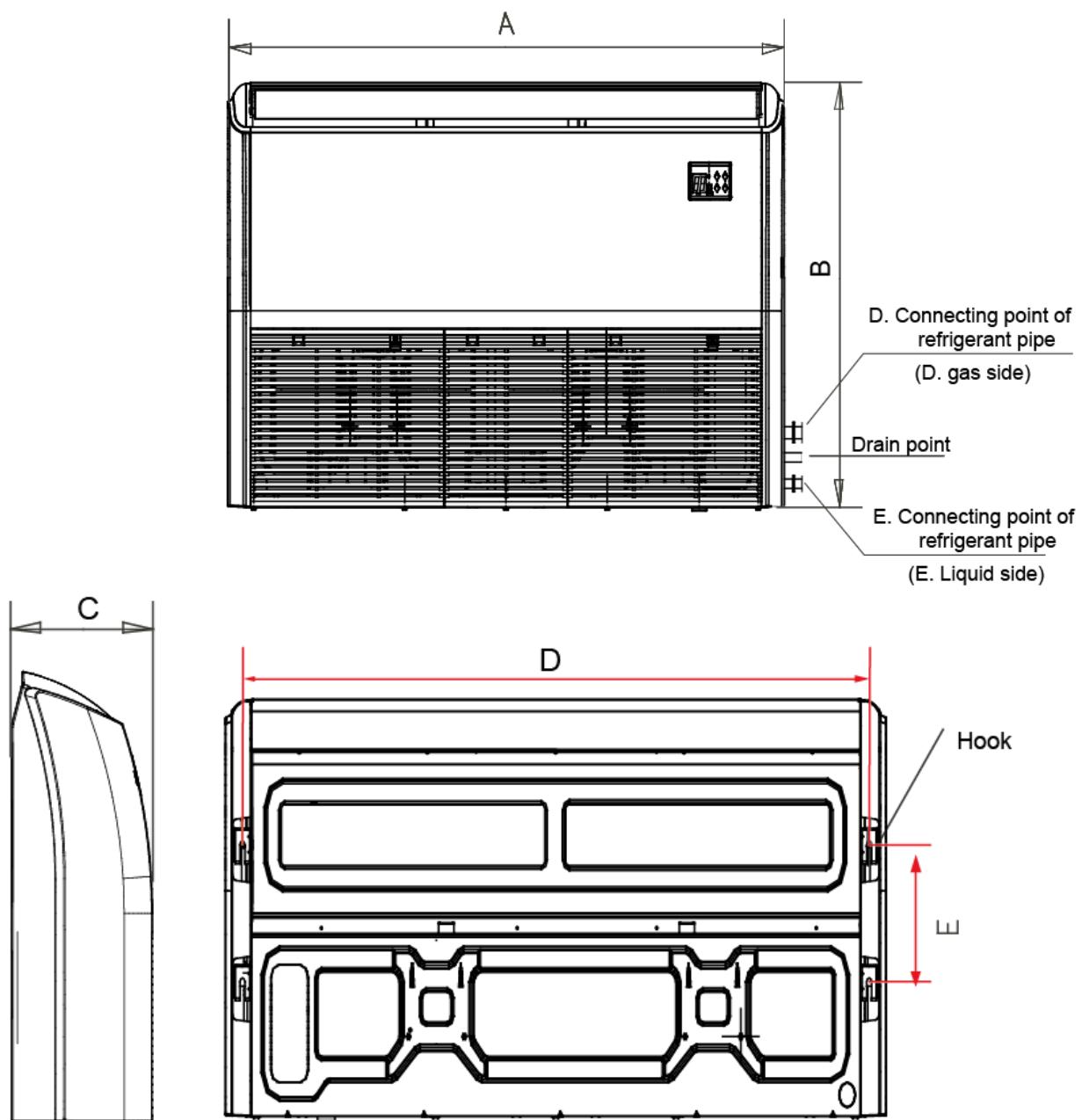
1.5. New foam drain pan with plastic-spraying inner surface



1.6. Easy operation.

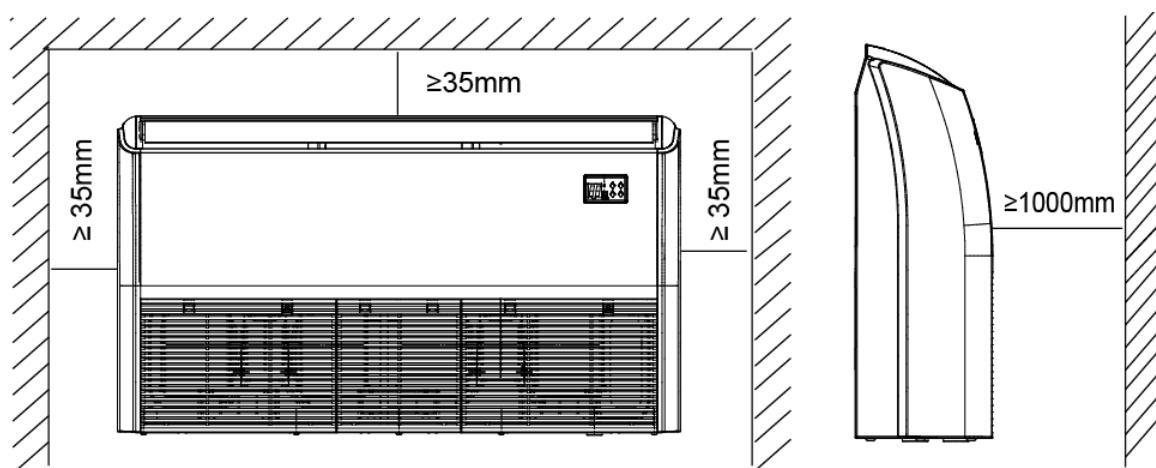
1.7. Remote control and optional wired control method.

2. Dimensions



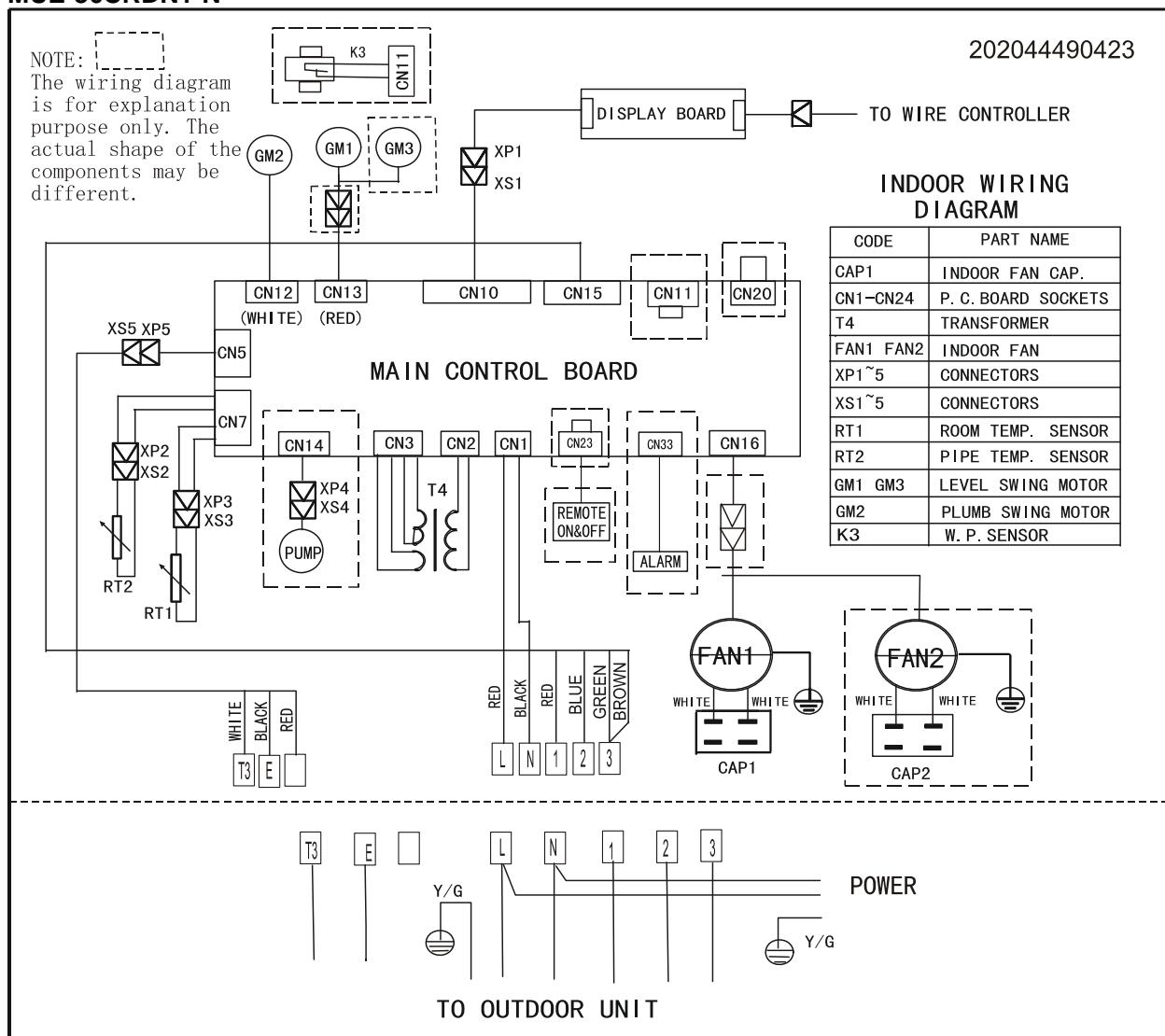
Capacity (Btu/h)	A	B	C	D	E
36K	1285	675	235	1200	220
48K, 60K	1650	675	235	1565	220

3. Service Space



4. Wiring Diagrams

MUE-36CRDN1-N



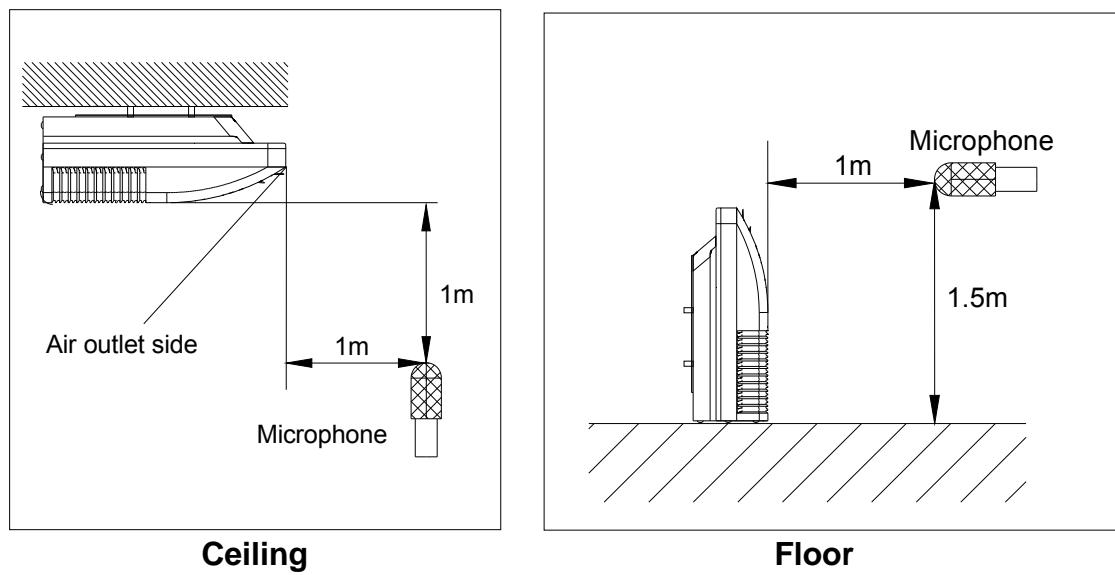
5. Electric Characteristics

Model	Indoor Units				Power Supply
	Hz	Voltage	Min.	Max.	
MUE-36CRDN1-N	60	220-240V	198V	242V	30

Remark:

MFA: Max. Fuse Amps. (A)

6. Sound Levels



Model	Noise level dB(A)		
	H	M	L
MUE-36CRDN1-N	54	52	48

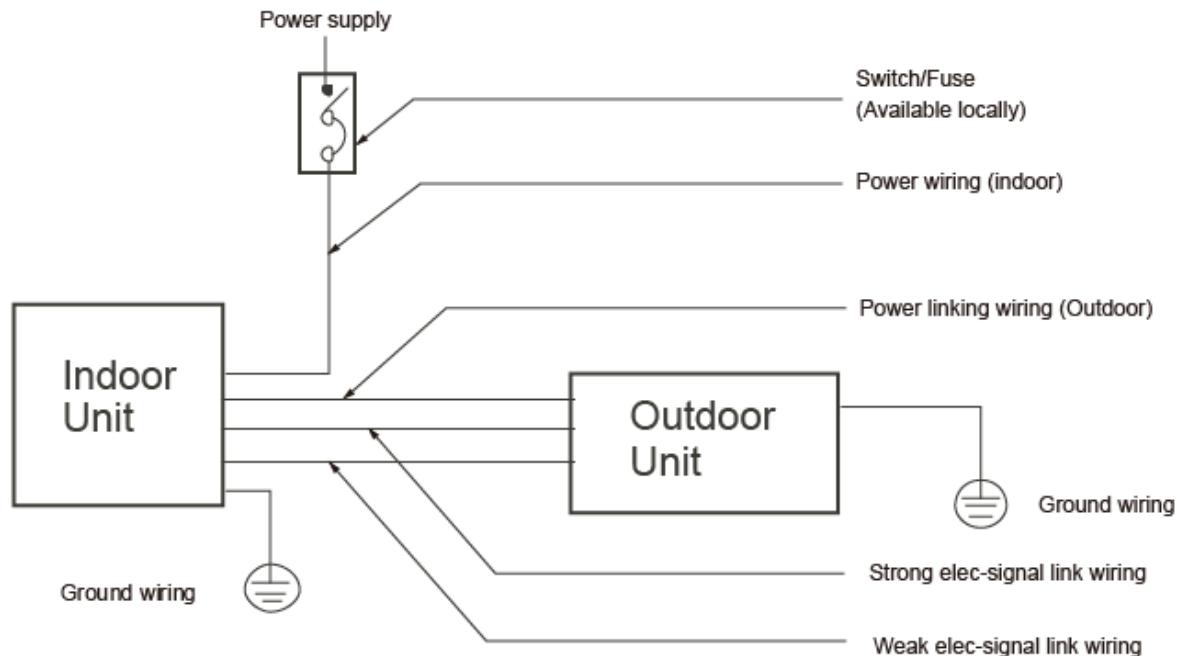
7. Accessories

Remote controller & Its holder	1. Remote controller		1
	2. Remote controller holder		1
	3. Mounting screw (ST2.9×10-C-H)		2
	4. Alkaline dry batteries (AM4)		2
Others	5. Owner's manual	—	1
	6. Installation manual	—	1
	7. Remote controller manual	—	1

8. The Specification of Power

Model		36000 Btu/h	30000-60000 Btu/h
Power	Phase	1-Phase	3-Phase
	Frequency and Volt	220-240V, 60Hz	380-415V, 60Hz
Circuit Breaker/Fuse(A)		50/30	25/20
Indoor unit power wiring(mm ²)		3×4.0	5×2.5
Indoor/out-door connecting wiring(mm ²)	Ground wiring	4.0	2.5
	Outdoor unit power wiring	3×4.0	5×2.5
	Strong electric signal	3×1.0	3×1.0
	Weak electric signal	2×0.75	—

9. Field Wiring

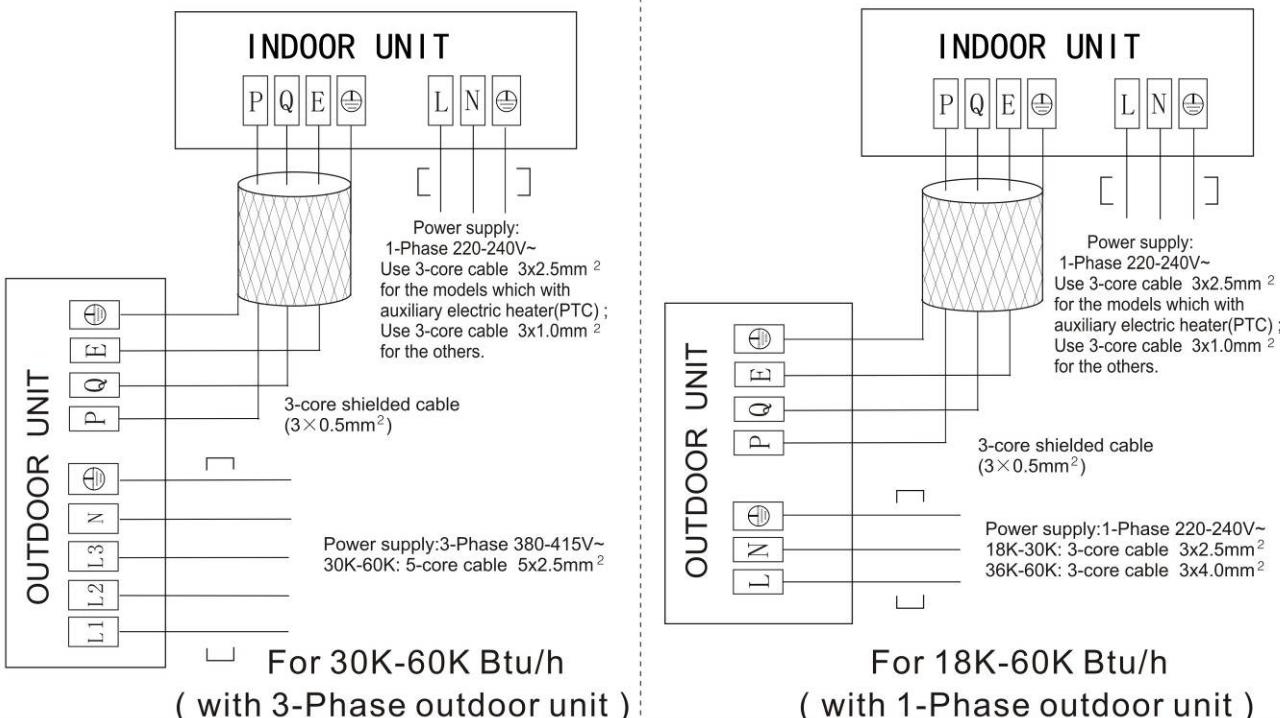


- **Ground the air conditioner properly in case to affect its anti-interference function**

MUE-36CRDN1-N

Air Condition Link-Circuit

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GA Floor-standing Type

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1. Features

1.1. Fashionable design, more modern and elegant appearance.



1.2. Air Outlet Dustproof

When turned off, the air outlet louver of the unit can be closed manually to prevent the dust falling in.

1.3. Simple and bright panel

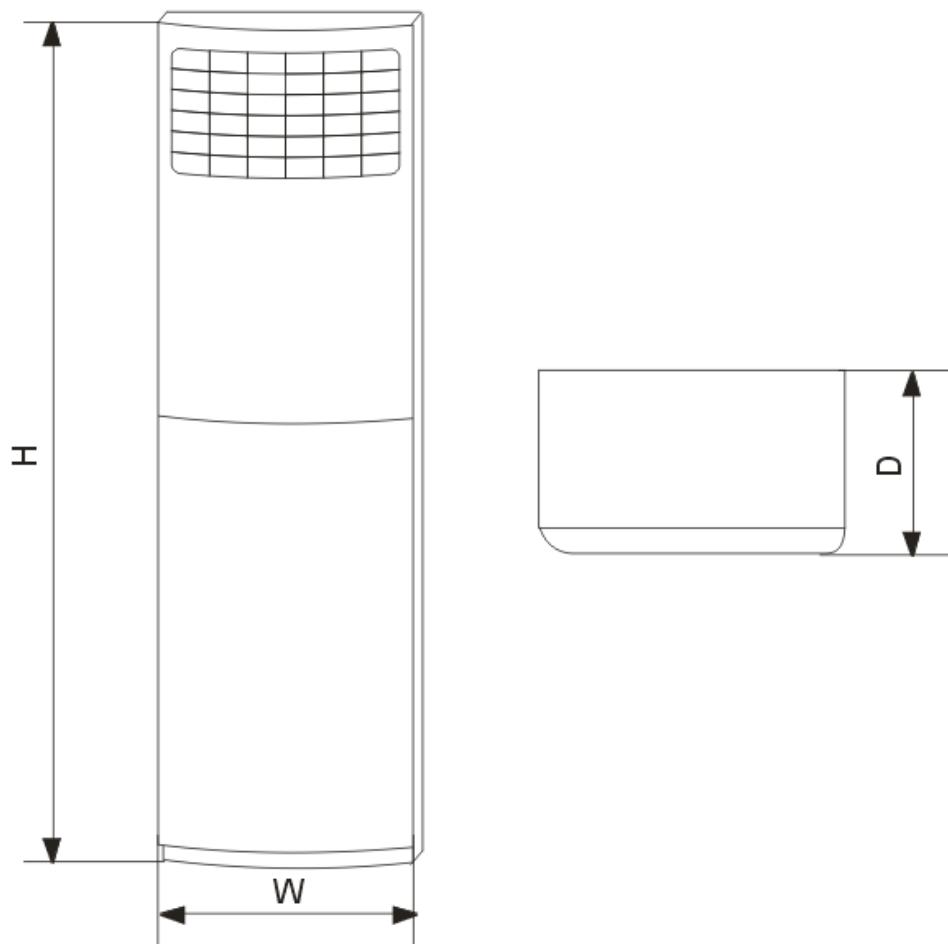
Adopts simple and bright style panel, GA series are suitable for most different space, and show in good taste.

1.4. Big LCD display, easy to read and to operate



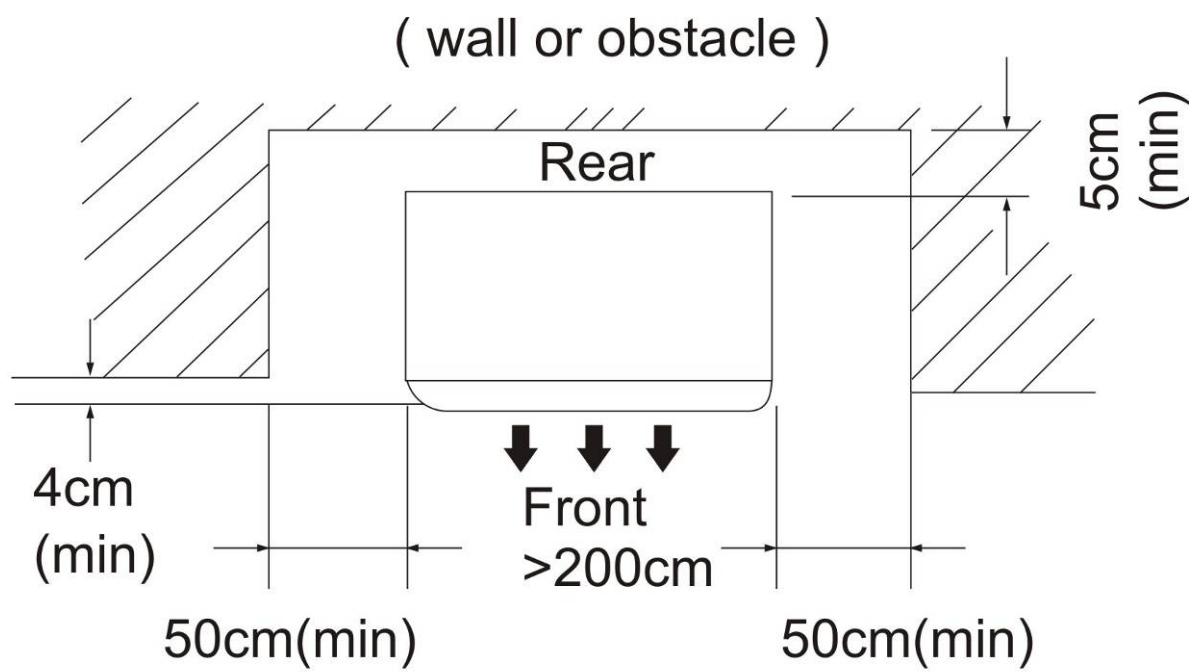
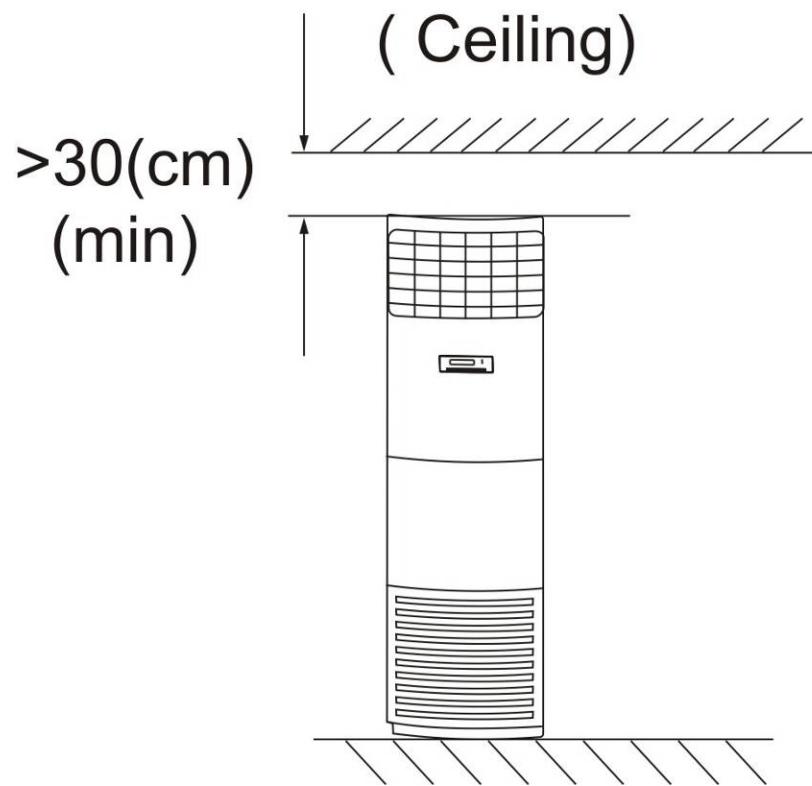
1.5. Optional GA1 & GA2 panel, healthy filter and auto-restart function

2. Dimensions



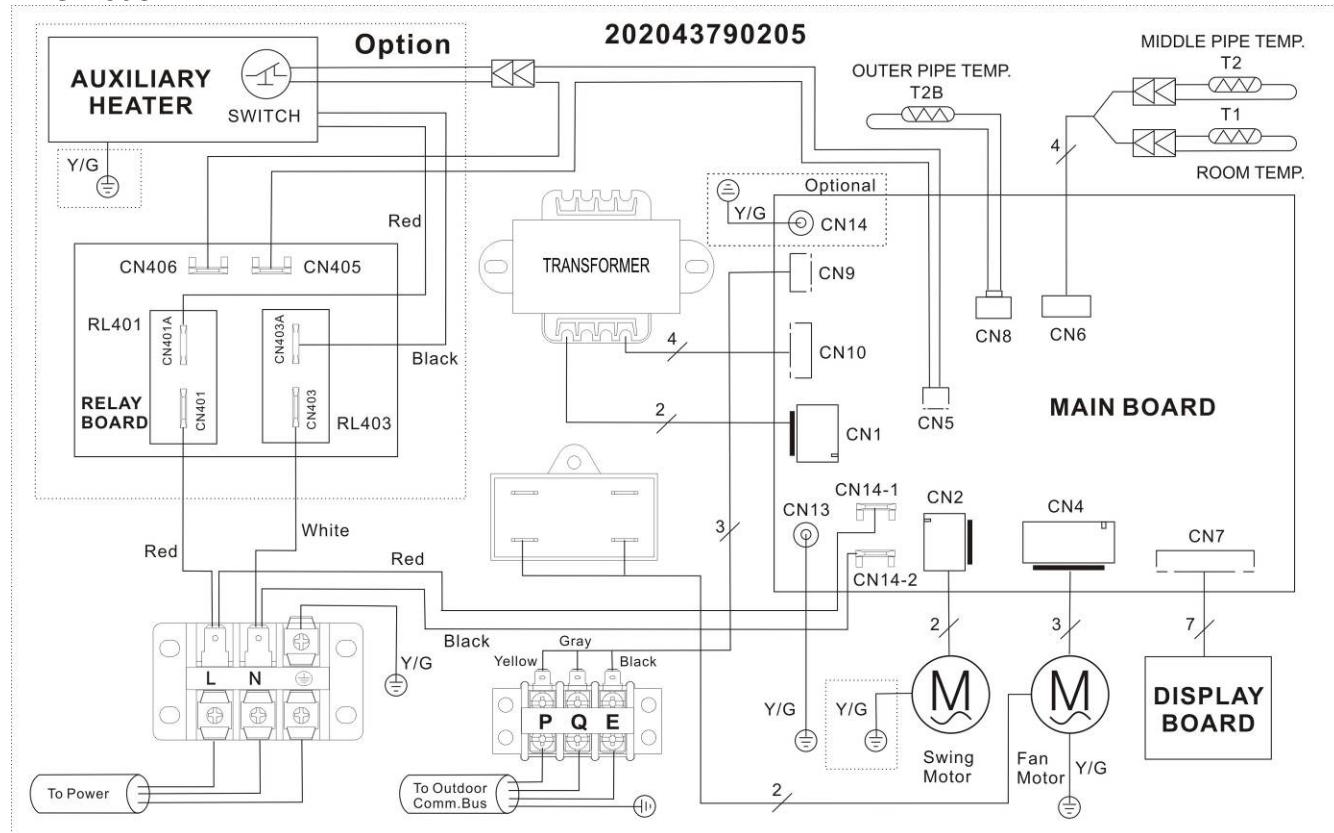
Mode \ Dimension	W(mm)	D(mm)	H(mm)
MFGA-36CRDN1-N	550	350	1800

3. Service Space



4. Wiring Diagrams

MFGA-36CRDN1-N



5. Electric Characteristics

Model	Indoor Units				Power Supply
	Hz	Voltage	Min.	Max.	
MFGA-36CRDN1-N	60	220-240V	198V	242V	30

Remark:

MFA: Max. Fuse Amps. (A)

6. Sound Levels

Model	Noise level dB(A)	
	H	L
MFGA-36CRDN1-N	56	51

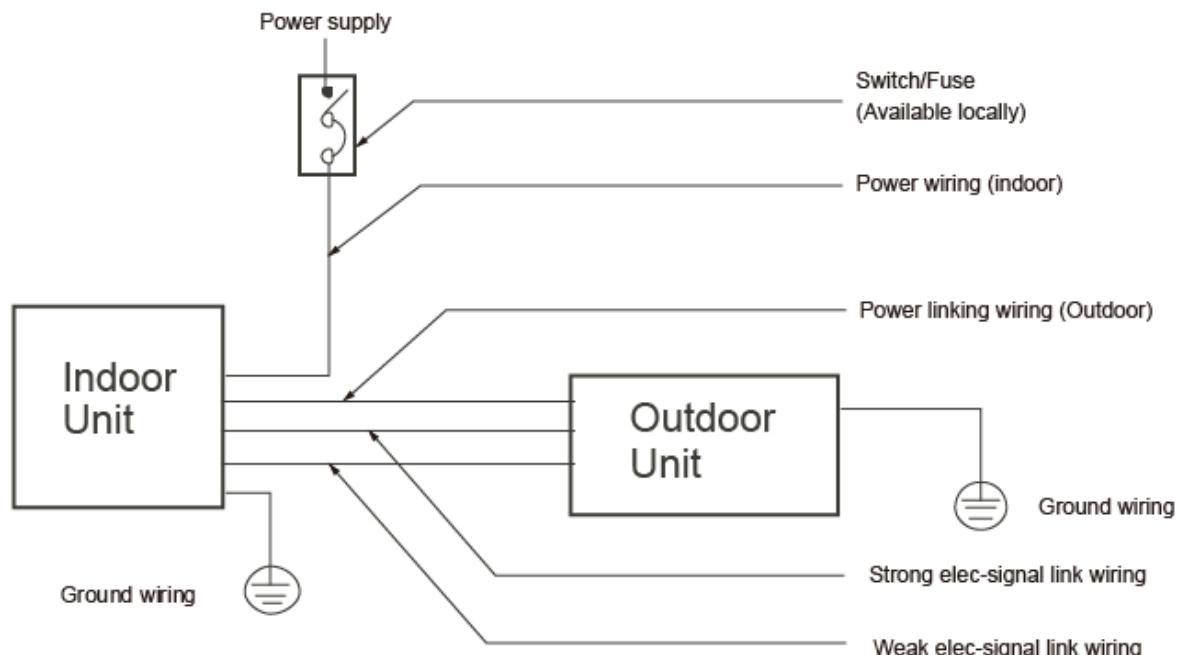
7. Accessories

NO.	Part Name	Quantity	Illustrations
1	Safety Lock	1	
2	Self-tapping Screw 3.9×25	2	
3	Flat Washers	2	
4	Bushing-Sleeve Cover	1	
5	Sound/Heat Insulation Sleeves	2	
6	Seal	1	
7	Drain joint	1	
8	Pipe - hole - protection Ring	1	
9	Remote Battery	2	
10	Remote Control	1	
11	Connection Cables	1	

8. The Specification of Power

Model		36000 Btu/h	30000-60000 Btu/h
Power	Phase	1-Phase	3-Phase
	Frequency and Volt	220-240V,60Hz	380-415V, 60Hz
Circuit Breaker/Fuse(A)		50/30	25/20
Indoor unit power wiring(mm ²)		3×4.0	5×2.5
Indoor/out-door connecting wiring(mm ²)	Ground wiring	4.0	2.5
	Outdoor unit power wiring	3×4.0	5×2.5
	Strong electric signal	3×1.0	3×1.0
	Weak electric signal	2×0.75	—

9. Field Wiring

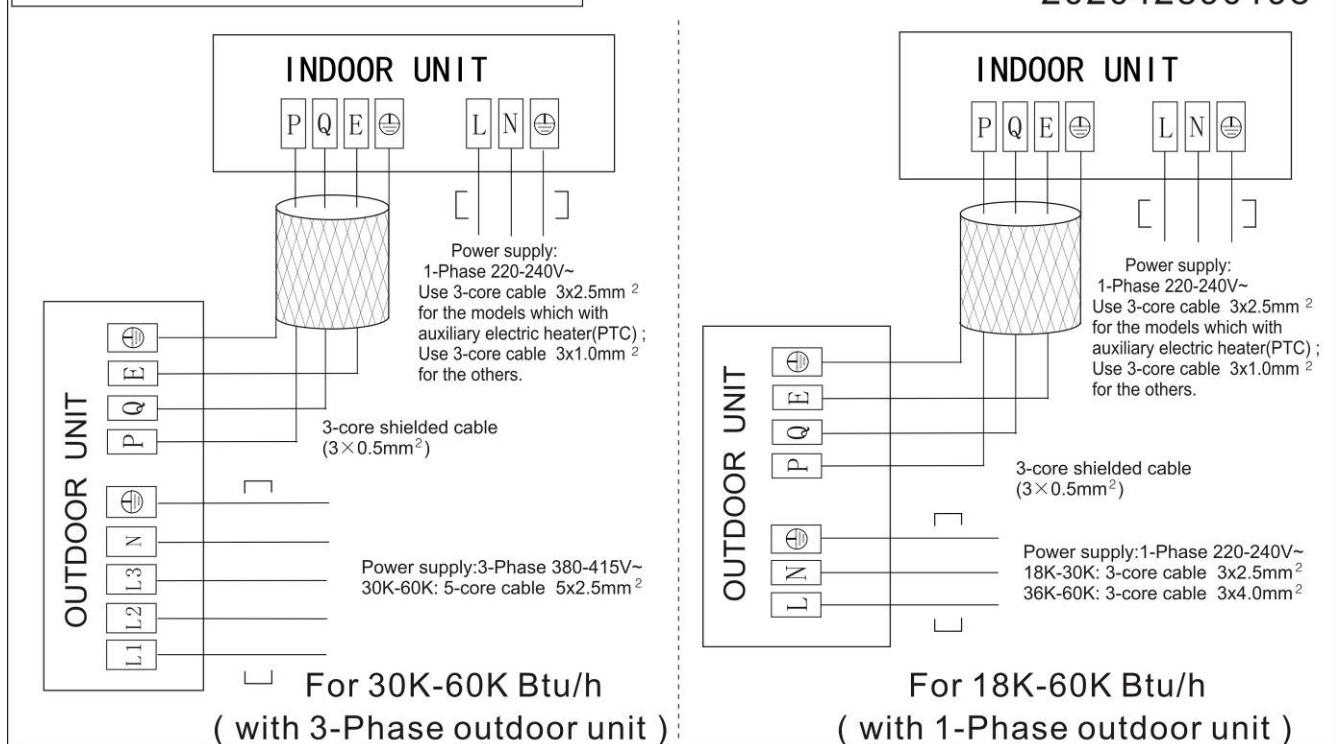


- **Ground the air conditioner properly in case to affect its anti-interference function**

MFGA-36CRDN1-N

Air Condition Link-Circuit

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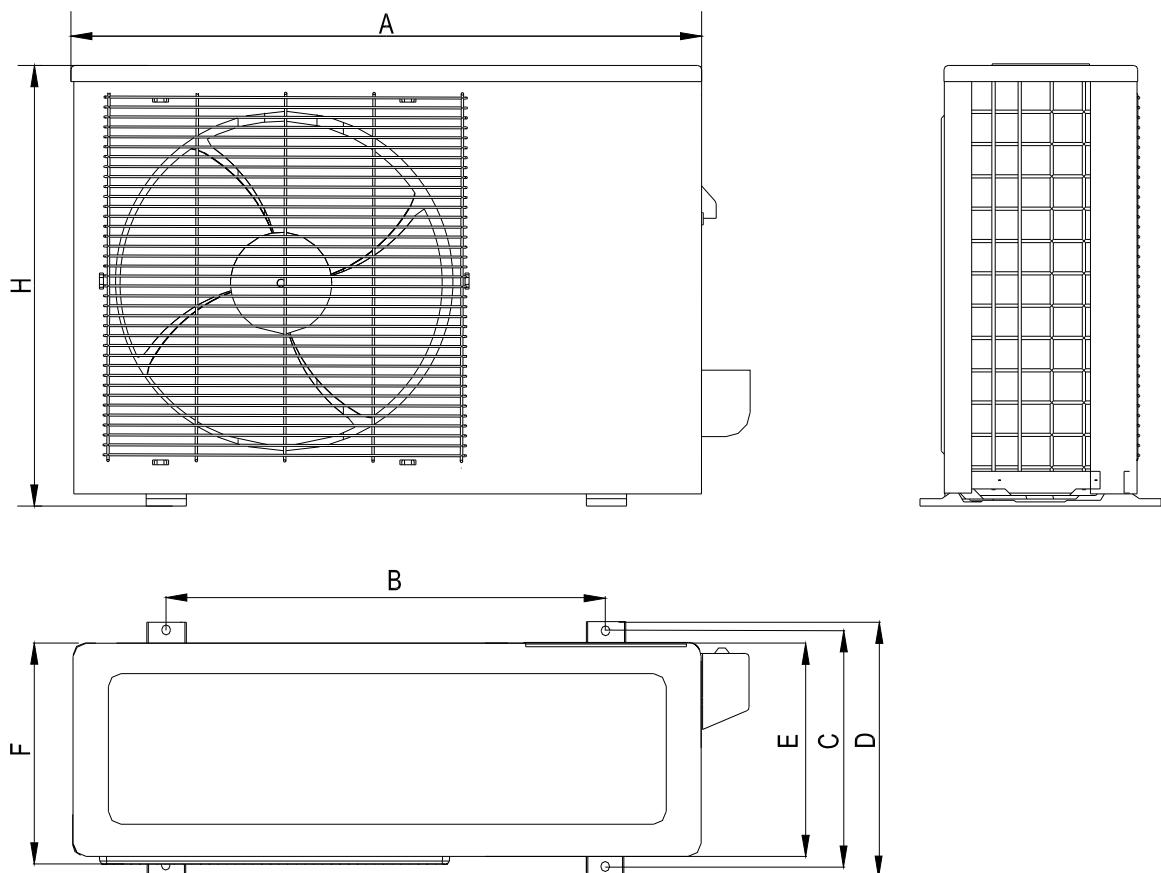


Part 3

Outdoor Units

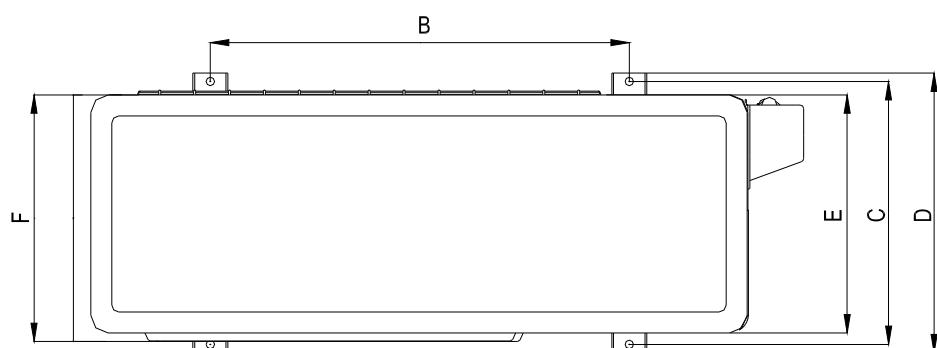
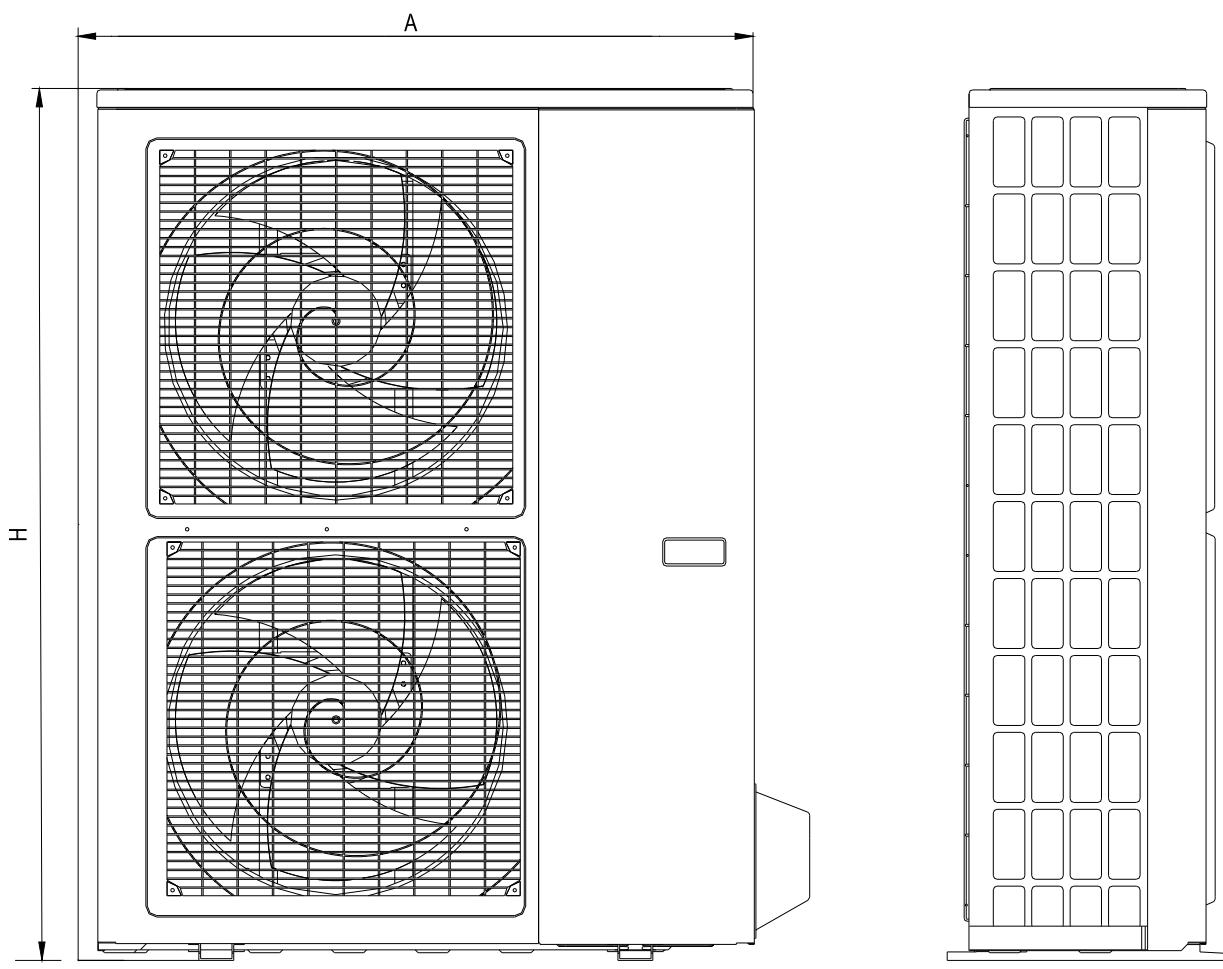
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1. Dimensions



Unit: mm

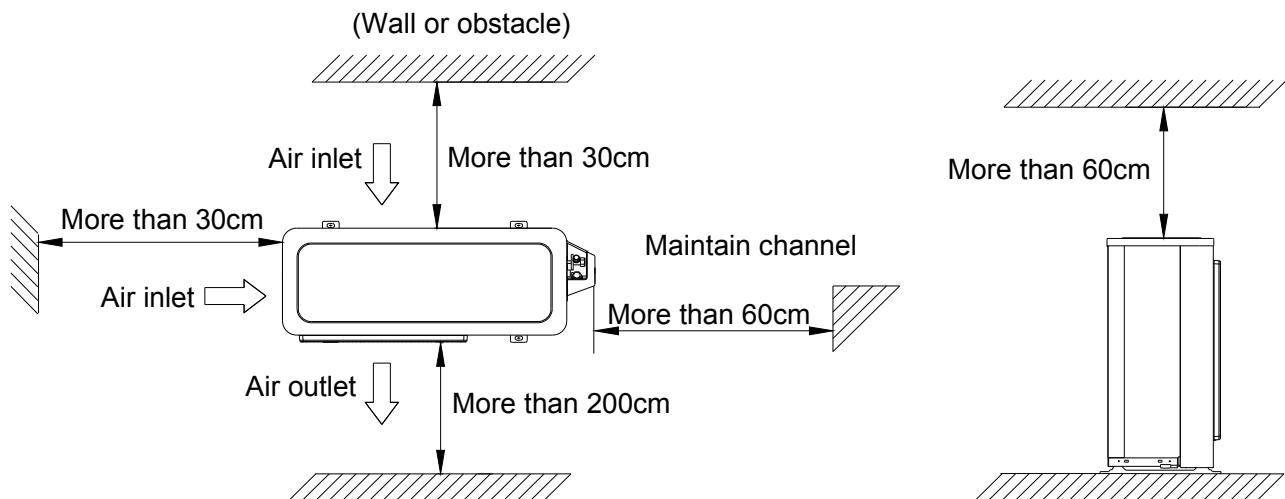
MODEL	A	B	C	D	E	F	H
MOU-24CDN1-N	842	560	335	360	312	324	695
MOU-36CDN1-N	990	624	366	396	340	354	966



Unit: mm

MODEL	A	B	C	D	E	F	H
MOU-48CDN1-N	940	600	376	400	340	360	1245

2. Service Space

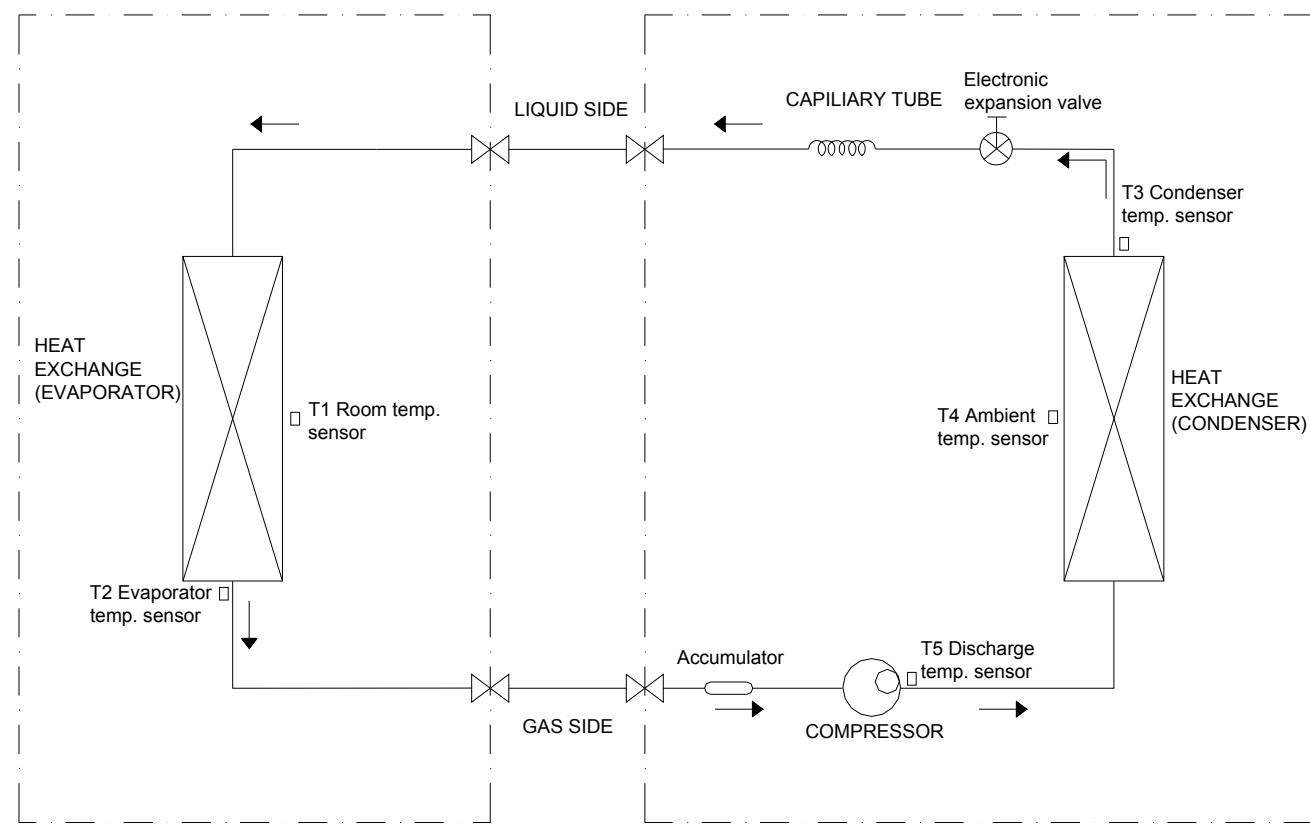


3. Piping Diagrams

MOU-24CDN1-N, MOU-36CDN1-N

INDOOR

OUTDOOR

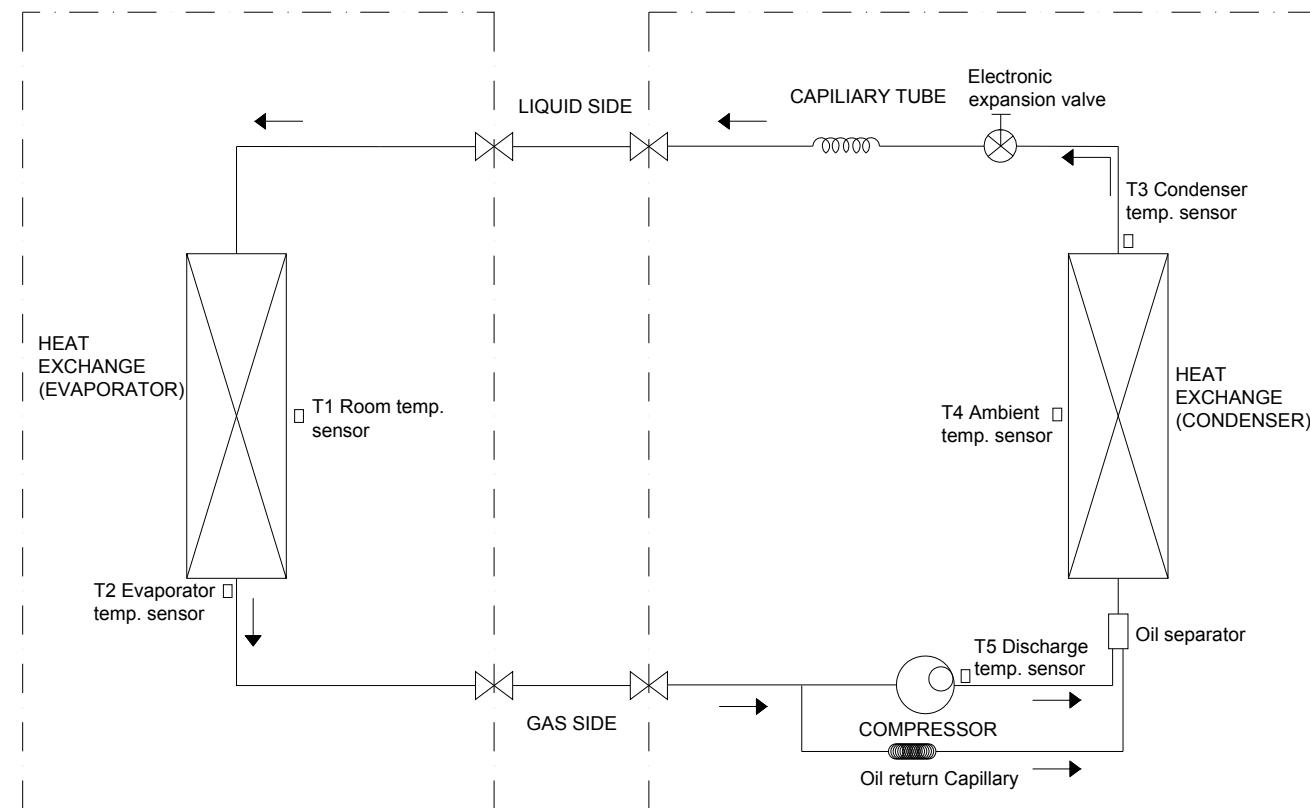


Notes: MOU-24CDN1-N(220075301740) & MOU-36CDN1-N(220075502120) are no EXV.

MOU-48CDN1-N

INDOOR

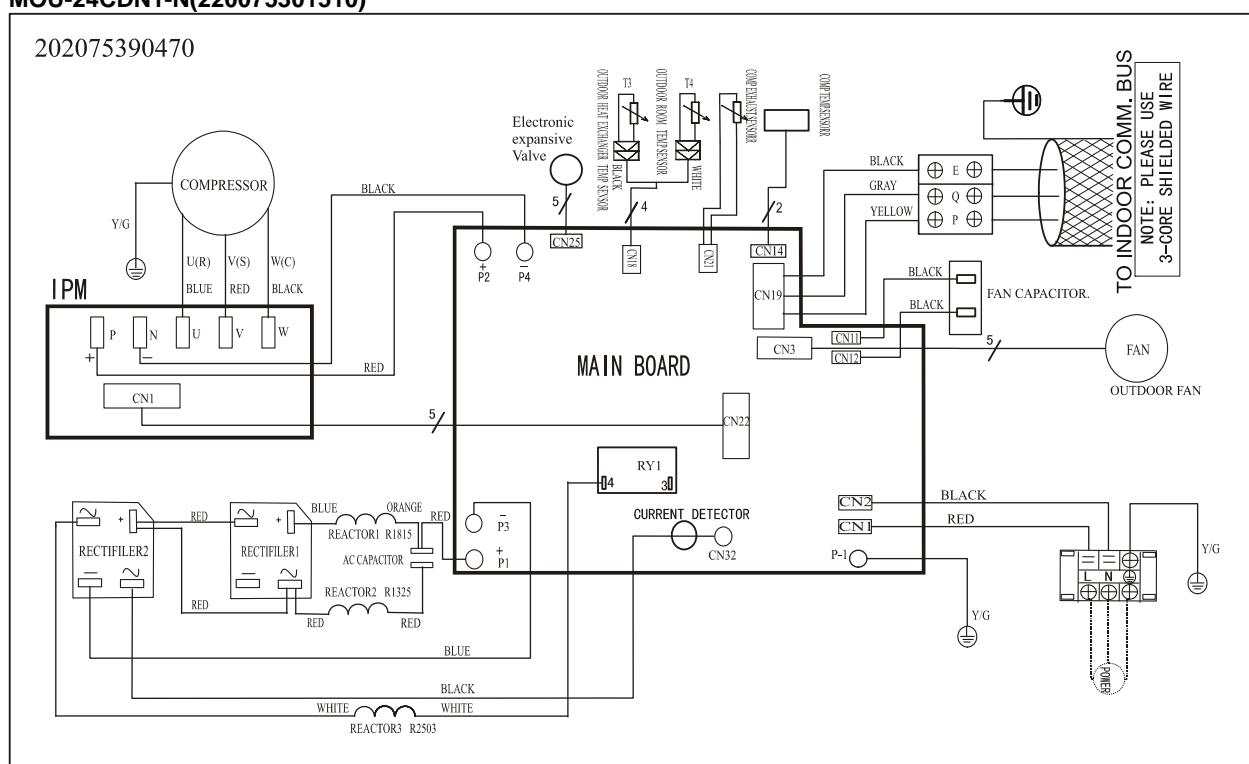
OUTDOOR



4. Wiring Diagrams

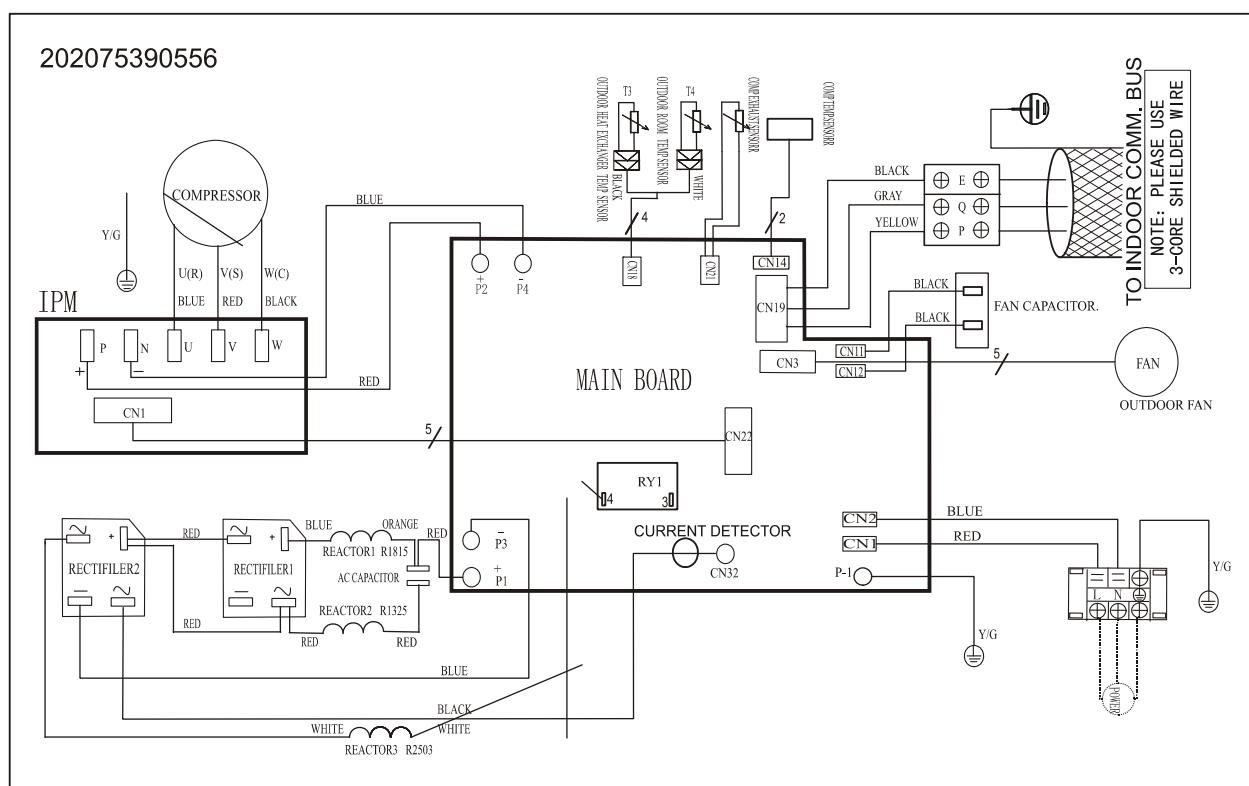
MOU-24CDN1-N(220075301510)

202075390470



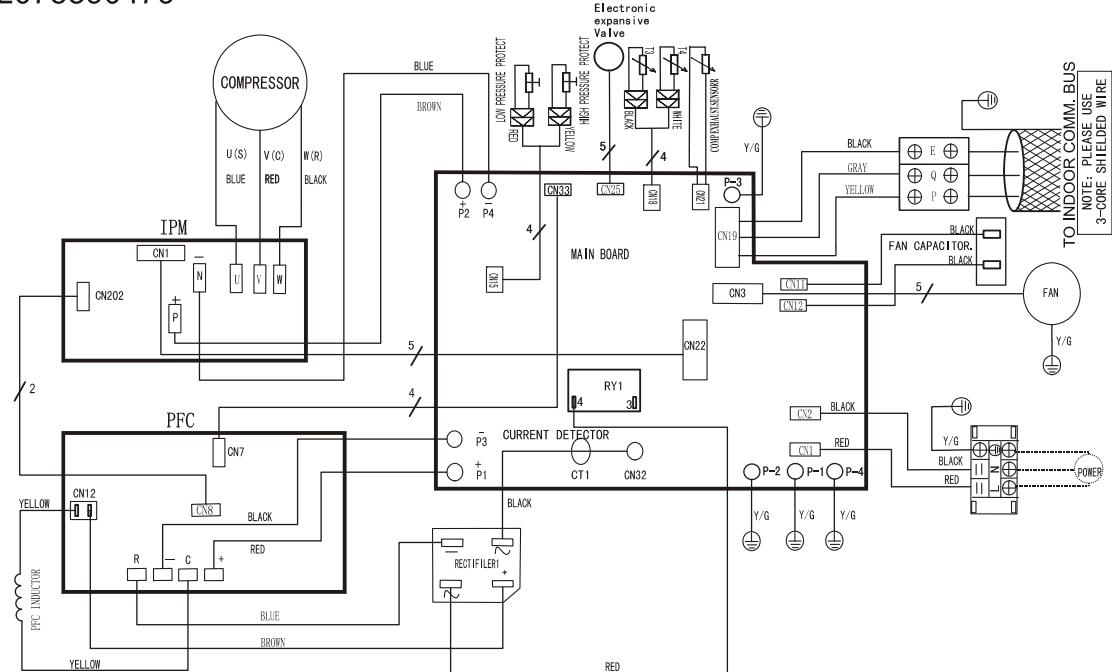
MOU-24CDN1-N(220075301740)

202075390556

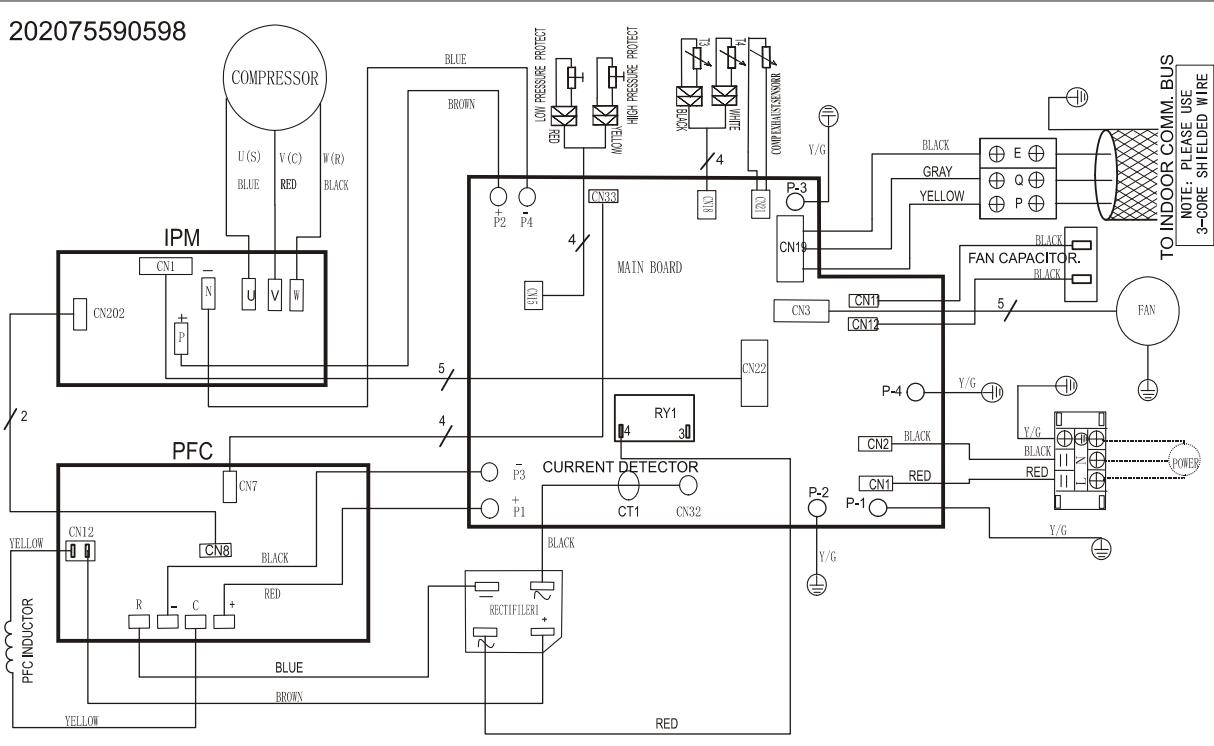


MOU-36CDN1-N(220075501730)

202075590479

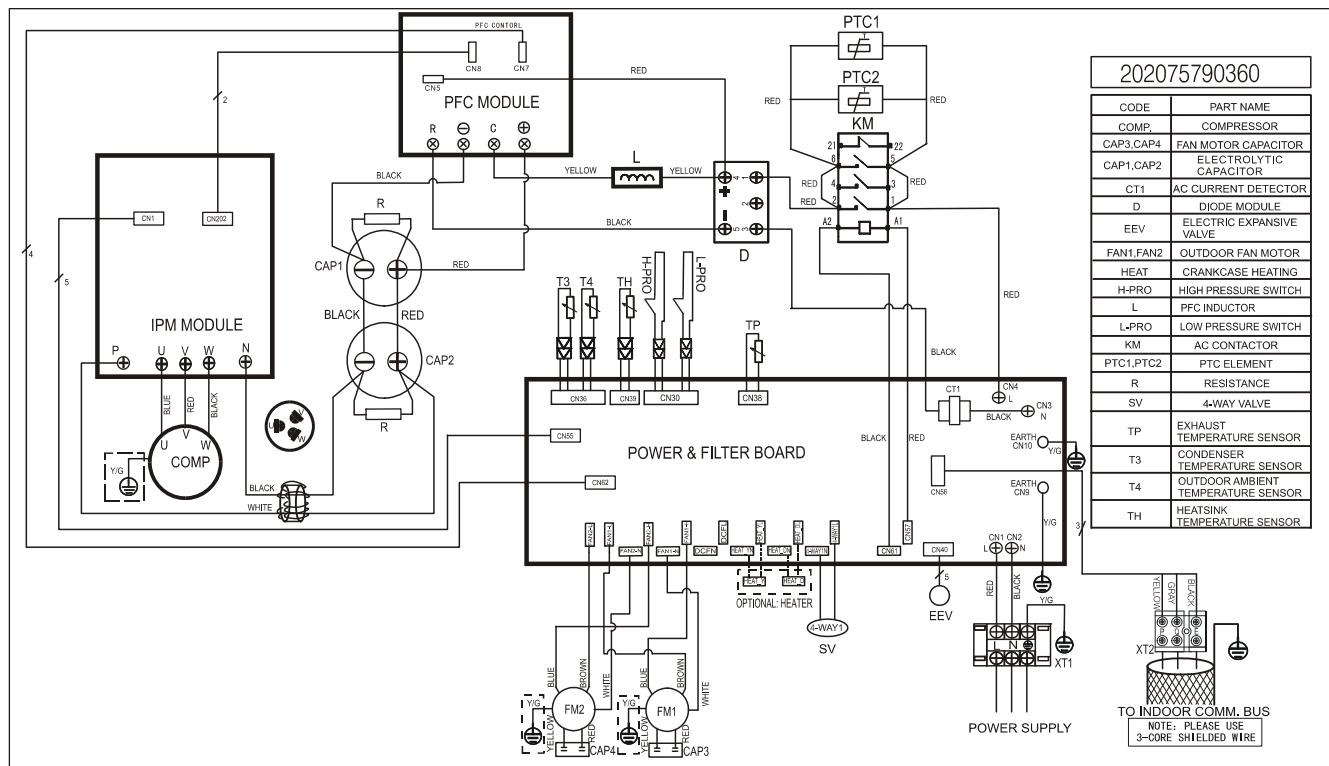


MOU-36CDN1-N(220075502120)



Outdoor Unit

MOU-48CDN1-N



5. Electric Characteristics

Model	Outdoor Unit			
	Hz	Voltage	Min.	Max.
MOU-24CDN1-N	60	220-240	198	254
MOU-36CDN1-N	60	220-240	198	254
MOU-48CDN1-N	60	220-240	198	254

6. Operation Limits

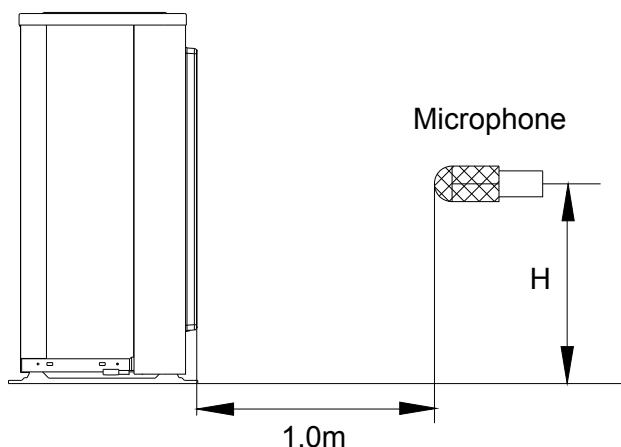
Temperature Mode	Cooling operation
Room temperature	$\geq 17^{\circ}\text{C}$
Outdoor temperature	$0^{\circ}\text{C} \sim 50^{\circ}\text{C}$ ($-15^{\circ}\text{C} \sim 50^{\circ}\text{C}$: For the models with low temperature cooling system)

CAUTION:

1. If the air conditioner is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.
2. The room relative humidity should be less than 80%. If the air conditioner operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.
3. The optimum performance will be achieved during this operating temperature zone.

7. Sound Levels

Outdoor Unit



Note: $H = 0.5 \times \text{height of outdoor unit}$

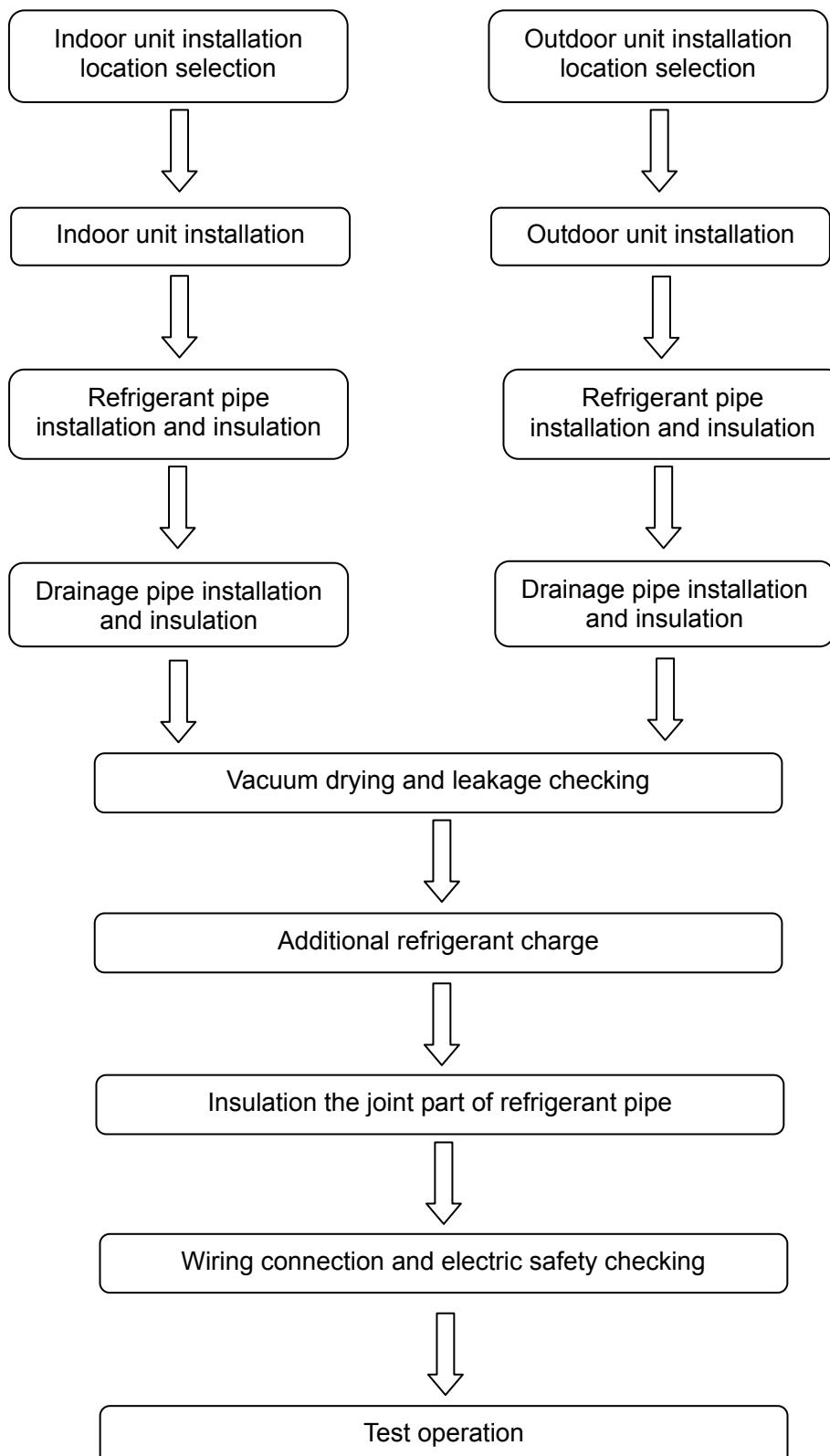
Model	Noise level dB(A)
MOU-24CDN1-N	54
MOU-36CDN1-N	55
MOU-48CDN1-N	60

Part 4

Installation

1. Installation Procedure	75
2. Location selection	76
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7. Vacuum Drying and Leakage Checking	104
8. Additional refrigerant charge	105
9. Engineering of insulation.....	106
10. Engineering of electrical wiring	108
11. Test operation	109

1. Installation Procedure



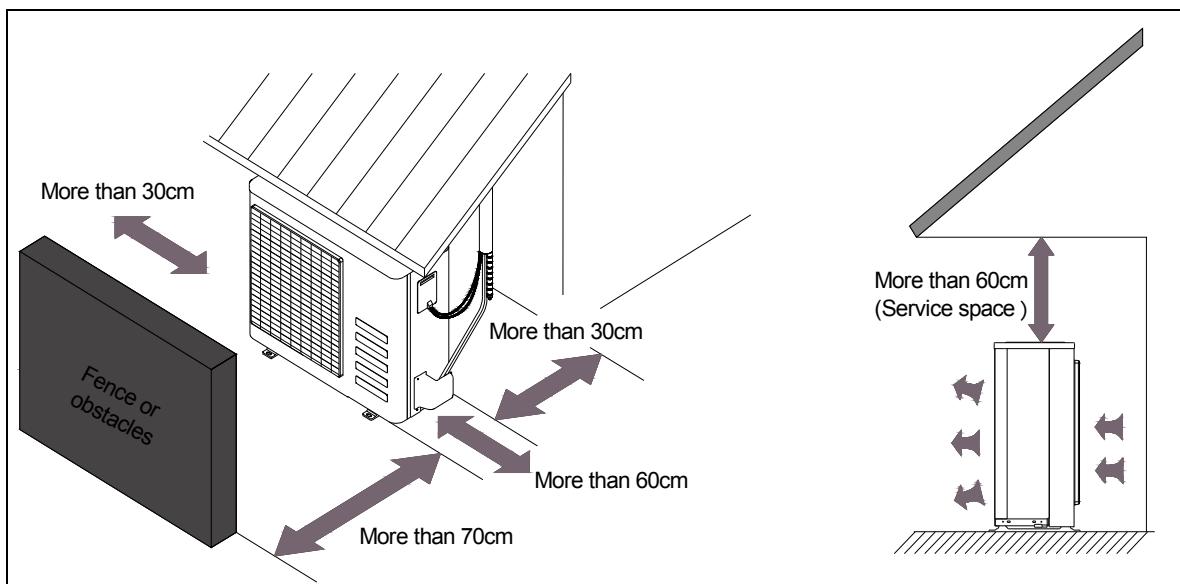
2. Location selection

2.1 Indoor unit location selection

- The place shall easily support the indoor unit's weight.
- The place can ensure the indoor unit installation and inspection.
- The place can ensure the indoor unit horizontally installed.
- The place shall allow easy water drainage.
- The place shall easily connect with the outdoor unit.
- The place where air circulation in the room should be good.
- There should not be any heat source or steam near the unit.
- There should not be any oil gas near the unit
- There should not be any corrosive gas near the unit
- There should not be any salty air near the unit
- There should not be strong electromagnetic wave near the unit
- There should not be inflammable materials or gas near the unit
- There should not be strong voltage vibration.

2.2 Outdoor unit location selection

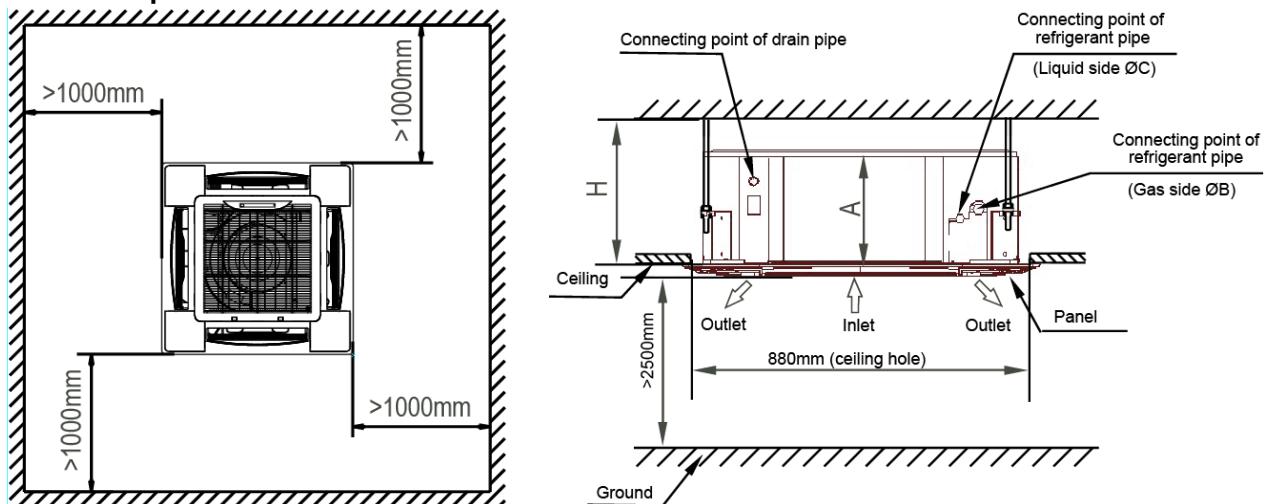
- The place shall easily support the outdoor unit's weight.
- Locate the outdoor unit as close to indoor unit as possible
- The piping length and height drop can not exceed the allowable value.
- The place where the noise, vibration and outlet air do not disturb the neighbors.
- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and not face the strong wind.
- It is easy to install the connecting pipes and cables.
- There is no danger of fire due to leakage of inflammable gas.
- It should be a dry and well ventilation place
- The support should be flat and horizontal
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid blockage of the heat exchanger in the outdoor unit.
- If is built over the unit to prevent direct sunlight, rain exposure, direct strong wind, snow and other scraps accumulation, make sure that heat radiation from the condenser is not restricted.



3. Indoor unit installation

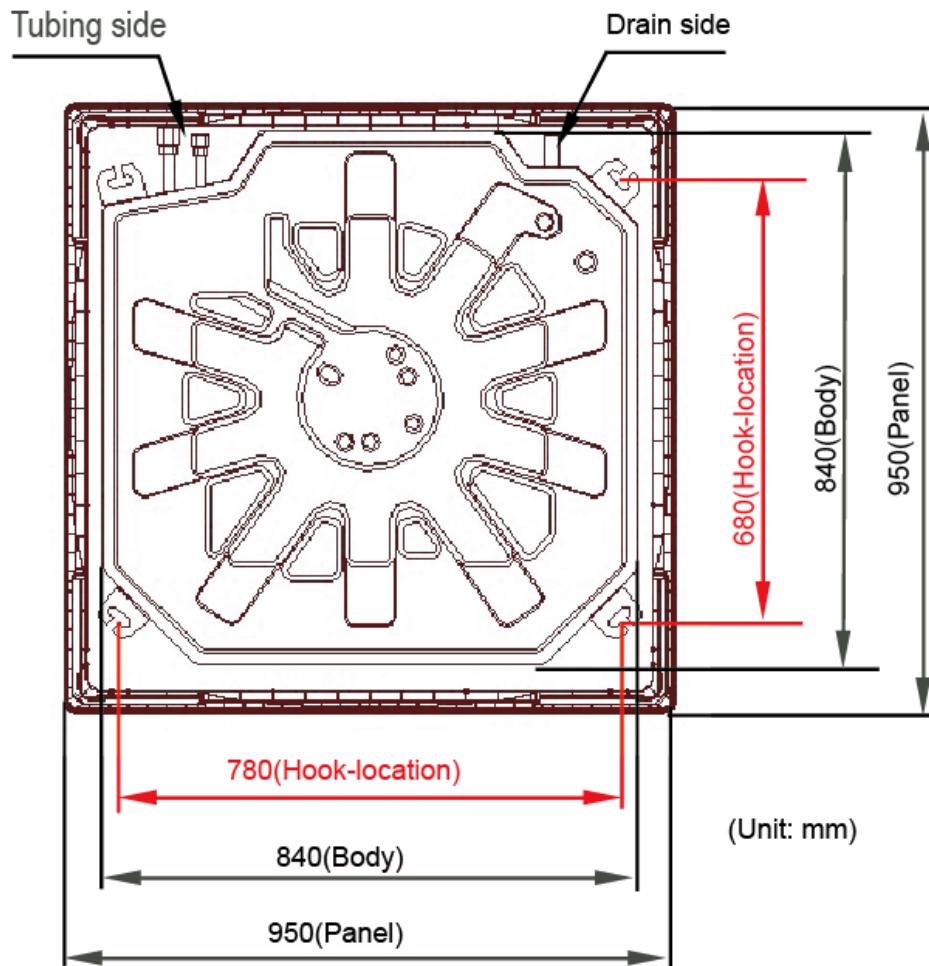
3.1 Big cassette indoor unit installation

3.1.1 Service space for indoor unit



Model	A	H	Remark	
18	230	>260	R410A and R22	Cooling / Cooling & Heating
24	230	>260	R410A and R22	Cooling / Cooling & Heating
30-60	300	>330	R410A and R22	Cooling / Cooling & Heating

3.1.2 Bolt pitch



3.1.3 Install the pendant bolt

Select the position of installation hooks according to the hook holes positions showed in upper picture. Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expandable hooks (fittings).

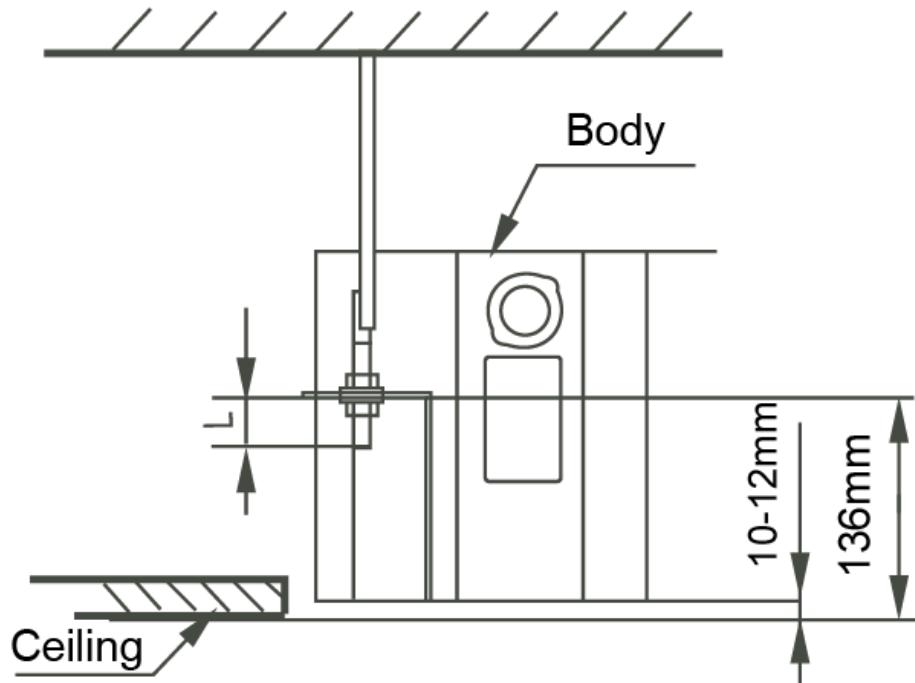


3.1.4 Install the main body

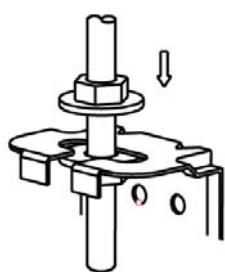
Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within $\pm 1^\circ$.



Adjust the position to ensure the gaps between the body and the four sides of ceiling are even. The body's lower part should sink into the ceiling for 10~12 mm. In general, L is half of the screw length of the installation hook.

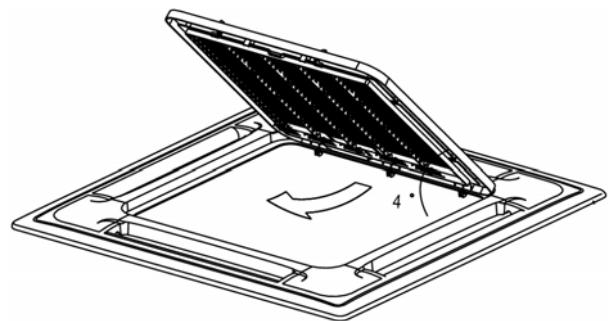
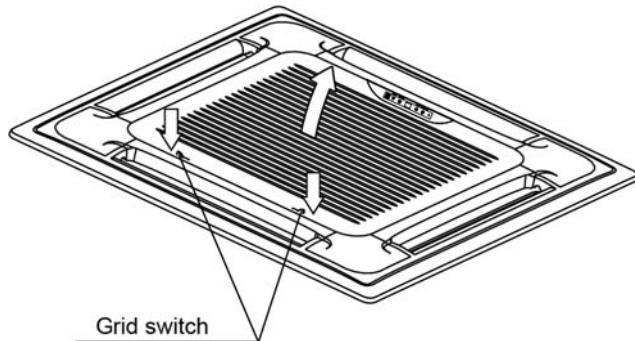


Locate the air conditioner firmly by wrenching the nuts after having adjusted the body's position well.

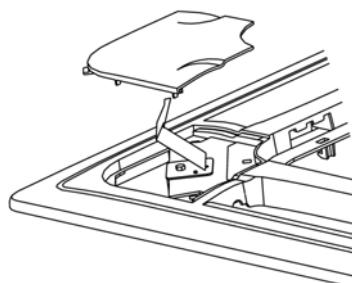


3.1.5 Install the panel

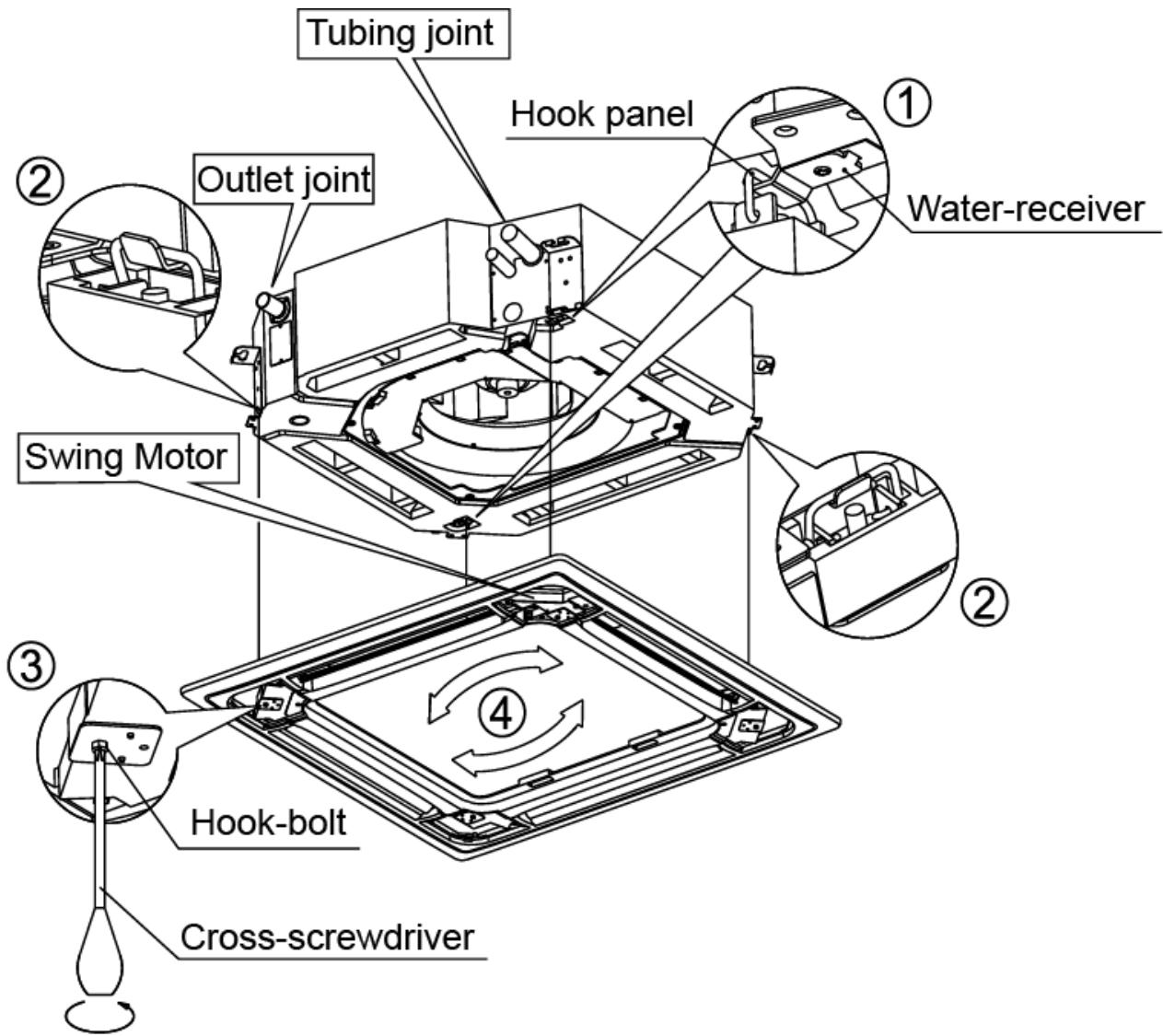
Remove the grille



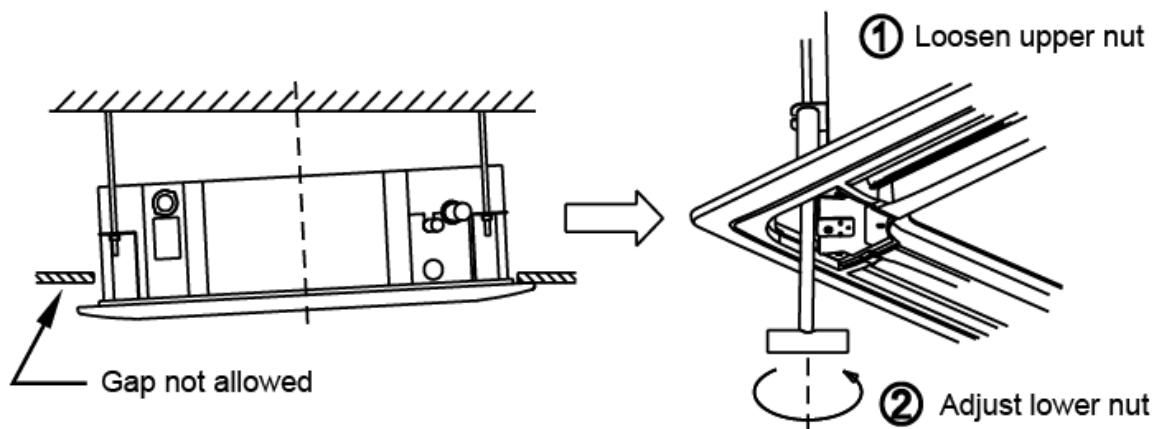
Remove the 4 corner covers.

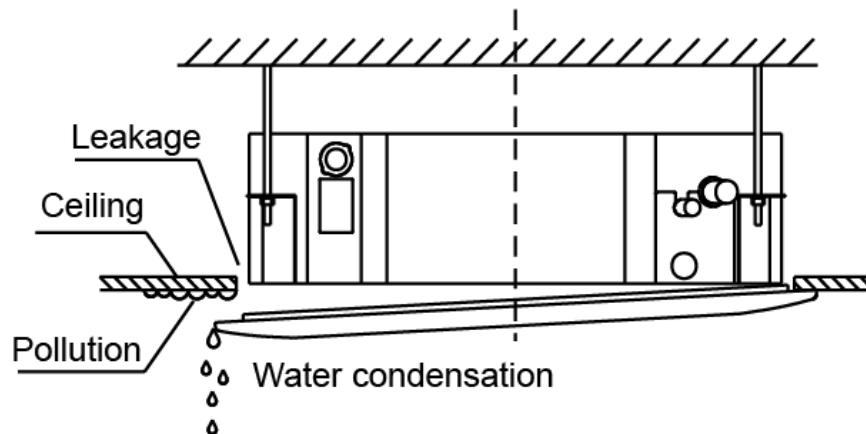


Hang the panel to the hooks on the mainbody.



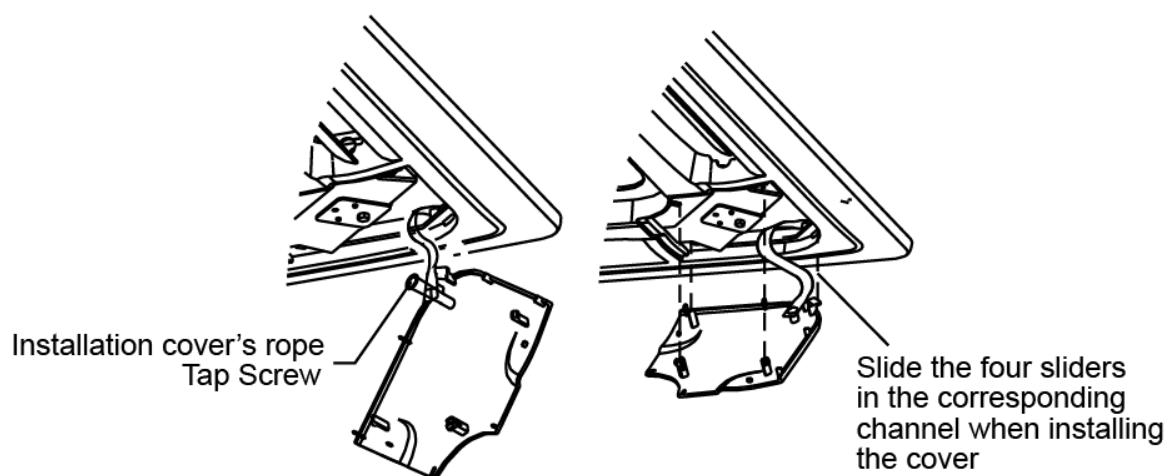
Tighten the screws under the panel hooks till the panel closely stick on the ceiling to avoid condensate water.





Hang the air-in grill to the panel, then connect the lead terminator of the swing motor and that of the control box with corresponding terminators on the body respectively.

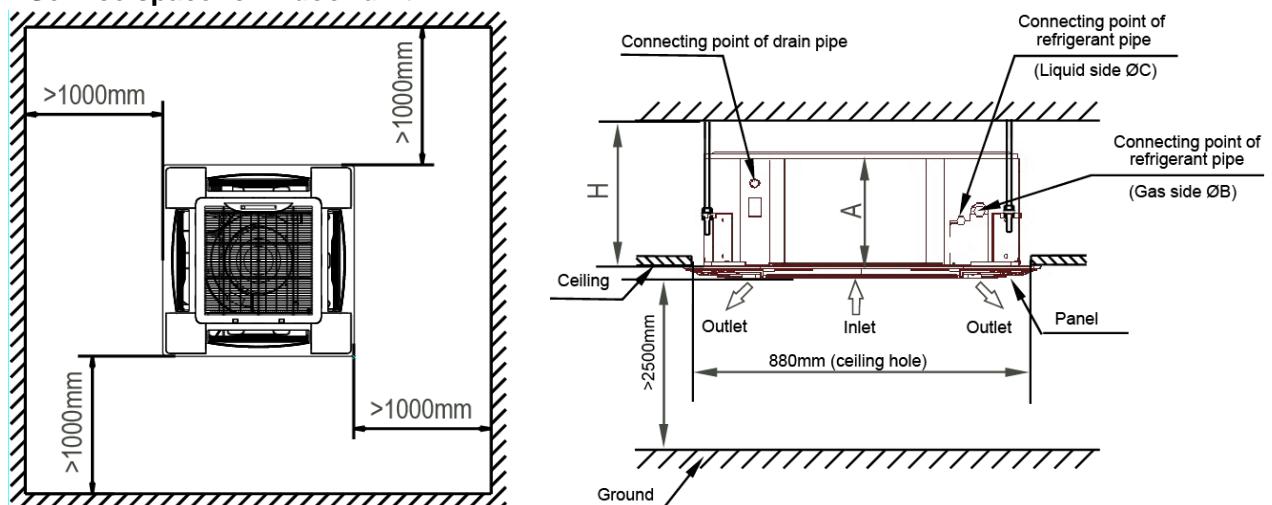
Install the 4 corner covers back.



Note: The panel shall be installed after the wiring connected.

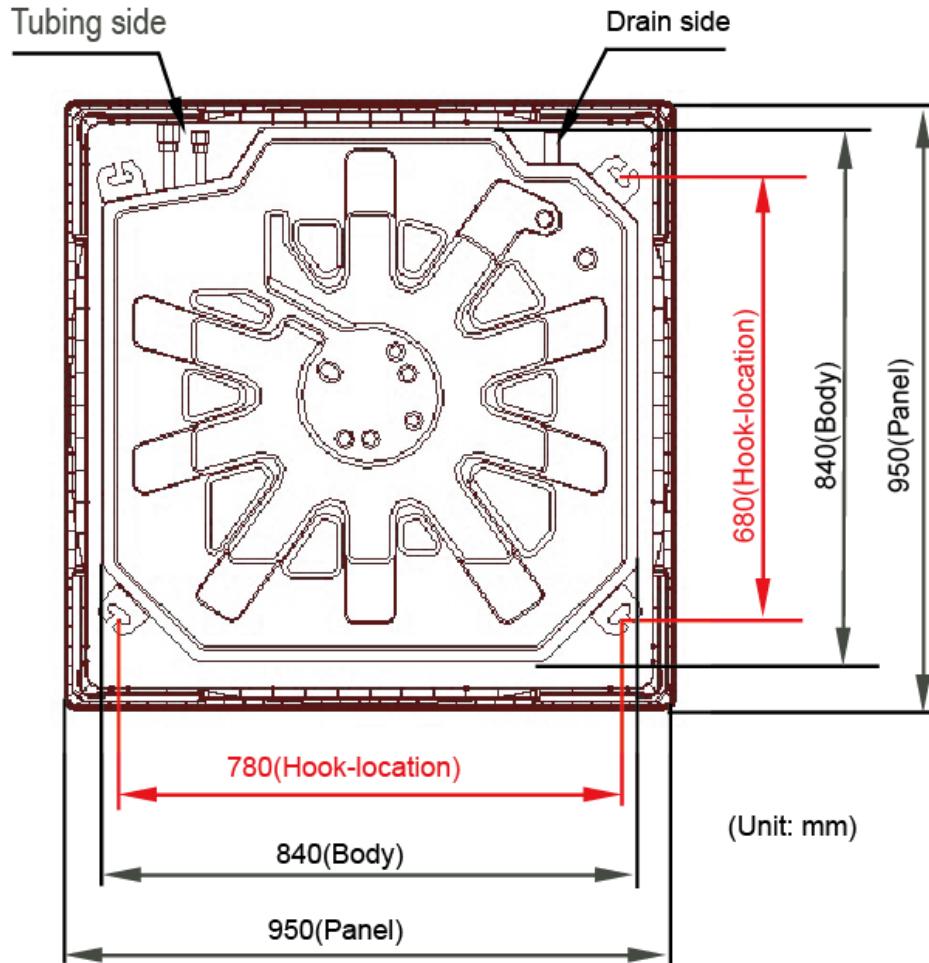
3.2 Supper slim cassette indoor unit installation

3.2.1 Service space for indoor unit



Model	A	H	Remark	
18-30	205	>235	R410A and R22	Cooling / Cooling & Heating
36-48	245	>275	R410A and R22	Cooling / Cooling & Heating
48-60	287	>317	R410A and R22	Cooling / Cooling & Heating

3.2.2 Bolt pitch



3.2.3 Install the pendant bolt

Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expandable hooks (fittings).

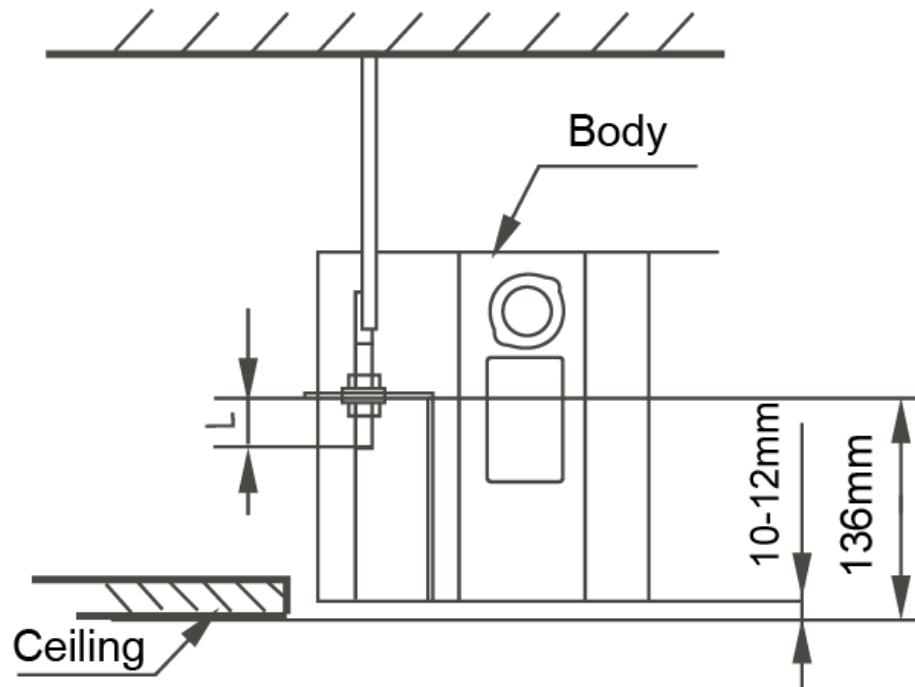


3.2.4 Install the main body

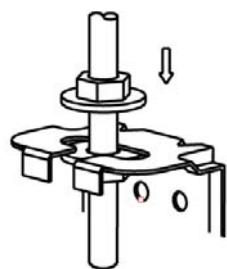
Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within $\pm 1^\circ$.



Adjust the position to ensure the gaps between the body and the four sides of ceiling are even. The body's lower part should sink into the ceiling for 10~12 mm. In general, L is half of the screw length of the installation hook.

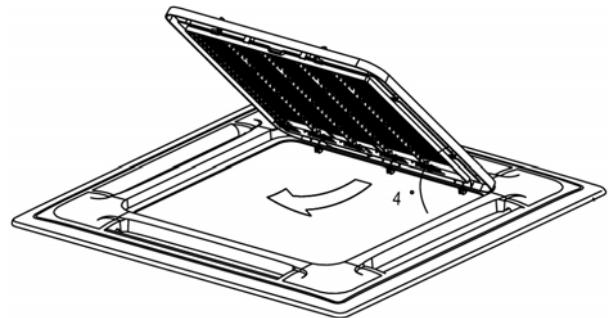
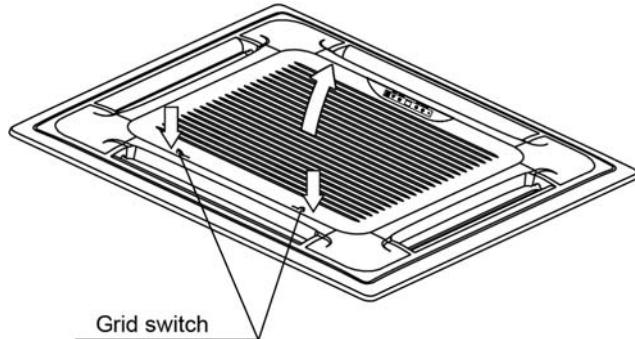


Locate the air conditioner firmly by wrenching the nuts after having adjusted the body's position well.

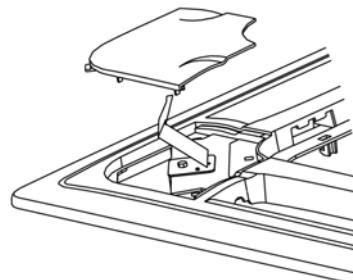


3.2.5 Install the panel

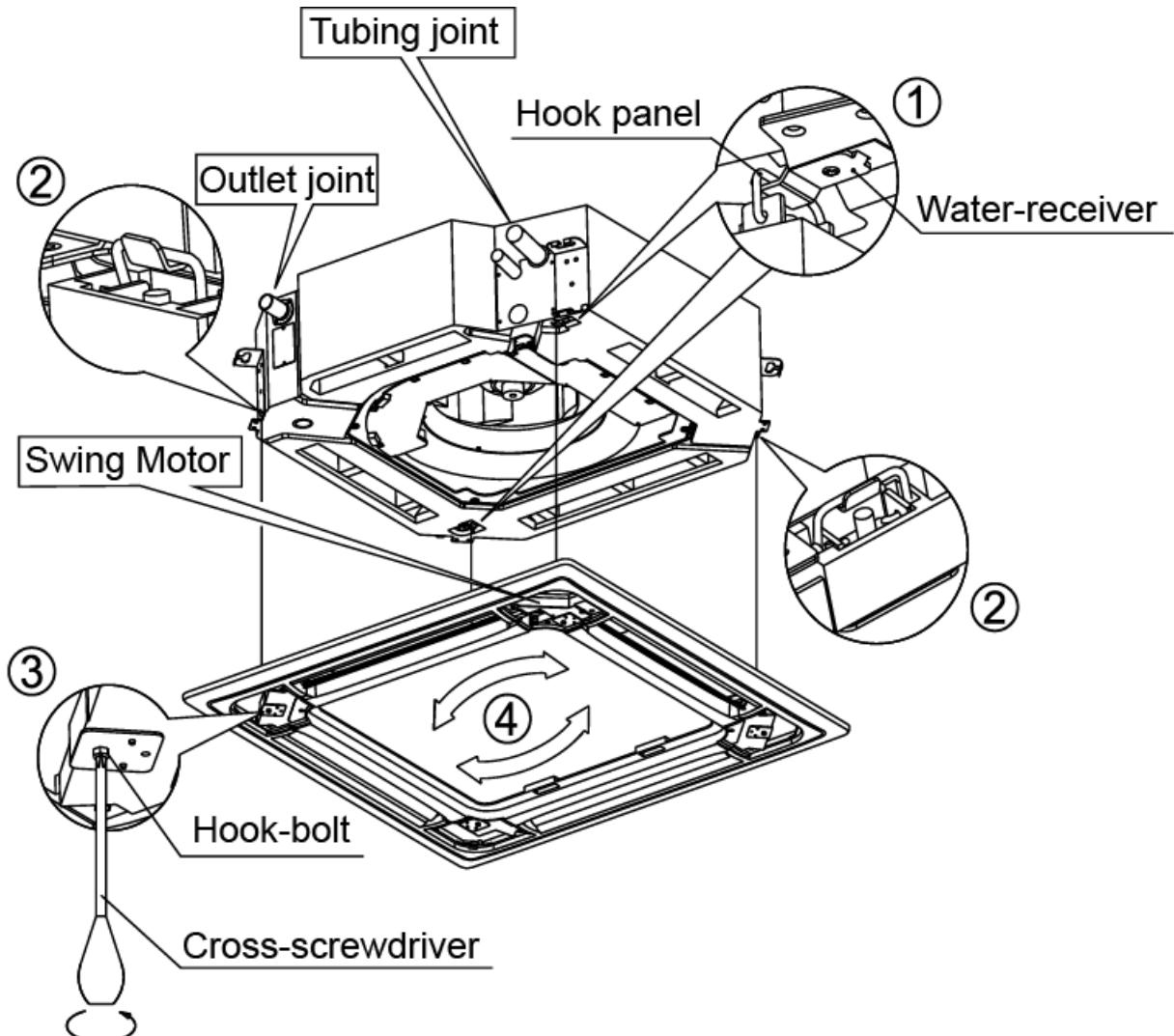
Remove the grille



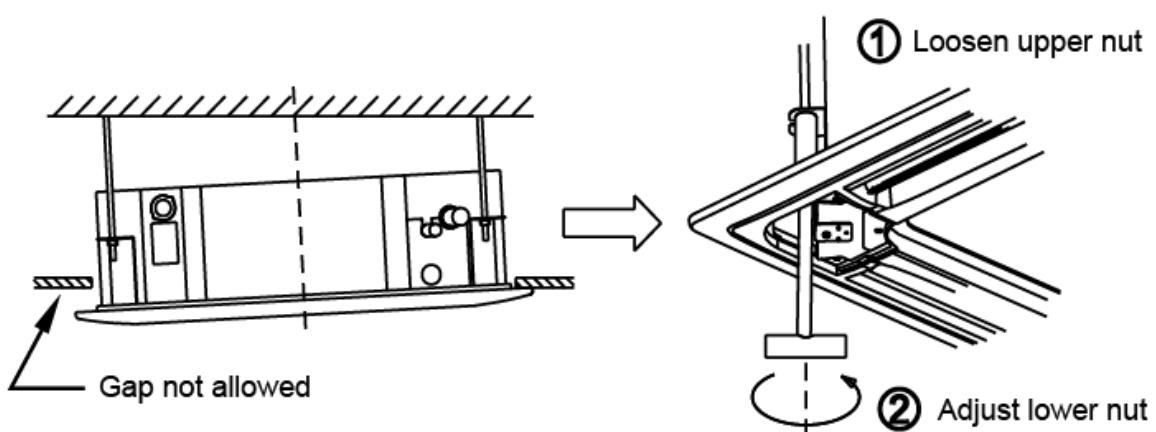
Remove the 4 corner covers.

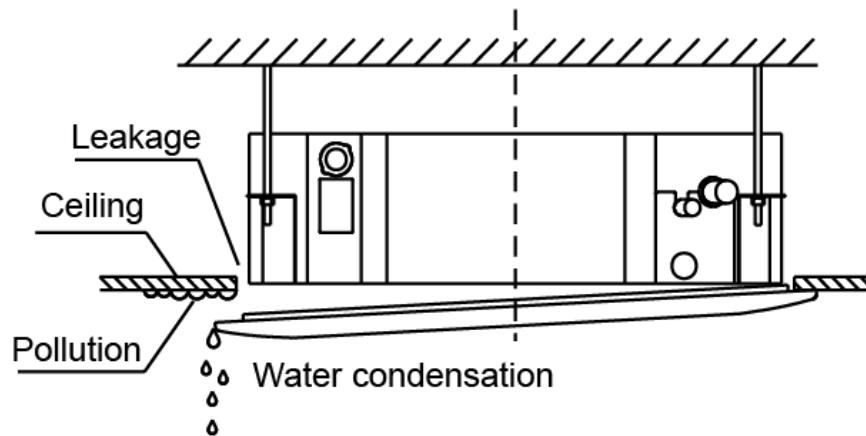


Hang the panel to the hooks on the mainbody. If the panel is with auto-lift grille, please watch the ropes lifting the grille, DO NOT make the ropes enwinded or blocked.



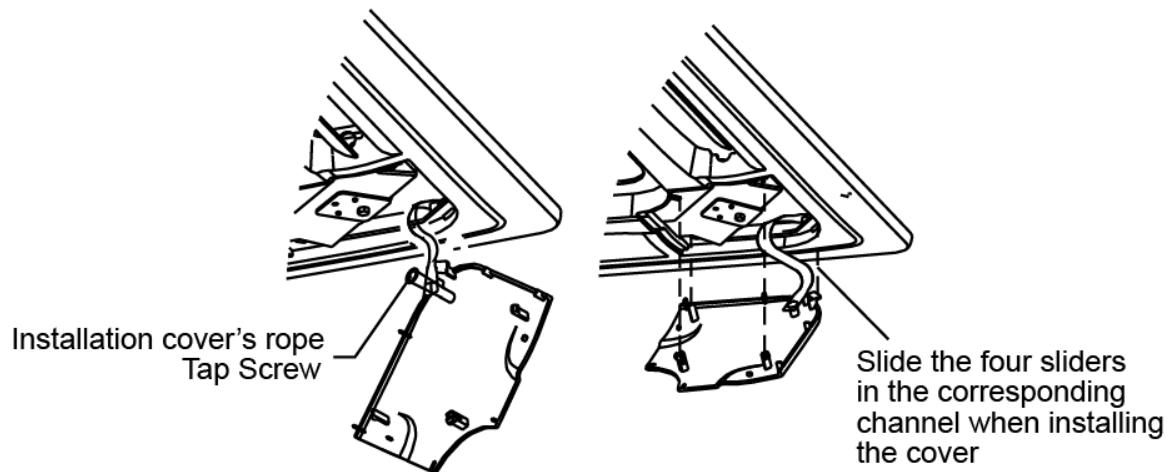
Tighten the screws under the panel hooks till the panel closely stick on the ceiling to avoid condensate water.





Hang the air-in grill to the panel, then connect the lead terminator of the swing motor and that of the control box with corresponding terminators on the body respectively.

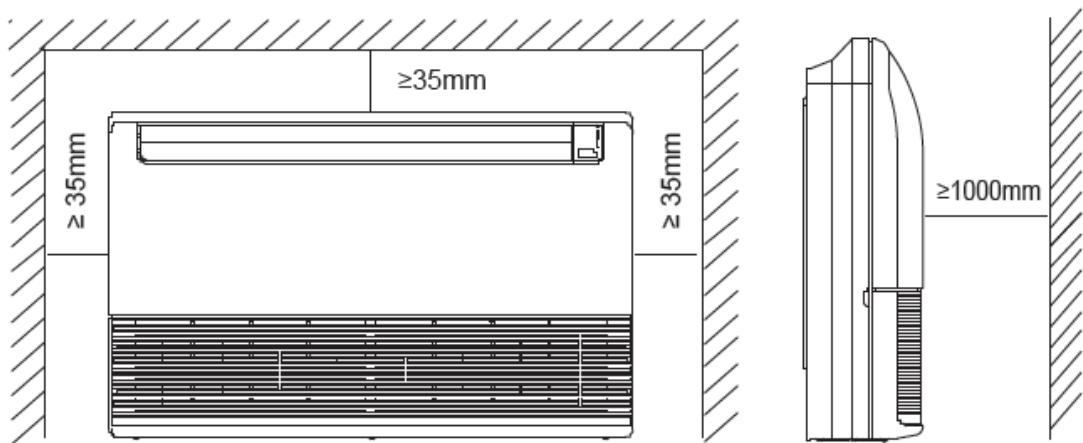
Install the 4 corner covers back.



Note: The panel shall be installed after the wiring connected.

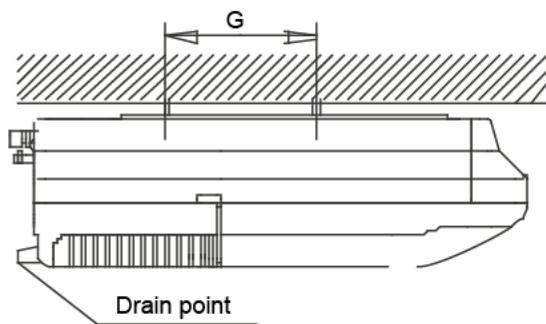
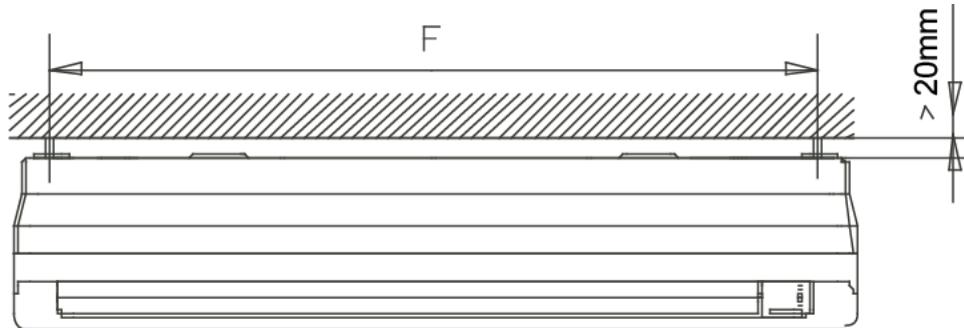
3.3 Ceiling & floor indoor unit installation

3.3.1 Service space for indoor unit



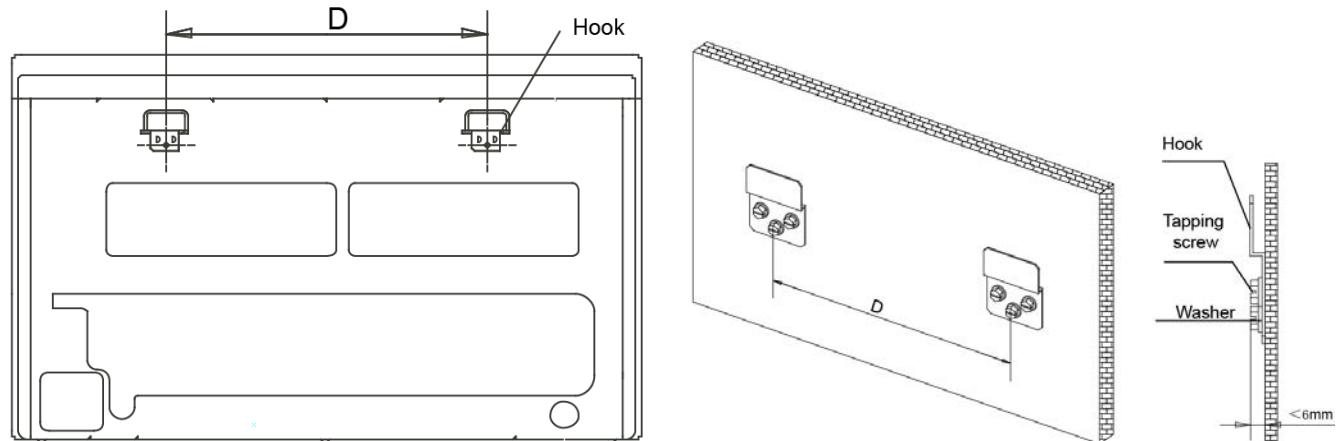
3.3.2 Bolt pitch

① Ceiling installation



Capacity (Btu/h)	D	F	G
12K, 24K	505	907	200
36K	795	1195	200
48K, 60K	1070	1542	200

② Floor standing installation



3.3.3 Install the pendant bolt

① Ceiling installation

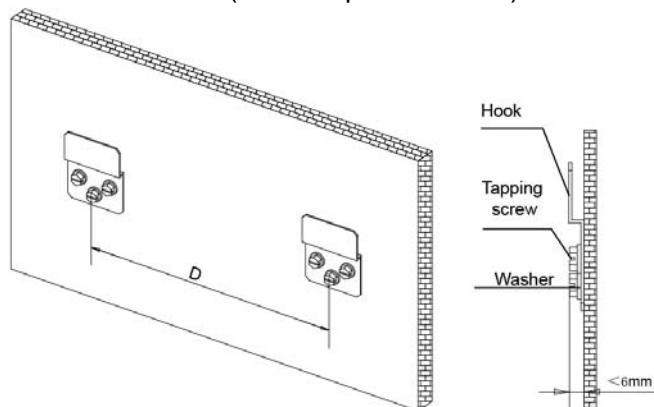
Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expandable hooks (fittings).



② Floor standing installation

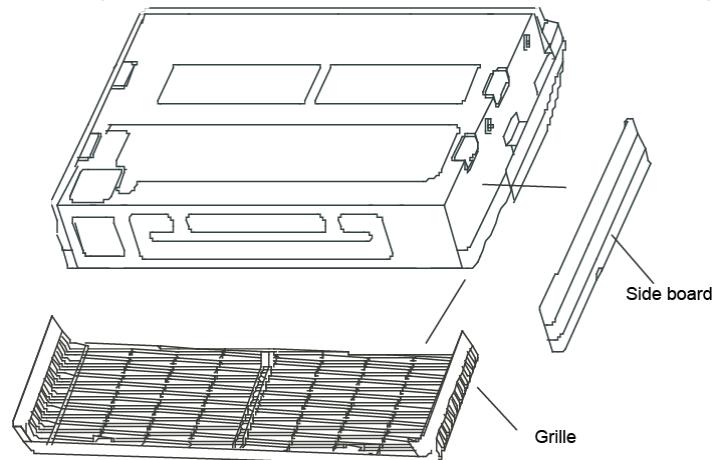
Fix the hook with tapping screw onto the wall.(Refer to picture below)



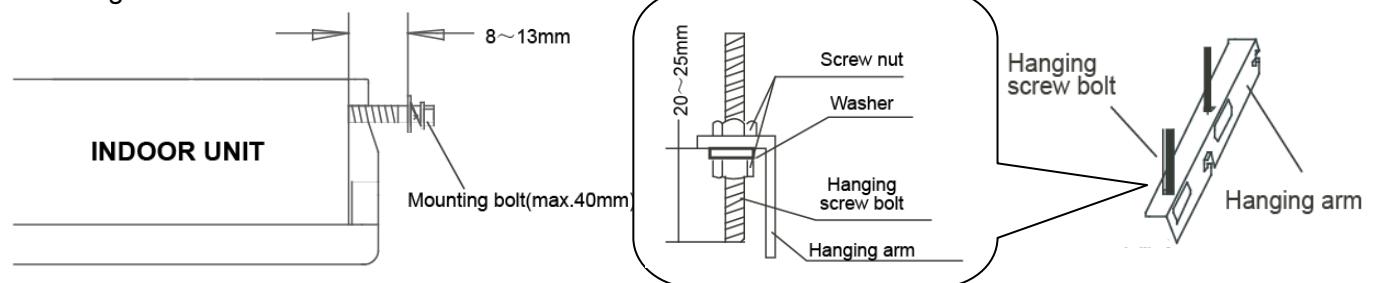
3.3.4 Install the main body

① Ceiling installation (The only installation method for the unit with drain pump)

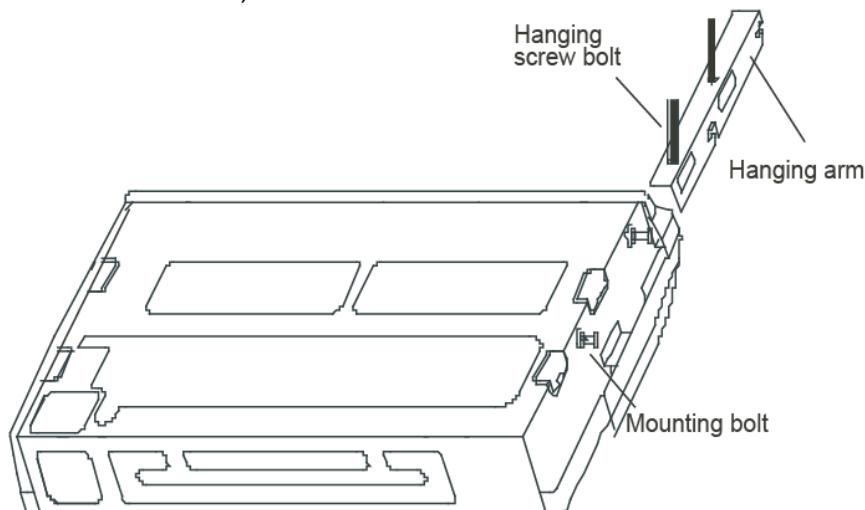
Remove the side board and the grille. (For models 48 and 60, do not remove the grille.)



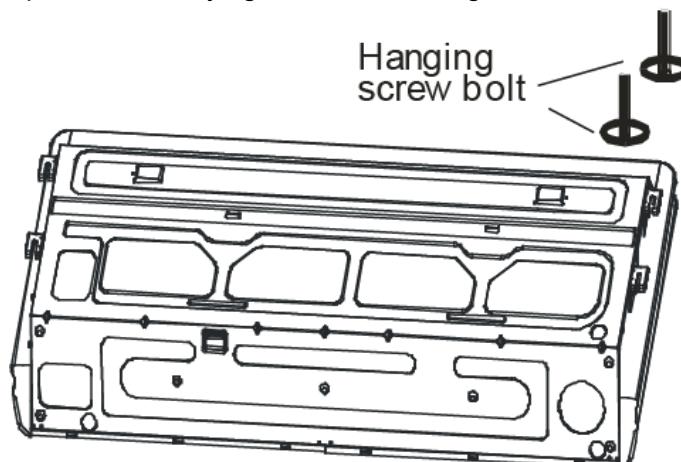
Locate the hanging arm on the hanging screw bolt. (for some of the models 60, do not do this). Prepare the mounting bolts on the unit.



Hang the unit on the hanging arm by sliding backward. Securely tighten the mounting bolts on both sides. (some of the models 60 do not do this)



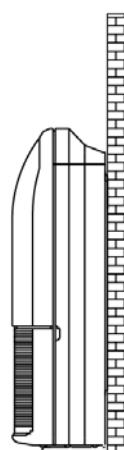
For some of the models 60 please securely tighten the mounting bolts on both sides.



Then install the side panels and grilles back to the main unit.

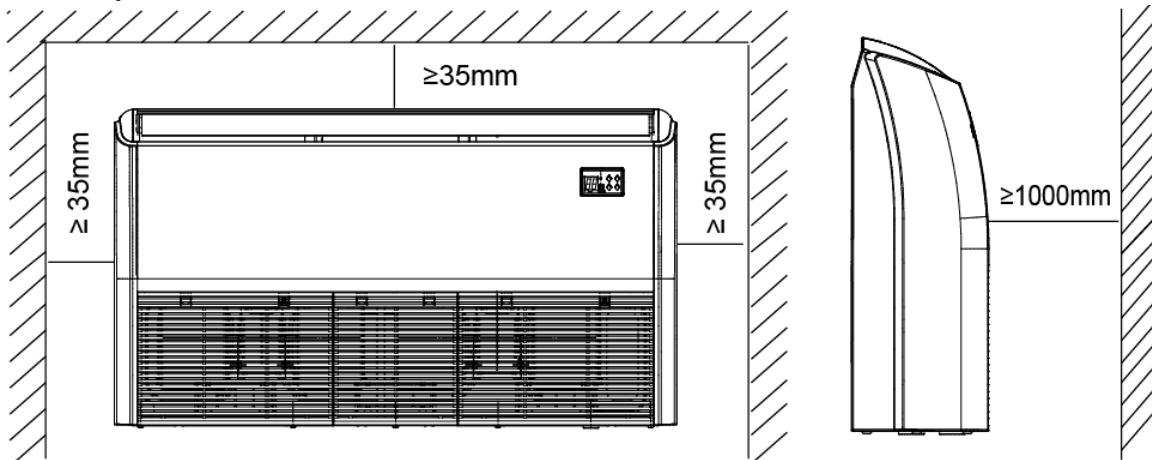
② Floor standing installation

Hang the indoor unit on the hook. (The bottom of body can touch with floor or suspended, but the body must install vertically.)



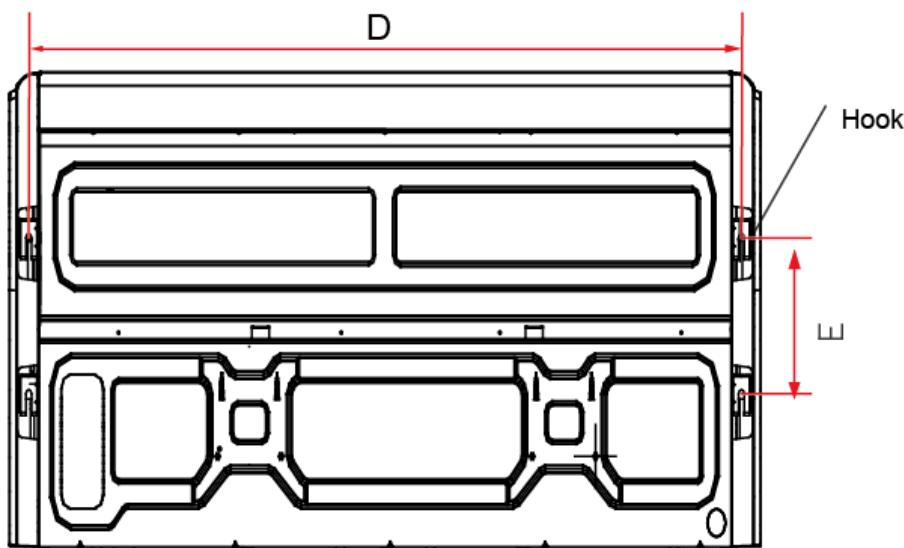
3.4 3rd generation ceiling & floor indoor unit installation

3.4.1 Service space for indoor unit



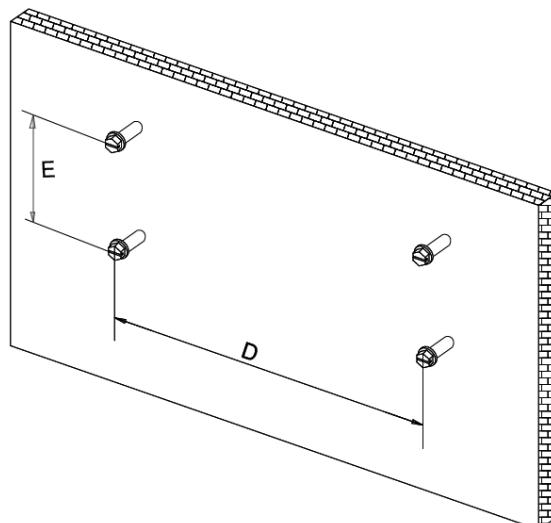
3.4.2 Bolt pitch

① Ceiling installation



Capacity (Btu/h)	D	E
36K	1200	220
48K, 60K	1565	220

② Wall-mounted installation



3.4.3 Install the pendant bolt

① Ceiling installation

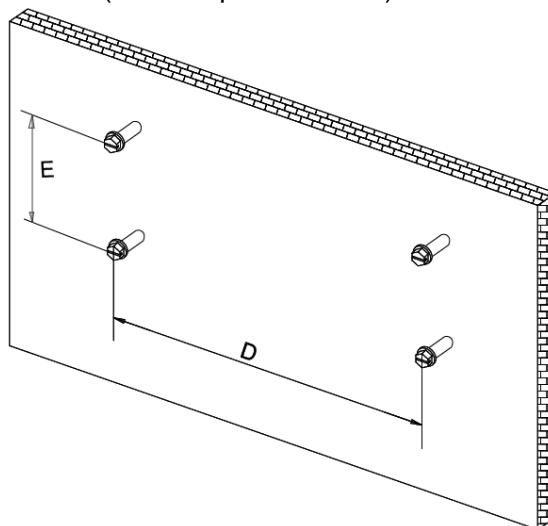
Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expandable hooks (fittings).



② Wall-mounted installation

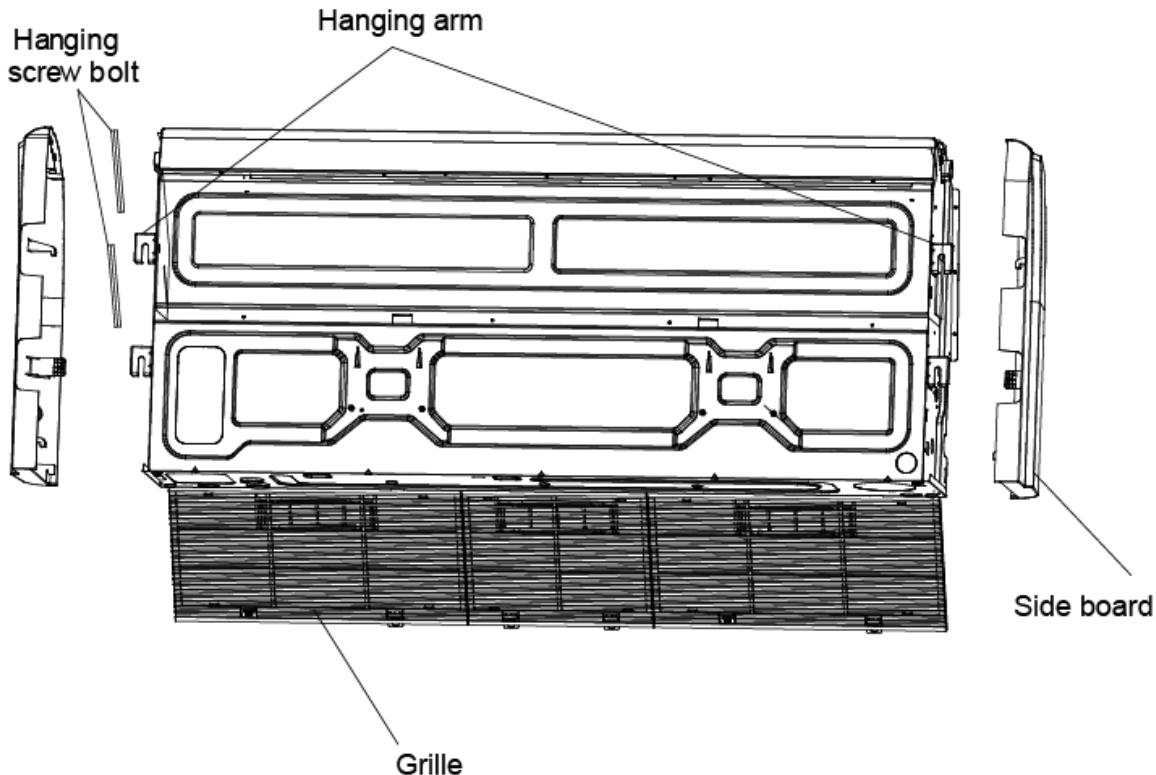
Install the tapping screws onto the wall.(Refer to picture below)



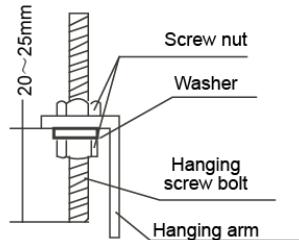
3.4.4 Install the main body

① Ceiling installation (The only installation method for the unit with drain pump)

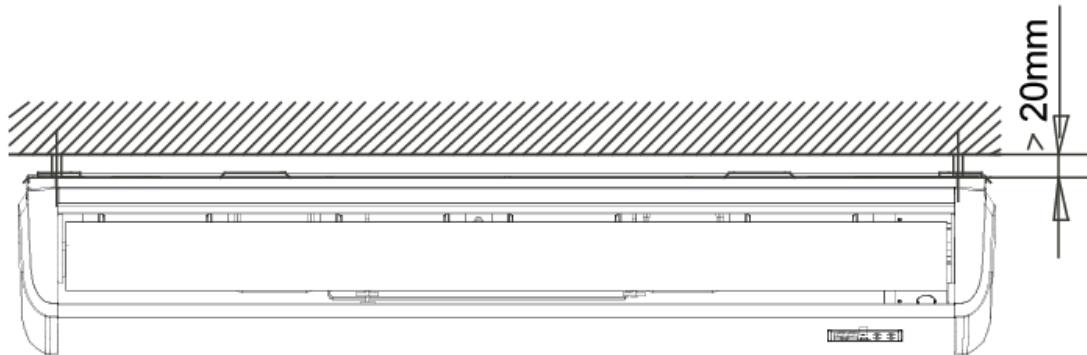
Remove the side board and the grille.

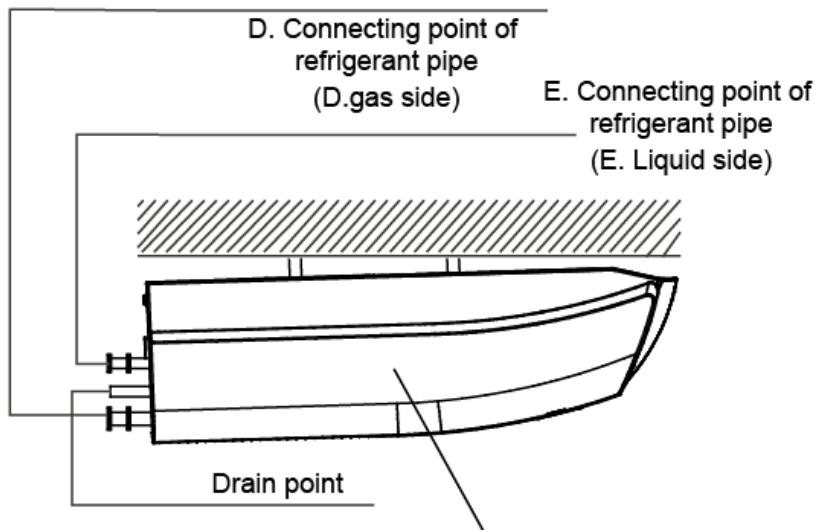


Locate the hanging arm on the hanging screw bolt. Prepare the mounting bolts on the unit.



Put the side panels and grilles back.

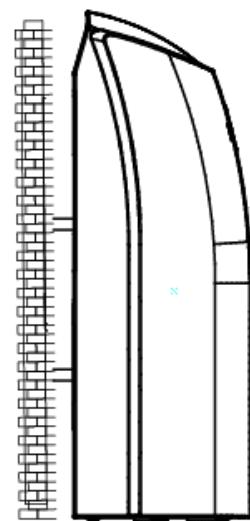
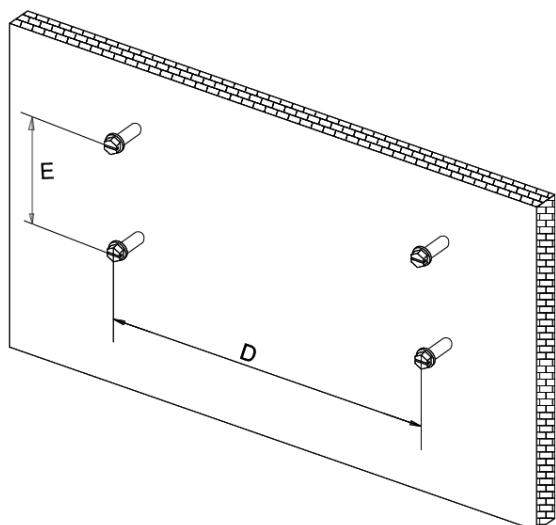




Downward declivity lower between(1-2)/100

② Wall-mounted installation

Hang the indoor unit by insert the tapping screws into the hanging arms on the main unit. (The bottom of body can touch with floor or suspended, but the body must install vertically.)



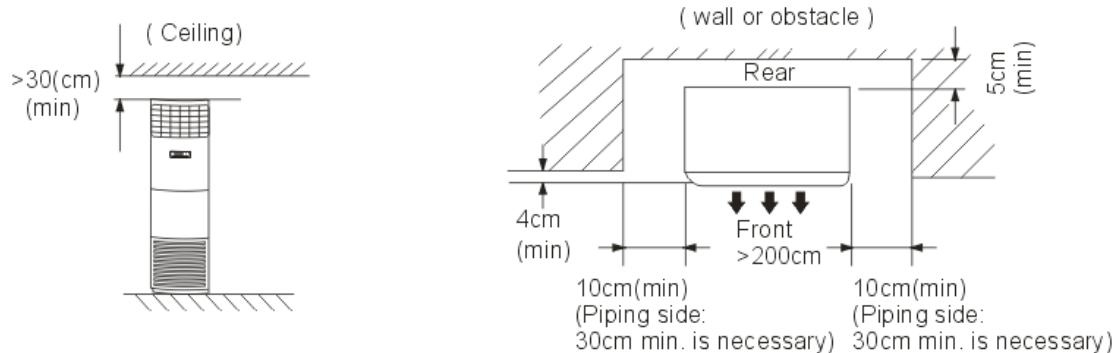
3.5 GA floor standing indoor unit installation

3.5.1 Service space for indoor unit

- A place which provides the spaces around the indoor unit as required above in the diagram.
- A place where is no obstacle near the inlet and outlet area.
- A place which can bear the weight of the indoor unit.
- A place which allows the air filter to be removed downward.
- A place where the reception range is not exposed to direct sunlight.
- In the center of the room where possible.

3.8.1.1 Please stand the unit in hard and flat ground;

Please reserve space for installation and maintenance.



3.8.1.2 Please check the elevation difference between the indoor unit and the outdoor unit, the length of the refrigerant pipe, and the curved places (bend) of the pipe are no more than the following numbers:

Elevation difference: no more than 20M (if the elevation difference between indoor and outdoor unit is more than 10 meters, it is recommended that the indoor unit be located higher than the outdoor unit.)

Pipe length: no more than 30M.

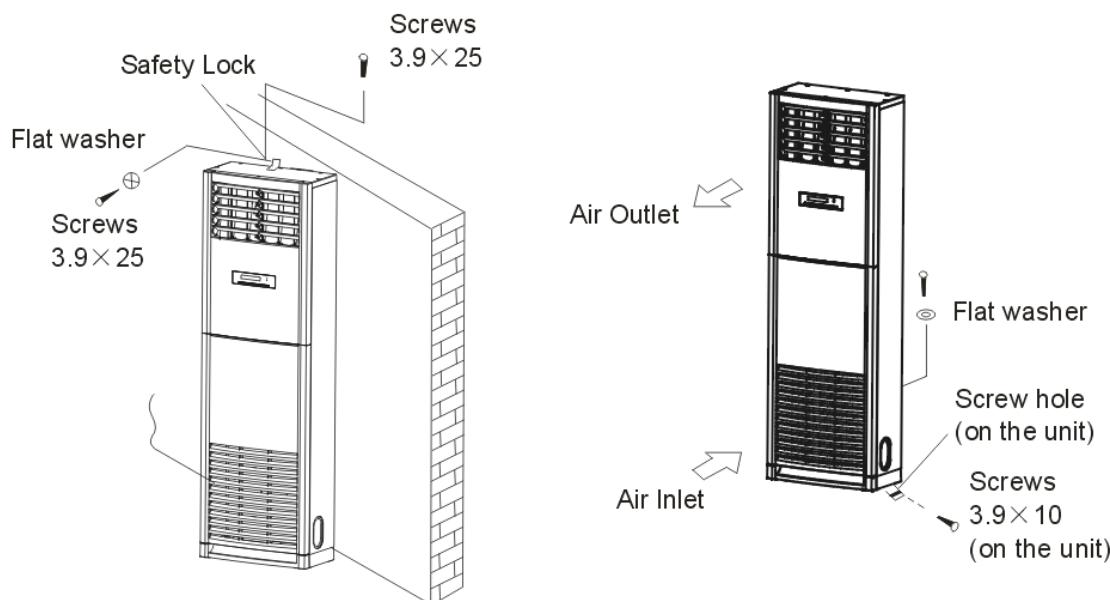
Bends: no more than 15 places.

3.5.2 Installing

3.8.2.1. Anti-falling:

To prevent the indoor unit from falling, you must:

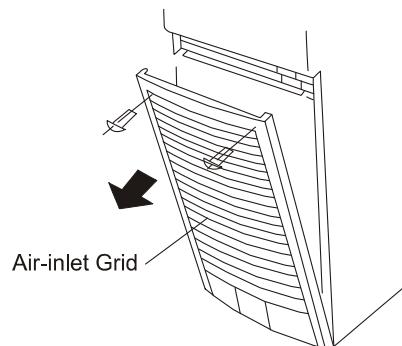
- Pay full attention to the unit because its long outer shape makes it easy to fall;
- Firmly fix the unit to the wall or in the ground to avoid accidental falling.



3.8.2.2. Dismounting the lower front panel

Please take off the lower front panel before connecting the pipes/wires.

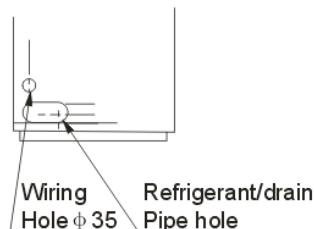
Pull down the two knobs on the grille, take off the two screws, then the air-inlet grille goes free.



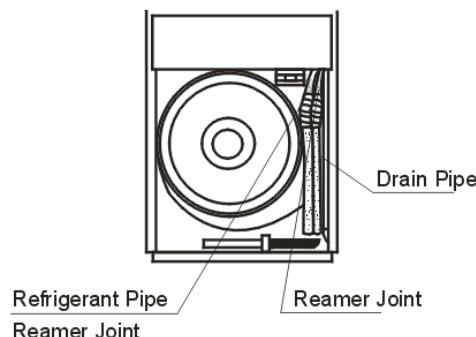
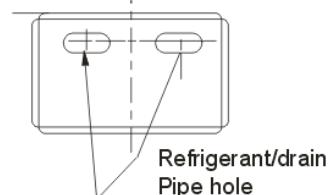
3.8.2.3. Take the Pipe Clip off before connecting the pipes and wiring; fit it when these finished.

Use accessories to connect the pipes/wires on both sides and back side.

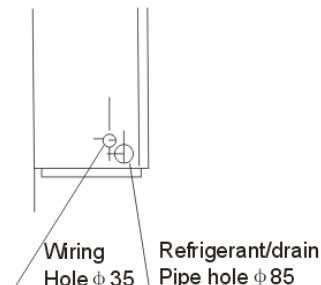
Pipe/wire-hole position on back side



Pipe/wire-hole position on the bottom



Pipe/wire-hole positions on both sides



3.4 Outdoor unit installation (Side Discharge Unit)

4.1 Service space for outdoor unit

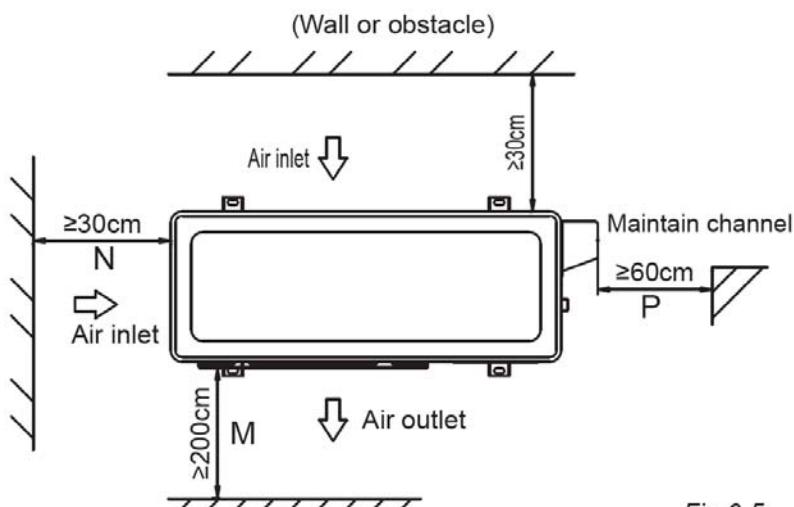
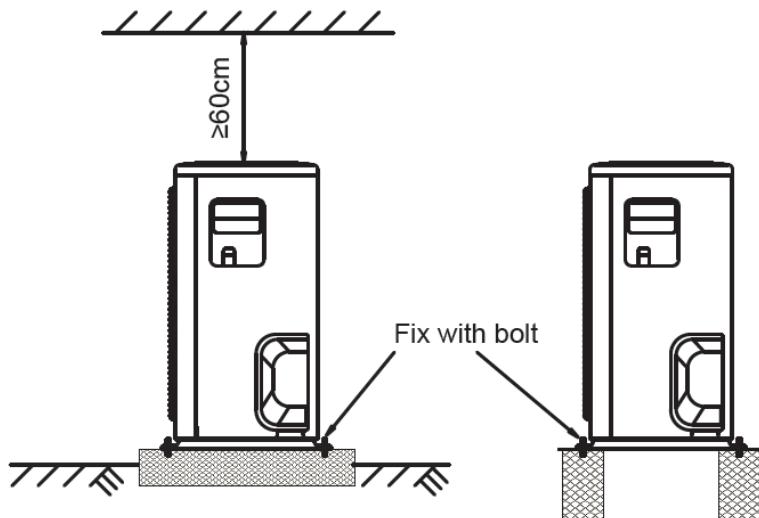
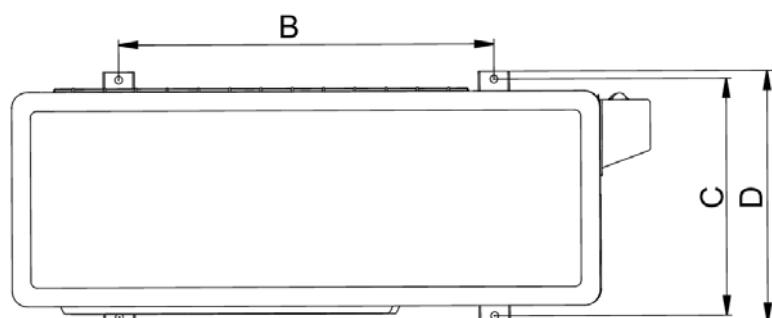


Fig.6-5



4.2 Bolt pitch



Model	B	C	D
12K	530	290	315
18K	530	290	315
24K	560	335	360
30K	590	333	355
36K	624	366	396
48K	600	376	400
60K	600	376	400

4.3 Install the Unit

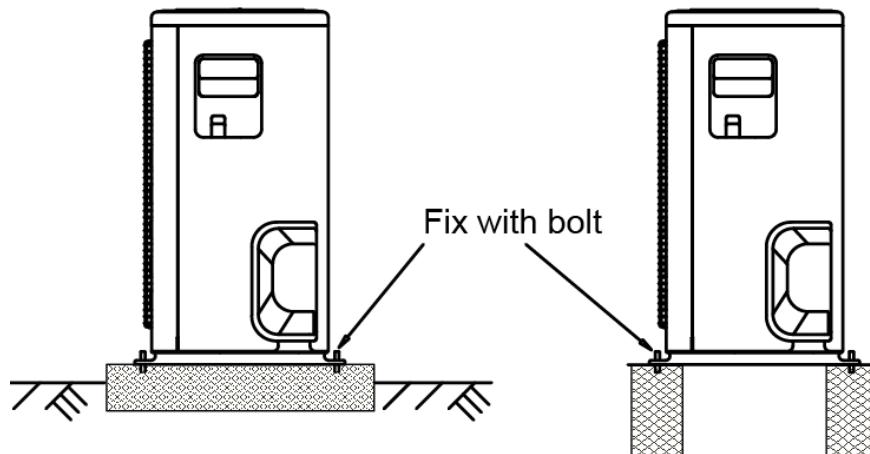
Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling. Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45°, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.



4. Refrigerant pipe installation

5.1 Maximum pipe length and height drop

Considering the allowable pipe length and height drop to decide the installation position. Make sure the distance and height drop between indoor and outdoor unit not exceeded the date in the following table.

Model	Max. Length	Max. Elevation
12,000Btu/h	15m	8m
18,000Btu/h ~24,000Btu/h	25m	12m
30,000Btu/h	25m	15m
36,000Btu/h	30m	20m
48,000Btu/h ~60,000Btu/h	50m	25m

5.2 The procedure of connecting pipes

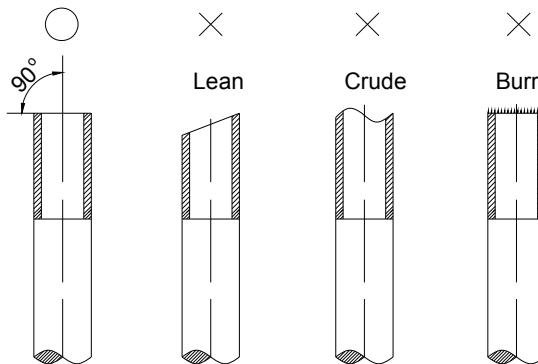
5.2.1 Choose the pipe size according to the specification table.

5.2.2 Confirm the cross way of the pipes.

5.2.3 Measure the necessary pipe length.

5.2.4 Cut the selected pipe with pipe cutter

- Make the section flat and smooth.



5.2.5 Insulate the copper pipe

- Before test operation, the joint parts should not be heat insulated.

5.2.6 Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- According to the following table to flare the pipe

Pipe diameter	Flare dimension A (mm)		Flare shape
	Min	Max	
1/4" (6.35)	8.3	8.7	
3/8" (9.52)	12.0	12.4	
1/2" (12.7)	15.4	15.8	
5/8" (15.9)	18.6	19.1	
3/4" (19)	22.9	23.3	

- After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

5.2.7 Drill holes if the pipes need to pass the wall.

5.2.8 According to the field condition to bend the pipes so that it can pass the wall smoothly.

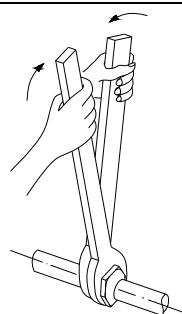
5.2.9 Bind and wrap the wire together with the insulated pipe if necessary.**5.2.10 Set the wall conduit****5.2.11 Set the supporter for the pipe.****5.2.12 Locate the pipe and fix it by supporter**

➢ For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.

➢ For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

5.2.13 Connect the pipe to indoor unit and outdoor unit by using two spanners.

➢ Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the bellmouthing, and too small torque may cause leakage. Refer the following table for different pipe connection.

Pipe Diameter	Torque		Sketch map
	(kgf.cm)	(N.cm)	
1/4" (6.35)	144~176	1420~1720	
3/8" (9.52)	333~407	3270~3990	
1/2" (12.7)	504~616	4950~6030	
5/8" (15.9)	630~770	6180~7540	
3/4" (19)	990~1210	9270~11860	

5. Drainage pipe installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

6.1 Installation principle

- Ensure at least 1/100 slope of the drainage pipe
- Adopt suitable pipe diameter
- Adopt nearby condensate water discharge

6.2 Key points of drainage water pipe installation

6.2.1 Considering the pipeline route and elevation

- Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.

6.2.2 Drainage pipe selection

- The drainage pipe diameter shall not be smaller than the drain hose of indoor unit
- According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

Capacity (x1000Btu)	Water flowrate (l/h)
12	2.4
18	4
24	6
30	7
36	8
42	10
48	12
60	14

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)		Remark
		Slope 1/50	Slope 1/100	
PVC25	20	39	27	For branch pipe
PVC32	25	70	50	
PVC40	31	125	88	Could be used for confluence pipe
PVC50	40	247	175	
PVC63	51	473	334	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)	Remark
PVC25	20	220	For branch pipe
PVC32	25	410	
PVC40	31	730	Could be used for confluence pipe
PVC50	40	1440	
PVC63	51	2760	
PVC75	67	5710	
PVC90	77	8280	

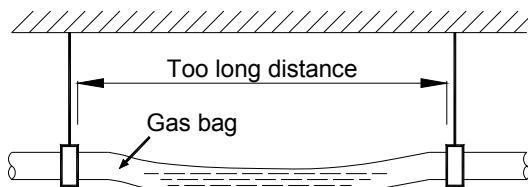
Attention: Adopt PVC40 or bigger pipe to be the main pipe.

6.2.3 Individual design of drainage pipe system

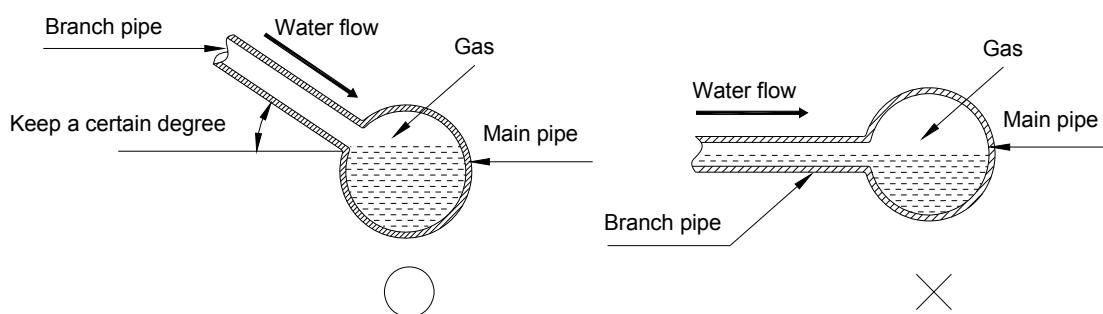
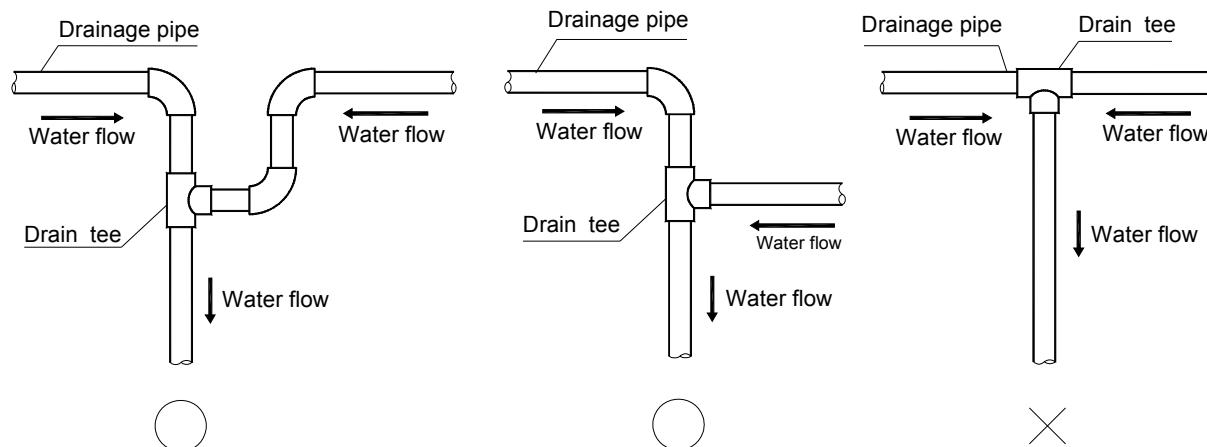
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

6.2.4 Supporter gap of drainage pipe

- In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m and 1.5m~2.0m.
- Each vertical pipe shall be equipped with not less than two hangers.
- Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.



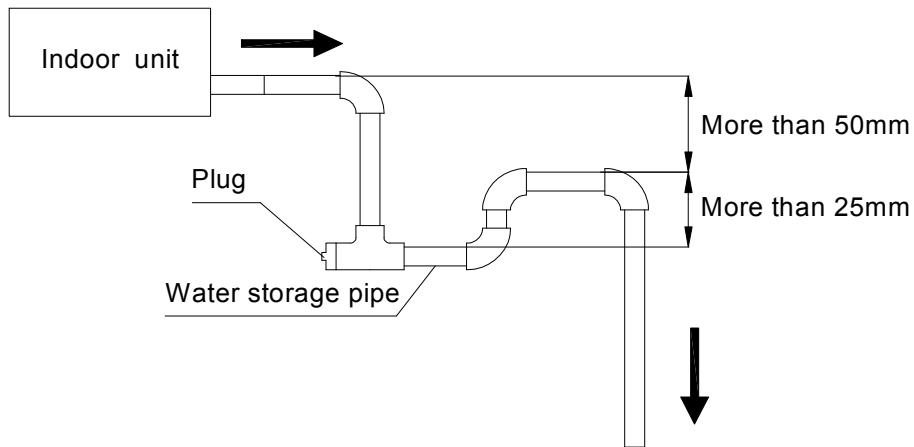
6.2.5 The horizontal pipe layout should avoid converse flow or bad flow



- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

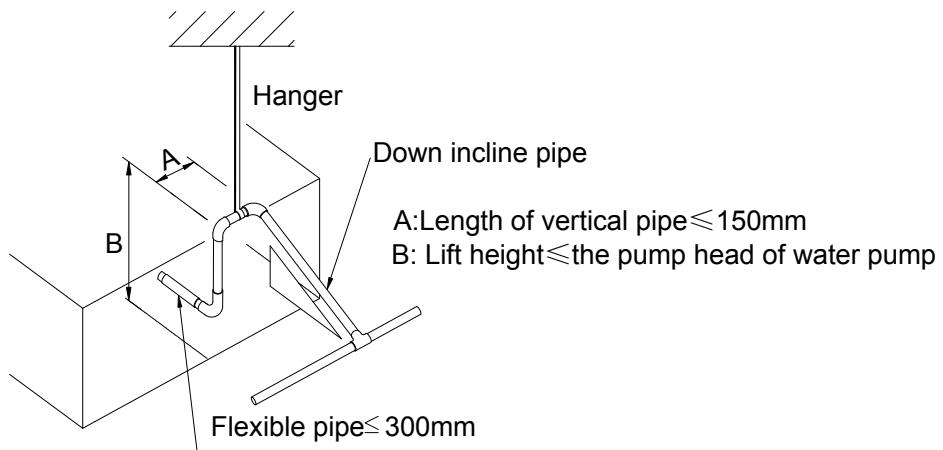
6.2.6 Water storage pipe setting

- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit, the water storage pipe should be set to avoid converse flow or blow water phenomena.



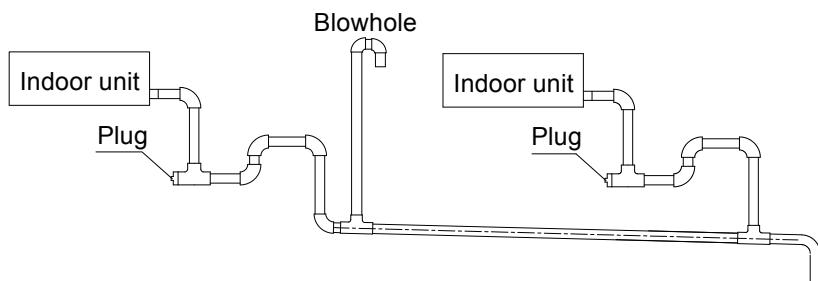
6.2.7 Lifting pipe setting of indoor unit with water pump

- The length of lifting pipe should not exceed the pump head of indoor unit water pump.
Pump head of big four way cassette: 750mm
Pump head of compact four way cassette: 500mm
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.
- Refer the following picture for installation reference.



6.2.8 Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.
- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.



6.2.9 The end of drainage pipe shall not contact with ground directly.

6.3 Drainage test

6.3.1 Water leakage test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

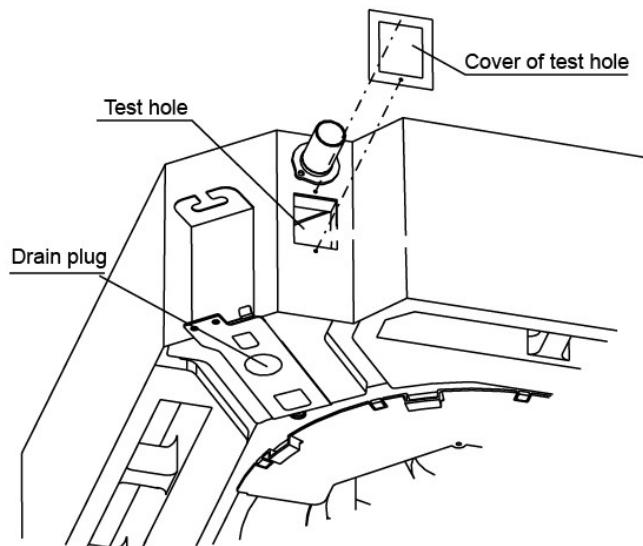
6.3.2 Water discharge test

1. Natural drainage mode(the indoor unit with outdoor drainage pump)

Infuse above 600ml water through water test hole slowly into the water collector, observe whether the water can discharge through the transparent hard pipe at drainage outlet.

2. Pump drainage mode

- 2.1 Disconnect the plug of water level switch, remove the cover of water test hole and slowly infuse about 2000ml water through the water test hole, be sure that the water will not touch the motor of drainage pump.



- 2.2 Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then connect the plug of water level switch, check the operation sound of water pump and observe whether the water can discharge through the transparent hard pipe at drainage outlet. (In light of the length of drainage pipe, water shall be discharged about 1 minute delayed)

- 2.3 Stop the operation of air conditioner, power off the power supply and put the cover of water test hole back to the original place.

- a. After stopped the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and even water shall run over the water collector.
- b. Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

6.4 Insulation work of drainage pipe

Refer the introduction to the insulation engineering parts.

6. Vacuum Drying and Leakage Checking

7.1 Purpose of vacuum drying

- Eliminating moisture in system to prevent the phenomena of ice-blockage and copper [oxidation](#).
Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.
- Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

7.2 Selection of vacuum pump

- The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.
- Precision of vacuum pump shall reach 0.02mmHg or above.

7.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

7.3.1 Ordinary vacuum drying

1. When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).
2. If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.
3. If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.
4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7.3.2 Special vacuum drying

The special vacuum drying method shall be adopted when:

1. Finding moisture during flushing refrigerant pipe.
2. Conducting construction on rainy day, because rain water might penetrated into pipeline.
3. Construction period is long, and rain water might penetrated into pipeline.
4. Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

1. Vacuum drying for 1 hour.
2. Vacuum damage, filling nitrogen to reach 0.5Kgf/cm² .
Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.
3. Vacuum drying again for half an hour.
If the pressure reached -755mmHg, start to pressure leakage test. If it can not reached the value, repeat vacuum damage and vacuum drying again for 1 hour.
4. Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

7. Additional refrigerant charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed.
- The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Φ6.35	Φ9.52	Φ12.7
Formula	$V=11g/m \times (L-5)$	$V=30g/m \times (L-5)$	$V=60g/m \times (L-5)$

V: Additional refrigerant charge volume (g).

L : The length of the liquid pipe (m).

Note:

- Refrigerant may only be charged after performed the vacuum drying process.
- Always use gloves and glasses to protect your hands and eyes during the charge work.
- Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
- Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
- After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part.(Using gas leakage detector or soap water to detect).

8. Engineering of insulation

9.1 Insulation of refrigerant pipe

9.1.1 Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection→ vacuum drying → insulate the joint parts

9.1.2 Purpose of refrigerant pipe insulation

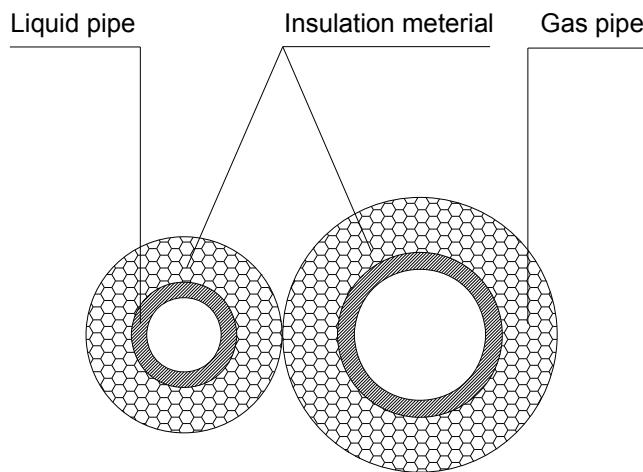
- During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
- Temperature of gas pipe is very high (generally 50-100°C) during heating. Insulation work must be carried out to prevent hurt by carelessness touching.

9.1.3 Insulation material selection for refrigerant pipe

- The burning performance should over 120°C
- According to the local law to choose insulation materials
- The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

9.1.4 Installation highlights of insulation construction

- Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.



- The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
- The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
- The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
- The linking part should be use glue to paste together
- Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

9.2 Insulation of drainage pipe

9.2.1 Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection→ drainage test→ insulate the joint parts

9.2.2 Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and

cause leakage to damage the house decoration.

9.2.3 Insulation material selection for drainage pipe

- The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.
- Thickness of insulation layer is usually above 10mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

9.2.4 Installation and highlights of insulation construction

- The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.
- There should be no insulation gap between the insulation material.

9. Engineering of electrical wiring

10.1 Highlights of electrical wiring installation

- All field wiring construction should be finished by qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.
- According to table in indoor part named “the specification of the power” to choose the wiring, make sure the selected wiring not small than the date showing in the table.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.
- There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.
- The wiring with different voltage should not be in one wire tube.
- Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.

10. Test operation

11.1 The test operation must be carried out after the entire installation has been completed.

11.2 Please confirm the following points before the test operation.

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop values are both opened.
- The air conditioner is pre-heated by turning on the power.

11.3 Test operation

Set the air conditioner under the mode of "COOLING" by remote controller, and check the following points.

Indoor unit

- Whether the switch on the remote controller works well.
- Whether the buttons on the remote controller works well.
- Whether the air flow louver moves normally.
- Whether the room temperature is adjusted well.
- Whether the indicator lights normally.
- Whether the temporary buttons works well.
- Whether the drainage is normal.
- Whether there is vibration or abnormal noise during operation.

Outdoor unit

- Whether there is vibration or abnormal noise during operation.
- Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

Part 5

Electrical Control System

1. Electrical Control Function.....	111
2. Troubleshooting.....	120
3. Controller.....	144

1. Electrical Control Function

1.1 Definition

- T1: Indoor room temperature
- T2: Coil temperature of indoor heat exchanger middle.
- T2B: Coil temperature of indoor heat exchanger outlet.
- T3: Coil temperature of condenser
- T4: Outdoor ambient temperature
- T5: Compressor discharge temperature

1.2 Main Protection

1.2.1 Time delay at restart for compressor.

1.2.2 Temperature protection of compressor top

The unit will stop working when the compressor top temp. protector cut off, and will restart after the compressor top temp. protector restart.

1.2.3 Temperature protection of compressor discharge

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

For 12k models:

- Compressor discharge temp. $T5 > 115^{\circ}\text{C}$ for 5s, compressor stops.
- $108 < T5 < 115^{\circ}\text{C}$, decrease the frequency to the lower level every 3 minutes till F1.
- $90 < T5 < 105^{\circ}\text{C}$, keep running at the current frequency.
- $T5 < 90^{\circ}\text{C}$, no limit for frequency.

For other models:

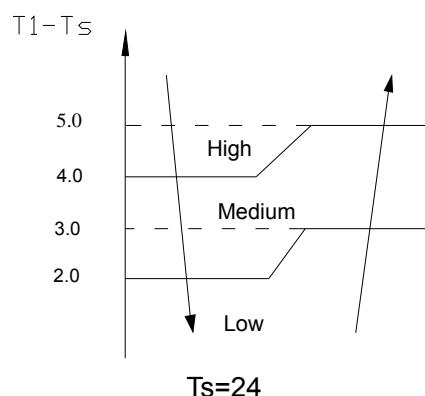
- If $102^{\circ}\text{C} < T5 < 115^{\circ}\text{C}$, decrease the frequency to the lower level every 2 minutes till to F1.
- If $T5 > 115^{\circ}\text{C}$ for 10 seconds, the compressor will stop and restart till $T5 < 90^{\circ}\text{C}$.

1.2.4 Sensor protection at open circuit and breaking disconnection.

1.3 Operation Modes and Functions

1.3.1 Fan mode

- (1) Outdoor fan and compressor stop.
- (2) Temperature setting function is disabled, and no setting temperature is displayed.
- (3) Indoor fan can be set to high/(med)/low/auto.
- (4) The louver operates same as in cooling mode.
- (5) Auto fan:

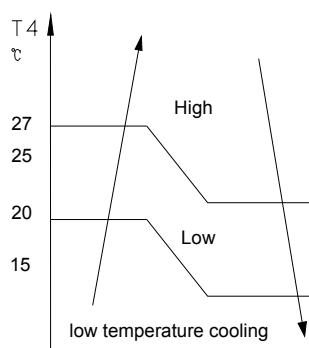


1.3.2 Cooling Mode

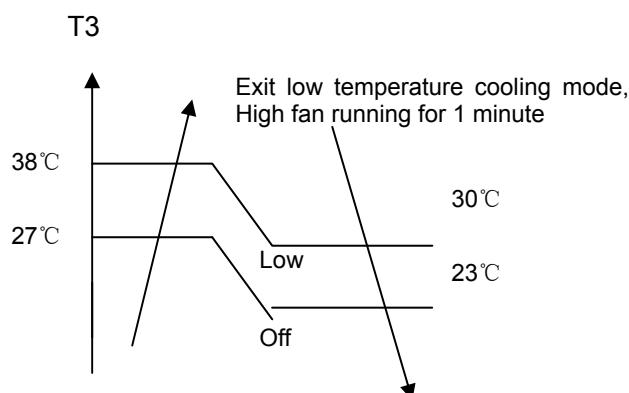
1.3.2.1 Outdoor PMW open angle control

The unit is working in cooling mode with the EXV open 300P for 3 minutes, then adjusting PMW open angle according to the temperature of compressor discharge every 2 minutes.

1.3.2.2 Outdoor fan running rules



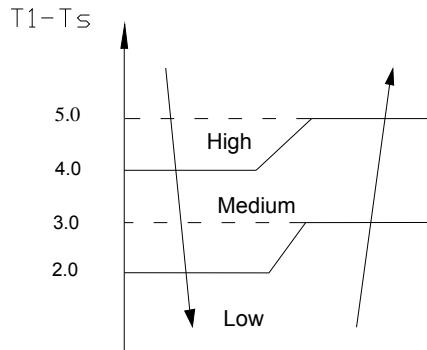
Outdoor fan in low temperature cooling mode acts as follow:



1.3.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, (medium), low and auto.

The auto fan:



1.3.2.4 Evaporator low temperature T2 protection.

When $T2 < 2^\circ\text{C}$ and lasts for 3 minutes, the indoor has no capacity demand and resume till $T2 \geq 7^\circ\text{C}$.

1.3.2.5 Condenser high temperature T3 protection

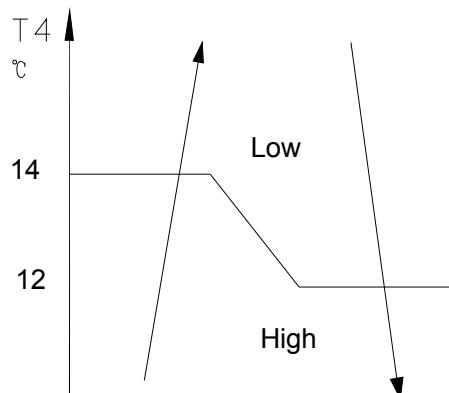
When $T3 \geq 65^\circ\text{C}$ for 3 seconds, the compressor will shut off. When $T3 < 52$, the compressor will restart.

1.3.3 Heating Mode

1.3.2.1 Outdoor PMW open angle control

The unit is working in heating mode with the EXV open 300P for 3 minutes, then adjusting PMW open angle according to the temperature of compressor discharge every 2 minutes.

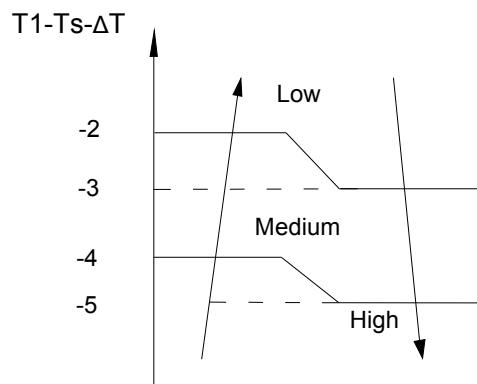
1.3.3.2 Outdoor fan running rules:



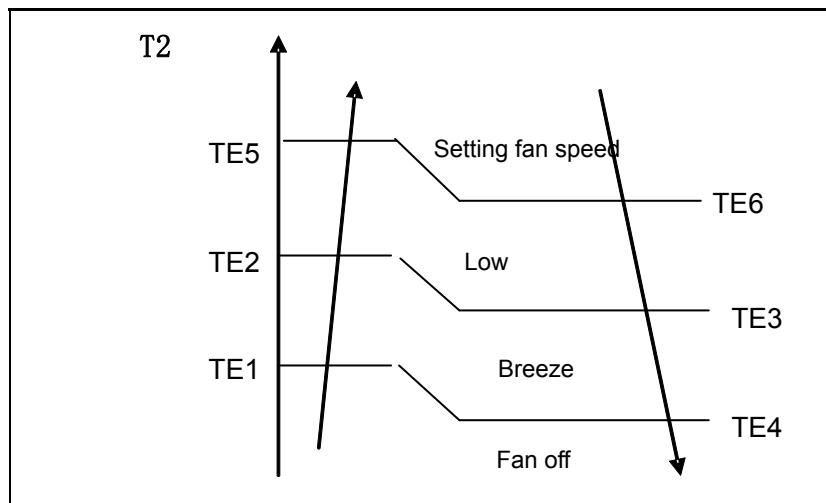
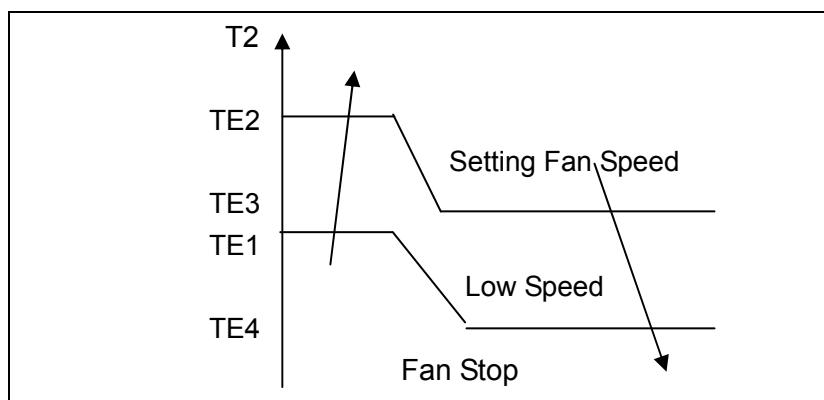
1.3.3.3 Indoor fan running rules:

When the compressor is on, the indoor fan can be set to high/(med)/low/auto. And the anti-cold wind function has the priority.

Auto fan action:

**Anti-cold Wind Function:**

For super-slim 4-way Cassette&3rd generation ceiling & floor

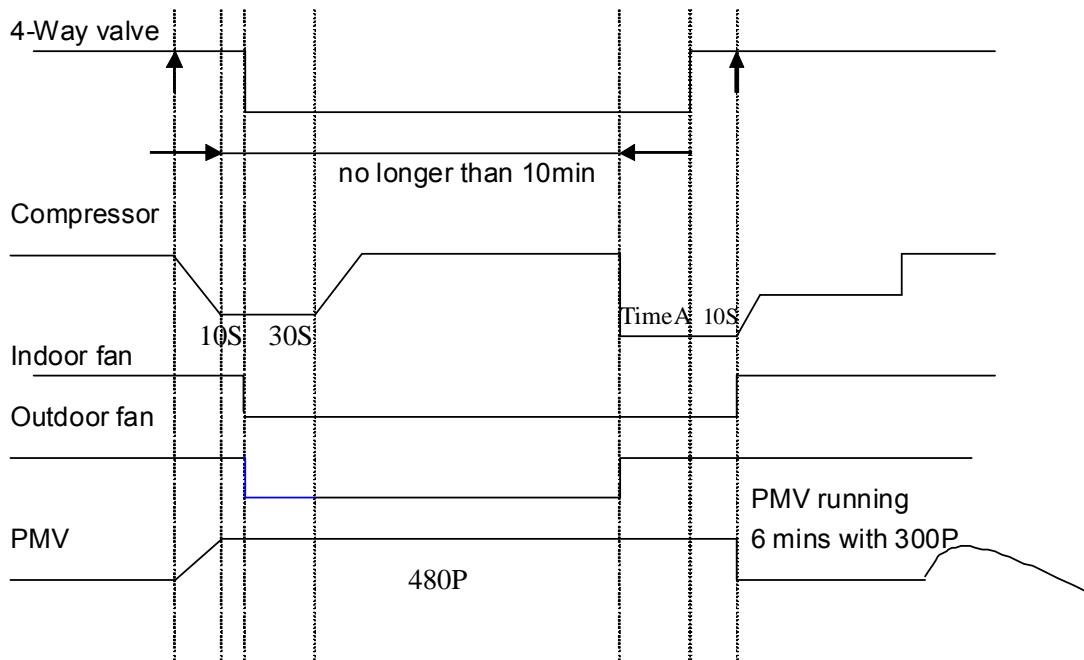
**For other models:****1.3.3.4 Defrosting mode:**

For 18-36K(1-Phase) models:

Condition of defrosting:

$T3 \leq \text{TempEnterDefrost_ADD } ^\circ\text{C}$ and lasts for 40 minutes.

Defrosting action:



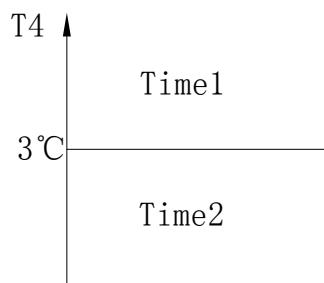
Condition of ending defrosting:

If any one of following items is satisfied, defrosting will stop and the machine will turn to normal heating mode.

- ① $T_3 > \text{TempQuitDefrost_ADD } ^\circ\text{C}$;
- ② The defrosting time achieves 10min.

For 48K(1-Phase) models:

Condition of defrosting:



Time conditions:

time1

Time conditions(Meet the following conditions)

1. Running in heating mode
2. $T_4 \geq 3^\circ\text{C}$
3. Compressor is on
4. $T_3 \leq \text{TempEnterDefrost_ADD } ^\circ\text{C}$

Cleared conditions (Meet any one of the following conditions)

1. Compressor is off.
2. $T_3 > \text{TempEnterDefrost_ADD } ^\circ\text{C}$

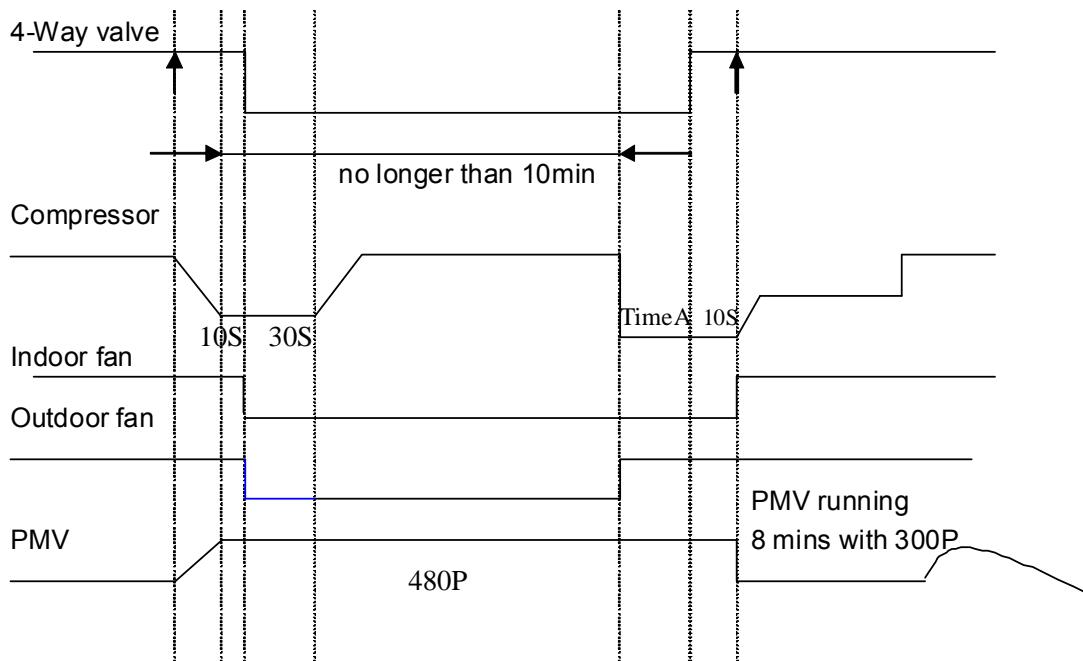
Time2

Time conditions (Meet the following conditions)

1. Running in heating mode
2. $T4 < 3^\circ\text{C}$
3. Compressor is on
4. $T3 \leq \text{TempEnterDefrost_ADD } ^\circ\text{C}$

Cleared conditions (Meet any one of the following conditions)

1. Compressor is off and $T3 > \text{TempEnterDefrost_ADD} + 2^\circ\text{C}$ last for 20 minutes
2. Running in cooling mode.
3. Compressor is off for 1 hour.

Condition of entry defrosting:time1+ time2 ≥ 40 minutes, When defrosting is end, time1 and time2 are cleared.**Defrosting action:****Condition of ending defrosting:**

If any one of following items is satisfied, defrosting will stop and the machine will turn to normal heating mode.

- ① The defrosting time achieves 10min;
- ② $T3 \geq 15^\circ\text{C}$;
- ③ $T3 \geq 7^\circ\text{C}$ for 60seconds.

1.3.3.5 High evaporator coil temp.T2 protection:T2 $>60^\circ\text{C}$, the compressor will stop and restart when T2 $<54^\circ\text{C}$.

1.3.4 Auto-mode

This mode can be chosen with remote controller and the setting temperature can be changed between 17~30°C.

In auto mode, the machine will choose cooling, heating or fan-only mode according to ΔT ($\Delta T = T_1 - T_s$).

$\Delta T = T_1 - T_s$	Running mode
$\Delta T \geq 2^\circ C$	Cooling
$-1 \leq \Delta T < 2^\circ C$	Fan-only
$\Delta T < -1^\circ C$	Heating

Indoor fan will run at auto fan of the relevant mode.

The louver operates same as in relevant mode.

If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose mode according to $T_1 - T_s$.

If the setting temperature is modified, the machine will choose running function again.

1.3.5 Drying mode

Drying mode works the same as cooling mode in low speed.

All protections are active and the same as that in cooling mode.

1.3.6 Timer function

1.3.6.1 Timing range is 24 hours.

1.3.6.2 Timer on. The machine will turn on automatically when reaching the setting time.

1.3.6.3 Timer off. The machine will turn off automatically when reaching the setting time.

1.3.6.4 Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.

1.3.6.5 Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.

1.3.6.6 The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the “timer off” function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.

1.3.6.7 The setting time is relative time.

1.3.7 Economy function

1.3.7.1 The sleep function is available in cooling, heating or auto mode.

1.3.7.2. Operation process in sleep mode is as follow:

When cooling, the setting temperature rises 1°C (be lower than 30°C) every one hour, 2 hours later the setting temperature stops rising and the indoor fan is fixed at low speed.

When heating, the setting temperature decreases 1°C (be higher than 17°C) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed at low speed. (Anti-cold wind function has the priority).

1.3.7.3 Operation time in sleep mode is 7 hours. After 7 hours the AC quits this mode but doesn't turns off

1.3.7.4 Timer setting is available

1.3.8 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including Swing function) automatically after 3 minutes when power returns.

1.3.9 Drain pump control (For Cassette)

Adopt the water-level switch to control the action of drain pump.

Main action under different condition :(every 5 seconds the system will check the water level one time)

1. When the A/C operates with cooling (including auto cooling), dehumidifying, and forced cooling mode, the pump will start running immediately and continuously, till stop cooling.
2. Once the water level increase and up to the control point, LED will alarm and the drain pump open and continue checking the water level. If the water level fall down and LED disarmed (drain pump delay close 1 minute) and operate with the last mode. Otherwise the entire system stop operating (including the pump) and LED remain alarming after 3 minutes,

1.3.10 Point Check Function

There is a check switch in outdoor PCB.

Press the switch SW1 to check the states of unit when the unit is running.

Press the switch N times it will display the content corresponding to No. N. After getting into the check function, it will display No. N with 1.5s, meanwhile the low bit decimal of digit display flashing, indicated to get into the check function display. After 1.5s, it will display the content corresponding to No. N. the digital display tube will display the follow procedure when push SW1 each time.

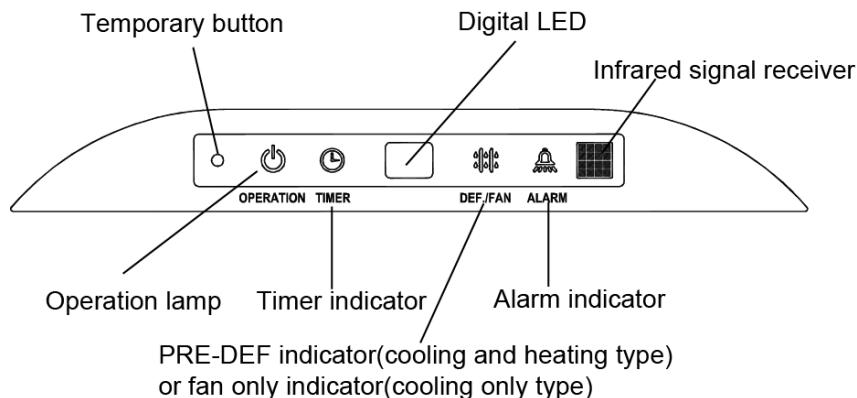
N	Display	Remark
00	Normal display	Display running frequency, running state or malfunction code
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "5.0", it means the capacity demand is 15. the digital display tube show "60", it means the capacity demand is 6.0)
02	Amendatory capacity demand code	
03	The frequency after the capacity requirement transfer	
04	The frequency after the frequency limit	
05	The frequency of sending to 341	
06	Indoor unit evaporator outlet temp.(T2)	If the temp. is lower than 0 degree, the digital display tube will show "0". If the temp. is higher than 70 degree, the digital display tube will show "70".
07	Condenser pipe temp.(T3)	If the temp. is lower than -9 degree, the digital display tube will show "-9". If the temp. is higher than 70 degree, the digital display tube will show "70".
08	Outdoor ambient temp.(T4)	If the indoor unit is not connected, the digital display tube will show: "—"
09	Compressor discharge temp.(Tp)	The display value is between 30~120 degree. If the temp. is lower than 30 degree, the digital display tube will show "30". If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital

		display tube show "0.5", it means the compressor discharge temp. is 105 degree. the digital display tube show "1.6", it means the compressor discharge temp. is 116 degree)		
10	AD value of current	The display value is hex number.		
11	AD value of voltage			
12	Indoor unit running mode code	Off:0, Fan only 1, Cooling:2, Heating:3, Forced cooling:4		
13	Outdoor unit running mode code			
14	EXV open angle	Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "2.0", it means the EXV open angle is $120 \times 4 = 480$ p.)		
15	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is hex number. For example, the digital display tube show 2A, then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4, T3 and current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by Tp.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	
16	DC fan motor speed			
17	IGBT radiator temp.(Reserved)	The display value is between 13~120 degree. If the temp. is lower than 13 degree, the digital display tube will show "13". If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "0.5", it means the IGBT radiator temp. is 105 degree. the digital display tube show "1.6", it means the IGBT radiator temp. is 116 degree)		
18	Indoor unit number	The indoor unit can communicate with outdoor unit well.		
19	Condenser pipe temp. of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show "0". If the temp. is higher than 70 degree, the digital display tube will show "70". If the capacity demand is 0, the digital display tube will show "0". If the indoor unit is not connected, the digital display tube will show: "—"		
20	Condenser pipe temp. of 2# indoor unit			
21	Condenser pipe temp. of 3# indoor unit			
22	1# Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "5.0", it means the capacity demand is 15. the digital display tube show "60", it means the capacity demand is 6.0). If the indoor unit is not connected, the digital display tube will show: "—"		
23	2# Indoor unit capacity demand code			
24	3# Indoor unit capacity demand code			

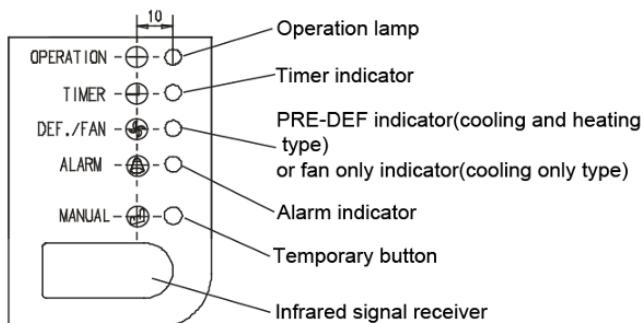
2. Troubleshooting

2.1 Display board

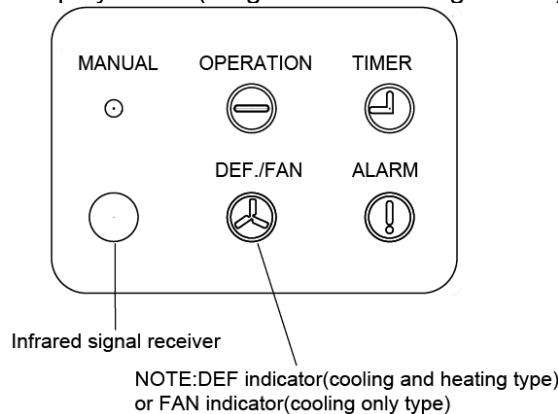
2.1.1 Icon explanation on indoor display board (Big cassette).



2.1.2 Icon explanation on indoor display board (Ceiling & floor)



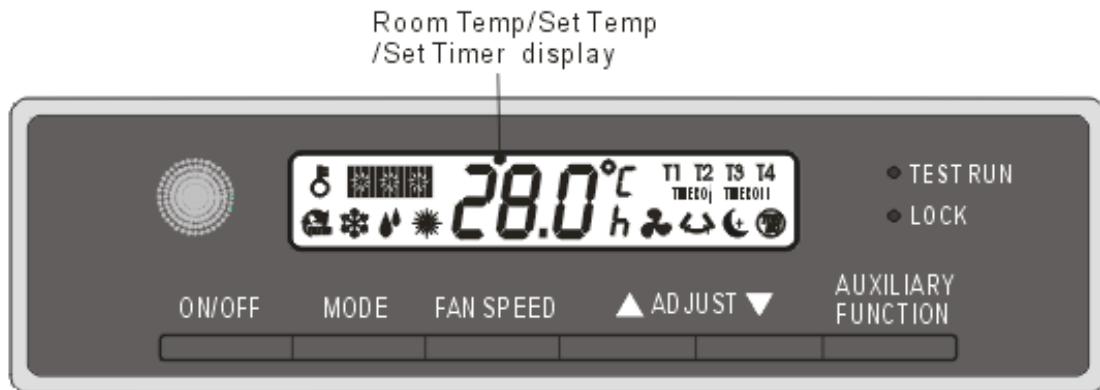
2.1.3 Icon explanation on indoor display board (3rd generation ceiling & floor)



2.1.4 Display board of auto-lifting panel of 4 way cassette



2.1.5 Display board of GA floor standing

Unit Control PanelIndicators

- ⌚ Auto operation display
- ❄ Cooling operation display
- 🔥 Dry operation display
- ☀ Heating operation display
- 🌀 Fan operation display

- 🌀 Swing operation display
- 🌙 Sleep operation display
- (TM) Turbo operation display
- TIMER ON** On timer operation display
- TIMER OFF** Off timer operation display
- 🔒 Lock operation display
- 📊 Fan speed display

2.2 Indoor unit malfunction

NO.	Malfunction	Running lamp	Timer lamp	Defrosting lamp	Alarm lamp	Display(nixie tube)
1	Communication malfunction between indoor and outdoor units.	X	☆	X	X	E1
2	Open or short circuit of T1 temperature sensor	☆	X	X	X	E2
3	Open or short circuit of T2 temperature sensor	☆	X	X	X	E3
4	Open or short circuit of T2B temperature sensor	☆	X	X	X	E4
5	Full-water malfunction	X	X	X	☆	EE
6	EEPROM malfunction	X	X	☆	X	E7
7	Outdoor unit malfunction	X	X	X	◎	Ed

X(off) ☆(flash at 5Hz) ◎(flash at 0.5Hz)
Note: Digital display is only available for 4-way cassette.

For super-slim 4-way Cassette&3rd generation ceiling & floor

NO.	Malfunction	Defrosting lamp	Alarm lamp	Running lamp	Timer lamp	Display(digital tube)
1	Communication malfunction between indoor and outdoor units.	X	X	X	☆	E1
2	Open or short circuit of T1 temperature sensor	X	X	☆	X	E2
3	Open or short circuit of T2 temperature sensor	X	X	☆	X	E3
4	Open or short circuit of T2B temperature sensor	X	X	☆	X	E4
5	Full-water malfunction	X	☆	X	X	EE
6	Indoor EEPROM malfunction	☆	X	X	X	E7
7	Outdoor unit malfunction	X	◎	X	X	Ed
8	Indoor fan speed is out of control	☆	☆	X	X	E8
9	Communication malfunction between main PCB and up-down panel PCB	☆	☆	☆	X	F0
10	Up-down panel malfunction	☆	☆	X	☆	F1
11	Up-down panel is not closed	☆	☆	X	O	F2
12	Communication malfunction between master unit and slave unit	X	☆	X	☆	F3
13	Other malfunction of master unit or slave unit	X	☆	☆	X	F4

O (on) X(off) ☆(flash at 5Hz) ◎(flash at 0.5Hz)

For GA floor standing:

Codes	Contents
P0	Evaporator low temp. protection
P1	Defrosting or anti-cold air
Ed	Outdoor unit protection / Open or short circuit of outdoor temp. sensor

E1	Indoor / outdoor units communication error
E2	Open or short circuit of T1 temperature sensor
E3	Open or short circuit of T2 temperature sensor
E4	Open or short circuit of T2B temperature sensor
E7	EEPROM chip malfunction
CP	Remote ON/OFF ports are open
dF	Defrosting mode
FC	Forced cooling mode

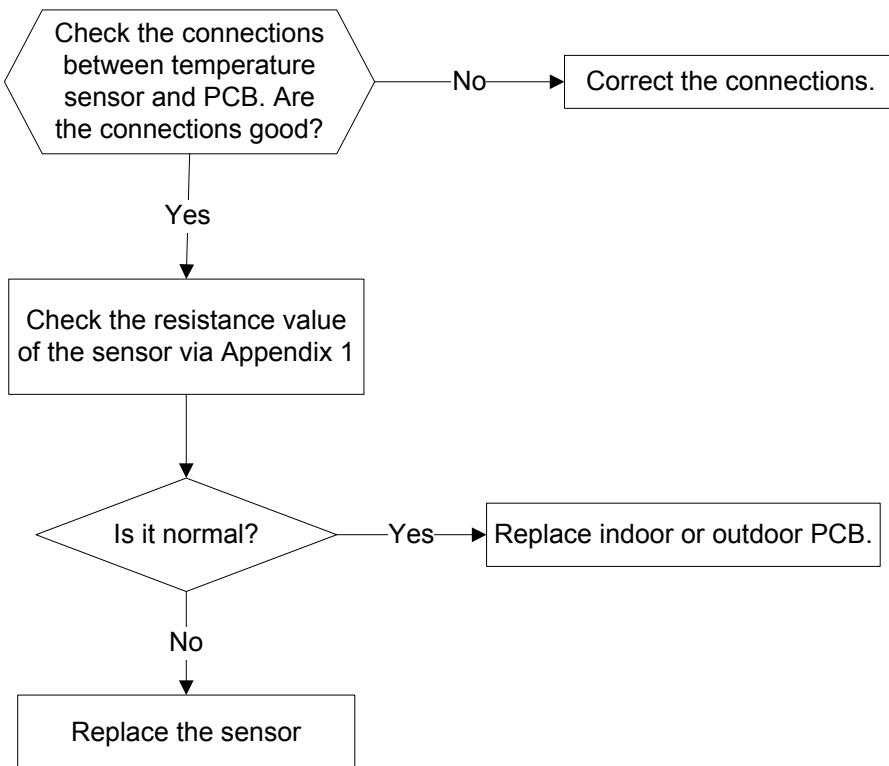
2.3 Outdoor unit malfunction

Display	Malfunction or Protection
E0	Outdoor EEPROM malfunction
E2	Indoor / outdoor units communication error
E3	Communication malfunction between IPM board and outdoor main board
E4	Open or short circuit of T3 or T4 temperature sensor
E5	Voltage protection of compressor
E6	PFC module protection (Only for 36K, 48K)
P0	Top temperature protection of compressor
P1	High pressure protection(Only for 36K, 48K)
P2	Low pressure protection(Only for 36K, 48K)
P3	Current protection of compressor
P4	Discharge temperature protection of compressor
P5	High temperature protection of condenser
P6	IPM module protection
P7	High temperature protection of evaporator

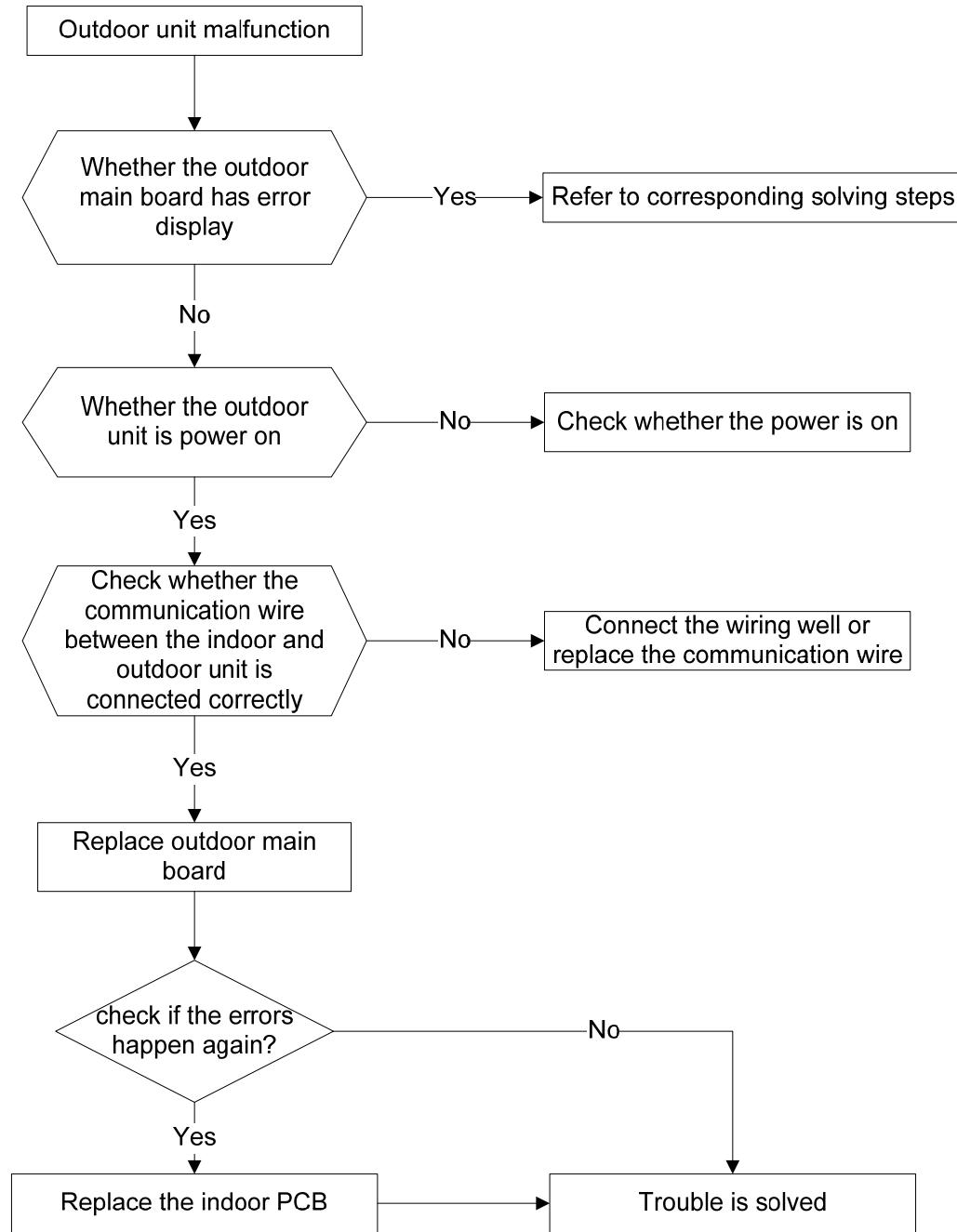
2.4 Solving steps for typical malfunction

2.4.1 For the indoor unit

2.4.1.1 Open or short circuit of temperature sensor

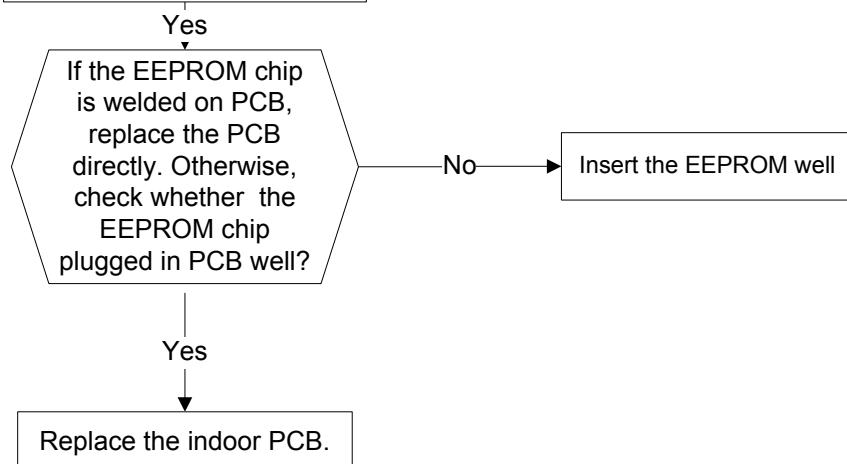


2.4.1.2. Outdoor unit malfunction

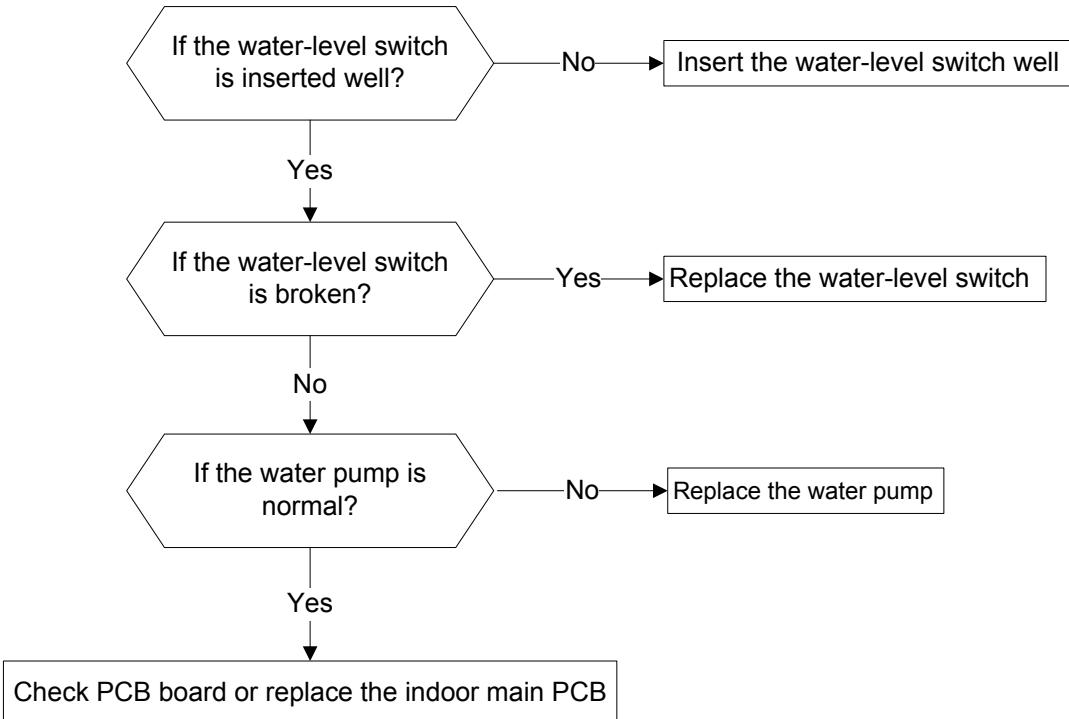


2.4.1.3. Indoor EEPROM malfunction

Shut off the power supply and turn it on 5 seconds later. Is it still displaying the error code?

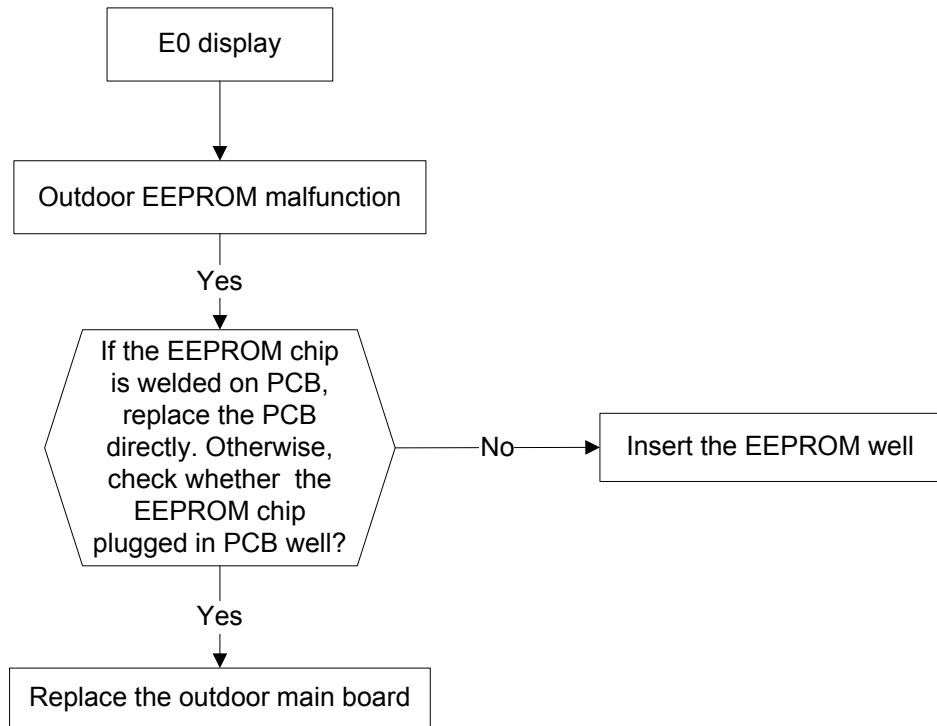


2.4.1.4. Full-water malfunction

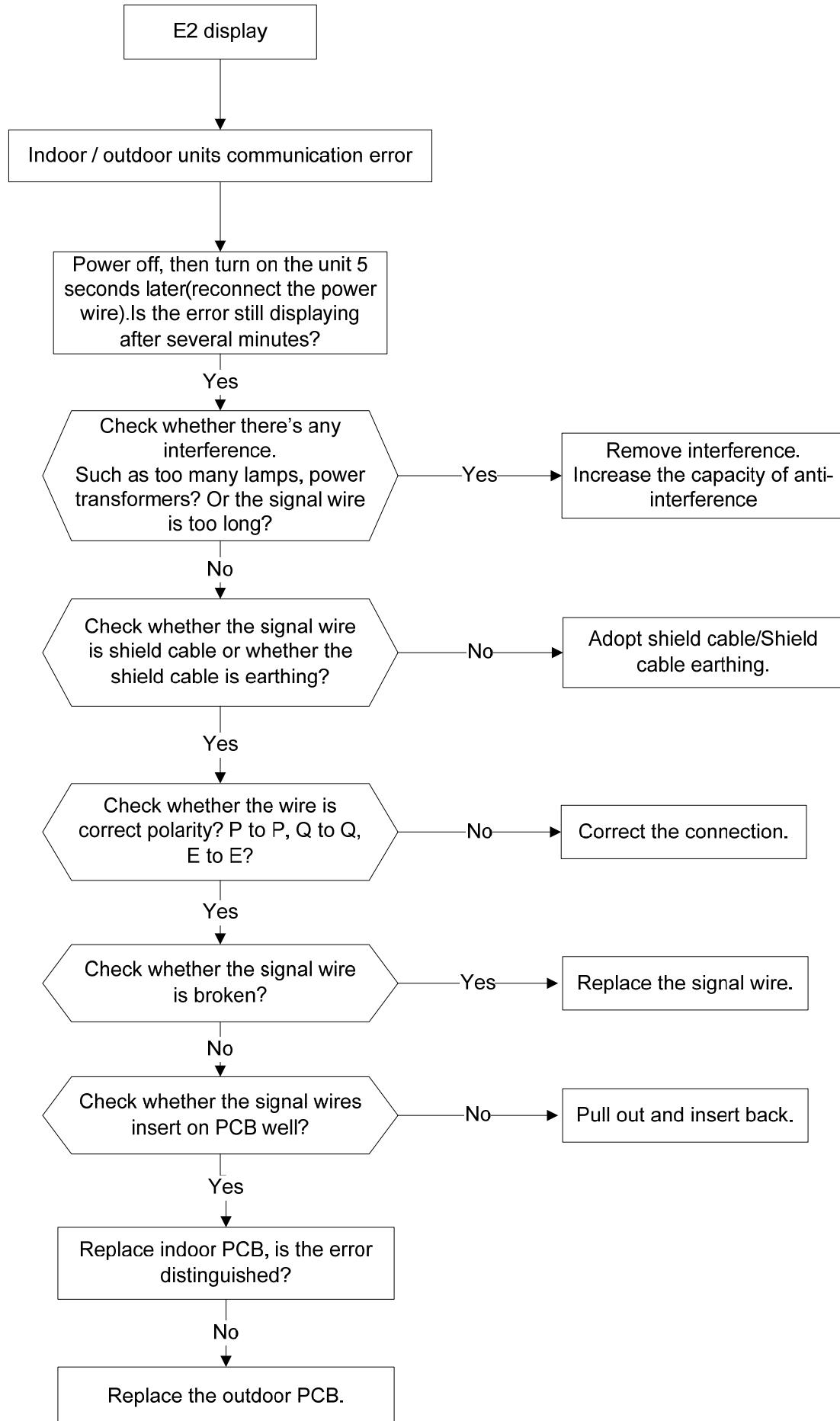


2.4.2 For the outdoor unit

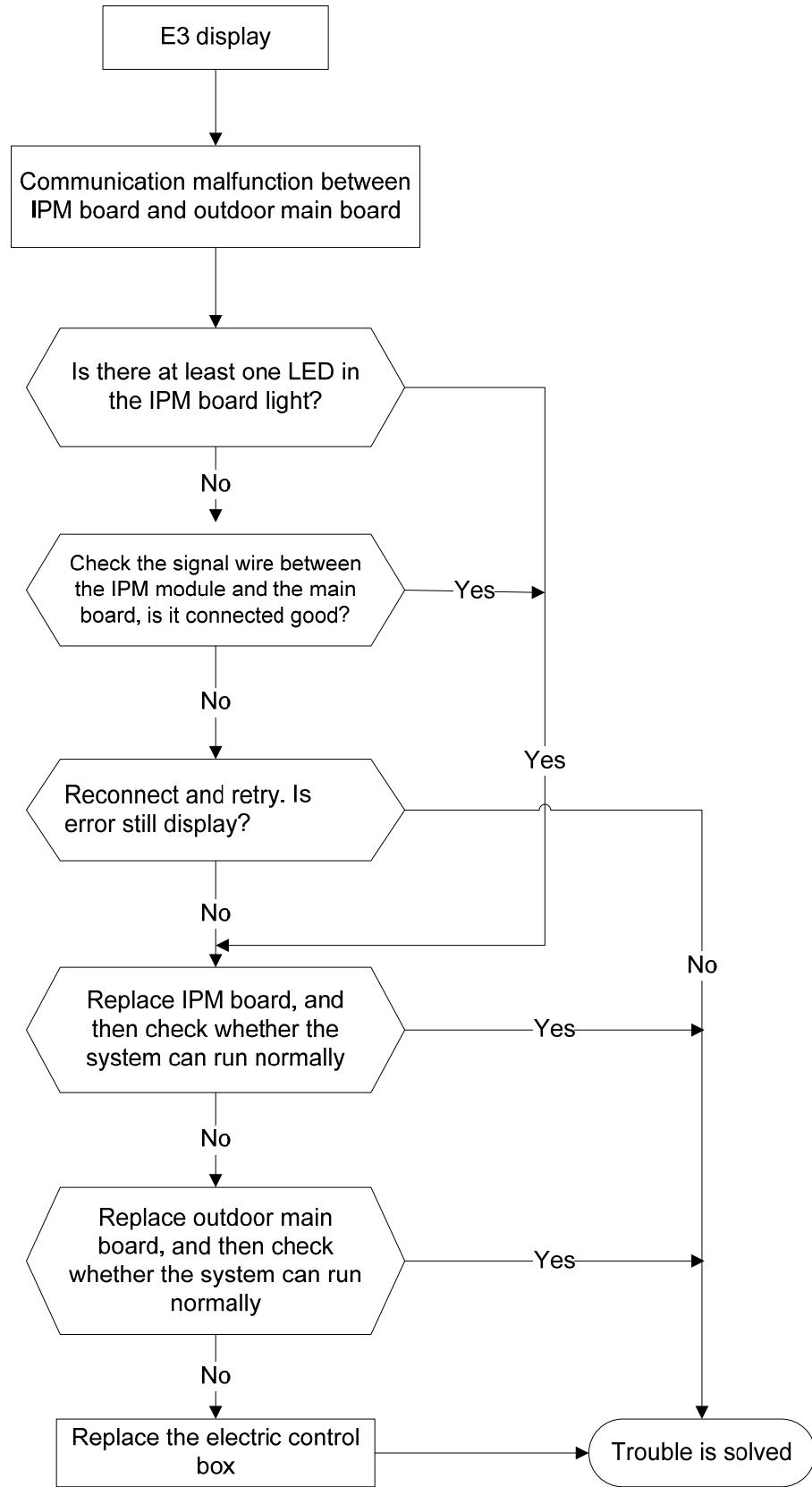
2.4.2.1. E0 malfunction



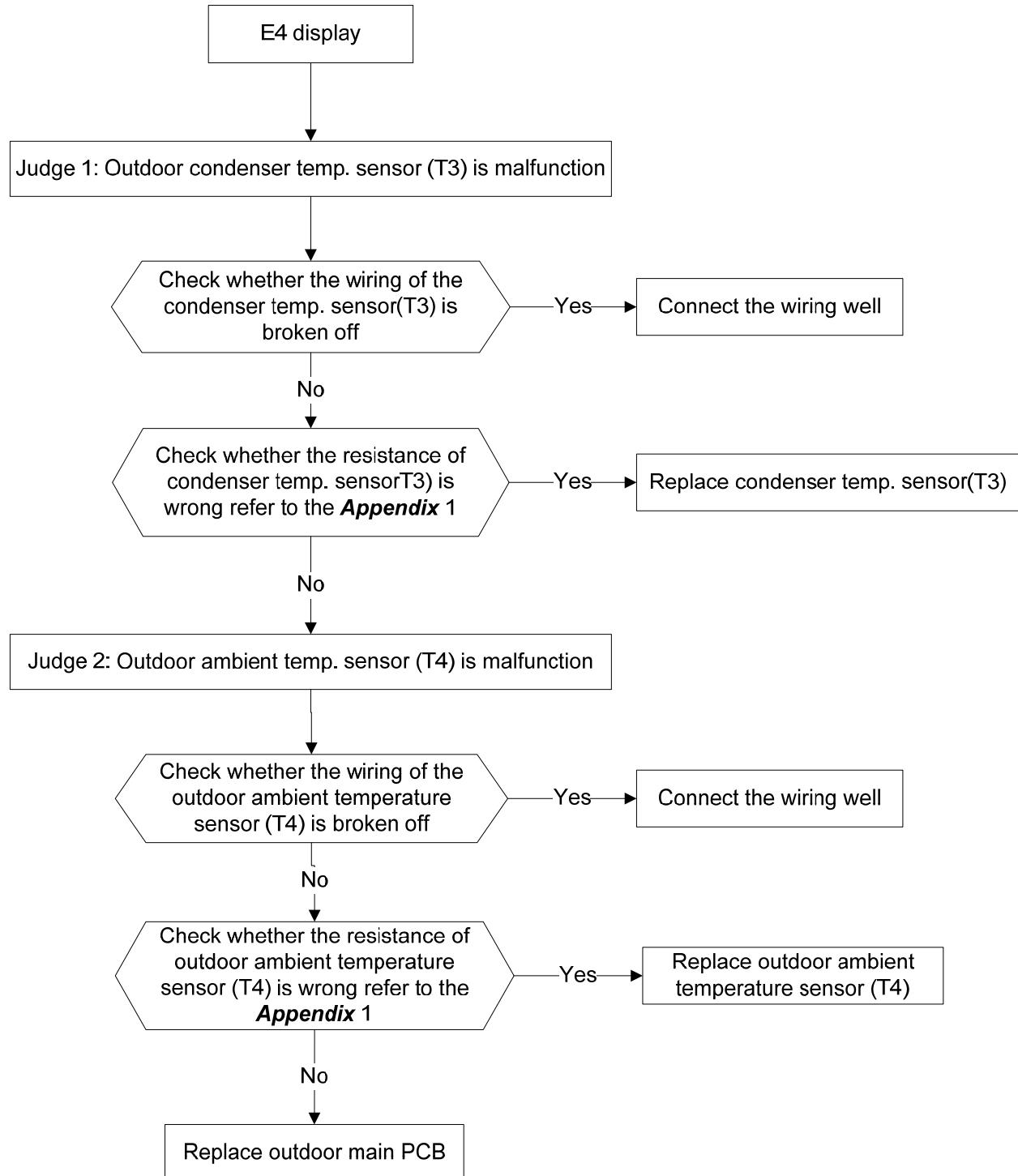
2.4.2.2. E2 malfunction



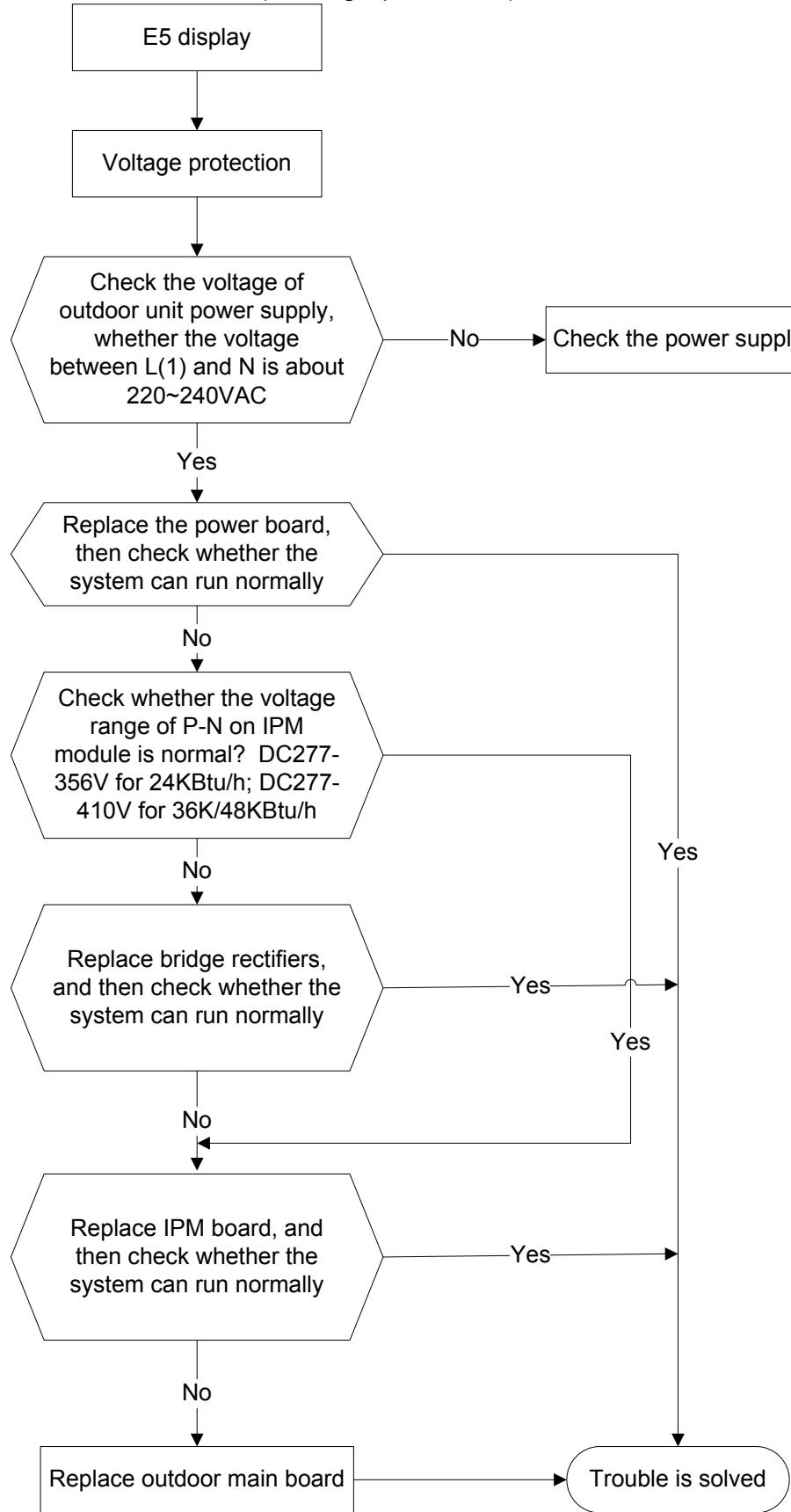
2.4.2.3. E3 malfunction



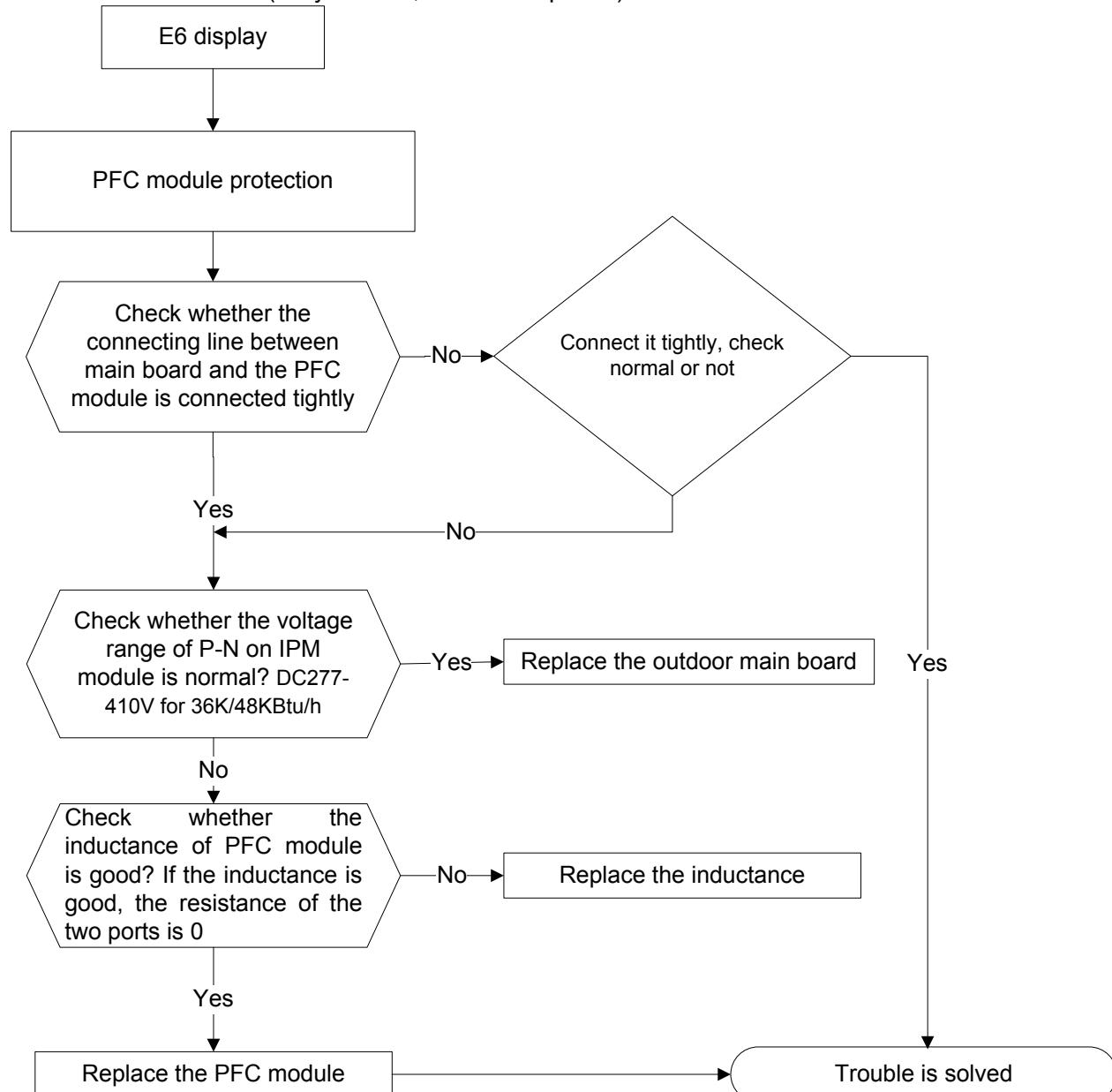
2.4.2.4. E4 malfunction



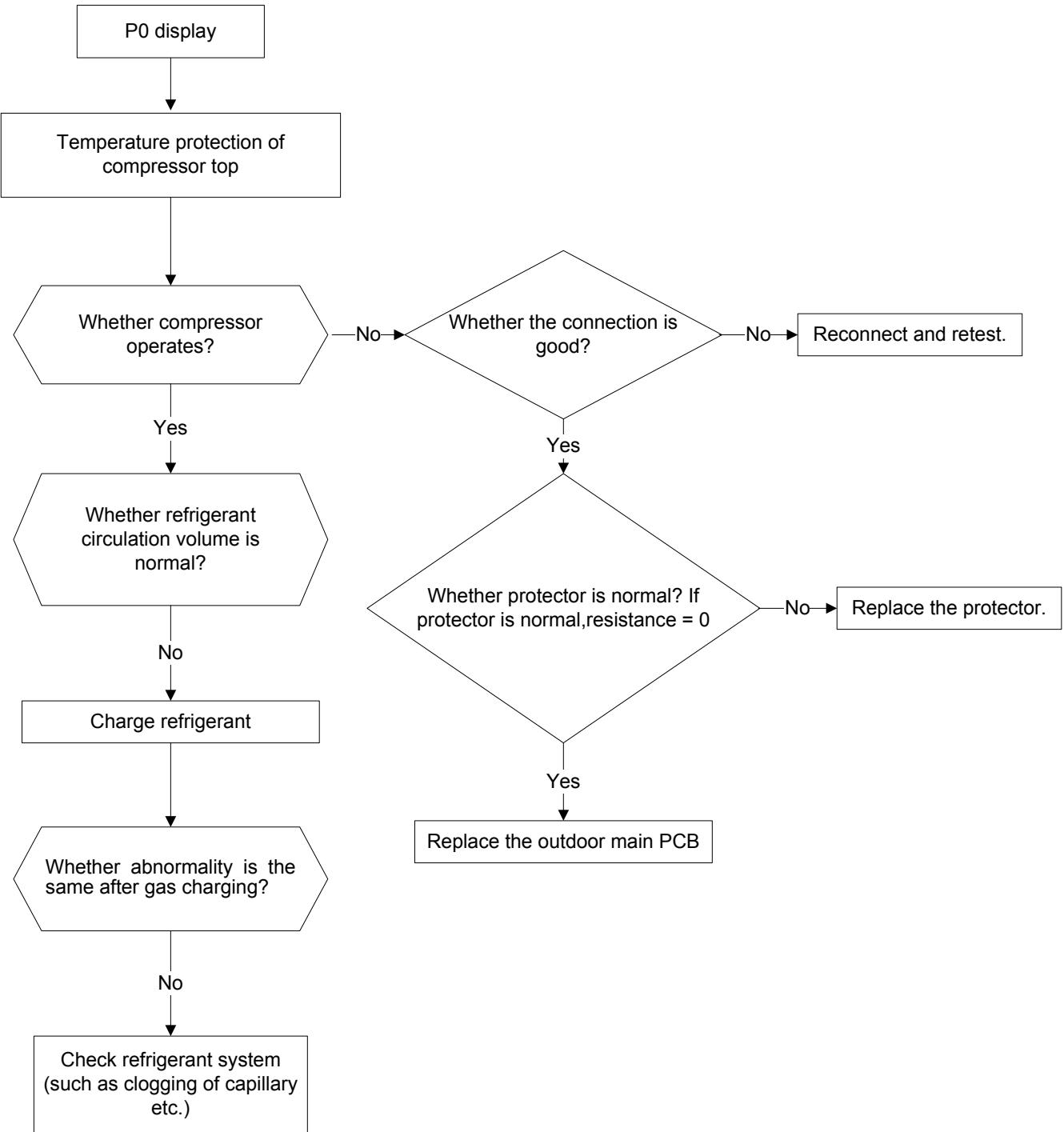
2.4.2.5. E5 malfunction(For single phase units)



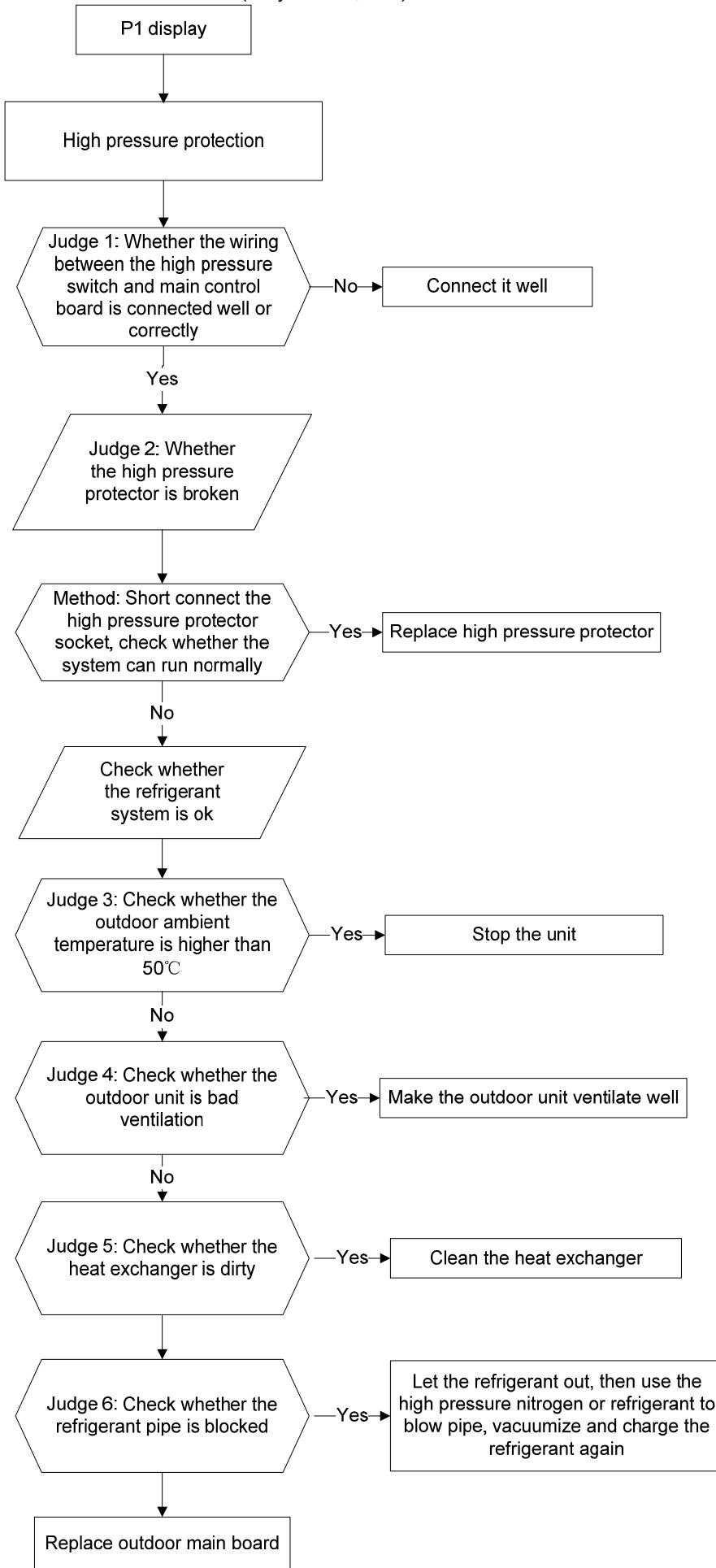
2.4.2.6. E6 malfunction (Only for 36K, 48K with 1 phase)



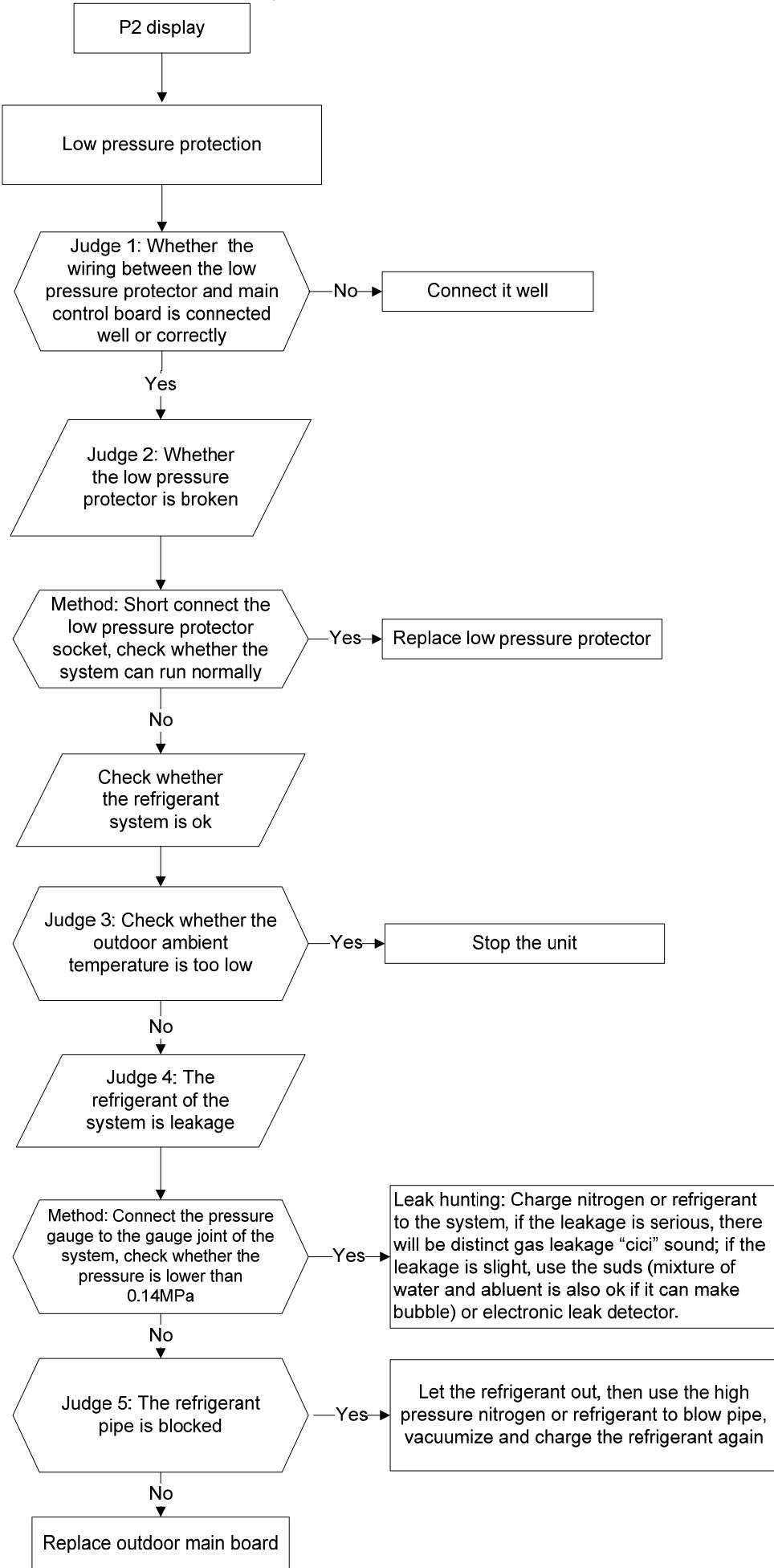
2.4.2.7. P0 malfunction



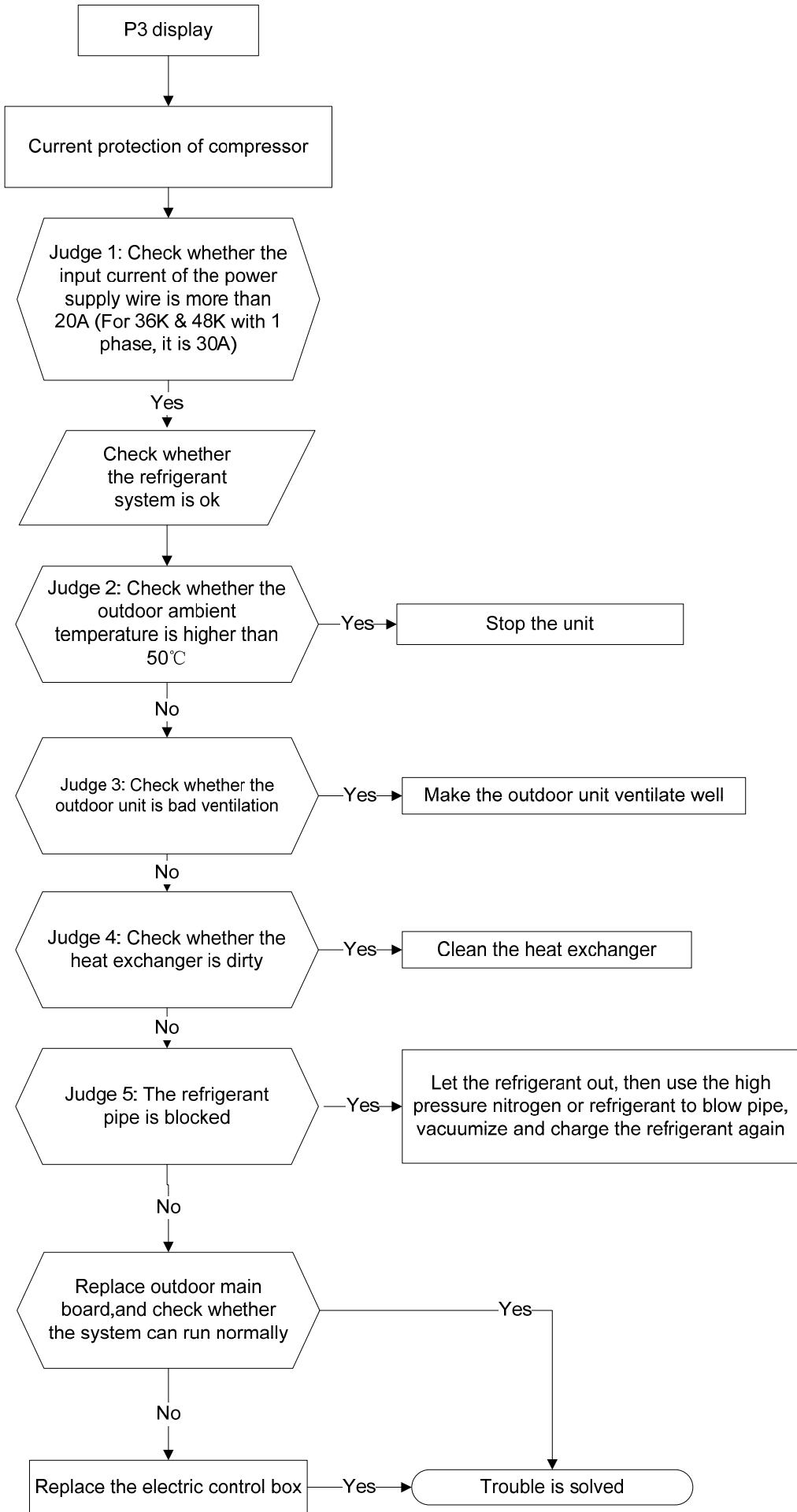
2.4.2.8. P1 malfunction (Only for 36K, 48K)



2.4.2.9. P2 malfunction (Only for 36K, 48K)

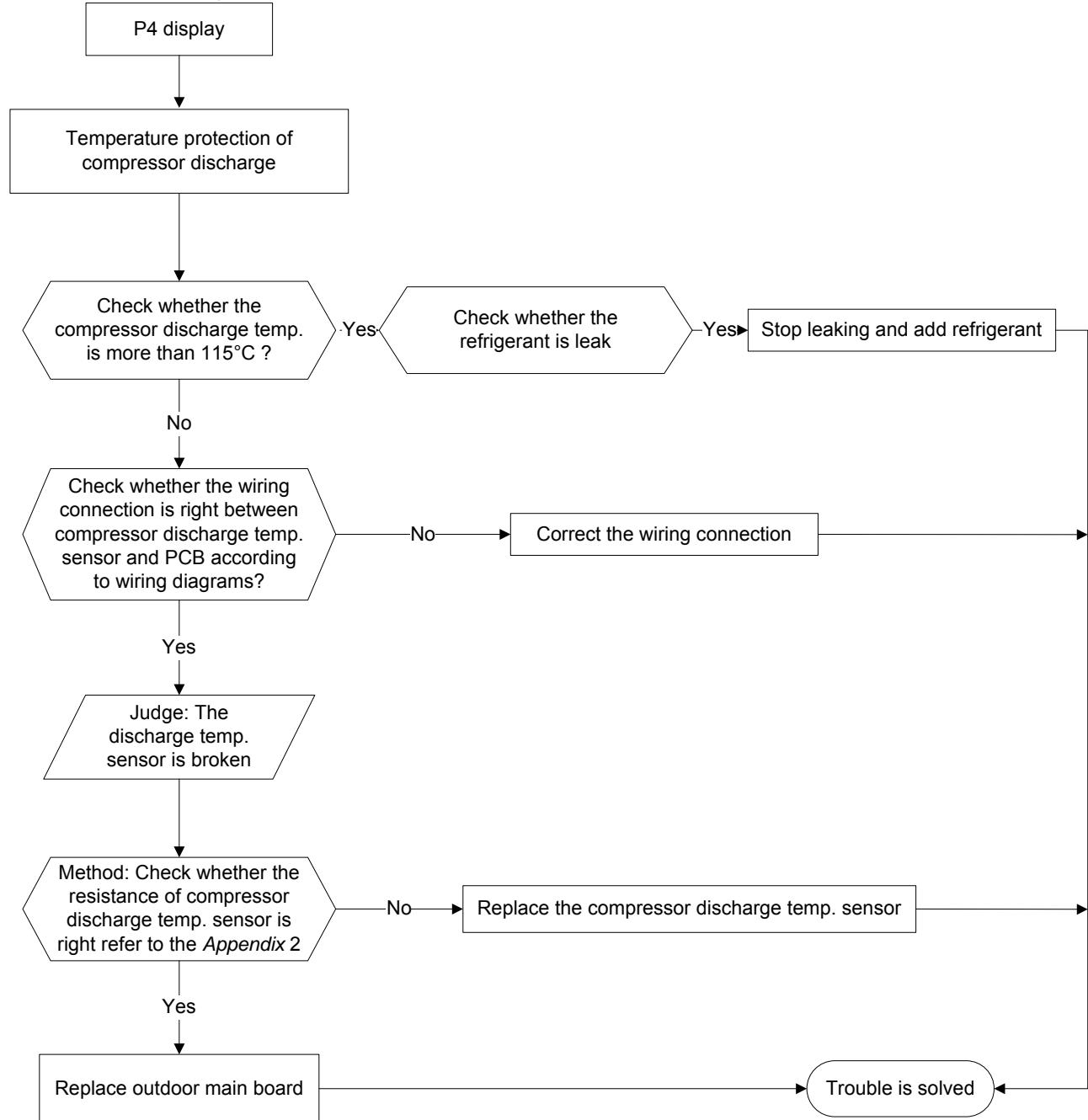


2.4.2.10. P3 malfunction



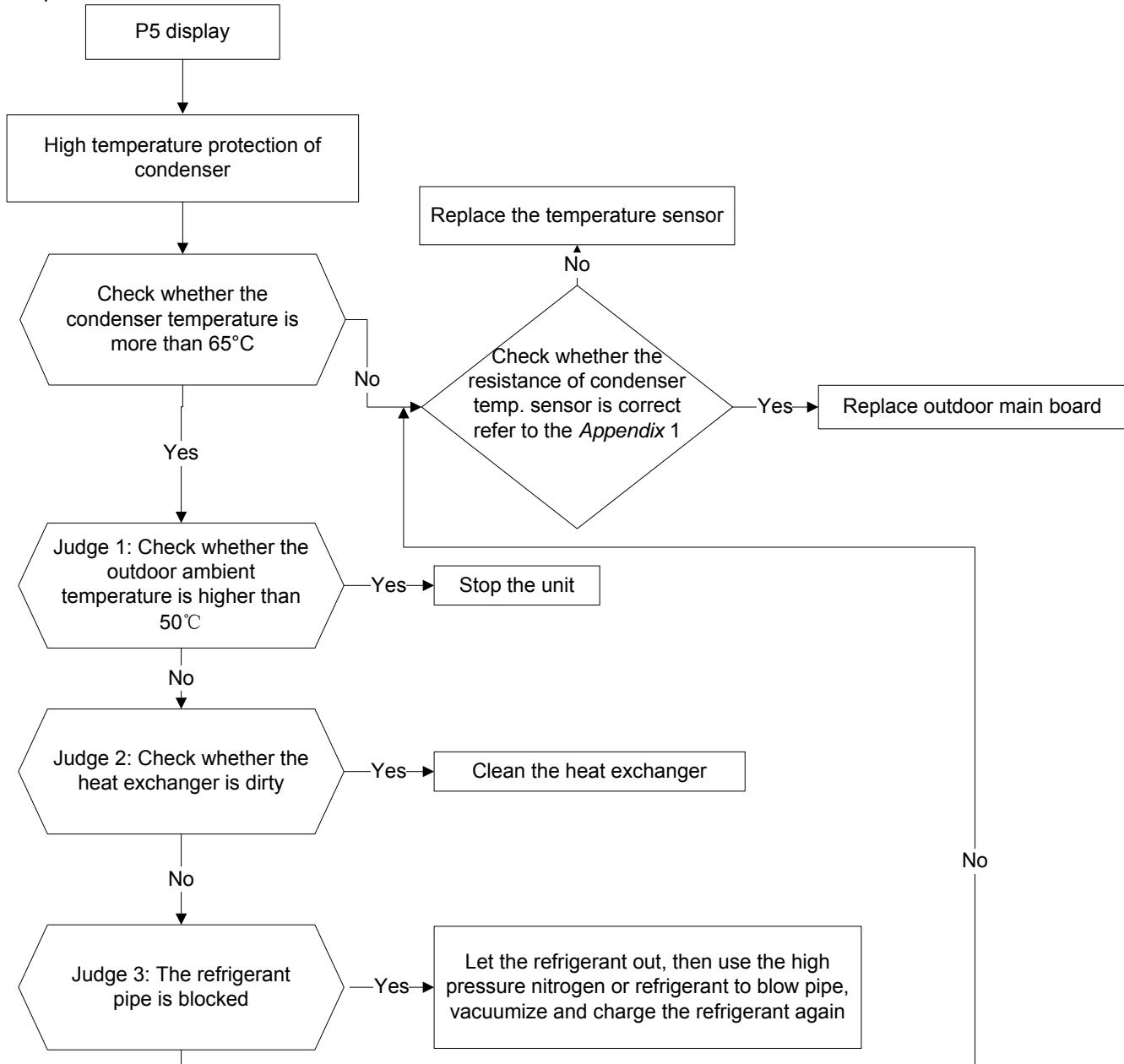
2.4.2.11. P4 malfunction

When compressor discharge temperature is higher than 115°C, the unit will stop, and unit runs again when compressor discharge temperature is lower than 90°C.

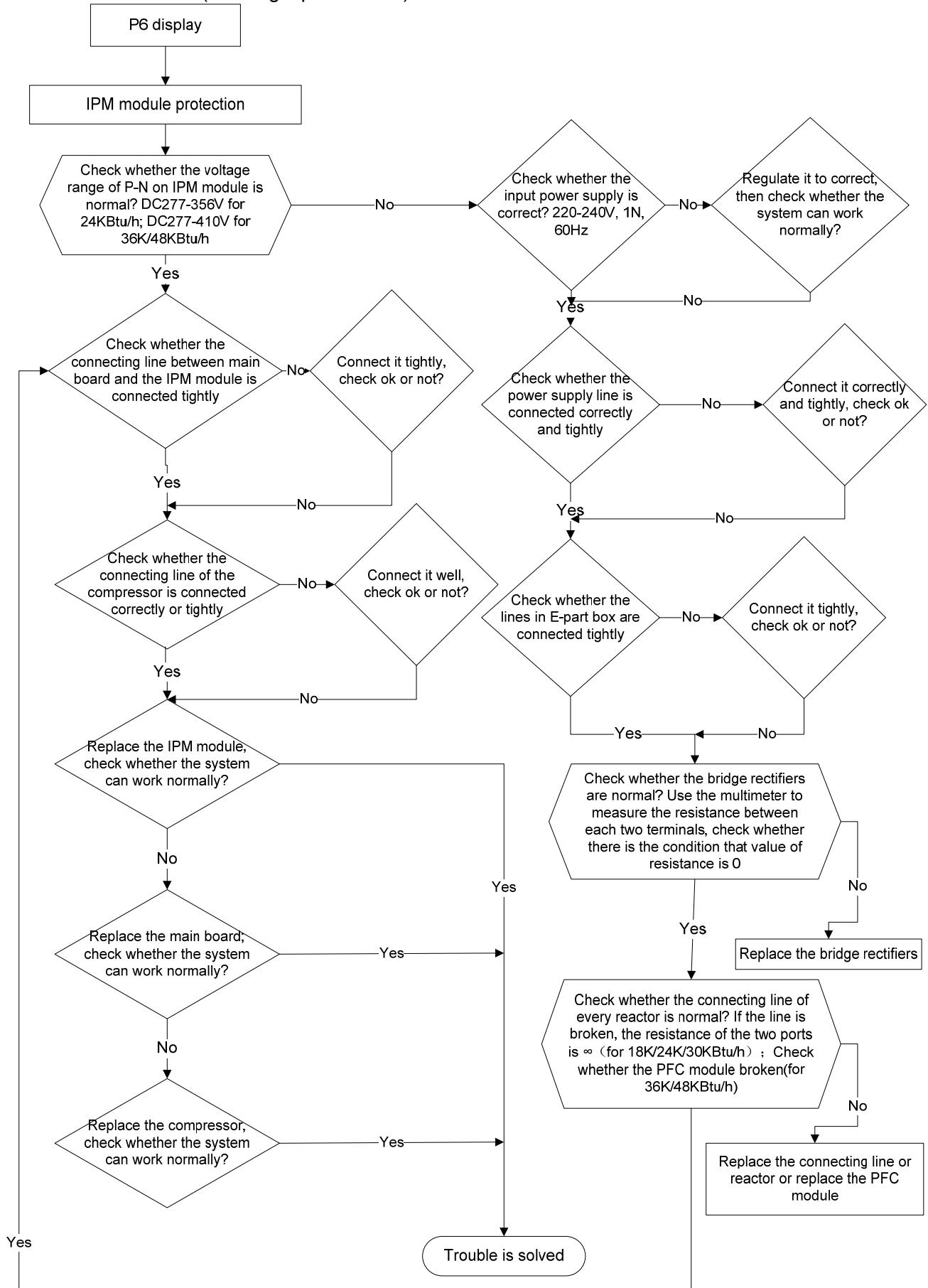


2.4.2.12. P5 malfunction

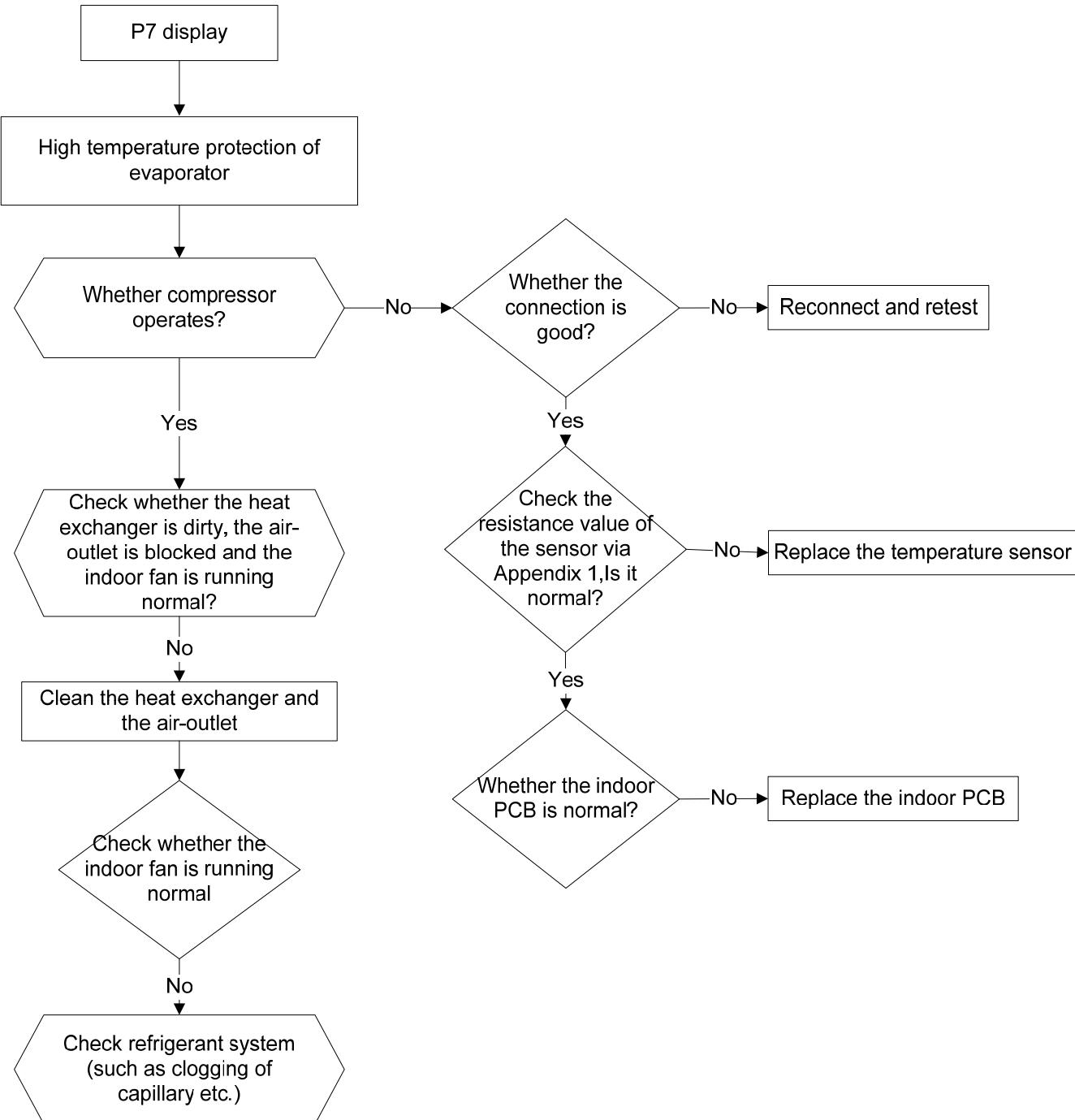
When condenser high temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.



2.4.2.13. P6 malfunction (For single phase units)



2.4.2.14. P7 malfunction



Appendix 1 Temperature Sensor Resistance Value Table (°C--K)

°C	K Ohm	°C	K Ohm	°C	K Ohm	°C	K Ohm
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

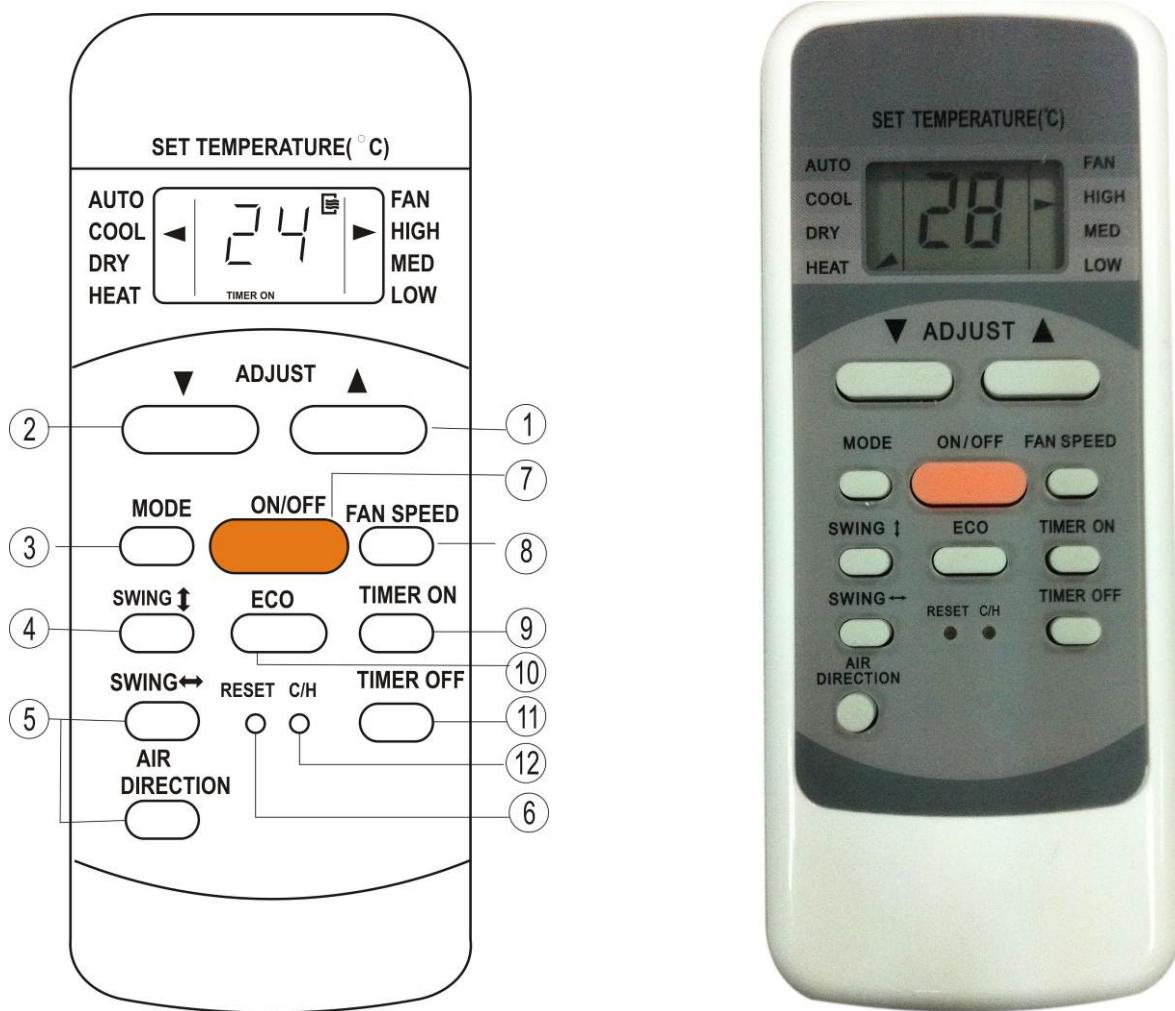
Appendix 2

Unit: °C---K		Discharge temp. sensor table					
-20	542.7	20	68.66	60	13.59	100	3.702
-19	511.9	21	65.62	61	13.11	101	3.595
-18	483	22	62.73	62	12.65	102	3.492
-17	455.9	23	59.98	63	12.21	103	3.392
-16	430.5	24	57.37	64	11.79	104	3.296
-15	406.7	25	54.89	65	11.38	105	3.203
-14	384.3	26	52.53	66	10.99	106	3.113
-13	363.3	27	50.28	67	10.61	107	3.025
-12	343.6	28	48.14	68	10.25	108	2.941
-11	325.1	29	46.11	69	9.902	109	2.86
-10	307.7	30	44.17	70	9.569	110	2.781
-9	291.3	31	42.33	71	9.248	111	2.704
-8	275.9	32	40.57	72	8.94	112	2.63
-7	261.4	33	38.89	73	8.643	113	2.559
-6	247.8	34	37.3	74	8.358	114	2.489
-5	234.9	35	35.78	75	8.084	115	2.422
-4	222.8	36	34.32	76	7.82	116	2.357
-3	211.4	37	32.94	77	7.566	117	2.294
-2	200.7	38	31.62	78	7.321	118	2.233
-1	190.5	39	30.36	79	7.086	119	2.174
0	180.9	40	29.15	80	6.859	120	2.117
1	171.9	41	28	81	6.641	121	2.061
2	163.3	42	26.9	82	6.43	122	2.007
3	155.2	43	25.86	83	6.228	123	1.955
4	147.6	44	24.85	84	6.033	124	1.905
5	140.4	45	23.89	85	5.844	125	1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1.762
8	121	48	21.26	88	5.32	128	1.717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90	5	130	1.632
11	104.6	51	18.96	91	4.849		
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/50)=3950K	
16	82.54	56	15.73	96	4.167		
17	78.79	57	15.16	97	4.045	R(90°C)=5KΩ±3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		

3. Controller

3.1 Wireless Remote Controller

3.1.1 RG51Q1/BGE



General Function for wireless remote controller:

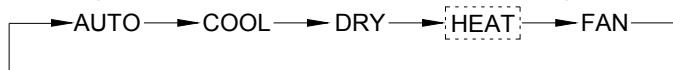
Model	RG51Q1/BGE
Rated voltage	3.0V(2pieces of LR03 7# batteries)
Min voltage for sending signal of CPU	2.4V
Effective receiving distance	8m~11m
Operation condition	-5~60°C

Buttons and functions

1. Adjust ▼ : Decrease the set temp. Keeping pressing will decrease the temp with 1°C per 0.5s.

2. Adjust ▲ : Increase the set temp. Keeping pressing will increase the temp with 1°C per 0.5s.

3. MODE: Once pressing, running mode will be selected in the following sequence:



NOTE: No heating mode for cool only type unit.

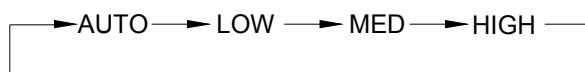
4. VERT SWING: Used to stop or start horizontal louver movement or set the desired up/down air flow direction. The louver changes 6 degree in angle for each press. If keep pushing more than 2 seconds, the louver will swing up and down automatically.

5. HORIZ SWING: Used to stop or start vertical louver movement.

6. AIR DIRECTION: Used to set the desired up/down air flow direction. The louver changes 6 degree in angle for each press.

7. ON/OFF: For turning on or turning off the air conditioner.

8. FAN SPEED: Fan speed will be selected in following sequence once pressing this button:



9. TIME ON: For time ON setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour. Adjusting the figure to 0.00 will cancel time ON setting.

10. ECO: Activate or turn off economic operation mode. It is suggested to turn on this function when sleeping. (Only available when remote controller is used with corresponding unit.)

11. TIME OFF: For time OFF setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour.

Adjust the figure to 0.00 will cancel time ON setting.

12. C/H (inner located): Press this button with a needle of 1mm to shift the mode between Cooling only and Cooling & Heating according to the feature of the machine.

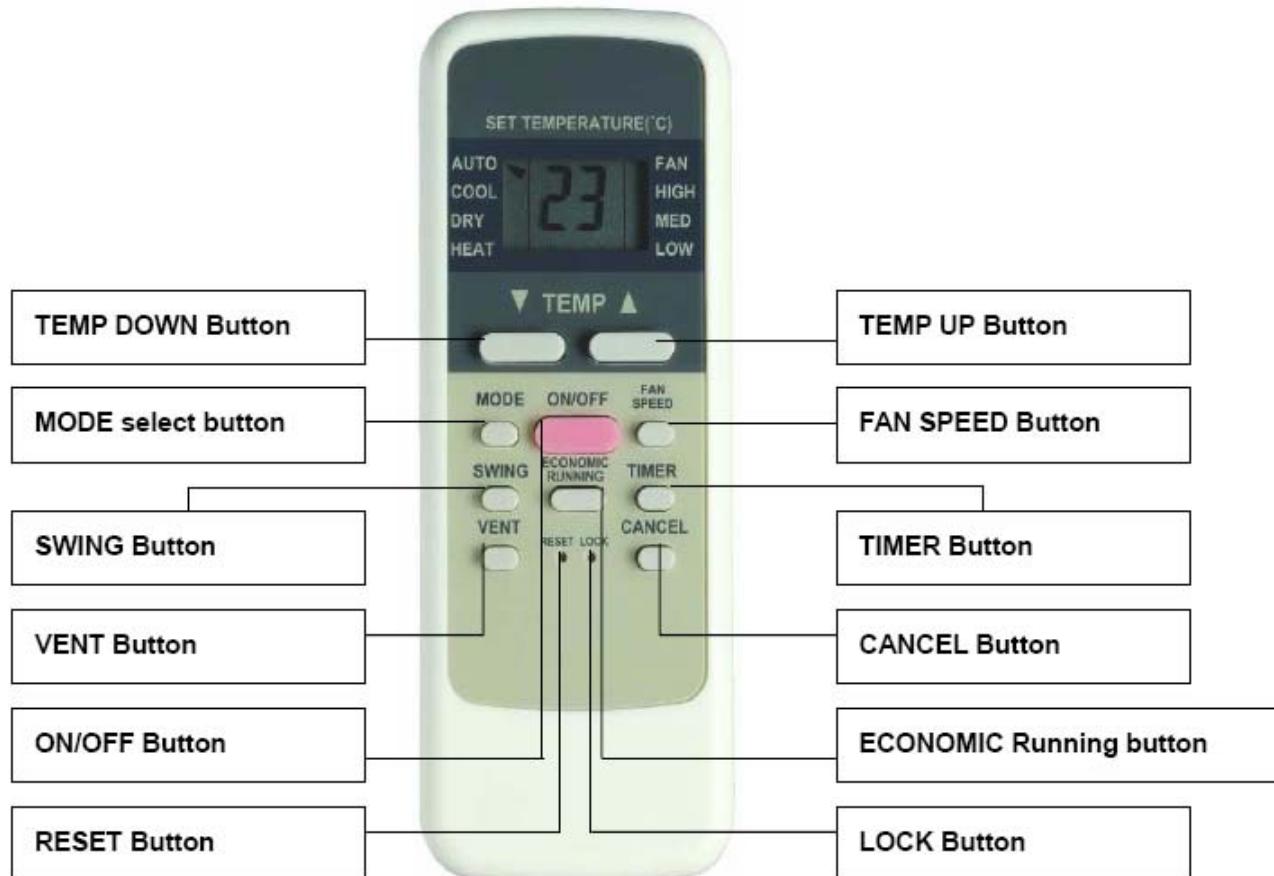
13. RESET (inner located): Press this button with a needle of 1mm to cancel the current setting and reset remote controller.

3.1.2 R51/E

Remote Controller Specifications

Model	R51/E
Rated Voltage	3.0V
Lowest Voltage of CPU Emitting Signal	2.0V
Reaching Distance	8m (when using 3.0 voltage, it can get 11m)
Environment Temperature Range	-5°C ~ 60°C

Introduction of Function Buttons on the Remote Controller



1. TEMP DOWN Button: Push the TEMP DOWN button to decrease the indoor temperature setting or to adjust the timer in a counter-clockwise direction.

2. MODE SELECT Button: Each time you push the button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, HEAT and FAN as the following figure indicates:



▲NOTE: HEAT only for Heat Pump

3. SWING Button: Push this switch button to change the louver angle.

4. RESET Button: When the RESET button is pushed, all of the current settings are cancelled and the control will return to the initial settings.

5. ECONOMIC RUNNING Button: Push this button to go into the Energy-Saving operation mode.

6. LOCK Button: Push this button to lock in all the current settings. To release settings, push again.

7. CANCEL Button: Push this button to cancel the TIMER settings.

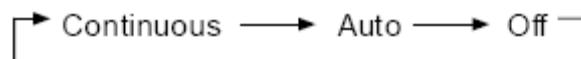
8. TIMER Button: This button is used to preset the time ON (start to operate) and the time OFF (turn off the operation)

9. ON/OFF Button: Push this button to start the unit operation. Push the button again to stop the unit operation.

10. FAN SPEED Button: This button is used for setting fan speed in the sequence that goes from AUTO, LOW, MED to HIGH, and then back to Auto.

11. TEMP UP Button: Push this button to increase the indoor temperature setting or to adjust the timer in a counter-clockwise direction.

12. VENT Button: Push this button to set the ventilating mode. The ventilating mode will operate in the following sequence:

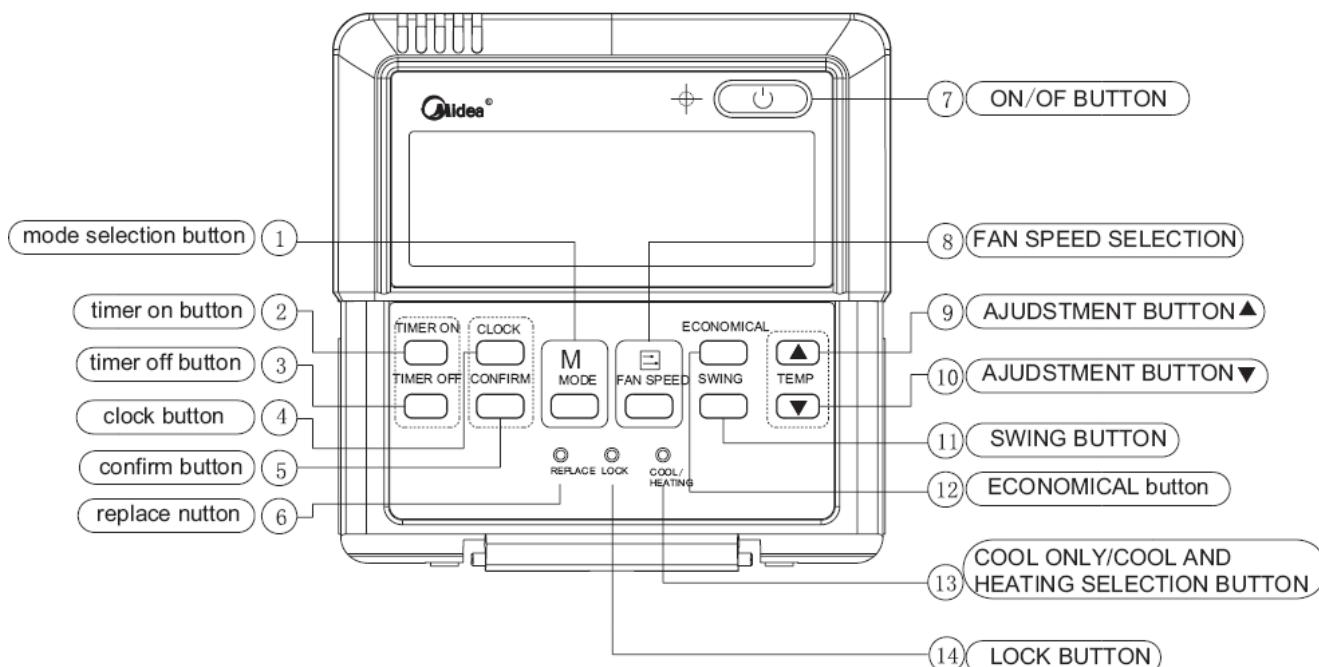


Ventilation Function is available for the Fresh Star Series.

3.2 Wired Remote Controller

3.2.1 KJR-10B

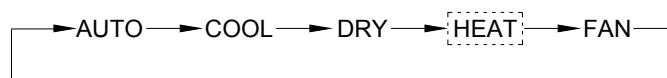
Name and functions of buttons on the wire controller



1 mode selection button:

It is used to select mode, push the button one time, then the operation modes will change

In turn as follows:



Remark: no heating mode if wire controller is set as the cool only.

2 Timer on button:

Push the button to set TIMER ON, each time you push the button the time moves forward by 0.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0

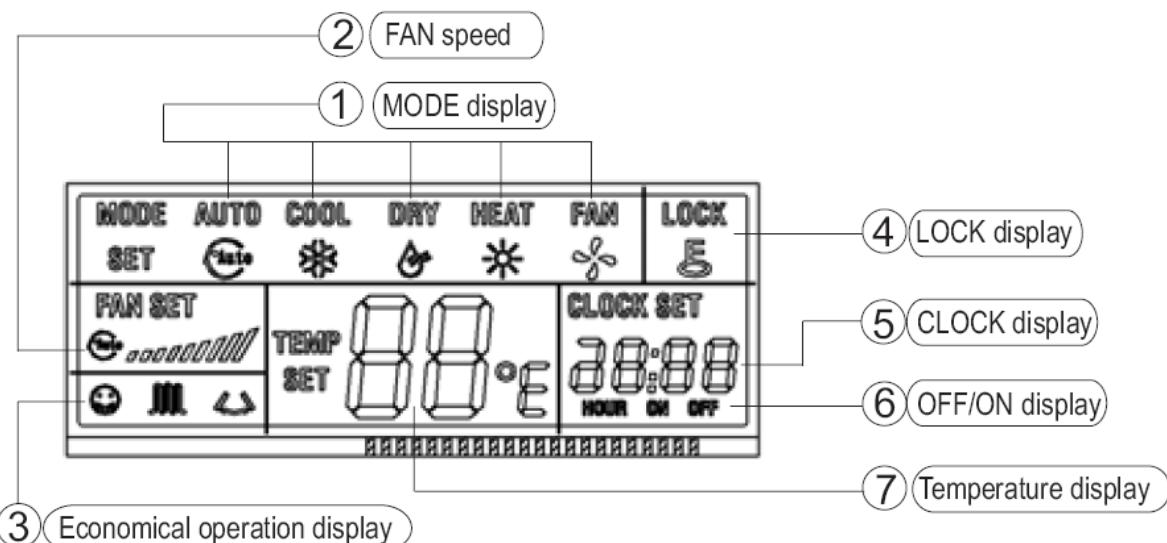
3 Timer off button:

Push the button to set TIMER OFF, each time you push the button the time moves forward by 0.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0

4 CLOCK button:

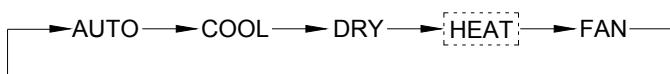
Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When push the button for 4 seconds, the hour part on the clock display flashes every 0.5 seconds, then push button and to adjust hour; push the button CLOCK again, the minute part flashes every 0.5 seconds, then push and button to adjust minute. When set clock or alter clock setting, must push the confirm button to complete the setting

Name and function of LCD on the wire controller



1 Mode select button (MODE):

Press MODE button to select "COOL", "DRY" , "HEAT", or "FAN ONLY" mode.(HEAT is invalid for COOL ONLY wire controller.)



2 Fan speed button (FAN SPEED)

Press FAN SPEED to select fan speed from "AUTO", "LOW", "MED" , and "HIGH". NOTE: some air conditioners have no MED fan speed, and then the MED is regarded as HIGH.

3 Economical operation displays:

Press ECONOMICAL to display economical operation, if press ECONOMICAL again then the display disappears

4 Lock display

Press LOCK to display the icon of LOCK. Press the button again then the icon of LOCK disappears. In the mode of LOCK, all the buttons are invalid except for LOCK button.

5 CLOCK display.

Usually display the clock set currently. Press the button CLOCK for 4 seconds, the HOUR part will flash, press button ▲ and ▼ to adjust HOUR. Press the button CLOCK again, the minute part flash, press

button **▲** or **▼** to adjust MINUTE. After clock set or clock operation, it must press CONFIRM to complete the set.

6 TIMER ON/OFF display:

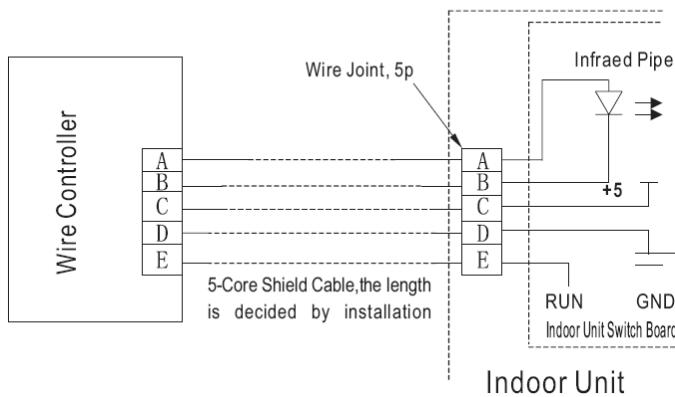
Display ON at the state of TIMER ON adjustment or after only set the TIMER ON; Display OFF at the state of TIMER OFF adjustment or after only set the TIMER OFF; Display ON/OFF if simultaneously set the mode of TIMER ON and TIMER OFF.

7 Temperature display area:

Usually display the set temperature. Press the buttons of **and** to set temperature, at the mode of FAN, there is no figure display in the area.

Installation

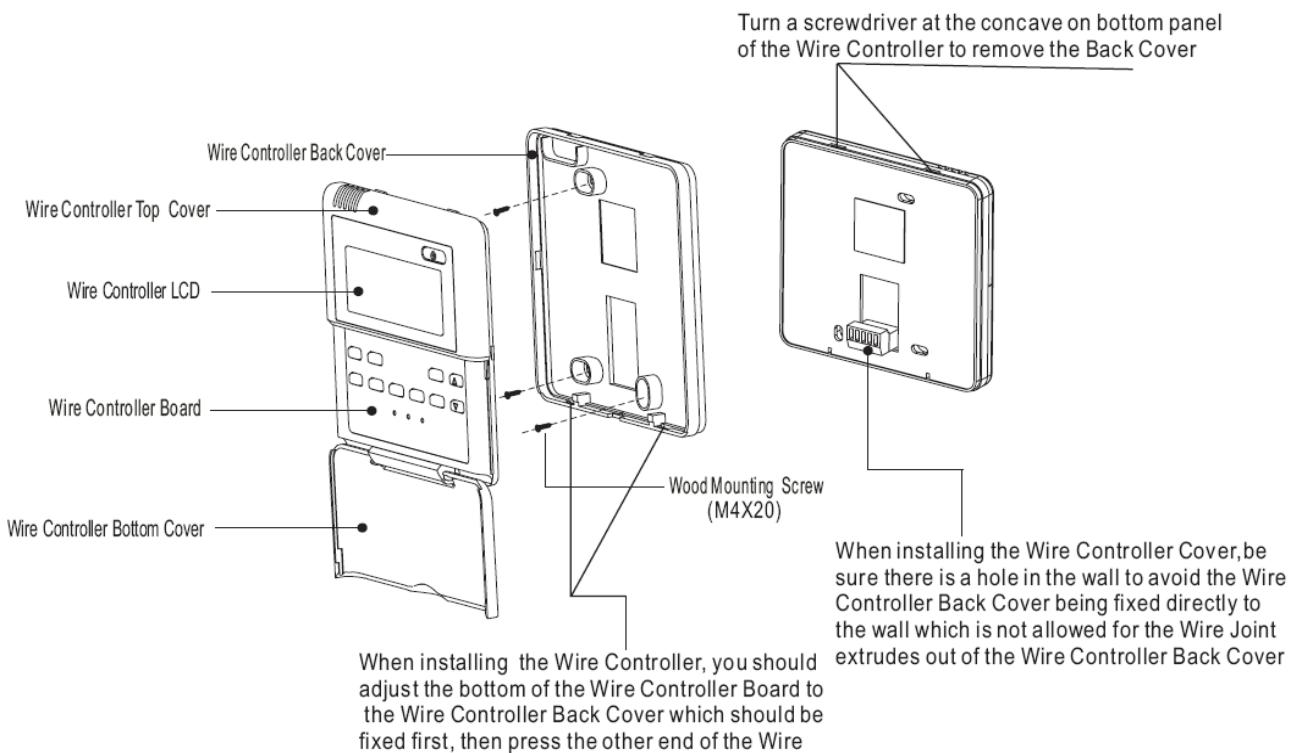
Wiring Principle Sketch:



Installation Notice:

When the air conditioner needs the constant frequency wire Controller, be sure adding a Wire Joint with 5 terminal named A, B, C, D, E in indoor unit, and fixing a infrared emitter whose anode and cathode connecting with A and B near the receiver in the Indoor Unit Switch Board, then connecting the terminal +5v, GND, Run in the Switch Board to C,D,E respectively.

Judge 1:
Indoor temp.
sensor is
abnormal
Running
lamp flashes



NOTE

Never turn screws too tightly, or else the cover would be dented or the Liquid Crystal breaks.

Please leave enough long cable for maintenance of the Wire Controller Board.

※The specifications, designs, and information in this book are subject to change without notice for product improvement.