



Australian Products

SUPER DC INVERTER SERIES

Service Manual 2014

Applied Models

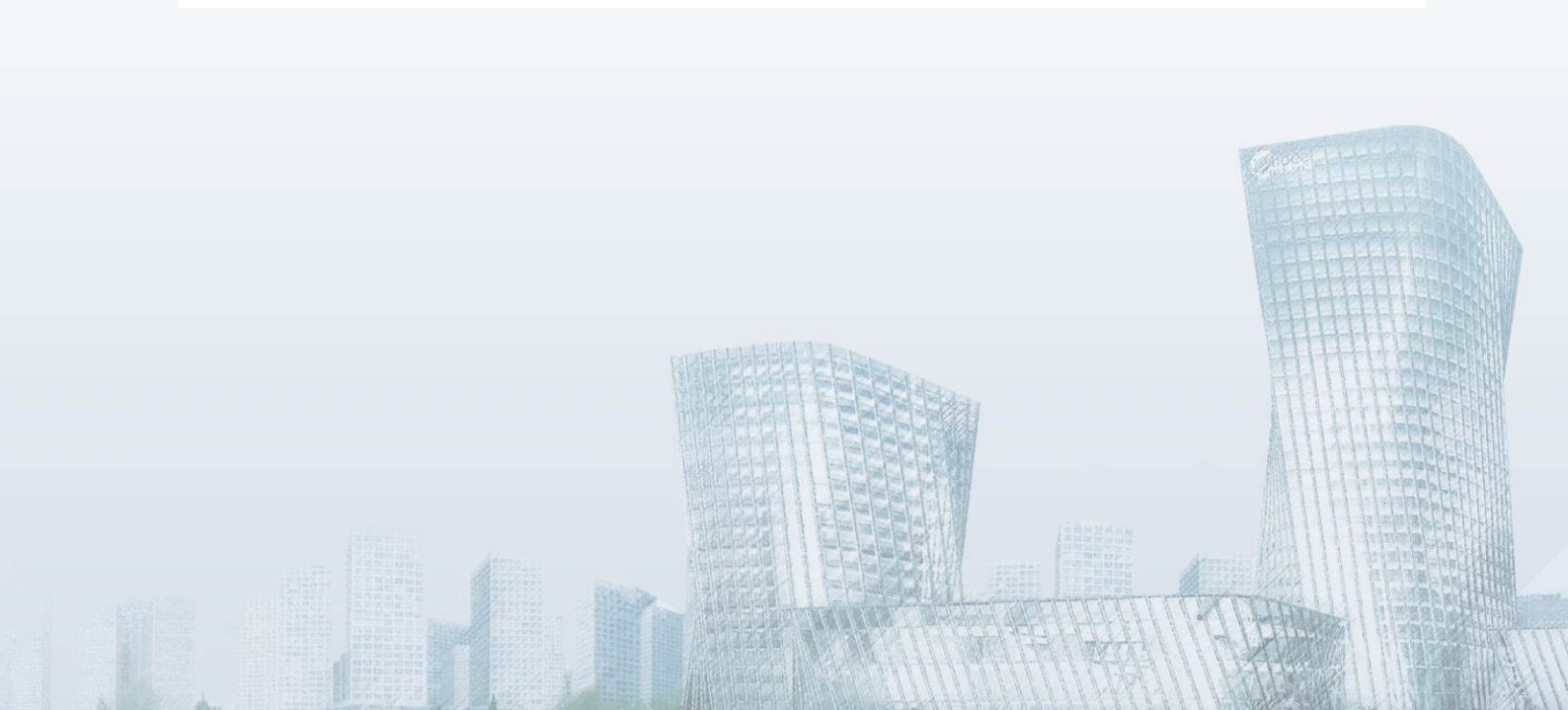
MHG-24HWFN1-Q / MOU-24HFN1-Q

MHG-30HWFN1-Q / MOU-30HFN1-Q

MHG-36HWFN1-Q / MOU-36HFN1-Q

MHG-48HWFN1-Q / MOU-48HFN1-Q

MHG-60HWFN1-Q / MOU-60HFN1-Q



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

Part 1

General Information

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1. Model Lists

1.1 Indoor Units

R410A (capacity multiplied by 1000Btu/h)

Type	Function	24	30	36	48	60
High static pressure duct	Cooling and heating	●	●	●	●	●

1.2 Outdoor Units

Universal Outdoor unit Model	Compressor type	Compressor Brand	Matched indoor units
MOU-24HFN1-Q	Rotary	GMCC	MHG-24HWDN1-Q
MOU-30HFN1-Q	Rotary	GMCC	MHG-30HWFN1-Q
MOU-36HFN1-Q	Rotary	Mitsubishi	MHG-36HWFN1-Q*1
MOJU-36HFN1-Q	Rotary	Mitsubishi	MHG-36HWFN1-Q*2
MOU-48HFN1-Q	Rotary	Mitsubishi	MHG-48HWFN1-Q
MOU-60HFN1-Q	Scroll	Mitsubishi	MHG-60HWFN1-Q

2. External Appearance

2.1 Indoor Units

High static pressure duct



2.2 Outdoor Units



Single fan outdoor unit

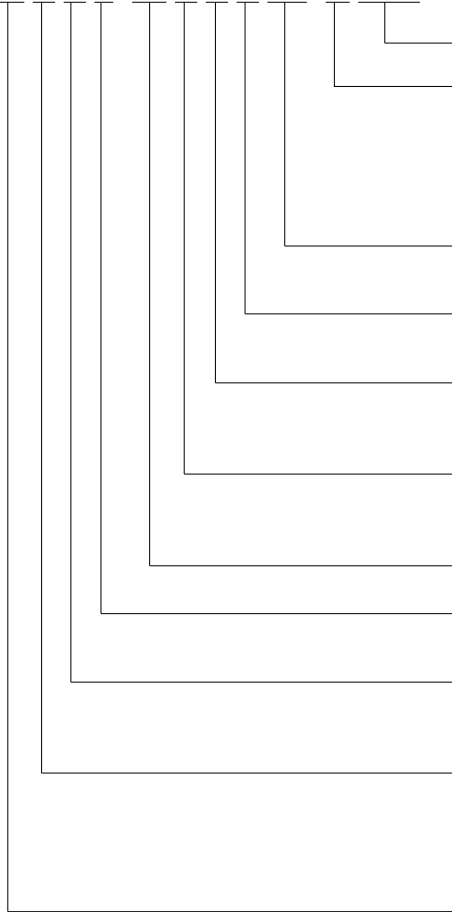


Double fan outdoor unit

3. Nomenclature

3.1 Indoor Unit

M U B T- 36 H R D N1- Q RC4



Energy Efficiency Code

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

Control Mode

- W Wired Control E Electric Control
- M Mechanical Control R Remote Control

Function Code

- C Cooling Only H Cooling & Heating
- A Cooling & Heating+PTC

Capacity (x1000Btu/h)

T Tropical Condition
-- T1 Condition

Designed Time

- A Time A Designed B Time B Designed
- C Time C Designed D Time D Designed

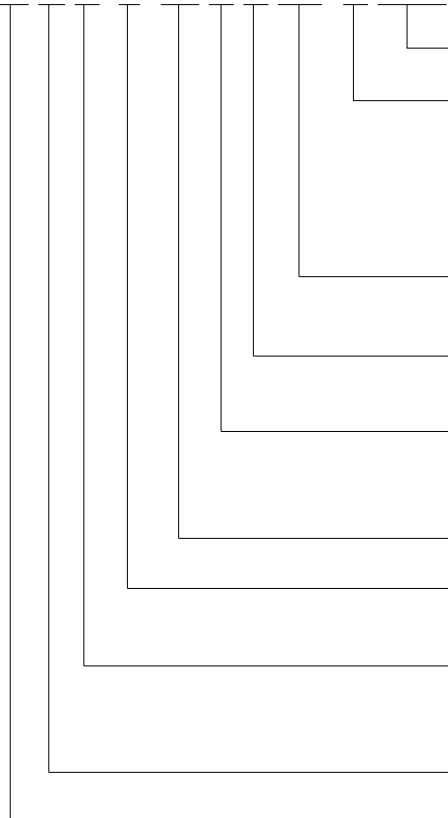
Product Category

- C Cassette Type V AHU Type
- T Duct Type F Console 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 RC4



Energy Efficiency Code

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 (x1000Btu/h)

T Tropical Condition
-- T1 Condition

- U Side Discharge Outdoor Unit
- V Top Discharge Outdoor Unit
- S Centrifugal Fan Outdoor Unit

O Outdoor unit

Midea

4. Features

- 4.1. To meet Europe A level, actual EER/COP of new product with BLDC motors of indoor & outdoor unit and DC compressor will be higher than 3.4.
- 4.2. Low ambient kit is standard for outdoor units.
- 4.3. Network control function is standard for the indoor units.
- 4.4. Standard auto restart function and follow me function.
- 4.5. Slim cassette with standard remote controller, wire controller and CCM for optional. Med ESP Duct and High ESP duct with standard wired controller, remote controller and CCM for optional.
- 4.6. Standard anti-cold air function.
- 4.7. Standard auto defrosting function.
- 4.8. Standard self-diagnose function.
- 4.9. Standard timer function and sleep mode function controlled by controller.

Part 2

Indoor Units

High Static Pressure Duct Type7

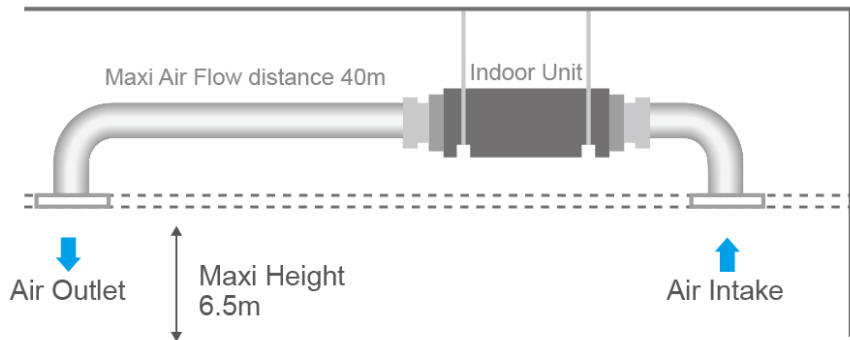
High Static Pressure Duct Type

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1. Features

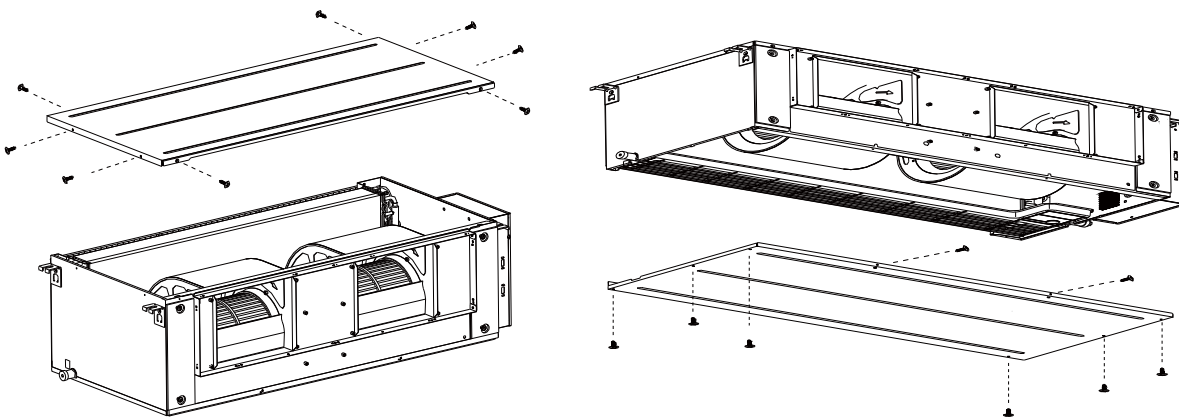
1.1 High static pressure design

- Max static pressure of indoor unit is 200Pa.
- The longest distance of air supply is 40m, the max height of air supply is 6.5m.
- Specially recommended for spacious and large rooms like large stores and factories.



1.2 Easy maintenance

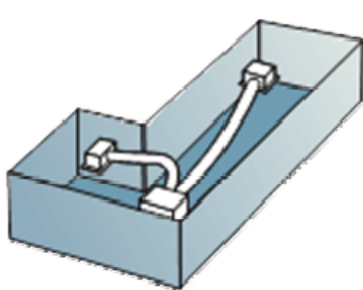
- The unit can be opened from top or bottom.



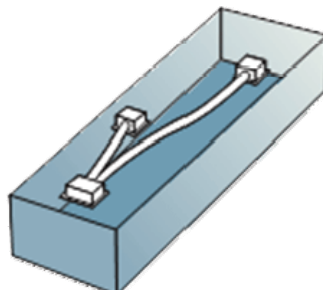
- The air outlet flange is isolated from either top panel or base panel, which makes the maintenance much easier when connecting duct.

1.3 Flexible Installation

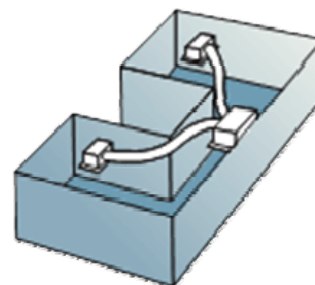
- Different solutions for any shape room by using kinds of air distribution ducts.



L-shaped



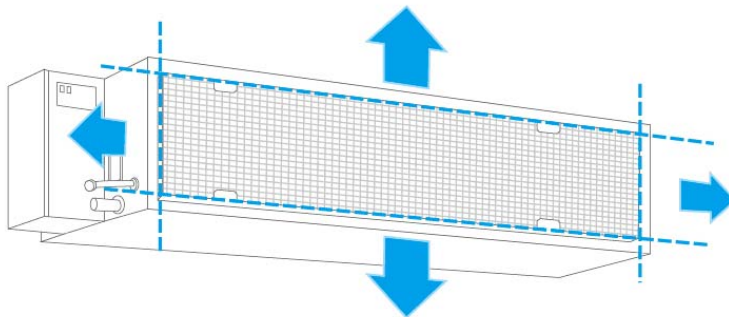
Areas far apart



Y-shaped

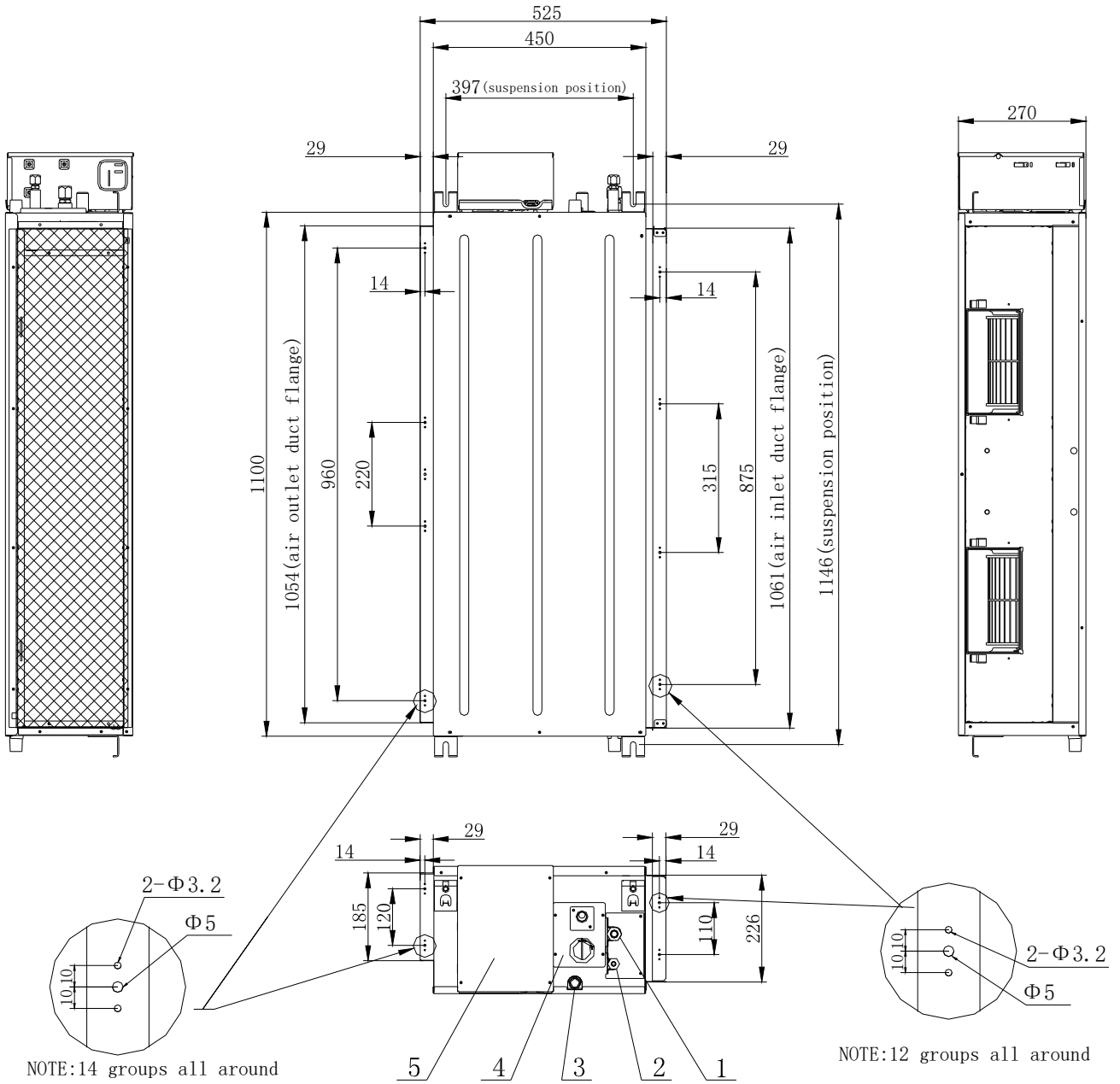
1.4 Easy cleaning filter (Optional)

- The filter can be easily removed or installed from the rear side for ease of cleaning.

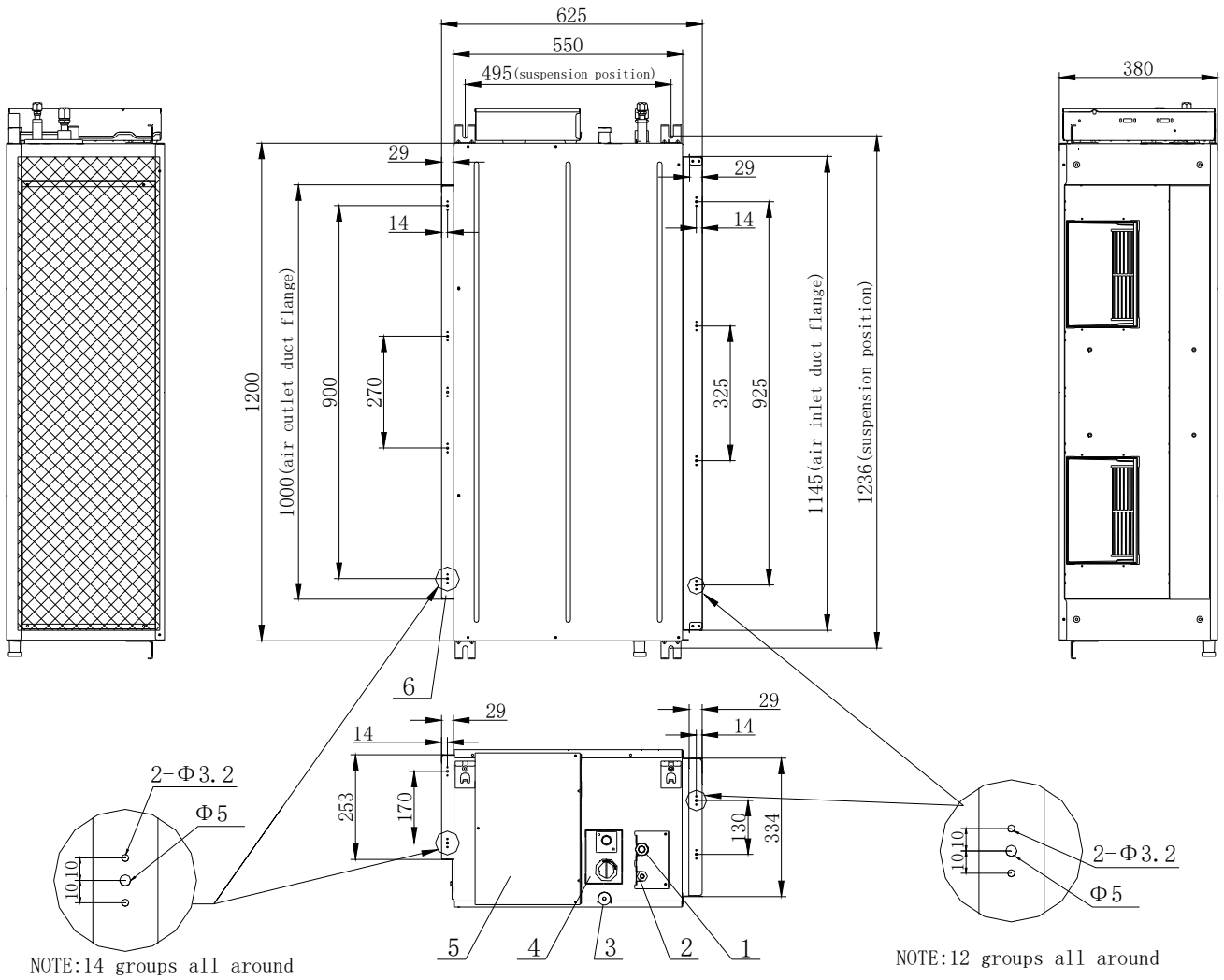


2. Dimensions

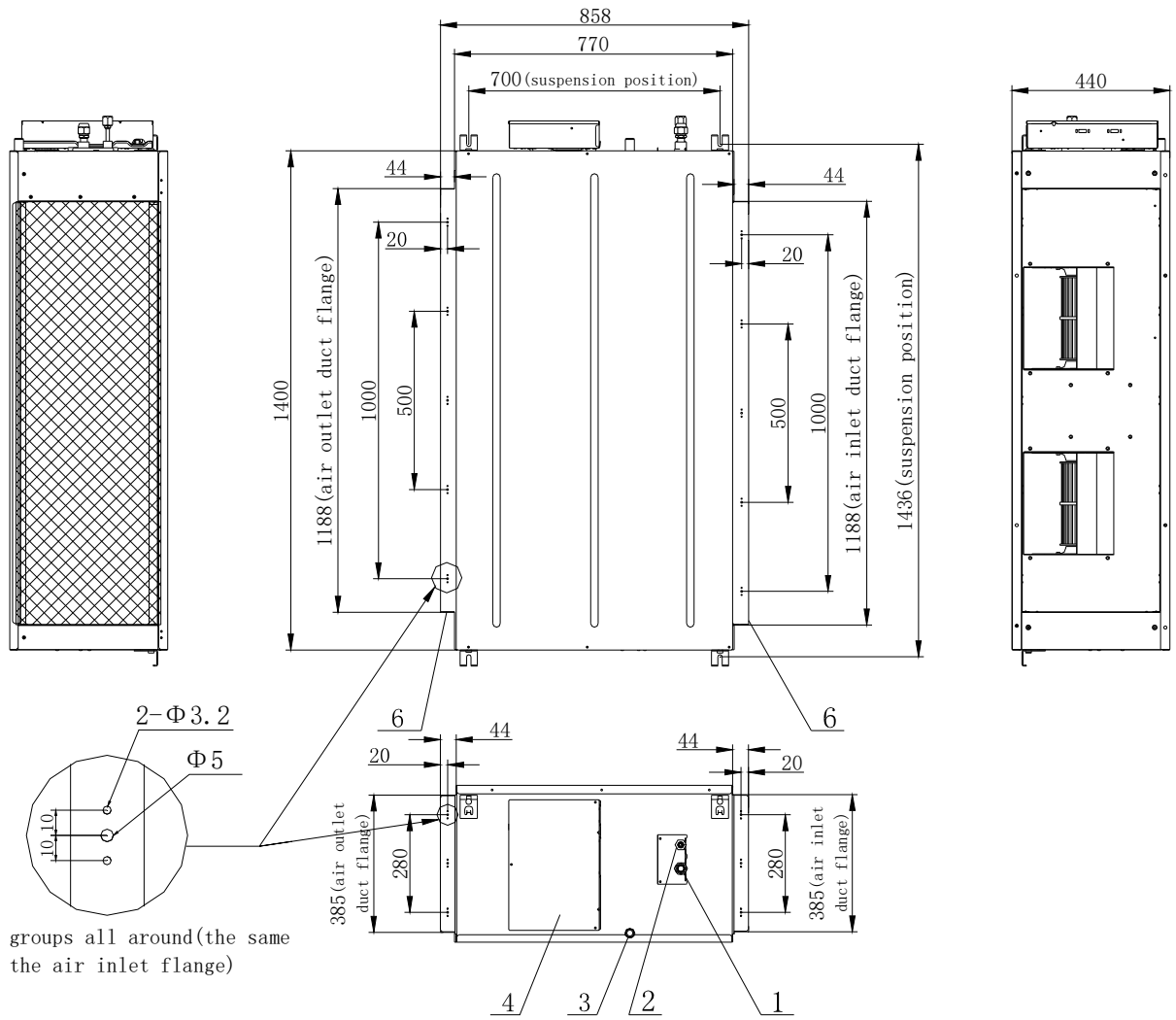
24K



30K-48K



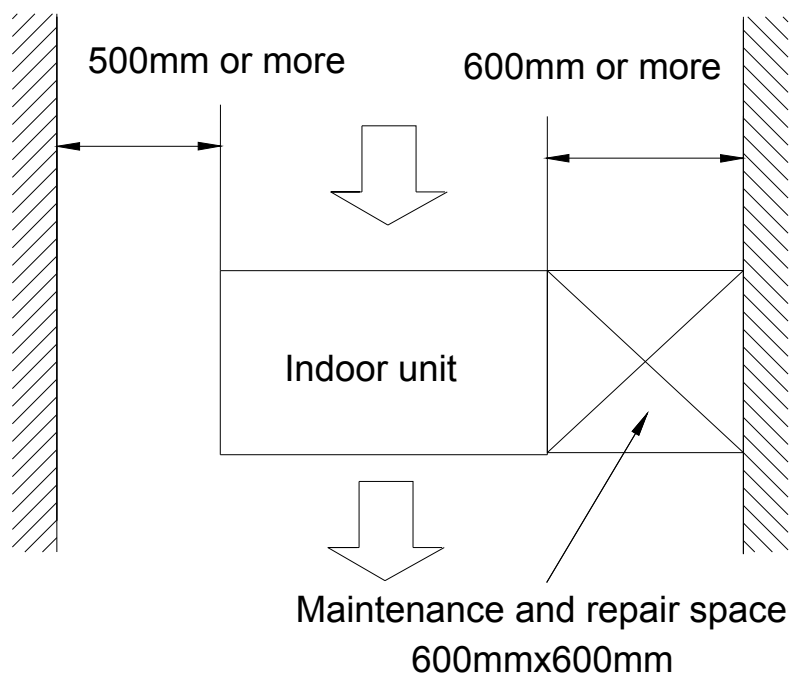
60K



NOTE:16 groups all around(the same of the air inlet flange)

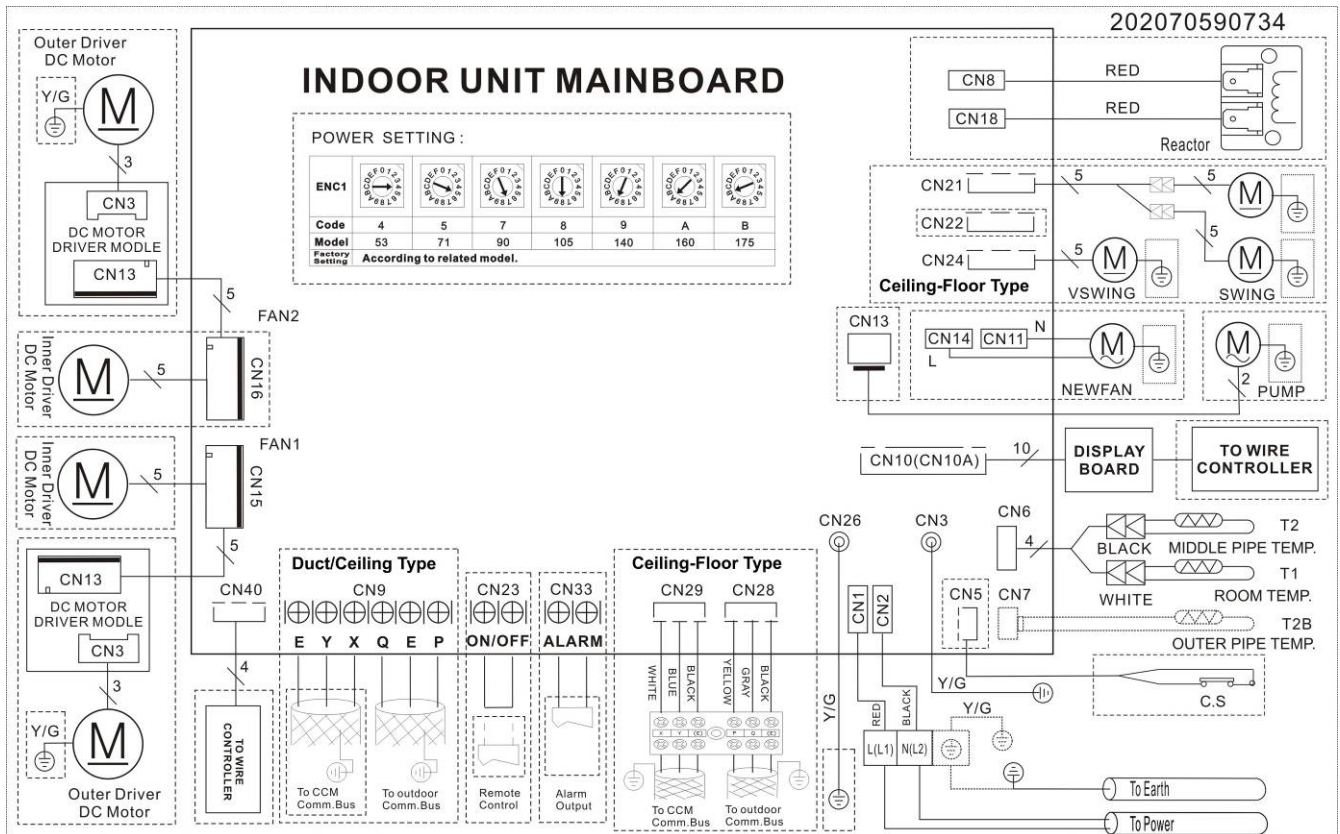
3. Service Space

Ensure enough space required for installation and maintenance.



4. Wiring Diagrams

MHG-24HWFN1-Q MHG-30HWFN1-Q MHG-36HWFN1-Q(*1)(*2) MHG-48HWFN1-Q
MHG-60HWFN1-Q



Function Setting Label

FOR SETTING STATIC PRESSURE(MIDDLE STATIC PRESSURE MODEL)						
ENC2						
MODEL (K Btu/h)	CODE	0	1	2	3	4
	MODEL ≤ 12	10(Pa)	25(Pa)	37(Pa)	50(Pa)	60(Pa)
	12 < MODEL ≤ 24	10(Pa)	25(Pa)	37(Pa)	50(Pa)	75(Pa)
	24 < MODEL ≤ 42	25(Pa)	37(Pa)	50(Pa)	75(Pa)	100(Pa)
	42 < MODEL ≤ 60	25(Pa)	50(Pa)	75(Pa)	100(Pa)	125(Pa)
FACTORY SETTING			✓			
FOR SETTING STATIC PRESSURE(HIGH STATIC PRESSURE MODEL)						
ENC2						
MODEL (K Btu/h)	CODE	0	1	2	3	4
	MODEL ≤ 24	15(Pa)	25(Pa)	37(Pa)	50(Pa)	75(Pa)
	24 < MODEL ≤ 42	25(Pa)	37(Pa)	50(Pa)	75(Pa)	100(Pa)
	42 < MODEL ≤ 60	25(Pa)	50(Pa)	75(Pa)	100(Pa)	150(Pa)
FACTORY SETTING			✓			

PLEASE REFER TO THE ABOVE STATIC PRESSURE TO INSTALL. CHANGE THE FAN MOTOR STATIC PRESSURE CORRESPONDING TO EXTERNAL DUCT STATIC PRESSURE. 2020703A2333

FUNCTION SETTING INDICATION 2020708A3242

For Setting NETAddress				
S1+S2				
Code	0~F 00	0~F 01	0~F 10	0~F 11
NETAddress	0~15	16~31	32~47	48~63
Factory Setting	✓			

For Setting POWER						
ENC1						
Code	4	5	7	8	9	A B
POWER	≤53	54~71	72~90	91~105	106~140	141~160 ≥161
Factory Setting	According to related model.					

For temp. compensation				
SW1				
/	/	/	/	/
TE1	28	30	Fan motor do not stop.	According to E Function
TE2	30	32		
TE3	24	28		
TE4	15	24		
TE5	32	35		
TE6	30	32		
Factory Setting	✓			

For temp. compensation				
SW6				
TYPE	/	/	/	/
DUCT TYPE	3℃	4℃	6℃	According to E Function
/	/	/	/	
CEILING AND FLOOR TYPE	1℃	4℃	6℃	
For Setting CEILING TYPE or FLOOR TYPE	FLOOR TYPE		CEILING TYPE	
Factory Setting	✓			

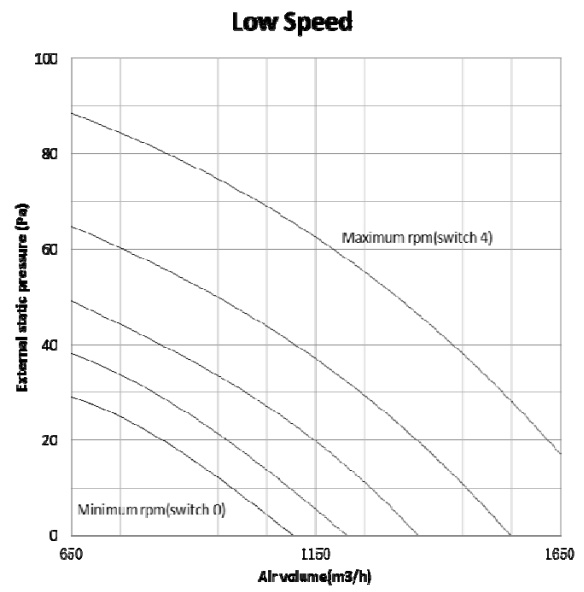
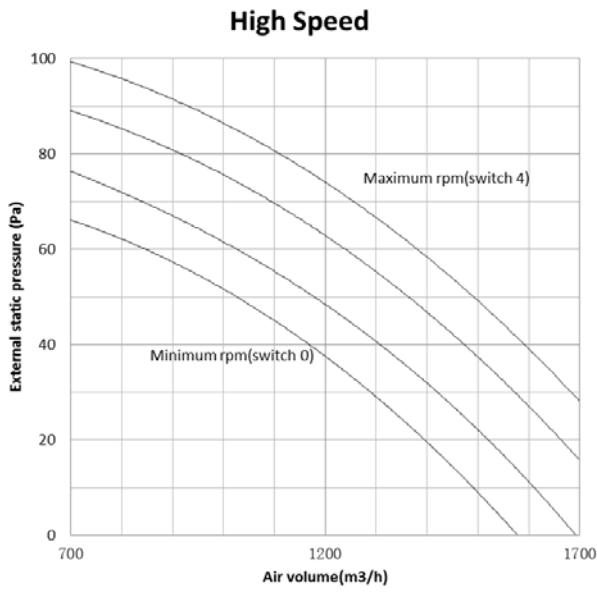
For Setting Fan Motor Control then No Power Request		
SW2		
Mode	Fan OFF	Fan ON
Factory Setting	✓	

For Setting Auto-Restart		
SW3		
AUTO-RESTART	ACTIVE	INACTIVE
Factory Setting	✓	

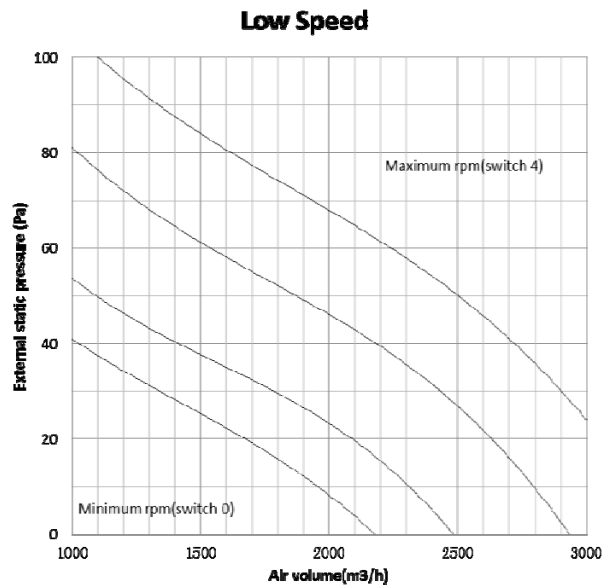
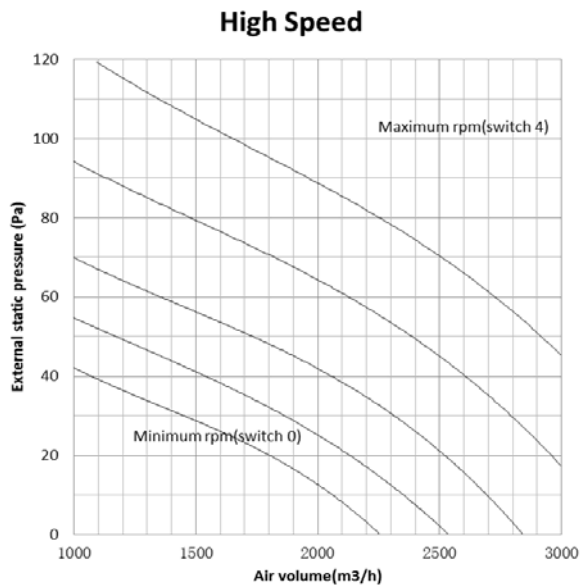
For Setting Fan Quantity (optional)		
SW4		
Mode	Single Fan	Double Fan
Factory Setting	✓	

5. Static Pressure

24,000Btu/h

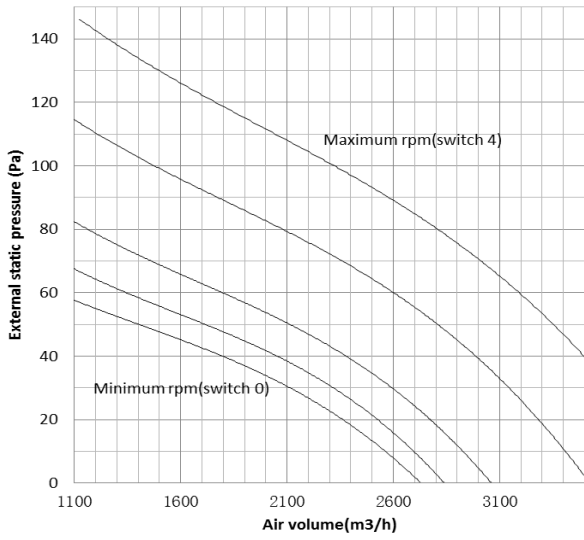


30,000Btu/h

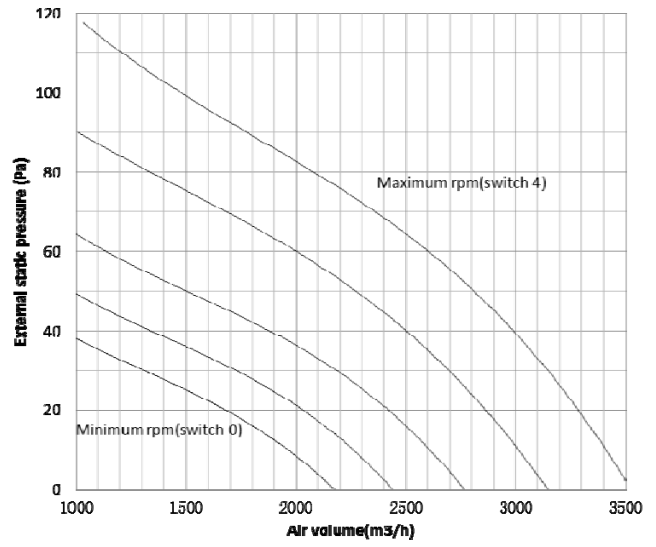


36,000Btu/h(220070502550)

High Speed

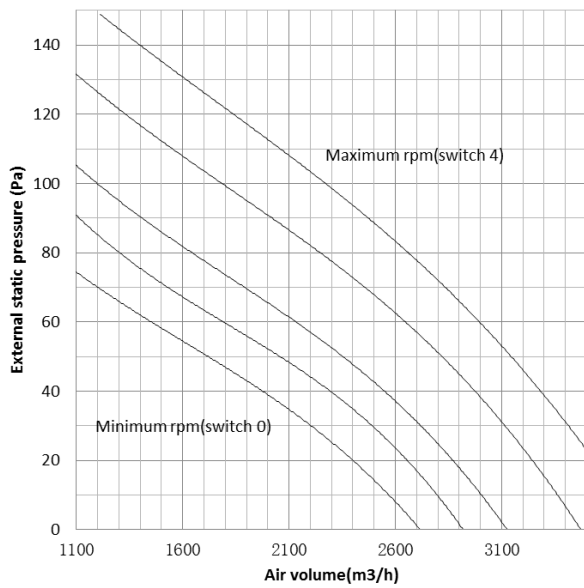


Low Speed

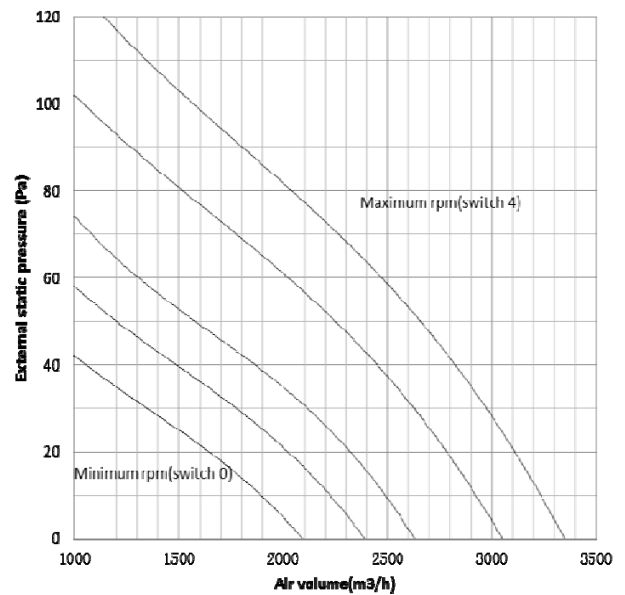


36,000Btu/h(220070502940)

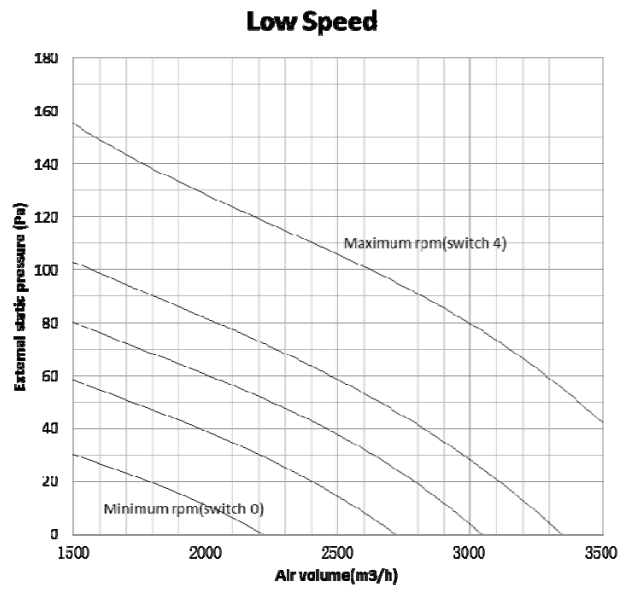
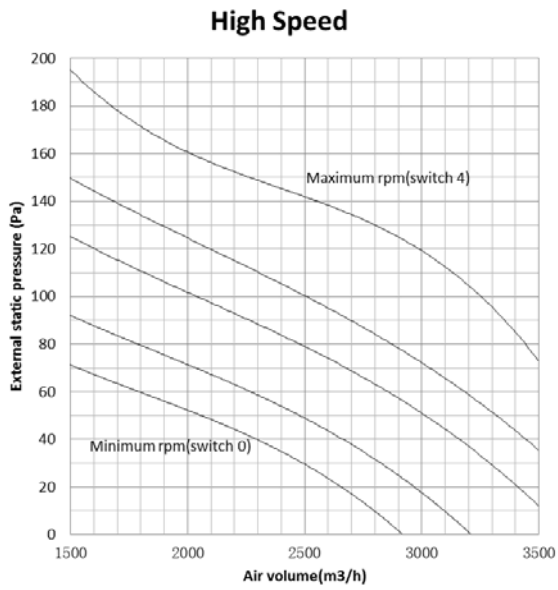
High Speed



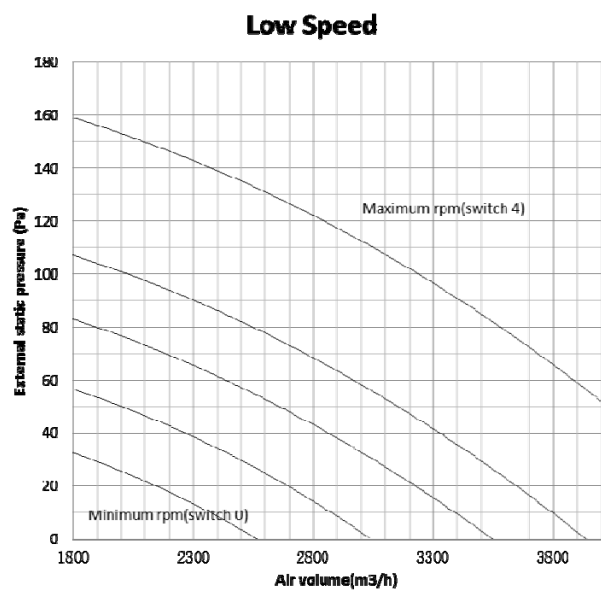
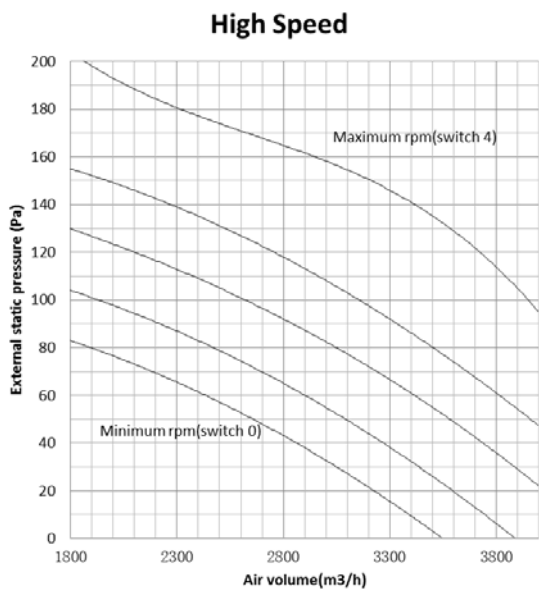
Low Speed



48,000Btu/h



60,000Btu/h



6. Capacity Tales

6.1 Cooling Capacity

MHG-24HWFN1-Q

Hi Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	7.31	6.96	6.60	6.32	5.96
	SC	5.41	5.36	5.28	5.31	5.19
	Input	1.78	1.94	2.02	2.09	2.17
24/17°C DB/WB	TC	7.53	7.17	6.82	6.39	6.04
	SC	5.64	5.59	5.52	5.37	5.31
	Input	1.89	2.02	2.11	2.21	2.30
27/19°C DB/WB	TC	7.67	7.31	7.10	6.60	6.32
	SC	5.67	5.63	5.54	5.41	5.37
	Input	1.94	2.04	2.15	2.26	2.37
32/23°C DB/WB	TC	7.81	7.53	7.38	6.82	6.53
	SC	6.64	6.55	6.50	6.34	6.27
	Input	2.02	2.11	2.26	2.34	2.47

Middle Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	7.02	6.68	6.34	6.00	5.73
	SC	4.98	4.94	4.88	4.86	4.81
	Input	1.73	1.88	1.96	2.02	2.11
24/17°C DB/WB	TC	7.22	6.88	6.54	6.13	5.79
	SC	5.20	5.16	5.10	4.97	4.92
	Input	1.84	1.96	2.04	2.15	2.23
27/19°C DB/WB	TC	7.36	7.02	6.82	6.34	6.07
	SC	5.23	5.20	5.11	5.01	4.97
	Input	1.88	1.98	2.09	2.19	2.29
32/23°C DB/WB	TC	7.50	7.22	7.09	6.54	6.27
	SC	6.15	6.07	6.03	5.89	5.83
	Input	1.96	2.04	2.19	2.27	2.40

Low Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	6.73	6.40	6.07	5.81	5.49
	SC	4.58	4.54	4.50	4.53	4.44
	Input	1.66	1.80	1.88	1.94	2.02
24/17°C DB/WB	TC	6.92	6.60	6.27	5.88	5.55
	SC	4.78	4.75	4.70	4.59	4.44
	Input	1.76	1.88	1.96	2.06	2.14
27/19°C DB/WB	TC	7.05	6.73	6.53	6.07	5.81
	SC	4.80	4.78	4.74	4.62	4.59
	Input	1.80	1.90	2.00	2.10	2.20
32/23°C DB/WB	TC	7.19	6.99	6.79	6.27	6.01
	SC	5.68	5.66	5.57	5.46	5.41
	Input	1.88	1.96	2.10	2.18	2.30

* TC=Total Capacity SC=Sensible Capacity

MHG-30HWFN1-Q

Hi Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	8.91	8.48	8.04	7.70	7.27
	SC	6.59	6.53	6.44	6.47	6.32
	Input	2.17	2.36	2.46	2.54	2.65
24/17°C DB/WB	TC	9.17	8.74	8.30	7.79	7.35
	SC	6.88	6.81	6.73	6.54	6.47
	Input	2.31	2.46	2.57	2.70	2.80
27/19°C DB/WB	TC	9.34	8.91	8.65	8.04	7.70
	SC	6.91	6.86	6.75	6.60	6.54
	Input	2.36	2.49	2.62	2.75	2.88
32/23°C DB/WB	TC	9.52	9.17	9.00	8.30	7.96
	SC	8.09	7.98	7.92	7.72	7.64
	Input	2.46	2.57	2.75	2.86	3.01

Middle Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	8.55	8.14	7.72	7.31	6.98
	SC	6.07	6.02	5.95	5.92	5.86
	Input	2.11	2.29	2.39	2.47	2.57
24/17°C DB/WB	TC	8.80	8.39	7.97	7.47	7.06
	SC	6.34	6.29	6.22	6.05	6.00
	Input	2.24	2.39	2.49	2.62	2.72
27/19°C DB/WB	TC	8.97	8.55	8.30	7.72	7.39
	SC	6.37	6.33	6.23	6.10	6.06
	Input	2.29	2.41	2.54	2.67	2.80
32/23°C DB/WB	TC	9.13	8.80	8.64	7.97	7.64
	SC	7.49	7.39	7.34	7.17	7.10
	Input	2.39	2.49	2.67	2.77	2.92

Low Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	8.20	7.80	7.40	7.08	6.68
	SC	5.57	5.54	5.48	5.52	5.41
	Input	2.02	2.19	2.29	2.36	2.46
24/17°C DB/WB	TC	8.44	8.04	7.64	7.16	6.76
	SC	5.82	5.79	5.73	5.59	5.41
	Input	2.14	2.29	2.39	2.51	2.61
27/19°C DB/WB	TC	8.59	8.20	7.96	7.40	7.08
	SC	5.84	5.82	5.77	5.62	5.60
	Input	2.19	2.31	2.44	2.56	2.68
32/23°C DB/WB	TC	8.75	8.52	8.28	7.64	7.32
	SC	6.92	6.90	6.79	6.65	6.59
	Input	2.29	2.39	2.56	2.66	2.80

* TC=Total Capacity SC=Sensible Capacity

MHG-36HWFN1-Q

Hi Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	10.82	10.29	9.77	9.35	8.82
	SC	8.00	7.92	7.81	7.85	7.67
	Input	2.81	3.05	3.18	3.29	3.42
24/17°C DB/WB	TC	11.13	10.61	10.08	9.45	8.93
	SC	8.35	8.27	8.16	7.94	7.85
	Input	2.98	3.18	3.32	3.49	3.62
27/19°C DB/WB	TC	11.34	10.82	10.50	9.77	9.35
	SC	8.39	8.33	8.19	8.01	7.94
	Input	3.05	3.22	3.39	3.56	3.73
32/23°C DB/WB	TC	11.55	11.13	10.92	10.08	9.66
	SC	9.82	9.68	9.61	9.37	9.27
	Input	3.18	3.32	3.56	3.69	3.90

Middle Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	10.38	9.88	9.37	8.87	8.47
	SC	7.37	7.31	7.22	7.19	7.11
	Input	2.73	2.96	3.09	3.19	3.32
24/17°C DB/WB	TC	10.68	10.18	9.68	9.07	8.57
	SC	7.69	7.64	7.55	7.35	7.28
	Input	2.89	3.09	3.22	3.38	3.52
27/19°C DB/WB	TC	10.89	10.38	10.08	9.37	8.97
	SC	7.73	7.68	7.56	7.41	7.36
	Input	2.96	3.12	3.29	3.45	3.61
32/23°C DB/WB	TC	11.09	10.68	10.48	9.68	9.27
	SC	9.09	8.98	8.91	8.71	8.62
	Input	3.09	3.22	3.45	3.58	3.78

Low Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	9.95	9.47	8.98	8.60	8.11
	SC	6.77	6.72	6.65	6.71	6.57
	Input	2.61	2.83	2.96	3.06	3.18
24/17°C DB/WB	TC	10.24	9.76	9.27	8.69	8.21
	SC	7.07	7.02	6.96	6.78	6.57
	Input	2.77	2.96	3.09	3.24	3.37
27/19°C DB/WB	TC	10.43	9.95	9.66	8.98	8.60
	SC	7.09	7.06	7.00	6.83	6.79
	Input	2.83	2.99	3.15	3.31	3.46
32/23°C DB/WB	TC	10.63	10.34	10.05	9.27	8.89
	SC	8.39	8.37	8.24	8.07	8.00
	Input	2.96	3.09	3.31	3.43	3.62

* TC=Total Capacity SC=Sensible Capacity

MHG-48HWFN1-Q

Hi Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	14.42	13.72	13.02	12.46	11.76
	SC	10.67	10.56	10.42	10.47	10.23
	Input	3.72	4.04	4.22	4.35	4.53
24/17°C DB/WB	TC	14.84	14.14	13.44	12.60	11.90
	SC	11.13	11.03	10.89	10.58	10.47
	Input	3.95	4.22	4.40	4.62	4.80
27/19°C DB/WB	TC	15.12	14.42	14.00	13.02	12.46
	SC	11.19	11.10	10.92	10.68	10.59
	Input	4.04	4.26	4.49	4.71	4.94
32/23°C DB/WB	TC	15.40	14.84	14.56	13.44	12.88
	SC	13.09	12.91	12.81	12.50	12.36
	Input	4.22	4.40	4.71	4.89	5.16

Middle Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	13.84	13.17	12.50	11.83	11.29
	SC	9.83	9.75	9.62	9.58	9.48
	Input	3.61	3.92	4.09	4.22	4.40
24/17°C DB/WB	TC	14.25	13.57	12.90	12.10	11.42
	SC	10.26	10.18	10.06	9.80	9.71
	Input	3.83	4.09	4.27	4.48	4.66
27/19°C DB/WB	TC	14.52	13.84	13.44	12.50	11.96
	SC	10.31	10.24	10.08	9.87	9.81
	Input	3.92	4.13	4.35	4.57	4.79
32/23°C DB/WB	TC	14.78	14.25	13.98	12.90	12.36
	SC	12.12	11.97	11.88	11.61	11.50
	Input	4.09	4.27	4.57	4.74	5.01

Low Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	13.27	12.62	11.98	11.46	10.82
	SC	9.02	8.96	8.86	8.94	8.76
	Input	3.46	3.76	3.92	4.05	4.21
24/17°C DB/WB	TC	13.65	13.01	12.36	11.59	10.95
	SC	9.42	9.37	9.27	9.04	8.76
	Input	3.67	3.92	4.09	4.30	4.47
27/19°C DB/WB	TC	13.91	13.27	12.88	11.98	11.46
	SC	9.46	9.42	9.34	9.10	9.06
	Input	3.76	3.96	4.17	4.38	4.59
32/23°C DB/WB	TC	14.17	13.78	13.40	12.36	11.85
	SC	11.19	11.16	10.98	10.76	10.66
	Input	3.92	4.09	4.38	4.55	4.80

* TC=Total Capacity SC=Sensible Capacity

MHG-60HWFN1-Q

Hi Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	18.03	17.15	16.28	15.58	14.70
	SC	13.34	13.21	13.02	13.08	12.79
	Input	4.69	5.08	5.31	5.48	5.70
24/17°C DB/WB	TC	18.55	17.68	16.80	15.75	14.88
	SC	13.91	13.79	13.61	13.23	13.09
	Input	4.97	5.31	5.53	5.81	6.04
27/19°C DB/WB	TC	18.90	18.03	17.50	16.28	15.58
	SC	13.99	13.88	13.65	13.35	13.24
	Input	5.08	5.36	5.65	5.93	6.21
32/23°C DB/WB	TC	19.25	18.55	18.20	16.80	16.10
	SC	16.36	16.14	16.02	15.62	15.46
	Input	5.31	5.53	5.93	6.15	6.49

Middle Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	17.30	16.46	15.62	14.78	14.11
	SC	12.29	12.18	12.03	11.98	11.85
	Input	4.54	4.93	5.15	5.31	5.53
24/17°C DB/WB	TC	17.81	16.97	16.13	15.12	14.28
	SC	12.82	12.73	12.58	12.25	12.14
	Input	4.82	5.15	5.37	5.64	5.86
27/19°C DB/WB	TC	18.14	17.30	16.80	15.62	14.95
	SC	12.88	12.80	12.60	12.34	12.26
	Input	4.93	5.20	5.48	5.75	6.02
32/23°C DB/WB	TC	18.48	17.81	17.47	16.13	15.46
	SC	15.15	14.96	14.85	14.52	14.37
	Input	5.15	5.37	5.75	5.97	6.30

Low Fan Speed						
Cooling		Outdoor conditions (DB)				
Indoor Conditions	(kW)	21°C	28°C	35°C	43°C	50°C
21/15°C DB/WB	TC	16.58	15.78	14.97	14.33	13.52
	SC	11.28	11.20	11.08	11.18	10.95
	Input	4.36	4.72	4.93	5.09	5.30
24/17°C DB/WB	TC	17.07	16.26	15.46	14.49	13.69
	SC	11.78	11.71	11.59	11.30	10.95
	Input	4.62	4.93	5.14	5.41	5.62
27/19°C DB/WB	TC	17.39	16.58	16.10	14.97	14.33
	SC	11.82	11.77	11.67	11.38	11.32
	Input	4.72	4.99	5.25	5.51	5.77
32/23°C DB/WB	TC	17.71	17.23	16.74	15.46	14.81
	SC	13.99	13.95	13.73	13.45	13.33
	Input	4.93	5.14	5.51	5.72	6.04

* TC=Total Capacity SC=Sensible Capacity

6.2 heating Capacity**MHG-24HWFN1-Q**

Hi Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	9.75	7.88	6.45	5.85
	Input	2.25	1.94	1.67	1.56
20°C	TC	9.45	7.50	6.08	5.70
	Input	2.46	2.08	1.83	1.69
27°C	TC	8.85	7.05	5.70	5.55
	Input	2.60	2.25	1.98	1.83
Middle Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	9.26	7.48	6.13	5.56
	Input	2.16	1.86	1.60	1.50
20°C	TC	8.98	7.13	5.77	5.42
	Input	2.36	2.00	1.76	1.62
27°C	TC	8.41	6.70	5.42	5.27
	Input	2.50	2.16	1.90	1.76
Low Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	8.87	7.17	5.87	5.32
	Input	2.07	1.78	1.53	1.44
20°C	TC	8.60	6.83	5.53	5.19
	Input	2.26	1.92	1.69	1.55
27°C	TC	8.05	6.42	5.19	5.05
	Input	2.40	2.07	1.82	1.69

* TC=Total Capacity

MHG-30HWFN1-Q

Hi Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	11.70	9.45	7.74	7.02
	Input	2.86	2.46	2.12	1.98
20°C	TC	11.34	9.00	7.29	6.84
	Input	3.12	2.65	2.33	2.14
27°C	TC	10.62	8.46	6.84	6.66
	Input	3.31	2.86	2.51	2.33
Middle Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	11.12	8.98	7.35	6.67
	Input	2.74	2.36	2.03	1.90
20°C	TC	10.77	8.55	6.93	6.50
	Input	3.00	2.54	2.23	2.06
27°C	TC	10.09	8.04	6.50	6.33
	Input	3.17	2.74	2.41	2.23
Low Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	10.65	8.60	7.04	6.39
	Input	2.63	2.26	1.95	1.83
20°C	TC	10.32	8.19	6.63	6.22
	Input	2.87	2.43	2.14	1.97
27°C	TC	9.66	7.70	6.22	6.06
	Input	3.04	2.63	2.31	2.14

* TC=Total Capacity

MHG-36HWFN1-Q

Hi Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	14.30	11.55	9.46	8.58
	Input	3.83	3.30	2.84	2.66
20°C	TC	13.86	11.00	8.91	8.36
	Input	4.19	3.55	3.12	2.87
27°C	TC	12.98	10.34	8.36	8.14
	Input	4.44	3.83	3.37	3.12
Middle Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	13.59	10.97	8.99	8.15
	Input	3.68	3.17	2.72	2.55
20°C	TC	13.17	10.45	8.46	7.94
	Input	4.02	3.41	3.00	2.76
27°C	TC	12.33	9.82	7.94	7.73
	Input	4.26	3.68	3.24	3.00
Low Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	13.01	10.51	8.61	7.81
	Input	3.53	3.04	2.61	2.45
20°C	TC	12.61	10.01	8.11	7.61
	Input	3.85	3.26	2.87	2.64
27°C	TC	11.81	9.41	7.61	7.41
	Input	4.08	3.53	3.10	2.87

* TC=Total Capacity

MHG-48HWFN1-Q

Hi Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	19.50	15.75	12.90	11.70
	Input	5.19	4.47	3.85	3.61
20°C	TC	18.90	15.00	12.15	11.40
	Input	5.67	4.81	4.23	3.89
27°C	TC	17.70	14.10	11.40	11.10
	Input	6.01	5.19	4.57	4.23
Middle Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	18.53	14.96	12.26	11.12
	Input	4.98	4.29	3.69	3.46
20°C	TC	17.96	14.25	11.54	10.83
	Input	5.45	4.61	4.06	3.74
27°C	TC	16.82	13.40	10.83	10.55
	Input	5.77	4.98	4.38	4.06
Low Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	17.75	14.33	11.74	10.65
	Input	4.78	4.11	3.54	3.32
20°C	TC	17.20	13.65	11.06	10.37
	Input	5.22	4.42	3.89	3.58
27°C	TC	16.11	12.83	10.37	10.10
	Input	5.53	4.78	4.20	3.89

* TC=Total Capacity

MHG-60HWFN1-Q

Hi Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	23.40	18.90	15.48	14.04
	Input	6.26	5.39	4.64	4.35
20°C	TC	22.68	18.00	14.58	13.68
	Input	6.84	5.80	5.10	4.70
27°C	TC	21.24	16.92	13.68	13.32
	Input	7.25	6.26	5.51	5.10
Middle Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	22.23	17.96	14.71	13.34
	Input	6.01	5.18	4.45	4.18
20°C	TC	21.55	17.10	13.85	13.00
	Input	6.57	5.57	4.90	4.51
27°C	TC	20.18	16.07	13.00	12.65
	Input	6.96	6.01	5.29	4.90
Low Fan Speed					
Heating		Outdoor conditions			
Indoor Conditions (DB)	(kW)	24/18°C DB/WB	7/6°C DB/WB	2/1°C DB/WB	-5/-6°C DB/WB
15°C	TC	21.29	17.20	14.09	12.78
	Input	5.76	4.96	4.27	4.00
20°C	TC	20.64	16.38	13.27	12.45
	Input	6.30	5.34	4.70	4.32
27°C	TC	19.33	15.40	12.45	12.12
	Input	6.67	5.76	5.07	4.70

* TC=Total Capacity

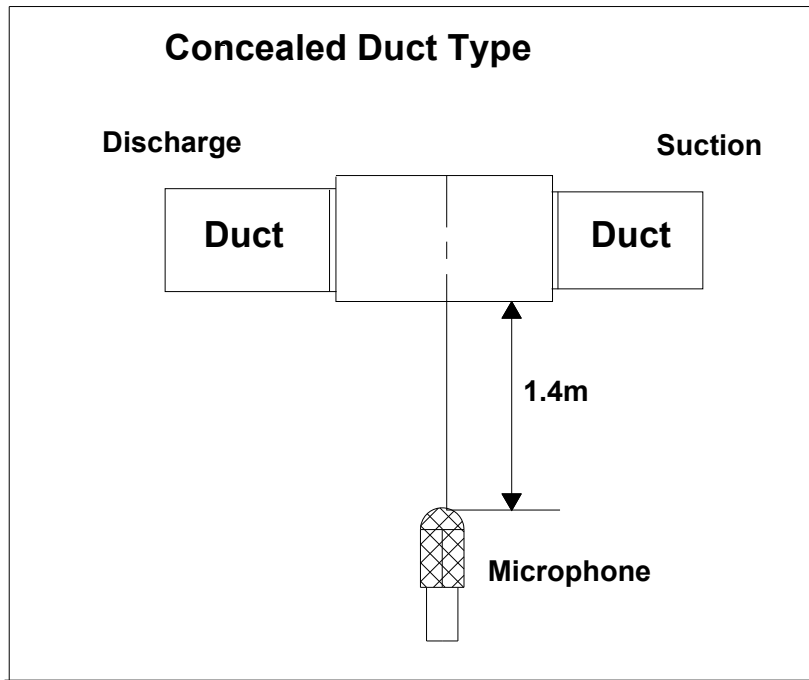
7. Electric Characteristics

Model	Indoor Unit				Power Supply
	Hz	Voltage	Min.	Max.	MFA
MHG-24HWFN1-Q	50	220-240	198	254	15
MHG-30HWFN1-Q	50	220-240	198	254	15
MHG-36HWFN1-Q	50	220-240	198	254	15
MHG-48HWFN1-Q	50	220-240	198	254	15
MHG-60HWFN1-Q	50	220-240	198	254	15

Note:









MFA: Max. Fuse Amps. (A)

8. Sound Levels



Model	Noise level dB(A)		
	H	M	L
MHG-24HWFN1-Q	42	38	33
MHG-30HWFN1-Q	41	38	35
MHG-36HWFN1-Q	49	46	42
MHG-48HWFN1-Q	49	45	42
MHG-60HWFN1-Q	49	46	42

9. Accessories

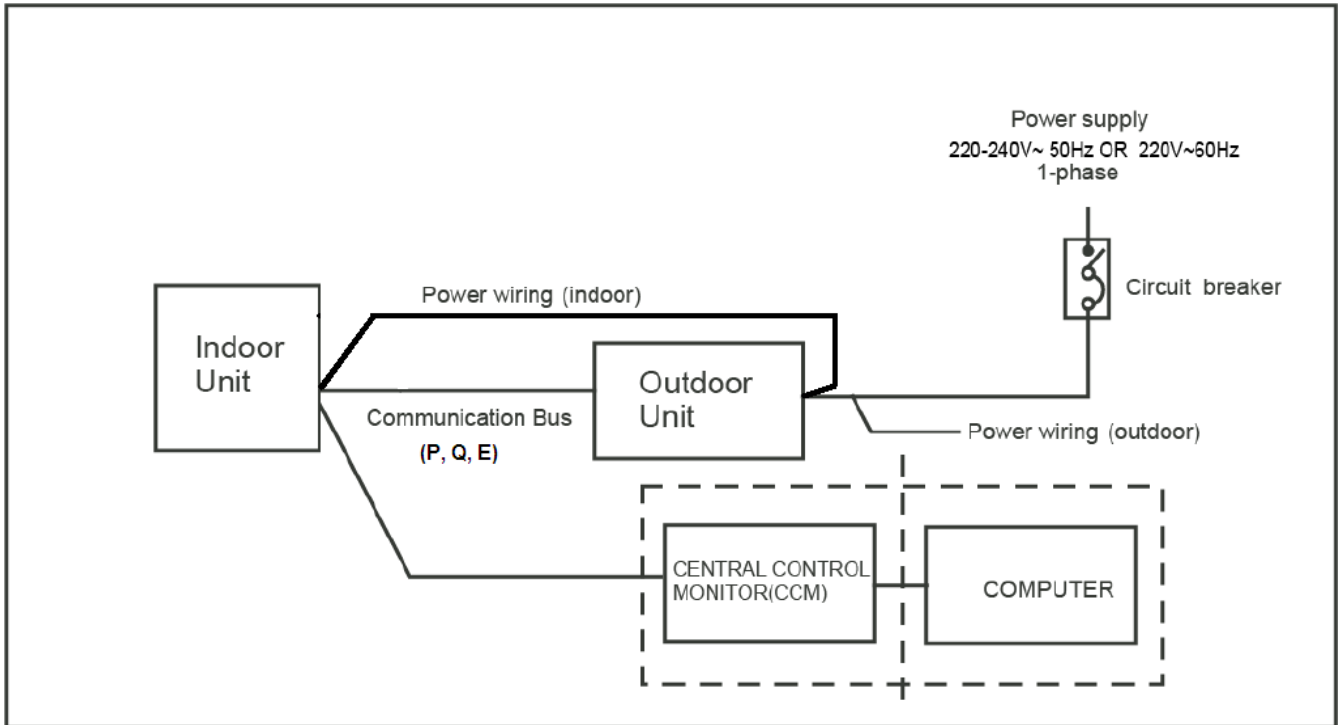
	Name	Shape	Quantity
Tubing & Fittings	Soundproof / insulation sheath		2
	Drain joint		1
Drainpipe Fittings (for cooling & heating)	Seal ring		1
	Wired controller		1
Wired controller & Its Frame	Owner' s manual of wired controller		1
	Wired controller installation manual		1
	Owner' s manual		1
Others	Installation manual		1

10. The Specification of Power

Model		24000Btu/h	30000Btu/h	36000-48000Btu/h	60000Btu/h
INDOOR UNIT POWER	Phase	1-phase	1-phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm ²)	3×1.0	3×1.0	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	--	--	--	--
OUTDOOR UNIT POWER	Phase	1-phase	1-phase	1-phase	1-phase
	Frequency and Voltage	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz	220-240V, 50Hz
	POWER WIRING (mm ²)	3×2.5	3×2.5	3×4.0	3×4.0
	CIRCUIT BREAKER (A)	25	25	30	40
Indoor/Outdoor Connecting Wiring (Weak Electric Signal) (mm ²)		3×0.75	3×0.75	3×0.75	3×0.75
Indoor/Outdoor Connecting Wiring (Strong Electric Signal) (mm ²)		—————	—————	—————	—————

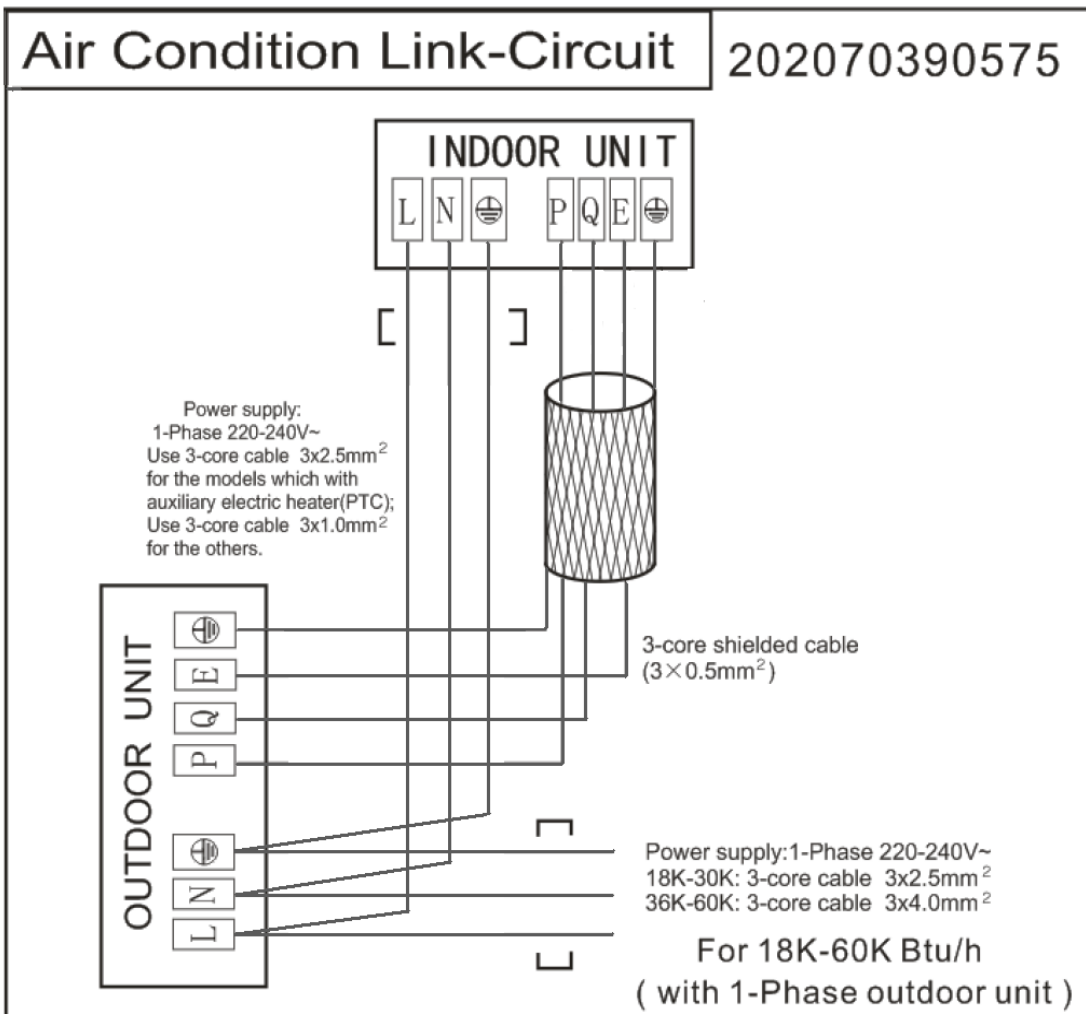
-- Use one circuit breaker for both indoor and outdoor unit.

11. Field Wiring



Air Condition Link-Circuit

202070390575

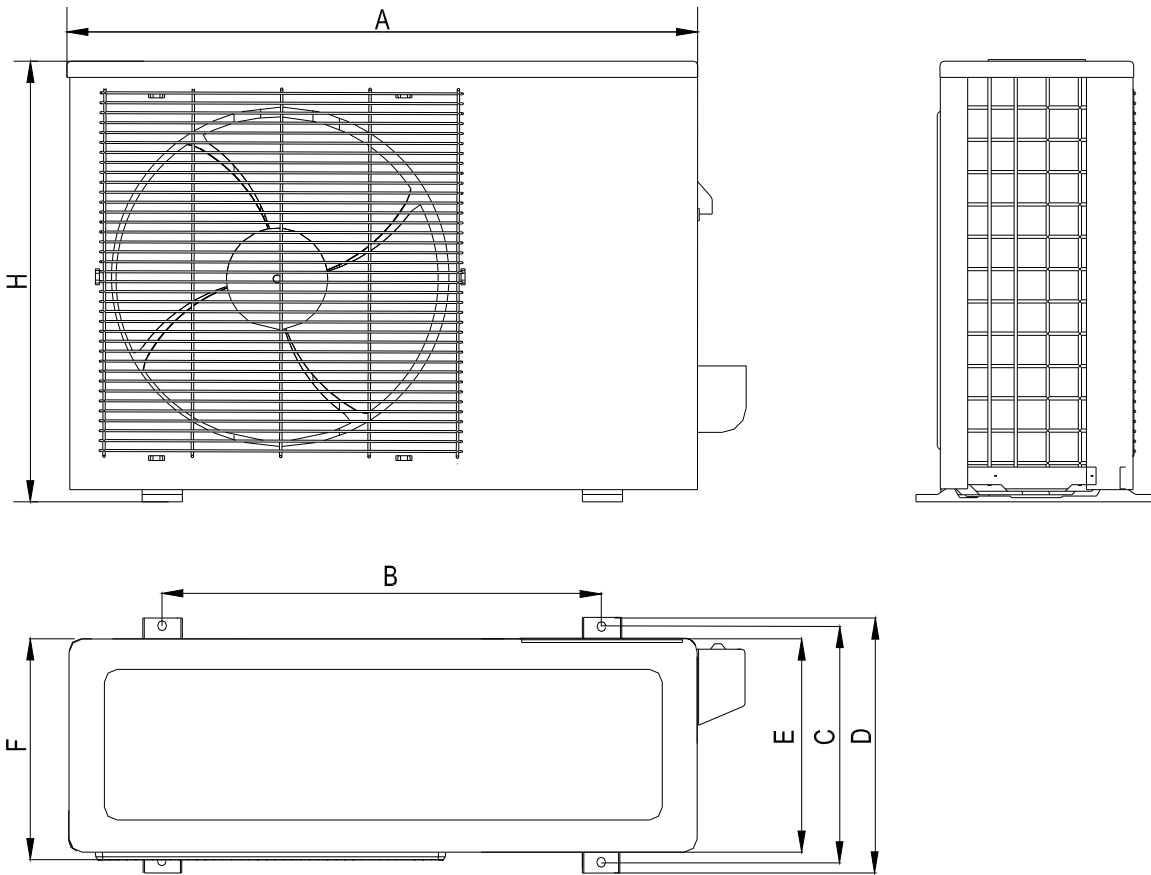


Part 3

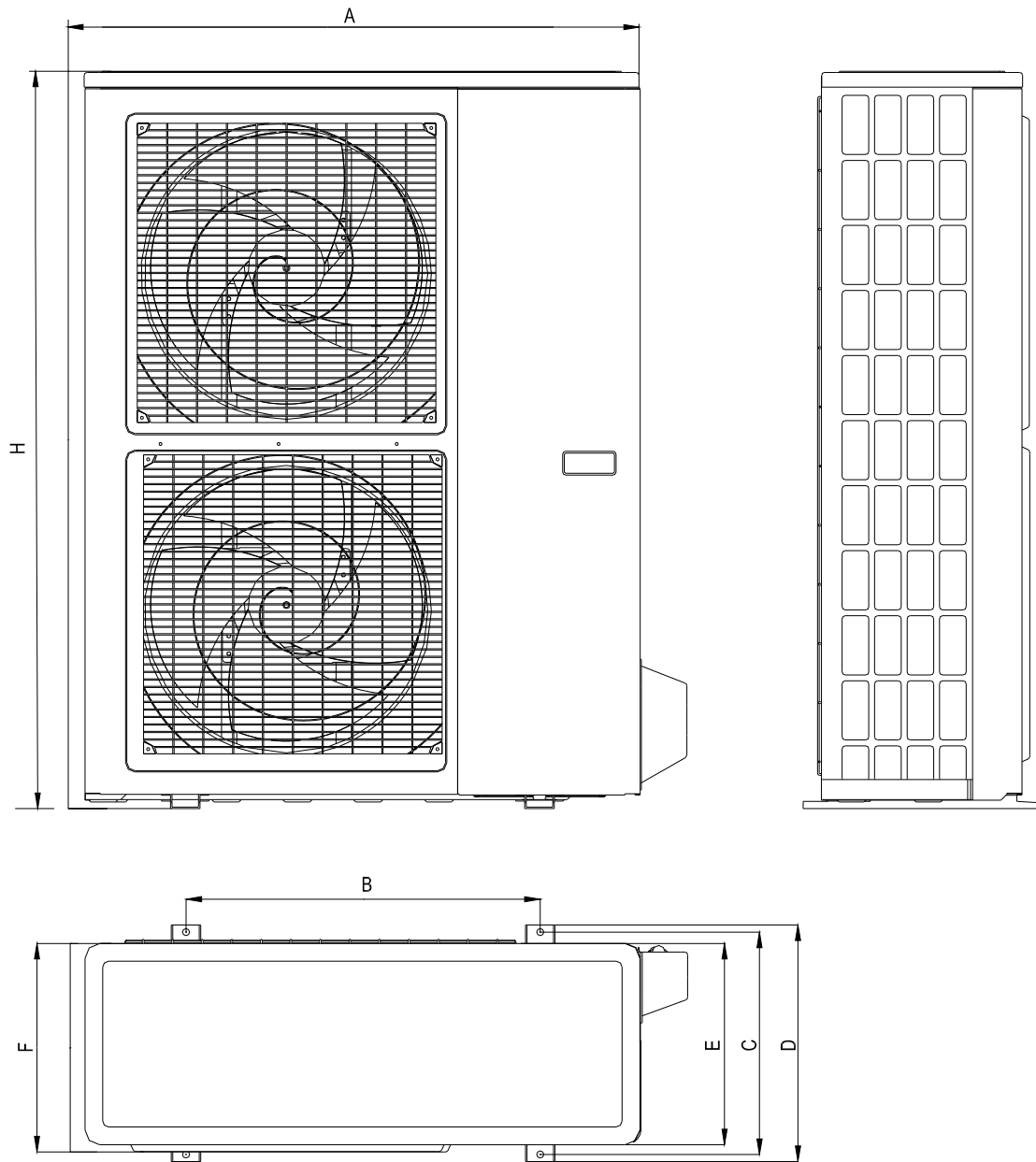
Outdoor Units

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1. Dimensions

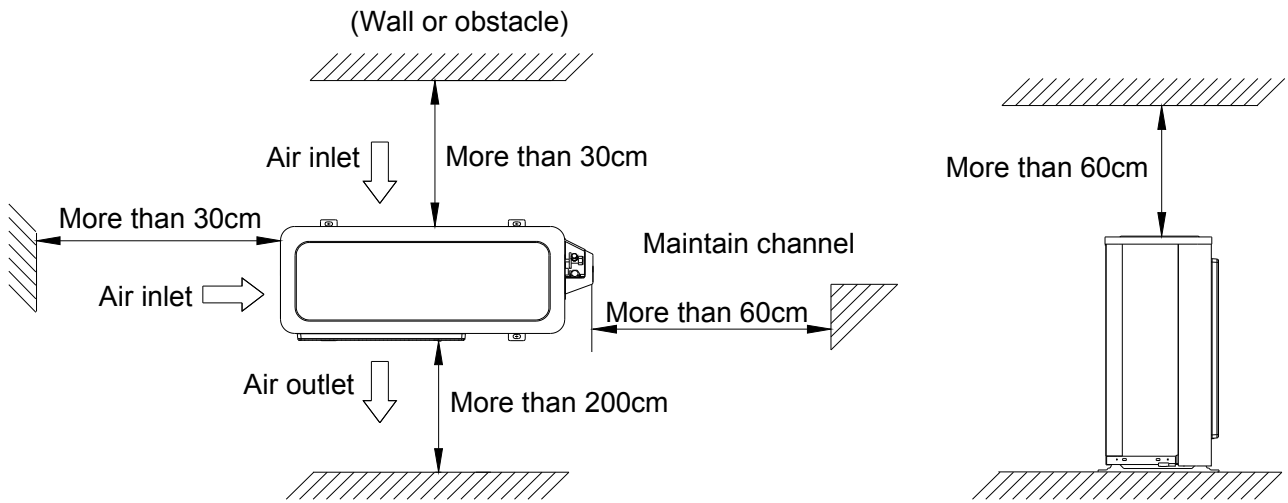


Model	Unit: mm						
	A	B	C	D	E	F	H
MOU-24HFN1-Q	900	590	333	355	302	315	860
MOU-30HFN1-Q	900	590	333	355	302	315	860
MOU-36HFN1-Q	990	624	366	396	340	345	965
MOJU-36HFN1-Q	990	624	366	396	340	345	965



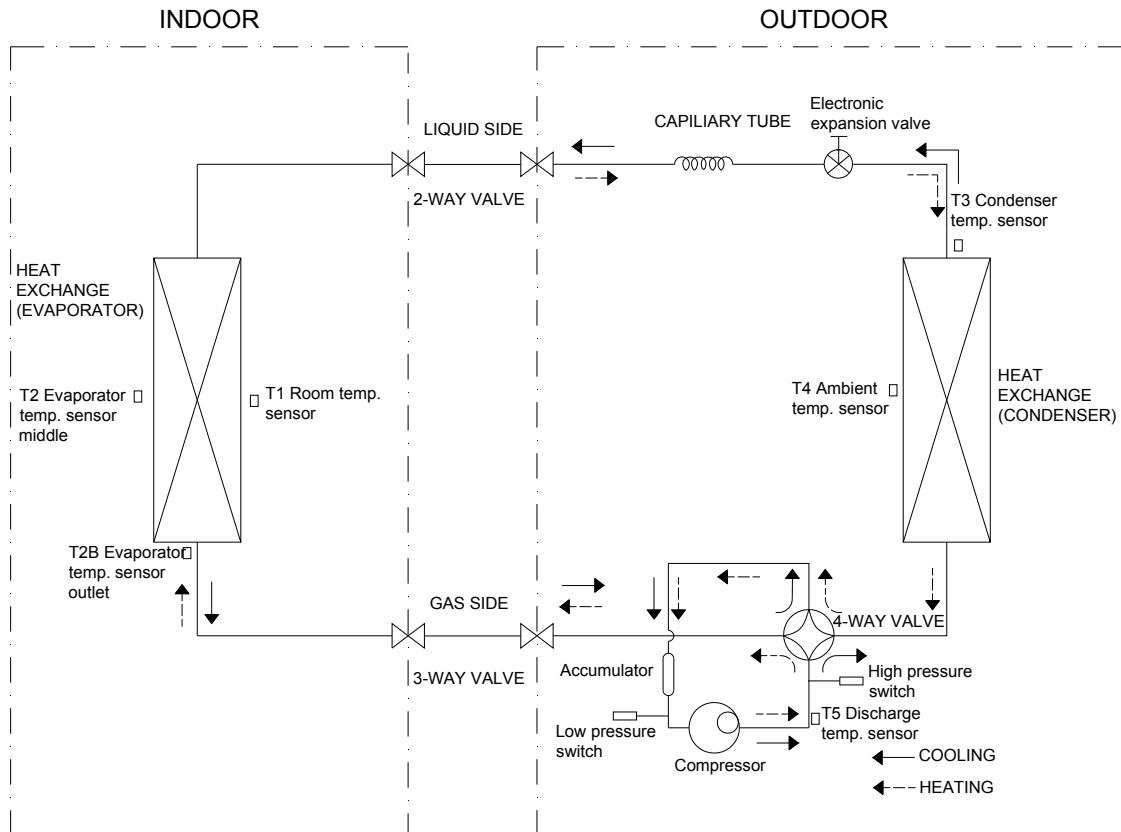
Model	Unit: mm						
	A	B	C	D	E	F	H
MOU-48HFN1-Q	938	634	404	448	370	392	1369
MOU-60HFN1-Q	938	634	404	448	370	392	1369

2. Service Space



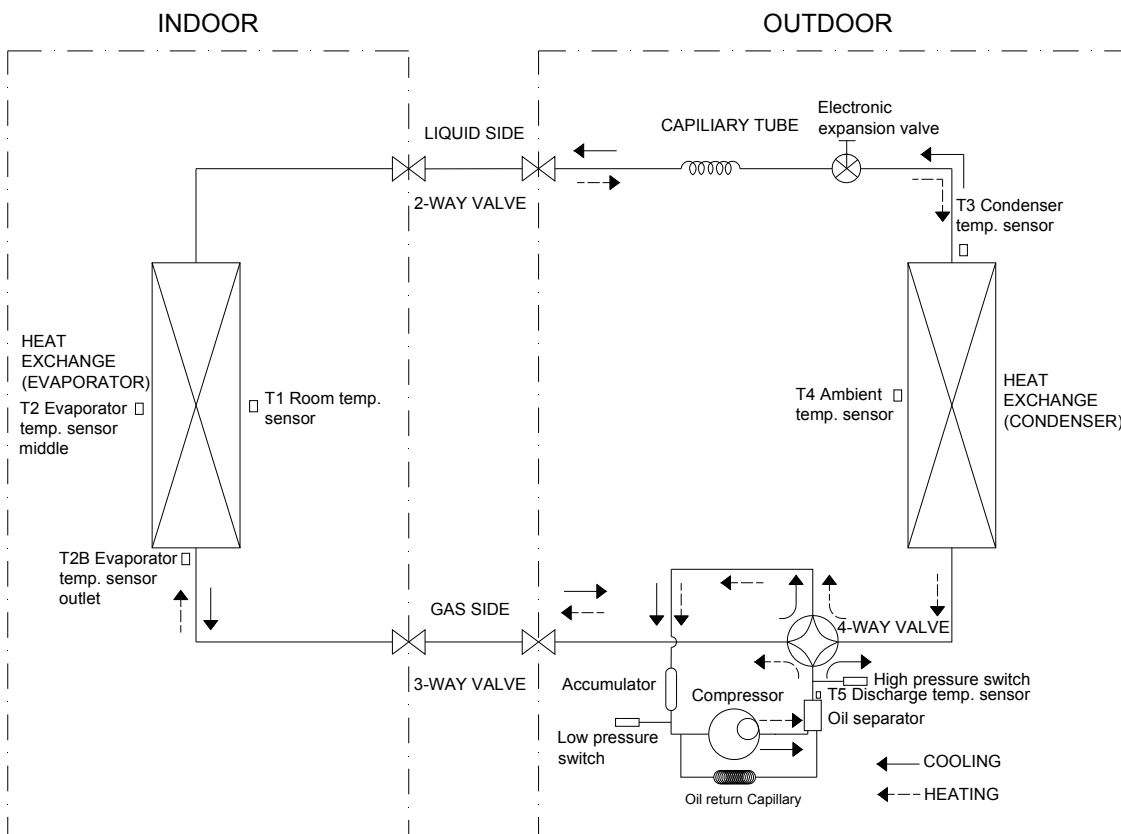
3. Piping Diagrams

MOU-24HFN1-Q MOU-30HFN1-Q



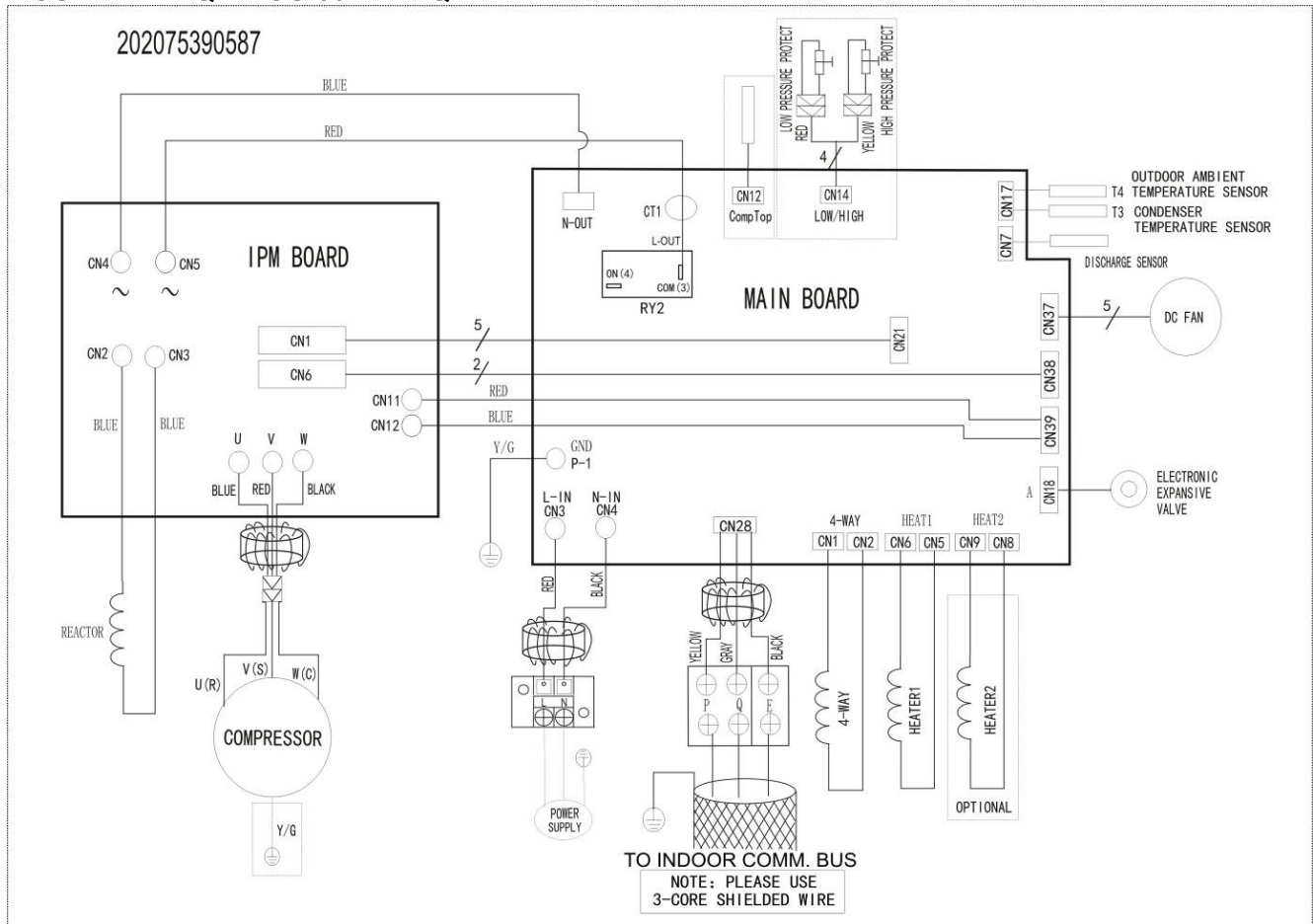
For MOU-24HFN1-Q, There is no high pressure switch or low pressure switch.

MOU-36HFN1-Q MOU-48HFN1-Q MOU-60HFN1-Q

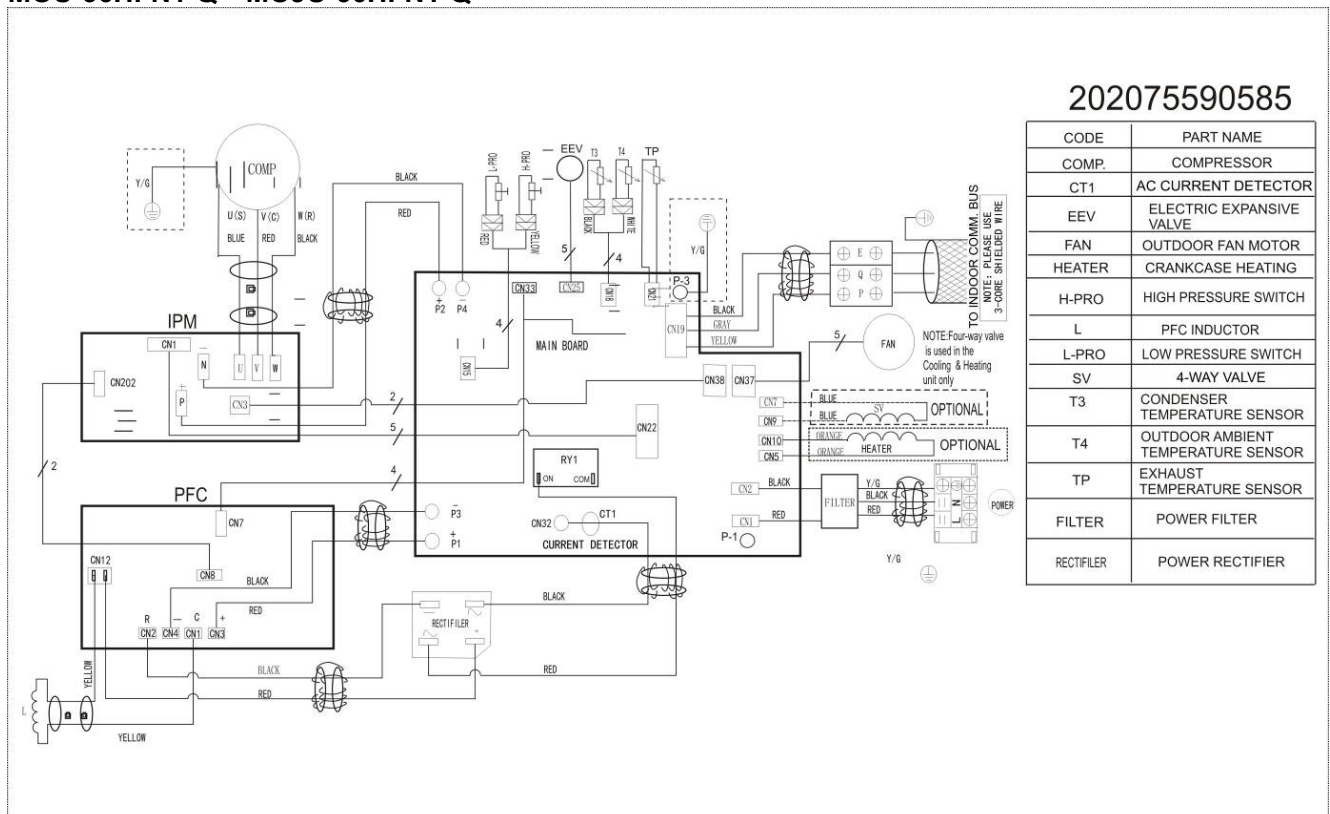


4. Wiring Diagrams

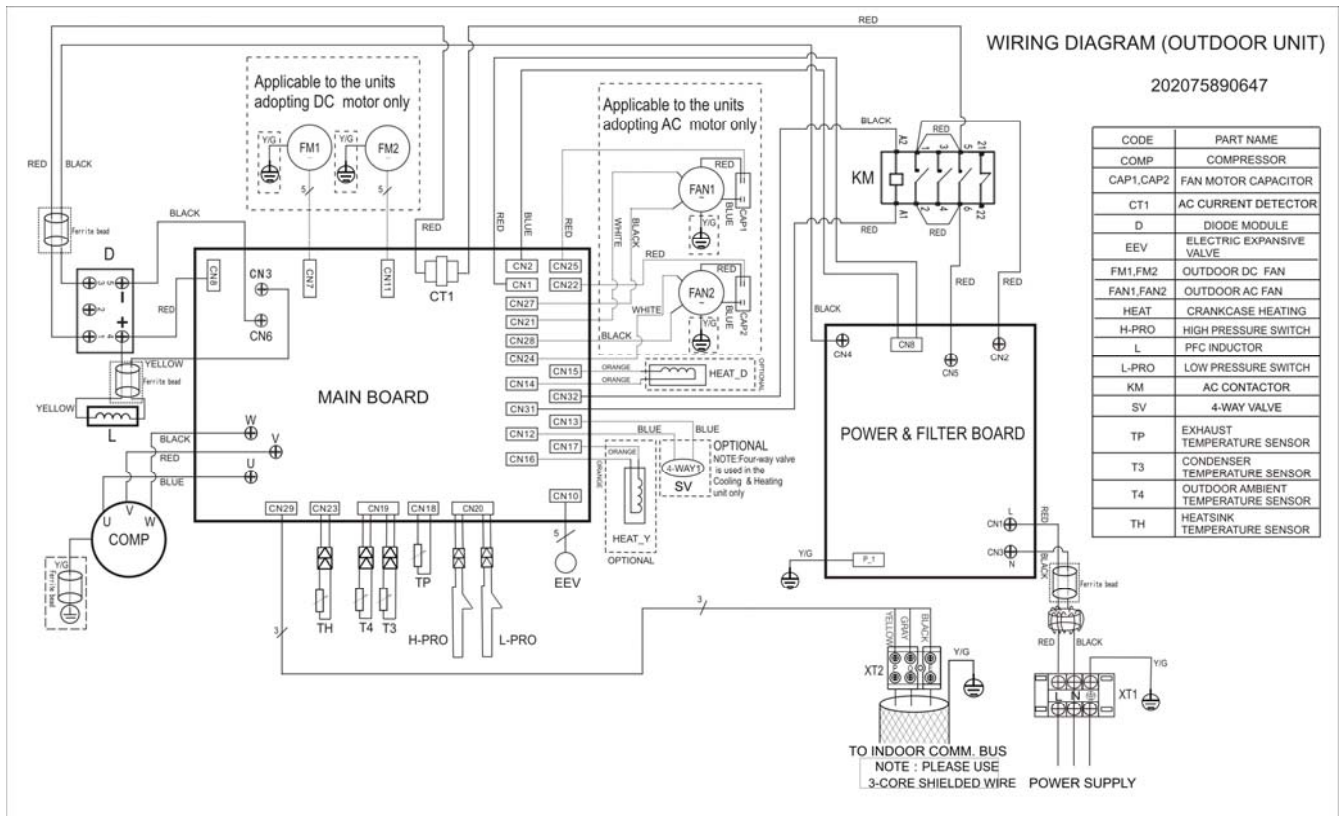
MOU-24HFN1-Q MOU-30HFN1-Q



MOU-36HFN1-Q MOJU-36HFN1-Q



MOU-48HFN1-Q MOU-60HFN1-Q



5. Electric Characteristics

Model	Outdoor Unit			
	Hz	Voltage	Min.	Max.
MOU-24HFN1-Q	50	220-240V	198V	254V
MOU-30HFN1-Q	50	220-240V	198V	254V
MOU-36HFN1-Q	50	220-240V	198V	254V
MOJU-36HFN1-Q	50	220-240V	198V	254V
MOU-48HFN1-Q	50	220-240V	198V	254V
MOU-60HFN1-Q	50	220-240V	198V	254V

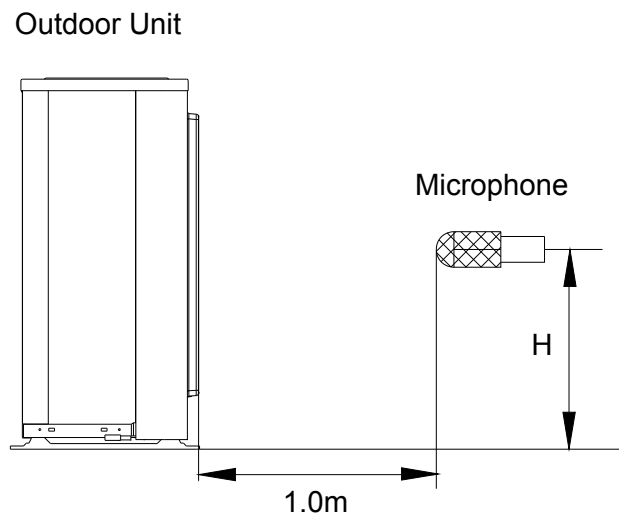
6. Operation Limits

Temperature Mode	Cooling operation	Heating operation	Drying operation
Room temperature	17°C~32°C	0°C~30°C	17°C~32°C
Outdoor temperature	0°C~50°C	-15°C~24°C	0°C~50°C
	(-15°C~50°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



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

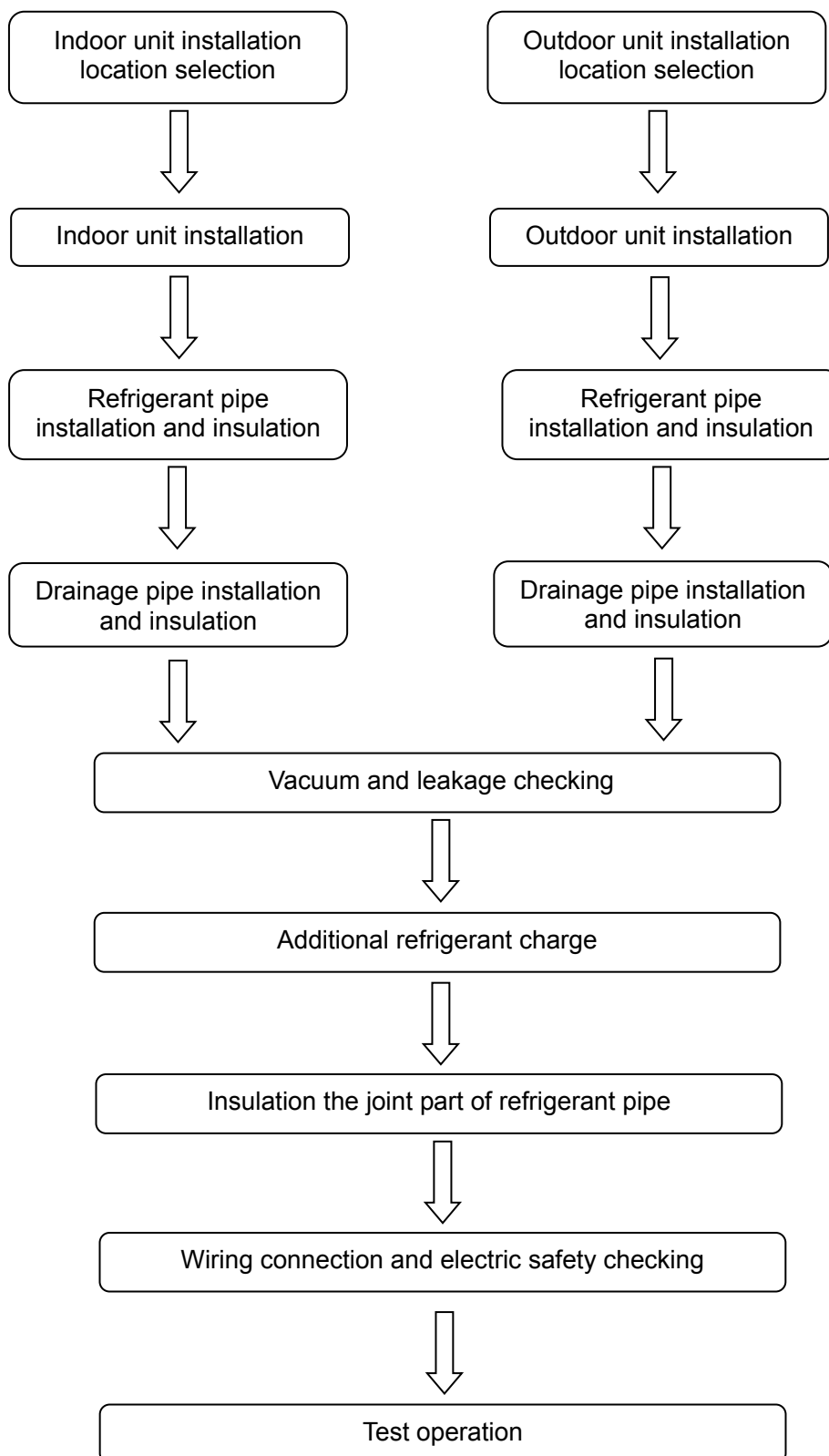
Model	Noise Level dB(A)
MOU-24HFN1-Q	59
MOU-30HFN1-Q	61
MOU-36HFN1-Q	62
MOJU-36HFN1-Q	62
MOU-48HFN1-Q	63
MOU-60HFN1-Q	63

Part 4

Installation

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1. Installation Procedure



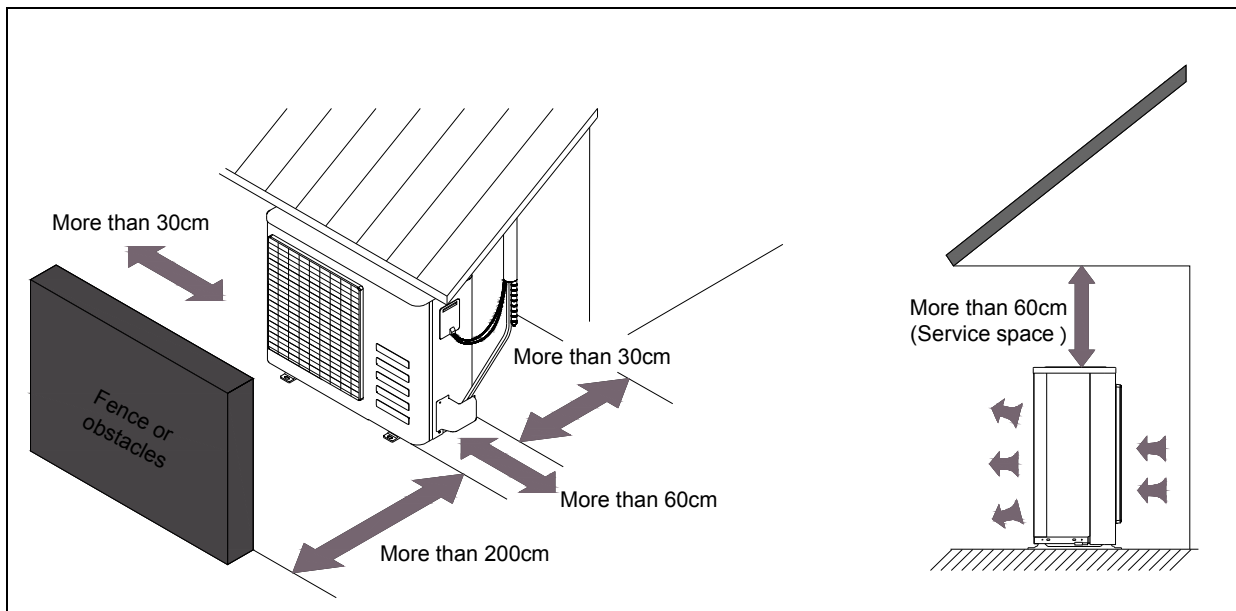
2. Location selection

2.1 Indoor unit location selection

- Where can easily support the indoor unit's weight.
- Where with sufficient space for proper installation.
- Where with sufficient space for easy service access.
- Where condensate water can be easily drained.
- Where can easily connect to outdoor unit.
- Where easy for duct installation and air distribution.
- Where away from heat source or steam.
- Where away from oil gas.
- Where away from corrosive gas.
- Where away from any salty air.
- Where away from strong electromagnetic radiation source.
- Where away from inflammable materials.
- Where with less voltage fluctuation.

2.2 Outdoor unit location selection

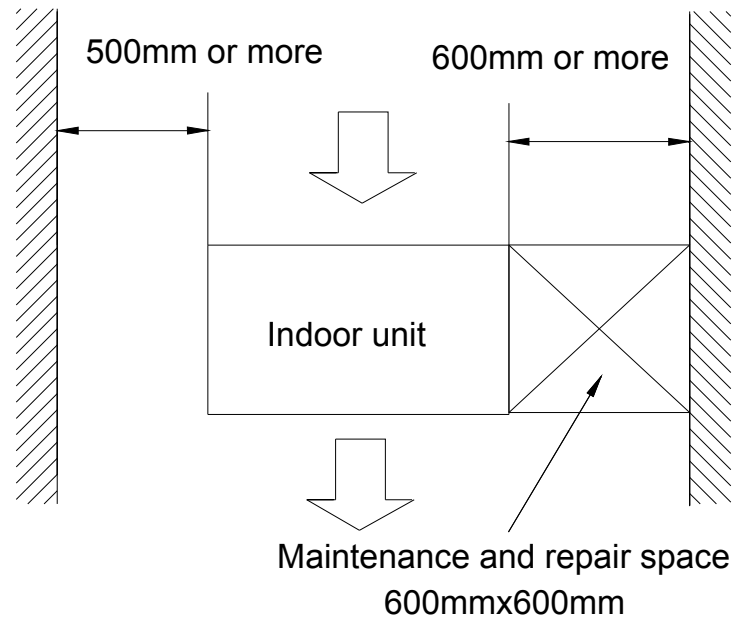
- Where can easily support the outdoor unit's weight.
- Where the piping length and height drop between indoor and outdoor unit are not exceed the maximum allowable value.
- Where the noise, vibration and discharge air are less disturbing to the neighbors.
- Where with sufficient space for installation, maintenance and service access.
- Where airflow is good but not exposed to strong wind.
- Where rain or direct sunlight can be avoided as much as possible.
- Where there is no risk of combustible gas leak.
- Install the unit horizontally.
- Do not install the outdoor unit in a dusty or severely polluted place to avoid blocking heat exchange in outdoor unit.
- Please install it in an area not affected by snowfall or blowing snow. In areas with heavy snow, please install a canopy, a pedestal and/or some baffle boards.



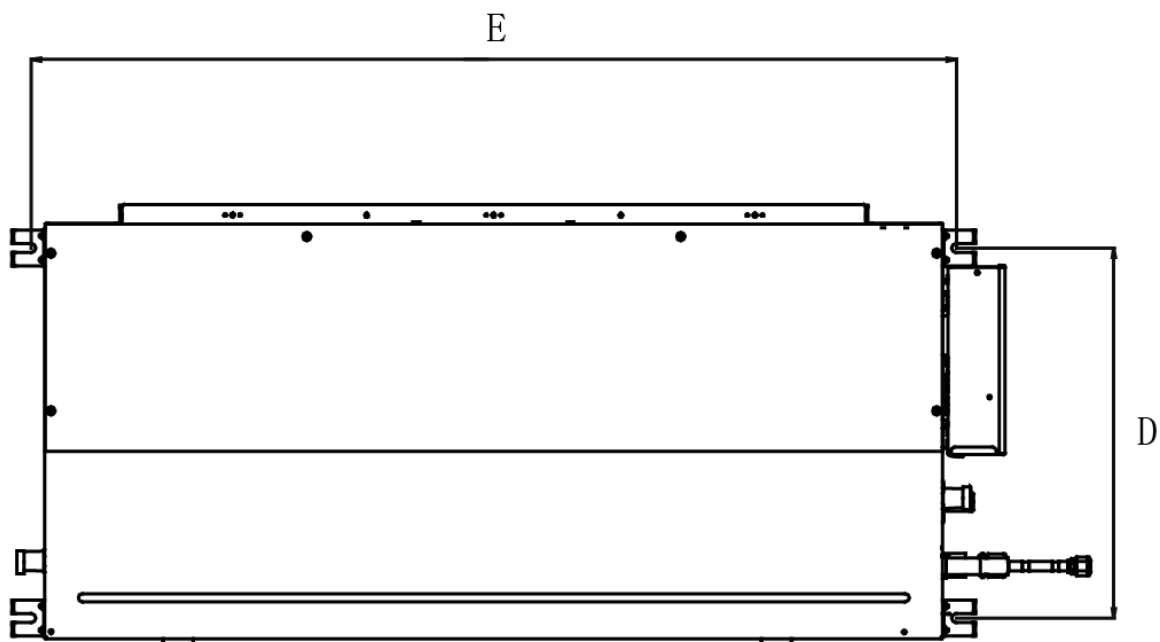
3. Indoor unit installation

3.1 HESP duct indoor unit installation

3.1.1 Service space for indoor unit



3.1.2 Bolt pitch



Capacity (KBtu)	Size of mounted lug	
	D	E
24	397	1146
30~48	495	1236
60	700	1436

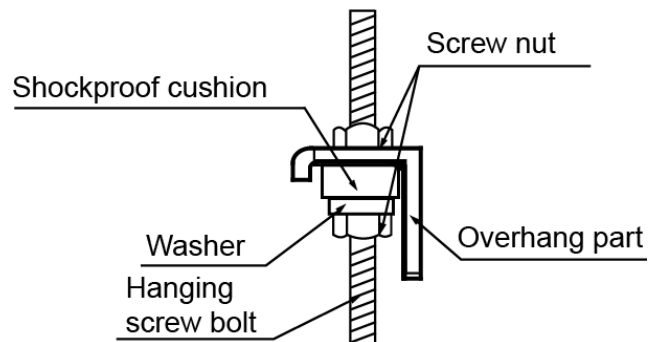
3.1.3 Install the pendant bolt

Select the position of installation hooks according to the hook holes positions showed in upper picture. Drill four holes of $\varnothing 12\text{mm}$, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).



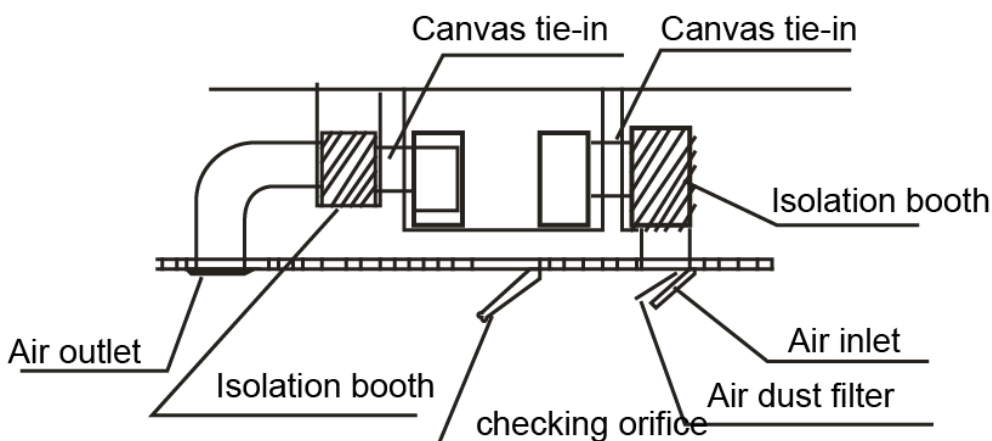
3.1.4 Install the main body

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 $\pm 1^\circ$.



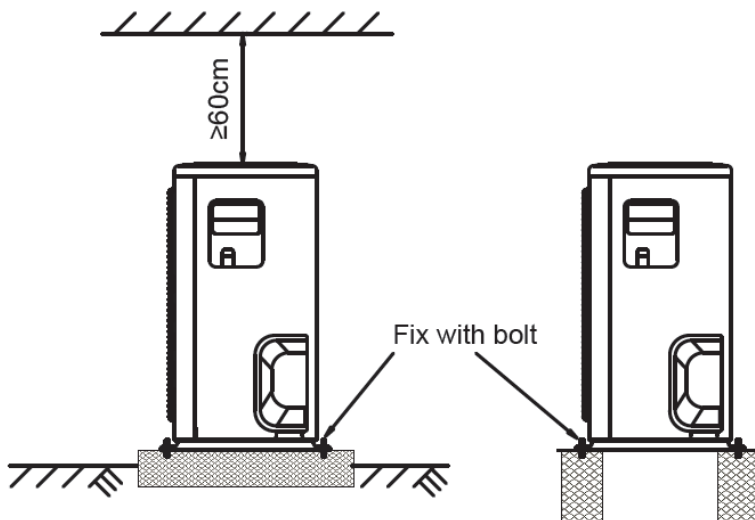
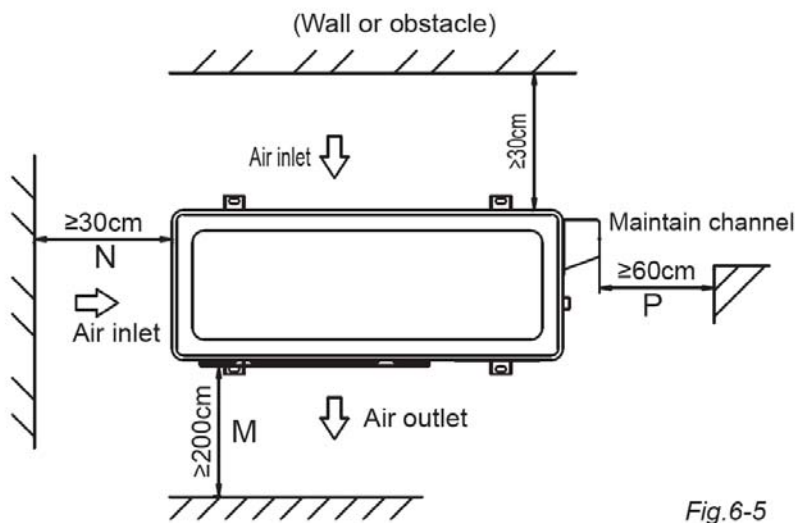
3.1.5 Install the air duct

Please design the air duct as below recommended picture



4. Outdoor unit installation (Side Discharge Unit)

4.1 Service space for outdoor unit



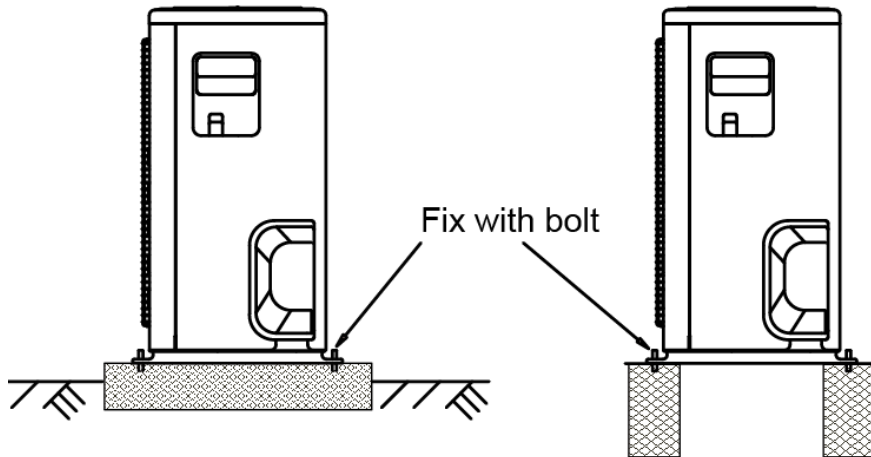
4.2 Bolt pitch



Model	B	C	D
24K/30K	590	333	355
36K	624	366	396
48K	634	404	448
60K	634	404	448

4.3 Install the Unit

Please note the unit's gravity center is not at its physical center, so please be careful when sling it.
 Never hold the inlet of the outdoor unit to avoid deformation.
 Do not apply force on fan blade with hands or other objects.
 Upright installation only. Do not tilt it for more than 5 degree.
 Make concrete foundation according to the specifications of the outdoor units.
 Bolted all feet firmly to prevent it from collapsing in case of earthquake or strong wind.



5. 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 data in the following table.

Model	Max. Length	Max. Elevation
24,000Btu/h-30,000Btu/h	50m	25m
36,000Btu/h-60,000Btu/h	65m	30m

5.2 Pipe connecting procedure

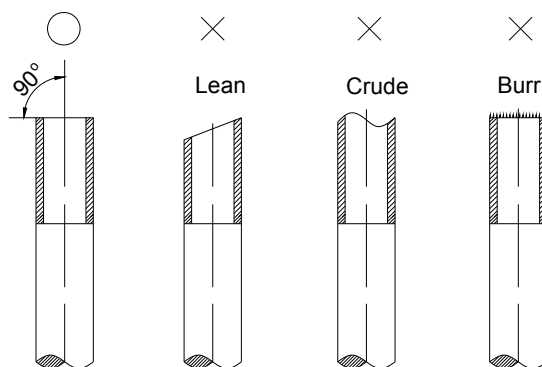
5.2.1 Choose the pipe size according to the specification table.

5.2.2 Confirm the pathway of the pipes.

5.2.3 Measure the 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, all joint parts should not be thermal insulated.

5.2.6 Flare the pipe

- Insert a flare nut into the pipe before flaring the pipe
- Flare the pipe according to blow table.

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	

- Joint pipe immediately after flaring. Or seal the opening part with cap cover or adhesive tape to avoid dust or foreign object getting into the pipe.

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

5.2.8 Bend pipe according to the field condition 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 wall conduit

5.2.11 Set 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 exceed 1m.
- For vertical refrigerant pipe, the distance between supporters should not 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	

6. Drainage pipe installation

Install the drainage pipe as shown below and take measures against condensation. Improper installation

may cause leakage and water damage.

6.1 Installation principle

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

6.2 Key points of drainage pipe installation

6.2.1 Consider 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 small 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	

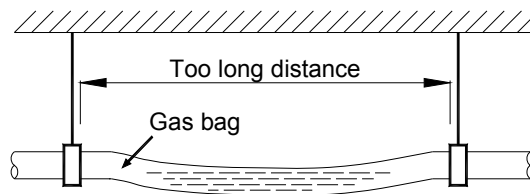
Note: Adopt PVC40 or bigger pipe to be the main pipe.

6.2.3 Individual design of drainage pipe system

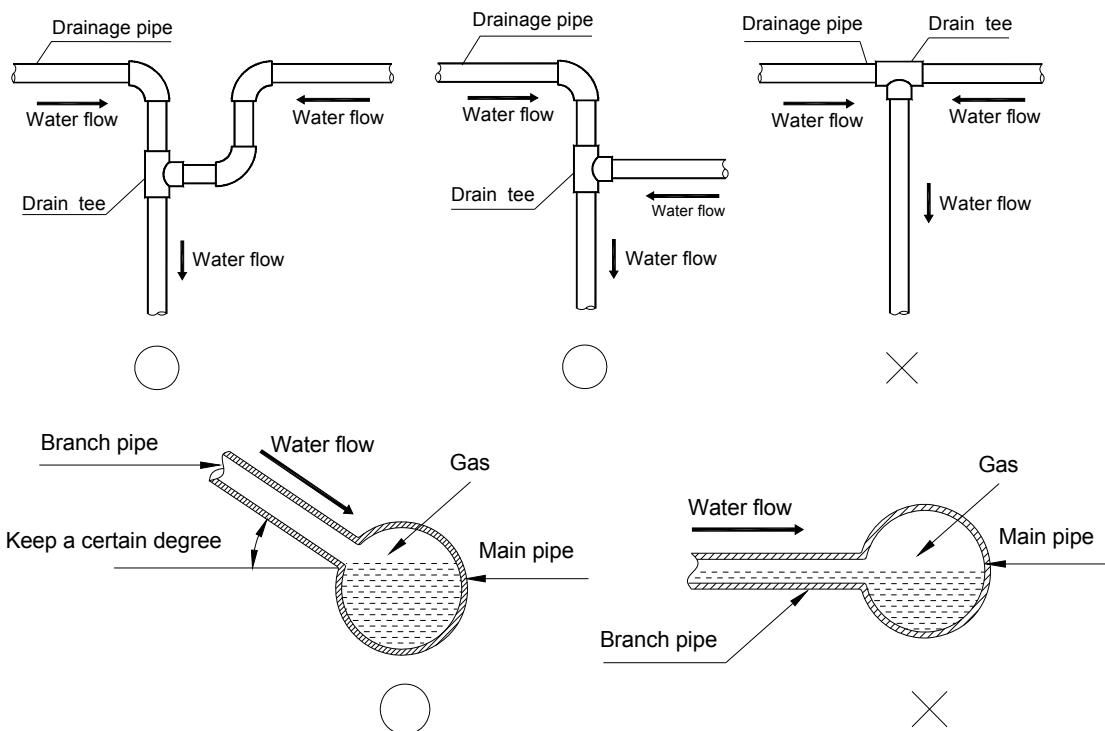
- The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.
- The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

6.2.4 Supporter gap of drainage pipe

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



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

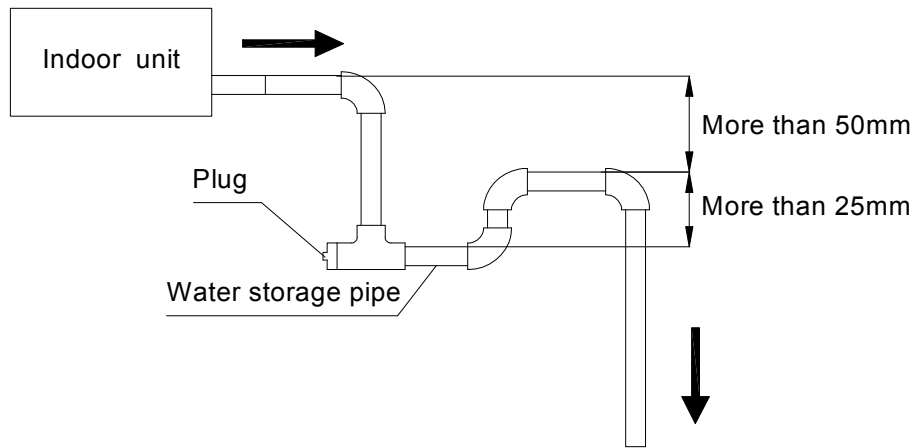


- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe can not be adjusted.

6.2.6 Water storage pipe setting

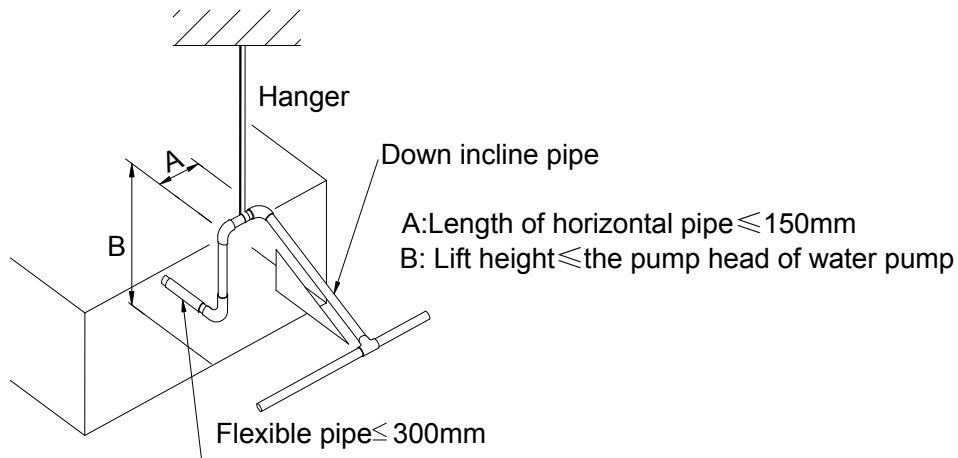
- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water,

such as high extra static pressure duct unit , the water storage pipe should be set to avoid converse flow or blow water phenomena.



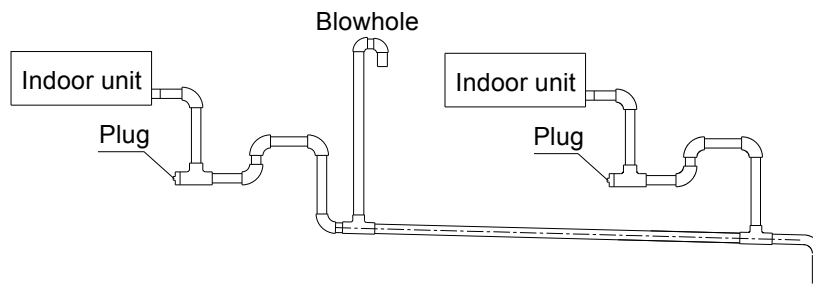
6.2.7 Lifting pipe setting of indoor unit with water pump (water pump not supplied)

- The length of lifting pipe should not exceed the pump head of indoor unit water pump.
- 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.

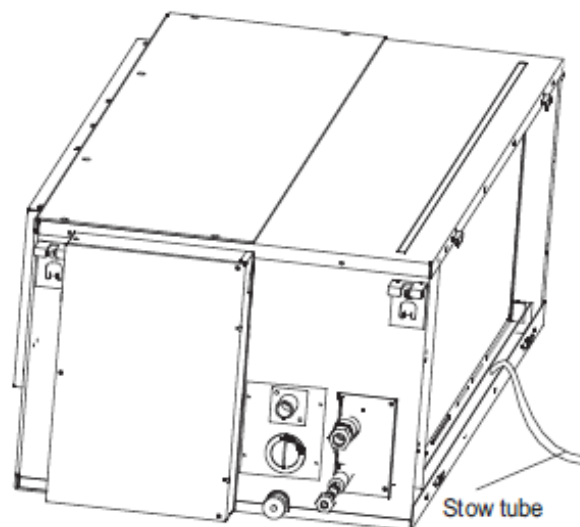
6.3 Drainage test

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 (without drainage pump)
 - Infuse about 2000ml water slowly into the water pan, check whether the water can be drained unhindered.
2. Pump drainage mode
 - 2.1 Slowly infuse about 2000ml water through to the water pan.



- 2.2 Power on and let the air conditioner operate for cooling. Check operation status of drainage pump - check the operation sound of water pump and observe whether the water can discharge through the pipe unhindered.at drainage outlet.
- 2.3 Stop the operation of air conditioner.

- a. After stopped the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, water back-flow may happen.
- 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.

6.4 Insulation work of drainage pipe

Refer to "Engineering of Insulation" chapter.

7. Vacuum and Leakage Checking

● Purpose of vacuum

- Eliminating moisture in system to prevent ice-blockage and copper oxidation.
Ice-blockage can cause abnormal operation and copper-oxide can damage compressor.
- Eliminating non-condensable gas (air) in system to prevent components oxidizing, pressure fluctuation and unefficient heat exchange.

● Selection of vacuum pump

- The vacuum pump shall be capable for no less than -756mmHg vacuum level.
- Precision of vacuum pump shall be no less than 0.02mmHg.

● Vacuum procedure

Depend on different circumstance, two vacuum methods could be applied - standard vacuum and special vacuum.

7.3.1 Standard vacuum

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

The special vacuum 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 are as follows:

1. Vacuum for 1 hour.
2. Stop vacuum, then fill nitrogen to reach 0.5Kgf/cm² .
Because nitrogen is dry gas, filling nitrogen could achieve the effect of vacuum drying. However this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn when there is excess water.
3. Vacuum again for half an hour.

If the pressure reached -755mmHg, proceed to pressure leakage test. If it can not reached the value, repeat above process 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.

8. Additional refrigerant charge

- After the vacuum drying process is carried out, the additional refrigerant charge process need to be performed if actual pipe length exceed 20m.
- 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)	Φ9.52
Formula	$V=30g/m \times (L-20)$

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).

9. 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

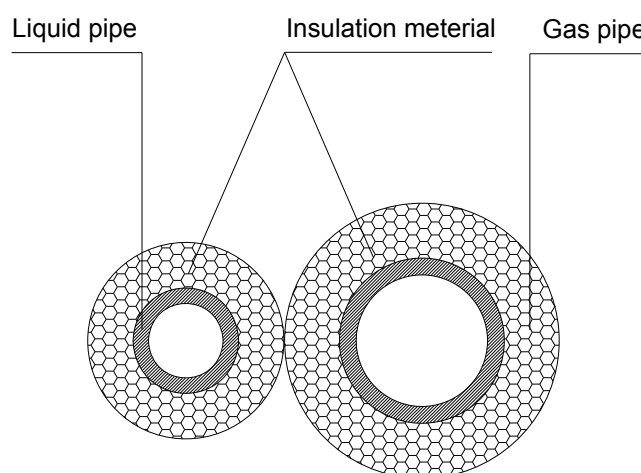
- During operation, temperature of gas pipe and liquid pipe shall be significantly higher or lower than ambient temperature. Therefore, it is necessary to carry out insulation; otherwise system performance will be debased and may lead to compressor damage.
- Gas pipe temperature is very low during cooling. If insulation is not enough, it may 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 injury 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 extremely hot or wet environment, 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 and cause no or less insulation and fast 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 regulation.
- 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.

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.

10. 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 no wire connect joint in the wire tube. If joint is required, 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.

11. 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 valves 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 water by the air conditioner have influenced your neighborhood.
- Whether any of the refrigerant is leaked.

Part 5

Electrical Control System

1. Electrical Control Function	63
2. Troubleshooting	73
3. Controller	97

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:

----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.

1.2.5 Indoor fan delayed open function

When the unit starts up, the indoor fan will start 10s later.

If the unit runs in heating mode, the indoor fan will be also controlled by anti-cold wind function.

1.2.6 Fan speed is out of control

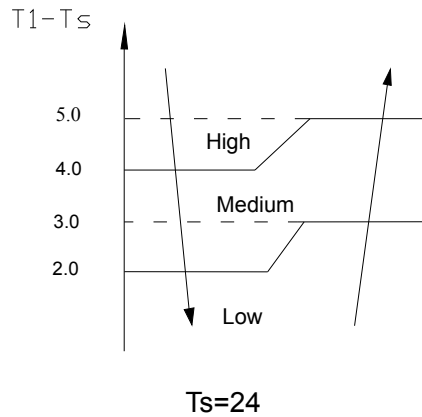
When indoor fan speed stays too low (lower than 300RPM) for 50s, the unit will stop and the LED will display the fault.

When outdoor fan speed stays too low(lower than 300RPM) or too high (higher than 2400RPM) for 60s, the unit will stop and the LED will display the fault.

1.3 Operation Modes and Functions

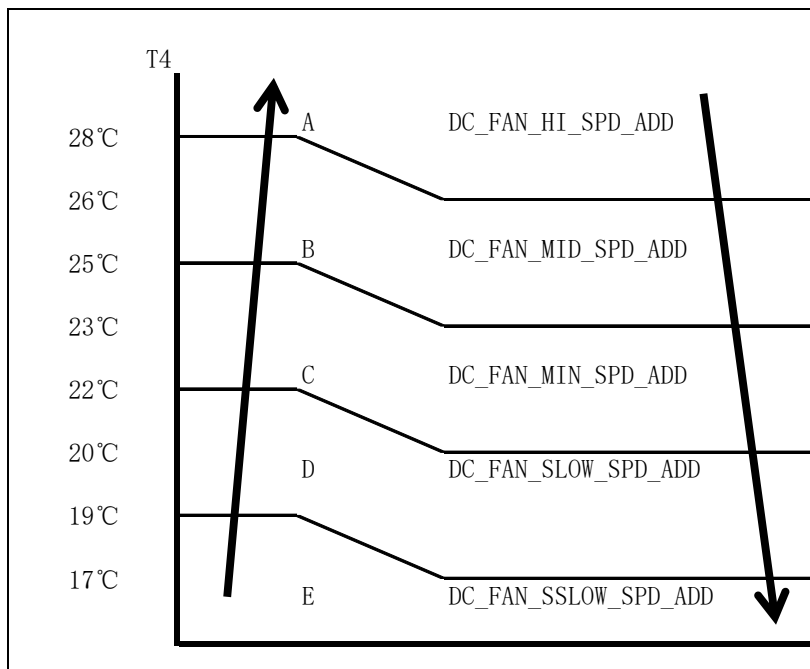
1.3.1 Fan mode

- (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

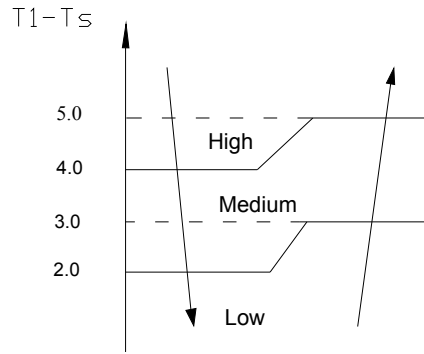
1.3.2.1 Outdoor fan running rules



1.3.2.2 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:



1.3.2.3 Evaporator low temperature T2 protection.

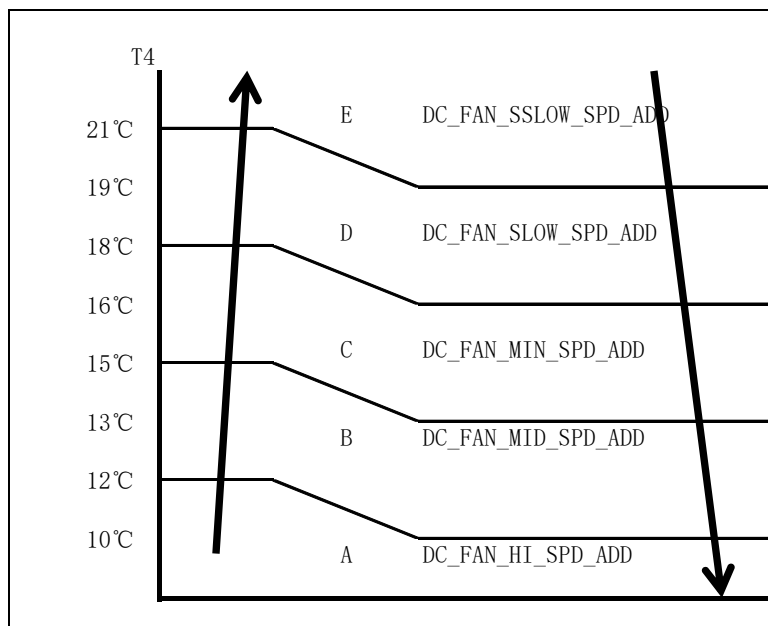
When $T2 < 2^\circ\text{C}$ and lasts for 3 minutes, the indoor has no capacity demand and resume till $T2 \geq 7^\circ\text{C}$.

1.3.2.4 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

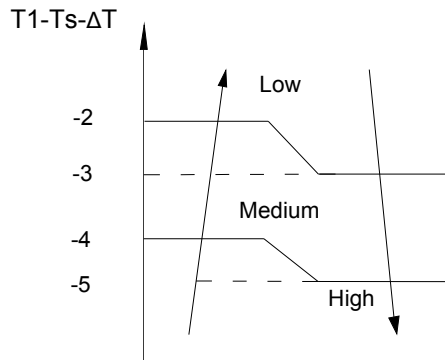
1.3.3.1 Outdoor fan running rules:



1.3.3.2 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:



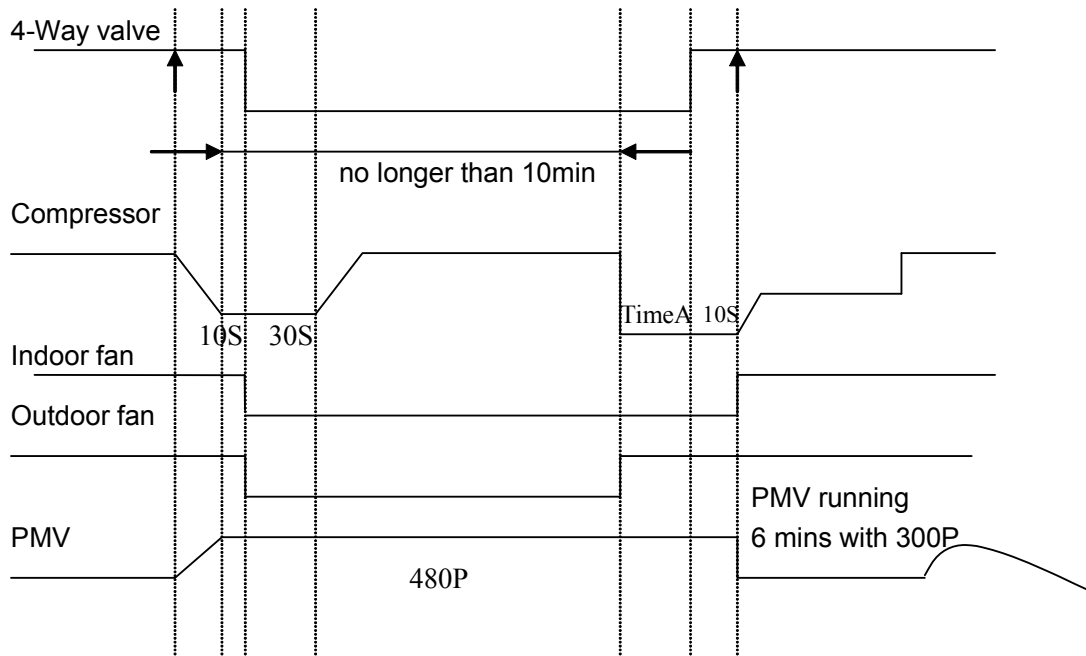
1.3.3.3 Defrosting mode:

For 24-36K models:

Condition of defrosting:

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

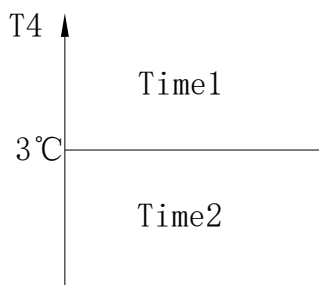
Defrosting action:



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 $T3 > \text{TempQuitDefrost_ADD } ^\circ\text{C}$;
- ② The defrosting time achieves 10min.
- ③ Turn to the other modes or turn off.

For 48-60K models:**Condition of defrosting:****Time conditions:****time1**

Time conditions (Meet the following conditions)

1. Running in heating mode
2. $T4 \geq 3^{\circ}\text{C}$
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.
2. $T3 > \text{TempEnterDefrost_ADD } ^{\circ}\text{C}$

Time2

Time conditions (Meet the following conditions)

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

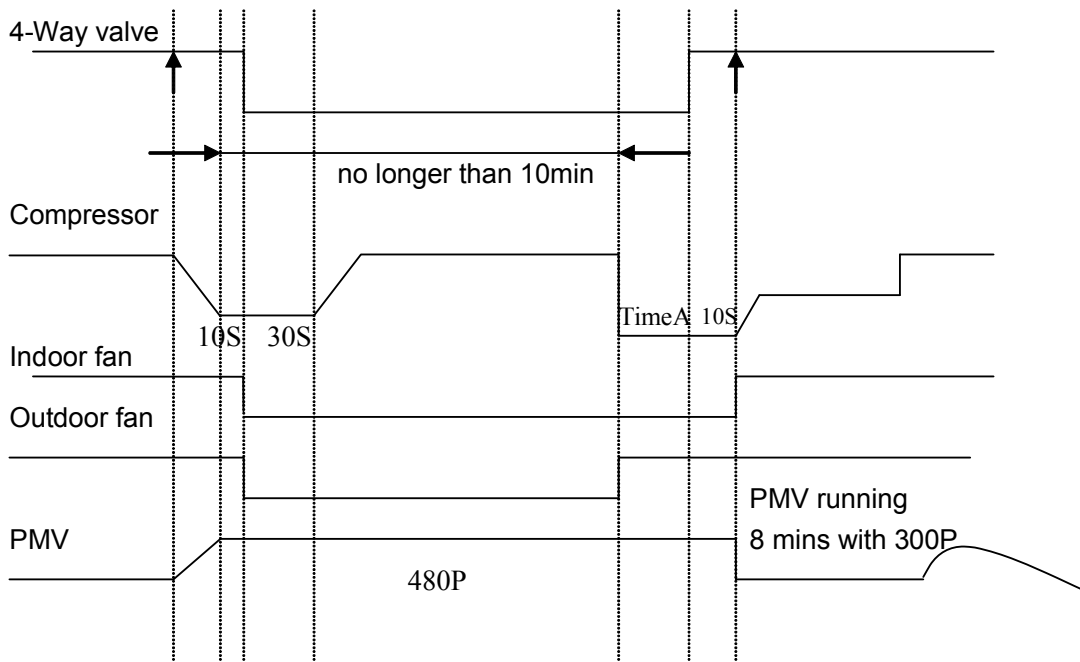
Cleared conditions (Meet any one of the following conditions)

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:

$\text{time1} + \text{time2} \geq 40$ 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 $T_3 \geq 15^\circ\text{C}$;
- ③ $T_3 \geq 7^\circ\text{C}$ for 60seconds.

1.3.3.5 High evaporator coil temp.T2 protection:

$T_2 > 60^\circ\text{C}$, the compressor will stop and restart when $T_2 < 54^\circ\text{C}$.

1.3.4 Auto-mode

This mode can be chosen with remote controller and the setting temperature can be changed between $17\sim 30^\circ\text{C}$.

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
$\Delta T \geq 2^\circ\text{C}$	Cooling
$-1 \leq \Delta T < 2^\circ\text{C}$	Fan-only
$\Delta T < -1^\circ\text{C}$	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

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) 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	Display data = Actual data(HP)*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tenth 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.(Cooling:T2B,Heating: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". If the indoor unit is not connected, the digital display tube will show: "____"
08	Outdoor ambient temp.(T4)	

09	Compressor discharge temp.(T5)	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 tenth digit. (For example, the digital display tube show "0.5" when the compressor discharge temp. is 105 degree. The digital display tube show "1.6" when the compressor discharge temp. is 116 degree).		
10	AD value of current	The display value is a hex number.		
11	AD value of voltage			
12	Indoor unit running mode code	Off:0, Fan only 1, Cooling:2, Heating:3		
13	Outdoor unit running mode code	Off:0, Fan only 1, Cooling:2, Heating:3, Forced cooling:4		
14	EXV open angle	Actual data = Display Data x 4. If the value is higher than 99, the digital display tube will show single digit and tenth digit. For example, the digital display tube show "2.0" when the EXV open angle is 120×4=480p.)		
15	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is a 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 T5.	
		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 tenth digit. For example, the digital display tube show "0.5" when the IGBT radiator temp. is 105 degree. The digital display tube shows "1.6" when 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			

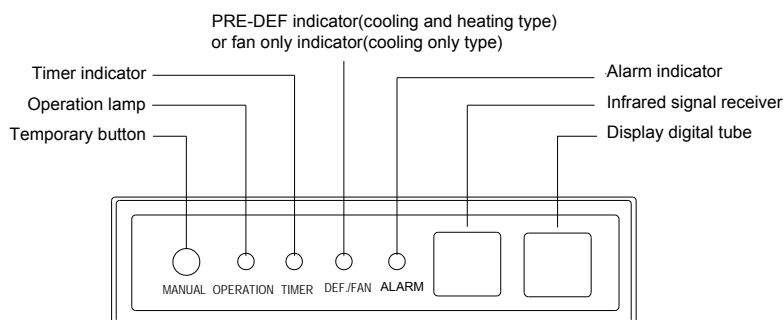
Electrical Control Function

22	1# Indoor unit capacity demand code	<p>Actual data(HP) = Display Data / 10</p> <p>If capacity demand code is higher than 99, the digital display tube will show single digit and tenth digit. For example, the digital display tube shows "5.0" when the capacity demand is 15. The digital display tube shows "60" when the capacity demand is 6.0. If the indoor unit is not connected, the digital display tube will show: "——"</p>
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 (High Static Pressure Duct)



2.2 Indoor unit malfunction

NO.	Malfunction	Running lamp	Timer lamp	Defrosting lamp	Alarm 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 has been out of control	☆	☆	X	X	E8

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

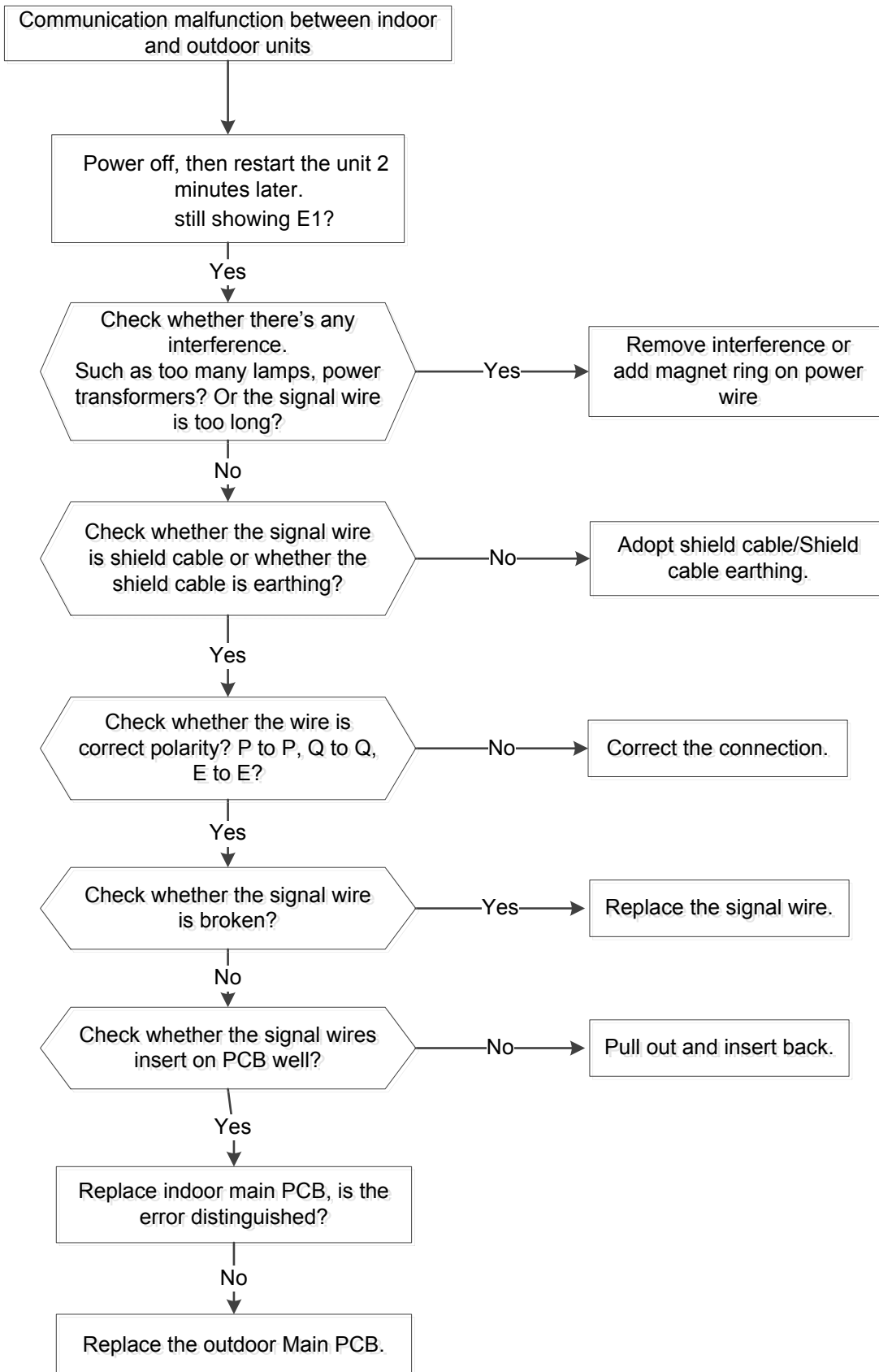
2.3 Outdoor unit malfunction

Display Code	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 (For 30K-60K)
E8	Outdoor fan speed has been out of control
P0	Top temperature protection of compressor
P1	High pressure protection
P2	Low pressure protection
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

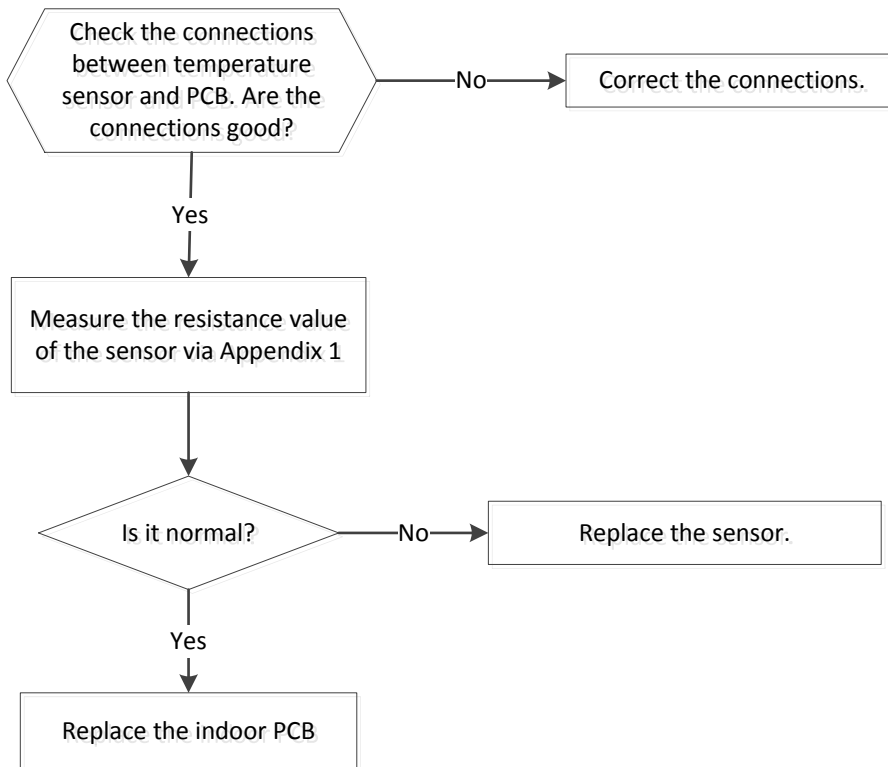
2.4 Solving steps for typical malfunction

2.4.1 For the indoor unit

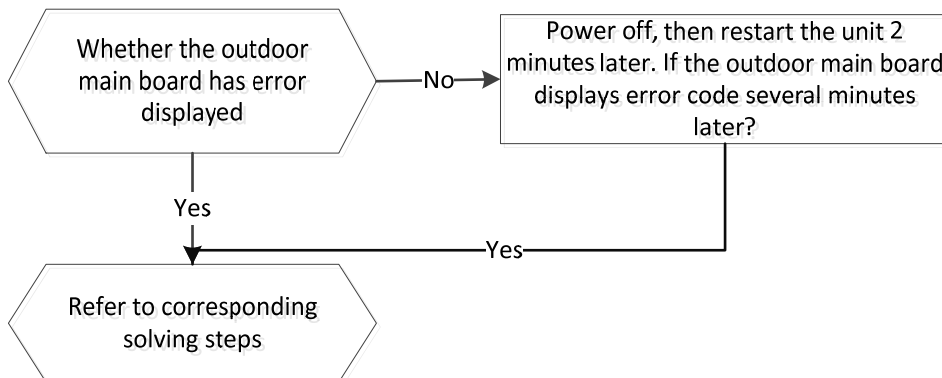
2.4.1.1 Communication malfunction between indoor and outdoor units.(E1)



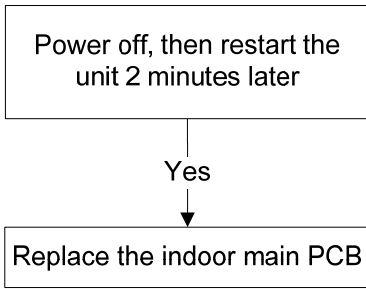
2.4.1.2 Open or short circuit of temperature sensor(E2,E3,E4)



2.4.1.3. Outdoor unit malfunction(Ed)

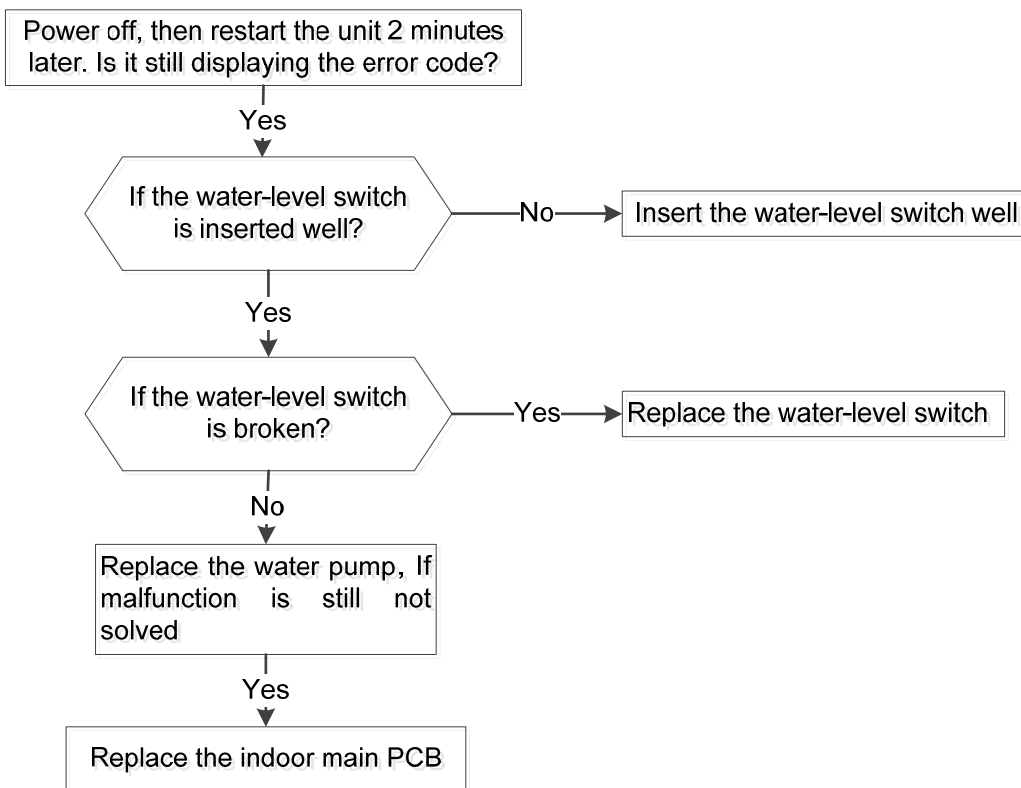


2.4.1.4. Indoor EEPROM malfunction(E7)

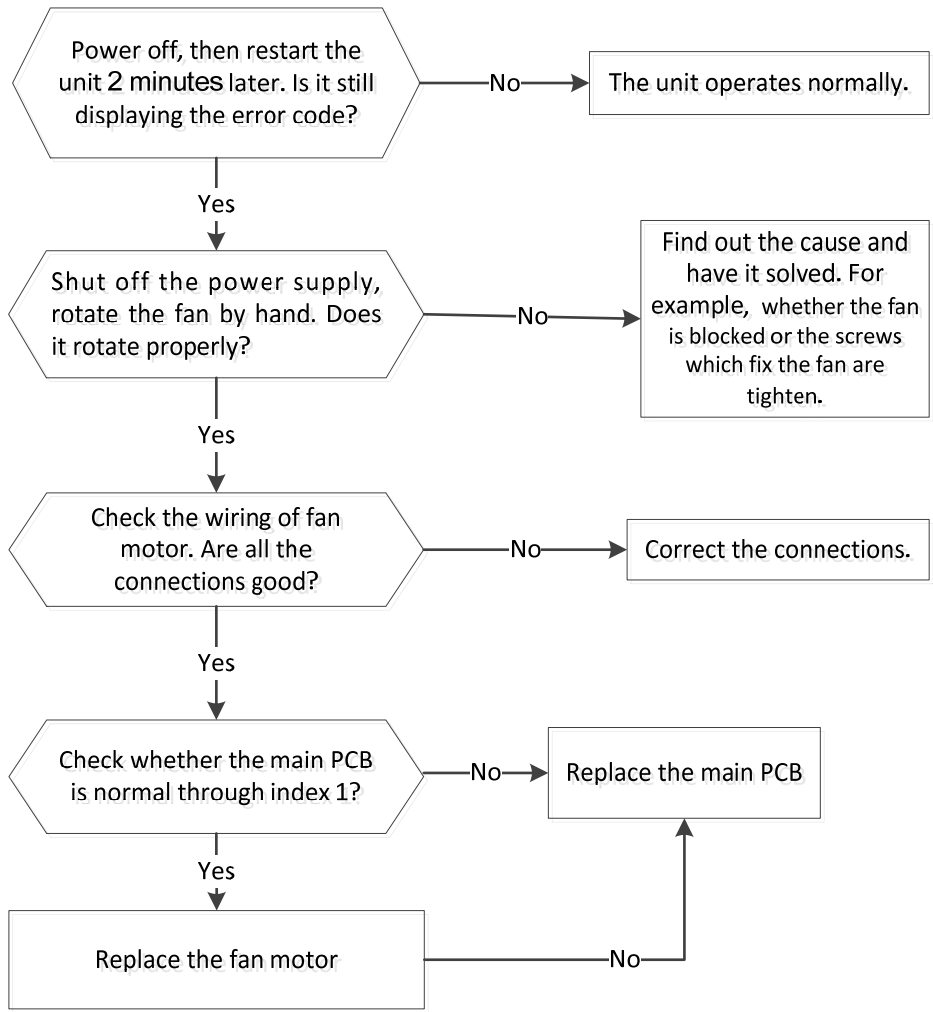


EEPROM: An electrically erasable programmable read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

2.4.1.5. Water-level alarm malfunction(EE)



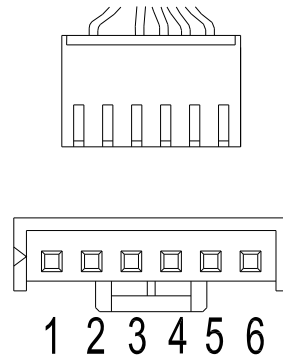
2.4.1.6. Indoor fan Speed has been out of control. (E8)



Index 1:

1. Indoor DC fan motor(control chip is inside fan motor)

Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.

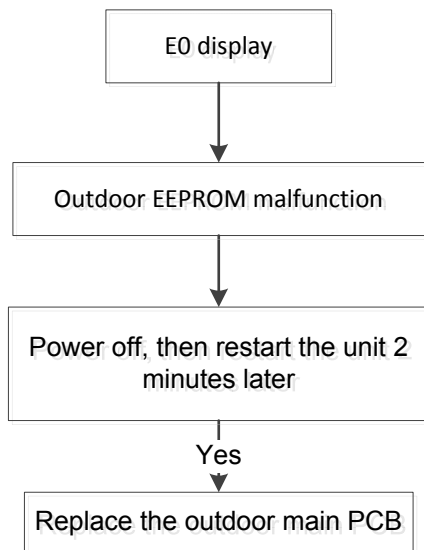


DC motor voltage input and output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	200~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5~16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5~16.5V

2.4.4 For the outdoor unit

2.4.4.1. E0 malfunction

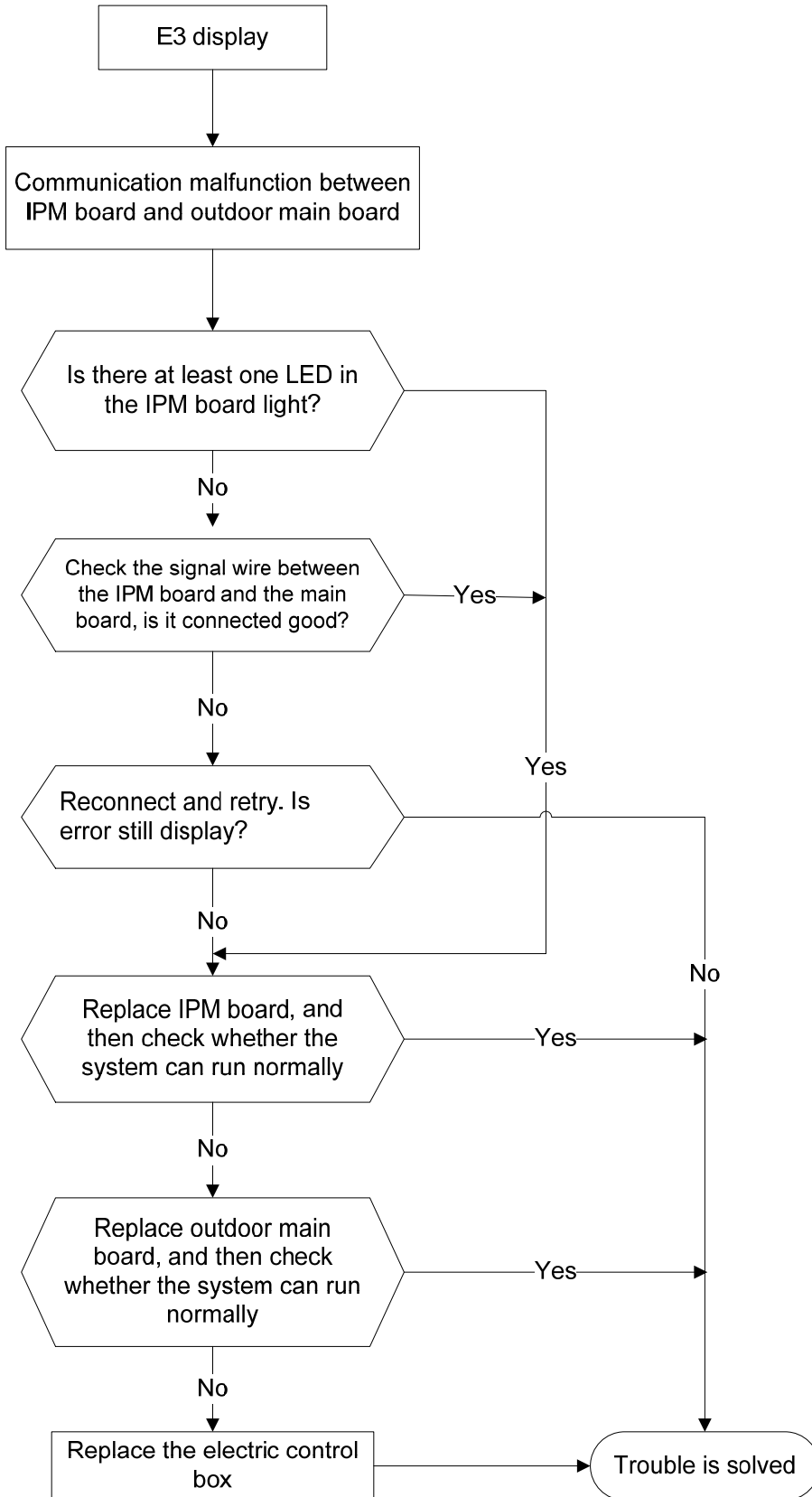


EEPROM: An electrically erasable programmable read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

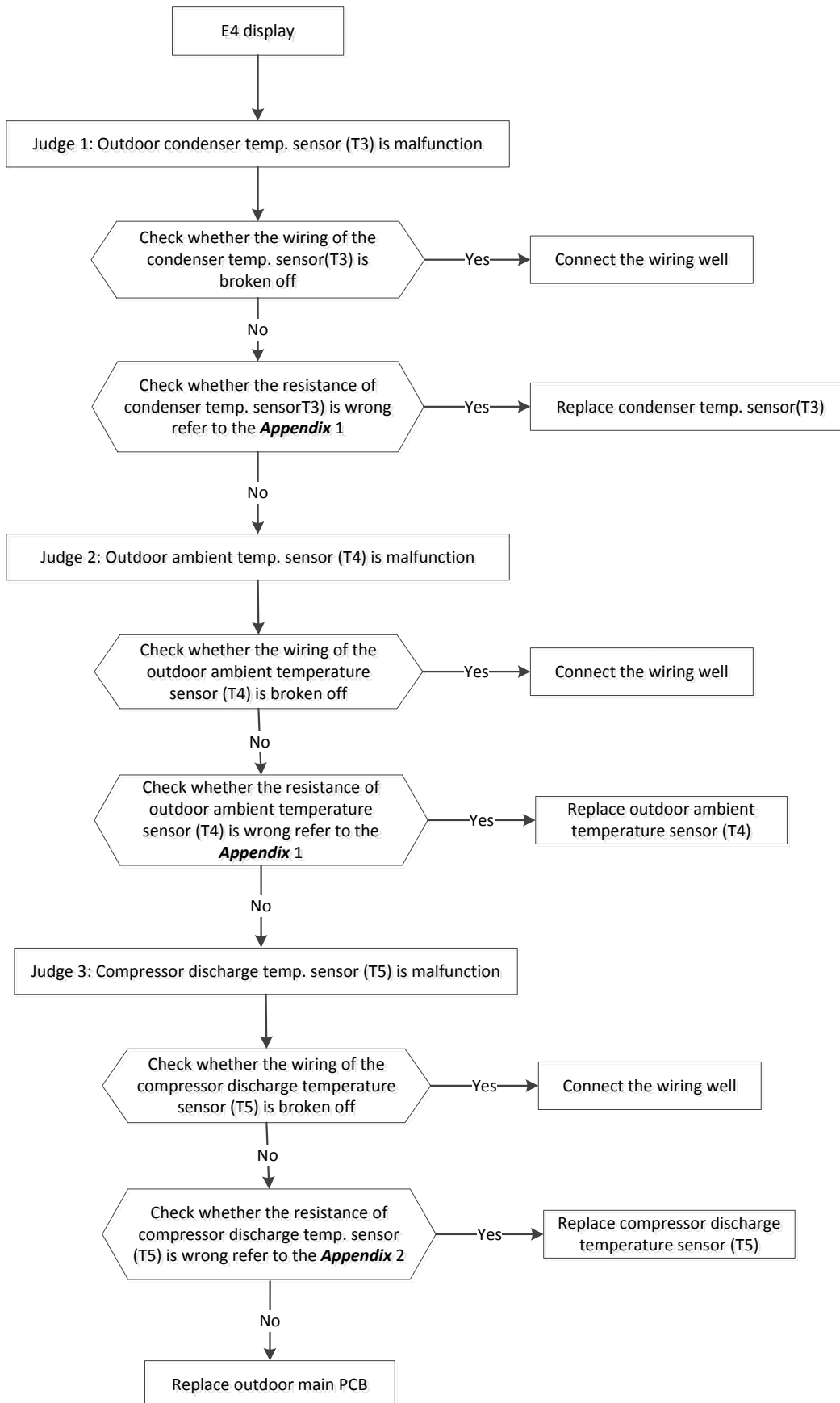
2.4.4.2. E2 malfunction

The same as E1 in indoor

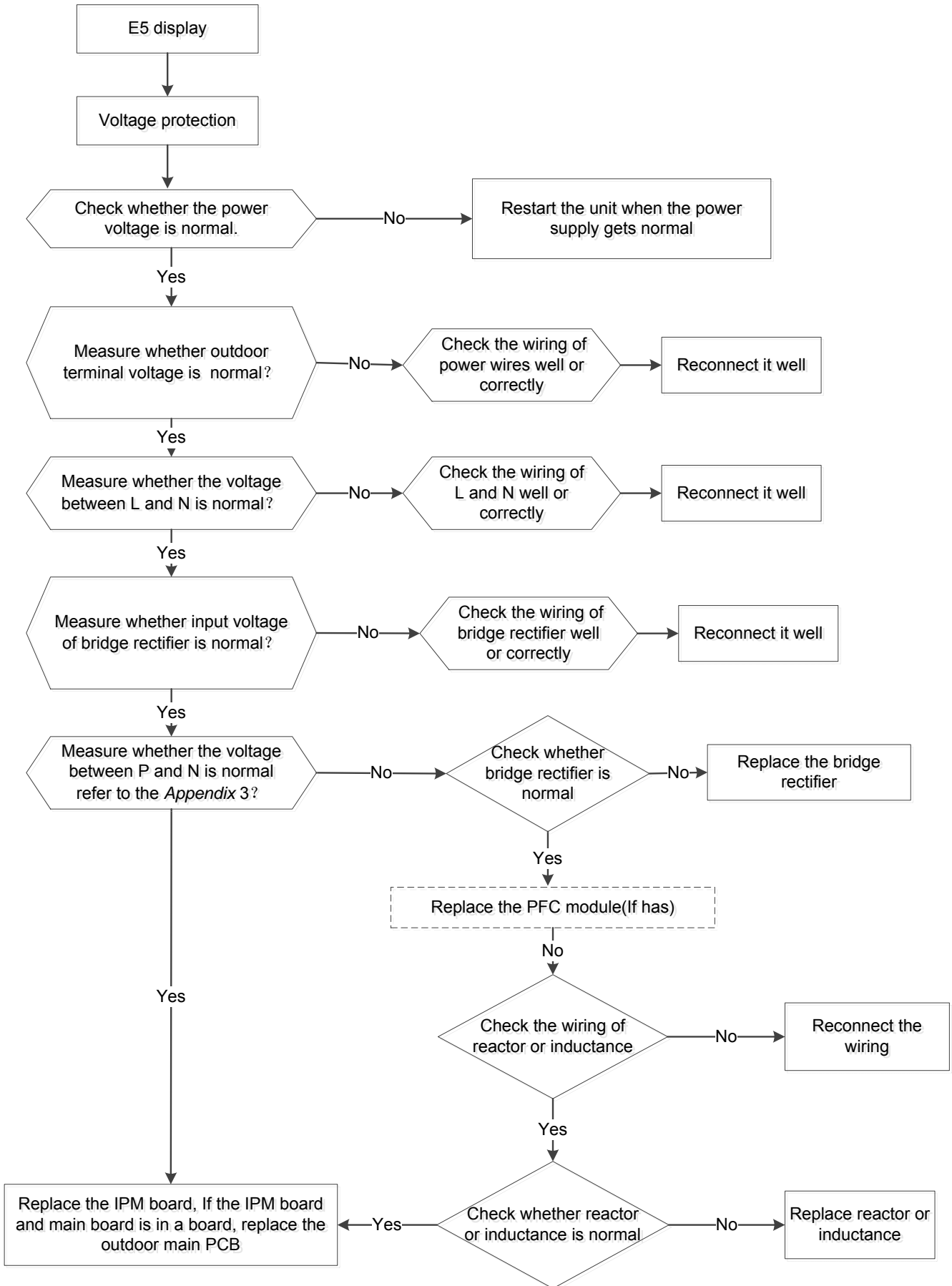
2.4.4.3. E3 malfunction



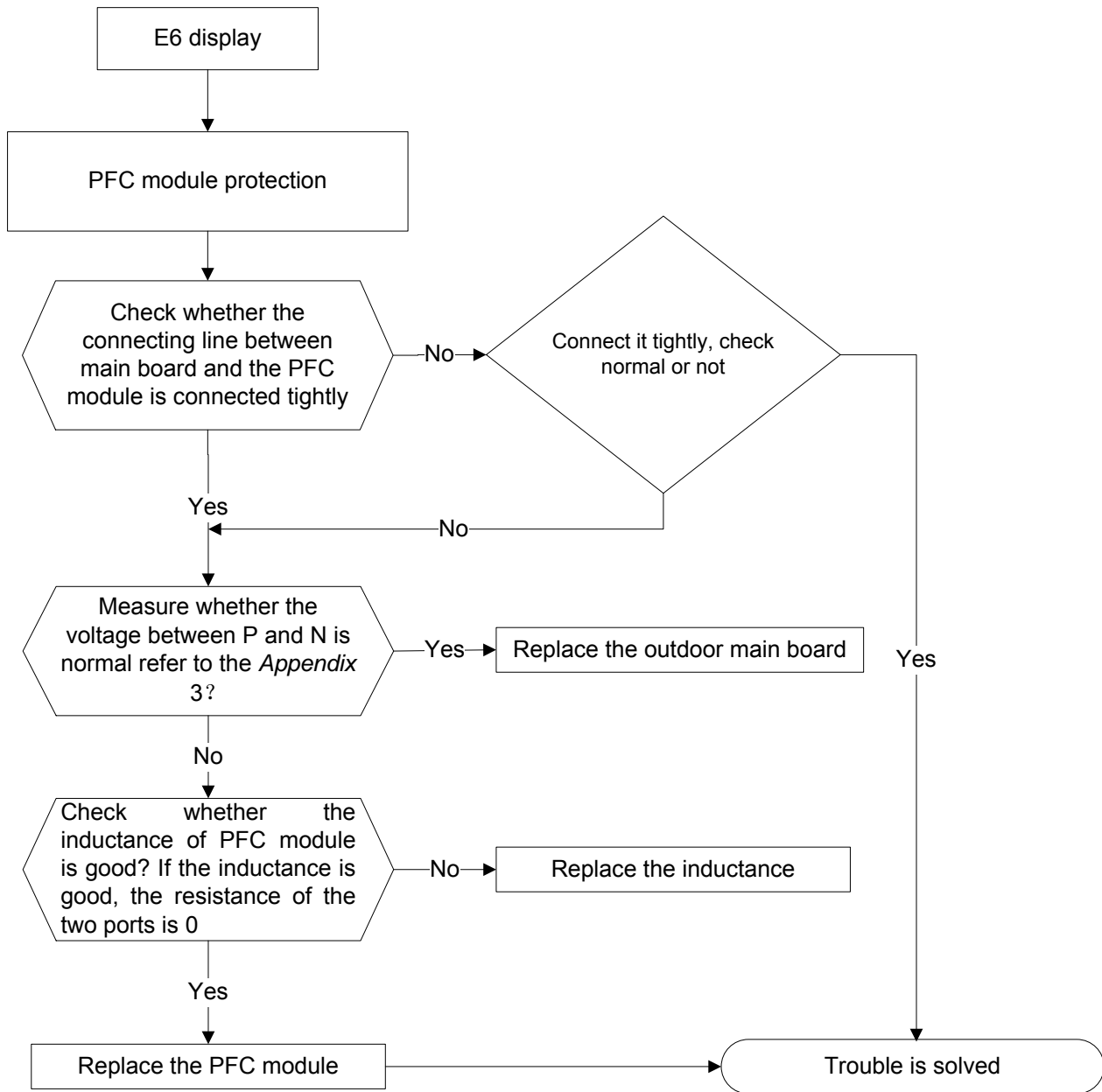
2.4.4.4. E4 malfunction



2.4.4.5. E5 malfunction



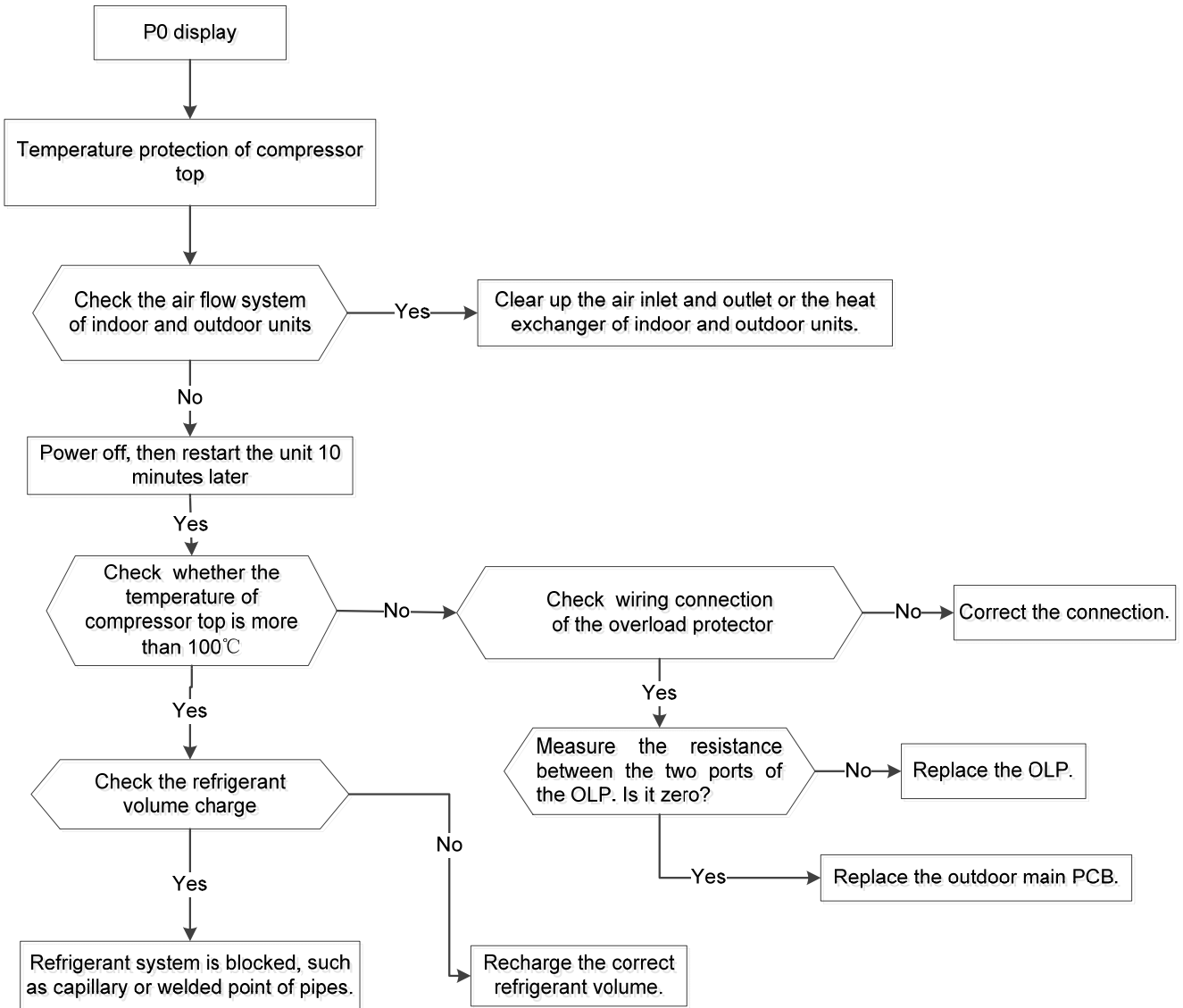
2.4.4.6. E6 malfunction (Only for 36K~60K)



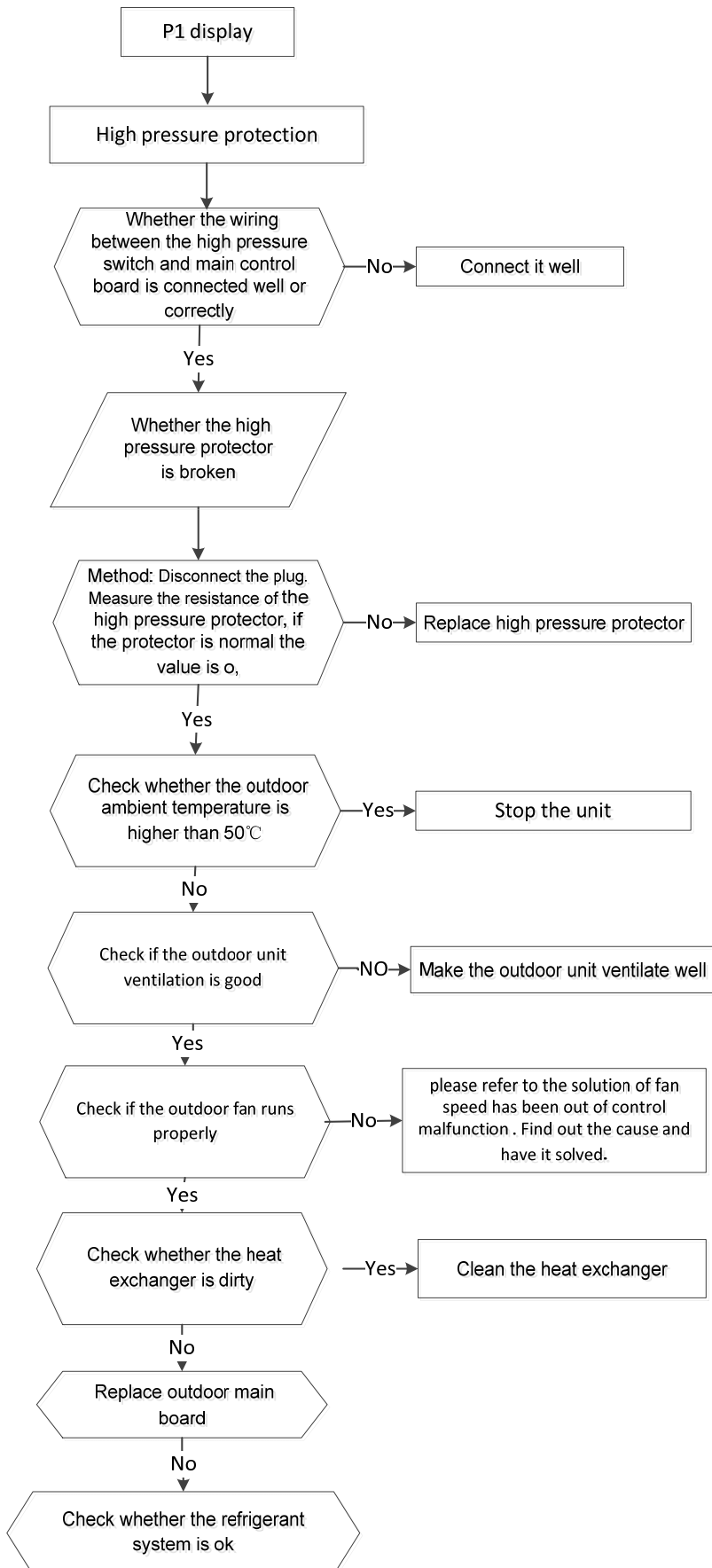
2.4.4.7. E8 malfunction

Same as E8 in indoor

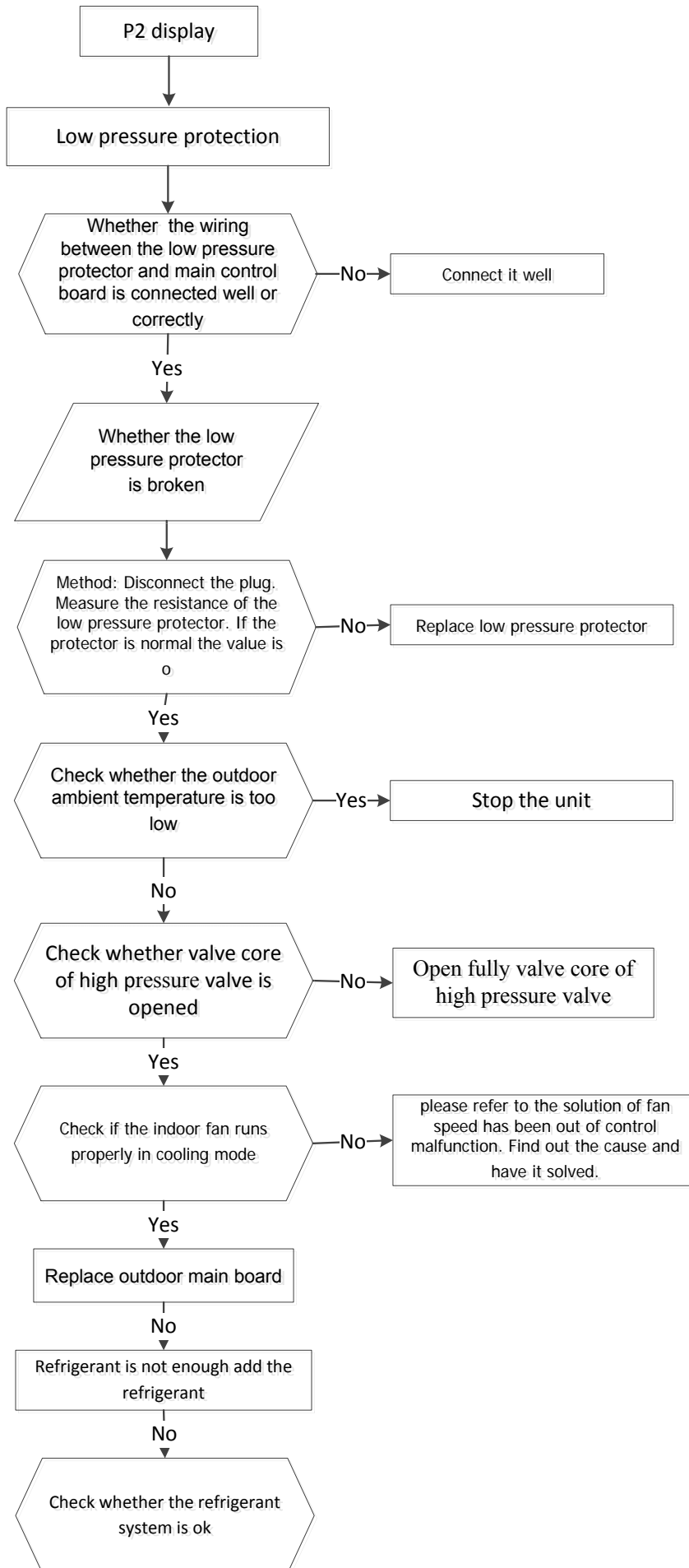
2.4.4.8. P0 malfunction



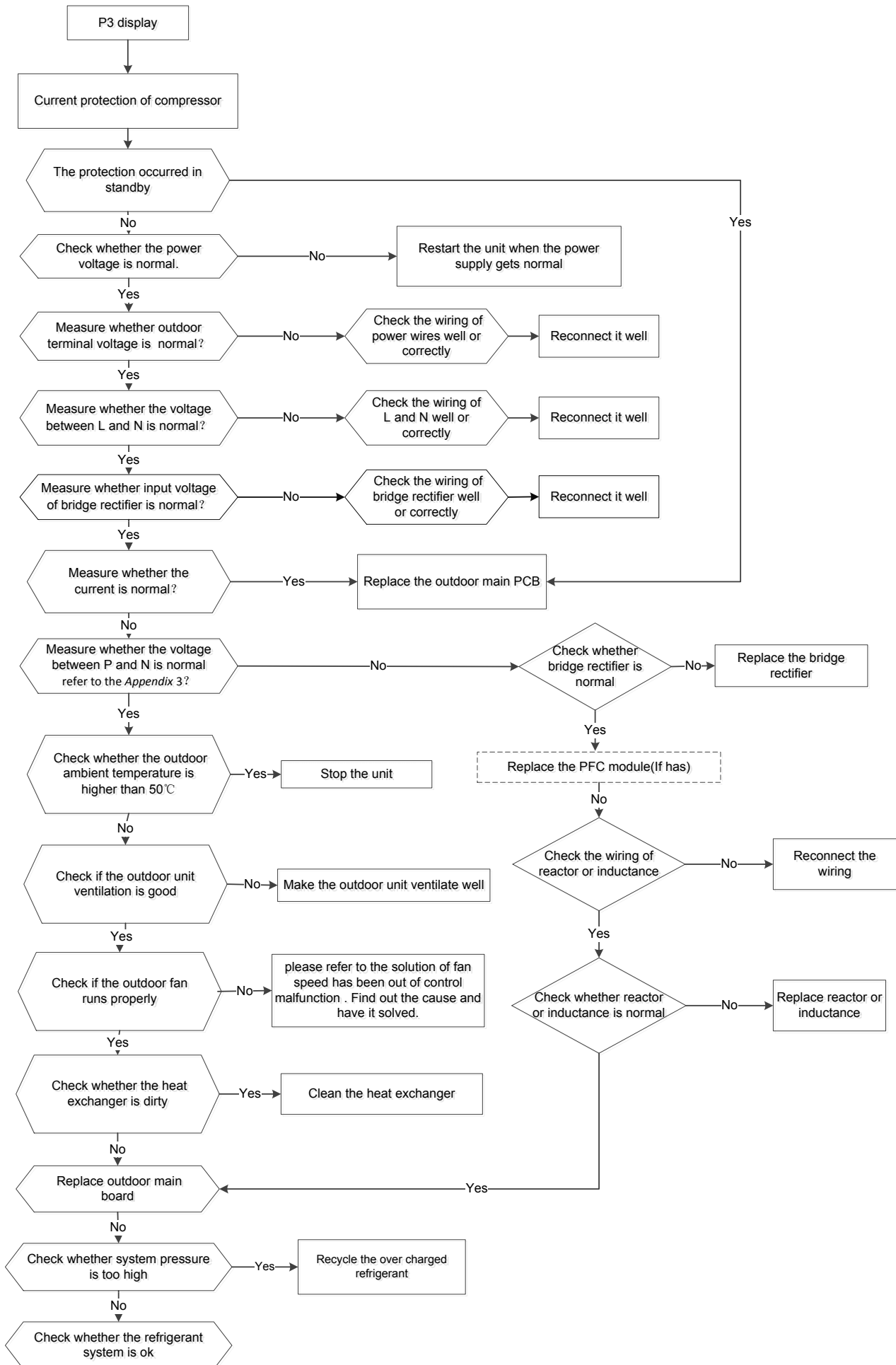
2.4.4.9. P1 malfunction (Only for 30K~60K)



2.4.4.10. P2 malfunction (Only for 30K~60K)

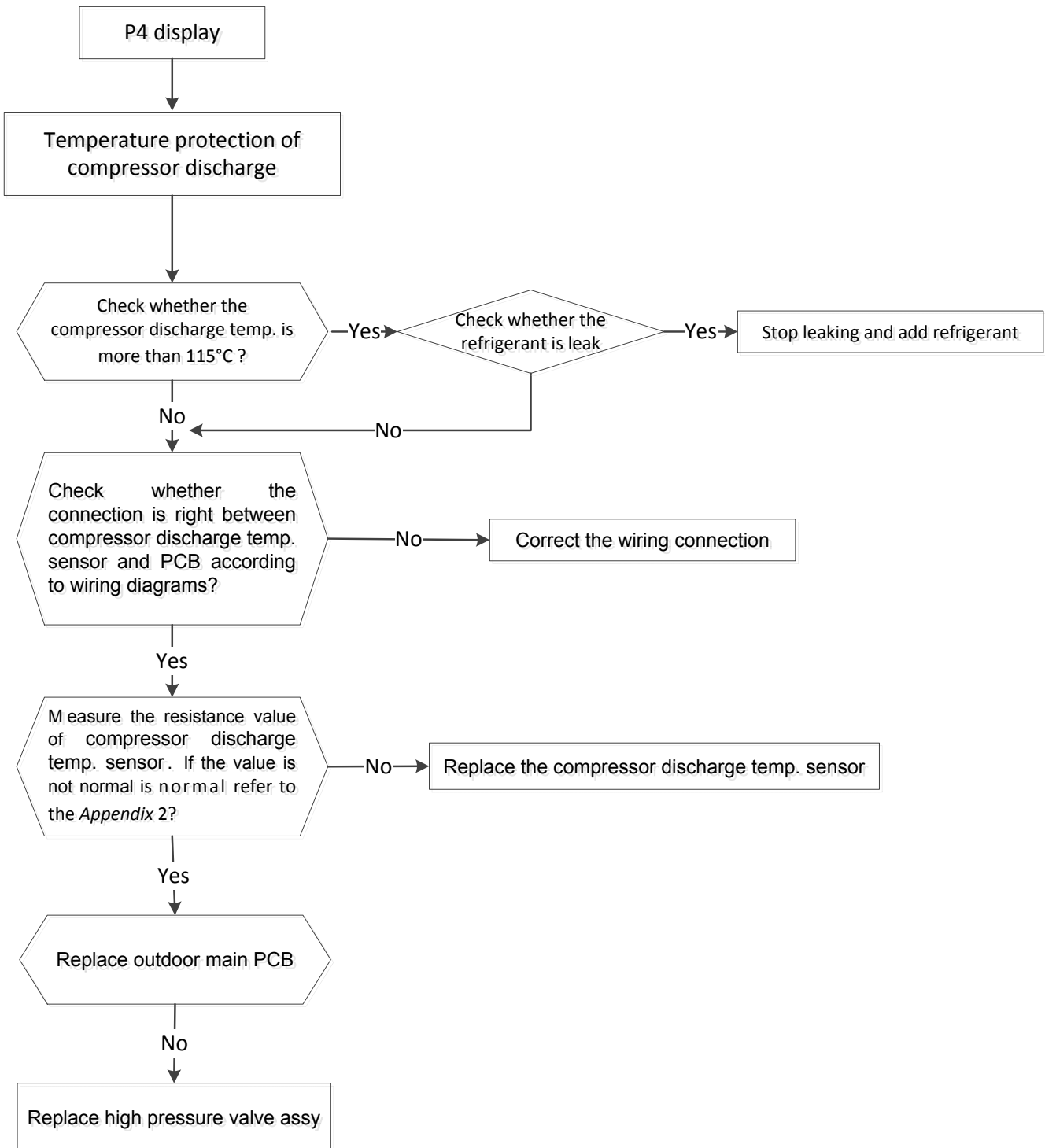


2.4.4.11. P3 malfunction



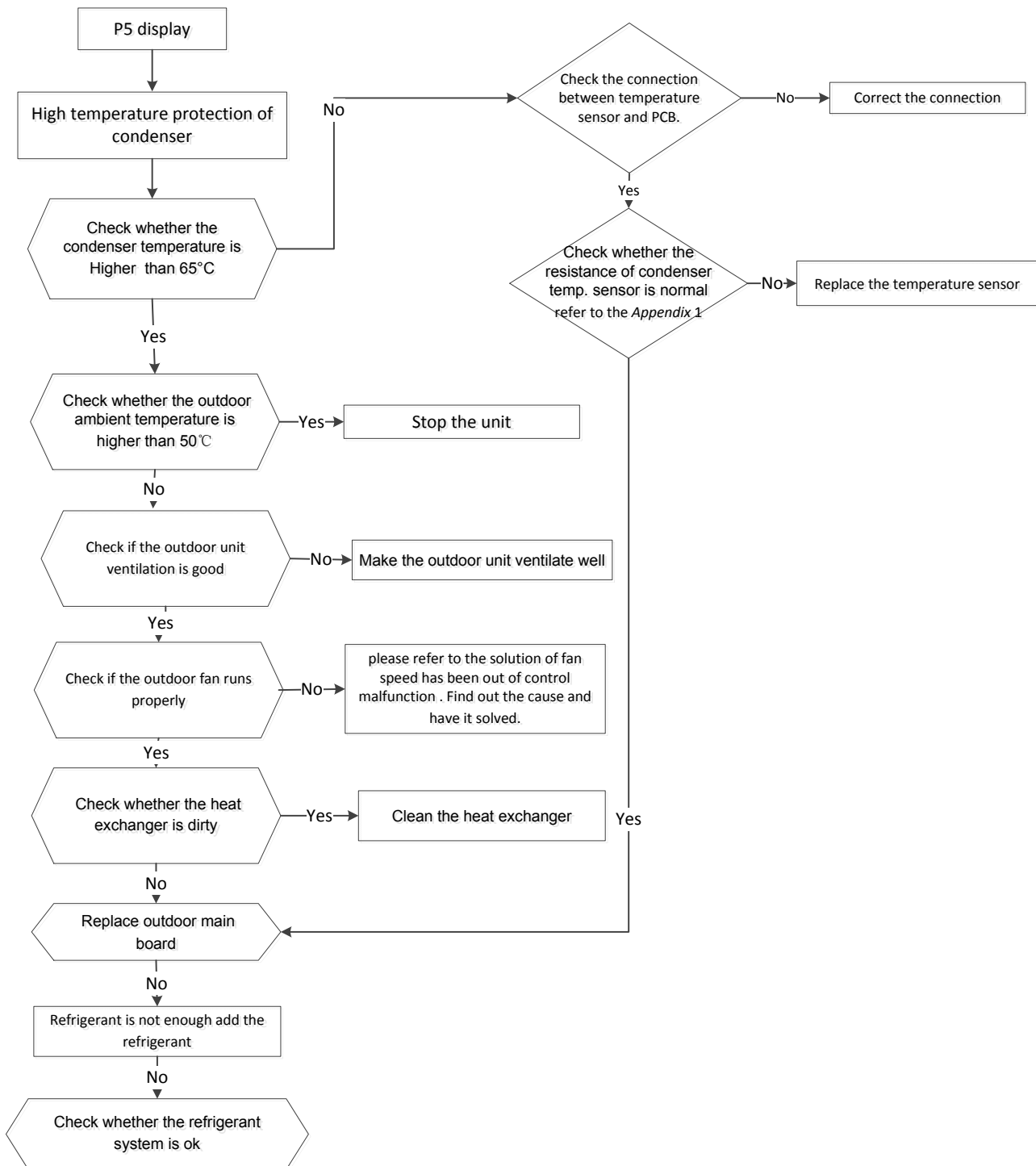
2.4.4.12. P4 malfunction

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.



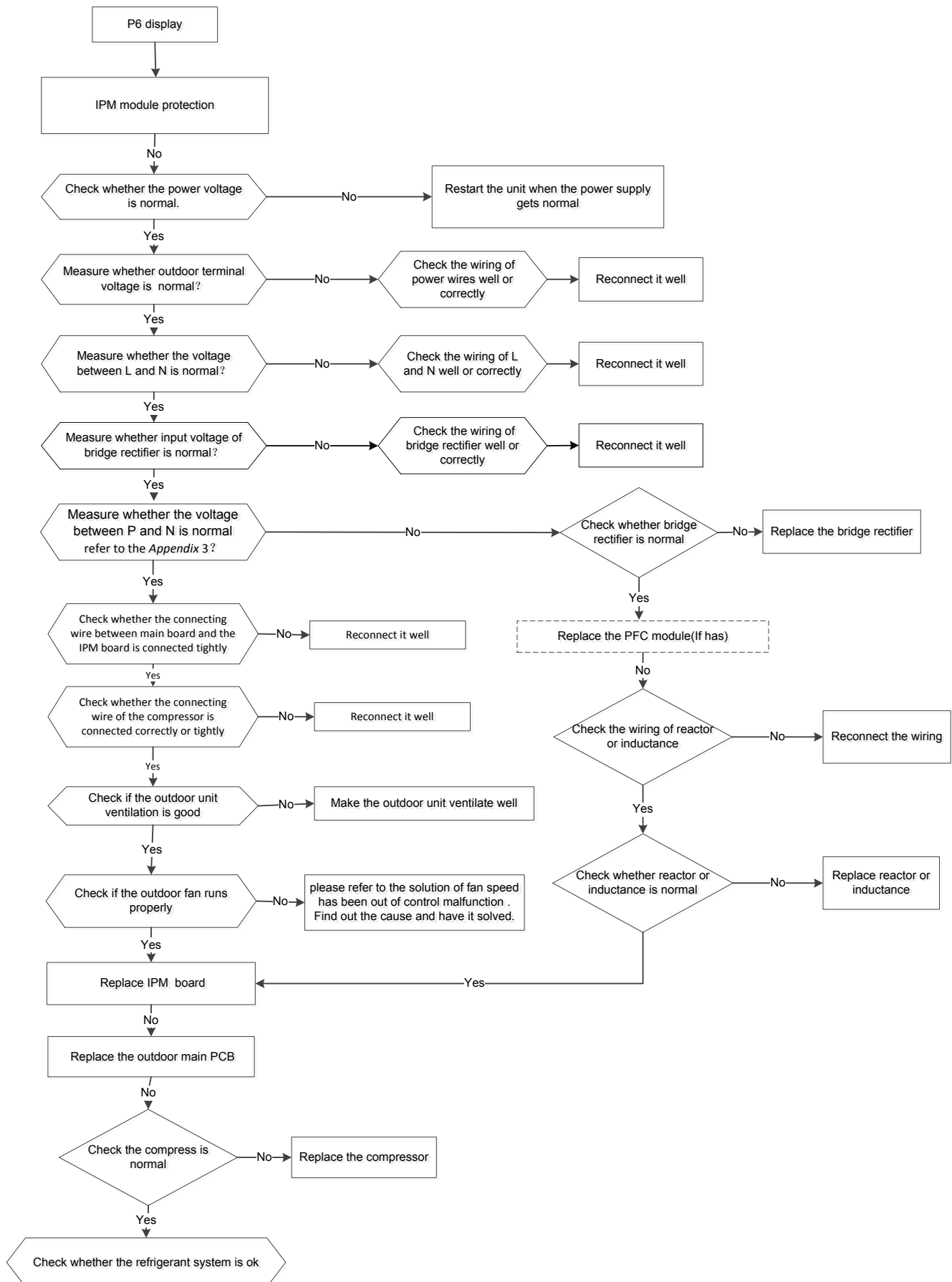
2.4.4.13. P5 malfunction

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.

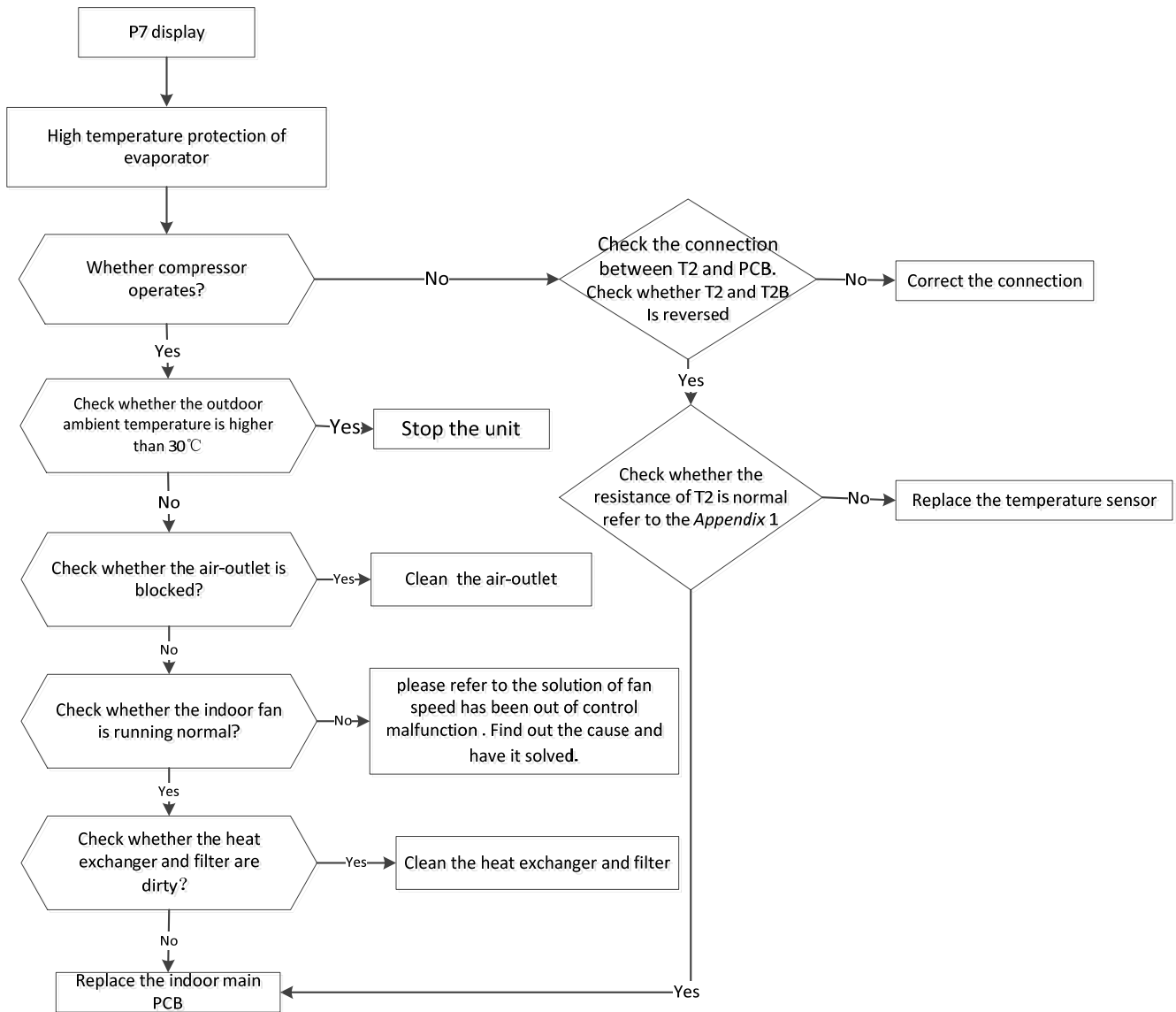


2.4.4.14. P6 malfunction

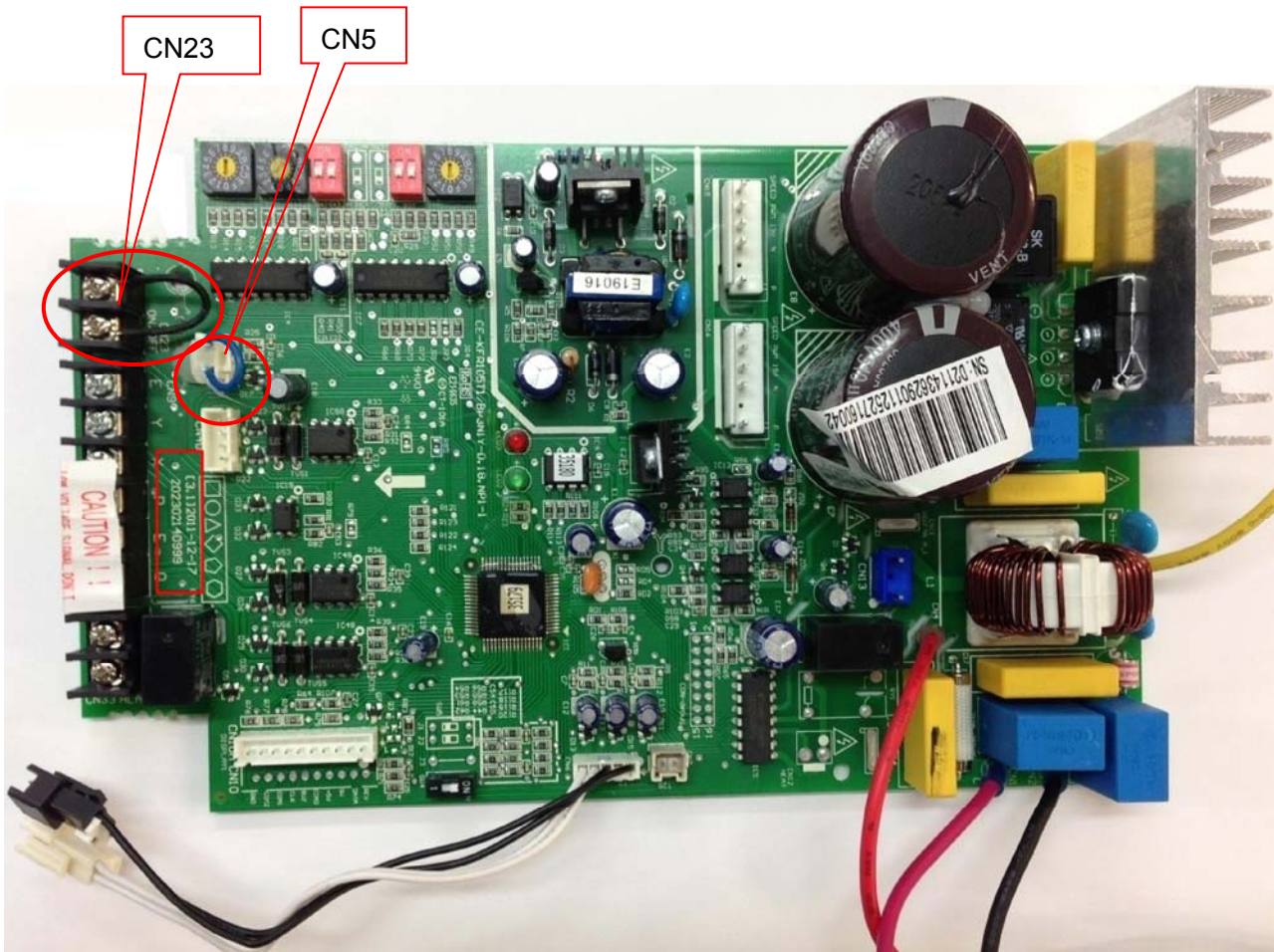
At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:



2.4.4.15. P7 malfunction



Note: If you replace the indoor PCB, you should short the CN23 and CN5 as picture.



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	10.0000	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		

Appendix 3

Normal voltage of P and N			
208-240V(1-phase,3-phase)		380-420V(3-phase)	
In standby			
around 310VDC		around 530VDC	
In operation			
With passive PFC module	With partial active PFC module	With fully active PFC module	/
>200VDC	>310VDC	>370VDC	>450VDC

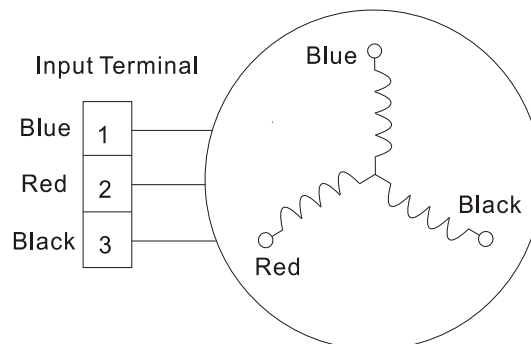
Appendix 4

Spec.

Indoor code	220070302010	220070401600	220070502550
Indoor	MHG-24HWFN1-Q	MHG-30HWFN1-Q	MHG-36HWFN1-Q
Indoor fan motor	WZDK150-38GS-W(★)	WZDK560-38GS-W(★)	WZDK560-38GS-W(★)
Indoor code	220070702450	220070802440	220070502940
Indoor	MHG-48HWFN1-Q	MHG-60HWFN1-Q	MHG-36HWFN1-Q
Indoor fan motor	WZDK560-38GS-W	WZDK560-38GS-W	WZDK560-38GS-W
Outdoor code	220075301980	220075401880	220075502510
Outdoor	MOU-24HFN1-Q	MOU-30HFN1-Q	MOU-36HFN1-Q
Compressor	DA250S2C-30MT	DA250S2C-30MT	TNB306FPGMC-L
Outdoor fan motor	WZDK72-38G	WZDK72-38G	WZDK180-38G
Outdoor code	220075702380	220075802520	220075502890
Outdoor	MOU-48HFN1-Q	MOU-60HFN1-Q	MOJU-36HFN1-Q
Compressor	MNB36FAAMC-L	ANB42FBSMT	TNB306FPGMC-L
Outdoor fan motor	WZDK85-38G	WZDK85-38G	WZDK180-38G

1.Compressor checking

Measure the resistance value of each winding by using the tester.



Position	Resistance Value			
	DA250S2C-30MT	TNB306FPGMC-L	MNB36FAAMC-L	ANB42FBSMT
Blue - Red	0.55Ω (20°C)	0.53Ω (20°C)	0.44Ω (20°C)	0.188Ω (20°C)
Blue - Black				
Red - Blue				

2. IPM continuity check

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and dismount the IPM. Use a digital tester to measure the resistance between P and UVWN; UVW and N.

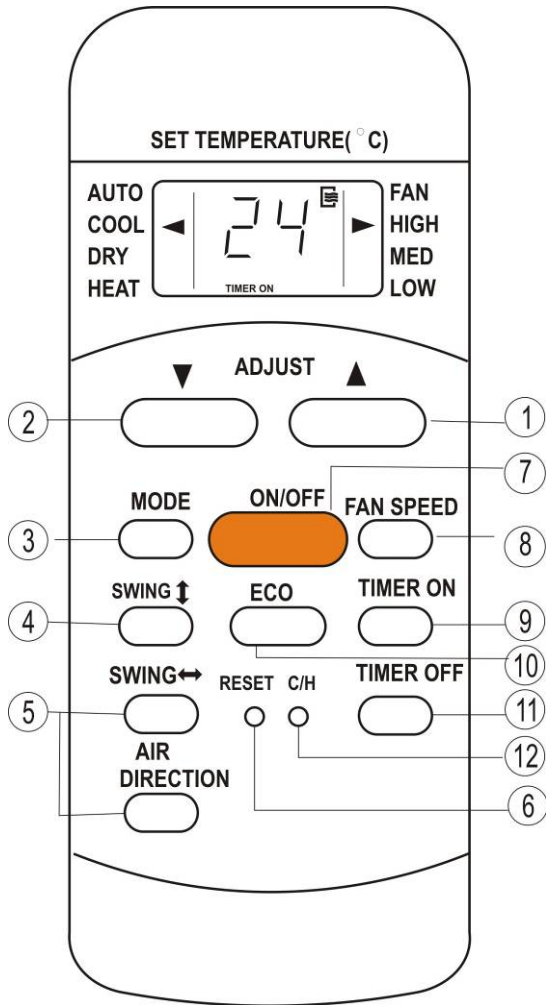
Digital tester		Normal resistance value
(+)Red	(-)Black	∞ (Several MΩ)
P	N	
	U	
	V	
	W	

Digital tester		Normal resistance value
(+)Red	(-)Black	∞ (Several MΩ)
U	N	
V		
W		

3. Controller

3.1 Wireless Remote Controller

3.1.1 RG51Q1/BGE



General Function for wireless remote controller:

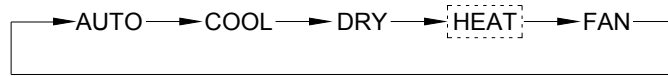
Model	RG51Q1/BGE
Rated voltage	3.0V(2pieces of LR03 7 # batteries)
Min voltage for sending signal of CPU	2.4V
Effective receiving distance	8m~11m
Operation condition	-5~60°C

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.

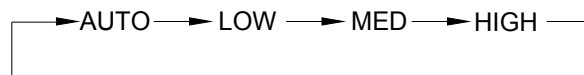
4. **VERT SWING**: Used to stop or start horizontal louver movement or set the desired up/down air flow direction. The louver changes 6 degree in angle for each press. If keep pushing more than 2 seconds, the louver will swing up and down automatically.

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.

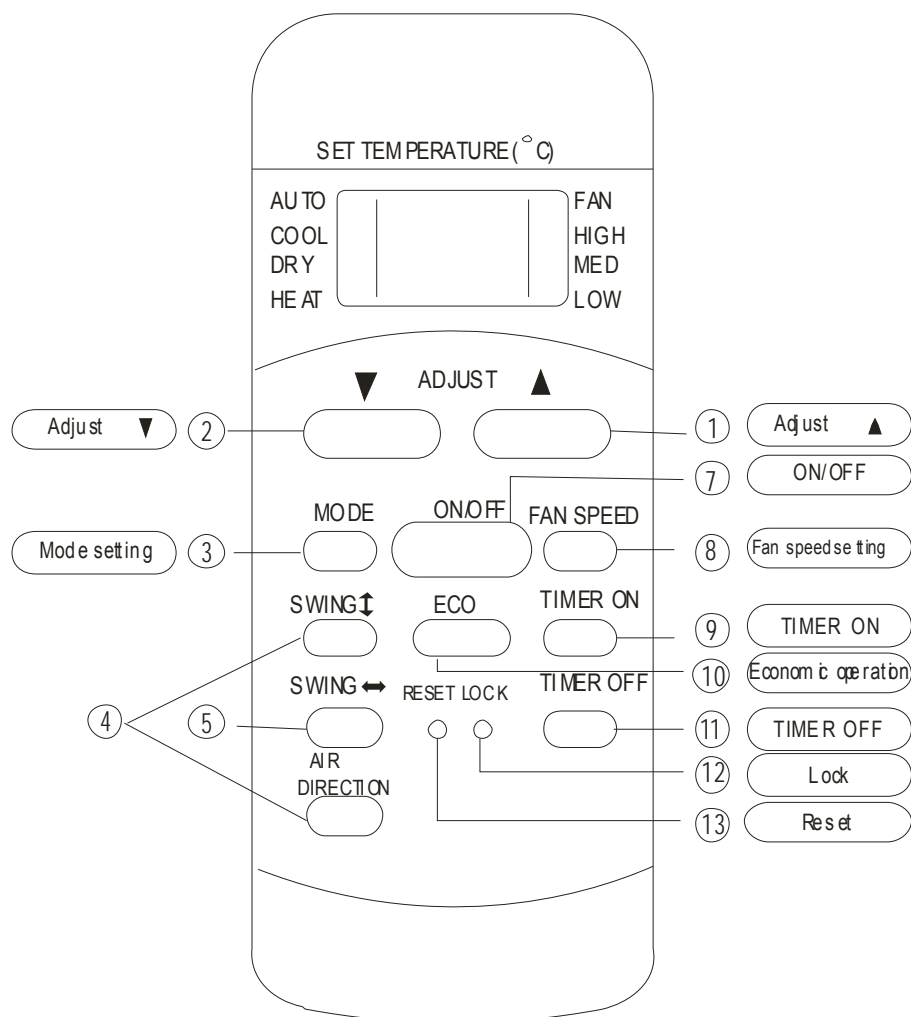
13. **RESET** (inner located): Press this button with a needle of 1mm to cancel the current setting and reset remote controller.

3.1.2 RG51C/E

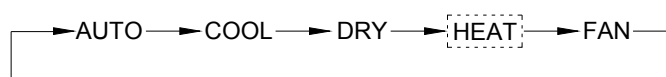
Remote Controller Specifications

Model	RG51C/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



- Adjust ▼** : Decrease the set temp. Keeping pressing will decrease the temp with 1°C per 0.5s.
- Adjust ▲** : Increase the set temp. Keeping pressing will increase the temp with 1°C per 0.5s.
- 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. The louver will swing up and down automatically if push this button.

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

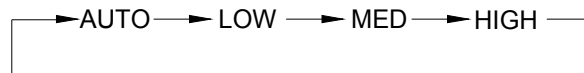
angle for each press.

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

6. FAN SPEED+ MODE: Press the Mode and Fan speed button simultaneously for 2 seconds. The remote controls into faceplate setting state and the LCD shows F2. Press the TEMPUP(▲) to control the faceplate up and press the TEMP DOWN(▼) to control the faceplate down. Press any button to exit the faceplate setting state, then the LCD back to the normal display.

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: Select this function during the sleeping time. It can maintain the most comfortable temperature and save energy. This function is available on COOL, HEAT or AUTO mode only .

NOTE: While the unit is running under Energy-saving mode, it would be cancelled if press MODE, FAN SPEED or ON/OFF button.

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. LOCK (inner located): Push this button to lock in all the current settings, and the remote controller will not accept any operation except that of the LOCK. Use the LOCK mode when you want to prevent settings from being changed accidentally. Press the LOCK button again to cancel the LOCK function. A lock symbol will appear on the remote controller display when the lock function is activated.

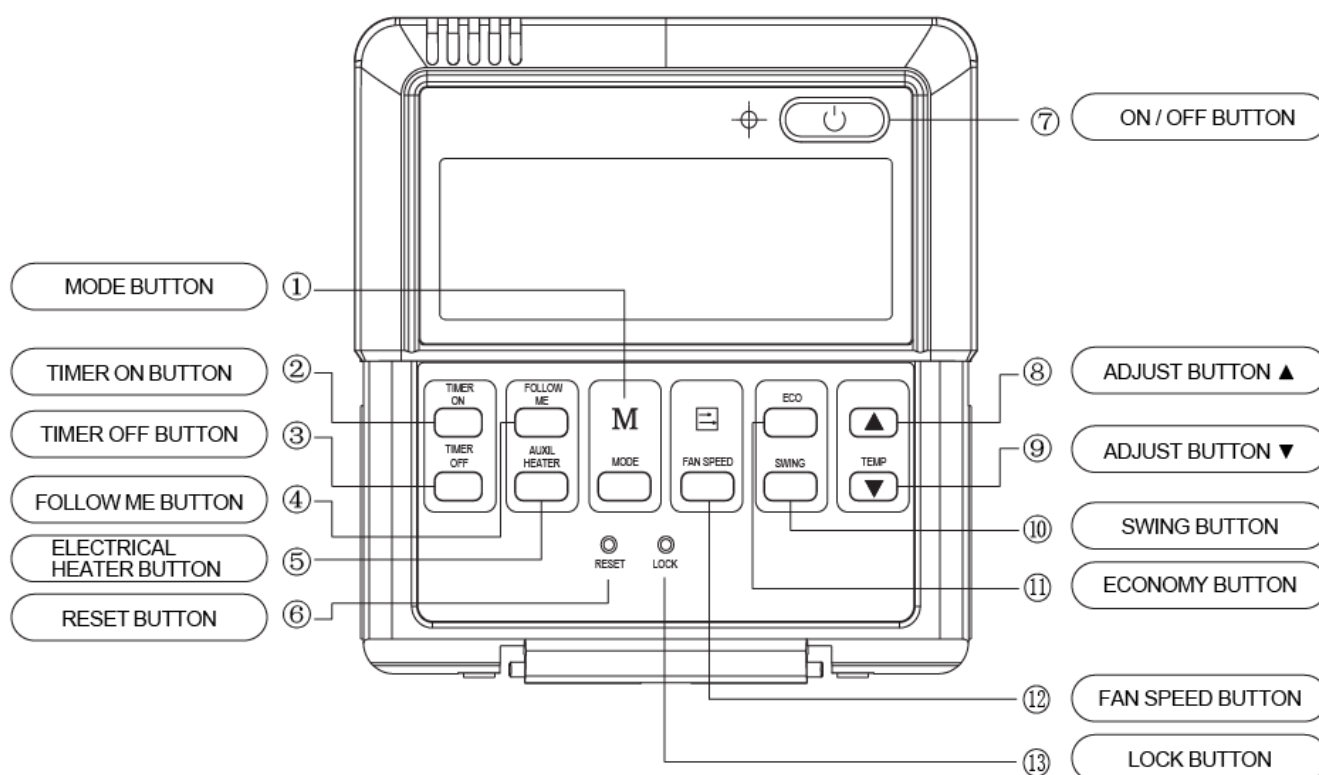
13. RESET (inner located): Once the recessed RESET button is pressed, all of the current settings will be cancelled and the controller will return to the initial settings..

3.2 Wired Remote Controller

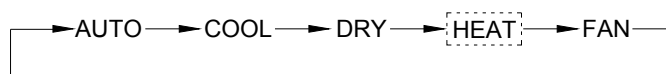
3.2.1 KJR-12B



Name and functions of buttons on the wire controller



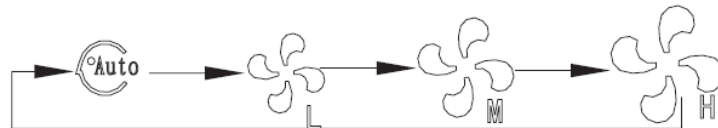
1. Mode button: When press this button, the operation mode change as the following sequence:



Remark: For the cooling only model, the heating mode is skipped.

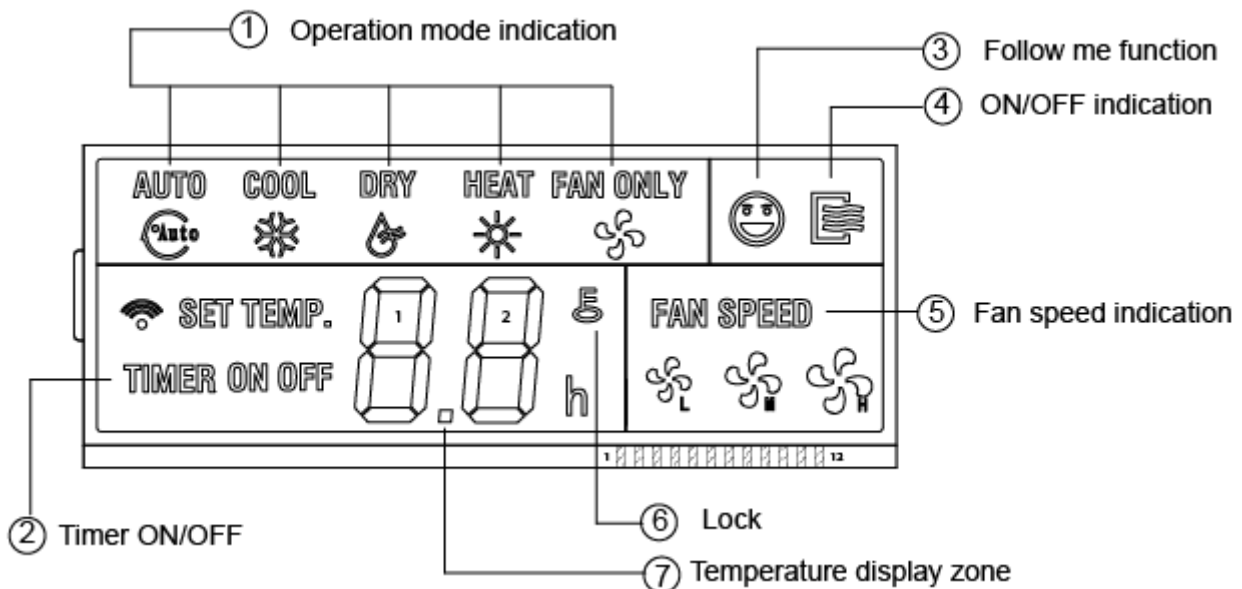
2. Timer on button: Press this button, timer on function is active. Then every press, the time increase 0.5h, after 10h, 1h increasement after each press. If cancel this Function, just set it to "0.0"
3. Timer off button: Press this button, timer off function is active. Then every press, the time increase 0.5h, after 10h, 1h increasement after each press. If cancel this function, just set it to "0.0" .
4. Follow me button: When under cool, heat and auto mode, press this button, follow me function is active. Press again, this function is ineffective.
5. Electrical heater button: If press this button in heat mode, electrical heater function become ineffective.

6. Reset button (hidden): Use a 1mm stick to press in the little hole , then the current setting is canceled . The wire controllers enter into original state.
7. ON/OFF button: When in off state, press this button, the indicator is on, the wire controller enter into on state, and send setting information to indoor PCB. When in on state, press this button, the indicator is off, and send instruction. If timer on or timer off has been set, it cancel this setting then send instruction to stop the machine.
8. Adjust button: Set indoor temperature up. If press and hold on, it will increase at 1degree per 0.5 second.
9. Adjust button: Set indoor temperature down. if press and hold on, it will decrease at 1degree per 0.5 Second.
10. Swing button: First press, start swing function; second press, stop swing. (Match to some model with swing function).
11. Economy operation button: press this button, the indoor unit operates in economy mode, press again, exit this mode (it may be ineffective for some models)
12. Fan speed button: press this button consecutively; the fan speed will circle as follow:



13. Lock button (hidden): When you push the LOCK button, all current settings are locked in and the wire controller does not accept any operation except that of the LOCK button. Use the lock mode when you want to prevent setting from being changed accidentally or play fully. Push the LOCK button again when you want to cancel the LOCK mode.

Name and function of LCD on the wire controller



1. Operation mode indication: When press" MODE" button, the following mode can be selected in circle.
 Auto Cool Dry Heat Fan only Auto.
 Auto→ Cool→ Dry →Heat→ Fan only →Auto
 For cooling only model, heat mode is skipped.

2. Timer: When adjust setting on time or only on time is set, the "ON" is lighted. When adjust setting off time or only off time is set, the "OFF" is lighted. If on and off timer are both set, the "ON" and "OFF" are both lighted.
3. Follow me function: There is a temperature sensor inside the wire controller, after setting temperature, it will compare the two temperatures, and the space of wire controller will be the same as setting temperature. It is available under cooling, heating, auto mode.
4. ON/OFF indication: When it is on, the icon display, otherwise it is extinguished.
5. Fan speed indication: There are four fan modes: low, middle, high, auto. For some models, no middle fan then the middle fan is seen as high speed.
6. Lock: When the "LOCK" button is pressed, the icon appears and other buttons is unable, press again, the icon disappears.
7. Temperature display zone: Generally it displays setting temperature; it can be adjusted by press temperature button▲and▼ .But in fan mode, no display here.

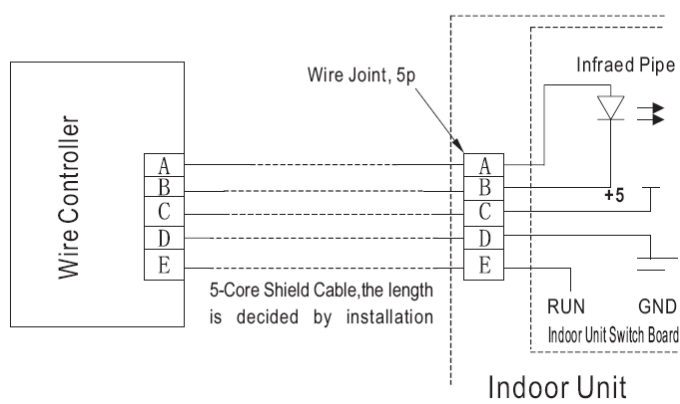
Remark:

The wired controller will reset to factory setting with auto mode, auto fan and 24°C setting temperature when the air conditioner restarts after power failure.

And this may cause inconsistent displays on the wired controller and on the air conditioner. You need to readjust the running status through the wired controller.

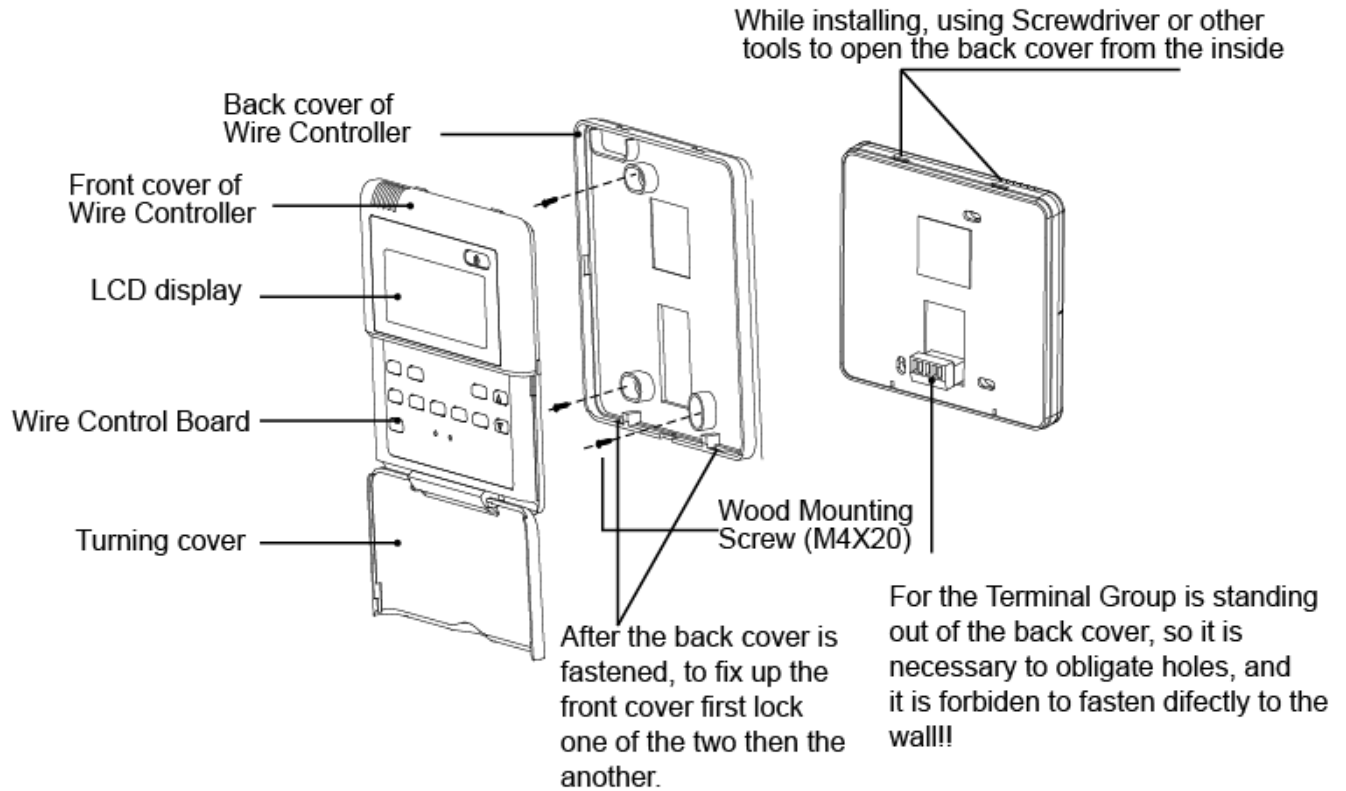
Installation

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 an 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.



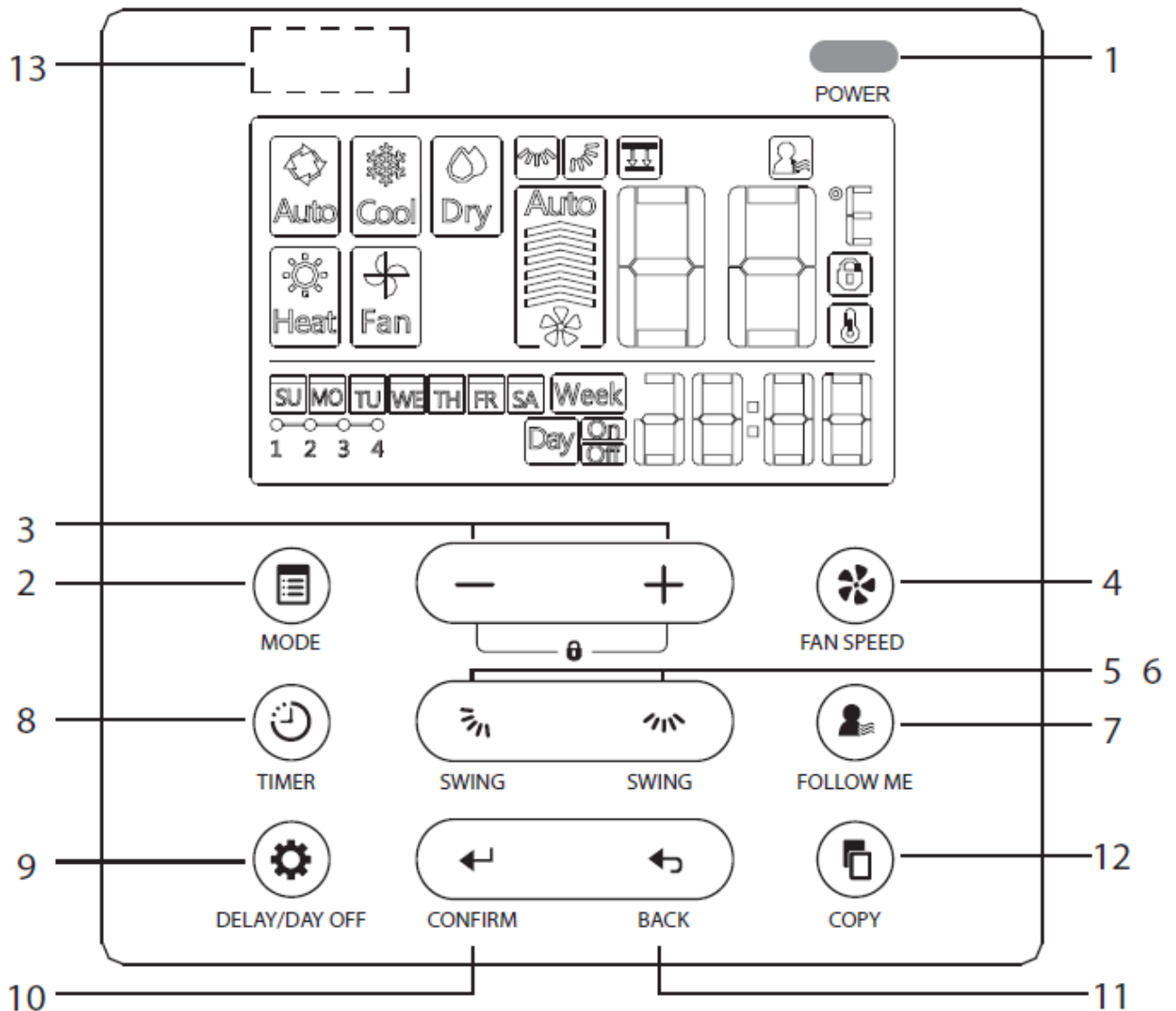
NOTE

- The connecting wire should be a little longer as to take away the switch board easily for maintenance.
- The connecting wire should be a little longer as to take away the controller easily for maintenance.

3.2.2 KJR-120C1/BTF-E



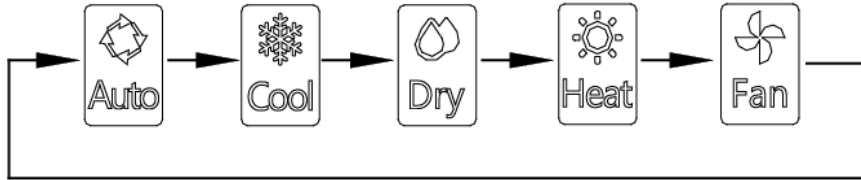
Name and functions of buttons on the wire controller



1. Power button: When in off state, short press this button, the operation lamp lights brightly. When in on state, short press this button, the operation lamp does not light. If timer on or timer off has been set, it will not cancel this setting.

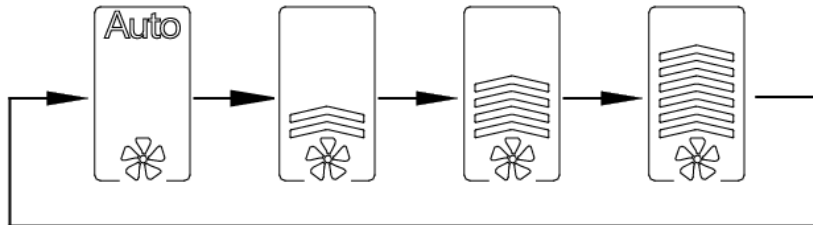
When in on state, long press this button 2s or more, the wire controller enters into off state. If timer on, timer off or weekly timer has been set, it will cancel this setting, related indicator is off.

2. Mode button: When pressed this button, the operation mode changes as the following sequence:



Remark: For the cooling only model, the heating mode is skipped.

3. Adjust button(+,-): Press the button “+” or “-” to set indoor temperature, Indoor Setting Temperature Range : 17~30°C(62~86°F/62~88°F(Depending on models..
4. Fan speed button: press this button consecutively; the fan speed will cycle as follows:



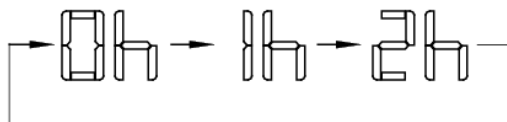
Remark: This button is unavailable when in the mode of Auto or Dry

- 5,6. Swing button: First press, start swing function; second press, stop swing. (Match to some model with swing function).
7. Follow me button: When under cool, heat and auto mode, press this button, follow me function is active. Press again, this function is ineffective.
8. Timer button: Long press this button for 2s, enter week and clock time setting. Short press this button, select timer mode as below:
Weekly timer → On timer → Off timer → On and off timer → No timer → Weekly timer → On timer →
9. Delay/Day off button: During the weekly timer, press the DAY OFF button to set the DAY OFF. The DAY OFF setting is cancelled automatically after the set day has passed.

During the weekly timer, pressing the DELAY button once, display “0h”, Press this button twice, display

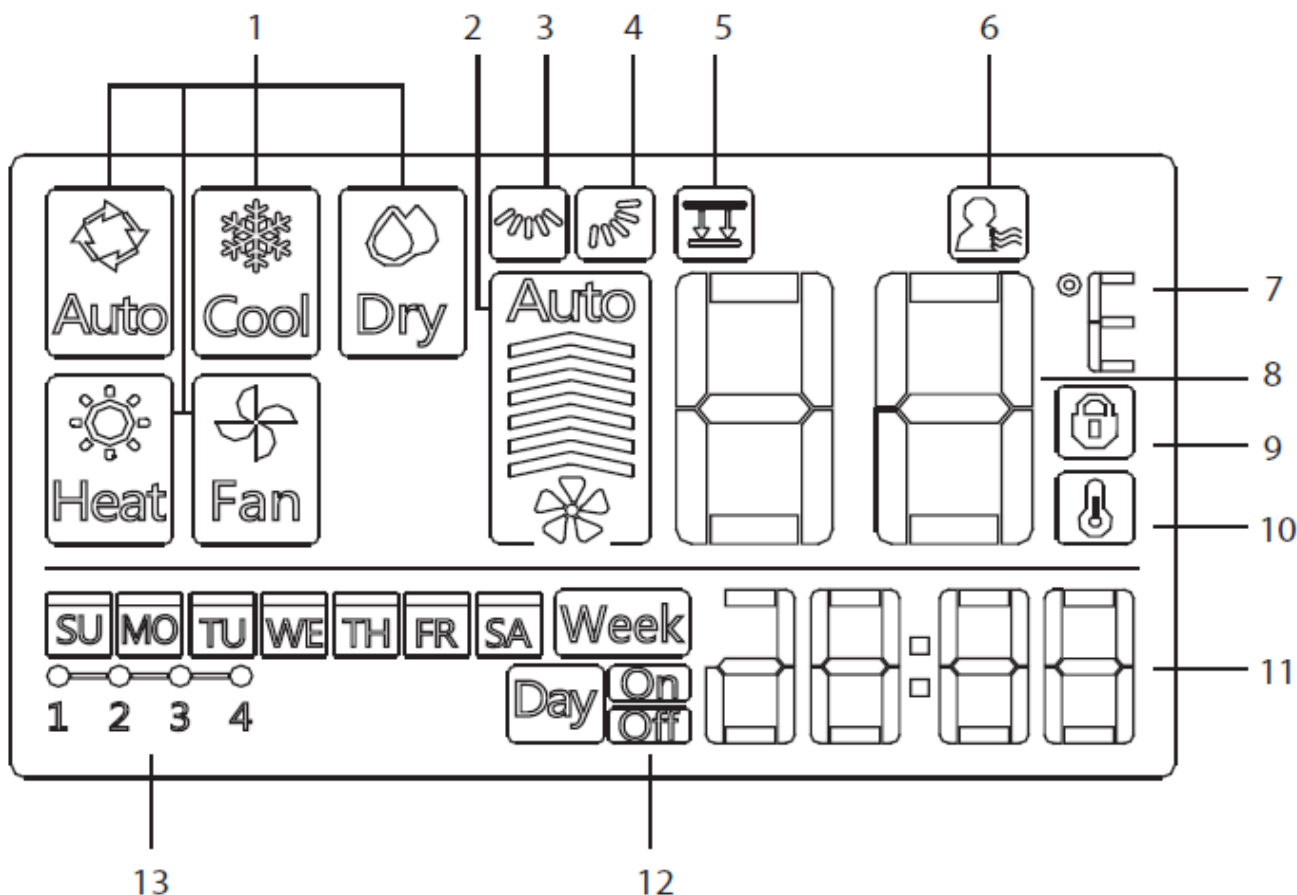
“1h”, and wait 3 seconds to confirm. It means the unit will override 1 hour; Press this button three times,

display “2h” and wait 3 seconds to confirm. It means the unit will override 2 hours.



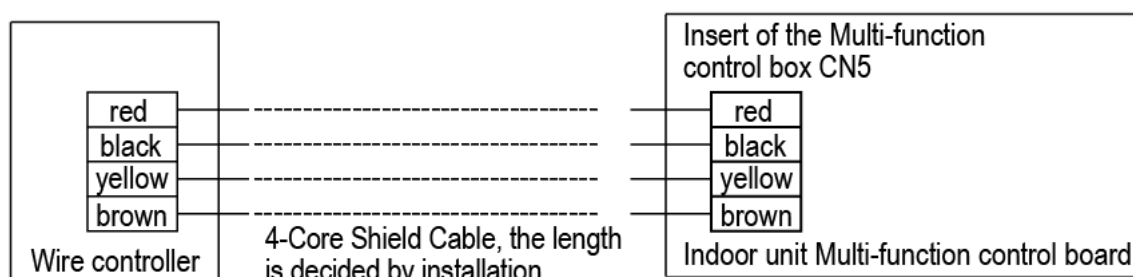
10. Confirm button: Press the CONFIRM button to confirm the settings..
11. Back button: During the weekly timer, press the BACK button to back to last setting until quit the weekly timer and save changed state automatically...
12. Copy button: During the weekly timer, press the COPY button, copy one day’s setting to the other day.

Name and function of LCD on the wire controller

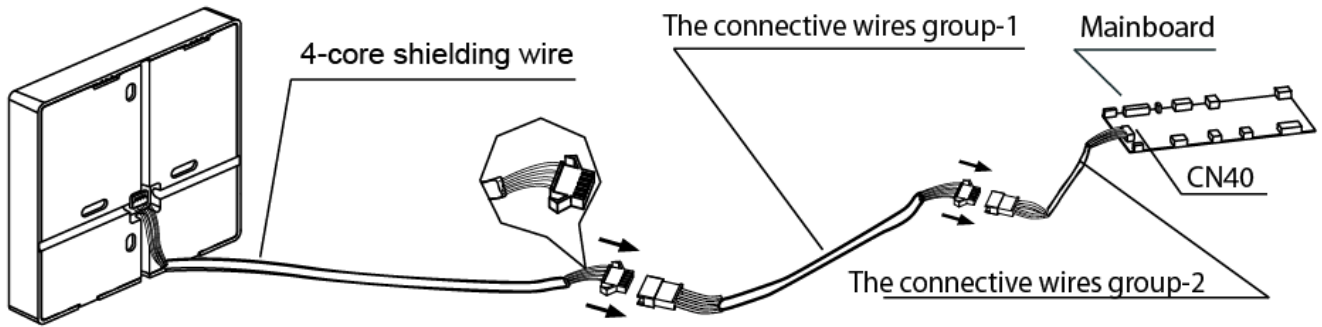


- | | |
|---------------------------------|--------------------------------|
| 1 Operation mode indication | 8 Temperature display |
| 2 Fan speed indication | 9 Lock indication |
| 3 Left-right swing indication | 10 Room temperature indication |
| 4 Up-down swing indication | 11 Clock display |
| 5 Faceplate function indication | 12 On/Off timer |
| 6 Follow me function indication | 13 Timer display |
| 7 C° / F° indication | |

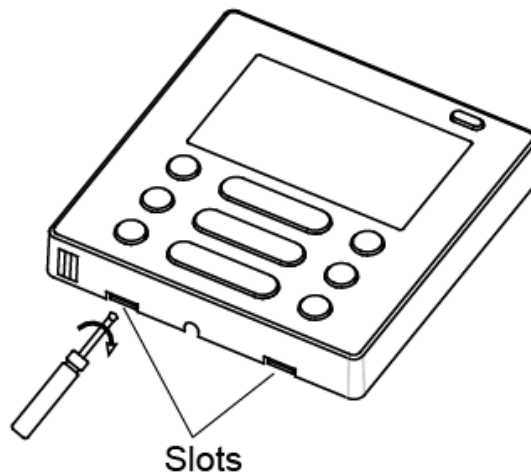
Installation



1. Connect the female joint of wires group from the mainboard with the male joint of connective wires group.
2. Please connect the other side of connective wires group with the male joint of wires group leads from wire controller

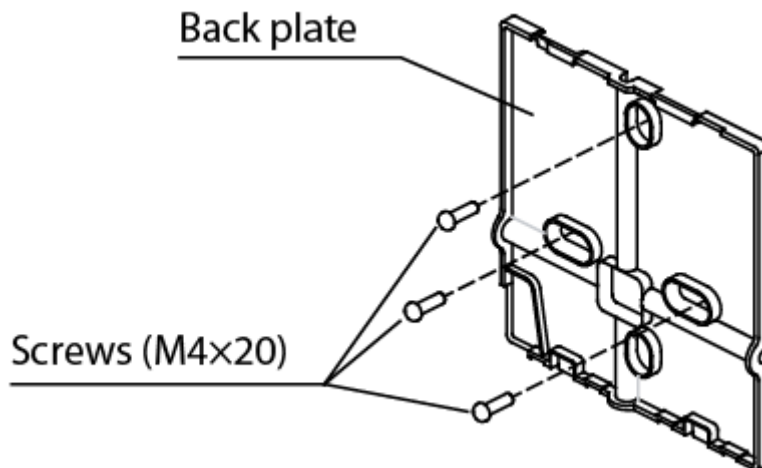


3. Insert a slot screwdriver into the slots in the lower part of the wire controller (2 places), and remove the upper part of the wire controller.

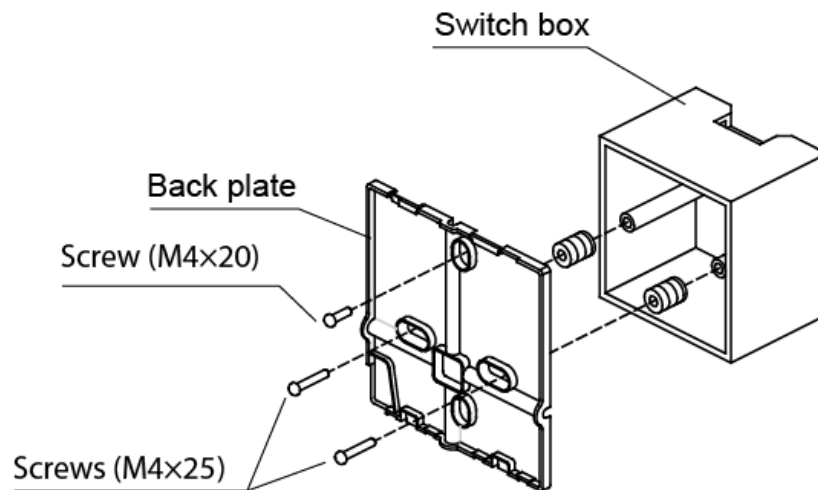


4. Fasten the back plate of the wire controller

- For exposed mounting, fasten the back plate on the wall with the 3 screws (M4×20) and plugs.

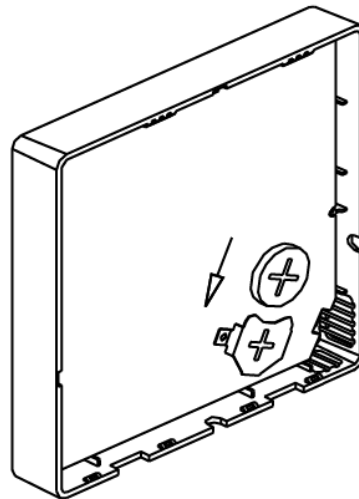


- For flush-mounting, fasten the back plate on the switch box with 2 screws (M4×25) and fasten it on the wall with 1 screw (M4×20).



5. Battery installation

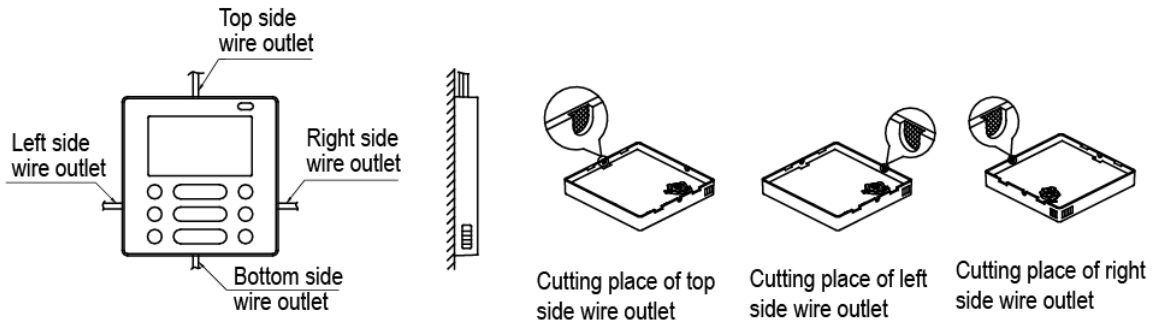
- Put the battery into the installationsite and make sure the positive side of the battery is in accordance with the positive side of installationsite.



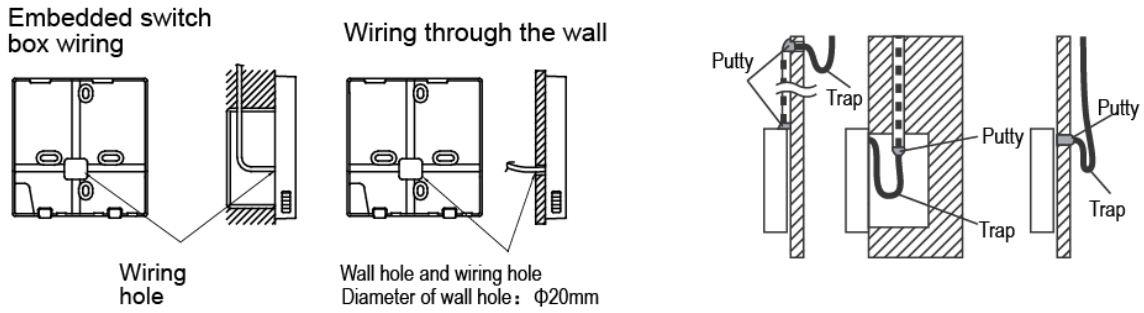
- Please set the time corrected on the first time operation. Batteries in the wire controller can timing under power failure which ensure the time keep right. When the power restores, if the time displayed is not correct, it means the battery is dead and replace the battery.

6. Wiring

- A. For exposed mounting, four outletting positions. There are three need cutting.



B. Shielded wiring



7. Reattach the upper part of the wire controller

After adjusting the upper case and then buckle the upper case; avoid clamping the wiring during installation

